United States Department of the Interior
National Park Service

Yellowstone National Park

North Entrance Road Reconstruction Project
(Mammoth Hot Springs, WY to Gardiner, MT)

Environmental Assessment

January 2026

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CHAPTER 1: PURPOSE OF AND NEED FOR ACTION

1.1 INTRODUCTION

The National Park Service (NPS), in cooperation with the Federal Highway Administration-Western Federal Lands Highway Division (FHWA-WFLHD), is preparing this Environmental Assessment (EA) to assess potential impacts for proposed construction of the North Entrance Road (project) in Yellowstone National Park (Park). The Department of the Interior (DOI) partially rescinded and updated regulations for implementing the National Environmental Policy Act (NEPA) on July 3, 2025. The NEPA process was initiated prior to the rescission and targeted updates by DOI and, therefore, this EA has been prepared in accordance with the revised 2024 Council on Environmental Quality (CEQ) regulations that were in effect at the time the project was initiated and follows the CEQ, *Memorandum for Heads of Federal Departments and Agencies,* released in February 2025 (CEQ 2025).[1]

1.2 PURPOSE OF AND NEED FOR ACTION

The purpose of the project is to restore reliable and safe long-term access to and from the Park's North Entrance while making it resilient to future floods and other natural hazards and protecting natural and cultural resources. The wastewater line that ran underneath the road must also be replaced to provide adequate and continued reliable wastewater service for the Mammoth Hot Springs area. The 2022 flood, described below in Section 1.4, Background, caused significant damage to the North Entrance Road, making it impassable, and destroyed about half of the 4.5-mile wastewater line between Mammoth Hot Springs, Wyoming, and Gardiner, Montana. The Old Gardiner Road (OGR), originally a historic dirt and gravel wagon trail and most recently before the 2022 flood a gravel road, was upgraded to provide temporary access to the Park's North Entrance in October 2022.

The proposed project is needed for the NPS to provide a long-term solution to Park visitor access for current public enjoyment and for the enjoyment of future generations (16 USC § 1). It is also needed to provide essential long-term access for Park staff, commercial users, concessioners, residents of nearby towns, and critical emergency vehicle access.

[1] Executive Order 14154, *Unleashing American Energy* (January 20, 2025) and Presidential Memorandum, *Ending Illegal Discrimination and Restoring Merit-Based Opportunity* (January 21, 2025) require the NPS to strictly adhere to NEPA (42 United States Code (USC) §§ 4321 et seq.). Further, such order and memorandum repeal Executive Order 12898 (February 11, 1994) and Executive Order 14096 (April 21, 2023). Because Executive Orders 12898 and 14096 have been repealed, complying with such orders is a legal impossibility. The NPS verifies that it has complied with the requirements of NEPA, including the Department's regulations and procedures implementing NEPA at 43 Code of Federal Regulations (CFR) Parts 46 and 516 of the Departmental Manual, consistent with the President's January 2025 Order and Memorandum.

The DOI published an interim final rule, NEPA Implementing Regulations, on July 3, 2025, "rescinding and making necessary targeted updates to its remaining regulations implementing" NEPA. 90 Federal Register 29498 (July 3, 2025). In this EA, the Park relied on preexisting procedures that predate July 2, 2025. The NEPA review was sufficiently advanced at the time DOI issued the rule; therefore, the NPS will rely on the preexisting procedures to release this EA, completing the NEPA review. Nonetheless, the EA is consistent with DOI's July 3, 2025 NEPA Implementing Regulations.

1.3 PROJECT AREA

The North Entrance Road project area (Figure 1) is in the northwest portion of the Park and consists of the area between Mammoth Hot Springs, where the Park headquarters are located (project start), and the North Entrance Station (North Entrance) near Gardiner (project end).

The North Entrance Road is the second most popular entrance, and one of two year-round entrances to the Park. The North Entrance and Northeast Entrance (Figure 2 in Chapter 2) are the only entrances open year-round and serve as the only winter vehicle access in and out of the Park (Highway 212 between Cooke City and the Pilot Creek parking lot is closed early November through mid-May). Additionally, the North Entrance Road provides the only year-round access to Cooke City/Silver Gate, Montana. The road is a popular scenic drive that includes the Roosevelt Arch at the northern boundary near Gardiner and generally follows the Gardner River to Mammoth Hot Springs. Currently, visitor, Park employee, and community traffic between the North Entrance and Mammoth Hot Springs has been rerouted from the North Entrance Road (which remains impassable due to flood damage) to the OGR, which is serving as the current temporary entrance road.

1.4 BACKGROUND

On June 12 and 13, 2022, a record-breaking flood event was experienced in several locations in the northern part of the Park (2022 flood), including along the Yellowstone River, Gardner River, and tributaries in Park County, Montana and Park County, Wyoming. Devastating damage occurred in the Park on multiple sections of the North Entrance Road between Gardiner and Mammoth Hot Springs, necessitating closure of the road and temporary closure of the North Entrance Station on June 13, 2022. During the summer and fall of 2022, the FHWA-WFLHD, in cooperation with the NPS, improved the existing gravel OGR using FHWA Emergency Relief for Federally Owned Roads funding. The OGR was re-opened to the public on October 30, 2022. This entrance road has an estimated 5- to 10-year design life because (1) it is partially located on slow-moving geologic slides and poor soils and (2) because it could not be designed and built to American Association of State Highway and Transportation Officials (AASHTO) standards due to the urgent need to complete construction prior to the winter of 2022. Currently, wastewater is being diverted to new and existing emergency treatment ponds and a recently installed treatment plant near Mammoth Hot Springs.

The NPS, in cooperation with the FHWA-WFLHD, is evaluating the best options for construction of a new permanent North Entrance Road in the Park. NEPA requires federal agencies to evaluate the environmental impacts of proposed actions.

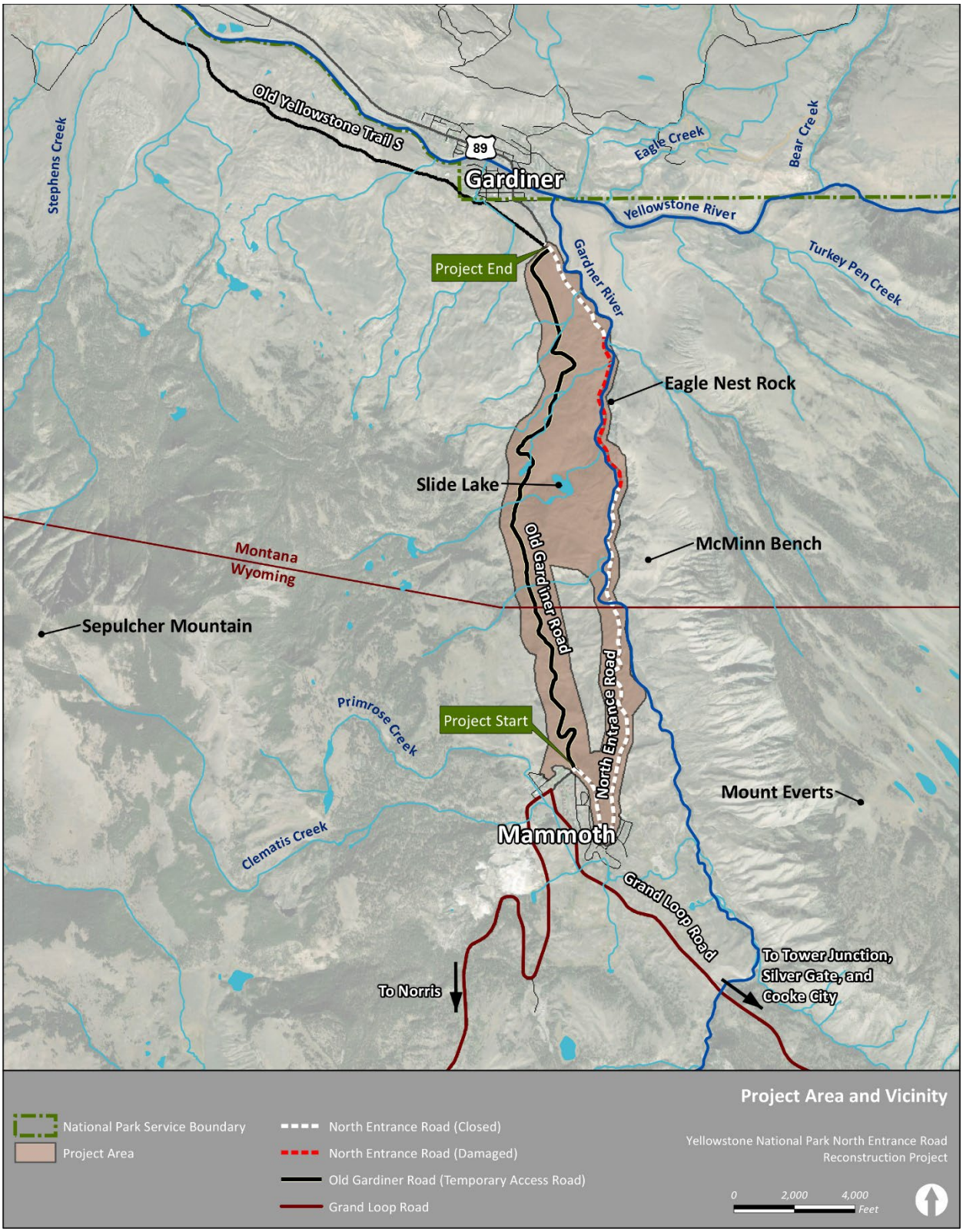


FIGURE 1. PROJECT AREA AND VICINITY

ISSUES AND RESOURCE TOPICS

An interdisciplinary team of Park and regional staff including natural and cultural resource experts, landscape architects, and engineers familiar with the project area identified resources considered in this EA during scoping and site visits, and analysis of site conditions, federal laws, regulations, executive orders, and NPS director's orders. The NPS developed a range of issues and impact topics to evaluate in this EA. Issues are problems that the current situation has caused or that will continue to occur if they are not addressed. Impact topics are resources to be analyzed as part of the proposed project.

The DOI *NEPA Handbook* (DOI 2025) provides specific guidance for determining whether to retain issues for detailed analysis. Issues should be retained for consideration and discussed in detail if:

- the environmental impacts associated with the issue are central to the proposal or are of critical importance;
- a detailed analysis of environmental impacts related to the issue is necessary to make a reasoned choice between alternatives;
- the environmental impacts associated with the issue are a big point of contention among the public or other agencies; or
- there are potentially significant impacts on resources associated with the issue.

Impact topics carried forward for detailed analysis are listed below:

- Visitor Use and Experience
- Wildlife and Wildlife Habitat
- Special Status Species
- Vegetation and Soils
- Water Resources
- Geologic Resources
- Cultural Resources

1.4.1 Resource Topics Dismissed from Detailed Analysis

Several issues were dismissed from detailed analysis and are described in Appendix A. Resource topics were dismissed from detailed analysis if they:

- do not exist in the project area;
- would not be affected by the alternatives or effects are not reasonably expected;
- would experience effects that, through applied mitigation measures, would be minimal; or
- contain little to no controversy on the subject or few reasons to otherwise include the topic.

CHAPTER 2: ALTERNATIVES

2.1 INTRODUCTION

In this EA, the NPS evaluates four alternatives for a permanent North Entrance Road between Gardiner, Montana and Mammoth Hot Springs, Wyoming in the Park: the No Action Alternative (Figure 2) and three action alternatives (Figure 3).

2.1.1 Alternatives Development

Scientific analyses and engineering were used to inform and develop preliminary alternatives. To identify the alternatives that would be analyzed in detail, the Park completed a value analysis study (e.g., a cost-benefit analysis) in 2022 (NPS 2022a). Five preliminary action alternatives were considered during the study and evaluated relative to the following criteria: (1) protect public health, safety, and welfare; (2) protect cultural and natural resources; (3) provide visitor services and educational and recreational opportunities; (4) improve operational efficiency and sustainability; and (5) provide cost-effective, environmentally responsible, and otherwise beneficial development (NPS 2022a). Based on the study, two potential action alternatives, the McMinn Bench alignment and the Rescue Creek alignment, were dismissed from detailed analysis (see rationale in Appendix B). Three action alternatives were carried forward for public review and comment prior to development of the EA (pre-NEPA civic engagement), which was held in early February/March 2024.

After pre-NEPA civic engagement, the three preliminary action alternatives were refined based on public comments, additional scientific analyses, cultural and natural resources surveys, and additional engineering work. This chapter presents the No Action Alternative (Figure 2) and the three revised action alternatives (Figure 3). Each of the three action alternatives share similar elements, which are described in Section 2.3, Elements Common to All Action Alternatives.

- Alternative 1: No Action (Figure 2)
  - Maintain OGR as is and conduct general and emergency maintenance, repairs, and potential re-engineering, as needed
  - Do not reclaim the old North Entrance Road canyon alignment, which was damaged during the 2022 flood
- Alternative 2: Center Alignment – NPS Preferred Alternative (Figure 4)
  - Create a new alignment, but use some segments of the old North Entrance Road canyon alignment
  - Redesign the OGR as a multi-use trail
  - Reclaim sections of the old North Entrance Road canyon alignment that were damaged during the 2022 flood
- Alternative 3: OGR Alignment (Figure 5)
  - Re-engineer the OGR to current NPS Park road standards with wider lanes and shoulders
  - Reclaim sections of the old North Entrance Road canyon alignment that were damaged during the 2022 flood

- Alternative 4: Gardner Canyon Alignment (Figure 6)
  - Rebuild the flood-damaged old North Entrance Road canyon alignment
  - Redesign the OGR as a multi-use trail

Currently, the NPS preferred alternative is Alternative 2: Center Alignment. The final selected alternative will be detailed in the decision document.

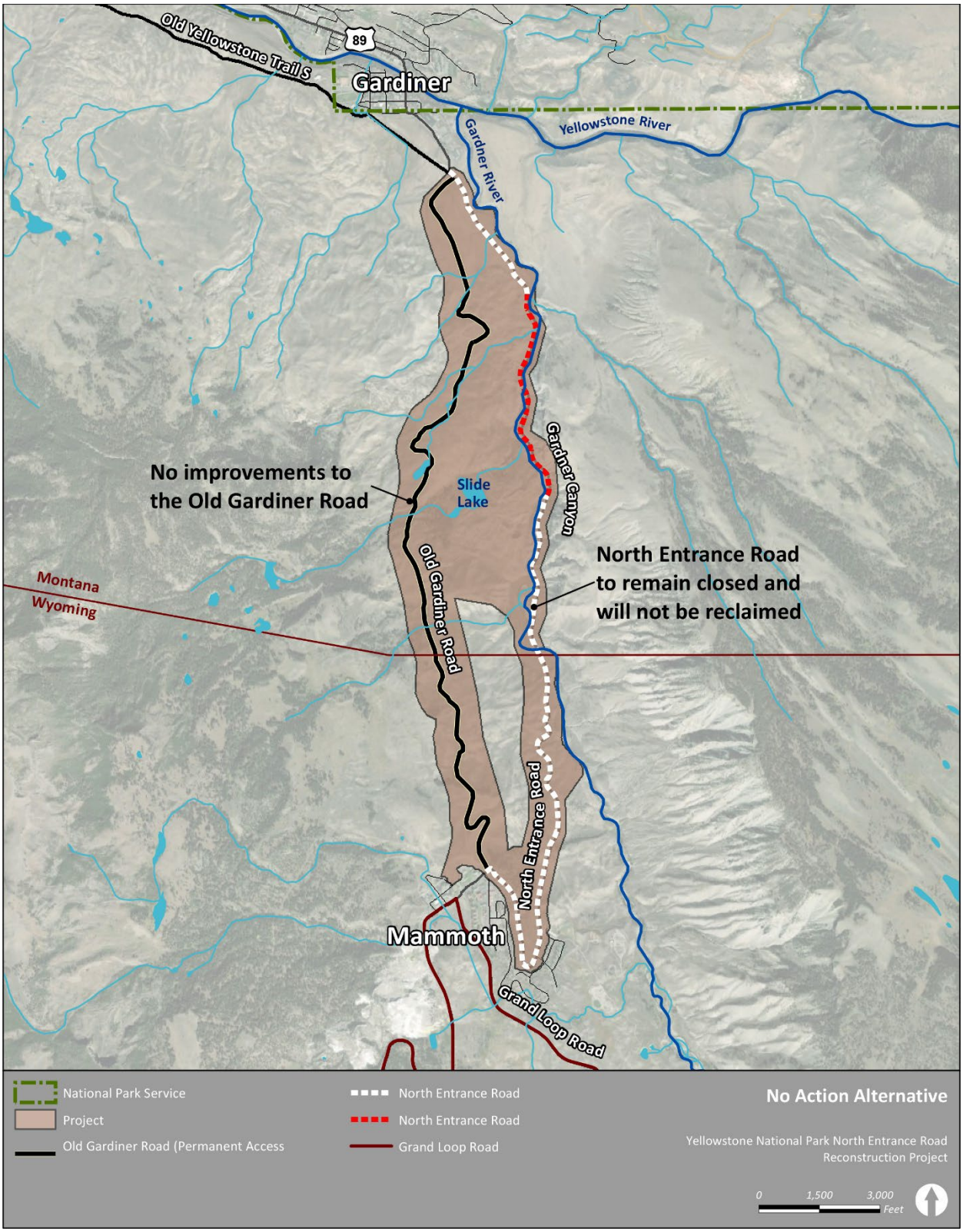


FIGURE 2. NO ACTION ALTERNATIVE

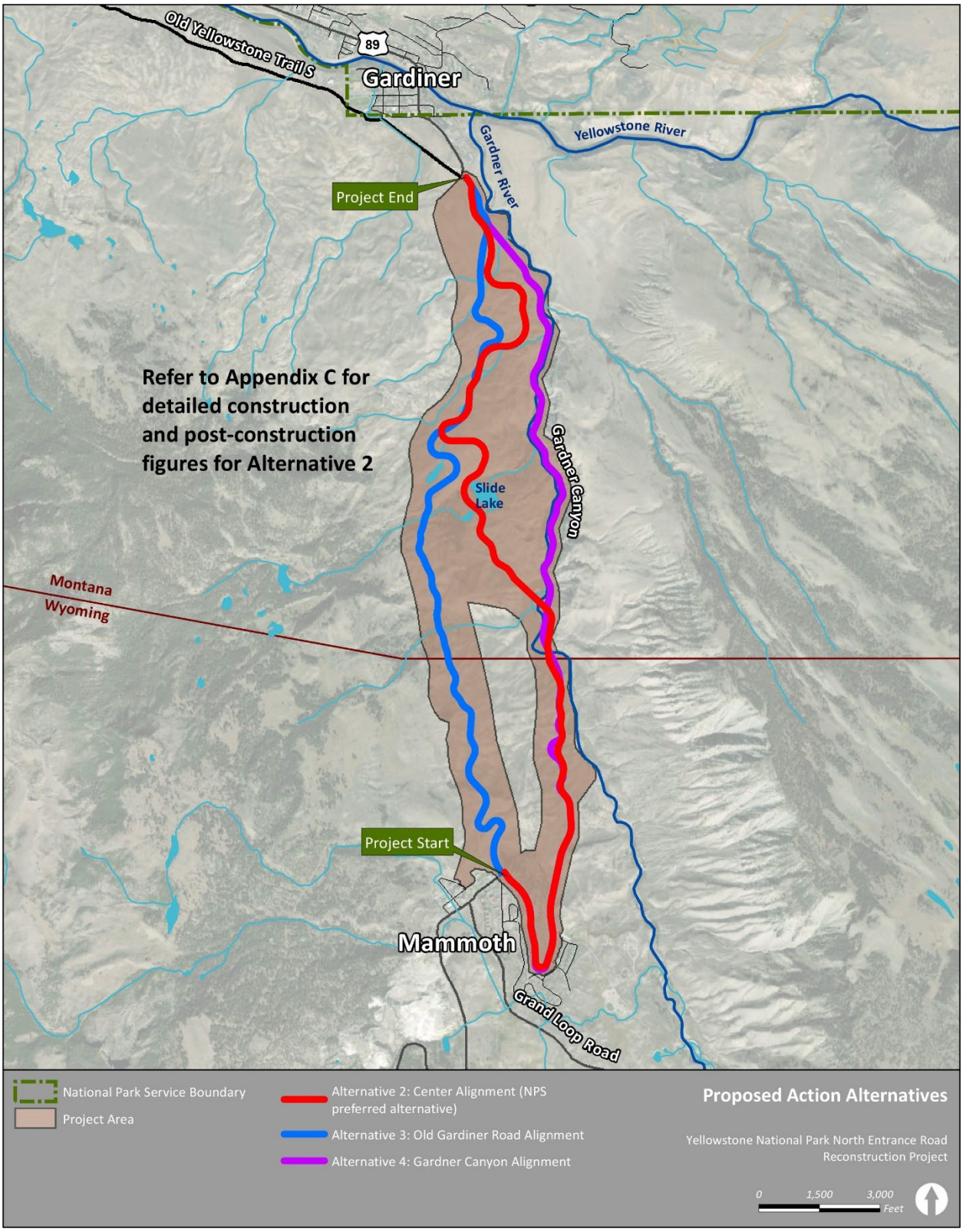


FIGURE 3. PROPOSED ACTION ALTERNATIVES

2.2 ALTERNATIVE 1: NO ACTION

Under Alternative 1: No Action, the NPS would not reconstruct the North Entrance Road impacted during the 2022 flood (Figure 2). As a result of the emergency access needs after the 2022 flood, the OGR was quickly rebuilt but with substandard road geometry (i.e., built above soft soils that are prone to movement and freeze-thaw conditions) with narrower lanes, as compared to current FHWA and NPS road guidelines. Under the No Action Alternative, the alignment would remain on the temporary entrance road, which is the OGR. No new environmental impacts would occur under the No Action Alternative.

2.2.1 Road Elements

Under the No Action Alternative, travel lanes would remain 11 feet wide, which does not comply with the FHWA standards for permanent roads. The existing width would continue to be inadequate for large vehicles, delivery trucks, and trailers, and shoulders would remain unpaved, resulting in a greater potential for accidents. Sharp curves would not be improved, and the speed would continue to be 25 mph for safety reasons. The existing drainage features, which include three low water crossings and a culvert, would remain unchanged. Although these features are structurally sound, they provide inadequate drainage, which results in occasional road flooding.

The road alignment under the No Action Alternative would also require frequent and heavy maintenance to remain safe and functional. Because the temporary access road was a temporary fix, major repairs beyond routine maintenance may be needed within 5 years of the construction date (fall 2022) due to road vulnerabilities.

Regular maintenance activities would include the following activities:

- Snow removal
- Debris removal
- Resurfacing
- Filling potholes
- Repainting lines

Emergency repairs also may be needed from time to time to address the following conditions:

- Poor soils would cause the road to develop dips and ruts under normal traffic, which would require areas to be excavated and repaired.
- Reinforcement beneath the road surface was not installed at areas where landslides will cause ground movement, which would result in cracks and bumps in the road that would need to be repaired.
- Shallow ditches and undersized culvert crossings were installed, which would cause increased maintenance to keep the ditches clear, and would require culvert cleaning after heavier storms.
- Steeper hillsides were constructed next to the road, which would make revegetation and stabilization slower, resulting in erosion issues along some hillsides.
- Road grades are steeper than other roads in the Park, resulting in slippery conditions when the road is covered in snow or ice. Guardrails, signs, and delineators would need to

be repaired when hit by vehicles. Sections of the road considered to be in geologically vulnerable areas would be monitored and re-engineered as issues arise.

2.2.2 Flood-Damaged Infrastructure and Facilities

Under the No Action Alternative, improvements to safety and accessibility would not be completed and additional parking areas would not be constructed. The flood-damaged North Entrance Road would remain in its existing condition, and no asphalt and road base materials would be removed. There would be no recontouring and revegetating of the area; and remaining flood-damaged structures, existing utilities, and sewer lines would not be removed. To ensure flood-damaged infrastructure and facilities remain in place but inaccessible to the public for health and safety reasons, the movable barriers currently blocking entry would be replaced with a metal gate to prevent any vehicles from accessing the flood-damaged area. The existing structures and pavement would remain in their current condition.

2.3 ELEMENTS COMMON TO ALL ACTION ALTERNATIVES

Each of the three action alternatives share similar elements, which are described below. These elements would be implemented regardless of which action alternative is selected; however, the specifics of the location may vary, as described below.

2.3.1 Construction Access, Staging, and Equipment

Under all action alternatives, construction access to the project area would use existing roads. Where roads have been damaged, temporary construction structures and access roads would need to be constructed. For example, under Alternative 4 (Gardner Canyon Alignment), a temporary earthen road and temporary bridge structure would need to be constructed adjacent to the Gardner River to build the new bridge foundations. The number and length of temporary structures and access roads would likely vary by alternative and would be determined at final design. Under all action alternatives, after the permanent road and infrastructure are built, the temporary roads and temporary structures would be removed. Disturbed ground would be returned to preexisting conditions to the greatest extent feasible.

Under all action alternatives, areas for construction staging, material stockpiling, and equipment storage would be needed. Preliminary staging, stockpiling, and storage areas have been identified for Alternative 2 (Center Alignment and NPS Preferred Alternative) but would need to be finalized prior to construction (see proposed locations in Appendix C). Some of these identified areas for Alternative 2 would be common to all action alternatives; however, depending on which alternative is selected for implementation, different locations may be needed.

Staging and stockpiling would use existing parking areas or would be subsequently used to construct new parking areas and other permanent features to avoid additional disturbance and potential resource impacts to the extent possible (see Appendix C for a comparison of construction and post-construction disturbance areas under Alternative 2). Delineated resources (e.g., wetlands and cultural resources) would be avoided. Areas within the project area limits where road realignment or new or changed parking areas are planned could be used for

staging and stockpiling. Staging areas would also be needed around bridges to temporarily place bridge materials, such as girders, before cranes place them on the bridge foundation. Staging areas for bridge construction would be approximately 4 to 5 acres for each bridge and would include areas near the Boiling River Bridge and the Gardens Bridge construction locations (Figure 9).

Under all action alternatives, general construction equipment and materials would be stored at existing and proposed road pullouts. Various types of construction equipment would be needed such as excavators, front-end loaders, cranes, pavers, and material delivery trucks. Resource Protection Measures (Appendix D) and Best Management Practices would be implemented during construction under each action alternative to minimize impacts on resources.

The Reese Creek Pit (approximately 17.2 acres), Swan Lake Pit (25.5 acres), and Frog Rock Pit (14.8 acres) could be used as concrete or asphalt batch plants, materials storage, and staging, or as material waste sites during some phases of the project (Figure 13). A batch plant would require the space to accommodate semi-trucks, deliveries of materials, and placement of temporary propane tanks for fuel to heat materials to produce asphalt. Propane tanks would be protected and contained within 110 percent containment capacity systems. No washing of concrete materials would occur at any of these sites in the project area.

2.3.2 Road Construction Methods

For all action alternatives, the road width would be designed with two 11-foot-wide travel lanes and two 4- to 6-foot-wide shoulders (depending on alternative). The pavement would consist of 4 inches of asphalt underlain by 8 inches of aggregate base and 12 inches of select borrow. Damaged road sections would be removed and reclaimed (as funding allows), and materials would be reused in the reconstruction to the greatest extent feasible. The post-construction speed limit would be 35 mph for most of the corridor but may be reduced in congested areas or curved sections. The maximum grade along the corridor would be 8 percent, with one 900-foot-long section of 9 percent grade for the OGR alignment (Alternative 3).

2.3.2.1 Parking Lots, Trails, and Turnouts

Existing and new parking areas and turnouts along the project corridor would be improved, relocated, or constructed under all action alternatives (see list and descriptions in Appendix E and maps in Appendix C). For example, the Rescue Creek Trailhead parking area for pedestrians and stock horse trailers would be improved to provide access to the trail. The existing parking areas near the Boiling River Bridge would be improved for safe access onto the new road alignment, while retaining parking and Architectural Barriers Act (ABA) opportunities to access the Gardner Canyon. A new 45th parallel parking area would be constructed to provide an exhibit for the point of interest.

After construction, staging areas would be partially or fully converted into permanent parking areas (see complete list and descriptions in Appendix E). Parking areas and pullouts would not be in areas of sensitive cultural and natural resources. Parking areas would be constructed in previously disturbed areas such as staging and stockpiling areas to the greatest extent feasible.

2.3.2.2 Water Quality

To avoid or reduce water quality impacts, roads would be designed to allow for water to flow off the road surface and to infiltrate into adjacent land. On bridges, water would be routed to the bridge end and infiltrated (i.e., no direct discharge to surface water would occur). In areas of wetlands, road runoff would be routed away from wetlands to infiltrate into upland soils.

2.3.2.3 Architectural Barriers Act (ABA) Accessibility

New ABA-accessible features would be constructed under all action alternatives. These include accessible parking, toilets, and trails as summarized below and detailed in Appendix E (see also maps in Appendix C).

The existing Boiling River (east side) parking area would be enhanced to provide ABA-accessible restroom facilities and ABA-compliant parking. An accessible trail would be constructed connecting the new Boiling River (east side) parking area to the west side of the road. This 8-foot paved trail would cross under the road through a pedestrian underpass to provide fishing and wading opportunities on the west side of the North Entrance Road along the Gardner River.

In addition, new accessible trails would be constructed in the Slide Lake Overlook area and at the Beaver Ponds Trailhead, offering views and new access to these popular areas.

2.3.3 Sewer Line Alignment

Under any of the action alternatives, a new buried sewer line would be installed in the project area (width of 30 to 34 feet, based on the alternative) using open-trenching, pipe-bursting, and cured-in-place pipe techniques. Installation would require excavation to an average depth of 5 to 10 feet with the possibility of deeper excavations in some locations (e.g., river crossings, if needed). Two routes for the sewer line are being considered (see Option 1 and Option 2 below) and could be implemented for any of the action alternatives. One or two lift stations (depending on the option) would be constructed (40-foot by 40-foot footprint) and connected to a new 3- to 5-mile underground power line coming from Gardiner, and would include a telecommunications line. Final designs and engineering for the sewer line and lift stations are still being developed and would be completed prior to issuance of the decision document.

2.3.3.1 Option 1: OGR Alignment

Under Option 1, the sewer line alignment would follow the OGR alignment (Figure 5) and would require at least one lift station (to be located near the existing station). This sewer line option would not change the width of the road alignment or increase the area of disturbance (34 feet with two 11-foot-wide travel lanes and two 6-foot-wide shoulders).

2.3.3.2 Option 2: Center Alignment

Under Option 2, the sewer line alignment would follow the Center Alignment (Figure 4) and would require at least two lift stations (or perhaps three). This sewer line option would not change the width of the road alignment or increase the area of disturbance (30 feet with two 11-foot-wide travel lanes and two 4-foot-wide shoulders).

2.4 ALTERNATIVE 2: CENTER ALIGNMENT (NPS PREFERRED ALTERNATIVE)

The Alternative 2 alignment (Figure 4 and Appendix D), the NPS preferred alternative, is a hybrid alignment that generally follows the same route as the old North Entrance Road (canyon road impacted by the 2022 flood) south from Mammoth Hot Springs, circling around the Mammoth Campground, and then heading north toward the Gardner River. A new road segment would be constructed upstream of the Boiling River Bridge and would include two new bridge crossings over the Gardner River. The first new crossing would be near the existing bridge at the Boiling River parking area with an approximately 260-foot-long single-span bridge, and the second new crossing would be over an area known as the Chinese Gardens (Gardens) with an approximately 825-foot-long three-span bridge (Figure 9). The Alternative 2 alignment would continue in a northwesterly direction and would circle around and above Slide Lake. The alignment would then switch east, crossing north of Slide Lake, before switching back west and heading toward the OGR. Under Alternative 2, the alignment would generally follow the existing OGR corridor but would be fully redesigned over a distance of approximately 0.4 mile. Next, Alternative 2 would veer east away from the OGR before turning north to follow Gardner Canyon. This alignment would then descend west and north to intercept the old North Entrance Road at the North Entrance Station. Along this last portion of the route, the alignment would stay above the old North Entrance Road and would jog west to avoid a river washout hazard.

Once construction of the Alternative 2 alignment is complete, the OGR would be narrowed to a multi-use pedestrian and bicyclist trail (multi-use trail). The multi-use trail would also serve as access for emergency vehicles when needed. During construction of the 0.4-mile overlap segment (described above), a new 22-foot-wide construction bypass road would be constructed adjacent to the existing road to carry the public traffic. After construction, the bypass trail would be narrowed and converted to the multi-use trail. The northern access/parking area for the multi-use trail would be in Gardiner and two connection points along the route. At the southern/Mammoth Hot Springs end of the multi-use trail, the existing OGR would remain 22 feet wide from Mammoth Hot Springs up the first hill to an overlook parking area that would serve as the south end of the multi-use trail as well as parking for the Beaver Ponds Trailhead (Figure 9).

As part of Alternative 2, portions of the old North Entrance Road canyon alignment would be removed, along with remaining flood-damaged infrastructure, including the old sewer line. The segment from the new Gardens Bridge to the large washout would be removed and replaced with a 6-foot-wide ABA trail into the canyon. Along this segment, interpretive wayside exhibits highlighting the 2022 flood may be installed. This alternative also includes construction of a new sewer line beneath the new alignment (as described in Section 2.3.3, Sewer Line Alignment above), reestablishing the connection between Mammoth Hot Springs and Gardiner that was destroyed during the 2022 flood. Due to changes in elevation along the Alternative 2 alignment, up to three pump stations may be required to pressurize portions of the new sewer line. These pump stations would require a new underground power line to be installed along the new alignment from Gardiner.

Identified locations for staging and stockpiling under Alternative 2 include various areas along the OGR, which is the temporary entrance road, as well as along existing pullouts along the North Entrance Road, including at the Rescue Creek parking area, the Boiling River parking area, and the Reese Creek Pit.

Alternative 2 was designed to avoid wetlands, waterways, and cultural resources to the greatest extent practical. Where such areas could not be avoided entirely, structures such as walls would be used to minimize impacts.

2.4.1 Road Elements

The Alternative 2 road would be constructed to the Park-wide standard 30-foot paved width. This paved width would consist of two 11-foot-wide travel lanes and two 4-foot-wide paved shoulders. Segments of the road that follow existing alignments not impacted by the 2022 flood would be reconstructed to the same 30-foot paved width.

Both the Boiling River Bridge and the Gardens Bridge would be constructed to a full paved width of 30 feet. Additionally, each bridge would include 6-foot-wide sidewalks on both sides, designed to meet accessibility standards.

The posted speed limit for Alternative 2 would be 35 mph, with certain areas posted for 25 mph. An advisory speed would be posted for 25 mph where tighter curves still exist.

The narrowed OGR multi-use trail would be reconstructed with a 12-foot paved width. A center stripe would delineate two 6-foot multi-use lanes.

The segment of OGR connecting Mammoth Hot Springs to the Beaver Ponds Trailhead would not be reconstructed and would remain at its current 22-foot paved width consisting of two 10-foot travel lanes and two 1-foot paved shoulders.

2.4.2 Construction Schedule

The anticipated duration for completing all work under Alternative 2 would be five construction seasons (generally extending from early April through mid-November each year, with additional winter work conducted as weather conditions permit). Under this schedule, the new road would be open to public traffic in the fourth year and would include the following anticipated steps:

- Construction of the realigned construction bypass segment (0.4mile) of the OGR would occur in the first construction season.
- Construction of the new road alignment, including demolition of the old Boiling River Bridge and construction of the new Boiling River Bridge and Gardens Bridge, would occur over the first four construction seasons.
- Restoration of Gardner Canyon would occur during the second through fourth construction seasons.
- The OGR from the Beaver Ponds Trailhead to the North Entrance Station would be narrowed to a multi-use trail during the fifth construction season.

2.4.3 Retaining Walls

Retaining walls would be used to minimize impacts on resources including wetlands, riparian zones, and archeological sites, as well as to reduce the need to remove hundreds of feet of hillside. Approximately four retaining walls are anticipated ranging from approximately 200 to 1,200 feet long. The heights would vary as the terrain varies. The walls would be faced with natural stone.

2.4.4 Drainage Structures

Three drainage structures are anticipated to be constructed under Alternative 2. Two structures would be located on the new Alternative 2 alignment and one structure would be located on the OGR multi-use trail. All three structures would be reinforced concrete box culverts. Wing walls would be constructed to protect the structures from stream erosion damage.

In addition to these box culverts, smaller drainages along both the new North Entrance Road and the OGR multi-use trail would be sized to not restrict natural flow rates and patterns . Wing walls and headwalls on culverts would be constructed with or faced with stone masonry.

2.4.5 Bridge Elements

The new Boiling River Bridge and Gardens Bridge would have steel girders spanning the piers and abutments. The bridge decks would be reinforced concrete. Pedestrian sidewalks would be constructed on both sides of the bridges.

The new Boiling River Bridge would feature cast-in-place concrete abutments constructed on-site. Both abutments would be set above the ordinary high water mark of the Gardner River. Wing walls would be constructed at each abutment, and both the abutments and wing walls would be faced with stone masonry.

The new Gardens Bridge would have cast-in-place concrete abutments at its west and east ends. The west abutment would have cast-in-place concrete wing walls, constructed on-site. This abutment and its wing walls would be faced with stone masonry. The east abutment would be wrapped with walls on the front and sides, which would be constructed on-site. The walls would have a stone masonry veneer.

The new Boiling River Bridge would have no piers, being a single-span bridge. A pedestrian underpass to be located before the bridge would provide access to the west side of the new North Entrance Road from the east side parking area.

The Gardens Bridge would have two piers, both constructed from reinforced concrete. Both piers would require foundations. One of the piers would be constructed in the channel of the Gardner River where there is no active flow under normal conditions. In-water work to construct this pier would be timed to have the least impact on fish and other aquatic organisms based on Clean Water Act permit conditions. Construction of this pier would require isolating it from the active river channel, which would be done using a cofferdam – a watertight steel and concrete temporary structure that is built around the pier location. Pumps would be used to dewater the area inside the cofferdam, allowing the pier to be constructed safely. The other pier would be located away from the active channel.

2.4.6 Parking Lots, Trails, and Turnouts

Existing and new parking areas along the project corridor would be improved or constructed under Alternative 2 (see the list in Appendix E; preliminary locations are identified in the Appendix C map book). Under Alternative 2, parking area improvements would be categorized into three primary types:

Improve Existing Parking Areas: Existing formal parking areas would be kept and improved with pavement or paved and expanded to accommodate additional vehicles. These parking areas include the Lava Creek Trailhead parking area just north of the Mammoth Campground and the Boiling River/Gardner River picnic area parking on the east and west sides of the Boiling River Bridge. The proposed bridge would eliminate vehicle access to the existing parking area on the west side of the new North Entrance Road. Parking would be expanded in the existing Boiling River parking area, picnic tables would be added, and a trail and underpass to the river level on the west side of the road would be provided.

Relocate Existing Parking Areas: Some formal existing parking areas would be relocated to fit the new road alignment. A new 45th parallel parking area where the 45th parallel crosses the new road north of the Gardens Bridge would be constructed. The Rescue Creek Trailhead and adjacent Wildlife Viewing parking area on the old North Entrance Road would be relocated outside the archeology sites and hydrologic hazards in this area. A short road would connect the parking area to the new Center Alignment.

Add New Parking Areas: To accommodate new visitor use opportunities, new parking areas would be constructed where no formal parking currently exists. These areas would be designed to accommodate both small and larger vehicles common to the Park. These areas include a Slide Lake overlook parking area and trail, a Beaver Ponds Trail/multi-use trailhead at the top of the first hill leaving Mammoth Hot Springs on the OGR, and two small parking areas for multi-use trail users connecting the multi-use trail and the Center Alignment.

The temporary North Entrance Road parking area would no longer accommodate public vehicular traffic; therefore, the pullouts for parking would no longer be in service. Additionally, the existing pullouts for public parking along the old North Entrance Road between the Rescue Creek Trailhead and Boiling River Bridge would no longer be in service for public parking. The loss of these parking locations would be offset by the parking capacity added by the proposed parking areas described above.

Turnouts: In addition to parking area improvements, Alternative 2 would include vehicle turnouts along the project corridor, as well as associated facility improvements. Turnouts would be located to facilitate slower traffic pulling over, wildlife viewing, scenic areas, vehicle problems and other driver needs. The terrain would determine turnout locations. Turnouts on both sides of the road would be included A pullout would be constructed south of the Boiling River Bridge.

Facility Improvements: Up to four vault toilets would be considered along the corridor, and possible locations include Boiling River, Slide Lake Overlook, Rescue Creek, and Beaver Ponds. Accessibility would be addressed at all parking areas.

One picnic area (the Gardner River Picnic Area) is located in the old North Entrance Road corridor on the west side of the road near the Boiling River Bridge. The existing picnic area would be removed, and a new picnic area would be located near the east side parking area near the Boiling River Bridge.

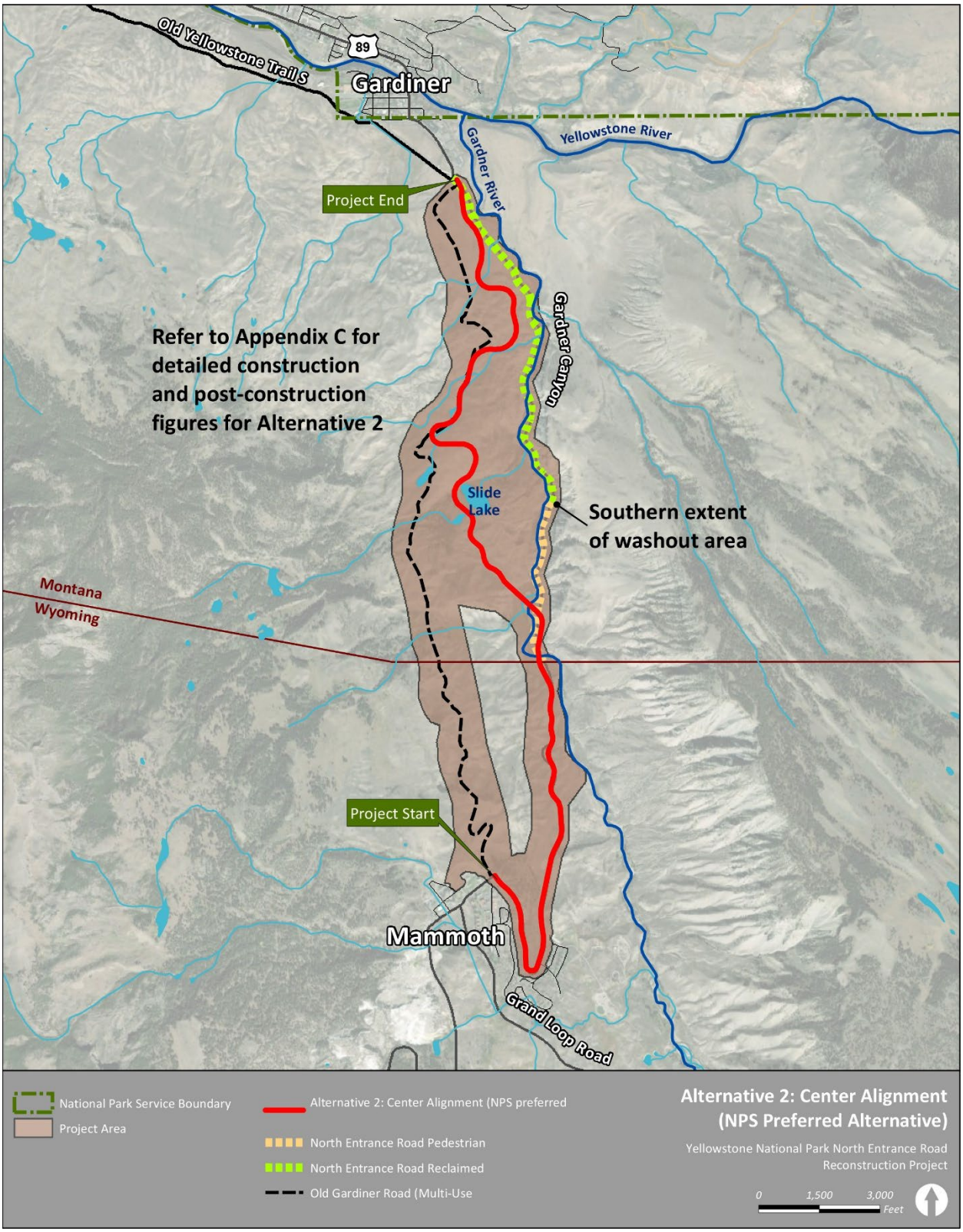


FIGURE 4. ALTERNATIVE 2: CENTER ALIGNMENT (NPS PREFERRED ALTERNATIVE)

2.5 ALTERNATIVE 3: OLD GARDINER ROAD (OGR) ALIGNMENT

The Alternative 3 alignment follows the existing OGR, which currently serves as the temporary entrance road, extending from Mammoth Hot Springs to Gardiner. Under this alternative, the road would be widened from its current width of approximately 22 feet to 34 feet (Figure 5). The road would be reconstructed to improve the geometry and drivability, featuring widened curves and flatter profile grades. These substantial modifications would result in minimal reuse of the existing temporary road. In some areas where the grade is being reduced, the new road may be 10 feet vertically higher than the existing road. On the approach to Gardiner, the Alternative 3 alignment would either follow the existing temporary alignment (approaching the Entrance Station from the west), or veer northeast to intercept the pre-flood North Entrance Road at the North Entrance Station (in a similar fashion to Alternative 2).

Under Alternative 3, the portion of the pre-flood North Entrance Road located in Gardner Canyon would be removed along with all other flood-damaged infrastructure located in the canyon, such as the old sewer line. The southern portion of the pre-flood North Entrance Road from Mammoth Hot Springs to the Boiling River Bridge would remain open to public traffic for access to the Mammoth Campground and the Lava Creek Trailhead. The existing Boiling River Bridge would be left in place for pedestrian access across the Gardner River. The road segment north from the Boiling River Bridge to the large washout would be removed and replaced by a 6-foot accessible trail to the washout viewing area. This alternative also includes construction of a new sewer line beneath the new alignment (as described in Section 2.3.3, Sewer Line Alignment above), reestablishing the connection between Mammoth Hot Springs and Gardiner that was destroyed during the 2022 flood. Up to three pump stations would be required to make the connection from the lower Mammoth Hot Springs temporary wastewater treatment facility to the new sewer line following Alternative 3. These pump stations would require power. A new underground power line would be installed along the new road alignment from Gardiner to the pump stations.

Alternative 3 was designed to avoid wetlands, waterways, and cultural resources to the greatest extent practical. Where such areas could not be avoided entirely, structures such as walls would be used to minimize impacts.

2.5.1 Road Elements

The Alternative 3 road would be constructed to a 34-foot width, including two 11-foot-wide travel lanes and two 6-foot-wide shoulders to accommodate bicycle traffic. The Slide Creek drainage would be replaced with an open-bottomed concrete box culvert. Existing retaining and drainage structures would be replaced or enlarged to fit the wider road.

The posted speed limit for Alternative 3 would be 35 mph, with certain areas posted for 25 mph. An advisory speed would be posted for 25 mph where tighter curves would still exist.

2.5.2 Construction Schedule

The anticipated construction time for all the work under Alternative 3 would be six construction seasons (beginning of April to mid-November each year).

A work zone delay analysis for construction on Alternative 3 was completed with the assumption of two-way, one-lane traffic setups on the road. The analysis also considered the combined effect of queuing from the work zone extending backwards into Mammoth Hot Springs or into Gardiner (depending on the work zone location). Analysis was completed for three scenarios of maximum allowed delay times: 10 minutes, 20 minutes, or 30 minutes.

Delay times would be heavily influenced by traffic volumes, traffic types, average travel speed, and grade. Steep grades are present throughout large stretches of the corridor. Larger vehicles such as RVs or trucks would have a difficult time gaining speed from a complete stop on steep grades, resulting in a lower average travel speed for all users through the work zone. To comply with the reasonable delay times, work zones would be short in length, which would limit the amount of work that could be accomplished in a construction season, extending the total duration of construction.

To reduce traffic queuing issues, minimal construction work would occur during daytime when traffic volumes are highest. Most of the construction work would occur during nighttime road closures.

Restoration of Gardner Canyon would occur during construction of Alternative 3.

2.5.3 Retaining Walls

Retaining walls would be used to minimize impacts on resources including wetlands, riparian zones, and archeological sites, and to reduce the need to remove hundreds of feet of hillside. Numerous retaining walls are anticipated, amounting to approximately 6,800 linear feet of walls. The heights would vary as the terrain varies. The walls would be faced with natural materials such as rocks or stone masonry.

2.5.4 Drainage Structures

Existing retaining and drainage structures would be replaced or enlarged to fit the wider road.

2.5.5 Bridge Elements

Under Alternative 3, there would be no bridge elements.

2.5.6 Parking Lots, Trails, and Turnouts

Existing or new parking areas along the project corridor would be improved or constructed under Alternative 3 (see the list in Appendix E). The parking areas fall into three main categories of improvements under Alternative 3:

> **Improve Existing Parking Areas:** Existing formal parking areas would be kept and improved with pavement or paved and expanded to accommodate additional vehicles. These parking areas include the Lava Creek Trailhead parking area just north of the Mammoth Campground and the Boiling River/Gardner River picnic area parking on the east and west sides of the Boiling River Bridge. Parking would be expanded in the existing Boiling River parking area, and picnic tables would be added.

Relocate Existing Parking Areas: Some formal existing parking areas would be relocated to fit the new road alignment. A new 45th parallel parking area where the 45th parallel crosses the new road would be constructed. The Rescue Creek Trailhead and adjacent Wildlife Viewing parking area on the old North Entrance Road would be relocated outside of archeology sites and hydrologic hazards in this area. A short road would connect the parking area to the new OGR alignment.

Add New Parking Areas: To accommodate new visitor use opportunities, improved parking areas would be constructed in new areas to serve current uses of the existing parking lots. These areas would be designed to accommodate both small and larger vehicles common to the Park. These areas include a Slide Lake overlook parking area and a Beaver Ponds Trailhead at the top of the first hill north of Mammoth Hot Springs on the OGR.

In addition to parking area improvements, vehicle turnouts along the project corridor and facility improvements would be implemented under Alternative 3.

Turnouts: Turnouts would be located to facilitate slower traffic pulling over, wildlife viewing, scenic areas, vehicle problems, and other driver needs. The terrain will determine the turnout locations. Turnouts on both sides of the road would be included.

Facility Improvements: Up to four vault toilets would be considered along the corridor, and possible locations include Boiling River, Slide Lake Overlook, Rescue Creek, and Beaver Ponds. Accessibility would be addressed at all parking areas.

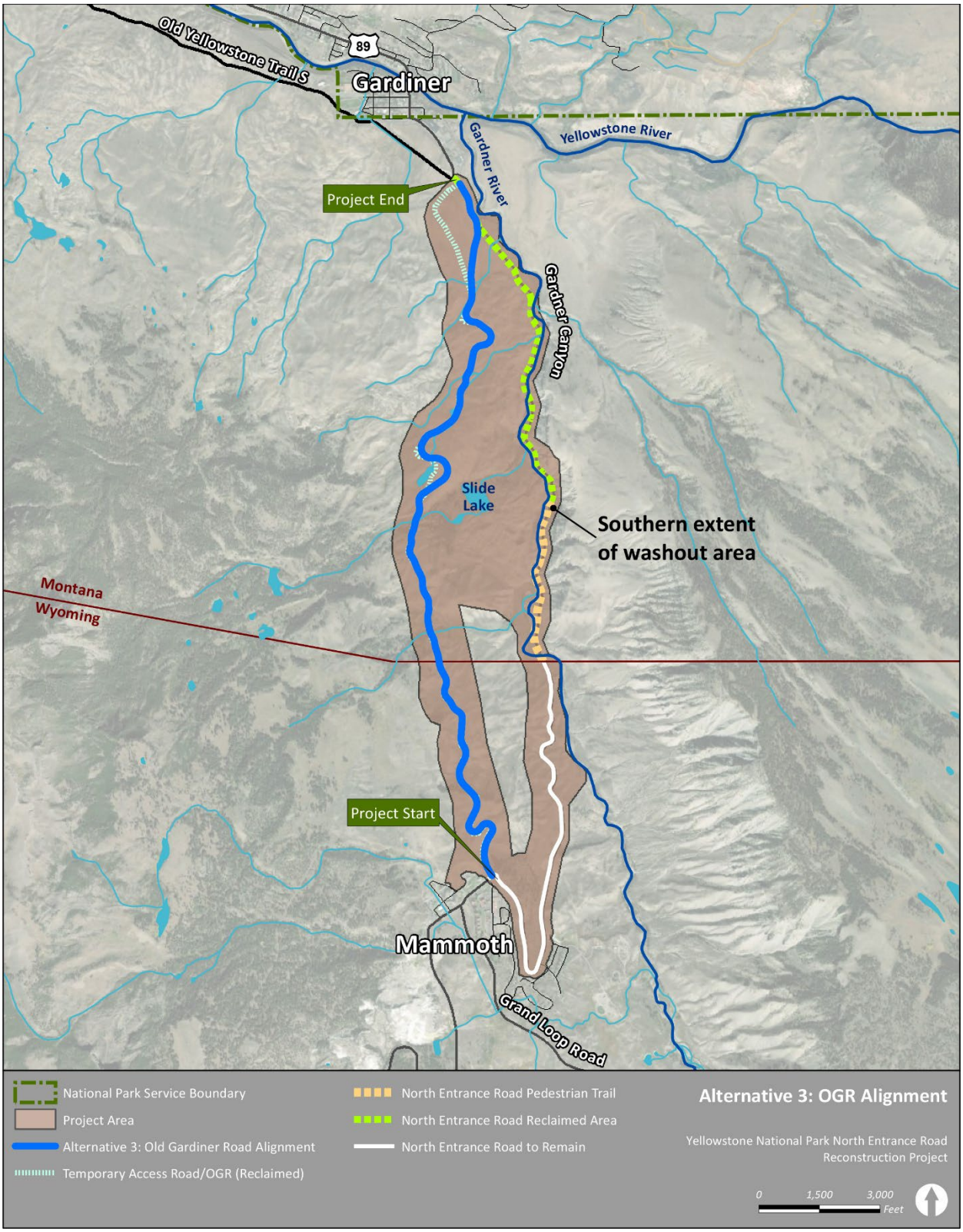


FIGURE 5. ALTERNATIVE 3: OGR ALIGNMENT

2.6 ALTERNATIVE 4: GARDNER CANYON ALIGNMENT

Alternative 4 follows the pre-flood North Entrance Road alignment and includes new structures through the Gardner Canyon, including three new bridges (Figure 6). Structures would be needed to provide a route that is resilient to future flood events and rockfall. The first river crossing north of Mammoth Hot Springs would be at the site of the existing Boiling River Bridge, which would be replaced with a longer and higher profile structure (approximately 260-foot length, single-span). At the site of the first major road embankment washout from the 2022 flood, a two-span bridge structure (approximately 590-foot length) would be constructed parallel to the river channel, while avoiding the eroding east side slope, debris flow chutes, and landslide toe on the west side. Under Alternative 4, the road alignment would transition into a rock shed structure (approximately 1,070-foot length; (Figure 7) to protect the road from the rockfall hazard along the east bank of the Gardner River before continuing approximately 600 feet and making the final bridge crossing (approximately 600-foot length, four-span) toward Gardiner. The existing retaining bin wall structure (located past the final river crossing) would be retained and reinforced and would be covered with a new facing. The road would be realigned for approximately 1,000 feet to the west of the previous alignment on the approach into the North Entrance Station to avoid the river erosion area on the east side.

Similar to Alternative 2, upon completion of the Alternative 4 alignment construction, the OGR would be narrowed and converted into a multi-use trail for pedestrians and bicyclists (multi-use trail). The multi-use trail would also provide emergency vehicle access as needed. The northern access/parking area for the multi-use trail would be in Gardiner and at the Rescue Creek Trailhead parking area. At the southern/Mammoth Hot Springs end of the multi-use trail, the existing OGR would remain from Mammoth Hot Springs up the first hill to an overlook parking area that would serve as the north end of the multi-use trail as well as trailhead parking for the Beaver Ponds Trail.

Under Alternative 4, the sewer line would be replaced from the original location beneath the road through the Gardner Canyon (as described in Section 2.3.3, Sewer Line Alignment above). A single pump station at the existing temporary wastewater collection site would be used to pump wastewater into the gravity line beneath the road, directing it to the treatment facilities in Gardiner. This system would not require a new power utility connection to function.

Alternative 4 was designed to avoid wetlands, waterways, and cultural resources to the greatest extent practical. Where such areas could not be avoided entirely, structures such as walls would be used to minimize impacts. A rock shed structure (1,070-foot length; Figure 7) would be constructed to protect the road from the rockfall hazard along the east bank of the Gardner River before making the final bridge crossing (600-foot length, four-span) toward Gardiner. The existing bin wall structure (Figure 8) past the final river crossing would be retained and reinforced, and a fascia (structural covering element) would be added.

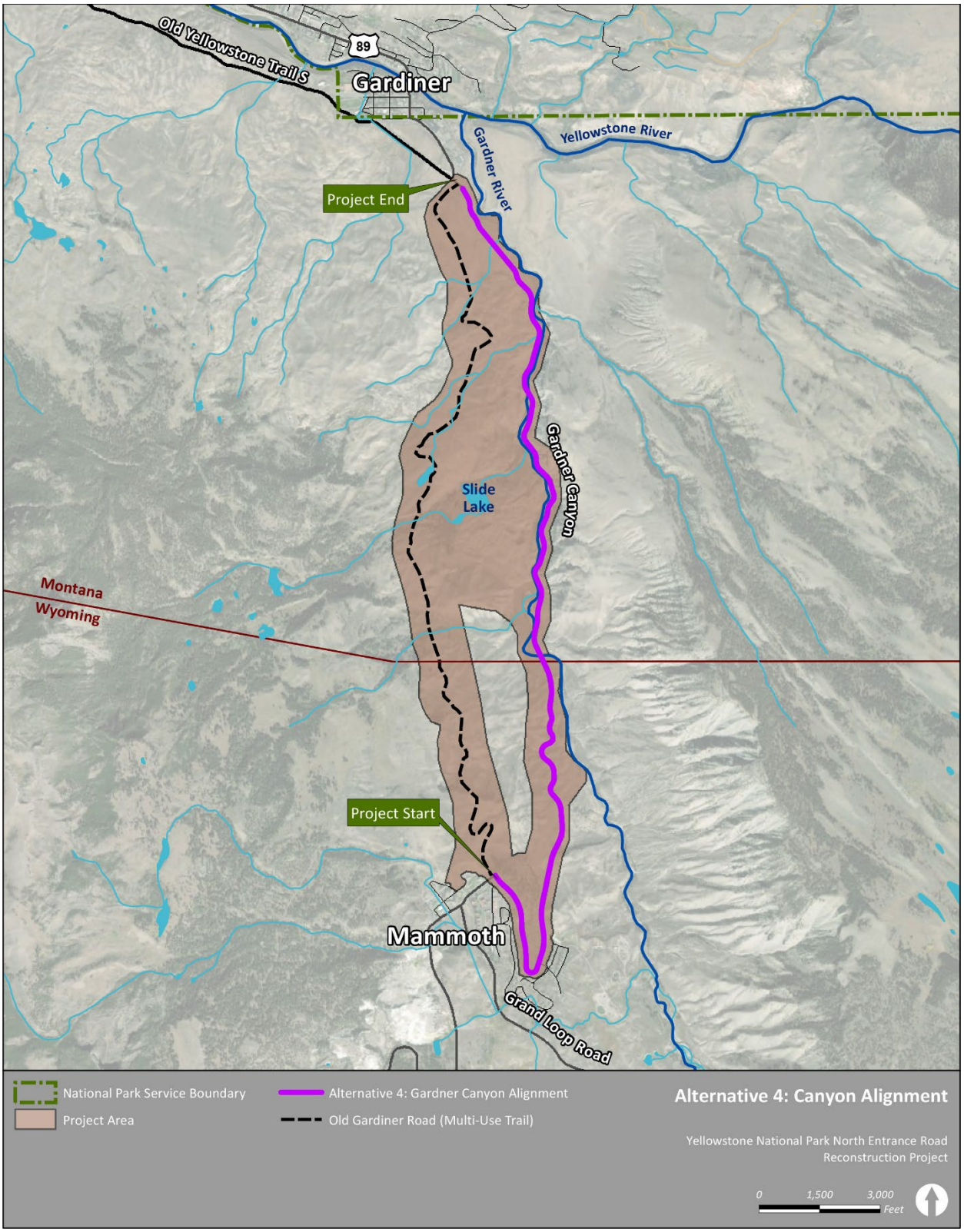


FIGURE 6. ALTERNATIVE 4: GARDNER CANYON ALIGNMENT



FIGURE 7. EXAMPLE ROCK SHED STRUCTURE ALONG TRANS-CANADA HIGHWAY NEAR GLACIER NATIONAL PARK



FIGURE 8. EXISTING BIN WALL (TO BE ENHANCED)

2.6.1 Road Elements

Alternative 4 would be constructed to the Park-wide standard paved width of 30 feet. This paved width would consist of two 11-foot-wide travel lanes and two 4-foot-wide paved shoulders. Segments of the road that follow existing alignments would be reconstructed to the same 30-foot paved width with improvements to the road geometry.

The three new bridges, the Boiling River Bridge and the two canyon bridges, would each be constructed with a full 30-foot width. Additionally, all bridges would include 6-foot-wide sidewalks on both sides that meet accessibility standards. The road section beneath the rock shed would also be constructed to accommodate the full 30-foot width.

The bridge piers would span the active stream channel. The piers would be protected from major flows by large rocks that are set in place with concrete (shotcrete) for stabilization. The shotcrete would be top-dressed with native materials to maintain a natural aesthetic in the corridor. In-water work needed to protect the piers from potential future flood events would be isolated from the active river flow by temporary protective measures such as sandbag dams. Some work would occur in the Gardner River. Reconstructed riverbanks would use riprap, woody debris, and other treatments to protect the embankments. Resource Protection Measures (Appendix D) would be implemented to minimize adverse impacts on fish and other aquatic organisms.

The posted speed limit for Alternative 4 would be 35 mph, with certain areas posted for 25 mph. An advisory speed would be posted for 25 mph where tighter curves still exist.

The narrowed OGR multi-use trail would be reconstructed with a 12-foot paved width. A center stripe would delineate two 6-foot multi-use lanes.

The segment of OGR connecting Mammoth Hot Springs to the Beaver Ponds Trailhead would not be reconstructed and would remain at its current 22-foot paved width consisting of two 10-foot travel lanes and two 1-foot paved shoulders.

2.6.2 Construction Schedule

The anticipated construction time for all the work under Alternative 4 would be nine construction seasons (beginning of April to mid-November each year with winter work as weather allows). Under Alternative 4, the long construction duration would be due to the complexity of the structures and anticipated difficulty to establish access to the structure locations in the washed-out canyon. Seasonal high water and persistent rockfall through the canyon would also add to the difficulty and complexity of constructing Alternative 4. The new road should be open to public traffic in the eighth year.

The OGR from the Beaver Ponds Trailhead to the North Entrance Station would be narrowed to a multi-use trail during the ninth construction season.

2.6.3 Retaining Walls

Retaining walls would be used to minimize impacts on resources, including wetlands, riparian zones, and archeological sites, as well as reduce the need to remove hundreds of feet of hillside. Numerous retaining walls are anticipated, amounting to approximately 3,250 linear feet of walls.

The heights would vary as the terrain varies. The walls would be faced with natural materials such as rocks or stone masonry.

The rock shed would be constructed to reduce rockfall hazards to vehicles and pedestrians within the canyon (see Figure 7) and would be constructed above a retaining wall located on the west, river side of the road, using reinforced concrete. The reinforced concrete columns would allow for limited viewshed to the west toward the river channel, and the rock shed would be constructed or faced with stone masonry.

Slope scaling would take place at the location of the proposed rock shed to remove loose materials from the slopes during construction. The slope scaling would include mechanical and hand equipment, and loose material would be removed from the existing road level to the top of the hillside slope. Temporary barriers would be placed along the road to catch removed materials and prevent them from entering the river channel.

2.6.4 Drainage Structures

Under Alternative 4, minor drainage crossings along the alignment from Mammoth Hot Springs to the southern washout in the Gardner Canyon would be replaced or upsized based on hydraulic analysis. Damaged drainage structures in the washed-out segment of the pre-flood North Entrance Road through the Gardner Canyon would be replaced or upsized near their previous locations along the Alternative 4 alignment. Minor drainage structures along the pre-flood North Entrance Road between the Gardner Canyon and the North Entrance Station would be replaced or upsized along the Alternative 4 alignment.

One drainage structure would be replaced and upsized on the OGR multi-use trail. The existing undersized culvert would be replaced with a reinforced concrete box culvert.

Smaller drainages along both the Alternative 4 alignment and the OGR multi-use trail would be sized to allow existing drainages to continue flowing at their existing rates. Wing walls and headwalls on culverts would be constructed or faced with stone masonry.

2.6.5 Bridge Elements

The three new bridges, Boiling River Bridge, South Gardner Canyon Bridge, and North Gardner Canyon Bridge would have steel girders spanning the piers and abutments. The bridge decks would be reinforced concrete.

The new Boiling River Bridge would have both of its abutments constructed from cast-in-place concrete on-site. Both abutments would be set above the ordinary high water of the Gardner River. Wing walls would be constructed for both abutments. Both abutments and wing walls would be faced with stone masonry. The Boiling River Bridge would have no piers, being a single-span bridge.

The South Gardner Canyon Bridge would have cast-in-place concrete abutments at its west and east ends. The abutments would have cast-in-place concrete wing walls, constructed on-site with stone masonry facing. The bridge would have one pier constructed from reinforced concrete. The piers would require a foundation and would be constructed in the active channel of the Gardner River. In-water work to construct this pier would be timed to have the least impact on fish and other aquatic organisms. Construction of the pier would require isolation

from the active river channel, which would be done using a cofferdam – a watertight steel and concrete temporary structure that is built surrounding the pier location to minimize environmental impacts.

The North Gardner Canyon Bridge would have cast-in-place concrete abutments at its west and east ends. The abutments would have cast-in-place concrete wing walls, constructed on-site with stone masonry facing. The bridge would have three piers constructed from reinforced concrete. The piers would require a foundation and would be constructed in the active channel of the Gardner River. In-water work to construct this pier would be timed to have the least impact on fish and other aquatic organisms. Construction of three piers would require isolation from the active river channel, which would be done using a cofferdam.

2.6.6 Parking Lots, Trails, and Turnouts

Existing and new parking areas along the project corridor would be improved or constructed under Alternative 4 (see list of parking areas in Appendix E). The parking areas fall into three main categories of improvements under Alternative 4:

Improve Existing Parking Areas: Existing formal parking areas would be kept and improved with pavement or paved and expanded to accommodate additional vehicles. These parking areas include the Lava Creek Trailhead parking area just north of the Mammoth Campground and the Boiling River/Gardner River picnic area parking on the east and west sides of the Boiling River Bridge. The proposed bridge would eliminate vehicle access to the existing parking area on the west side of the road. Parking would be expanded in the existing Boiling River parking area, picnic tables would be added, and a trail and underpass to the river level on the west side of the road would be provided.

Relocate Existing Parking Areas: Some formal existing parking areas would be relocated to fit the new road alignment. The Rescue Creek Trailhead and adjacent Wildlife Viewing parking area on the old North Entrance Road would be relocated adjacent to the Wildlife Viewing parking area, outside the archeology sites and areas likely to erode by the river in this area. The 45th parallel pullout would be relocated to be more authentic to the actual location of the 45th parallel.

Add New Parking Areas: To accommodate the visitor use opportunities on the new road, new parking areas would be constructed where no formal parking currently exists. These areas would be designed to accommodate both small and larger vehicles common to the Park. These areas include a Beaver Ponds Trail/multi-use trailhead at the top of the first hill leaving Mammoth Hot Springs on the OGR. A parking area would be constructed along the current OGR near the North Entrance Station for access to the multi-use trail at the northern end.

In addition to parking area improvements, vehicle turnouts along the project corridor and facility improvements would be implemented under Alternative 4.

Turnouts: Turnouts would be located to facilitate slower traffic pulling over, wildlife viewing, scenic areas, vehicle problems, and other driver needs. The terrain would determine turnout locations. Turnouts on both sides of the road would be included.

Facility Improvements: The number of vault toilets along the corridor would increase from the existing one at Boiling River to three (Boiling River, Rescue Creek, and Beaver Ponds). Accessibility would be addressed at all parking areas.

2.7 SUMMARY OF THE ALTERNATIVES

Table 1 provides a summary of the key elements of the four alternatives analyzed in this EA. Figure 2 through Figure 4, located at the beginning of this chapter, summarize elements of the alternatives. Specifically, Figure 2 depicts the No Action Alternative, while Figure 3 compares the alignments of the action alternatives. Figure 4, Figure 5, and Figure 6 provide detailed views of the action alternatives.

TABLE 1. SUMMARY OF THE ALTERNATIVES.

	No Action (Alternative 1)	Center Alignment (Alternative 2)	OGR Alignment (Alternative 3)	Gardner Canyon Alignment (Alternative 4)
Road Widths and Curves	▪ Temporary entrance road would remain 22 feet wide. ▪ Curves and grades would remain the same.	▪ Sections up to 30 feet wide (two 11-foot-wide travel lanes with two 4-foot-wide shoulders).	▪ Widen existing road from 22 feet to 34 feet (two 11-foot-wide travel lanes with two 6-foot-wide shoulders). ▪ Widen existing curves.	▪ Reconstruct to 30 feet wide (two 11-foot-wide travel lanes with two 4-foot-wide shoulders).
Bridge(s)	▪ No bridges	Two new bridges/river crossings.	▪ No bridges.	Three new bridges/river crossings.
Effect on Traffic Flow	▪ No traffic changes.	▪ One lane for the portions that overlap the OGR. Two lanes while the new road is being constructed/converted down to a narrower corridor after construction. ▪ Full closures (30 minutes) occasionally.	▪ Down to one lane for most of the construction period. ▪ Full closures (2 to 4 hours). ▪ Nighttime closures throughout construction.	No traffic changes.
New Structures (other than bridges)	▪ No new retaining and drainage structures.	▪ Three new culverts and drainage structures. ▪ Four retaining walls (200 to 1,200 linear feet).	▪ Replace or enlarge culverts and drainage structures. ▪ Retaining walls (up to 6,800 linear feet).	▪ Replace or enlarge culverts and drainage structures. ▪ Rock shed (Figure 7). ▪ Retaining walls (up to 3,250 linear feet).
Construction Schedule	▪ No construction anticipated, other than regular and emergency maintenance, as needed.	▪ Five construction seasons.	▪ Six construction seasons.	▪ Nine construction seasons.

2.8 ALTERNATIVES CONSIDERED BUT DISMISSED

Appendix B describes the alternatives that were considered but dismissed: the McMinn Bench alignment and the Rescue Creek alignment. As described in this chapter, a value analysis study was conducted using five criteria to determine which alternatives should be carried forward for detailed analysis.

CHAPTER 3: AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

3.1 INTRODUCTION

This chapter describes the existing condition of the resources retained for analysis, along with reasonably foreseeable environmental trends and planned actions for those resources. The descriptions of the resources provided in this chapter serve as an account of the baseline conditions in the project area. The resources described in this chapter are visitor use and experience (includes recreation, traffic, and visual/scenic resources); wildlife and wildlife habitat; special status species including threatened and endangered species; vegetation and soils; water resources (surface water and wetlands); geological resources; cultural resources; and socioeconomics.

Chapter 3 also describes the potential impacts on the above resources from implementing the No Action Alternative and the proposed action alternatives. Resource Protection Measures are part of the proposed action and are discussed in more detail in Appendix D. Where appropriate, Resource Protection Measures have been incorporated into the evaluation to prevent or lessen adverse impacts. Any modifications to the design would reduce or avoid impacts on Park resources.

3.2 METHODOLOGY FOR ESTABLISHING IMPACTS

The analysis of impacts follows the DOI NEPA handbook (DOI 2025). The intensity of impacts is assessed in the context of the Park's purpose and significance and any resource-specific context that may be applicable. The methods used to assess impacts vary depending on the resource being considered but generally are based on a review of pertinent literature and studies, information provided by on-site experts and other agencies, professional judgment, and Park staff knowledge and insight.

3.2.1 Area of Analysis for Impacts

The area of analysis refers to the geographic setting within which an impact may occur, such as the affected area in the project area. For the purposes of this project, most impacts are local to the immediate project area unless otherwise noted.

The area of analysis is based on conceptual design information and reasonable assumptions and includes the length and width of each alignment. For some analysis resources, such as cultural resources, the area of analysis includes a 50-meter buffer on either side of each alignment. The approximate disturbance calculations are subject to change during subsequent design phases. Changes that are not addressed by the range of impacts covered in this EA may require additional NEPA compliance or compliance with other laws.

3.2.2 Type of Impact

The potential impacts of the alternatives are described using the following terminology:

Short-term: Impacts that would occur as a result of the construction activities. Depending on impact topic, impacts may be intermittent (days or weeks) or continuous during construction.

Long-term: Impacts that would continue to occur after construction is complete and may continue for years or decades.

Beneficial: A favorable change in the condition or appearance of the resource, or a change that moves the resource toward a desired condition.

Adverse: A change that declines, degrades, or moves the resource away from a desired condition or detracts from its appearance or condition.

3.3 REASONABLY FORESEEABLE FUTURE ACTIONS

To determine potential impacts, past, present, and reasonably foreseeable future actions and land uses were identified in or near the project area. These actions are assessed in conjunction with the impacts of the alternatives to determine if they would have added adverse or beneficial impacts on resources in the Park. The evaluation of reasonably foreseeable impacts is based on the most current and updated available information.

The projects listed in Table 2 were considered in the analysis of reasonably foreseeable impacts for each resource analyzed in detail.

TABLE 2. LIST OF PAST, PRESENT, AND REASONABLY FORESEEABLE FUTURE ACTIONS AND LAND USES.

Project	Project Description	Completion Date (Construction)	Resources Affected
Northeast Entrance Road	The project begins approximately 1 mile east of the intersection of Northeast Entrance Road and Tower Junction and extends approximately 27 miles to the northeast boundary of the Park. The project will improve safety and traffic flow through various upgrades. Project alternatives will analyze ways to avoid, minimize or mitigate impacts on sensitive resources.	Construction to begin in 2028 and to last approximately 5 years.	Natural resources, cultural resources. hydrological resources, socioeconomic resources, visitor use and experience, recreation resources, and scenic resources.
Bison Management Plan Environmental Impact Statement	The Yellowstone National Park Bison Management Plan, outlined in this Final Environmental Impact Statement (EIS) and Record of Decision, focuses on actions the NPS may take to manage the Park's wild, migratory bison population. The NPS coordinates with other federal, state, and tribal agencies under the Interagency Bison Management Plan (IBMP), which was signed in 2000 by the Secretaries of Agriculture and Interior and the Governor of Montana. The IBMP was established due to concerns about bison migrating outside Yellowstone National Park and potentially transmitting the bacterial disease brucellosis to cattle, which could affect interstate and international trade. The plan integrates two decades of environmental compliance analyses and aims to preserve an ecologically sustainable bison population while addressing brucellosis transmission, human safety, property damage, and fulfilling tribal trust responsibilities. The plan also considers recent changes, such as fewer cattle near the Park, federal and state regulatory efforts to mitigate the economic impacts of brucellosis, climate change, and the exercise of tribal treaty rights on federal lands.	June 2024	Wildlife resources, vegetation resources, American Indian Tribe and ethnographic resources, human health and safety, socioeconomic resources, visitor use and experience, vegetation resources, special status wildlife species, and natural resources.
Norris to Golden Gate	The Park is constructing a 15.9-mile (25.6-kilometer) segment of road between Norris Junction and Golden Gate. The road will be reconstructed and widened to a 30-foot paved width from its existing 19- to 22-foot width, addressing issues and concerns with associated parking areas along the road.	EA was completed in 2011 and updated via Categorical Exclusion in July 2024. Phases 1 and 2 have been completed. Phase 3 is currently underway with construction scheduled to be completed by 2027.	Natural resources, wildlife resources, special status wildlife species, cultural resources, and socioeconomic resources.
Old Yellowstone Trail South Road Rehabilitation	The primary goal of this project is to improve the surface condition of 8.08 miles of Old Yellowstone Trail South Road corridor by implementing recommendations from the 2020 Old Yellowstone Trail South Corridor Study. Most of the gravel aggregate has been eroded over the years, with additional damage incurred as a result of the 2022 flood. The project will include resurfacing the existing gravel road, improving drainage, and replacing guardrails and signage.	2025	Natural resources and visitor use and experience.
Goal IV Housing-Lower Mammoth and Goal IV Housing-Yellowstone Heritage and Research Center (HRC)/Gardiner	Modular housing will be constructed to house Park employees.	2028	Natural resources, cultural resources, lightscapes, viewsheds, and visitor use and experience.

Project	Project Description	Completion Date (Construction)	Resources Affected
Rescue Creek Bridge Replacement	The bridge is on the Rescue Creek Trail and is popular with hikers and stock users. It was destroyed in the 2022 flood and will be replaced with a prefabricated steel structure.	Installation planned summer/fall of 2026	Natural resources, hydrological resources, visitor use and experience, recreation resources, and scenic resources.
Rock hauling through Gardiner	Hauling of various construction materials to multiple projects throughout Yellowstone National Park, occurs between the North Entrance (Gardiner) and Mammoth.	Every year	Visitor use and experience.
Yellowstone River Bridge Replacement	The project includes replacing the Yellowstone River Bridge located on the Northeast Entrance Road in Yellowstone National Park. The existing bridge, which has deteriorating conditions such as spalling concrete and exposed rebar, is being replaced to improve structural safety and traffic flow. The new bridge minimizes traffic disruptions by constructing the bridge off the existing alignment and involves measures to mitigate geothermal, vegetation, and wetland impacts, with the potential for wetland restoration in affected areas. The project also aims to balance construction needs with minimal disruption to Park visitors and local wildlife.	Signed 2020. Project is currently under construction and is scheduled to be completed by late 2026.	Geothermal resources, visitor use and experience, vegetation resources, and wetlands.

3.4 RESOURCE ANALYSIS

3.4.1 Visitor Use and Experience

3.4.1.1 Affected Environment

Survey results from 2018 indicate that the most important experience for Park visitors is viewing wildlife, followed by the opportunities to be close to nature and to experience solitude (Jorgensen et al. 2019). More than half the visits to the Park each year occur during summer with an increasing number in spring and autumn. Visitation is lowest to the Park during winter when vehicle travel is limited to the North and Northeast Entrances, and access to the interior is only via over-snow vehicles (e.g., snowmobile or snow coach), skiing, or snowshoeing (NPS 2023b).

In addition to providing visitor access, the North Entrance is the primary entry point both for Park employees and service vehicles en route to Mammoth Hot Springs and Cooke City/Silver Gate (NPS 2019). It is open 24 hours a day, seven days a week. The road originating at the North Entrance (whether the North Entrance Road route or the OGR route as shown on Figure 2) provides not only public and Park employee entry, but also emergency and administrative access and essential services between Gardiner and Mammoth Hot Springs.

Until its closure in June 2022, the North Entrance Road was commonly used by visitors for wildlife viewing in the Gardner Canyon area; hikers planning to embark from the Rescue Creek Trailhead (or Lava Creek Trailhead; recreational visitors planning to visit the Boiling River, Eagle Rock, or 45th parallel picnic area; campers heading to Mammoth Campground; visitors traveling to Mammoth Hot Springs (and other key areas beyond in the Park); and visitors driving through the Park to other destinations, such as Grand Teton National Park (to the south) or Beartooth Pass (to the east). Additional information on historical visitation numbers and visitor use and experience to support the analysis presented in this section is provided in Appendix F.

3.4.1.1.1 Scenic and Recreation Areas

The North Entrance Station, which is open year-round, provides access to a number of scenic and recreation resources in the project area (Figure 9) as well as popular destinations at Mammoth Hot Springs and beyond on the Grand Loop Road. The North Entrance is also a popular way for visitors to enter as they drive through the Park on their way to other destinations, such as Grand Teton National Park and Beartooth Pass. A 2017 study found that 55 percent of visitors that come through the North Entrance are heading south (toward Norris and beyond), and, in the summer, 45 percent of visitors passing through the North Entrance are heading east (toward Tower Junction, Lamar Valley, and beyond) (NPS 2017). The most popular visitor destinations from the North Entrance are Mammoth-Norris-Madison-West Entrance (25 percent of visitors), Mammoth-Roosevelt-Northeast Entrance (18 percent), Mammoth-Norris-Madison-Old Faithful-West Thumb-South Entrance (15 percent), Mammoth-Roosevelt-Mammoth-North Entrance (12 percent), Mammoth-Tower-Roosevelt-Canyon-Norris-Madison-West Entrance (7 percent), and other (21 percent).

Key scenic and recreation areas in the project area are described in the following sections and shown on Figure 9. Prior to the 2022 flood, many of these popular areas, including the Gardner Canyon, Eagle Nest Rock, Boiling River area, and trailheads for Lava Creek and Rescue Creek Trails, were accessed from the North Entrance Road but are currently closed or have limited accessibility since they are not accessible from the OGR.

North Entrance and Roosevelt Arch

The North Entrance was the first major entrance to the Park. The Roosevelt Arch, which was constructed in 1903 to welcome visitors, is an iconic Park feature. It was designed by Robert Reamer, and the cornerstone was placed by President Theodore Roosevelt. The area around the Roosevelt Arch and the grasslands around the North Entrance Station, in particular, are popular wildlife viewing areas; elk, bison, pronghorn, and mule deer frequent the area, depending on the season.

Gardner Canyon

The scenic Gardner Canyon includes the Gardner River, which flows next to the old North Entrance Road. The Gardner River originates in the northwest corner of the Park and flows into the Yellowstone River, a tributary of the Missouri River, near Rattlesnake Butte at the North Entrance to the Park (NPS 2023a). The Gardner Canyon area has long been popular with Park visitors due to its geology, scenery, fishing access, and the opportunity to view wildlife, such as bighorn sheep. Currently, the Gardner Canyon is not easily accessible to Park visitors as the road has washed away; however, limited access is available for visitors who are able to walk the road into the canyon.

Yellowstone Northern Range "Wildlife Pullout" Parking Area

The Yellowstone Northern Range "Wildlife Pullout" parking area is located along the old North Entrance Road, has been a popular destination for wildlife viewing, and includes wayside exhibits. Currently, this parking area cannot be accessed by vehicles, but Park visitors can walk there from the North Entrance Station.

Eagle Nest Rock

Eagle Nest Rock is a pinnacle-shaped rock feature in the Gardner Canyon that is visible from the old North Entrance Road. It has often been used as a nesting site for eagles and has been a popular destination for wildlife viewing from the North Entrance. Currently, this feature is difficult for Park visitors to access because it can only be accessed by pedestrians and not by vehicles.

Rescue Creek Trailhead

The Rescue Creek Trail is a year-round 8-mile (12.8-kilometer) through-hike trail that begins and ends at different trailheads, one at the Blacktail Creek Trailhead parking lot east of Mammoth Hot Springs on the Grand Loop Road and the other from the old North Entrance Road. The trail gradually climbs through aspens and meadows, then descends through forests to sagebrush flats that lead to a footbridge (washed out in the 2022 flood) across the Gardner River. With the North Entrance Road closed, hikers primarily have access from the Grand Loop Road; unless the water is low and hikers are confident fording the Gardner River, hikers must do the trail as an out-and-back hike.

45th Parallel Sign

The 45th parallel sign, which is located in the Gardner Canyon where the 45th parallel crosses through the Park (just north of the Montana/Wyoming border), is a popular photo opportunity for Park visitors. The sign can be accessed from the road to the Mammoth Campground; access is limited to pedestrians (from the south) as compared to pre-flood conditions when it could be accessed by vehicles from both the north and south.

Gardner River Picnic Area

The Gardner River picnic area, which is located on the west side of the old North Entrance Road near the Boiling River Bridge, is across the road from the parking area for the Boiling River Trailhead and swimming area (described below). This recreation site features three picnic tables, including one accessible picnic table. The picnic area is currently not accessible from the OGR but remains a popular picnic area that can be accessed from the road to the Mammoth Campground. Access is limited to pedestrians (from the south) as compared to pre-flood conditions when it could be accessed by vehicles from both the north and south.

Boiling River Parking Area, Trailhead, and Swimming Area

The Boiling River Area was a popular swimming spot in the Park in the Gardner River just south of the Boiling River Bridge and the 45th parallel sign; this area used to feature a hot spring. Warm water soaking at the Boiling River Area is no longer possible because the 2022 flood caused the river to shift its course and there is no longer a convergence of river and hot springs water. In 2019, the NPS made upgrades to the trail and signage. The trailhead now includes a wheelchair-accessible vault toilet.

Pre-flood, the Boiling River parking area and trailhead could be accessed by vehicles from the North Entrance Road from both the north and south. Currently, the area is not accessible from the OGR but can be accessed by visitors from the road to the Mammoth Campground; access is limited to pedestrians (from the south) as compared to pre-flood conditions when it could be accessed by vehicles from both the north and south.

Lava Creek Trailhead

Like the Rescue Creek Trailhead, the Lava Creek Trailhead provides access to the Park's backcountry areas (managed as wilderness) and was previously accessed from the North Entrance Road. Access from the North Entrance Road is no longer available, but the trailhead can still be accessed from the Grand Loop Road.

The Lava Creek Trail is a through-hike trail running between the Lava Creek picnic area off the Grand Loop Road and the Mammoth Campground off the old North Entrance Road. This 4.2-mile-trail follows Lava Creek and the Gardner River, and at the confluence hikers can view the scenic Undine Falls (60-foot drop). Near the west end of the trail, visitors used to be able to cross the Gardner River on a footbridge, but the footbridge was severely damaged by the 2022 flood and is closed to public access. With the North Entrance Road closed, hikers primarily have access from the Grand Loop Road; unless the water is low and hikers are confident fording the Gardner River, hikers must do the trail as an out-and-back hike.

Mammoth Campground

The popular 85-site Mammoth Campground was accessible from the north via the North Entrance Road before the 2022 flood, but now, visitors must go through Mammoth Hot Springs to access the campground. The campground is approximately 5 miles south of the North

Entrance Station. After a period of closure due to 2022 flood damage to the area's wastewater system, the campground reopened to public use in May 2024. Mammoth Campground is the Park's only year-round campground, offering developed sites for RV, trailer, and tent camping, and five ABA-accessible campsites. Part of the campground closes for the winter beginning in mid-October. The campground is near popular fishing and hiking spots, as well as the Mammoth Hot Springs and provides abundant wildlife viewing opportunities (elk and bison, in particular). The campground, originally constructed from 1938-1940, is in the Mammoth Hot Springs Historic District, as are the four comfort stations in the campground.

Mammoth Hot Springs

At Mammoth Hot Springs, visitors can take self-guiding tours of Fort Yellowstone, which was established by the U.S. Army in 1886, and the Mammoth Terraces, a steaming hydrothermal feature. Visitors can also join a guided walk or tour, cross-country ski, snowshoe, ice skate (winter only), watch wildlife (especially elk), attend ranger programs, and visit the Albright Visitor Center, which was originally the quarters for single Army officers (NPS 2023a). Several trails into Yellowstone's backcountry (managed as wilderness), including the Beaver Ponds and Sepulcher Mountain Trailheads, begin in the Mammoth Hot Springs area.

Beaver Ponds Trailhead

The Beaver Ponds Trailhead is located behind the Mammoth Hot Springs Hotel, next to the start of the OGR. This trailhead is used to access the Beaver Ponds Trail and the Sepulcher Mountain Trail. No parking is available at the trailhead; however, parking is available near the visitor center, hotel, and other nearby facilities.

The Beaver Ponds Trail is a 5-mile loop trail that begins and ends in the developed area of Mammoth Hot Springs. It is a moderate hike that rambles through sagebrush meadows and stands of trees.

The Sepulcher Mountain Trail is a strenuous 11.2-mile (one-way) there-and-back trail that climbs 3,400 feet through forest and meadows to the 9,652-foot summit. Optionally, from the summit, the trail continues north and east, descending across 4.2 miles to Mammoth Hot Springs near Liberty Cap.

Old Gardiner Road (OGR)

Before its conversion to the temporary access road, the OGR was a popular 5-mile biking and walking/hiking route on a gravel road for Park visitors. The OGR can still be used for biking, but vehicle traffic makes the route less appealing now for recreational use.

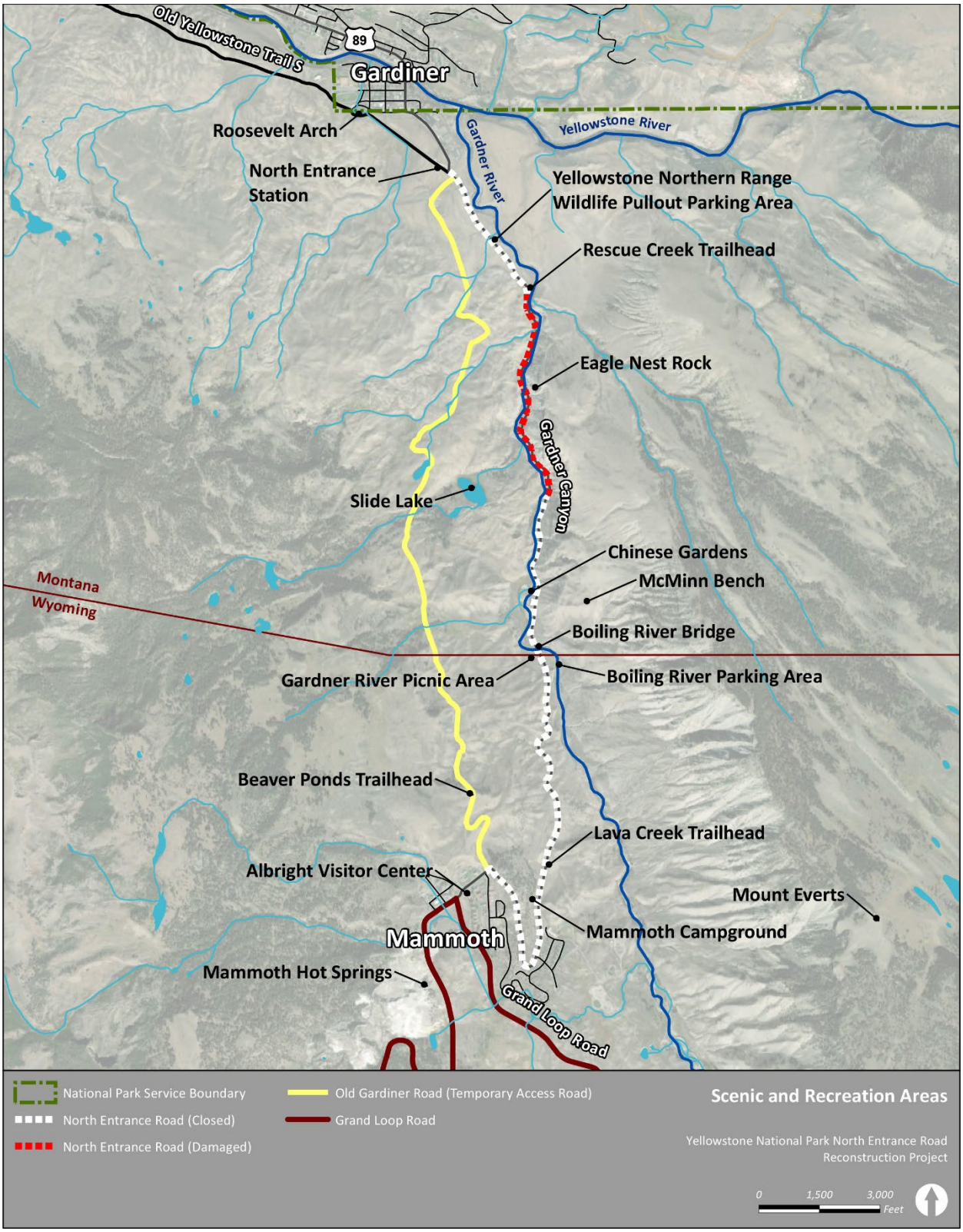


FIGURE 9. SCENIC AND RECREATION AREAS

Road Conditions and Speed

The OGR was constructed in 1879 as the original entrance road into the Park but was abandoned following construction of the North Entrance Road through the Gardner Canyon in 1884. The OGR was then used for wagons while stagecoaches took the more scenic route through the canyon (NPS 2022b). Until it was upgraded for use as the temporary entrance road in 2022, the OGR had been a narrow (12- to 15-foot-wide) gravel road that had generally been open to the public during summer months for one-way travel from Mammoth Hot Springs to Gardiner, as well as for bicycle and pedestrian use. Today, the improved OGR is a paved, 5.26-mile long, two-lane (22-foot total typical width) road. The posted speed limit is 25 miles per hour (mph) with slower sections posted at 15 mph due to sharp curves (FHWA 2024a). The average road grade is 6.6 percent, with a maximum grade of approximately 12 percent (FHWA 2024a). To improve safety, guardrails and pullouts were constructed as part of temporary improvements (NPS 2022c); however, oversized vehicles and vehicles with trailers cannot make the turns on this road due to the current design geometry (NPS 2022b).

On the pre-flood North Entrance Road through the canyon, the average road grade was approximately 4.2 percent, with a maximum grade of 9 percent (FHWA 2024a). The posted speed limit from the North Entrance to Mammoth Hot Springs was 35 mph, although the average speed traveled by visitors was typically closer to 25 mph (Jorgensen et al. 2019). It typically would take the average visitor 15 minutes to travel from the North Entrance to Mammoth Hot Springs. As noted above, the speed limit on the OGR, which has sharp curves and steep grades, ranges between 15 and 25 mph (NPS 2022c), so the typical drive time can be longer than what visitors previously experienced on the North Entrance Road.

3.4.1.2 Environmental Consequences

3.4.1.2.1 Alternative 1: No Action

As compared to the action alternatives, particularly Alternatives 2 and 4, visitors would have less access to the scenic and recreation areas in the project area under Alternative 1. The reduced level of access to many of the key scenic and recreation areas in the Gardner Canyon that occurred after the 2022 flood would continue permanently, denying visitors vehicular access and limiting access to pedestrians for many of these popular areas. These permanent reductions in access would change the experience of returning Park visitors who were accustomed to entering the Park through the scenic Gardner Canyon and making stops at the recreation areas along that route, including the Yellowstone Northern Range "Wildlife Pullout" parking area, Eagle Nest Rock, the 45th parallel sign, the Gardner River picnic area, and the Boiling River Trailhead and swimming area parking area (Figure 2). The Lava Creek Trail and the Rescue Creek Trail (Figure 9), which previously could be accessed from the old North Entrance Road, would continue to be primarily out-and-back trails (unless visitors are willing and able to ford the river) that can only be accessed from the Grand Loop Road, reducing hiking access options over the long term. The Mammoth Campground facilities and recreation amenities (Figure 9), which used to be accessible from the north, would continue to be accessible only by traveling through Mammoth Hot Springs. Under the No Action Alternative, these reduced access conditions would continue permanently.

Walking and biking recreational opportunities along the OGR are now more limited since this road became the temporary access road, potentially adversely impacting visitors accustomed to

using the OGR for a relatively vehicle-free recreational experience. Bikers can still use this route but now must contend with vehicular traffic on the road.

Permanent changes to the nature of recreational sites along the route of the old North Entrance Road and on the OGR may not be consistent with visitor expectations. Limited accessibility to these recreational sites also may put additional visitor pressure on other recreational sites in other parts of the Park, particularly those that are ABA accessible.

Under the No Action Alternative, flood-damaged infrastructure and facilities would remain in their current condition, and improvements, such as those for ABA accessibility or increased parking, would not be implemented, affecting the visitor experience.

3.4.1.2.2 Alternative 2: Center Alignment - NPS Preferred Alternative

The Alternative 2 alignment is intended to maximize visitor access to popular scenic and recreational sites (see detailed map book in Appendix C), including those in the Gardner Canyon, while providing a less curvy driving experience with fewer grade changes as compared to any of the other alternatives.

Under Alternative 2, more visitors would be able to experience the scenic vistas in the southern portion of the Gardner Canyon (as compared to the No Action Alternative and Alternative 3). Because the southern half of the Alternative 2 alignment would be the same as Alternative 4 from the McMinn Bench area south to Mammoth Hot Springs, full visitor access (including vehicle access) to many key scenic and recreation areas that experienced reduced access when the North Entrance Road washed out (described in Section 3.4.1.1, Affected Environment) would be restored, improving the visitor experience over current conditions. Once construction is complete, returning visitors would be able to use new vehicle turnouts and pedestrian trails, including one by the new Gardens Bridge and a new loop trail from a new proposed parking area north of Slide Lake, to experience the Gardner Canyon viewsheds they may remember from prior visits. After passing to the west of Slide Lake, the Alternative 2 alignment would follow the OGR alignment before diverging on the final approach to the North Entrance Station (Figure 4). As compared to Alternative 4, views of the northern part of the Gardner Canyon would be less accessible to visitors as access to sites upstream of the new Boiling River Bridge would be limited to pedestrians.

Under Alternative 2, two new bridges would be constructed, improving road safety and stability, but also potentially altering the viewshed from pre-flood and current conditions. A new Boiling River Bridge (approximately 260-foot-long single-span) would be constructed across the Gardner River, allowing both vehicle and pedestrian access. A second bridge for vehicles and pedestrians also would be constructed over the Gardner River in the vicinity of the historic Chinese Gardens area. This multi-span bridge would be approximately 850 feet. To minimize visual impacts, bridge abutments and wing walls would be faced with stone masonry. Approximately four retaining walls also are anticipated to be constructed under Alternative 2: these would range from approximately 200 to 1,200 feet long and would have varying heights, depending on the terrain. To minimize visual impacts, the retaining walls would be faced with natural stone.

As summarized in Chapter 2 and described in detail in Appendix E, existing parking areas would be upgraded or relocated; new parking areas would be created; facilities (e.g., picnic areas,

restroom facilities, and trails) would be constructed; and vehicle turnouts along the project corridor would be constructed or improved under Alternative 2. Preliminary locations for these features are shown on the detailed maps in the Appendix C map book. Accessibility improvements would be made in all parking areas. As described below, once these improvements are implemented, they are expected to have a beneficial impact on the visitor experience.

During the period of construction (up to five construction seasons), existing parking areas and recreational sites along the southern portion of the old North Entrance Road (described above under Section 3.4.1.1, Affected Environment) that are currently being used (even if access is only by pedestrians), may not be accessible, temporarily adversely impacting visitors until construction is complete and planned improvements have been implemented.

The impact of these types of interruptions would be limited since access to these areas is already reduced as compared to pre-flood conditions. As an example, the parking area for the Boiling River Trailhead and swimming area, which is currently only accessible by pedestrians, would be used as a staging and stockpiling area during construction under all alternatives. During that time, the area would not be accessible to the public, which would be a temporary adverse impact. Once construction is complete, this parking area would be enhanced and eventually (up to five years later) returned to visitor use. Post-construction improvements to the site would include picnic tables, expanded parking, and a trail and underpass to the river level on the west side of the road. Another recreational site that would be used as a staging area under Alternative 2 and closed to the public during construction is the Lava Creek Trailhead parking area (see detailed figures in the Appendix C map book). After construction, hikers would once again have access to this west-side trailhead for the Lava Creek Trail.

Under Alternative 2, some existing formal parking areas that are currently located along the old North Entrance Road and not accessible by vehicles would be relocated, including the parking area for the 45th parallel sign, which would be moved to facilitate bridge construction (see detailed figures in the Appendix C map book). Similarly, the Rescue Creek Trailhead and adjacent Wildlife Viewing parking area, would be relocated along the new alignment, once again allowing access to the Rescue Creek Trail from the west. During the construction period (up to five years), these areas would be unavailable for public use, which would be a temporary adverse impact. Once construction is complete, the visitor experience would be the same as or improved over pre-flood conditions.

Under Alternative 2, new parking areas for regular and oversized vehicles would be constructed where there currently is no formal parking and, once completed, would enhance the visitor experience (see detailed figures in the Appendix C map book). These new parking areas would also offset lost parking due to the removal of existing turnouts and parking areas along the old North Entrance Road. New parking areas include a Slide Lake overlook parking area and trail, a Beaver Ponds Trail/new OGR multi-use trailhead, two small parking areas for users of the new OGR multi-use trail, and the Gardner Canyon Trailhead parking (south of the Gardens Bridge providing access into the Gardner Canyon to the large washout of the old North Entrance Road). Once construction is complete, the visitor experience would be improved over current and pre-flood conditions.

The improvements and addition of parking areas and turnouts that would be completed under Alternative 2 is not easily compared to an existing road and capacity. Parking areas were not part of the current OGR as it was an emergency construction action to establish access. Parking areas for Alternative 2 within the new alignment would be comparable to the parking areas that existed along the pre-flood North Entrance Road. The new parking area designs are based on the increasing levels of visitors on this road and the knowledge of the outdated, undersized facilities when the old North Entrance Road was the main road.

Once construction is complete (around year five), the visitor experience also would be enhanced by facility improvements, including an increased number of vault toilets (four vault toilets located at Boiling River, Slide Lake Overlook, Rescue Creek, and Beaver Ponds); improved picnic facilities; and new recreational trails. For example, the Gardner River picnic area (currently located on the west side of the old North Entrance Road) near the Boiling River Bridge would be removed but replaced by the new picnic area on the east side (described above) at the Boiling River parking area for the trailhead and swimming area. As described in Chapter 2, the southern segment of the OGR, which would not be used for the Alternative 2 alignment, would be narrowed to a multi-use pedestrian and bicyclist trail (multi-use trail), returning that segment of the OGR to its pre-flood recreational use. Similarly, the northern segment of the old North Entrance Road in the Gardner Canyon from the new Gardens Bridge to the large washout would be removed and replaced with a 6-foot ABA-compliant trail to the washout. Along this segment, interpretive wayside exhibits highlighting the 2022 flood may be installed.

Under Alternative 2, up to 25 turnouts (on either side of the road) would be constructed along the alignment, improving the visitor experience by providing locations for wildlife and scenery viewing, as well as places to deal with vehicle problems and other driver needs. Each turnout would be paved and generally would provide parking for three to five passenger vehicles each.

During construction, visitor access to the Mammoth Campground may be temporarily restricted (up to five construction seasons), and impacts such as noise and vehicle movement may occur, which would impact visitor use experience. Other campgrounds would be available for visitors during that time. After construction, however, full access would return to meet the current level of visitor use.

3.4.1.2.3 Alternative 3: OGR Alignment

As with Alternative 1 (No Action), the reduced level of access to many of the key scenic and recreation areas in the Gardner Canyon that occurred after the 2022 flood would continue permanently, denying visitors vehicular access and limiting access to pedestrians for many of these popular areas. These permanent reductions in access would be greater than those under Alternative 2 and would change the experience of returning Park visitors who were accustomed to entering the Park through the scenic Gardner Canyon and making stops at recreation areas along that route, including the Yellowstone Northern Range “Wildlife Pullout” parking area, Eagle Nest Rock, the 45th parallel sign, the Gardner River picnic area, and the Boiling River Trailhead and swimming area parking area (Figure 9). Permanent loss of vehicle access to these recreational sites may continue to put additional visitor pressure on recreational sites in other parts of the Park, particularly those that are ABA-accessible.

Under Alternative 3 (Figure 5), the southern portion of the pre-flood North Entrance Road from Mammoth Hot Springs to the Boiling River Bridge would remain open to vehicles for public access to the Mammoth Campground, the Lava Creek Trailhead, and the Boiling River Trailhead and swimming area, improving access over current conditions by allowing vehicle access beyond the campground. The existing Boiling River Bridge would be left in place for pedestrian access across the Gardner River. As with Alternative 2, the road segment north from the Boiling River Bridge to the large washout would be removed and replaced with a 6-foot ABA-compliant trail to the washout, allowing pedestrians to view the Gardner Canyon, but not restoring pre-flood vehicle access. As with Alternative 2, interpretive wayside exhibits highlighting the 2022 flood may be installed.

As described for Alternative 2, recreational sites along the southern portion of the old North Entrance Road (described above under Section 3.4.1.1, Affected Environment) that are currently being used (even if access is only by pedestrians), may not be accessible during construction (up to six years under Alternative 3), temporarily adversely impacting visitors until construction is complete and planned improvements have been implemented. The impact of these types of interruptions would be limited since access to these areas is already reduced as compared to pre-flood conditions. As an example, the parking area for the Boiling River Trailhead and swimming area would be used as a staging and stockpiling area during construction under all action alternatives and would be unavailable during the period of construction. After construction, improvements would be made to the site (as described for Alternative 2).

As with Alternative 2, existing parking areas would be upgraded or relocated, new parking areas would be created, vehicle turnouts along the project corridor would be constructed or improved, and facilities (e.g., picnic areas, restroom facilities, and trails) would be constructed under Alternative 3 (see summary in Chapter 2 and detail in Appendix E). Accessibility improvements would be made in all parking areas. Once these improvements are implemented, they are expected to have a beneficial impact on the visitor experience.

The improvements and addition of parking areas and turnouts that would be implemented under Alternative 3 are not easily compared to the existing road and capacity. Parking areas were not part of the current OGR as it was an emergency construction action to establish access. The other portions of the road were part of the washed-out road and would be compared to the new alignment. The new parking area designs are based on the increasing levels of visitors on this road and the knowledge of the outdated and undersized facilities when the old North Entrance Road was the main road.

As with Alternative 2, visitor access to the Mammoth Campground may be temporarily restricted (up to six construction seasons), and impacts such as noise and vehicle movement may occur, which would impact visitor use experience. Other campgrounds would be available for visitors during that time. After construction, however, full access would return to meet the current level of visitor use.

3.4.1.2.4 Alternative 4: Gardner Canyon Alignment

Alternative 4 is the only alternative that would restore full access to the scenic Gardner Canyon and the recreation areas and experiences (e.g., viewing bighorn sheep, etc.) associated with that

corridor. Viewsheds of the Gardner Canyon have been key scenic attractions for visitors to the North Entrance in the past. Under Alternative 4, the visitor experience would be improved over current conditions because Park visitors would once again be able to enjoy the scenic drive along the Gardner River, restoring full access (vehicle and pedestrian) to key scenic and recreation areas to a level comparable to pre-flood conditions.

Under Alternative 4, three new bridges, numerous retaining walls, and numerous drainage structures would be constructed, improving road safety for visitors to the Gardner Canyon, but also altering visitors' viewshed from pre-flood conditions and current conditions. The Boiling River Bridge would be replaced by a longer and higher profile structure (approximately 260-foot length, single-span). The Gardner Canyon South Bridge would be constructed as a two-span bridge (approximately 590-foot length) parallel to the river channel (at the site of a major road embankment washout). The Gardner Canyon North Bridge would be an approximately 600-foot-long four-span bridge constructed over the river south of the town of Gardiner. This bridge would include a rock shed structure on the east bank of the river (approximately 1,070-foot length); see Figure 6 for an example of such a structure. Abutments and wing walls for each bridge would be faced with stone masonry to mitigate visual impacts. The road on each bridge would be 30 feet wide to meet safety standards, and all bridges would have 6-foot-wide sidewalks on both sides that meet accessibility standards. Numerous retaining walls (amounting to approximately 3,250 linear feet of walls) with varying heights based on terrain would be constructed to protect the road and natural resources. To mitigate visual impacts, the walls would be faced with natural materials such as rocks or stone masonry. Similarly, numerous new drainage structures would be constructed to protect the integrity of the road and faced with stone masonry to mitigate visual impacts. With all the new structures in the project corridor, returning visitors may experience a changed landscape in the Gardner Canyon.

As summarized in Chapter 2 and described in detail in Appendix E, existing parking areas would be upgraded or relocated; new parking areas would be created; facilities (e.g., picnic areas, restroom facilities, and trails) would be constructed; and vehicle turnouts along the project corridor would be constructed or improved under Alternative 4. Accessibility improvements would be made in all parking areas. Once these improvements are implemented, they would be expected to have a beneficial impact on the visitor experience.

The improvements and addition of parking areas and turnouts are not easily compared to an existing road and capacity. Parking areas were not part of the current OGR as it was an emergency construction action to establish access. Parking areas for Alternative 4 in the 2022 flood area of the canyon would be comparable to the parking areas that existed along the pre-flood North Entrance Road. The new parking area designs are based on the increasing levels of visitors on this road and the knowledge of the outdated and undersized facilities when the old North Entrance Road was the main road.

As with Alternative 2, during the period of construction (up to nine construction seasons under Alternative 4) existing parking areas and recreational sites along the old North Entrance Road (described above under Section 3.4.1.1, Affected Environment) that are currently being used (even if access is only by pedestrians), may not be accessible, temporarily adversely impacting visitors until construction is complete and planned improvements have been implemented. The impact of these types of interruptions would be limited since access to these areas is already

reduced as compared to pre-flood conditions. Full access to the recreational sites along the road would be restored after construction (as compared to Alternative 2, which would not restore full access to all sites).

As with Alternative 2, visitor access to the Mammoth Campground may be temporarily restricted (up to nine construction seasons), and impacts such as noise and vehicle movement may occur, which would impact visitor use experience. Other campgrounds would be available for visitors during that time. After construction, however, full access would return to meet the current level of visitor use.

3.4.2 Wildlife and Wildlife Habitat

3.4.2.1 Affected Environment

A wide range of wildlife species occur in the project area. Ungulates occurring in the project area include bison (*Bison bison*), elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), whitetail deer (*Odocoileus virginianus*), pronghorn (*Antilocapra americana*), moose (*Alces alces*), and bighorn sheep (*Ovis canadensis*). Large predators in the project area include grizzly bear (*Ursus arctos horribilis*), black bear (*Ursus americanus*), cougar (*Puma concolor*), and gray wolf (*Canis lupus*). The project area is in the Yellowstone Northern Range, which is defined as the area both inside and outside the Park, from Lamar Valley to the Dome Mountain wildlife area. Due to lower elevation, this portion of the Yellowstone Northern Range, including the project area, is important winter and summer range for several ungulate species in the Park. The project area also provides habitat for many terrestrial and aquatic wildlife species, including small mammals, birds, and fish.

3.4.2.1.1 Ungulates

Bison occur throughout the Park and are frequently present in the project area. The number of bison in the Park has varied from approximately 2,900 to 6,000 each summer between 2001 and 2022, with approximately 6,000 counted in summer 2022 (Bison EIS 2023; NPS 2023b). During the 2000s, bison numbers in the northern portion of the Park increased due to high survival rates and movements of bison from the central to northern portions of the Park.

Elk in the northern portion of the Park belong to the Northern Herd and are partially migratory, with most animals moving seasonally between summer and winter ranges and others remaining on the same range year-round. Many elk winter in the Yellowstone Northern Range, with numbers increasing during winters with deep snowpack at higher elevations (White et al. 2010, 2012). Interagency cooperative surveys of the Northern Herd have counted between 4,844 and 7,579 elk in the Northern Herd between 2014 and 2024. Spring migration occurs from late April to mid-May, with many elk migrating through the Sepulcher Mountain foothills, across Mount Everts, or along the Gardner River (White et al. 2010). Many female elk calve in these areas from mid-May to mid-June before moving to summer ranges throughout the Park, while some remain in the project area (White et al. 2010). Autumn migration begins in late September to mid-October, and many females with calves move to lower elevations inside and outside the Park where snowpack is lower and there are fewer predators.

The Yellowstone Northern Range is winter and summer range for mule deer, and the mule deer population was estimated at 1,032 in April 2023 (Montana Fish, Wildlife, and Parks 2023). This

is a minimum estimate as the aerial survey does not include the main project area. The mule deer population in the Yellowstone Northern Range is partially migratory, with most of the deer migrating to summer range inside and outside the Park during late April to mid-June. Migrant deer begin traveling back to the winter range in the Yellowstone Northern Range during mid-October (Gogan et al. 2019).

The Yellowstone Northern Range is also important winter range for pronghorn. An aerial survey in April 2024 counted 481 pronghorn in the Park (Yellowstone Center for Resources' 2023 Classification of Yellowstone Pronghorn Report). The pronghorn population in the Park is partially migratory, with all pronghorn spending winters in the Northern Range and southern Paradise Valley, just north of the Park, and most of them migrating in spring to higher elevations in the Park (White et al. 2007, 2022a). Migrating pronghorn travel from winter range in the Yellowstone Northern Range over Mount Everts before dispersing to their summer ranges. Spring migrations occur from mid-March to mid-May with most pronghorn reaching their summer ranges during April. Autumn migrations occur from mid-September to mid-November with pronghorn crossing Mount Everts and reaching the Yellowstone Northern Range winter range during October.

About a dozen bands of bighorn sheep occur in the northern portions of the Park and nearby areas of Montana (White et al. 2008, 2021; White and Gunther 2013; Garrott et al. 2021). Some bighorn sheep winter on Mount Everts, between the Yellowstone and Gardner Rivers (Keating et al. 1985). The core of this group's range is McMinn Bench, on the northwest corner of Mount Everts. Bighorn sheep congregate on McMinn Bench during the breeding season from mid-November to mid-December and through winter and spring (Garrott et al. 2021). Some bighorn sheep migrate from the winter range in late April or May, while others remain in the area year-round, including on McMinn Bench (Keating et al. 1985; Ostovar 1998). Lambing occurs in late May and early June (Lowrey et al. 2021). One group of bighorn sheep crosses the flood-damaged North Entrance Road and Gardner River on or near the bridge by Eagle Nest Rock in late May or early June and travels approximately 4 to 5 miles west to give birth on the east-facing cliffs of Sepulcher Mountain. Many of these ewes return with their lambs to McMinn Bench and Mount Everts in late June and early July (Ostovar 1998).

3.4.2.1.2 Large Predators

Cougars and bears are important predators in the project area. As many as 50 cougars may be present in the Park (Murphy 1998; Ruth et al. 2019; Anton 2020). An estimated 150 to 275 black bears are present in the northern portion of the Park (Bowersock 2020). Approximately 800 to 1,100 grizzly bears are in the Greater Yellowstone Area (Bison EIS 2023; NPS 2023b). Grizzly bears are addressed in greater detail in Section 3.4.3, Special Status Species (Includes Threatened and Endangered Species). Due to management actions, such as food storage policies and limits on motorized access in the Park and surrounding areas, bear mortality has decreased and the prevalence of bears in the Park has increased over the last few decades (White et al. 2017).

Gray wolves were reintroduced to the Park from 1995 to 1997. As of January 2025, at least 108 wolves were in the Park in 9 packs (NPS 2024a). Wolves in the Park primarily prey on elk, although they also prey on deer and bison calves, and scavenge bison carcasses. Wolves have been present in and near the project area for much of the last several decades since their

reintroduction, especially during winter and spring when many hundreds of ungulates spend winter in the Yellowstone Northern Range in and surrounding foothills (NPS 2024a).

3.4.2.1.3 Birds

More than 300 bird species have been documented to occur in the Park, including raptors, songbirds, shorebirds, and waterfowl, and approximately 150 species nest in the Park (NPS 2024b). In 2019, bird surveys conducted by the NPS documented 24 species of songbirds in sagebrush steppe and grassland habitats, including the Yellowstone Northern Range (NPS 2019). Many bird species are likely present in the project area and breed during the summer months, including 15 species identified by the U.S. Fish and Wildlife Service (USFWS) as birds of conservation concern (USFWS 2024). The most abundant species observed during surveys included Brewer's blackbird (*Euphagus cyanocephalus*), horned lark (*Eremophila alpestris*), and western meadowlark (*Sturnella neglecta*) (NPS 2019). Birds of conservation concern that could occur in the project area include bald eagle (*Haliaeetus leucocephalus*), California gull (*Larus californicus*), calliope hummingbird (*Selasphorus calliope*), Clark's grebe (*Aechmophorus clarkia*), evening grosbeak (*Coccothraustes vespertinus*), Franklin's gull (*Leucophaeus pipixcan*), golden eagle (*Aquila chrysaetos*), lesser yellowlegs (*Tringa flavipes*), long-eared owl (*Asio otus*), olive-sided flycatcher (*Contopus cooperi*), pinyon jay (*Gymnorhinus cyanocephalus*), rufous hummingbird (*Selasphorus rufus*), western grebe (*Aechmophorus occidentalis*), willet (*Tringa semipalmata*), and Williamson's sapsucker (*Sphyrapicus thyroideus nataliae*) (USFWS 2024). An osprey (*Pandion haliaetus*) nest occurs in a tree along the Gardner River, which is 1 of 56 known osprey territories in the Park (NPS 2019).

3.4.2.1.4 Fish

The Gardner River is in a Native Trout Conservation Area and provides habitat for several fish species including the native Yellowstone cutthroat trout (*Oncorhynchus virginialis bouvieri*) and mountain whitefish (*Prosopium williamsoni*) (NPS 2024c). Introduced fish species are also present in the Gardner River including brown trout (*Salmo trutta*) and rainbow trout (*Oncorhynchus mykiss*), both of which pose a threat to native fish populations, through predation (brown trout) and hybridization, as rainbow trout will readily hybridize with native cutthroat trout.

3.4.2.2 Environmental Consequences

3.4.2.2.1 Alternative 1: No Action

Under the No Action Alternative, adverse impacts on wildlife would include temporary habitat loss during regular road maintenance. Road maintenance and associated construction could increase sedimentation and turbidity of the Gardner River drainage, which may affect fish, aquatic organisms, and terrestrial wildlife that use the river for drinking water. However, construction activities would be monitored, and erosion- and sediment-control Best Management Practices (BMPs) would be implemented to minimize erosion and sediment movement (see Appendix D).

Noise associated with regular maintenance could result in changes to normal foraging behavior or displacement of animals. These actions could adversely impact localized populations in the project area and would last for the duration of maintenance activities. Although this

maintenance-related displacement could affect ungulates, large predators, and birds at the individual or local population level, there would be no long-term impacts on populations because elevated noise levels would last only during maintenance activities. Resource Protection Measures to reduce construction-related impacts could include avoiding construction activities in crucial ungulate winter ranges (December 15 to April 15) and in identified ungulate calving ranges (May 15 to June 30) (see Appendix D). Work during the summer breeding season (March 1 to August 15 for most species) could disrupt breeding activities with increased noise and human activities.

3.4.2.2.2 Alternative 2: Center Alignment - NPS Preferred Alternative

Ungulates

Impacts on ungulates would include temporary and permanent habitat loss and fragmentation. Removal of vegetation and ground disturbance in the project area would degrade the quality of foraging habitat. Under Alternative 2, approximately 47 acres of foraging habitat for ungulate species would be permanently lost. Approximately 7.3 acres of currently non-vegetated areas would be restored by deconstructing portions of the previous North Entrance Road in Gardner Canyon, resulting in a net loss of approximately 40 acres of habitat.

The Yellowstone Northern Range provides important winter foraging habitat for ungulates and is approximately 380,000 acres. In the summer, many of the Park's ungulates migrate and use summer foraging habitats across much of the 2.2 million acres of the Park. The anticipated net loss of 40 acres as a result of this project represents less than 0.01 percent of winter range acreage and is an even more negligible and immeasurable loss to ungulate summer foraging habitat in acreage given the mobility and ability of ungulates to find alternative foraging habitats. Temporary impacts on ungulates may include behavior avoidance due to noise and increased human activity. However, these impacts would cease when construction is complete. Additionally, temporary work areas where vegetation removal would disturb ungulate habitat would be revegetated after construction.

Alternative 2 would partially follow the existing alignments of the Gardner Canyon Road and the OGR, with several new sections of road in the center and northern portions of the project area. The project area is a migration corridor and calving range for elk and provides habitat for mule deer and pronghorn. Constructing new sections of road, where no road is currently present, would increase habitat fragmentation. The addition of a busy road and approximately four retaining walls ranging from approximately 200 to 1,200 feet long could impede ungulate movements, resulting in adverse impacts on ungulates attempting to move east to west across the project area. Permanent impacts would also result from increased traffic noise in the area where the new road is constructed. Alternative 2 could result in changes in ungulate seasonal movements during and after construction of the road. These impacts could adversely affect local populations but would not be expected to affect ungulates at the regional or parkwide scale due to the availability of quality undisturbed habitat throughout the Park.

Adverse impacts on local populations would be long-term. Alternative 2 includes an 850-foot multi-span bridge at the Chinese Gardens, which would reduce impacts on ungulates by allowing wildlife movements along the Gardner River. Adverse impacts on ungulate movements and habitat would be partially offset by reduced traffic along the OGR, if Alternative 2 were to be implemented. In addition, impacts would be partially offset because the damaged road in

Gardner Canyon (including bridges) between the Boiling River picnic area and Rescue Creek parking area would be reclaimed and restored by removing the asphalt and road base materials, and recontouring and revegetating the area. Construction activities and noise could result in changes in normal foraging behavior or displacement of animals during the construction period. These changes could adversely impact localized populations in the project area and would last for approximately five construction seasons (beginning of April to mid-November each year). Although displacement could impact ungulates at the individual or local population level, there would be no long-term impacts on the population as a whole because elevated noise levels would last only during construction, ample habitat surrounds the project area to accommodate displaced ungulates, and animals would be expected to adapt to the changed conditions once construction is complete. Potential Resource Protection Measures to reduce construction-related impacts could include avoiding construction activities in crucial ungulate winter ranges (December 15 to April 15) and in identified ungulate calving ranges (May 15 to June 30) (see also Appendix D, Resource Protection Measures).

The potential exists for increased vehicle strikes of wildlife from the new road. This risk would be reduced due to the relatively low proposed speed limit (35 mph).

Large Predators

Potential impacts on large predators could include disturbance or displacement during construction due to increased noise and human activity. Foraging activities could also be altered if prey species are displaced from the area due to construction activities. As described for ungulates, these impacts would be temporary, lasting only during the approximately five construction seasons. Permanent impacts would also result from increased traffic noise in the area where the new road is constructed. Given the temporary nature of construction impacts and the availability of extensive habitat nearby, however, the project is not expected to have measurable adverse impacts on large predator habitat beyond the permanent loss of approximately 40 acres of prey habitat.

The potential also exists that predators, such as black bears and wolves, could become food conditioned due to improper food storage related to construction, resulting in control actions or removal. Implementation of food storage requirements, as described under Appendix D, would minimize the potential for wildlife to become food conditioned.

The risk of vehicle strikes also exists for large predators. This risk would be reduced due to the relatively low proposed speed limit (35 mph) along the road.

Birds

As described for ungulates, impacts on bird species would include temporary and permanent loss of foraging habitat during and after construction. Approximately 47 acres of foraging habitat would be permanently lost. Approximately 7.3 acres of currently nonvegetated areas would be restored by deconstructing portions of the previous North Entrance Road in the Gardner Canyon. Birds may avoid the project area during construction and may be temporarily displaced from the immediate vicinity of the project area due to noise and human presence. However, ample habitat suitable for breeding, nesting, and foraging near the project area would accommodate displaced birds. Birds would be expected to adapt to the changed conditions once construction is complete. Although the project would result in a net loss of bird habitat,

habitat loss would not result in measurable impacts on birds due to the small size of the impacts relative to the amount of habitat available for these species in the Park.

Work during the summer breeding season (March 1 to August 15 for most species) could disrupt breeding activities with increased noise and human activities; however, as described in Appendix D, Resource Protection Measures, ground clearing and tree removal activities would occur outside the breeding season to avoid impacts on breeding birds.

Fish

Under Alternative 2, construction activities would occur in and adjacent to the Gardner River, with construction of two bridges with piers that would span the active channel. Work below the ordinary high water mark and ground disturbance from construction and staging activities in the Gardner River drainage could result in increased sedimentation and turbidity in the river during the five construction seasons. Potential impacts associated with increased sedimentation and turbidity include decreased dissolved oxygen levels, irritation or impairment of fish gills, and detrimental impacts on aquatic vegetation growth that are important to fish. Construction activities would be monitored, and erosion- and sediment-control BMPs would be implemented to minimize erosion and sediment movement (see Appendix D). Work below the ordinary high water mark would occur at times that would have the least effect on fish and other aquatic organisms based on Clean Water Act permits. Disturbed areas would be revegetated with native species following construction. The road and bridges would be designed to route surface water flows away from the river and wetlands to protect water quality; therefore, no long-term impacts on native fish species are expected.

3.4.2.2.3 Alternative 3: OGR Alignment

Ungulates

As described for Alternative 2, impacts on ungulates under Alternative 3 would include temporary and permanent habitat loss. Removal of vegetation and ground disturbance in the project area would degrade the quality of foraging habitat. Under Alternative 3, approximately 30.4 acres of foraging habitat for ungulate species would be permanently lost, and approximately 10.1 acres of habitat would be restored by deconstructing portions of the previous North Entrance Road in Gardner Canyon. Although the project would result in a net loss of foraging habitat, habitat loss would not result in measurable impacts on ungulates due to the small size of the impacts relative to the amount of habitat available for these species in the Park. Temporarily affected areas would be revegetated, as described in Appendix D, Resource Protection Measures.

Alternative 3 would involve changes to the alignment and widening of the existing OGR, rather than reconstructing a partially destroyed road, as in Alternative 4, or constructing a new road where a road currently does not exist, as in Alternative 2. As a result, new habitat fragmentation and disruption of ungulate seasonal migration would be less under Alternative 3 than the other alternatives. In addition, Alternative 3 would involve removal of storm-damaged infrastructure in Gardner Canyon, which could potentially improve conditions for seasonal migration and use of the canyon by elk, bighorn sheep, and other ungulates.

As previously described, construction activities and noise could result in changes in normal foraging behavior or displacement of animals during the construction period. Impacts would be

the same as described for Alternative 2 except that the construction period would last for six construction seasons (beginning of April to mid-November each year) as opposed to five seasons. Although displacement could impact ungulates at the individual or local population level, there would be no long-term impacts on the population as a whole because elevated noise levels would last only during construction, ample habitat surrounds the project area to accommodate displaced ungulates, and animals would be expected to adapt to the changed conditions once construction is complete. Potential Resource Protection Measures to reduce construction-related impacts would be the same as for Alternative 2 and could include avoiding construction activities in crucial ungulate winter ranges (December 15 to April 15) and in identified ungulate calving ranges (May 15 to June 30) (see also Appendix D, Resource Protection Measures).

Alternative 3 is not expected to result in increased vehicle strikes because the road would continue to be in the same general location as it is currently. This risk would be reduced due to the relatively low proposed speed limit (35 mph) and would be similar to existing conditions.

Large Predators

Potential impacts on large predators due to increased noise and human activity, food conditioning, and vehicle strikes, and proposed Resource Protection Measures (Appendix D) would be the same as described for Alternative 2. Construction-related impacts would occur during six construction seasons. Given the temporary nature of construction impacts and the availability of extensive habitat nearby, however, the project is not expected to have measurable adverse impacts on large predator habitat beyond the permanent loss of prey habitat.

Birds

Potential impacts on birds would be similar to those described above for Alternative 2. However, ample habitat suitable for breeding, nesting, and foraging located adjacent to the project area would accommodate displaced birds. Although the project would result in a net loss of habitat, habitat loss would not result in measurable impacts on birds due to the small size of the impacts relative to the amount of habitat available for these species in the Park. Work during the summer breeding season (March 1 to August 15 for most species) could disrupt breeding activities with increased noise and human activities; however, as described in Appendix D, Resource Protection Measures, ground clearing and tree removal activities would occur outside the breeding season to avoid impacts on breeding birds.

Fish

A short section at the northern end of the proposed alignment for Alternative 3 would be adjacent to the Gardner River. In addition, this alternative would involve in-water work in the Gardner River to remove storm-damaged infrastructure in Gardner Canyon. Ground disturbance from removal of infrastructure in the Gardner River drainage would expose soils to erosion, which could result in increased sedimentation and turbidity in the river. Potential impacts associated with increased sedimentation and turbidity include decreased dissolved oxygen levels, irritation or impairment of fish gills, and detrimental impacts on aquatic vegetation growth that are important to fish. These impacts would be temporary, lasting up to five years; however, the infrastructure removal may not occur during the entire six construction seasons. Construction activities would be monitored, and erosion- and sediment-control BMPs would be implemented to minimize erosion and sediment movement (see also Appendix D, Resource Protection Measures). Disturbed areas would be revegetated with native species

following construction. The road and bridges proposed under Alternative 3 would be designed to route surface water flows away from the river and wetlands to protect water quality, so no long-term impacts on native fish species are expected.

3.4.2.2.4 Alternative 4: Gardner Canyon Alignment

Ungulates

Impacts on ungulates would include temporary and permanent habitat loss and fragmentation. Impacts on ungulates from Alternative 4 would include temporary and permanent habitat loss and fragmentation. The types of impacts would be the same as described for Alternative 2, with the addition of rock scaling. Rock scaling would include workers climbing the slopes of the canyon and dislodging loose or fractured rock. For steep slopes such as the hillsides above the road in the Gardner Canyon, this would likely require access to the top of the cliff face. Removal of vegetation and ground disturbance in the project area would degrade the quality of foraging habitat. Under Alternative 4, approximately 29.1 acres of foraging habitat for ungulate species would be permanently lost.

Reconstructing the road in the Gardner Canyon would increase habitat fragmentation. Although the Gardner River serves as a natural barrier to movement, a road with a rock shed more than 1,000 feet long and approximately 3,800 linear feet of retaining walls would further impede ungulate movements, resulting in adverse impacts on ungulates attempting to move across the river corridor. Because the Gardner River corridor is both a migration corridor and calving range for elk, construction of Alternative 4 could result in changes in elk seasonal movements or could result in elk avoiding the area during and after reconstruction of the road. Bighorn sheep that currently cross the flood-damaged North Entrance Road and Gardner River on or near the bridge by Eagle Nest Rock in late May or early June could alter their movement patterns to avoid the additional obstructions created by the rock shed and retaining walls. Changes in the availability of migration routes for elk and bighorn sheep would adversely affect local populations and would not be expected to affect ungulates at the regional or parkwide scale due to the availability of quality undisturbed habitat throughout the Park. These adverse impacts would be long-term.

Construction activities and noise, including rock scaling, could result in changes in normal foraging behavior or displacement of animals during the construction period. The potential exists for increased vehicle strikes of wildlife from the new sections of road. These impacts, and Appendix D, Resource Protection Measures, would be the same as described for Alternative 2 except that construction activities would last nine construction seasons under Alternative 4 compared to five construction seasons under Alternative 2. Although displacement could impact ungulates at the individual or local population level, there would be no long-term impacts on the population as a whole because elevated noise levels would last only during construction, ample habitat surrounds the project area to accommodate displaced ungulates, and animals would be expected to adapt to the changed conditions once construction is complete. Potential Resource Protection Measures to reduce construction-related impacts would be the same as described for Alternative 2 and could include avoiding construction activities in crucial ungulate winter ranges (December 15 to April 15) and in identified ungulate calving ranges (May 15 to June 30) (see also Appendix D, Resource Protection Measures).

Large Predators
Potential impacts on large predators due to increased noise and human activity, food conditioning, and vehicle strikes would be the same as described for Alternative 2. Construction-related impacts would occur during nine construction seasons. Given the temporary nature of construction impacts and the availability of extensive habitat nearby, however, the project is not expected to have measurable adverse impacts on large predator habitat beyond the permanent loss of prey habitat.

Birds
Potential impacts on birds and proposed Resource Protection Measures (Appendix D) would be the same as described for Alternative 2, except that a known osprey nest occurs in a tree along the Gardner River, and nesting ospreys, if present, could be disturbed and adversely affected by construction activities. However, ample habitat suitable for breeding, nesting, and foraging near the project area would accommodate displaced birds. Birds would be expected to adapt to the changed conditions once construction is complete. Although the project would result in a net loss of habitat, habitat loss would not result in measurable impacts on birds due to the small size of the impacts relative to the amount of habitat available for these species in the Park.

Fish
Under Alternative 4, construction activities would occur in and adjacent to the Gardner River, including construction of three bridges with piers that would span the active channel. Some work on the piers or bridge abutments would occur below the ordinary high water mark of the river. Native fish in the Gardner River could potentially be adversely affected by construction-related runoff. Ground disturbance from construction and staging activities in the Gardner River drainage would expose soils to erosion, which could result in increased sedimentation and turbidity in the river. Potential impacts associated with increased sedimentation and turbidity include decreased dissolved oxygen levels, irritation or impairment of fish gills, and detrimental impacts on aquatic vegetation growth that are important to fish. These impacts would be temporary, lasting during the approximately nine construction seasons. However, construction activities would be monitored, and erosion- and sediment-control BMPs would be implemented to minimize erosion and sediment movement (see Appendix D). Disturbed areas would be revegetated with native species following construction. The road and bridges would be designed to route surface water flows away from the river and wetlands to protect water quality; therefore, no long-term impacts on native fish species from runoff are expected. The bottom beam of the bridges would range from approximately 20 to 40 feet above the water surface, which would result in some shading of the river and potential changes in microclimate. The shaded areas would be relatively small compared to the overall water surface of the Gardner River; therefore, long-term impacts on fish from temperature changes and shading are not expected.

3.4.3 Special Status Species (Includes Threatened and Endangered Species)

3.4.3.1 Affected Environment

Federally listed threatened, endangered, proposed, and candidate species with the potential to occur in the project area include the threatened grizzly bear, threatened North American wolverine (wolverine; *Gulo gulo luscus*), threatened Ute ladies'-tresses orchid (ULTO; *Spiranthes diluvialis*), proposed threatened monarch butterfly (*Danaus plexippus*), and proposed

endangered Suckley's cuckoo bumble bee (*Bombus suckleyi*) (USFWS 2024). The grizzly bear is also listed as threatened by the state of Montana. Three species identified as Tier I Species of Greatest Conservation Need, western toad (*Anaxyrus boreas*) and common loon (*Gavia immer*) also have the potential to occur in the Wyoming portion of the project area (Wyoming Natural Diversity Database 2024).

3.4.3.1.1 Grizzly Bear

The grizzly bear was listed as a threatened species in the lower 48 states in 1975 because of the frequency of human-caused grizzly bear mortalities, loss of habitat, and geographic isolation from other grizzly bear populations (40 FR 31734, July 28, 1975). The life history and habitat requirements of grizzly bears are summarized in the *Grizzly Bear Recovery Plan* (USFWS 1993). Currently, approximately 965 bears occupy more than 27,200 square miles in the Greater Yellowstone Area (Bison EIS 2023; NPS 2023b). The project area provides important birthing habitat for multiple ungulate species, making it important habitat for grizzly bears preying on ungulate newborns in May and June.

3.4.3.1.2 North American Wolverine

The wolverine in the contiguous United States was listed as threatened in November 2023. Wolverines inhabit alpine and Arctic tundra, and boreal and coniferous mountain forests, especially large wilderness areas and areas with snow on the ground in winter. Wolverines may disperse through atypical habitat that lacks persistent snow. Deep, persistent, and reliable spring snow cover (April 15 to May 14) is the best overall predictor of wolverine occurrence in the contiguous United States (USFWS 2013). Wolverines are rare and sparsely distributed in the Park and adjacent national forest system areas (Beauvais and Johnson 2004; Inman et al. 2011). From 2005 to 2009, wolverines were captured or detected in the Absaroka-Beartooth wilderness area along the north boundary of the Park, the Thorofare region (southeast corner), and the adjoining Washakie and Teton wilderness areas (Murphy et al. 2011). Wolverine detections, while still rare, have increased over the last five years. Since December 2022, NPS biologists have verified multiple sets of wolverine tracks in snow annually, six remote camera videos of individual wolverines, and multiple observations of a traveling wolverine inside the Park (Stahler, pers. comm. 2025). Due to relatively low elevation and snow cover, wolverines may disperse through the project area but are unlikely to occur on a regular basis.

3.4.3.1.3 Ute Ladies'-Tresses Orchid

ULTO occurs at elevations below 7,800 feet in moist to wet alluvial meadows, floodplains of perennial streams, and around springs and lakes (USFWS 1992a). Generally, the preferred vegetative cover for ULTO is relatively open; dense overgrown sites are not conducive to establishment of the species. Where ULTO is found, soils are typically alluvial deposits of sandy, gravelly material that are saturated to within 18 inches of the surface for at least part of the growing season. The main reason for this species' decline appears to be drastic modification of riparian habitat by urbanization and stream channelization. Because of this decline, the Service listed this species as threatened under the Endangered Species Act in 1992 (USFWS 1992b). When listing occurred, ULTO was found only in Colorado, Utah, and Nevada. Since then, the species has been found in Wyoming, Montana, Nebraska, and Idaho. Other historic populations in Utah, Colorado, and Nevada are presumed to be extirpated (USFWS 1992a). Suitable habitat

for the species may exist in wetland habitats in the project area. However, individuals were not observed during the rare plant survey and wetland delineation conducted in 2024.

3.4.3.1.4 Monarch Butterfly

The monarch butterfly was proposed as threatened in December 2024 (89 FR 100716, December 2024) due to widespread drought, habitat loss, fragmentation, and low population abundance. Monarch butterflies occur at elevations from 4,300 to 11,500 feet (but rarely above 9,000 feet), mainly in lowlands near larval food plants. Milkweed (*Asclepias* spp.) is an essential feature of quality monarch butterfly habitat. Eggs, larvae, and adults require healthy and abundant milkweed for laying eggs and larval consumption (USFWS 2020c). Common places where milkweed occurs include shortgrass and tallgrass prairies, livestock pastures, agricultural margins, roadsides, wetland and riparian areas, sandy areas, and gardens, in addition to deserts, open forests, and woodlands. Monarch butterflies migrate in the spring (March to June) and fall (August to October) from and to breeding and overwintering sites in California for the western population (Western Association of Fish and Wildlife Agencies 2019). No milkweed plants were documented in the project area during extensive surveys for rare and invasive plant species during summer 2024 (ERO Resources Corporation [ERO] 2024). Although the project area does not have suitable monarch butterfly habitat for breeding or overwintering roosts, flowering plants could be used for feeding during migration.

3.4.3.1.5 Suckley's Cuckoo Bumble Bee

Suckley's cuckoo bumble bee was proposed as an endangered species by the USFWS on December 17, 2024 (89 FR 102074). Suckley's cuckoo bumble bee is known from approximately 2,317 occurrence records across North America. There is no population level information available specific to Suckley's cuckoo bumble bee. The species is rare to encounter because it is a naturally less abundant parasite, and it does not have a worker caste active throughout the field season (USFWS 2024). Suckley's cuckoo bumble bee is often misidentified, leading to uncertainty about the species' range. A known occurrence of Suckley's cuckoo bumble bee from 2010 is located near the summit of Mount Washburn at an elevation of 9,347 feet above mean sea level. No Suckley's cuckoo bumble bees have been observed in the United States since 2016 and they are naturally low in abundance (USFWS 2024), decreasing the likelihood this species occurs in the project area. Suckley's cuckoo bumble bee is a generalist nectar forager, and flowering plants preferred by a host species (the western bumble bee) occur in the vicinity of the action areas. Suitable habitat for flowering plants that could be used for feeding occurs along the on-alignment road shoulders, forest openings, and meadow habitat present throughout the action area.

3.4.3.1.6 Western Toad

The western toad occurs throughout most of western North America, from Alaska to New Mexico and was formerly widespread and common but is now scarce except in localized areas. Suitable breeding habitat includes sun-warmed water in lakes, marshes, wetlands, and river backwaters. Adults can sometimes be found far from wetlands because of their ability to soak up water from tiny puddles or moist areas. The western toad is the only toad species confirmed to breed in the Park. Once common, this species has declined in the Park and throughout its range. Chytrid fungus (*Batrachochytrium dendrobatidis*) is suspected to be a leading cause in the

western toad's decline (Montana Natural Heritage Program 2024). Wetlands occur in the project area, as described in the *Wetlands* section, and provide potential habitat for this species. Western toads have been documented to occur in higher elevation areas just west of the project area but have not been documented in the project area (Wyoming Natural Diversity Database 2024).

3.4.3.1.7 Common Loon

Common loons are large waterbirds that use freshwater lakes and ponds for breeding. The majority of the breeding population of common loons in Wyoming occurs in the Park (NPS 2024d). Loons are typically present in the Park from April through November. In 2021, 38 loons in 18 territorial pairs were documented in the Park. Loons rarely nest on lakes smaller than 15 acres (NPS 2024d; Montana Natural Heritage Program 2024). Although several ponds and other bodies of water are in the project area, none of them are large enough to support a breeding pair of loons. This species could occur occasionally in the project area but is unlikely to breed there.

3.4.3.1.8 Rare Plants

As previously described, ULTO is not likely to occur in the project area due to a lack of suitable habitat. Rare plant surveys in the project area in summer 2024 did not identify any federally listed threatened or endangered plant species. Several plant species identified as imperiled or vulnerable by the Montana Natural Heritage Program or Wyoming Natural Diversity Database have been identified in the project area (ERO 2024). Imperiled, vulnerable, or rare plant species identified in the project area are listed in Appendix F.

3.4.3.2 Environmental Consequences

3.4.3.2.1 Alternative 1: No Action

Under the No Action Alternative, impacts on special status species would include temporary habitat loss from construction and could include habitat avoidance during scheduled road maintenance. Some individuals may have become habituated to routine maintenance and, thus, may not be affected. Road maintenance and associated construction that are more intensive than routine maintenance, such as repairing inadequate subgrade, deep excavation, and repair of road failures, could increase sedimentation and turbidity of the Gardner River drainage, which may affect special status species that use the river for drinking water. Additionally, noise and traffic associated with construction during regular road maintenance may lead to behavioral changes such as avoidance of the Gardner River, which may decrease reproductive success and dependable habitat. Given the temporary nature of construction impacts and the availability of extensive habitat nearby, however, the regular maintenance is not expected to have measurable adverse impacts on special status species. The No Action Alternative would not require the removal of vegetation and, therefore, would not have any impacts on rare plants. However, the locations of special status plant populations would be clearly identified in the field prior to the start of construction activities to avoid disturbing rare plants.

3.4.3.2.2 Alternative 2: Center Alignment - NPS Preferred Alternative

Monarch Butterfly, Suckley's Cuckoo Bumble Bee, Western Toad, and Common Loon

The project area does not provide suitable habitat for western toad and common loon, which are only likely to occur in the project area incidentally or during dispersal. The action area lacks suitable breeding habitat for monarch butterfly and contains minimal suitable foraging habitat for both monarch butterfly and Suckley's cuckoo bumble bee, and neither species has been observed in the project area. Further, an abundance of suitable foraging habitat is adjacent to the project area. As such, Alternative 2 would not impact these species.

Grizzly Bear and North American Wolverine

Alternative 2 would result in the permanent loss of approximately 47 acres of foraging habitat. Approximately 7.3 acres of currently nonvegetated areas would be restored by deconstructing portions of the previous North Entrance Road in Gardner Canyon. Although the project would result in a net loss of foraging habitat, habitat loss would not result in measurable impacts on grizzly bear and wolverine due to the small size of the impacts relative to the amount of habitat available for this species in the Park.

Increased human activity and noise during the five construction seasons could cause grizzly bears and wolverines to avoid the project area. Most construction and noise disturbance would occur during the daylight hours when bears are less active. Although a few individual grizzly bears and wolverines may slightly alter their movements because of construction activity, the noise and human presence resulting from Alternative 2 is not expected to affect grizzly bear or wolverine habitat or populations. The availability of habitat surrounding the project area would accommodate displaced individuals. Additionally, habitat restoration in the Gardner Canyon would provide additional suitable habitat for these species over the long term.

The potential also exists for grizzly bear mortality from management actions to remove or relocate grizzly bears that have become habituated to human presence or food conditioned. Human-habituated or food-conditioned bears are more likely to be killed by humans than nonhabituated bears (Mattson et al. 1992). All construction personnel working on the project would be required to attend a briefing session on grizzly bears and proper food storage. Food storage requirements would be strictly enforced. These measures should greatly reduce the risk of human conflicts with grizzly bears and impacts, if any, would be limited to individual animals without population-level effects.

As previously described for other large predators, the potential exists for increased vehicle strikes of wildlife, including grizzly bears and wolverines, from the new road. This risk would be reduced due to the relatively low proposed speed limit (35 mph). The risk of vehicle strikes would be similar to existing conditions.

Ute Ladies'-Tresses Orchid

Although no ULTO individuals were found during field surveys, suitable habitat for the species exists in wetland habitats in the project area. Potential habitat for the species could be adversely affected during ground-clearing activities or trampling by construction equipment. Ground-clearing activities could diminish the suitability of potential habitat. Resource Protection Measures (Appendix D) to avoid and minimize impacts on plants would include avoidance where possible.

Rare Plants

Thirteen rare plant species were documented within the limits of disturbance for Alternative 2, including western fairy candelabra (*Androsace occidentalis*), Indian-hemp (*Apocynum cannabinum*), alkali sagebrush (*Artemisia arbuscula ssp. Longiloba*), wedgescale orache (*Atriplex truncata*), longspike Indian paintbrush (*Castilleja coccinea*), gray-green thistle (*Cirsium canovirens*), buff fleabane (*Erigeron ochroleucus*), Tweedy's fleabane (*Erigeron tweedyi*), hairy golden-aster (*Heterotheca villosa*), lava aster (*Lonactis alpina*), brittle prickly pear (*Opuntia fragilis*), clammy weed (*Polanisia dodecandra*), and slender wirelettuce (*Stephanomeria tenuifolia*), covering a total of approximately 2 acres. Of these species, only gray-green thistle and lava aster are ranked as S1(State Critically Imperiled) in Wyoming. Gray-green thistle consists of 14 populations with 1 to 20 individuals, and lava aster consists of 3 populations with 1 to 20 individuals within the alignment. No Montana S1 plants are in the Alternative 2 area. Two S2 (State Imperiled) listed fleabane species (linearleaf fleabane and Tweedy's fleabane) are in the Wyoming portion of Alternative 2. Rare plants within the limits of disturbance could be adversely affected during ground-clearing activities or trampling by construction equipment. Resource Protection Measures (Appendix D) to avoid and minimize impacts on rare plants would include avoidance (where possible), potentially harvesting seeds for use in revegetation, and transplanting of individual plants for use in revegetation efforts if avoidance is not practicable. Avoidance and restoration efforts would focus on S1 and S2 species.

3.4.3.2.3 Alternative 3: OGR Alignment

Monarch Butterfly, Suckley's Cuckoo Bumble Bee, Western Toad, and Common Loon

The project area does not provide suitable habitat for western toad and common loon, which are only likely to occur in the project area incidentally or during dispersal. The action area lacks suitable breeding habitat for monarch butterfly and contains minimal suitable foraging habitat for both monarch butterfly and Suckley's cuckoo bumble bee, and neither species has been observed in the project area. Further, an abundance of suitable foraging habitat is adjacent to the project area. As such, Alternative 3 would not impact these species.

Grizzly Bear and North American Wolverine

Alternative 3 would result in permanent loss of approximately 30.4 acres of foraging habitat, and approximately 10.1 acres of habitat would be restored by deconstructing portions of the previous North Entrance Road in Gardner Canyon. Although the project would result in a net loss of foraging habitat, habitat loss would not result in measurable impacts on grizzly bear and wolverine due to the small size of the impacts relative to the amount of habitat available for this species in the Park. Because Alternative 3 would generally follow the existing OGR alignment, impacts on grizzly bear and wolverine habitat from fragmentation would be minimal. Given the temporary nature of construction impacts and the availability of extensive habitat nearby, the project is not expected to have measurable adverse impact on grizzly bear and wolverine foraging habitat beyond the net permanent loss of approximately 20.3 acres of foraging habitat. The availability of habitat surrounding the project area would accommodate displaced individuals. Additionally, habitat restoration in the Gardner Canyon would provide additional suitable habitat for these species over the long term.

Potential impact on grizzly bears and wolverines from construction noise, management actions resulting from food habituation, and vehicle strikes (and proposed Resource Protection

Measures in Appendix D) would be the same as described for Alternative 2, except that construction would last for six years instead of five. All construction personnel working on the project would be required to attend a briefing session on grizzly bears and proper food storage. Park regulations related to food storage requirements would be strictly enforced. These measures should greatly reduce the risk of human conflicts with grizzly bears and impacts, if any, would be limited to individual animals without population-level effects.

Ute Ladies'-Tresses Orchid

Although no ULTO individuals were found during field surveys, suitable habitat for the species exists in wetland habitats in the project area. Potential habitat for the species could be adversely affected during ground-clearing activities or trampling by construction equipment. Ground-clearing activities could diminish the suitability of potential habitat. Resource Protection Measures (Appendix D) to avoid and minimize impacts on plants would include avoidance where possible.

Rare Plants

Ten rare plant species were documented within the limits of disturbance for the Alternative 3 alignment, including western fairy candelabra, red threeawn, low sagebrush, alkali sagebrush, silverscale, wedgescale orache, longspike Indian paintbrush, Tweedy's fleabane, hairy golden-aster, and brittle prickly pear covering a total of approximately 0.51 acre. No plants rated S1 (State Critically Imperiled) were found within the limits of disturbance for Alternative 3. Rare plants within the limits of disturbance could be adversely affected during ground-clearing activities or trampling by construction equipment. Resource Protection Measures (Appendix D) to avoid and minimize impacts on rare plants would include avoidance (where possible), potentially harvesting seeds for use in revegetation, and transplanting of individual plants for use in revegetation efforts if avoidance is not practicable.

3.4.3.2.4 Alternative 4: Gardner Canyon Alignment

Monarch Butterfly, Suckley's Cuckoo Bumble Bee, Western Toad, and Common Loon

The project area does not provide suitable habitat for western toad and common loon, which are only likely to occur in the project area incidentally or during dispersal. The action area lacks suitable breeding habitat for monarch butterfly and contains minimal suitable foraging habitat for both monarch butterfly and Suckley's cuckoo bumble bee, and neither species has been observed in the project area. Further, an abundance of suitable foraging habitat is adjacent to the project area. As such, Alternative 4 would not impact these species.

Grizzly Bear and North American Wolverine

Alternative 4 would result in permanent loss of approximately 29.1 acres of foraging habitat. Given the temporary nature of construction impacts and the availability of extensive habitat nearby, however, the project is not expected to have measurable adverse impacts on grizzly bear and wolverine foraging habitat beyond the permanent loss of approximately 29.1 acres of foraging habitat. The availability of habitat surrounding the project area would accommodate displaced individuals.

Potential impacts on grizzly bears and wolverines from construction noise, management actions resulting from food habituation, and vehicle strikes (see also proposed Resource Protection Measures in Appendix D) would be the same as described for Alternative 2, except that construction would last nine years instead of five. All construction personnel working on the

project would be required to attend a briefing session on grizzly bears and proper food storage. Park regulations related to food storage would be strictly enforced. These measures should greatly reduce the risk of human conflicts with grizzly bears and impacts, if any, would be limited to individual animals without population-level effects.

Ute Ladies'-Tresses Orchid

Although no ULTO individuals were found during field surveys, suitable habitat for the species exists in wetland habitats in the project area. Potential habitat for the species could be adversely affected during ground-clearing activities or trampling by construction equipment. Ground-clearing activities could diminish the suitability of potential habitat. Resource Protection Measures (Appendix D) to avoid and minimize impacts on plants would include avoidance where possible.

Rare Plants

Ten rare plant species were documented within the limits of disturbance for the Alternative 4 alignment, including western fairy candelabra, Indian-hemp, wedgescale orache, longspike Indian paintbrush, gray-green thistle, hairy golden-aster, lava aster, brittle prickly pear, clammy weed, and slender wirelettuce, covering a total of approximately 0.95 acre. Of these species, two species, gray-green thistle and lava aster, are ranked as S1 (State Critically Imperiled) in Wyoming. Gray-green thistle consists of 14 populations with 1 to 20 individuals, and lava aster consists of 1 population with 1 to 20 individuals within the alignment. Rare plants within the limits of disturbance could be adversely affected during ground-clearing activities or trampling by construction equipment. Resource Protection Measures (Appendix D) to avoid and minimize impacts on rare plants would include avoidance (where possible), potentially harvesting seeds for use in revegetation, and transplanting individual plants for use in revegetation efforts if avoidance is not practicable. Avoidance and restoration efforts would focus on S1 (State Critically Imperiled) and S2 (State Imperiled) species.

3.4.4 Vegetation and Soils

3.4.4.1 Affected Environment

Based on field surveys conducted in 2023 and 2024, vegetation communities in the project area include xeric sagebrush steppe, mixed-conifer woodland, and riparian habitat (NPS 2023c).

The majority of the project area is dominated by xeric sagebrush steppe, which is predominantly a mix of native species. Native grasses occurring in the project area include western wheatgrass (*Elymus smithii*), bluebunch wheatgrass, basin wildrye (*Leymus cinereus*), Sandberg bluegrass, and Junegrass (*Koeleria macrantha*). Common forbs in this community include fringed sage (*Artemisia frigida*), common yarrow (*Achillea millefolium*), prickly pear (*Opuntia polyacantha*), and phlox (*Phlox hoodii*). Very small annual native forbs grow between shrubs including blue-eyed Mary (*Collinsia parviflora*) and tiny trumpet (*Collomia linearis*).

Nonnative species are also present in the project area, such as Kentucky bluegrass (*Poa pratensis*), cheatgrass (*Bromus tectorum*), alyssum (*Alyssum* species), timothy (*Phleum pratense*), crested wheatgrass (*Agropyron cristatum*), and smooth brome (*Bromus inermis*). The project area includes native sagebrush communities that have been replaced with nonnative vegetation species in areas of bare ground. Rabbitbrush (*Ericameria nauseosa*), a common shrub, grows with the sagebrush. However, native species still dominate most of the construction area with

more invasions occurring near Gardiner. Some areas in the northern portion of the project area toward Gardiner are currently heavily invaded by invasive annual grasses, which has converted this vegetation community away from the bluebunch wheatgrass-Sandberg wheatgrass (*Poa secunda*) vegetation type.

Sagebrush steppe largely occurs on hillslopes and terraces throughout the project area. Multiple species of sagebrush occur throughout the project area, including a species (*Artemisia arbuscula*) that does not grow in much of the rest of the Park. Mixed-conifer woodlands are limited to locations along or near drainages in the project area or higher along the hillslopes in the western section of the project area. Riparian areas are concentrated along the Gardner River and the Slide Lake drainages in the project area. These areas are interspersed with dominant upland vegetation such as conifers and montane grasses outlining creeks and drainages, and on steep hillslopes. The riparian community above the Gardner River and Slide Lake contains riparian woodland and riparian shrublands and the riparian community along the Gardner River occurs as a mosaic of multiple communities that are tree-dominated with a diverse shrub component. Riparian vegetation in the project area includes mountain alder (*Alnus incana*), Canada goldenrod (*Solidago canadensis*), and American licorice (*Glycyrrhiza lepidota*). Other shrubs observed include snowberry (*Symphoricarpos* spp.), chokecherry (*Prunus virginiana*), dogwood (*Cornus sericea*), and prickly rose (*Rosa acicularis*).

During the 2023 and 2024 field surveys, noxious weed species were observed in the project area and include spotted knapweed, cheatgrass, dalmatian toadflax (*Linaria dalmatica*), field bindweed (*Convolvulus arvensis*), and Canada thistle (*Cirsium arvense*). Houndstongue (C*ynoglossum officinale*) is also spreading across the landscape in the project area. These species were more commonly observed near areas of disturbance such as road edges and trails.

3.4.4.1.1 Soils

The topography of the project area generally slopes downward from the west side of the OGR eastward to the Gardner River and its floodplain (Figure 10). Soils in the project area primarily consist of loams, clay loams, sandy loams, and silty clay loams (U.S. Department of Agriculture, Natural Resources Conservation Service [USDA, NRCS] 2023a). Soils in the valley floor along the Gardner River that comprise the lower elevations of the Park generally developed from alluvium of sedimentary rock or rhyolite. The USDA, NRCS mapped several primary soil series types (with multiple subseries) in the project area (USDA, NRCS 2023b). The largest soil series mapped as occurring in the project area includes Lepner-Gladlow-Beartooth families complex. This families complex has well-drained soils that formed in earthflow deposits derived from sedimentary rock; the Bolack subseries is mapped in the project area and is listed on the national hydric soils list (USDA, NRCS 2023b).

3.4.4.2 Environmental Consequences

3.4.4.2.1 Alternative 1: No Action

Under the No Action Alternative, the temporary entrance road would remain in its current location and continue to cause soil disturbance (e.g., by vehicles frequently pulling off beyond the narrow shoulder), contribute to roadside areas denuded of vegetation, and be prone to invasion by nonnative species. Regular road maintenance would increase the potential for soil erosion and sedimentation to waterways. The areas that were damaged by the 2022 flood are

more susceptible to erosion along the banks and could result in additional collapse where the road has been temporarily restored. The temporary entrance road was not built for long-term use and would need heavy maintenance, increasing disturbance of soils. No vegetation removal would be necessary under the No Action Alternative. Weed control methods would be implemented to minimize the introduction of noxious weeds during periodic maintenance activities.

3.4.4.2.2 Alternative 2: Center Alignment - NPS Preferred Alternative

Under Alternative 2, temporary and permanent disturbance of the vegetation and soils in the project area would occur. Construction of the new bridge structures and development of the new road segment past the Chinese Gardens toward Gardiner would eliminate existing vegetation communities along the new road and expand the area of soil and vegetation disturbance. Approximately 47 acres in the project area would be permanently affected under Alternative 2 by existing disturbance and new disturbance.

During construction, short-term adverse impacts on vegetation and soils would result from vegetation removal, soil disturbance, and compaction, and from the potential introduction and spread of nonnative species. Soil disturbance tends to encourage the establishment of noxious weeds, which could be a concern where nonnative species were inventoried in the project area. Construction activities would encourage the nonnative species to expand their habitat, potentially outcompeting native species that are not strongly established. This may reduce the ability of native species to establish, grow, or thrive in the project area in favor of nonnative species. However, a large area in the northern portion of the project area has already been invaded by invasive annual grasses and does not currently represent a diverse high-quality vegetation community. Impacts resulting from construction would be minimized through Resource Protection Measures described in Appendix D.The Proposed Action would be designed to minimize the visual intrusion of any new structures and would incorporate Resource Protection Measures (Appendix D) during the design process, including a review of contour plans, viewshed angles, and other pertinent aesthetic details. Resource Protection Measures, including recontouring and revegetating disturbed areas, would also take place following construction. Revegetation efforts would strive to reconstruct the natural spacing, abundance, and diversity of native plant species using native species as described in the project's revegetation plan. All disturbed areas would be restored as nearly as possible to natural conditions after construction activities are completed. Weed control methods would be implemented to minimize the introduction and spread of priority invasive weeds.

3.4.4.2.3 Alternative 3: OGR Alignment

Under Alternative 3, widening of the road template along the temporary entrance road and replacing drainage structures would have long-term adverse impacts on vegetation and soils. Vegetation located directly under where the new road is proposed would be permanently lost, and vegetation adjacent to and in the vicinity of the new alignment would also experience indirect long-term adverse impacts as a result of soil compaction and an alteration and fragmentation of the habitat. Under Alternative 3, approximately 30.4 acres would be disturbed and permanently affected by the road widening.

Portions of the road that need to be restored would require large quantities of topsoil, which would largely consist of seed bed salvage and reused soil. Because topsoil is likely to contain a high proportion of noxious weed seeds that would be difficult to eradicate and control during reseeding of the soil with native species, the use of certified weed-free topsoil would be required in the project area (Appendix D).

The realigned road would most likely disturb and partially eliminate areas of native sagebrush shrubland, while introducing opportunities for the expansion of nonnative grassland types, which may establish more easily than native vegetation types in disturbed areas post-construction. These impacts would be similar to those described under Alternative 2, but would be slightly decreased, as the proposed alignment under Alternative 2 diverges more from the existing road and, therefore, more undisturbed habitat would be removed.

During construction, short-term adverse impacts on vegetation and soils would result from vegetation removal, soil disturbance, and compaction, and from the potential introduction and spread of nonnative species. Impacts resulting from construction would be minimized through Resource Protection Measures described in Appendix D. Resource Protection Measures described under Alternative 2, including recontouring and revegetating disturbed areas, would also be implemented under Alternative 3. These measures would be implemented following construction and would be designed to minimize impacts on vegetation and soils.

3.4.4.2.4 Alternative 4: Gardner Canyon Alignment

Under Alternative 4, the existing road alignment of the North Entrance Road would remain in its current location and continue to be prone to invasion by nonnative species. Alternative 4 would also include the construction of new structures through the Gardner Canyon (rock shed, retaining walls, and bridges), which would contribute to soil and vegetation disturbance in areas that were not previously disturbed. Approximately 29.1 acres in the project area would be permanently affected by Alternative 4.

The continuing erosion, due to normal rain events, of the bank along the Gardner River adjacent to the road (pre- and post-flood) would continue to result in the loss of riparian vegetation along the bank. A majority of the existing road is in xeric sagebrush steppe areas that are being disturbed as a result of current road activities.

During construction, short-term adverse impacts on vegetation and soils would result from vegetation removal, soil disturbance, and compaction, and the potential introduction and spread of nonnative species. Impacts resulting from construction would be minimized through Resource Protection Measures described in Appendix D. Resource Protection Measures described under Alternative 2, including recontouring and revegetating disturbed areas, would also be implemented under Alternative 4. These measures would be implemented following construction and would be designed to minimize impacts on vegetation and soils.

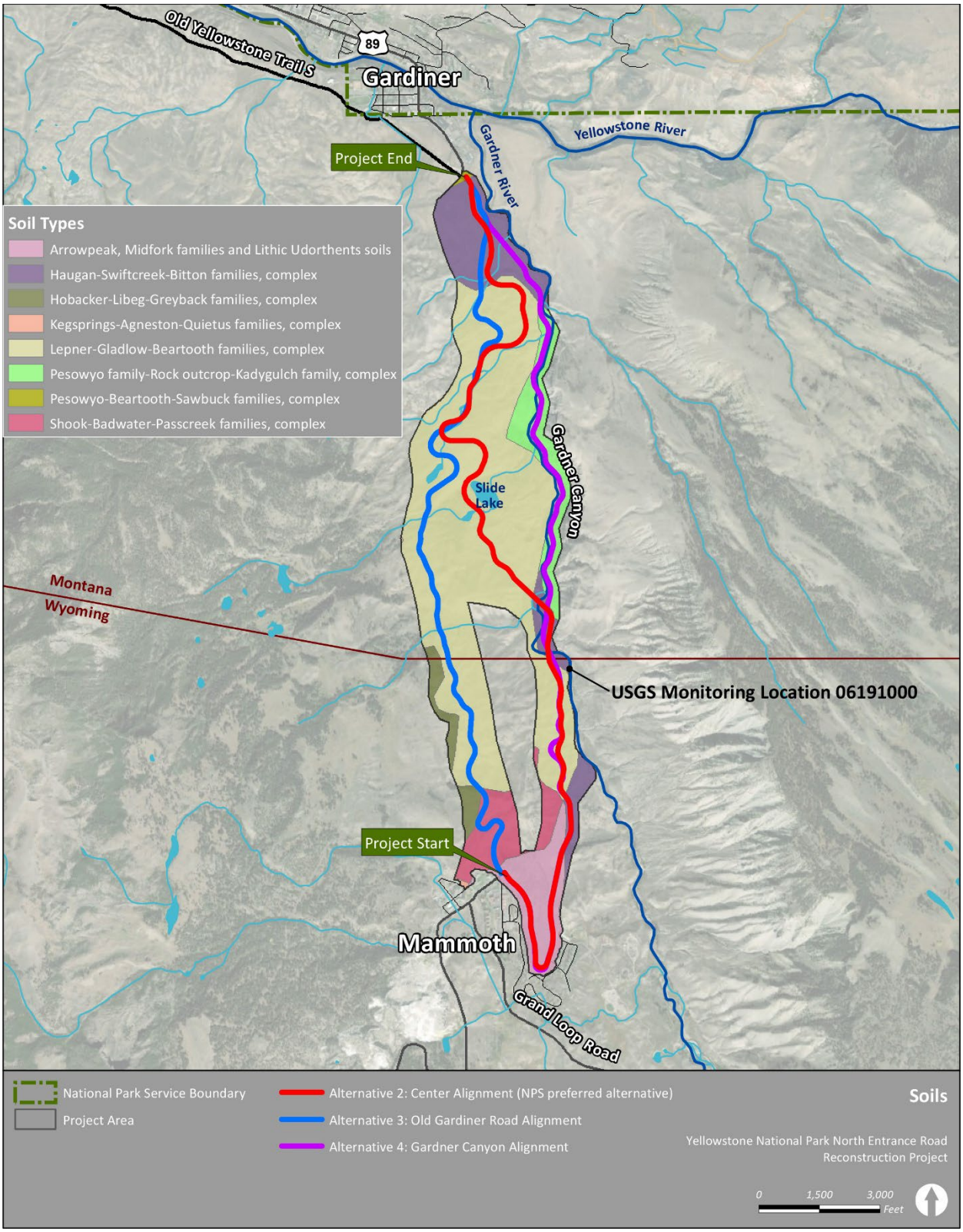


FIGURE 10. SOILS

3.4.5 Water Resources (Surface Water and Wetlands)

3.4.5.1 Affected Environment

3.4.5.1.1 Surface Water

The Gardner River is in the northwestern corner of the Park (Figure 1) and is listed in the Nationwide Rivers Inventory. The Gardner River is believed to possess one or more "outstandingly remarkable" natural or cultural values. It is approximately 25 miles long and formed below Cache Lake near Electric Peak, one of the Park's highest peaks. It is a tributary of the Yellowstone River and originates in the northwest corner of the Park, initially flowing southward. After merging with Panther Creek, Indian Creek, and Obsidian Creek, the Gardner River then turns north and flows through a steep canyon at Sheepeater Cliffs. Below Sheepeater Cliffs, Glen Creek and Lava Creek join the Gardner River near Mammoth Hot Springs. In the project area, as shown on Figure 11a, the Gardner River flows to the north through Gardner Canyon and empties into the Yellowstone River near Gardiner, Montana. Hydrothermal water from Mammoth Hot Springs flows into the Gardner River, primarily from the Boiling River.

The Gardner River crosses the damaged (pre-flood) North Entrance Road multiple times and, during the catastrophic 2022 flood, washed out entire portions of the road, making it inaccessible. The Gardner River is approximately 25 to 60 feet wide in the project area with a water depth of several inches to several feet as observed during the 2023 site visit (NPS 2023c). The substrate of the Gardner River is sand, gravel, cobble, and boulders with limited areas of exposed bedrock (see Section 3.4.6, Geologic Resources for further discussion). The U.S. Geological Survey (USGS) monitors the Gardner River near Mammoth Hot Springs at station 06191000 (USGS 2024). At the Gardner River near Mammoth Hot Springs, an average gage height of approximately 2 feet is typically recorded with flows, increasing May through July associated with spring runoff. Median daily flows during spring runoff range from approximately 200 to 800 cubic feet per second (cfs) with flows averaging approximately 100 cfs from August through April. Over the last 10 years of monitoring, the highest recorded discharge occurred during the 2022 flood that destroyed the North Entrance Road, at 2,540 cfs, measured on June 13, 2022.

Slide Lake is a perennial lake in the central portion of the project area (Figure 11b). A palustrine emergent (PEM) wetland fringe is present around the lake and is discussed in more detail below in the *Wetlands* section. Slide Lake receives runoff from upstream to the west and drains eastward to the Gardner River.

An unnamed perennial pond is northwest of Slide Lake (Figure 11b). A PEM wetland fringe is present around the pond and is discussed in more detail below in the *Wetlands* section. The unnamed pond receives runoff from upstream to the southwest and west. It appears this pond may have drained to the northeast during high-flow events, but the additional development of the OGR appears to have resulted in a disconnect from its historical drainage (NPS 2023c).

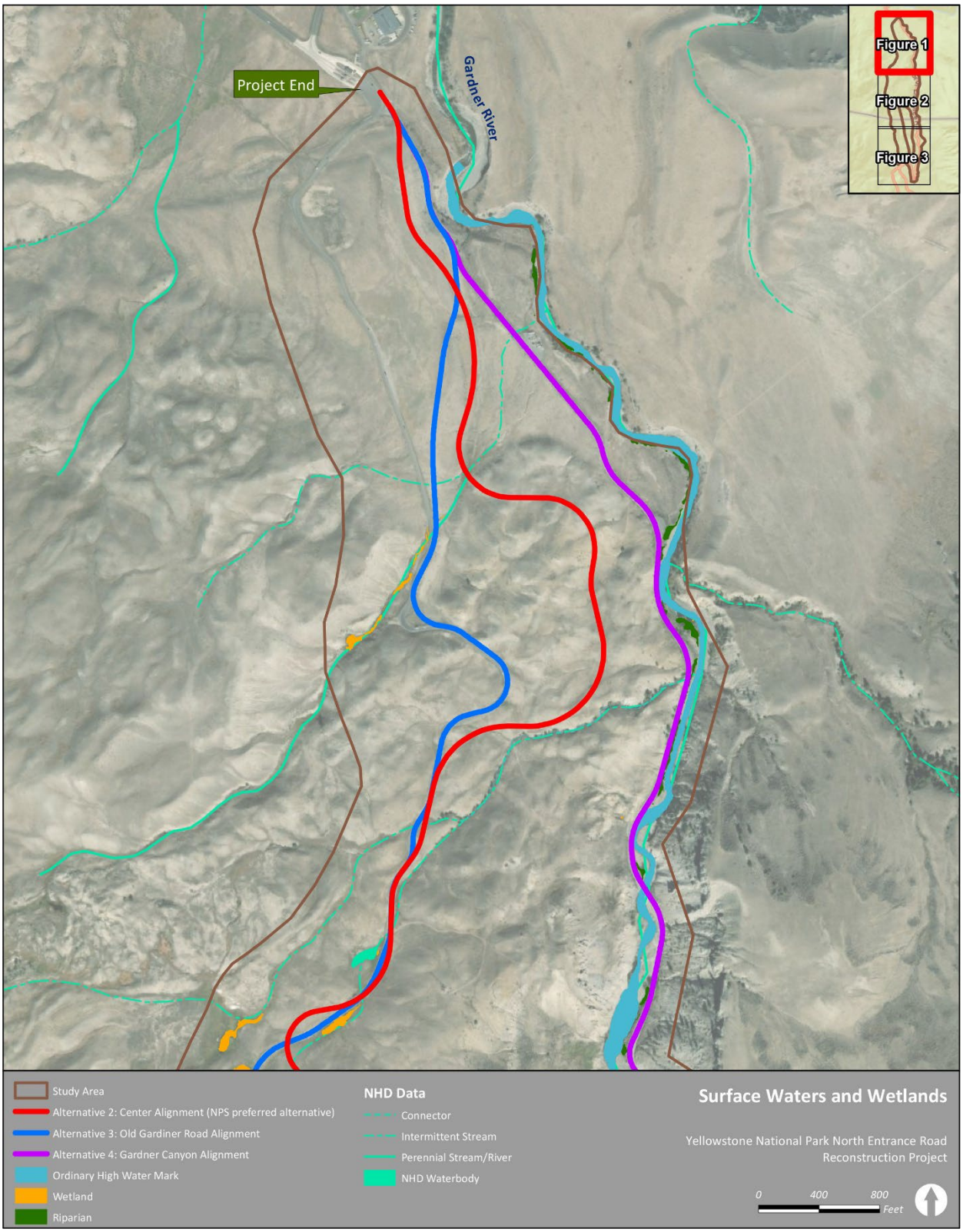


FIGURE 11A. SURFACE WATERS AND WETLANDS
NHD = National Hydrography Dataset

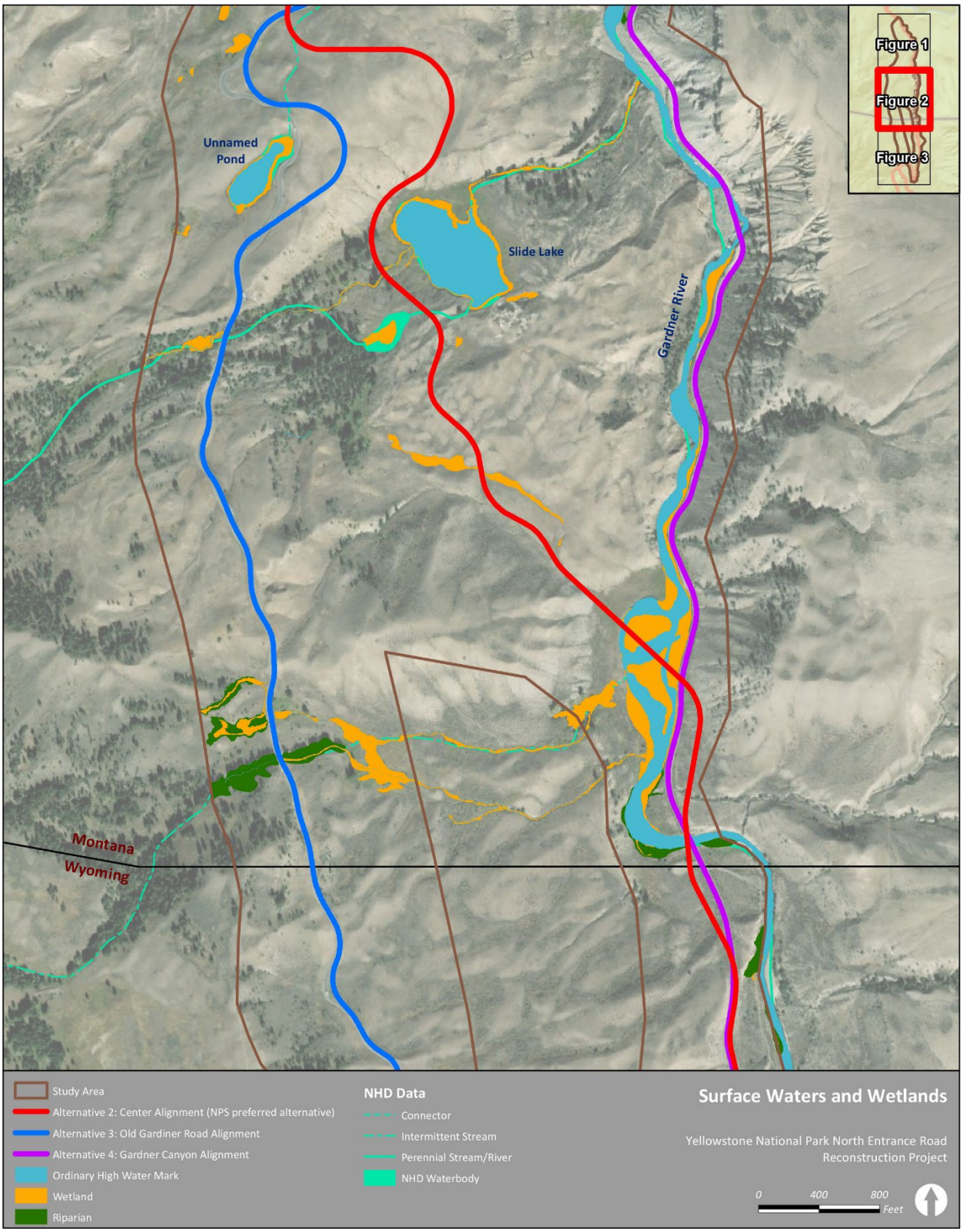


FIGURE 11B. SURFACE WATERS AND WETLANDS
NHD = National Hydrography Dataset

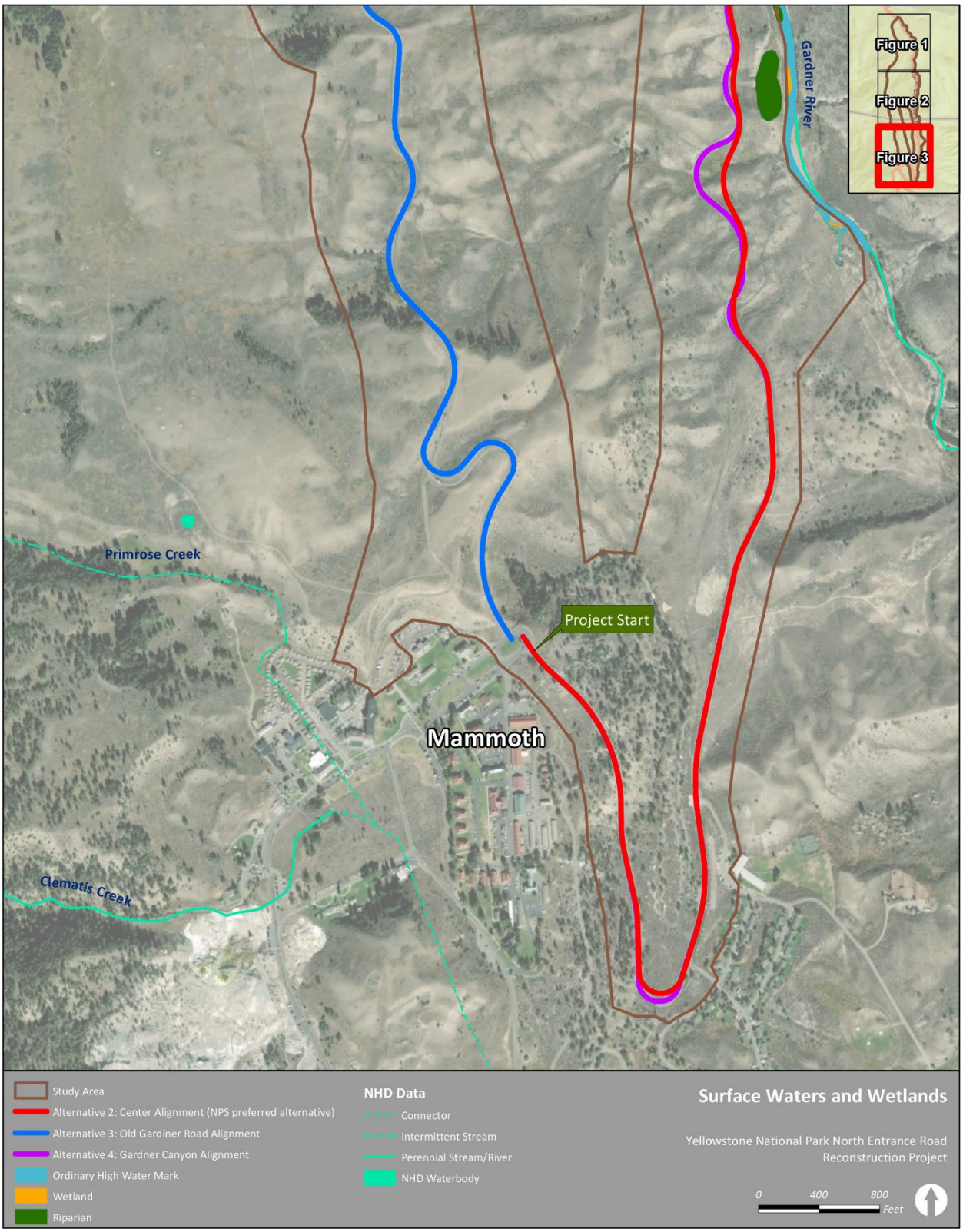


FIGURE 11C. SURFACE WATERS AND WETLANDS
NHD = National Hydrography Dataset

Floodplains

Executive Order 11988, "Floodplain Management" requires the NPS and other federal agencies to evaluate the likely impacts of actions in floodplains. As required by Executive Order 11988, and in accordance with Director's Order (DO) 77-2: *Floodplain Management*, if a proposed action is found to be in an applicable regulatory floodplain and relocating the action to a nonfloodplain site is not considered a viable alternative, then flood conditions and associated hazards must be quantified as a basis for management decision making, and a formal Statement of Findings must be prepared. A Statement of Findings for Floodplain Management and Wetland Protection (Appendix G) was completed for the project. The following provides a brief summary. No Federal Emergency Management Agency (FEMA)-mapped floodplains are in the project area. The FEMA Flood Insurance Rate Map that includes Gardiner, Montana does not show any mapped flood hazard areas along the Gardner River or other streams in the project area, and the FEMA digital floodplain mapping of Yellowstone National Park similarly does not show mapped flood hazard areas in the project area. The Gardner River and surrounding areas are shown on FEMA mapping as *Zone D: Areas with possible but undetermined flood hazards*, indicating that no flood hazard analysis has been conducted.

The existing floodplain in the project area was mapped along the Gardner River by the FHWA-WFLHD. The modeled 100-year and 500-year floodplains in the project area are shown on Figure 8 of Appendix G. The project area is partially within the 100-year floodplain. The project would require work within the 100-year and 500-year floodplains. Floodplain values in the project area associated with the Gardner River include the ability of the floodplain to absorb increased water flows and reduce downstream flood risks, improve water quality by filtering contaminants during flood events, recharge groundwater, and provide floodplain habitat.

3.4.5.1.2 Wetlands

For this EA and compliance with Executive Order 11990, "Protection of Wetlands" and DO #77-1: *Wetland Protection*, the NPS uses Classification of Wetlands and Deepwater Habitats of the United States (Cowardin et al. 1979) as the standard for defining, classifying, and inventorying wetlands. Habitats addressed for this analysis include wetlands, navigable waters, lakes, ponds, small streams, and some ditches.

An aquatic resources inventory was conducted in the project area from July 31 through August 4, 2023 to delineate wetlands and other waters of the United States (NPS 2023c). Results of the aquatic resources inventory are presented in the Aquatic Resources Inventory Report and summarized below (NPS 2023c). NPS Other surface water resources are described in the *Surface Water* section above.

Wetlands were assessed using the Montana Wetland Assessment Method (MWAM) for functional scores from I to IV (with I being the highest quality and IV being the lowest quality) (NPS 2023c). Wetlands cover approximately 16.1 acres of the project area (Figure 11a, Figure 11b, and Figure 11c). Five types of wetlands were documented in the project area and are described below, including Gardner River wetlands, seep-supported wetlands, unnamed pond and fringe wetlands, Slide Lake drainage wetlands, and depressional wetlands. Affected wetlands scored either category II or III for function, with the majority having a functional score of II. These wetlands function at high levels, providing habitat for wildlife, fish, and sensitive listed species, and are highly functioning for sediment/nutrient/toxicant removal,

sediment/shoreline stabilization, production export/food chain support, groundwater discharge/recharge, and recreation/education potential.

Gardner River Wetlands

Wetlands along the Gardner River are dominated by PEM wetlands with limited areas of palustrine scrub-shrub (PSS) wetlands. Due to the dynamic nature of the Gardner River, some wetlands have developed more recently because of flooding. However, it is likely that more wetlands were present pre-flooding than what are currently in the project area as some wetlands have been lost to erosion. The primary water source to this wetland community is surface water and subsurface seepage. The dominant species in these wetlands are willow (*Salix* sp.), bluejoint reedgrass (*Calamagrostis canadensis*), water sedge (*Carex aquatilis*), Baltic rush (*Juncus balticus*), American licorice, and redtop.

These wetlands provide habitat for wildlife, including the federally threatened grizzly bear. The wetlands also provide fish habitat and are highly functioning for sediment, nutrient, and toxicant removal; sediment and shoreline stabilization; and food chain support.

Seep-Supported Wetlands

Seep supported wetlands are predominantly PEM wetlands that occur throughout the project area. The primary water source is groundwater upwelling. The dominant species in the wetlands include beaked sedge (*Carex utriculata*), water sedge (*Carex aquatilis)*, redtop, seep monkeyflower (*Mimulus guttatus*), and Nebraska sedge (*Carex nebrascensis*).

These wetlands provide habitat and water sources for general wildlife and for sensitive listed species. These wetlands provide some functions, including food chain support, groundwater discharge and recharge, and overall uniqueness. Ecological uniqueness is defined as a site or ecosystem having a distinct species composition and high species diversity.

Unnamed Pond and Fringe Wetlands

Slide Lake and an unnamed pond are located in the central portion of the project area (Figure 11b). Fringe PEM wetlands surround these open waters. The primary water source to the fringe wetlands is surface water and subsurface seepage. The dominant species in the fringe wetlands include hardstem bulrush (*Schoenoplectus acutus*), redtop, beaked sedge, and broadleaf cattail (*Typha latifolia*), and black creeper sedge (*Carex praegracilis*).

Slide Lake and the unnamed pond provide habitat for wildlife by offering a year-round water source and wetland vegetation. The lakes also provide high functions for short- and long-term surface water storage, sediment and shoreline stabilization, food chain support, and groundwater discharge and recharge. Slide Lake has a connection to the Gardner River and is a relatively permanent water source. The unnamed pond does not appear to have a surface connection to any known waters of the United States and appears to be isolated.

Slide Lake Drainage Wetlands

Drainages above and below Slide Lake contain PSS and PEM wetlands. The primary water source to this wetland community is surface flow from upgradient beaver ponds, surface water from precipitation, and subsurface seepage. The dominant species in these wetlands are Rocky Mountain juniper (*Juniperus scopulorum*), Wolf's willow (*Salix wolfii*), speckled alder (*Alnus incana*), red osier dogwood (*Cornus sericea*), beaked sedge, water hemlock (*Cicuta maculata*), Baltic rush, fowl bluegrass (*Poa palustris*), redtop, and sweet clover (*Melilotus officinalis*).

The drainage wetlands provide habitat for wildlife by offering a water source and wetland vegetation. The wetlands also provide high functions for sediment and shoreline stabilization, groundwater discharge and recharge, recreational use, such as wildlife viewing, and education potential.

Depressional Wetlands

Many isolated depressional PEM wetlands are in the project area. Several of these wetlands appear to be located in dry pond depressions. The primary water source to this wetland community is precipitation. The dominant species in these wetlands are common spikerush (*Eleocharis palustris*), Baltic rush, Nebraska sedge, foxtail barley (*Hordeum jubatum*), black creeper grass, and hardstem bulrush. The depressional wetlands consist of emergent communities that provide important habitat for wildlife. Disturbances in the wetlands are few, with most occurring in the Park surrounded by uplands. The wetlands provide shoreline stabilization, groundwater discharge and recharge, and recreational opportunities and education potential. NPS mandate per DO #77-1 is to mitigate and avoid all wetlands regardless of jurisdictional nature.

3.4.5.2 Environmental Consequences

3.4.5.2.1 Alternative 1: No Action.

Under the No Action Alternative, no new environmental impacts on wetlands would occur. Current conditions would continue, and no modification to the temporary entrance road would be made. The temporary entrance road would continue to be used, and conditions including narrow lanes, unpaved shoulders, and deteriorating pavement conditions would continue.

3.4.5.2.2 Alternative 2: Center Alignment - NPS Preferred Alternative

Surface Water

The piers for the new Boiling River Bridge and Gardens Bridge would span the active stream channel and would be protected from major flows by large rocks (riprap) that would potentially be set in place with concrete (shotcrete) for stabilization. Disturbed areas would be revegetated following construction with native species.

Permanent impacts on the floodplain would include placement of a pier for the Gardens Bridge within the regulatory floodplain of the Gardner River. The pier would be up to 12 feet in diameter and would have a permanent footprint in the floodplain of approximately 115 square feet (0.003 acre) in the 500-year and 100- year floodplain. The project would also involve up to 1.2 acres of temporary floodplain impacts from construction of temporary work bridges during construction of the new bridges and restoration of Gardner Canyon. The project area encompasses approximately 28.5 acres of 100-year floodplain and 29.7 acres of 500-year floodplain. Therefore, anticipated net impacts associated with the pier for the Gardens Bridge would affect less than 0.01 percent of the floodplains in the project area for the pier, which represents a negligible amount. Anticipated temporary impacts associated with temporary work bridges would affect approximately 4 percent of floodplains in the project area, which is minimal. Impacts would be mitigated by Resource Protection Measures during construction and would cease after construction (Appendix D). The second pier for the Gardens Bridge would be outside the floodplain. Both new bridges would be designed to pass the 100-year floodplain with 5 feet of additional clearance for woody debris and ice flow and, thus, would not be expected to

alter or constrict flood waters. The temporary work bridges would be constructed with two rows of temporary piles installed in the channel for the length of the temporary crossing. The temporary work bridges would be removed once the proposed new Boiling River and Gardens Bridges are constructed. The temporary work bridge for the Boiling River would be in place for two years, and the temporary work bridge for the Gardens Bridge would be in place for three years. Because the work bridges would be in place for multiple years, they would be designed at minimum to pass the 10-year flood event, with additional freeboard of 5 feet to the low chord. Impacts on floodplains are described in greater detail in the *Wetland and Floodplains Statement of Findings* (Appendix G).

Activities during construction of the Boiling River Bridge and Gardens Bridge over the Gardner River would occur in the regulatory floodplain. Construction activities would temporarily impact natural floodplain values along the river. The floodplain would be negatively impacted during construction due to the presence of the temporary access bridges, construction equipment, materials in the floodplain, and possible erosion from bare soils prior to revegetation. The total area of temporary impacts would be approximately 1.2 acres in the regulatory (500-year) floodplain. Potential impacts on water quality would include increases in suspended sediments that would last only as long as these in-water activities occur, which are expected to last for a few weeks. To minimize stormwater impacts, the NPS would obtain the appropriate National Pollutant Discharge Elimination System Permit for Discharges of Stormwater Associated with Construction Activities and would develop a site-specific stormwater pollution prevention plan. Construction activities would be monitored, and erosion and sediment control BMPs would be implemented to minimize erosion and sediment movement. Any in-water work would be isolated from the active river flow using a cofferdam. Construction vehicles have the potential to introduce pollutants and increase sedimentation into the Gardner River and decrease water quality; however, Resource Protection Measures (Appendix D), such as checking equipment for leaks prior to use, using environmentally friendly lubricants in equipment involved in in-water work, refueling restrictions including restricting fuel storage and hazardous waste storage during construction to at least 3 feet above the regulatory floodplain elevation, and containing construction activities where work is occurring next to surface water (see Appendix D), would be used to limit the short-term water quality impacts and lessen impacts on fish and other aquatic organisms. The road construction techniques and Resource Protection Measures (Appendix D) implemented would be the same as those implemented to construct the sewer line alignment associated with Alternative 2; therefore, sewer line construction impacts would be negligible and would not add any additional impacts to those already incurred from the road construction activities.

Water for dust control and compaction of road base materials would be drawn from the Gardner River, resulting in negligible water use and impacts on stream flow (cubic feet per second) that are not measurable. Any water used would not be allowed to migrate back to the river or creek, and all equipment used for pumping and hauling would be decontaminated prior to use to prevent the potential spread of aquatic invasive species. Equipment fueling would occur at least 150 feet from surface waters. Water for concrete preparation would be from a potable water source; therefore, no impact on Gardner River flow would occur from concrete preparation.

Following road construction, road runoff water would generally flow over the soil or road surface and infiltrate into adjacent Park land. On bridges, water would be routed to the bridge end and infiltrated (i.e., no direct discharge would occur). In areas of wetlands, road water would be routed away from wetlands to infiltrate into nonwetland soils. These actions would limit any potential long-term water quality impacts related to construction of the alternative.

A portion of the damaged road sections associated with the previous North Entrance Road alignment running through the Gardner Canyon would be removed and reclaimed (as funding allows), and materials would be reused in the construction of the Alternative 2 alignment to the greatest extent feasible. This would allow a return of the natural character of the Gardner River and floodplain in the area where Alternative 2 bypasses the river.

Wetlands

Placement of fill for the new road alignment and from construction of a pier for the Gardens Bridge would permanently remove 0.028 acre of the 16.1 acres of vegetated wetlands that occur in the project area. Permanent loss of 0.0017 acre (30 linear feet) of rivers and stream (unvegetated wetlands) would occur from cut and fill associated with the new road alignment. Temporary impacts on 0.187 acre of vegetated wetlands would occur from the construction of the Gardens Bridge and from cut and fill for the new alignment. Construction of the Boiling River Bridge and Gardens Bridge would also result in temporary impacts on 0.403 acre (1,520 linear feet) of streambed, which would impact soils and wetland vegetation. Temporary wetland impacts would occur from cut and fill associated with the new road alignment and from construction of the temporary work bridges. Temporary impacts would be restored by removing the work bridges and revegetating disturbed surfaces with native plant species. Wetlands that would be affected by Alternative 2 are supported by seeps and subsurface flow, pond surface water, and the Gardner River. The wetlands that would be affected consist mostly of PEM communities and a few PSS communities that provide habitat for wildlife, including the federally threatened grizzly bear. Wetland impacts are described in greater detail in the *Wetland and Floodplain Statement of Findings* (Appendix G).

The project would need to comply with NPS wetland policies under DO #77-1, and preparation of a Wetland Statement of Findings (WSOF) is required and is included in Appendix G. A Section 404 permit from the U.S. Army Corps of Engineers (USACE) would also be needed for impacts on wetlands that are determined to be under USACE jurisdiction. Compensatory mitigation would be needed for all affected wetlands under NPS policy. Wetland mitigation would be established to replace the affected wetlands, either by restoring affected wetland or enhancing existing wetlands. A total of approximately 0.028 acre of vegetated wetlands and 0.0017 acre of streambed (unvegetated wetland) would need to be reestablished. The WSOF includes a mitigation plan.

3.4.5.2.3 Alternative 3: OGR Alignment

Surface Water

As with Alternatives 2 and 4, Resource Protection Measures to reduce adverse impacts associated with sedimentation and turbidity due to construction activities would still be needed (Appendix D); however, construction activities occurring next to surface water would be nearly eliminated from those associated with Alternatives 2 and 4 due to the location of the alignment

above the Gardner River and only limited areas of road crossings over smaller surface water tributaries.

As with Alternatives 2 and 4, use of surface water to meet construction needs would result in short-term adverse impacts proportional to the amount of water used. The road construction techniques and Resource Protection Measures (Appendix D) implemented would be the same as those implemented to construct the sewer line alignment associated with Alternative 2, therefore, sewer line construction impacts would be negligible and would not add any additional impacts on those already incurred from the road construction activities. The flooding potential for Alternative 3 would be greatly reduced compared to Alternatives 2 and 4 due to the alignment being located above the Gardner River.

Similar to Alternatives 2 and 4, damaged road sections associated with the previous North Entrance Road alignment running through the Gardner Canyon would be removed and reclaimed (as funding allows), and materials would be reused in the construction of the Alternative 3 alignment to the greatest extent feasible. This would result in a beneficial impact on surface water resources for Alternative 3 in that the removal of the previous North Entrance Road would allow a return of the natural character of the Gardner River and floodplain in the project area, and any potential future flooding in the Gardner River floodplain would not affect the road alignment under this alternative. Similar to Alternative 2, the road and bridges would be designed to route surface water flows away from the river and wetlands to protect water quality; therefore, no long-term impacts on surface water quality are expected under Alternative 3.

Wetlands

Approximately 0.001 acre of riverine wetlands and 0.004 acre of vegetated wetlands would be permanently affected under Alternative 3. Approximately 0.006 acre of riverine wetlands and 0.129 acre of vegetated wetlands would be temporarily disturbed under Alternative 3 for a total of approximately 0.14 acre of impacts on wetlands. Most wetland impacts from Alternative 3 would result from the road widening activities and construction of a retaining wall. Removal and reclamation of the flood-damaged road in the Gardner Canyon could also potentially provide benefits to wetlands, if road sections within the former river channel are removed and vegetated wetlands are able to establish. Wetlands that would be affected by Alternative 3 are mostly supported by seeps and subsurface flow, with a few wetlands around the ponds supported by surface water from precipitation and the surface flow from upgradient beaver ponds. The wetlands that would be affected consist mostly of PEM communities and a few PSS communities that provide habitat for wildlife, including the federally threatened grizzly bear.

As described for Alternative 2, the project will comply with NPS wetland policies under DO #77-1, and a WSOF has been prepared and is included in Appendix G. A Section 404 permit from the USACE would also be needed for impacts on any wetlands that are determined to be under USACE jurisdiction, including wetlands near Slide Lake with connections to the Gardner River. Compensatory mitigation would be needed for all affected wetlands under NPS policy. Wetland mitigation would be established to replace the affected wetlands, either by restoring affected wetland or enhancing existing wetlands. A total of approximately 0.58 acre of wetlands would need to be reestablished.

3.4.5.2.4 Alternative 4: Gardner Canyon Alignment

Surface Water

As with Alternative 2, Resource Protection Measures to reduce adverse impacts associated with sedimentation and turbidity due to construction activities would be needed (Appendix D); however, under Alternative 4 the amount of construction activities occurring next to surface water would be greater than those associated with Alternative 2 and Alternative 3. As with Alternative 2, use of surface water to meet construction needs would result in short-term adverse impacts proportional to the amount of water used. The road construction techniques and Resource Protection Measures (Appendix D) implemented would be the same as those implemented to construct the sewer line alignment associated with Alternative 2; therefore, sewer line construction impacts would be negligible and would not add any significant impacts to those already incurred from the road construction activities. Similar to Alternative 2, the road and bridges would be designed to route surface water flows away from the river and wetlands to protect water quality; therefore, no long-term impacts on surface water quality are expected.

Under Alternative 4, bridge construction and associated impacts on surface waters would be similar to Alternative 2 with the use of Resource Protection Measures (Appendix D) to minimize impacts. However, in comparison to Alternative 2, Alternative 4 would have greater impacts due to the additional bridge constructed in the Gardner Canyon and the required access to build it. Potential flooding impacts would also be greatest for Alternative 4 relative to Alternatives 2 and 3 due to the amount of road and structures located in the Gardner River floodplain. Relative to the other alternatives, with the potential for increases in future flood events and other extreme weather events, Alternative 4 has the greatest need for effective mitigation measures to manage related flooding impacts, such as changing the river channel location and structure due to the mobile nature of the floodplain soils on which the alignment would be constructed. Removal of the damaged sections of the previous North Entrance Road alignment would require confinement techniques to prevent construction debris from entering the Gardner River.

Wetlands

Approximately 0.16 acre of riverine wetlands would be permanently affected under Alternative 3. Approximately 0.30 acre of riverine wetlands and 0.12 acre of vegetated wetlands would be temporarily disturbed under Alternative 4 for a total of approximately 0.58 acre of impacts on wetlands. Wetland impacts would occur from road demolition and construction, road realignment, and the construction of three bridges. Most wetland impacts from Alternative 4 would result from demolishing the existing road and reconstructing the new road. All but one of the wetlands that would be affected by Alternative 4 are supported by surface water from the Gardner River; the other is a depressional wetland supported by subsurface flows and seeps.

The wetlands that would be affected consist entirely of PEM communities that provide habitat for wildlife, including the federally threatened grizzly bear. The wetlands provide wildlife and fish habitat and are highly functioning for sediment/nutrient/toxicant removal, sediment/shoreline stabilization and production export/food chain support. According to the MWAM, these wetlands were given a high functional score of Category II (with I being the highest quality and IV being the lowest quality) (NPS 2023c).

The project would need to comply with NPS wetland policies under DO #77-1, and preparation of a WSOF would be required. A Section 404 permit from the USACE would be needed for

impacts on any wetlands that are determined to be under USACE jurisdiction, including the wetlands along the Gardner River. Wetland mitigation would need to be established to replace the affected wetlands, either by restoring affected wetland or enhancing existing wetlands. A total of approximately 1.1 acres of wetlands would need to be reestablished.

3.4.6 Geologic Resources

3.4.6.1 Affected Environment

The Park represents a broad, elevated, volcanic plateau with an average elevation of approximately 8,000 feet. The lowest point is Reese Creek at 5,282 feet and the highest point is Eagle Peak at 11,300 feet. Over the past 2.2 million years, the Yellowstone Plateau has been shaped by volcanic eruptions, uplift and extensive faulting, and erosion. Figure 12 presents the surficial geologic mapping conducted by Pierce et al. (2018).

In the project area, geologic formations range in age from Cretaceous shales and sandstones (Landslide Creek Formation identified as KBr on Figure 12) to Quaternary alluvium, travertine, and landslides (identified as units starting with Q on Figure 12). After a long period of mountain building and erosion, episodes of volcanic activity covered the eroded surface of the Cretaceous deposits with lava flows. About 45 to 50 million years ago, a period of volcanism covered the project area with up to 3,000 feet of andesitic lava flows and flow breccias known as the Absaroka Volcanic Supergroup (identified as TP on Figure 12). Subsequent periods of erosion and several eras of glaciation, including glacial outwash deposits following glacial retreat (identified as units starting with P on Figure 12), resulted in the topography and landforms that are present today.

Gardner Canyon surficial geology consists of unconsolidated materials highly susceptible to erosion that range from a large landslide along the western bank of the Gardner River, and cliffs consisting of shale, sandstone, and gravel layers on the eastern bank (Dewey et al. 2018). Along the east side of the Gardner River in the lower half of the Gardner Canyon, the slopes above the road consist of relatively flat-lying shale beds with thin interbedded sandstone and siltstone layers, topped by thicker cliff-forming sandstone layers.

The Yellowstone and Gardner Rivers deposited deep layers (as much as 500 feet) of river cobbles and gravel on the valley floor as the glaciation waned, and at least three flood events reworked the valley floor and deposited layers of boulders with subsequent incised channels downcut into the glacial outwash deposits. In the southern portion of the project area, the glaciers had removed the layers of Absaroka Volcanics, and the underlying softer Landslide Creek Formation was uncovered in this area. The glaciers also left glacial deposits and terraces of glacial soil mid-slope in some areas, primarily toward the south end of the project area.

Sepulcher Mountain rises more than 4,000 feet to the west of the project area above the Gardner and Yellowstone Rivers, and this gravitational potential provides the energy to drive extensive landslides, which occurred sometime after the deglaciation (Dewey et al. 2018). The northern landslides flowed northerly and northeasterly into the Gardiner Valley. The southern landslides have driven the Gardner River eastward, causing it to undercut the shale bedrock and form steep slopes and cliffs east of the Gardner River.

Quaternary alluvium in the project area consists of a mixture of sediment and soil materials. Fluvial deposits of sands, gravels, and cobbles deposited adjacent to the Gardner and Yellowstone Rivers tend to produce soils that are generally good road-building materials with low fines content that are not generally frost susceptible. Soil deposited as alluvial fans by intermittent streams are generally fair quality road-building materials, though they can have pockets of finer-grained soils that are more related to the underlying soil or rock types in the local area. Soil deposited as alluvial fans on flatter slopes are generally finer-grained silty sands and, depending on their clay content, may be moisture sensitive. They are relatively stable as road-building materials, but may be frost susceptible, and are generally not considered a risk for slope movement.

3.4.6.1.1 Project Area Studies

Geological studies have been recently conducted to advise the Park management of a suite of long-term approaches that are possible in the Park's efforts to stabilize, rehabilitate, and possibly relocate the North Entrance Road corridor. A three-phase study has been conducted. The First Phase (Dewey 2013) was conducted in 2012 and evaluated geologic hazards along the North Entrance Road (in the canyon) to provide concepts for mitigating hazards in the corridor and alternate alignments that might avoid problem areas. The Second Phase (Dewey 2018) was conducted in 2014 to better understand erosion issues related to the Gardner River itself and a series of ephemeral drainages flowing into the Gardner River in the Gardner Canyon that are frequently subject to debris flows that flow onto the road and block the road drainage systems. The Third Phase (Dewey et al. 2018) was conducted in 2016 and 2017 to understand the history of landslides in the project area and identify ways to adjust the current alignment of the road to more stable locations in the canyon. In 2022, landslide mapping was expanded and updated following the 2022 rain-on-snow event that flooded the Gardner River and resulted in erosive removal of many of the landslide toes and associated uphill retrogression of slope failures immediately adjacent to the Gardner River (Turner and Hornsby 2022).

Based on the studies conducted to date, the most problematic section of the North Entrance Road begins approximately 1,000 feet beyond the middle of the lower Gardner River Bridge at mile post (MP)1.73 and extends upriver approximately 1,600 feet to MP2.03. Along the first 1,100 feet of this section of the road, sandstone blocks 3 feet or more across capping shale cliffs up to 400 feet high separate and fall or cascade occasionally onto the road and ditch. The northernmost 500 feet of this problematic section of road are boulders that also loosen and tumble down onto the road. Dewey (2013) described this road segment in detail and provided two alternatives for reconstructing the road through this area; a 950-foot-long rock shed structure or excavating and laying back the slopes in this segment to a stable orientation. Dewey et al. (2018) provided three additional alternatives for relocating the road around this problem area—two possible realignments outside of the Gardner Canyon across the Gardner River on the slopes of Sepulcher Mountain, and a tunnel bored through the hillside to avoid the erosion and rockfall problems at the face. Turner and Hornsby (2022) extended the mapping of the 13 landslides mapped by Dewey et al. (2018) upslope to the west where the headscarps and source areas originate in the steep upper slopes on the eastern side of Sepulcher Mountain. The study provided more recent analysis data for assessing recency and activity in these complex earthflows since the years following the Dewey et al. (2018) investigation, resulting in updated

displacement rates. Following the 2022 rain-on-snow event, flooding resulted in removal of many of the landslide toes along with uphill retrogression of slope failures immediately adjacent to the Gardner River.

3.4.6.2 Environmental Consequences

3.4.6.2.1 Alternative 1: No Action

Under the No Action Alternative, no new environmental impacts would occur. Current conditions would continue, and no modification to the temporary entrance road would be made. The temporary entrance road would continue to be used, and conditions including narrow lanes, unpaved shoulders, and deteriorating pavement conditions would continue. The areas of the North Entrance Road that were damaged by the 2022 flood would continue to erode and could result in additional collapse. Regular road maintenance under the No Action Alternative would have no effect on geologic resources.

3.4.6.2.2 Alternative 2: Center Alignment - NPS Preferred Alternative

The Gardner River floodplain surficial geology consists of unconsolidated materials and represents an area highly susceptible to geologic hazards along with potential for erosion and redistribution of alluvial sediments to affect structures built in the Gardner River floodplain. Resource Protection Measures (Appendix D) would be implemented to minimize impacts. Sewer line construction impacts would be negligible and would not add any additional impacts to those already incurred from the road construction activities.

Retaining walls would be used to minimize impacts on resources as well as to reduce the need to remove hundreds of feet of geologic material comprising the hillside. Alternative 2 would have the least linear feet of retaining walls (approximately 200 to 1,200 linear feet) as compared to Alternative 3 (approximately 6,800 linear feet) and Alternative 4 (approximately 3,250 linear feet). Damaged road sections within the canyon would be removed and reclaimed (as funding allows), and materials would be reused in reconstruction to the greatest extent feasible. This would result in a beneficial impact on geologic resources in that areas of geologic materials that were previously covered would be restored, allowing a return of the natural character of the Gardner Canyon floor and floodplain.

The use of geologic materials to construct Alternative 2 would result in an immeasurable impact on the overall geologic features of importance in the Park.

3.4.6.2.3 Alternative 3: OGR Alignment

Under Alternative 3, the new access road would be constructed along a similar area as the temporary entrance road located above the Gardner Canyon and would represent widening the road template from its current width of approximately 22 feet to 34 feet. However, the road would be reconstructed to widen curves and flatten profile grades, resulting in minimal reuse of the existing temporary road. In some areas where the grade is being reduced, the new road may be 10 feet vertically higher than the existing road, which would increase the amount of geologic resources used. Similar to Alternatives 2 and 4, retaining walls would be used to minimize impacts on resources as well as to reduce the need to remove hundreds of feet of geologic material comprising the hillside. Alternative 3 would have the most linear feet of retaining walls

(approximately 6,800 linear feet) as compared to Alternative 2 (approximately 200 to 1,200 linear feet) and Alternative 4 (approximately 3,250 linear feet).

As with Alternatives 2 and 4, the use of geologic materials and altering some of the geology to construct the road would result in an irreversible adverse impact. The road construction techniques and Resource Protection Measures (Appendix D) implemented would be the same as those implemented to construct the sewer line alignment associated with Alternative 2; therefore, sewer line construction impacts would be negligible and would not add any additional impacts to those already incurred from the road construction activities.

Similar to Alternative 2, damaged road sections in the Gardner Canyon would be removed and reclaimed (as funding allows), and materials would be reused in reconstruction to the greatest extent feasible. This would result in a beneficial impact on geologic resources in that areas of geologic materials that were previously covered would be restored, allowing a return of the natural character of the Gardner Canyon floor and floodplain.

3.4.6.2.4 Alternative 4: Gardner Canyon Alignment

The road alignment associated with Alternative 4 would be subject to the most geological hazards of the alternatives evaluated due to its location along the Gardner River floodplain and at the bottom of the Gardner Canyon resulting in greater potential for rock fall impacting the road alignment. The need to mitigate the associated hazards would represent the largest impacts on geologic resources relative to the other alternatives due to the greater use of geologic materials in constructing the structures and altering the geology as necessary to mitigate these hazards.

Under Alternative 4, the new access road would be constructed along the previous North Entrance Road alignment and include three bridge structures, a rock shed structure, and approximately 3,250 linear feet of retaining wall. Similar to Alternatives 2 and 3, damaged road sections would be removed and reclaimed (as funding allows), and materials would be reused in the reconstruction to the greatest extent feasible. The road construction techniques and Resource Protection Measures (Appendix D) implemented would be the same as those implemented to construct the sewer line alignment associated with Alternative 2; therefore, sewer line construction impacts would be negligible and would not add any significant impacts on those already incurred from the road construction activities.

Unique to Alternative 4, numerous geologic hazards in the Gardner Canyon require mitigation. These hazards include steep cliffs consisting of shale, sandstone, and gravel layers on the eastern bank overlying the road alignment, which represent a rockfall hazard, and the toe of a large landslide along the western bank of the Gardner River. Erosion and redistribution along alluvial channels have the potential for these changes to undercut and increase the landslide potential of older consolidated shale and sandstone bedrock units located along the slopes of the Gardner River in the Gardner Canyon. These hazards, along with Gardner River floodplain surficial geology consisting of unconsolidated materials, represent an area highly susceptible to geologic hazards and erosion.

Use of geologic materials to construct Alternative 4 would result in an irreversible and adverse impact on the geologic resources used for construction. Long-term maintenance of the rock shed structure would remove and redistribute geologic material that accumulated behind the

structure. In comparison to Alternatives 2 and 3, Alternative 4 would use a greater amount of concrete due to the construction of three bridges and associated wing walls, a rock shed structure, and retaining walls as well as the greatest use of stone masonry to face the structures.

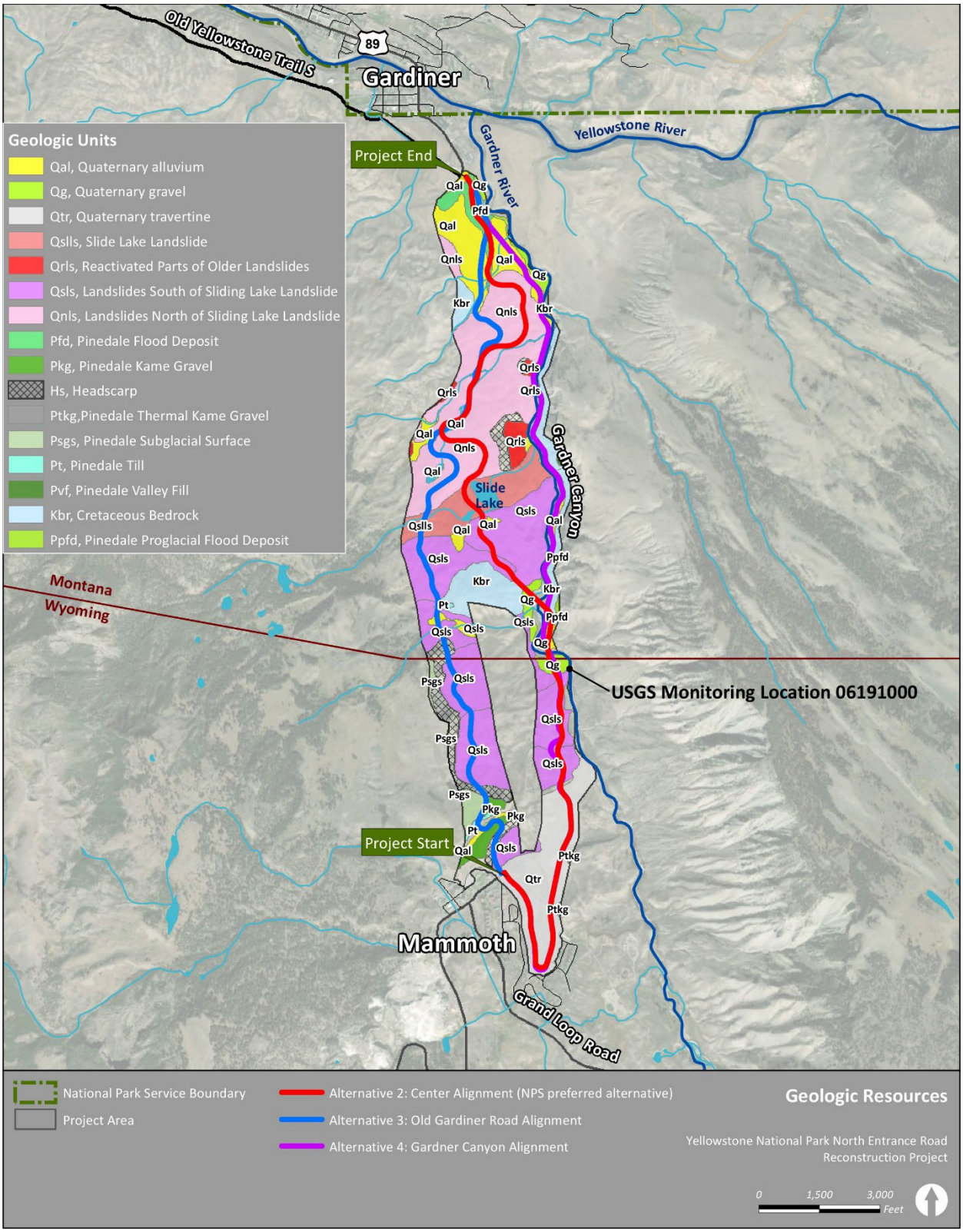


FIGURE 12. GEOLOGIC RESOURCES

3.4.7 Cultural Resources

3.4.7.1 Affected Environment

The NPS defined a preliminary area of potential effects (APE) for cultural resources under this study area as the limits of disturbance plus a 50-meter (164-foot) buffer on either side of the centerline of the proposed alignments (Figure 13). The study area APE includes a 30-foot-wide road and associated structures, as well as adjacent areas that may be disturbed during construction (e.g., clearing, grading, and staging). The NPS conducted a cultural resource survey of the study area (approximately 585 acres) to identify potential historic properties (those listed in or eligible for listing in the National Register of Historic Places (NRHP) that may be affected by the proposed project and would require further consideration under Section 106 of the National Historic Preservation Act (NHPA; James 2025). The survey identified a total of 46 archeological resources, 31 of which are in the defined APE (see Table 3). Of the 46 resources, 37 were previously recorded and 6 were newly documented. Of the six newly documented resources, five are recommended "not eligible" for listing in the NRHP and one is recommended "eligible" for listing in the NRHP. This effort expanded on 11 previous cultural resource inventories, most notably the work of Shortt (1999), who surveyed the Mammoth-Gardiner Road in 1998. Table 3 lists the documented cultural resources in the defined APE by alternative.

3.4.7.1.1 Archeological Resources

Most archeological sites in the project area are associated with Indigenous occupation of the area, including artifact scatters and sites with architecture such as stone alignments, circles, and cairns. Indigenous artifact scatters are concentrations of flaked stone reflecting the production or rejuvenation of stone tools. Other cultural resources reflect Euroamerican activity, including historical roads, trash scatters, and stone cairns that may represent land boundaries or pathway markers.

3.4.7.1.2 Cultural Landscapes and Historic Structures

Important historical period resources include the OGR, the North Entrance Road, the Fort Yellowstone National Historic Landmark (NHL), and the Mammoth Hot Springs Historic District.

The OGR was built in 1879 as the original road into the Park from the North Entrance with access to Mammoth Hot Springs. The road was later abandoned in favor of the North Entrance Road but was occasionally improved and used when landslides obstructed the North Entrance Road. Following the 2022 flood that destroyed the North Entrance Road, the Park completed emergency rehabilitation on OGR to support modern vehicle traffic and restore access.

The North Entrance Road was built in the 1880s and became the primary access between Gardiner and Mammoth Hot Springs; it is now a historic district reflecting an important historical road system in the Park.

The Mammoth Hot Springs Historic District and the Fort Yellowstone NHL together represent two aspects of the early development of the Park: private concessioner buildings that were built soon after establishment of the Park in 1872 and military buildings and structures built for the

protection of Park resources by the government and occupied from 1886 to 1918. The military contingent began as a tent camp, then Camp Sheridan, before being developed into Fort Yellowstone with a formal layout typical of military installations of the period (Front Range Research Associates 2000a). After 1916, the buildings and structures built for the protection of the Park were converted into the first administrative complex for the Park, and all of the concessioner buildings were acquired by the Park by 1979. The Mammoth Hot Springs Historic District encapsulates the Fort Yellowstone NHL.

The Fort Yellowstone NHL consists of 44 contributing structures and is significant for its association with the military administration of the Park. The Mammoth Hot Springs Historic District consists of 207 buildings, structures, and objects, of which 192 are contributing under the themes Recreation and Government (Front Range Research Associates 2000b).

TABLE 3. CULTURAL RESOURCES IN THE PROPOSED NORTH ENTRANCE ROAD PROJECT AREA.

Smithsonian Site Number	Resource Site Type	National Register Status	Alternative
24YE30/48YE827	Old Gardiner Road	Eligible	Shared
24YE31/48YE822	North Entrance Road Historic District	Listed	Shared
24YE66	Indigenous Archeological	Eligible	Center
24YE67	Multicomponent Archeological	Recommended Not Eligible	Center
24YE68	Indigenous Archeological	Not Eligible	OGR
24YE70	Indigenous Archeological	Eligible	Center
24YE71	Euroamerican Archeological	Recommended Not Eligible (currently unevaluated)	Center
24YE72	Indigenous Archeological	Eligible	OGR, Center
24YE74	Indigenous Archeological	Eligible	OGR
24YE83	Indigenous Archeological	Eligible	Shared
24YE85	Indigenous Archeological	Eligible	OGR
24YE89	Indigenous Archeological	Eligible	OGR
24YE92/24YE344	Indigenous Archeological	Eligible	Canyon
24YE93	Unknown	Recommended Not Eligible	OGR
24YE101	Indigenous Archeological	Eligible	Shared
24YE103	Multicomponent Archeological	Recommended Not Eligible	OGR
24YE210	Euroamerican Archeological	Not Eligible	Canyon
24YE229	Indigenous Archeological	Recommended Not Eligible	Center
24YE230	Euroamerican Archeological	Recommended Not Eligible	OGR, Center
24YE231	Indigenous Archeological	Eligible	Center
24YE232	Indigenous Archeological	Eligible	Center
48YE289	Indigenous Archeological	Eligible	Center, Canyon
48YE292	Indigenous Archeological	Eligible	Center, Canyon
48YE295/48YE317	Indigenous Archeological	Recommended Not Eligible	Center, Canyon
48YE298	Indigenous Archeological	Eligible	Center, Canyon
48YE486	Mammoth Hot Springs Historic District	Listed	Shared
48YE722	Euroamerican Archeological	Recommended Eligible	Shared
48YE1057	Fort Yellowstone National Historic Landmark	Listed	Shared
48YE1494	Euroamerican Archeological	Eligible	OGR
48YE1850	Euroamerican Archeological	Not Eligible	Center, Canyon
48YE1851	Euroamerican Archeological	Not Eligible	Center, Canyon

3.4.7.2 Environmental Consequences

The regulations implementing Section 106 of the NHPA (36 CFR 800) define a historic property as "any prehistoric or historic district, site, building, structure, or object included in, or eligible for inclusion in, the NRHP maintained by the Secretary of the Interior." Adverse impacts would alter any of the characteristics that qualify the property for inclusion in the NRHP in a manner that would diminish the integrity of the property's location, design, setting, materials,

workmanship, feeling, or association (36 CFR 800.5). NPS DO 28: *Cultural Resource Management* also directs the NPS to "protect and manage cultural resources in its custody…"

Impacts on cultural resources for each of the project alternatives are evaluated based on their potential to cause adverse impacts on historic properties. The types of impacts on historic properties can include physical destruction or damage (i.e., disturbance of archeological resources) or could be visual in nature, such as the introduction of new features on the landscape. Construction of a new structure could alter significant viewsheds and result in changes to the character of a NHL or National Historic District. Resource Protection Measures (Appendix D) to minimize or avoid adverse impacts on historic properties include redesign to avoid sensitive areas, construction fencing to limit access during construction, limiting disturbance to previously disturbed areas, placement of protective matting to protect the surface of an archeological site, and construction monitoring.

As defined, the APE for the project's preferred alignment includes the limits of disturbance and a 15-meter buffer extending out from the limits of disturbance. The APE accounts for direct and indirect impacts on historic properties. Impacts on historic properties are considered "direct" where ground disturbance would affect archeological resources (i.e., areas of direct impact) from construction, access and staging, obliteration of damaged roads, and new road and structure construction. Visual impacts are considered "indirect" and may occur from the introduction of new built environment elements on the landscape, such as the road and associated structures.

3.4.7.2.1 Alternative 1: No Action

Under the No Action Alternative, eight cultural resources are located in the APE for the temporary entrance road (Table 4). No buffer was applied to the study area for the No Action Alternative to evaluate potential impacts from the No Action Alternative. Impacts on the temporary entrance road have already occurred as provided for under the emergency exemption under 36 CFR 800.12 of the NHPA. After the 2022 flood, the OGR was rehabilitated for use as the temporary entrance road; however, the road remains eligible for listing in the NRHP. Both the North Entrance Historic District and Cultural Landscape were affected by the 2022 flood event. Under the No Action Alternative, impacts would continue to occur on the pre-flood North Entrance Road and associated structures from continued erosional deterioration to the North Entrance Road Historic District and increased visitor use impacts at archeological sites along the OGR as shown in Table 4. Bridges do not contribute to the historic district and are not eligible for inclusion on the NRHP as individual properties. For all resources under the No Action Alternative, effects have already occurred, if any, when the OGR was rehabilitated for temporary use.

TABLE 4. LIST OF CULTURAL RESOURCES UNDER THE NO ACTION ALTERNATIVE.

Smithsonian Site Number	Resource Site Type	NRHP Status	Impact
24YE30/48YE827	Old Gardiner Road	Eligible	Direct
24YE31/48YE822	North Entrance Road Historic District	Listed	Direct
24YE68	Indigenous Archeological	Not Eligible	Direct
24YE72	Indigenous Archeological	Eligible	Direct
24YE74	Indigenous Archeological	Eligible	Direct
24YE89	Indigenous Archeological	Eligible	Direct
24YE103	Multicomponent Archeological	Recommended Not Eligible	Direct
24YE918	North Entrance Cultural Landscape	Listed	Direct

3.4.7.2.2 Alternative 2: Center Alignment - NPS Preferred Alternative

Under Alternative 2, 22 cultural resources are located in the APE. The alignment would have direct impacts on eight cultural resources, three of which are listed in the NRHP and, therefore, historic properties (Table 5). Two archeological sites (24YE72 and 48YE289) would be physically impacted by construction associated with Alternative 2, which would result in an adverse effect on historic properties, consistent with 36 CFR 800.5(d)(2).

Direct impacts on OGR and the North Entrance Road Historic District would not be adverse. Indirect impacts on the Mammoth Hot Springs Historic District and Fort Yellowstone NHL from the introduction of a new road would not introduce new elements on the landscape and would not be considered adverse because the road alignment is already present on the landscape. The remaining resources, all of which are archeological sites, would be avoided and not impacted under Alternative 2. The effects assessment on historic properties under Alternative 2 would be adverse for archeological properties and not adverse for the built environment. Adverse effects would be resolved through mitigation, in consultation with the State Historic Preservation Office (SHPO) and tribes, pursuant to 36 CFR 800.6.

TABLE 5. LIST OF CULTURAL RESOURCES UNDER ALTERNATIVE 2.

Smithsonian Site Number	Resource Site Type	NRHP Status	Impact	Effects Assessment
24YE30/48YE827	Old Gardiner Road	Eligible	Direct – Remove pavement	Pending consultation
24YE31/48YE822	North Entrance Road Historic District	Listed	Direct – Realignment, new structures; structure replacement; restoration of destroyed alignment	No adverse effect
24YE66	Indigenous Archeological	Eligible	Buffer – Avoid	No adverse effect
24YE67	Multicomponent Archeological	Recommended Not Eligible (currently unevaluated)	Buffer	No effect (pending consultation)
24YE68	Indigenous Archeological	Not Eligible	Direct – Construction	No effect
24YE70	Indigenous Archeological	Eligible	Buffer – Avoid	No adverse effect
24YE71	Euroamerican Archeological	Recommended Not Eligible (currently unevaluated)	Direct – Construction	No effect (pending consultation)

Smithsonian Site Number	Resource Site Type	NRHP Status	Impact	Effects Assessment
24YE72	Indigenous Archeological	Eligible	Direct – Construction (data recovery)	Adverse effect
24YE83	Indigenous Archeological	Eligible	Buffer – Avoid	No adverse effect
24YE229	Indigenous Archeological	Recommended Not Eligible	Direct – Construction	No effect (pending consultation)
24YE230	Euroamerican Archeological	Recommended Not Eligible (currently unevaluated)	Direct – Construction	No effect (pending consultation)
24YE231	Indigenous Archeological	Eligible	Buffer – Avoid	No adverse effect
24YE232	Indigenous Archeological	Eligible	Buffer – Avoid	No adverse effect
48YE289	Indigenous Archeological	Eligible	Direct – Construction (data recovery)	Adverse effect
48YE292	Indigenous Archeological	Eligible	Buffer – Avoid	No adverse effect
48YE295/ 48YE317	Indigenous Archeological	Recommended Not Eligible (currently unevaluated)	Buffer	No effect (pending consultation)
48YE298	Indigenous Archeological	Eligible	Buffer – Avoid	No adverse effect
48YE486	Mammoth Hot Springs Historic District	Listed	Indirect – Visual	No adverse effect
48YE1057	Fort Yellowstone National Historic Landmark	Listed	Indirect – Visual	No adverse effect
48YE1494	Euroamerican Archeological	Eligible	Buffer	No adverse effect
48YE1850	Euroamerican Archeological	Not Eligible	Buffer	No effect
48YE1851	Euroamerican Archeological	Not Eligible	Buffer	No effect

3.4.7.2.3 Alternative 3: OGR Alignment

Under Alternative 3, 17 cultural resources are located in the APE. The alignment would have direct impacts on 11 cultural resources, 7 of which are listed in or eligible for listing in the NRHP and are therefore considered historic properties (Table 6). Five archeological sites (24YE72 24YE74, 24YE89, 24YE722, and 24YE1494) would be physically impacted by construction associated with Alternative 3, which would result in an adverse effect on historic properties, consistent with 36 CFR 800.5(d)(2).

Direct impacts on OGR and the North Entrance Road Historic District would not be adverse. Indirect impacts on the Mammoth Hot Springs Historic District and Fort Yellowstone NHL from the introduction of a new road would not introduce new elements on the landscape and would not be considered adverse because the road alignment is already present on the landscape. The remaining resources, all of which are archeological sites, would be avoided and not impacted under Alternative 2. The effects assessment on historic properties under Alternative 3 would be adverse for archeological properties and not adverse for the built environment. Adverse effects would be resolved through mitigation, in consultation with the SHPO and tribes, pursuant to 36 CFR 800.6.

TABLE 6. LIST OF CULTURAL RESOURCES UNDER ALTERNATIVE 3.

Smithsonian Site Number	Resource Site Type	NRHP Status	Impact	Impact Type
24YE30/48YE827	Old Gardiner Road	Eligible	Direct – Remove pavement	Pending consultation
24YE31/48YE822	North Entrance Road Historic District	Listed	Direct – Realignment, new structures; structure replacement; restoration of destroyed alignment	No adverse effect
24YE67	Multicomponent Archeological	Recommended Not Eligible (currently unevaluated)	Direct – Construction	No effect (pending consultation)
24YE68	Indigenous Archeological	Not Eligible	Direct – Construction	No effect
24YE72	Indigenous Archeological	Eligible	Direct – Construction (data recovery)	Adverse effect
24YE74	Indigenous Archeological	Eligible	Direct – Construction (data recovery	Adverse effect
24YE83	Indigenous Archeological	Eligible	Buffer – Avoid	No adverse effect
24YE85	Indigenous Archeological	Eligible	Buffer – Avoid	No adverse effect
24YE89	Indigenous Archeological	Eligible	Direct – Construction (data recovery)	Adverse effect
24YE93	Euroamerican Archeological	Recommended Not Eligible (currently unevaluated)	Buffer	No effect (pending consultation)
24YE94	Indigenous Archeological	Eligible	Buffer – Avoid	No adverse effect
24YE103	Multicomponent Archeological	Recommended Not Eligible	Direct – Construction	No effect (pending consultation)
24YE230	Euroamerican Archeological	Recommended Not Eligible (currently unevaluated)	Direct – Construction	No effect (pending consultation)
48YE486	Mammoth Hot Springs Historic District	Listed	Indirect – Visual	No adverse effect
48YE722	Euroamerican Archeological	Recommended Eligible	Direct – Construction (data recovery	Adverse effect (pending consultation)
48YE1057	Fort Yellowstone National Historic Landmark	Listed	Indirect – Visual	No adverse effect
48YE1494	Euroamerican Archeological	Eligible	Direct – Construction (data recovery	Adverse effect

3.4.7.2.4 Alternative 4: Gardner Canyon Alignment

Under Alternative 4, 17 cultural resources are located in the APE. The alignment would have direct impacts on seven cultural resources, all of which are listed in or eligible for listing in the NRHP and are therefore considered historic properties (Table 7). Five archeological sites (24YE72, 24YE92/24YE344, 24YE100/24YE101, 48YE289, and 24YE722) would be directly affected by Alternative 4 during construction.

Direct impacts on OGR and the North Entrance Road Historic District would not be adverse. Indirect impacts on the Mammoth Hot Springs Historic District and Fort Yellowstone NHL from the introduction of a new road would not introduce new elements on the landscape and would not be considered adverse because the road alignment is already present on the landscape. The remaining resources, all of which are archeological sites, would be avoided and not impacted under Alternative 4. The effects assessment on historic properties under

Alternative 4 would be adverse for archeological properties and not adverse for the built environment. Adverse effects would be resolved through mitigation, in consultation with the SHPO and tribes, pursuant to 36 CFR 800.6.

TABLE 7. LIST OF CULTURAL RESOURCES UNDER ALTERNATIVE 4.

Smithsonian Site Number	Resource Site Type	NRHP Status	Impact	Impact Type
24YE30/48YE827	Old Gardiner Road	Eligible	Direct – Remove pavement	Pending consultation
24YE31/48YE822	North Entrance Road Historic District	Listed	Direct – Realignment, new structures; structure replacement; restoration of destroyed alignment	No adverse effect
24YE66	Indigenous Archeological	Eligible	Buffer – Avoid	No adverse effect
24YE72	Indigenous Archeological	Eligible	Direct – Construction (data recovery)	Adverse effect
24YE75	Indigenous Archeological	Recommended Not Eligible (currently unevaluated)	Buffer	No effect (pending consultation)
24YE83	Indigenous Archeological	Eligible	Buffer – Avoid	No adverse effect
24YE92/24YE344	Indigenous Archeological	Eligible	Direct – Construction (data recovery	Adverse effect
24YE100/24YE101	Indigenous Archeological	Eligible	Direct – Construction (data recovery	Adverse effect
48YE289	Indigenous Archeological	Eligible	Direct – Construction (data recovery)	Adverse effect
48YE292	Indigenous Archeological	Eligible	Buffer – Avoid	No adverse effect
48YE295/48YE317	Indigenous Archeological	Recommended Not Eligible (currently unevaluated)	Buffer	No effect (pending consultation)
48YE298	Indigenous Archeological	Eligible	Buffer – Avoid	No adverse effect
48YE486	Mammoth Hot Springs Historic District	Listed	Indirect – Visual	No adverse effect
48YE722	Euroamerican Archeological	Recommended Eligible (currently unevaluated)	Direct – Construction (data recovery	Adverse effect (pending consultation)
48YE1057	Fort Yellowstone National Historic Landmark	Listed	Indirect – Visual	No adverse effect
48YE1850	Euroamerican Archeological	Not Eligible	Buffer	No effect
48YE1851	Euroamerican Archeological	Not Eligible	Buffer	No effect

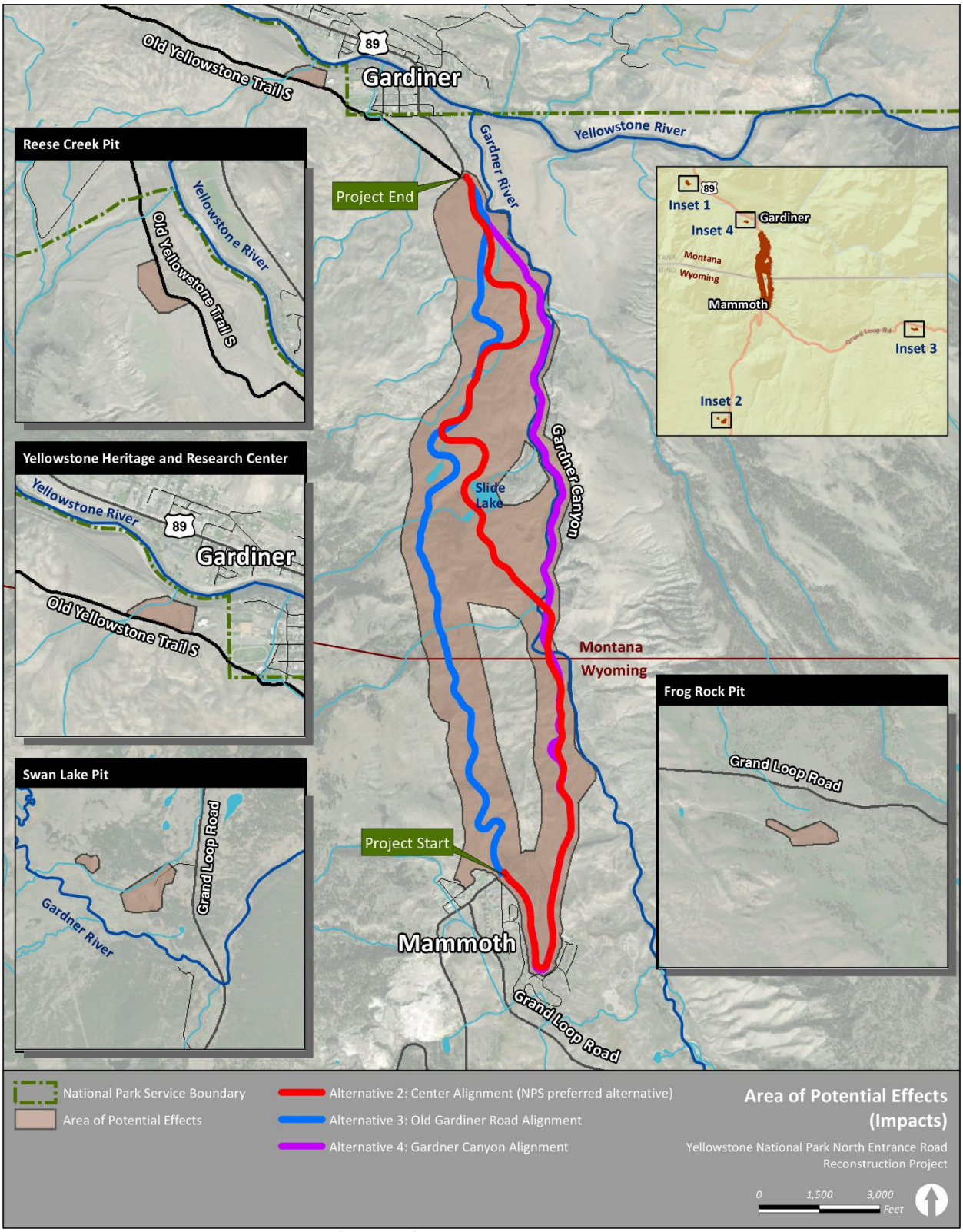


FIGURE 13. AREA OF POTENTIAL EFFECTS (IMPACTS)

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CHAPTER 4: APPENDICES

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APPENDIX A. ISSUES CONSIDERED BUT DISMISSED

APPENDIX A. RESOURCE TOPICS DISMISSED FROM DETAILED ANALYSIS

Several issues were dismissed from detailed analysis. Resource topics were dismissed from detailed analysis if they:

- do not exist in the project area;
- would not be affected by the alternatives or effects are not reasonably expected;
- would experience effects that, through applied mitigation measures, would be minimal; or
- there is little controversy on the subject or few reasons to otherwise include the topic.

Resource topics dismissed from detailed analysis, including dismissal rationale, are described below.

Air Quality

The action alternatives could have a slight effect on air quality from the use of construction vehicles, heavy equipment operation, and generation of fugitive dust during construction activities; however, the effects would be localized and temporary, lasting only for the duration of construction. Best management practices (BMPs) to control fugitive dust would be implemented, reducing potential impacts on air quality. BMPs would include, but are not limited to, the following: wetting soils to suppress dust, maintaining the existing vegetation to the extent possible, and limiting demolition work in high wind conditions. This project would not lead to an increase in traffic; therefore, no long-term impacts on air quality are expected from vehicle emissions. For these reasons, air quality is dismissed from further analysis.

Lightscapes

No temporary or permanent artificial lighting is proposed to be constructed on the North Entrance Road or surrounding areas. Although there would be some changes to where headlights would be visible, the environment already contains some artificial lights, and nighttime traffic would not increase due to the action alternatives. Therefore, lightscapes was dismissed from detailed analysis.

Soundscapes

Human-caused sounds would increase as a result of construction activities, the use of heavy equipment, vehicular traffic, and construction crews. Sounds generated from construction would be temporary, lasting only during the construction activity. Project-related construction noise would be minimized by using BMPs (see Resource Protection Measures in Appendix A), including limiting work to daylight hours in the project area to avoid night-time noise disruption and properly maintaining construction equipment to minimize noise. The proposed action would not increase the amount of traffic on the North Entrance Road in the long term and, therefore, would not increase vehicular noise over current conditions. In addition, shifting the

alignment would not change the effects on any sensitive noise receptors. For these reasons, soundscapes was dismissed from detailed analysis.

Land Use

The repair or realignment of the North Entrance Road would not change overall land use in the area. After construction, the road, parking, access, and recreational opportunities would still exist. Changes in recreation and access during construction and following the completion of the project are described in detail in the Visitor Use and Experience section of the EA. Therefore, land use was dismissed from detailed analysis.

Ethnographic Resources

Ethnographic resources are defined by the NPS as landscapes, objects, plants and animals, or sites and structures that are important to a people's sense of purpose or way of life (NPS 2022). The Park has initiated consultation with federally recognized tribal nations. Ethnographic resources have been dismissed at this time as none have been identified in the project area. However, if any of the affiliated tribes indicate the presence of important ethnographic resources and the potential for these resources to be affected by the proposed project, this section would be updated, and the topics would be analyzed in detail.

Paleontological Resources

The geology in the project area is not conducive for paleontology resources because it is largely volcanic.

The proposed alignments run through areas mapped as loose Quaternary surficial deposits (see Figure 12 in the Environmental Assessment (EA)) and would be favorable for avoiding paleontological resources. Therefore, based on geological surveys and mapping, the risk of encountering paleontological resources is low, and the resource topic was not carried forward for detailed analysis.

Indian Trust Resources and Sacred Sites

The federal Indian trust responsibility is a legally enforceable fiduciary obligation on the part of the United States to protect tribal lands, assets, resources, and treaty rights, and it represents a duty to carry out the mandates of federal law with respect to American Indian and Alaska Native tribes. The Park's lands and resources related to the proposed action are not held in trust by the Secretary of the Interior for the benefit of Americans Indians. Sacred sites are those places having established religious meaning and as locales of private ceremonial activities.

Effects on Indian trust resources and sacred sites must partially be determined though tribal consultation. The reconstruction of the North Entrance Road would primarily be confined to previously disturbed areas with the exception of Alternative 2. The Park has not been made aware of any Indian sacred sites related to this action. None of the alternatives would impact Indian trust resources or sacred sites; therefore, Indian trust resources and sacred sites were dismissed from detailed analysis. If during consultation, the Park is made aware of additional sites and impacts, these topics would be analyzed in detail.

Socioeconomics

After construction, the road, parking, access, local goods and services, and recreational opportunities would still exist, and the proposed project would not likely alter socioeconomic factors over the long term such as changes in local economic bases, salary levels, land use zoning, plans or programs of other agencies, or a particular socioeconomic group. Construction crews could come from the local or regional area. Although the project could increase short-term employment during construction, no substantial change to economic factors from the proposed construction activities or long-term operation of the North Entrance Road are likely to occur. For these reasons, socioeconomic resources were dismissed from detailed analysis.

Sanitation

Under the No Action Alternative, a new buried sewer line would not be constructed to replace the washed-out line. Emergency measures were taken after the 2022 flood to ensure adequate sanitation; those measures continue to meet visitor expectations. Under the Action Alternatives, a new buried sewer line (either Option 1 or Option 2) would be constructed to replace the washed-out line, ensuring that sanitation continues to meet visitor expectations. Construction would coincide with road construction and is not anticipated to impact sanitation. Therefore, there are no impacts to sanitation.

Visitor Use, Traffic, and Road Safety

Affected Environment

Visitor Numbers

Visits to Yellowstone National Park first exceeded 3 million in 1992 (NPS 2023a). Since then, annual visitation has tended to fluctuate between 2.8 and 3.1 million with new records being set in 2009 (3.3 million), 2015 (more than 4 million), and 2021 (nearly 4.9 million) (NPS 2023a). In 2022, Park visitation dropped to just under 3.3 million (perhaps due in part to the closed North Entrance) but returned to more than 4.5 million in 2023 and 4.7 million in 2024 (NPS 2025a). Overall, the Park's visitation trend has increased more than 40 percent since the early 2000s (NPS 2023b). North American visitors to Yellowstone make up 77 percent of all visitors; followed by visitors from Europe at 13 percent (Germany, France, Switzerland, and the United Kingdom make up the top four countries); and Asia at 8 percent (89 percent of Asian visitors are from China) (NPS 2023a).

Current and historical (past decade) visitor data for the Park (through all four entrance stations), according to NPS Stats Park Reports, are presented in Table A-1 for recreational visitors and in Table A-2 for nonrecreational visitors. Recreational visitors include those entering the Park by personal vehicle or arriving by bus, bicycle, foot, or cross-country skis (NPS 2013), while nonrecreational visitors include NPS and concessioner employees. Numbers for these visitors are based on the total number of nonrecreational vehicles entering the Park through all four entrance stations and a person-per-vehicle (PPV) multiplier of 1.2 (NPS 2013). NPS visitor data show that during the late fall through winter months (November through March), visitation is at its lowest and that during the summer months (June through September), visitation is at its highest (NPS 2025a).

North Entrance Station Visitor Number

While a breakdown of visitor numbers through the North Entrance Station is not available for this analysis, traffic data and daily vehicle counts at the North Entrance Station are available on both an annual and seasonal basis. The North Entrance Station is the second most popular entrance to the Park after the West Entrance Station. Traffic counts for the North Entrance Station are provided in Table A-3 in the *Traffic and Road Safety* section below. The total annual vehicle count through the North Entrance in 2024 (most recent full data year) was 553,276, accounting for approximately 29 percent of the total 1,921,480 vehicles entering the Park through one of the five entrance stations in 2024 (NPS 2025b). Based on this percentage, it is assumed that 1,375,862 recreational visitors and approximately 361,176 nonrecreational visitors entered through the North Entrance Station to the Park in 2024, making it the second most used entrance, with the West Entrance used the most.

TABLE A-1. PARK RECREATIONAL VISITORS BY MONTH.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual Total	Change From Previous Year
2024	42,740	49,291	32,862	71,784	522,450	914,612	992,352	868,259	852,435	346,025	21,133	30,410	4,744,353	5.4%
2023	45,709	45,717	30,044	69,247	454,262	847,864	969,692	846,389	838,458	299,127	20,109	34,764	4,501,382	36.8%
2022	46,615	47,300	35,593	80,283	523,680	525,363	596,562	582,211	567,587	236,567	17,687	30,794	3,290,242	-32.3%
2021	35,338	36,897	35,611	67,508	473,799	938,845	1,080,767	921,844	882,078	316,662	33,144	37,749	4,860,242	27.7%
2020*	25,234	41,880	32,516	0	46,219	573,205	955,645	881,829	837,114	359,889	24,132	28,643	3,806,306	-5.3%
2019	33,896	31,650	28,695	48,150	434,385	781,853	936,062	820,006	693,118	171,339	15,628	25,506	4,020,288	-2.3%
2018	29,179	34,263	22,741	37,766	446,875	810,884	940,563	813,970	724,454	218,076	13,849	22,380	4,115,000	0.0%
2017	29,518	32,275	23,897	45,160	419,635	803,652	962,404	916,166	640,068	211,987	10,468	21,294	4,116,524	-3.3%
2016	30,621	36,327	22,924	59,253	444,630	838,316	995,917	841,036	701,754	242,004	24,710	19,685	4,257,177	3.9%
2015	28,091	34,343	22,989	46,600	386,064	780,768	980,702	854,408	680,213	252,013	11,049	20,470	4,097,710	16.6%
2014	26,778	28,233	18,778	31,356	310,039	669,642	858,856	773,357	571,764	194,804	11,537	18,340	3,513,484	10.2%

*All national parks, including Yellowstone National Park, were closed in the spring of 2020 due to the Covid-19 pandemic.
Source: NPS 2025a.

TABLE A-2. PARK NONRECREATIONAL VISITORS BY MONTH.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual Total	Change From Previous Year
2024	58,796	40,288	47,167	58,609	115,341	165,644	195,204	182,030	158,256	111,184	56,432	56,483	1,245,434	-4.7%
2023	60,272	63,370	61,468	63,812	119,931	169,196	200,740	183,419	160,297	106,532	61,213	56,611	1,306,861	-2.2%
2022	62,941	67,972	75,280	68,193	97,654	166,662	204,661	196,261	174,103	121,380	49,087	52,440	1,336,634	0.5%
2021	60,975	53,569	73,117	77,290	126,299	191,850	202,660	180,479	154,422	104,321	63,973	40,413	1,329,368	18.4%
2020*	58,120	59,368	72,370	44,945	76,262	92,762	191,112	171,138	152,519	100,505	52,007	51,337	1,122,445	-5.5%
2019	58,361	52,880	64,620	63,536	108,215	152,062	193,317	170,202	134,406	81,757	52,449	55,723	1,187,528	-3.4%
2018	56,623	52,697	61,031	61,610	120,532	156,648	197,579	174,770	141,955	90,763	60,933	54,298	1,229,439	-1.5%
2017	53,822	54,038	62,505	65,733	119,406	159,872	202,263	189,463	140,300	92,665	55,331	52,150	1,247,548	4.1%
2016	51,099	55,180	62,138	64,044	105,417	156,070	192,910	176,451	142,449	84,598	60,954	47,546	1,198,856	3.7%
2015	53,478	55,693	65,087	62,472	98,137	148,865	190,369	168,410	131,438	84,572	49,416	48,181	1,156,118	9.3%
2014	50,564	48,265	56,798	54,533	86,304	131,003	173,738	159,471	119,629	80,328	47,544	49,377	1,057,554	0.8%

*All national parks, including Yellowstone National Park, were closed in the spring of 2020 due to the Covid-19 pandemic.
Source: NPS 2025a.

Traffic and Road Safety

Traffic Counts

The North Entrance Station is the second-most used vehicle entrance after the West Entrance Station. Use of the entrance varies seasonally, with highest vehicle counts in July and lowest vehicle counts in November. The current and historic (last decade) traffic counts according to NPS Stats Park Reports for the Park's North Entrance are presented in Table A-3. These data show that during the late fall and winter months (November through March), vehicle traffic is at its lowest and that during the summer months (June through September), vehicle traffic is at its highest. Except for access by over-snow vehicles, the roads south of Mammoth Hot Springs are closed seasonally to vehicles (November to mid-May for most), which is likely the reason for a drop in vehicle traffic during winter and spring months as compared to the summer. The average daily traffic (incoming plus outgoing) through the North Entrance Station based on 2017 data (pre-2022 flood event) and adjusted for July conditions was 6,100 for all vehicles, of which 3 percent were buses and 9 percent were recreational vehicles (RVs) (NPS 2017).

After the 2022 flood, the North Entrance Station was closed until the OGR could be upgraded to serve as the temporary entrance road into the Park (construction was completed in late October 2022). The North Entrance Station reopened as a point of entry into the Park in November 2022. Traffic patterns through the North Entrance Station since the opening of the OGR have continued to have the same seasonal fluctuations as when the North Entrance Road was in use (Table A-3 and Chart A-1). In 2024, the average daily traffic count (incoming plus outgoing) through the North Entrance Station in July (peak) was approximately 6,100 vehicles per day, with a total of 89,826 vehicles (incoming and outgoing) for the month (Chart A-1; Watson 2024).

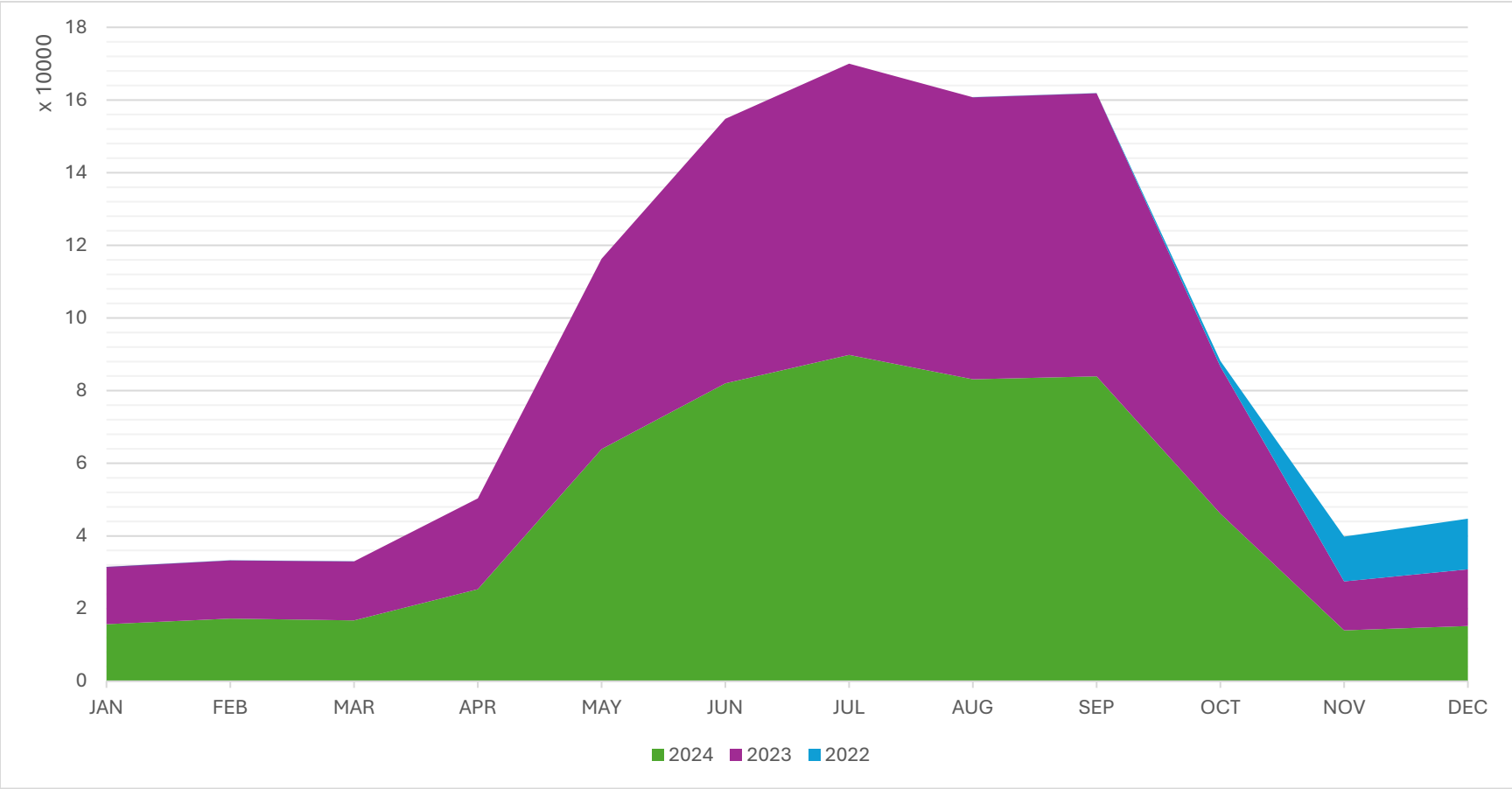
The busiest times of the day for entry at the North Entrance are the morning and evening hours, likely due to the mix of traffic types (visitors and Park employees) (NPS 2019). Although the North Entrance Station has one of the longest wait times for any of the Park entrances, many visitors (91.2 percent) reported no delay in their entry to the Park due to traffic congestion (NPS 2019). A 2017 study examining traffic in the Park noted that on a Monday in July from 9:00 to 10:00 a.m., a maximum of 144 cars per lane could be processed through the North Entrance Station (NPS 2017). At that peak time, researchers observed a delay of more than 9 minutes, resulting in a 28-vehicle queue that extended 850 feet back from the North Entrance Station (NPS 2017). Despite recorded delays, visitor surveys found that traffic congestion at the North Entrance Station and on the North Entrance Road (again, prior to the 2022 flood) was either less than visitor expectations (35.7 percent) or about what visitors expected (28 percent); only approximately 23 percent of visitors answered that traffic congestion exceeded their expectations (NPS 2019). See additional discussion below under *Level of Service Standards*.

TABLE A-3. TRAFFIC COUNTS (INCOMING AND OUTGOING) AT THE NORTH ENTRANCE STATION.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual Total	Change From Previous Year
2024	15,705	17,246	16,750	25,345	63,922	82,023	89,826	83,128	83,944	46,162	14,022	15,203	553,276	9.9%
2023	15,791	16,039	16,259	25,001	52,394	72,808	80,175	77,619	77,927	40,485	13,470	15,618	503,586	157.5%
2022*	16,848	16,381	17,996	24,150	60,690	31,696	0	0	0	1,536	12,342	13,957	195,596	-61.0%
2021	11,504	13,163	16,957	22,217	53,883	81,696	87,013	76,705	73,229	36,987	9,113	18,430	500,897	50.3%
2020**	6,581	9,251	12,385	0	12,406	41,895	64,833	64,150	65,705	36,779	9,693	9,495	333,173	-2.6%
2019	6,833	6,903	10,339	12,903	37,418	54,819	63,701	60,152	54,903	20,203	6,262	7,502	341,938	-6.4%
2018	5,752	6,598	7,372	9,361	38,993	60,351	72,030	66,947	61,645	23,860	6,421	6,067	365,397	1.3%
2017	6,237	6,904	8,347	11,812	38,577	62,205	71,086	70,316	52,688	21,504	5,430	5,525	360,631	-3.6%
2016	7,965	8,538	8,201	12,672	41,289	64,283	73,277	66,969	57,131	21,439	6,976	5,191	373,931	2.7%
2015	7,059	8,226	9,164	11,085	33,664	62,417	75,822	63,426	56,310	25,178	5,156	6,510	364,017	12.2%
2014	6,546	5,756	6,362	9,411	31,108	54,152	66,492	60,691	51,525	21,758	4,564	6,088	324,453	8.9%

*The North Entrance Station was closed from June 13, 2022, through June 30, 2022. The OGR was upgraded to provide temporary access to the Park's North Entrance in October 2022.
**All national parks, including Yellowstone National Park, were closed in the spring of 2020 due to the Covid-19 pandemic.
Source: NPS 2025b.

CHART A-1. MONTHLY TRAFFIC COUNTS AT THE NORTH ENTRANCE STATION SINCE OPENING OF THE TEMPORARY ENTRANCE ROAD (NOVEMBER 2022 THROUGH DECEMBER 2024).



Source: NPS 2025b.

Level of Service Standards

As part of a 2017 study the NPS evaluated the level of service (LOS) of major roads in the Park, including the North Entrance Road, to inform future transportation planning and visitor use management (NPS 2017). LOS is a rating system commonly used in the transportation field to describe road traffic conditions based on certain variables, such as speed, travel time, and safety; the scores can be used to understand road capacity and performance for current and projected conditions. LOS scores range from A to F, where LOS A is free-flowing traffic (optimal conditions) and LOS F represents significant delays or near-gridlock. When considering factors such as peak visitation rates, road grade, and heavy vehicle traffic, the 2017 study (NPS 2017) found that the North Entrance Road was operating at LOS D, below the acceptable threshold for road congestion and capacity. If visitation rates continue to increase, the LOS of the North Entrance Road is expected to deteriorate. Updated information regarding the LOS rating for the OGR is not available. Based on observations, the LOS of the OGR likely would not rank as an A, B, or C.

Based on 2018 visitor surveys (NPS 2019), visitors are generally comfortable with slow-speed travel in the Park, even if it is less than the posted speed limit. Researchers noted that visitors interested in driving scenic roads and viewing wildlife are not likely bothered by slow-speed travel, and repeat visitors to Yellowstone are more likely to experience frustration with slow-speed travel and traffic congestion than first-time visitors (Jorgensen et al. 2019).

Motor Vehicle Accidents

Based on collision data provided by FHWA (2024b), a little more than 10 motor vehicle accidents per year occur at the North Entrance (Montana); see Chart A-2. Collisions with an object or other motor vehicle were the most common, followed by collisions with animals (Table A-5). Most collisions occurred during dry conditions (Table A-5). As shown in Chart A-3, the rates of collisions between 2022 and 2024 on the OGR, which has served as the temporary entrance road since October 2022, are less than or similar to the most recent collision rates for the now-closed North Entrance Road (2018 through closure in 2022) (Townsend 2024). Problematic areas for accidents on the now-closed North Entrance Road included popular recreation areas (shown on Figure 1 in EA Chapter 1), such as the Boiling River Trailhead and parking area, 45th parallel sign, and Gardner Canyon, as well as steep or difficult parts of the road, such as the Mammoth S curves and Soap Hill. Along the OGR, problematic areas for accidents include steep hills and sharp curves (Townsend 2024).

CHART A-2. ACCIDENTS PER YEAR AT THE NORTH ENTRANCE.

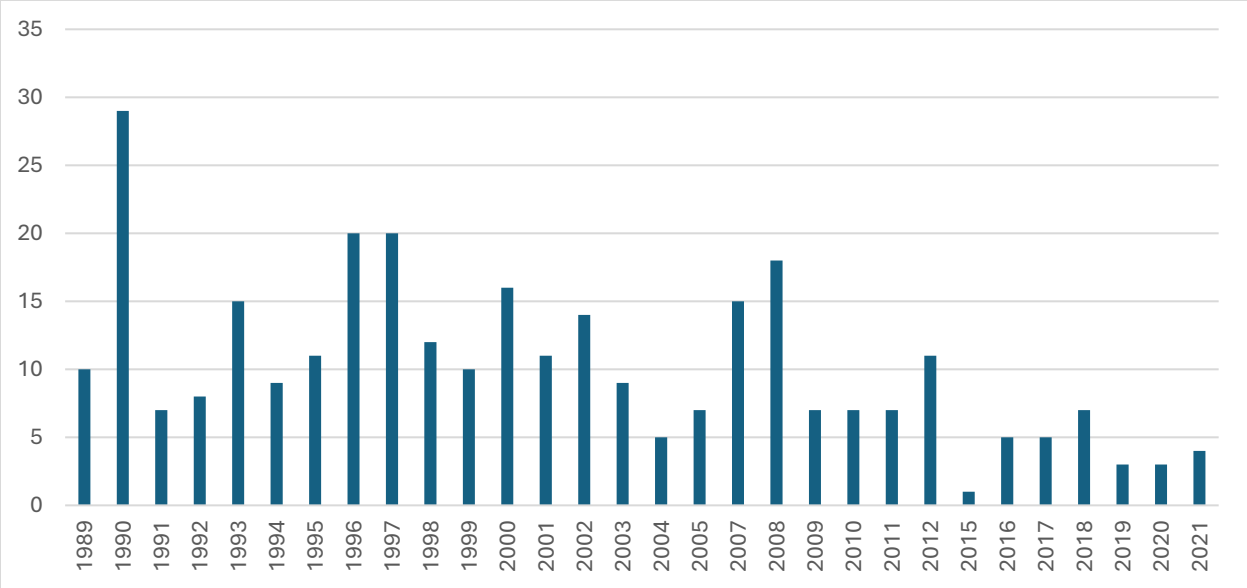


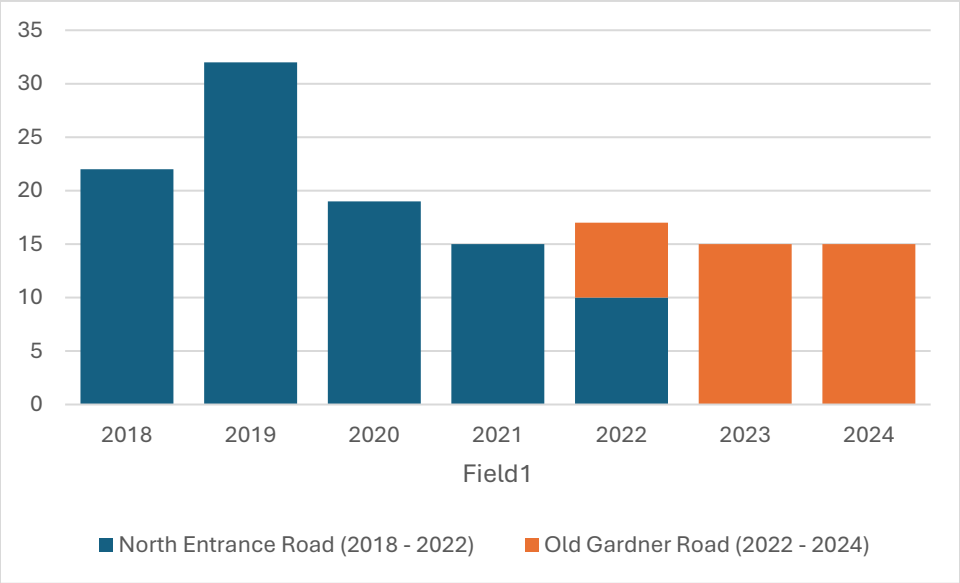
TABLE A-4. TYPE OF MOTOR VEHICLE CRASHES AT THE NORTH ENTRANCE.

Crash Description	Crash Count
Collision with Fixed or Other Object	100
Collision with Other Motor Vehicle	94
Collision with Animal	62
Non-Collision	33
Unknown or Other	14
Collision with Pedestrian	3
Total	**306**

TABLE A-5. COLLISIONS BY ROAD CONDITIONS.

Road Surface Conditions	Count of Case
Dry	202
Icy or Slushy	32
Wet	30
Snowy	28
Unknown	10
Debris	4
Total	**306**

CHART A-3. ACCIDENTS PER YEAR ALONG THE NORTH ENTRANCE ROAD (2018 – 2022) VERSUS OGR (2022-2024).



Environmental Consequences

Alternative 1: No Action

Traffic and Road Safety

Under the No Action Alternative, current levels of traffic would remain, but the visitor experience likely would be affected by frequent road maintenance and associated road closures. Road repairs and construction would be needed to maintain the road in a serviceable condition because the temporary entrance road was not constructed for long-term use and does not comply with NPS and FHWA long-term standards. The traffic delays associated with road maintenance would contribute to congestion in areas used by tourists and recreational site users. In addition to creating delays, road maintenance and the presence of associated construction equipment would temporarily affect the viewshed and decrease the quality of the visitor experience.

The temporary entrance road is a narrow road (approximately 22 feet wide consisting of two 11-foot-wide travel lanes) with unpaved shoulders, sharp curves, and steep grades that are barriers to oversized vehicles and require reduced speed limits for safe travel by passenger vehicles. Under the No Action Alternative, these road limitations would continue. Existing drainage structures, which are often inadequate and lead to potential flooding, would remain in place and likely would continue to need maintenance.

Alternative 2: Center Alignment - NPS Preferred Alternative

Traffic and Road Safety

Of the action alternatives, Alternative 2 would take the shortest amount of time to construct. The total length of construction under Alternative 2 would be five years, including a final year that would be used for conversion of the unused segments of the OGR and old North Entrance Road to multi-use or pedestrian trails. Road (including bridges) and sewer line construction

under Alternative 2 would occur over five construction seasons (beginning of April to mid-November each year, and winter work as weather allows).

Alternative 2 impacts on day-to-day visitor traffic would be minimal (compared to Alternative 3) as most of the construction would not be on the temporary access road. Work would be done during the day during the summer construction season; therefore, construction of the Alternative 2 alignment likely would coincide with the periods when traffic volumes are highest through the North Entrance Station, potentially adversely affecting more than 6,000 vehicles per day for five construction seasons. Because part of the Alternative 2 alignment overlaps the temporary access road, a construction bypass would be constructed to move visitor traffic around the construction area. The bypass would mitigate impacts on visitors and minimize lane reduction, closures, and delays. There still may be short-term periods when road construction would need to occur on the OGR. During these periods, there would be adverse impacts on visitors associated with lane reductions and temporary closures up to 30 minutes in length (see Alternative 3 for a detailed description of closure types), though like Alternative 3, it is anticipated that much of this work would occur at night when traffic volumes are less. Alternative 2 impacts would be less than those for Alternative 3 given the shorter period of construction and the shorter segment of the OGR that would be used for the Alternative 2 alignment. Under Alternative 2, the new road would be open to public traffic in the fourth year (as opposed to year six under Alternative 3).

Other construction-related impacts on visitors could include construction noise, scenic disruption, and potential for accidents in work zones, but the duration of these impacts would be one construction season shorter than for Alternative 3. Under Alternative 2, visitors would be removed from many of these impacts (as compared to Alternative 3) because except for some short segments, visitors would not be traveling through the construction area.

Most motor vehicle accidents reported for the North Entrance occur near the North Entrance Station or along the entrance road and occur with a fixed object, such as a jersey barrier, or another vehicle during dry conditions (likely summer) (Table A-5). Constrictions to traffic flows during the busy visitor season due to seasonal road construction under Alternative 2 could, but are not likely to, increase the rate of collisions in those areas (though the rate of any increase is unknown).

Once the new road has been constructed, road safety under Alternative 2 (as with both Alternatives 3 and 4) would improve as compared to current conditions because the width of the road would increase (two 11-foot-wide travel lanes and two 4-foot-wide shoulders) and curves would have larger radii, enhancing the safety of the entrance road. New bridges over the Gardner River at the Boiling River and the Chinese Gardens would be constructed with 30-foot-wide road widths, including two 6-foot-wide sidewalks for pedestrian use. The design of these bridges would mitigate the risk of road failure due to flooding and landslides and would enhance road safety.

The potential hazards from landslides and washouts would be less under Alternative 2 than either Alternative 3 or 4. Over the long term, the Alternative 2 alignment is not expected to have the same flooding and geologic hazards that would be associated with Alternative 4 since the alignment would avoid those hazard areas in the northern portion of the Gardner Canyon. Similarly, Alternative 2 avoids the geologic hazards on the OGR, making the road less prone to these hazards than under Alternative 3. Alternative 2, therefore, would have a lower likelihood

of temporary closure and associated adverse visitor experience impacts due to flooding and geologic hazards (as compared to either Alternative 3 or 4).

Alternative 3: OGR Alignment

Traffic and Road Safety

Road and sewer construction under Alternative 3 would occur over six construction seasons (beginning of April to mid-November each year) and would coincide with the periods when traffic volumes are highest through the North Entrance (see the discussion above in the *Affected Environment* section), potentially adversely affecting more than 6,000 vehicles per day.

Traffic impacts under Alternative 3 would be greater than those under any of the other action alternatives, adversely affecting the visitor experience over a period of six years. As described in Chapter 2, a work zone delay and queuing analysis was completed for Alternative 3. Delay times would be heavily influenced by traffic volumes, traffic types, average travel speed, and grade. To comply with reasonable delay times, work zones would be short in length, which would limit the amount of work that could be accomplished in a time period, extending the total duration of construction. The traffic simulations indicated there would be a high risk of queueing from the work zones extending backwards into Mammoth Hot Springs. Queueing would interact with the ability of drivers to turn at the Esplanade or further into Mammoth Hot Springs, further resulting in gridlock (due to successive blocked intersections and driveways, combined with parking maneuvers). To mitigate this gridlock potential, extensive traffic control (to be coordinated at each location) would be needed. Because there would be a high risk of this gridlock scenario occurring, meeting the maximum delay times may be impossible and would be highly detrimental to the visitor experience and Park operations, residents, and businesses. Similar impacts on Gardiner would also be expected, though to a lesser magnitude compared to Mammoth Hot Springs; extended queues into Gardiner would impact local businesses if driveways or parking areas were obstructed.

To mitigate potential traffic queuing issues, most of the construction work would occur during nighttime road closures, and minimal construction work would occur during daytime when traffic volumes are highest. The types of closures necessary for this work would include lane restrictions, full closures at night, and daytime full closures of approximately two to four hours periodically throughout each construction season. Night closures would still impact all users, and residents' access and commercial operations would be disrupted. Nighttime construction operations would be less efficient and would extend the duration to complete the construction.

During the six-year period of construction, the visitor experience (as with Alternative 2) also may be adversely affected by construction noise, viewshed disruption associated with construction, and the potential for accidents in work zones (as described for Alternative 2).

Once the new road has been constructed, road safety under Alternative 3 (as with both Alternatives 2 and 4) would improve as compared to current conditions because the width of the road would increase (two 11-foot-wide travel lanes and two 6-foot-wide shoulders), and curves would have larger radii, enhancing the safety and drivability of the entrance road. Existing retaining and drainage structures would be replaced or enlarged to fit the new road, and new retaining walls (amounting to approximately 6,800 feet in length) would be constructed to improve road stability. Over the long term, Alternative 3 is not expected to have the same flooding and geologic hazards that would be associated with Alternative 4 because it does not

have the same proximity to the Gardner River and, therefore, would have a lower likelihood of temporary closure and associated adverse visitor impacts due to those hazards. As compared to Alternative 2, however, the Alternative 3 alignment would have more geologic hazards (see the discussion in EA Section 3.4.6, Geologic Resources).

Alternative 4: Gardner Canyon Alignment

Traffic and Road Safety

Alternative 4 would take the longest to construct (nine seasons) due to the need to construct the multiple structures that would be required to fit a wider road in the canyon area and protect visitors and the environment. Construction would also be slow because the canyon cliffs have rockfall hazards that would make construction very difficult, hazardous, and challenging.

Impacts on day-to-day visitor traffic would be minimal as most of the construction would not be on the temporary access road, allowing traffic flow from the North Entrance Station to be mostly unimpeded. Construction-related vehicles, however, would need to use the temporary access road to access areas between the washout on the old North Entrance Road and Mammoth Campground. Some short-term minor alterations to traffic flow (and associated noise and visual impacts) would occur when construction equipment and materials are brought into the work zone. Also, once visitors are transitioned from the OGR to the new alignment, temporary traffic disruptions and associated noise and visual impacts could occur until the connections are completed at either end of the new alignment.

As described in the *Affected Environment* section, the OGR is a narrow road (approximately 22 feet wide) and has sharp curves and steep grades. These road features would continue to be a source of road safety concerns for Park visitors until the Alternative 4 alignment is constructed (anticipated to extend over nine construction seasons). Accident data for the OGR for 2022 through 2024 have been similar to recent (2018 through 2022) accident data for the now-closed canyon alignment (Townsend 2024). This accident trend is expected to continue through construction of the Alternative 4 alignment.

Once constructed, Alternative 4 would likely improve road safety over current conditions as the road would be wider (30 feet) than the temporary entrance road, the grade would be less steep, and curves would be similar to those previously experienced by Park visitors on the North Entrance Road. When the North Entrance Road was still in use, problematic areas for accidents included the North Entrance Station area and popular recreation areas, such as the Boiling River, 45th parallel sign, and other sites in the Gardner Canyon, as well as steep or curvy parts of the road. Features of Alternative 4, such as the rock shed structure, which would protect visitors from rockfall hazards, and the design of the bridge piers, which would mitigate the risk of road failure due to flooding, would enhance the safety of the entrance road. Alternative 4 would still be susceptible to the flooding and geologic issues that led to the closure of the old North Entrance Road, although the risks are anticipated to be less than those in the past due to more resilient road design and mitigations.

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APPENDIX B. ALTERNATIVES CONSIDERED BUT DISMISSED

APPENDIX B. ALTERNATIVES CONSIDERED BUT DISMISSED

McMinn Bench Alignment

The McMinn Bench alignment would be located on the east side of the Gardner River Canyon and includes 6 miles of new alignment. This alignment would require the construction of a wildlife pullout bridge, Rescue Creek bridge and the McMinn Dry Creek bridge. The McMinn Bench alignment would provide several advantages compared with the other alignments, such as reduced risk from geologic hazard and better park operations considerations. However, the significance of the natural resource values of the McMinn Bench and Mount Everts area and the magnitude of adverse impacts from a road corridor on these highly importance park resources warrant the dismissal of the alternative from further analysis.

The McMinn Bench is a key migration corridor for bighorn sheep, bison, deer, elk, and pronghorn. It supports essential breeding and calving areas for ungulates, is a critical low-elevation winter range for ungulates, and important carnivore hunting area for bears, cougars, and wolves. Traversing McMinn Bench with a road would adversely affect breeding, disease transmission, shelter, security, and access to water and minerals for bighorn sheep. It also could reduce the survival and reproductive success of migrant pronghorn reliant on this corridor. The large area of disturbance would adversely affect high quality habitat in general across species. A road on McMinn Bench would adversely affect recommended wilderness. Chapter 6 of the NPS Management Policies stipulates that improvement of existing roads is not permitted in wilderness areas unless necessary for resource protection and that new roads cannot be built in designated wilderness areas (NPS 2025). The McMinn Bench alignment would also likely result in unavoidable impacts on two National Register of Historic Places (NRHP)-eligible cultural sites including potential adverse effects on the North Entrance Road Historic District and Grand Loop Road Historic District. The McMinn Bench alignment may also result in visual impacts on the North Entrance cultural landscape and the Yellowstone Park Company Historic District.

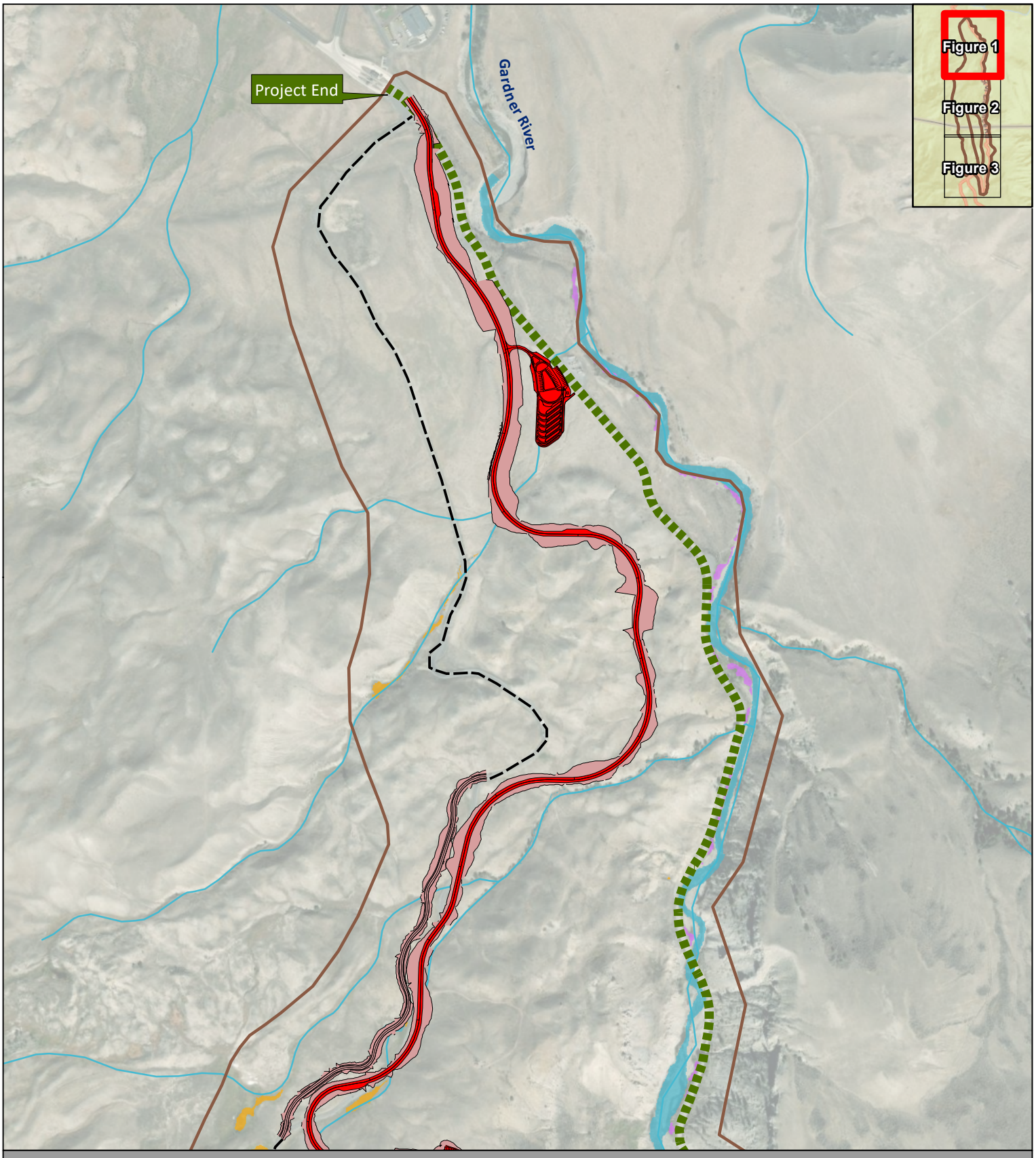
Rescue Creek Alignment

The Rescue Creek alignment would connect to the Grand Loop road between Mammoth and Tower, near the Blacktail trailhead, and follow the Rescue Creek trail around the east and north side of Mount Everts. The alignment reconnects to the previous North Entrance road near the site of the previous Rescue Creek bridge towards Gardiner, Montana. The alignment was dismissed due to environmental impacts and wilderness impacts, including potential impacts on ungulate habitat and migration corridors.

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APPENDIX C. DETAILED MAP BOOK: ACTION ALTERNATIVES

December 11, 2025



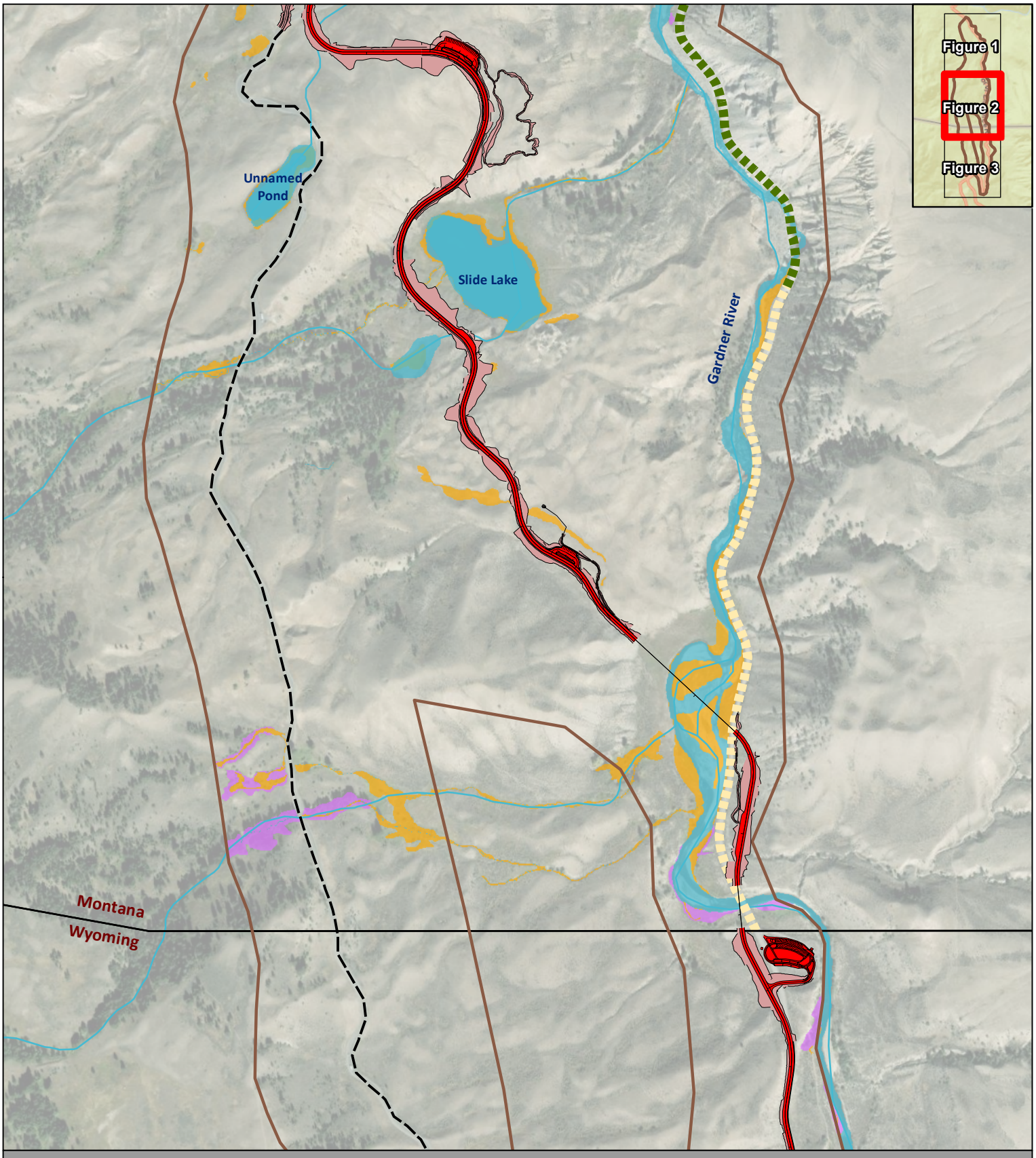
Study Area
Temporary Disturbance
Permanent Disturbance
Old Gardiner Road (Multi-Use Trail)
North Entrance Road Pedestrian Trail
North Entrance Road Reclaimed Area
Ordinary High Water Mark
Wetland
Riparian

Alternative 2
Post-Construction Areas

Yellowstone National Park North Entrance Road Reconstruction Project

0 400 800 Feet

December 11, 2025



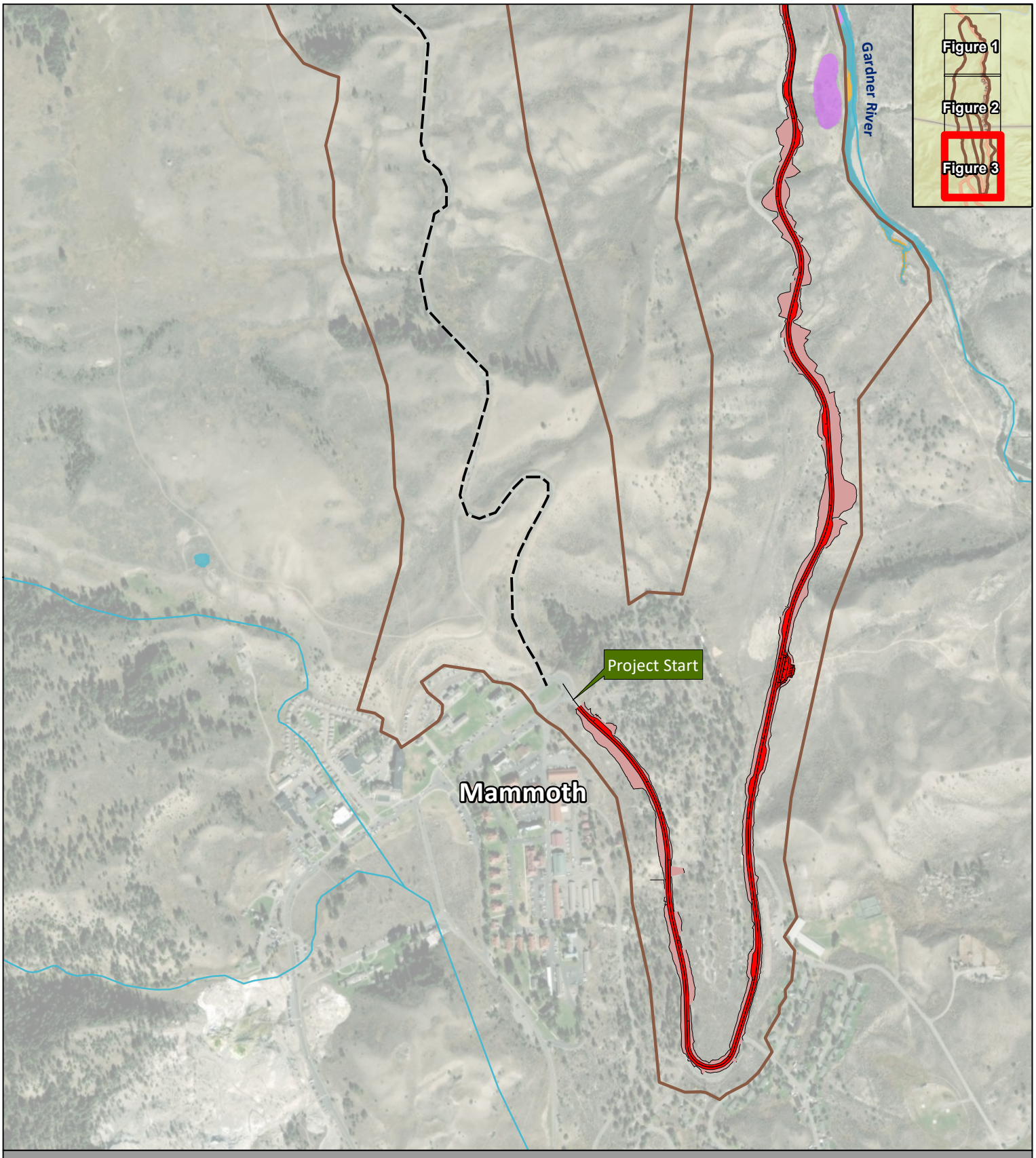
Study Area
Temporary Disturbance
Permanent Disturbance
Old Gardiner Road (Multi-Use Trail)
North Entrance Road Pedestrian Trail
North Entrance Road Reclaimed Area
Ordinary High Water Mark
Wetland
Riparian

Alternative 2
Post-Construction Areas

Yellowstone National Park North Entrance Road Reconstruction Project

0 400 800 Feet

December 11, 2025



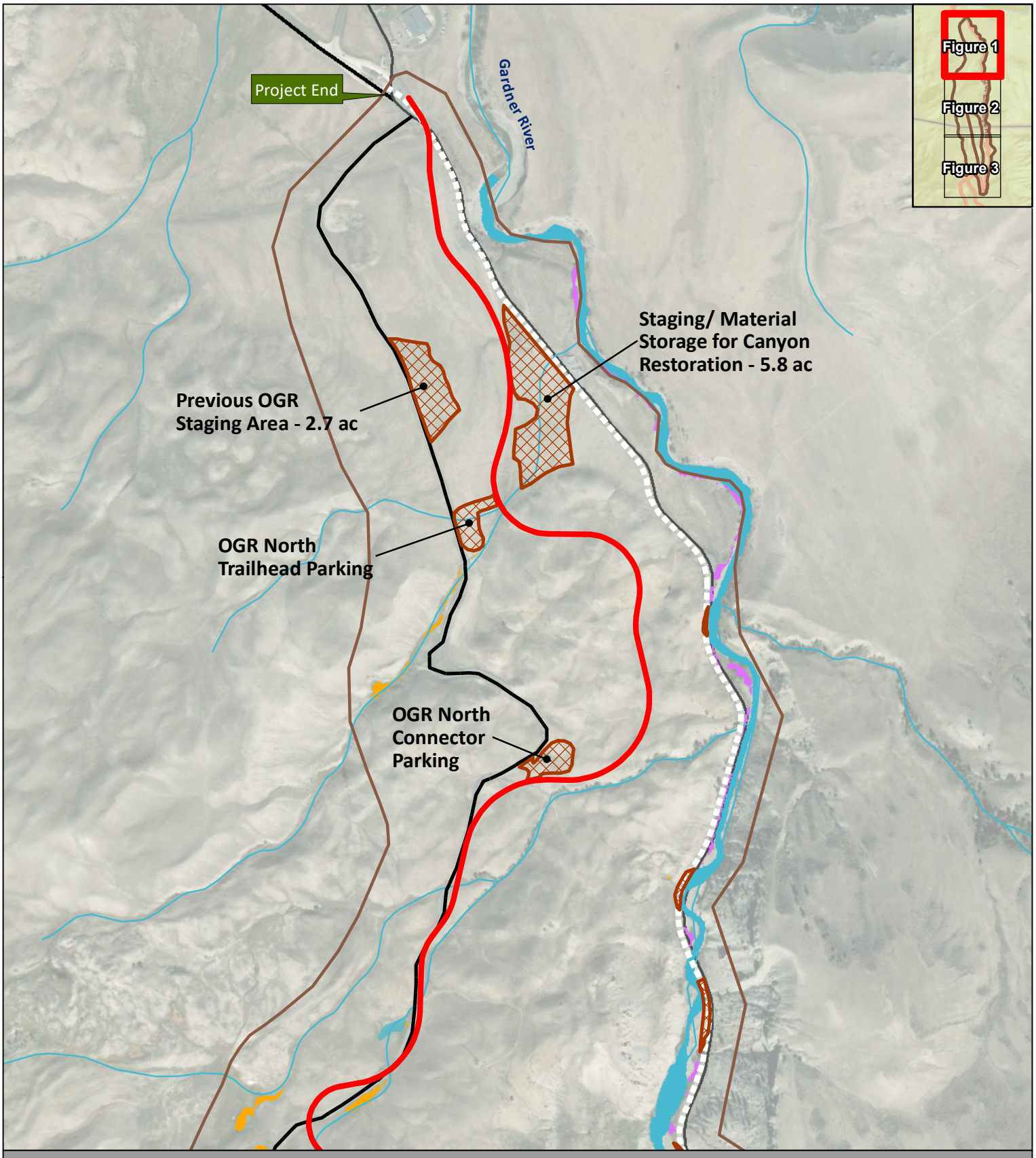
Study Area
Temporary Disturbance
Permanent Disturbance
Old Gardiner Road (Multi-Use Trail)
North Entrance Road Pedestrian Trail
North Entrance Road Reclaimed Area
Ordinary High Water Mark
Wetland
Riparian

Alternative 2
Post-Construction Areas

Yellowstone National Park North Entrance Road Reconstruction Project

0 400 800 Feet

December 11, 2025

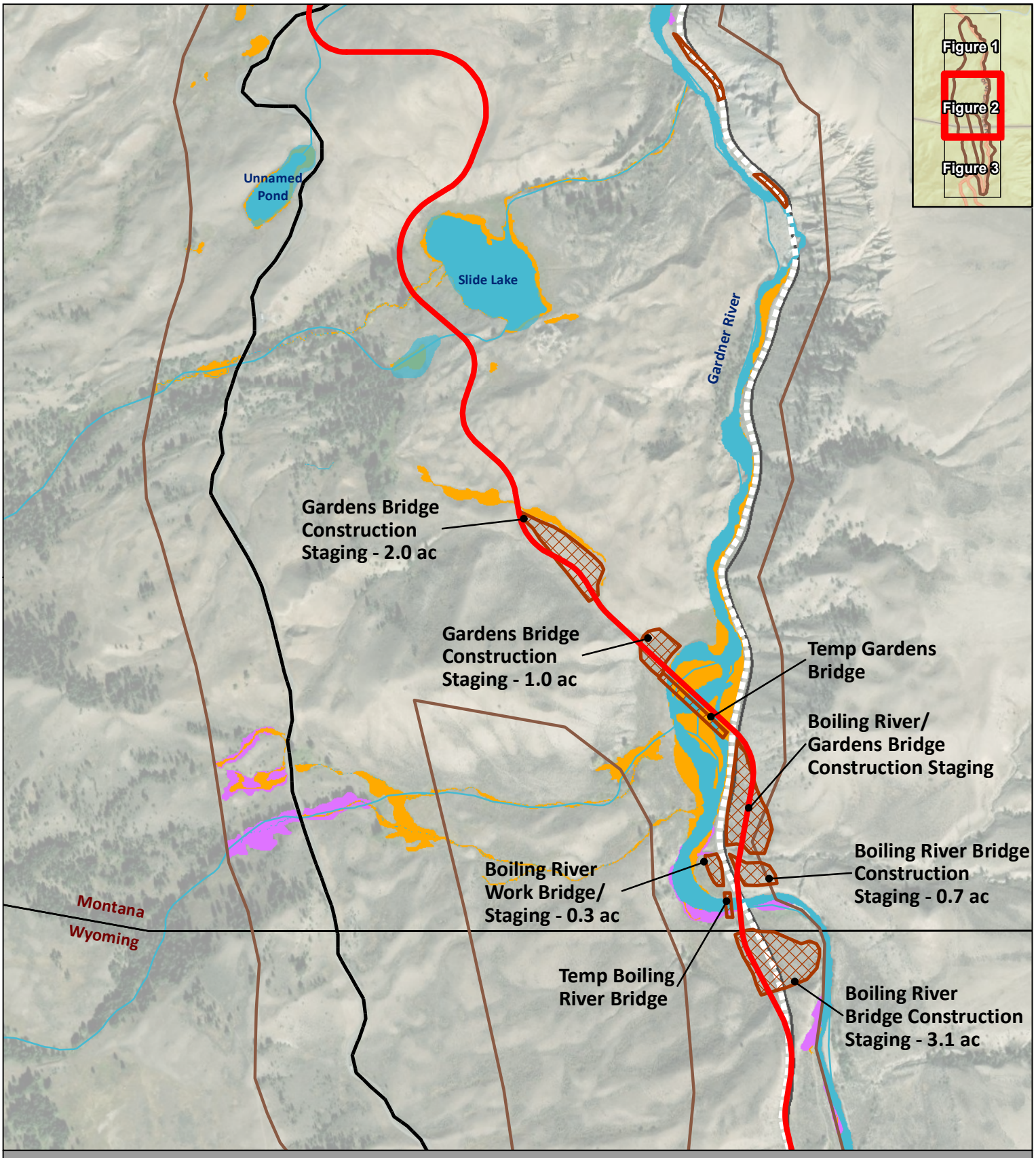


Study Area
North Entrance Road (Closed)
Old Gardiner Road (Temporary Access Road)
Alternative 2: Center Alignment (NPS preferred alternative)
Preconstruction Disturbance Area
Ordinary High Water Mark
Wetland
Riparian

Alternative 2
Pre-Construction Areas
Yellowstone National Park North Entrance Road Reconstruction Project

0 400 800 Feet

December 11, 2025

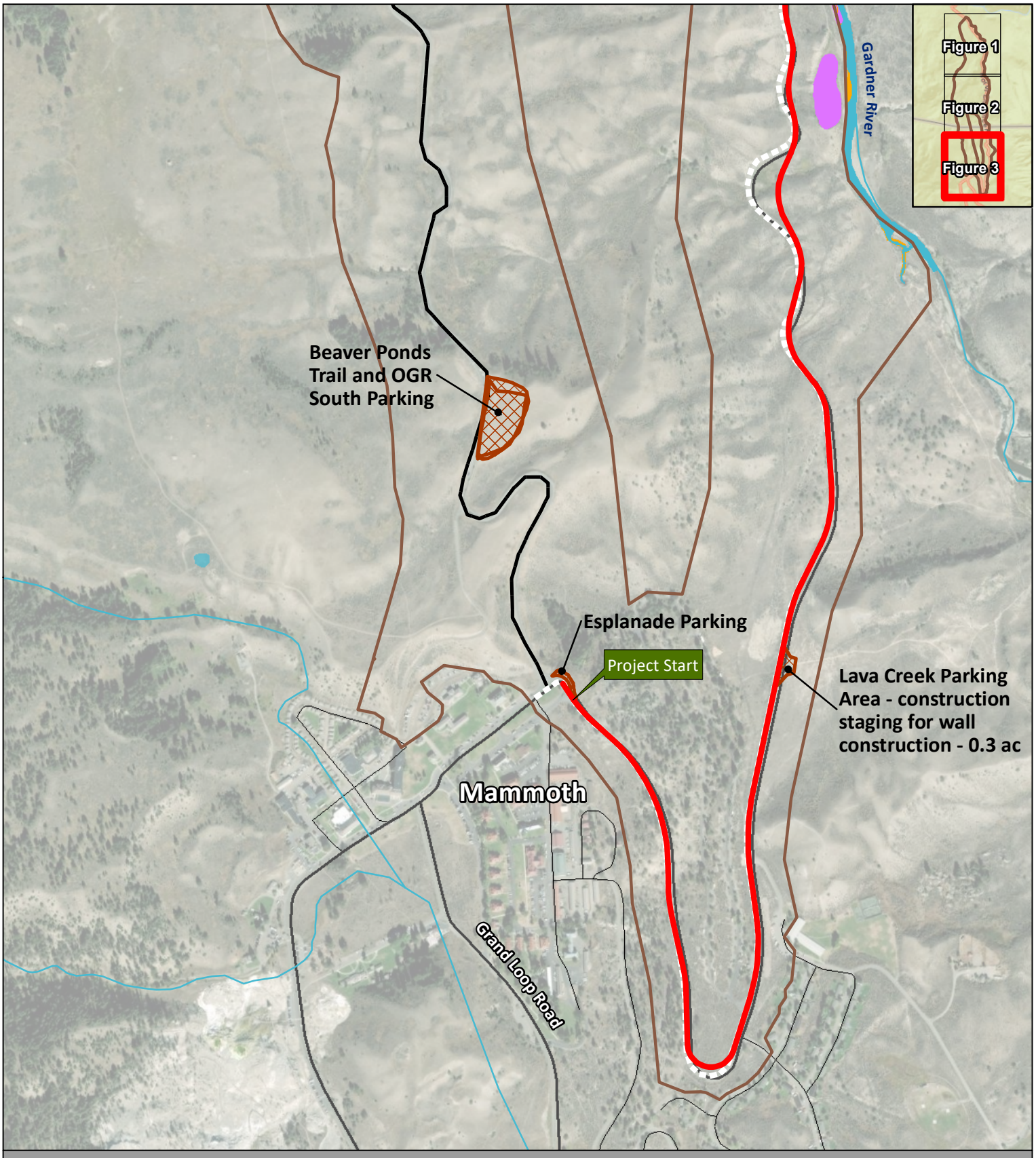


Study Area
North Entrance Road (Closed)
Old Gardiner Road (Temporary Access Road)
Alternative 2: Center Alignment (NPS preferred alternative)
Preconstruction Disturbance Area
Ordinary High Water Mark
Wetland
Riparian

Alternative 2
Pre-Construction Areas
Yellowstone National Park North Entrance Road Reconstruction Project

0 400 800 Feet

December 11, 2025



Study Area
North Entrance Road (Closed)
Old Gardiner Road (Temporary Access Road)
Alternative 2: Center Alignment (NPS preferred alternative)
Preconstruction Disturbance Area
Ordinary High Water Mark
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Alternative 2
Pre-Construction Areas
Yellowstone National Park North Entrance Road Reconstruction Project

0 400 800 Feet

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APPENDIX D. RESOURCE PROTECTION MEASURES

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General

- To minimize the amount of ground disturbance, staging and stockpiling areas would be in previously disturbed sites, including the road, and away from visitor use areas to the extent possible. All staging and stockpiling areas would be restored to pre-flood conditions following construction.
- Special resource areas in the construction zones would be identified and fenced with construction fencing or some similar material prior to any construction activity. In general, construction zones would be designed to confine activities to the minimum area required for construction. All Resource Protection Measures would be clearly stated in the construction specification plans, and workers would be instructed to avoid conducting activities beyond the construction zone, which would be defined by the construction zone fencing.
- This project will use only topsoil, rock, sand, gravel, mulch, and other natural materials from Park-approved sources. Where stockpile storage allows, topsoil will be retained for short periods in shallow windrows or stored in areas determined by Park staff to be free of invasive weeds for reuse throughout the project area to facilitate successful revegetation efforts. If necessary, fugitive dust generated by construction would be controlled by spraying water on the construction site. Construction vehicle speeds on unpaved roads would be limited to further reduce the generation of fugitive dust.
- To reduce air pollution and noise, construction equipment and vehicles would be well-maintained and properly functioning, and equipment idling would be limited to only what is necessary for safety and/or mechanical reasons. Equipment and vehicles would also be checked for leaking oil and fluids.

Visitor Use (Includes Recreation, Traffic, and Visual/Scenic Resources)

- With each alternative, portions of the temporary entrance road would remain open during construction so visitors could still access the Park from the North Entrance. The Mammoth Campground facilities and recreation amenities located along the temporary entrance road would still be accessible. Short-term closures of the road may be necessary during active construction. These closures would be posted on the Park website and other means to alert the public.
- During construction activities, safety measures to protect visitors would be implemented, such as restricting visitors from active work areas, to ensure their safety, and safely storing any hazardous materials required for construction.
- The construction schedule would be coordinated and communicated through the Park website and other appropriate means to inform Park visitors.
- Traffic safety signs and flaggers would be used to inform motorists, bicyclists, and pedestrians and manage traffic on affected roads during construction activities.

Wildlife and Wildlife Habitat, and Special Status Species (Includes Threatened and Endangered Species)

- Construction workers and supervisors would be informed of the occurrence and status of special status species (including federally listed species) and would be advised of the potential impacts on the species and potential penalties for taking or harming a special-status species. Provisions would be included in construction contracts that would require the cessation of construction activities if a special status species were discovered in the project area and until Park staff reevaluate the project.
- The contractor would be required to keep all waste and contaminants contained and remove them daily from the work site.
- All construction personnel working on the project would be required to attend a briefing session on grizzly bears and proper food storage. Food storage requirements would be strictly enforced.
- Resource Protection Measures to avoid and minimize impacts on rare plants would include avoidance (where possible), potentially harvesting seeds for use in revegetation, and transplanting individual plants for use in revegetation efforts if avoidance is not practicable. Avoidance and restoration efforts would focus on S1 (State Critically Imperiled) and S2 (State Imperiled) species.

Vegetation and Soils

- Existing vegetation would be retained to the extent possible.
- Recontouring and revegetation disturbed areas would take place during and following construction and would be designed to minimize the visual intrusion of any new structures. Revegetation efforts would strive to reconstruct the natural spacing, abundance, and diversity of native plant species using native species as described in the Park's revegetation plan (NPS 2025). All disturbed areas would be restored as nearly as possible to natural conditions shortly after construction activities are completed. Weed control methods would be implemented to minimize the introduction of noxious weeds.
- No imported topsoil or straw bales would be used during revegetation to avoid the introduction of exotic plant species or inappropriate genetic stock of native plant species.
- Following revegetation, restored areas would be monitored and managed to prevent colonization by nonnative invasive species.
- Resource Protection Measures for construction equipment would be followed such as decontamination and equipment washing prior to entrance to avoid exposure of the environment to risks such as oil leaks and fuel spills.
- Ground protection mats, or similar, would be placed in the construction areas to reduce trampling impacts on vegetation from heavy machinery.
- Locations of special status plant populations would be clearly identified in the field prior to the start of construction activities.

Water Resources (Surface Water and Wetlands)

- Erosion and storm runoff impacts would be mitigated through measures including, but not limited to, sediment traps, silt fences, and regular inspection of construction areas for erosion.
- No heavy equipment would operate in a live stream.
- No equipment servicing would be done near the river channel or immediate floodplain, unless equipment stationed in these locations cannot be readily relocated (i.e., pumps and generators).
- If necessary, all servicing of equipment done at the job site would be conducted in a designated, protected area to reduce threats to water quality from vehicle fluid spills. These designated service areas would not directly connect to the groundwater or surface water. The service areas would be clearly designated with berms, sandbags, or other barriers. Secondary containment, such as a drain pan, to catch spills or leaks would be used when removing or changing fluids. Fluids would be stored in appropriate containers with covers and properly recycled or disposed of off-site.
- No large fuel storage containers would be allowed in the project area.
- Only emergency repairs necessary to move equipment to a more secure location would be conducted in the channel or floodplain.
- Spill kits would be readily available on the project site.
- Confinement techniques would be used during the removal of the existing portion of the road to prevent construction debris from entering the Gardner River and the wetlands located in the project area.
- Resource Protection Measures (e.g., sediment curtains) would be used to reduce sedimentation and turbidity as needed for any in-water work, including installation of new stream barbs.

Cultural Resources

- The NPS would have monitors on-site during ground disturbance activities. Should construction unearth previously undiscovered cultural resources, work would be stopped in the area of any discovery and the Park would consult with the State Historic Preservation Officer and the Advisory Council on Historic Preservation, as necessary, according to 36 CFR 800.13, Post Review Discoveries. In the unlikely event that human remains are discovered during construction, provisions outlined in the Native American Graves Protection and Repatriation Act (1990) would be followed.
- The NPS would ensure that all contractors and subcontractors are informed of the penalties for illegally collecting artifacts or intentionally damaging paleontological materials, archeological sites, or historic properties. Contractors and subcontractors would also be instructed on procedures to follow in case previously unknown paleontological or archeological resources are uncovered during construction.
- Exclusionary fencing of cultural resources near ground disturbing activities would be considered in order to prevent encroachment.

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APPENDIX E. ACTION ALTERNATIVES: PARKING AREAS, TRAILS, AND TURNOUTS

APPENDIX E. ACTION ALTERNATIVES: PARKING AREAS, TRAILS, AND TURNOUTS

Parking Areas, Trails, and Turnouts

Parking Areas and Trails

The following existing and new parking areas, as well as vehicle turnouts along the project corridor, would be improved or constructed under Alternative 2: Center Alignment. Preliminary locations for these features are shown in the Appendix C map book. The other action alternatives would also include these features (as applicable, based on alignment).

Lava Creek Trailhead – This trailhead would be reconstructed and reconfigured (remaining within the limits of previously disturbed areas) to provide parking for approximately eight passenger vehicles and two buses or recreational vehicles.

Boiling River / Gardner River Picnic Area Parking Lot – A new parking lot would be constructed on the east side of the new North Entrance Road, south of the Boiling River. This parking lot would provide parking for approximately 36 passenger vehicles and 6 buses or recreational vehicles. The parking lot would be constructed in the area disturbed by the existing parking lot to the greatest extent practical. Existing vault toilets at this parking lot would be decommissioned and new vault toilets installed.

Boiling River/ Gardner River Picnic Area Trail – An accessible trail would be constructed connecting the new Boiling River parking lot to the west side of the new North Entrance Road. This 8-foot-wide paved trail would cross under the road through a pedestrian underpass. Visitors would have access to fishing and wading opportunities on the west side of North Entrance Road along the Gardner River.

Gardner Canyon Trailhead – A new turnout would be constructed between the Boiling River Bridge and Gardens Bridge on the west side of the new North Entrance Road. This parking lot would provide parking for approximately 11 parallel parking spaces.

Gardner Canyon Trail – A new accessible hiking trail following the old Gardner Canyon alignment would be constructed starting near the Gardner Canyon Trailhead and running north for approximately 4,000 feet and terminating at a new interpretive viewing area where the road was washed out by the 2022 flood. This trail would be up to 6 feet wide with a hard-packed-dirt or asphalt surface.

45th Parallel Parking Lot – A new parking lot would be constructed at the 45th parallel on the east side of the new North Entrance Road. This parking lot would provide parking for approximately 10 passenger vehicles and 2 buses or recreational vehicles. A trail, signs, and a marker designating the exact location of the 45th parallel would be provided.

Slide Lake Overlook Parking Lot – A new parking lot would be constructed on the north side of and above Slide Lake on the east side of the new North Entrance Road. This parking lot would provide parking for approximately 24 passenger vehicles and 4 buses or recreational vehicles.

Slide Lake Overlook Trail – An accessible trail would be constructed that both starts and ends at the Slide Lake Overlook parking lot. This trail would be a loop, running along the top edge of the hillsides above both Slide Lake and Gardner Canyon, offering excellent views of both.

Rescue Creek Trailhead – A new parking lot would be constructed approximately 1,500 feet northwest of the Rescue Creek Bridge on the east side of the new North Entrance Road. This parking lot would provide parking for approximately 39 passenger vehicles, 6 buses or recreational vehicles, and 6 livestock trailers. This parking lot would replace the old Rescue Creek Trailhead and Wildlife Pullout, which was a large turnout area with uncontrolled parking along the old North Entrance Road.

Beaver Ponds Trailhead – A new parking lot would be constructed approximately 1,500 feet north of Mammoth on the east side of the Old Gardiner Road (OGR) and would serve as a trailhead for both the Beaver Ponds and the narrowed OGR multi-use path. This parking lot would provide parking for approximately 28 passenger vehicles and 5 buses or recreational vehicles.

Beaver Ponds Trailhead Scenic Overlook Trail – A new accessible trail would be constructed that runs northeast from the Beaver Ponds Trailhead to the top edge of the hillside. This trail would provide views of the area north and east of the alignment. A new trail section to the west would provide a new way of accessing the popular Beaver Ponds Trail.

OGR Connector – A new parking lot and connector road would be constructed between the new alignment and the narrowed OGR approximately 1 mile south of the North Entrance Station. The connector road would provide access for emergency vehicles to and from the OGR. The parking lot would provide parking for approximately 19 passenger vehicles and 4 buses or recreational vehicles. This parking lot would serve as an alternative parking location for visitors wishing to use the OGR multi-use path.

OGR Trailhead – A new parking lot would be constructed between the new alignment and the OGR approximately 2,500 feet south of the North Entrance Station. This parking lot would provide parking for approximately 24 passenger vehicles and 4 buses or recreational vehicles. This parking lot would serve as the trailhead for the northern end of the OGR multi-use path.

Turnouts

In addition to the parking areas and trails, the action alternatives would include approximately 25 turnouts along the new North Entrance Road. These turnouts would vary slightly in size, but generally would provide parking for three to five passenger vehicles each. All turnouts would be paved. The turnouts would be located on either side of the road and in areas where the terrain is favorable for widening for a turnout and site distance for driver safety.

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APPENDIX F. RESOURCE ANALYSIS SUPPORTING INFORMATION

APPENDIX F. RESOURCE ANALYSIS SUPPORTING INFORMATION

Visitor Use and Experience

Visitor Numbers

Visits to Yellowstone National Park first exceeded 3 million in 1992 (NPS 2023a). Since then, annual visitation has tended to fluctuate between 2.8 and 3.1 million with new records being set in 2009 (3.3 million), 2015 (more than 4 million), and 2021 (nearly 4.9 million) (NPS 2023a). In 2022, Park visitation dropped to just under 3.3 million (perhaps due in part to the closed North Entrance) but returned to more than 4.5 million in 2023 and 4.7 million in 2024 (NPS 2025a). Overall, the Park's visitation trend has increased more than 40 percent since the early 2000s (NPS 2023b). North American visitors to Yellowstone make up 77 percent of all visitors; followed by visitors from Europe at 13 percent (Germany, France, Switzerland, and the United Kingdom make up the top four countries); and Asia at 8 percent (89 percent of Asian visitors are from China) (NPS 2023a).

Current and historical (past decade) visitor data for the Park (through all four entrance stations), according to NPS Stats Park Reports, are presented in Table F-1 for recreational visitors and in Table F-2 for nonrecreational visitors. Recreational visitors include those entering the Park by personal vehicle or arriving by bus, bicycle, foot, or cross-country skis (NPS 2013), while nonrecreational visitors include NPS and concessioner employees. Numbers for these visitors are based on the total number of nonrecreational vehicles entering the Park through all four entrance stations and a person-per-vehicle (PPV) multiplier of 1.2 (NPS 2013). NPS visitor data show that during the late fall through winter months (November through March), visitation is at its lowest and that during the summer months (June through September), visitation is at its highest (NPS 2025a).

North Entrance Station Visitor Number

While a breakdown of visitor numbers through the North Entrance Station is not available for this analysis, traffic data and daily vehicle counts at the North Entrance Station are available on both an annual and seasonal basis. The North Entrance Station is the second most popular entrance to the Park after the West Entrance Station. Traffic counts for the North Entrance Station are provided in Table A-3 in Appendix A. The total annual vehicle count through the North Entrance in 2024 (most recent full data year) was 553,276, accounting for approximately 29 percent of the total 1,921,480 vehicles entering the Park through one of the five entrance stations in 2024 (NPS 2025b). Based on this percentage, it is assumed that 1,375,862 recreational visitors and approximately 361,176 nonrecreational visitors entered through the North Entrance Station to the Park in 2024, making it the second most used entrance, with the West Entrance used the most.

TABLE F-1. PARK RECREATIONAL VISITORS BY MONTH.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual Total	Change From Previous Year
2024	42,740	49,291	32,862	71,784	522,450	914,612	992,352	868,259	852,435	346,025	21,133	30,410	4,744,353	5.4%
2023	45,709	45,717	30,044	69,247	454,262	847,864	969,692	846,389	838,458	299,127	20,109	34,764	4,501,382	36.8%
2022	46,615	47,300	35,593	80,283	523,680	525,363	596,562	582,211	567,587	236,567	17,687	30,794	3,290,242	-32.3%
2021	35,338	36,897	35,611	67,508	473,799	938,845	1,080,767	921,844	882,078	316,662	33,144	37,749	4,860,242	27.7%
2020*	25,234	41,880	32,516	0	46,219	573,205	955,645	881,829	837,114	359,889	24,132	28,643	3,806,306	-5.3%
2019	33,896	31,650	28,695	48,150	434,385	781,853	936,062	820,006	693,118	171,339	15,628	25,506	4,020,288	-2.3%
2018	29,179	34,263	22,741	37,766	446,875	810,884	940,563	813,970	724,454	218,076	13,849	22,380	4,115,000	0.0%
2017	29,518	32,275	23,897	45,160	419,635	803,652	962,404	916,166	640,068	211,987	10,468	21,294	4,116,524	-3.3%
2016	30,621	36,327	22,924	59,253	444,630	838,316	995,917	841,036	701,754	242,004	24,710	19,685	4,257,177	3.9%
2015	28,091	34,343	22,989	46,600	386,064	780,768	980,702	854,408	680,213	252,013	11,049	20,470	4,097,710	16.6%
2014	26,778	28,233	18,778	31,356	310,039	669,642	858,856	773,357	571,764	194,804	11,537	18,340	3,513,484	10.2%

*All national parks, including Yellowstone National Park, were closed in the spring of 2020 due to the Covid-19 pandemic.
Source: NPS 2025a.

TABLE F-2. PARK NONRECREATIONAL VISITORS BY MONTH.

	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	Annual Total	Change From Previous Year
2024	58,796	40,288	47,167	58,609	115,341	165,644	195,204	182,030	158,256	111,184	56,432	56,483	1,245,434	-4.7%
2023	60,272	63,370	61,468	63,812	119,931	169,196	200,740	183,419	160,297	106,532	61,213	56,611	1,306,861	-2.2%
2022	62,941	67,972	75,280	68,193	97,654	166,662	204,661	196,261	174,103	121,380	49,087	52,440	1,336,634	0.5%
2021	60,975	53,569	73,117	77,290	126,299	191,850	202,660	180,479	154,422	104,321	63,973	40,413	1,329,368	18.4%
2020*	58,120	59,368	72,370	44,945	76,262	92,762	191,112	171,138	152,519	100,505	52,007	51,337	1,122,445	-5.5%
2019	58,361	52,880	64,620	63,536	108,215	152,062	193,317	170,202	134,406	81,757	52,449	55,723	1,187,528	-3.4%
2018	56,623	52,697	61,031	61,610	120,532	156,648	197,579	174,770	141,955	90,763	60,933	54,298	1,229,439	-1.5%
2017	53,822	54,038	62,505	65,733	119,406	159,872	202,263	189,463	140,300	92,665	55,331	52,150	1,247,548	4.1%
2016	51,099	55,180	62,138	64,044	105,417	156,070	192,910	176,451	142,449	84,598	60,954	47,546	1,198,856	3.7%
2015	53,478	55,693	65,087	62,472	98,137	148,865	190,369	168,410	131,438	84,572	49,416	48,181	1,156,118	9.3%
2014	50,564	48,265	56,798	54,533	86,304	131,003	173,738	159,471	119,629	80,328	47,544	49,377	1,057,554	0.8%

*All national parks, including Yellowstone National Park, were closed in the spring of 2020 due to the Covid-19 pandemic.
Source: NPS 2025a.

Special Status Species

Imperiled or vulnerable plant species identified in the project area are shown in Table F-3. Several species that are not vulnerable or imperiled in either state (i.e., S4, S5, or state not ranked species) are included because they are considered rare in the Park.

TABLE F-3. RARE PLANTS DOCUMENTED IN THE SURVEY AREA.

Scientific Name	Common Name	Status (MT/WY)	Habitat
Androsace occidentalis	Western fairy-candelabra	S4S5/S3	Grasslands, steppe, open forests, and sometimes in disturbed soil; plains and valleys
Apocynum cannabinum var. cannabinum	Indian hemp	S4/S4	Grasslands and meadows, often along streams; plains and valleys
Aristida purpurea var. longiseta	Red threeawn	SNR/S4	Sandy or rocky slopes and plains and in barren soils of disturbed ground
Artemisia arbuscula var. arbuscula	Low sagebrush	S4/S3	Stoney calcareous soil in sagebrush steppe ecosystems
Artemisia arbuscula var. longiloba	Alkali sagebrush	S3S4/S3	Found on clay soils of alkaline basins and valleys, occasionally on outwash plains of mountains
Astragalus lotiflorus	Lotus milk-vetch	S4/S3	Grasslands, sagebrush steppe; plains and valleys
Atriplex argentea var. argentea	Silverscale	SNR/S3S4	Barren, fine-textured to sandy, often saline to alkaline soil of steppe, eroding slopes, and badlands; plains and valleys
Atriplex truncata	Wedgescale orache	S3/S3	Alkaline soil of steppe and moist meadows; valleys and montane
Castilleja pilosa var. longispica	Longspike Indian paintbrush	S3S4/S3	Sagebrush steppe, grasslands, and woodlands in the montane zones of Montana
Cirsium cymosum var. canovirens	Gray-green thistle	S3S4/S1	Sagebrush steppe, grasslands, and open forest; montane and subalpine
Cirsium foliosum	Leafy thistle	SNR/S1	Moist to wet, sometimes calcareous meadows and grasslands; valleys to subalpine
Erigeron linearis	Linearleaf fleabane	S2/S2	Open rocky plains, foothills in low- to moderate elevation grasslands, shrublands, and woodlands
Erigeron ochroleucus	Buff fleabane	S5/S4	Dry, stony soil of grasslands, sagebrush steppe, woodlands, fellfields, and open forest; all elevations
Erigeron pumilis var. intermedius	Intermediate shaggy fleabane	SNR/S5	Dry open sites in grassland, sagebrush, pinyon-juniper, and ponderosa pine communities
Erigeron tweedyi	Tweedy's fleabane	S3S4/S2	Stony, usually calcareous soil of sagebrush steppe, grasslands, and woodlands; valleys to subalpine
Eriogonum caespitosum	Mat buckwheat	S2S3/S4	Dry, stony limestone sagebrush steppe
Heterotheca villosa var. nana	Hairy golden-aster	SNR/S4	Sandy and gravelly limestone, sandstone and granitic soils, fissures in lava surfaces, igneous cliffs, short-grass grasslands, dry sagebrush areas, open mixed conifer forests at lower elevations, and pinyon-juniper-cholla cactus brush
Ionactis alpina	Lava aster	S4/S1	Dry ridges, slopes, and flats, commonly with sagebrush
Opuntia fragilis	Brittle prickly-pear	S4/S3	Dry ridges, slopes, and flats; commonly grows with sagebrush
Paronychia sessiliflora	Creeping nailwort	S4/S4	Sparsely vegetated, often stony soil of exposed slopes and ridge crests; plains and valleys to montane
Poa arida	Plains bluegrass	S4/SNR	Disturbed sites, pastures, meadows, prairies, piedmont valleys, foothills, and alpine sites
Polanisia trachysperma	Clammyweed	SNR/S4	Sparsely vegetated, sandy to clayey soil of sagebrush and saltbush steppe, streambanks, and roadsides; plains and valleys
Stephanomeria tenuifolia	Slender wirelettuce	SNR/SNR	Sandy or rocky soil of grasslands and sagebrush steppe; valleys

S1 – State Critically Imperiled; S2 – State Imperiled; S3 – State Vulnerable; S4 – State Apparently Secure; S5 – State Secure, SNR – State Not Ranked. Species with ratings of S3 or S4 are considered park rare species and are not listed by the state.
Source: "Definitions of NatureServe Conservation Status Ranks" n.d.

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APPENDIX G. WETLAND AND FLOODPLAIN STATEMENT OF FINDINGS

United States Department of the Interior
National Park Service
Yellowstone National Park

North Entrance Road

Statement of Findings for Director's Order #77-2 Floodplain Management and Director's Order #77-1 Wetland Protection

December 2025

Recommended:

Superintendent,	Date
Yellowstone National Park	

Certification of Technical Adequacy and Service-Wide Consistency:

Acting Chief,	Date
Water Resources Division	

Approved:

Director,	Date
Region 2	

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STATEMENT OF FINDINGS

1 INTRODUCTION

The National Park Service (NPS), in partnership with the Federal Highway Administration (FHWA) Western Federal Lands Highway Division (WFLHD), is proposing the North Entrance Road (project) in Yellowstone National Park (Park).

This Statement of Findings was prepared to evaluate the impacts on floodplains and wetlands for the construction of the North Entrance Road. The purpose of the Statement of Findings is to comply with NPS wetland protection and floodplain management procedures, which is required by Executive Order (EO) 11988, "Floodplain Management," and EO 11990, "Protection of Wetlands." NPS Director's Order (DO) #77-2 and its accompanying updated draft *Procedural Manual #77-2* (NPS 2024) provide procedures to comply with EO 11988. NPS DO #77-1: *Wetland Protection and Procedural Manual #77-1* (NPS 2024) provide NPS policies and procedures to comply with EO 11990.

This combined (floodplain and wetland) Statement of Findings is being prepared because constructing the North Entrance Road would occur within the NPS regulatory floodplain and adversely impact wetlands. The Statement of Findings is recommended to be included with the Finding of No Significant Impact to complete the National Environmental Policy Act (NEPA) compliance process. A floodplain Statement of Findings must describe the rationale for siting the project in a floodplain, disclose the amount of risk associated with the chosen site, and explain flood mitigation plans. A wetland Statement of Findings must document the impacts of the project on wetlands, provide the rationale for identifying a preferred alternative that has adverse impacts on wetlands, and explain why no alternatives with less wetland impacts were practicable.

2 PROJECT BACKGROUND

The purpose of the project is to restore reliable and safe long-term access to and from the Park's North Entrance while making the road resilient to future floods and other natural hazards and protecting natural and cultural resources. The wastewater line must also be replaced to provide adequate and continued reliable wastewater service for the Mammoth Hot Springs area. The 2022 flood, described below in *Background* section, caused significant damage to the North Entrance Road, making the road impassable, and also destroyed the 4.5-mile wastewater line between Mammoth Hot Springs and Gardiner. The Old Gardiner Road (OGR) was upgraded to provide temporary access to the Park's North Entrance in October 2022. Providing long-term access is essential for Park staff, visitors, and Cooke City residents and critical for emergency vehicle access.

The proposed project is needed for the NPS to provide a long-term solution for Park access for current public enjoyment and for the enjoyment of future generations (16 United States Code 1). The OGR upgrade has served as temporary access after the 2022 flood made the North Entrance Road impassable.

2.1 PROJECT AREA

The North Entrance Road project area (Figure 1) is in the northwest portion of the Park and consists of the area between Mammoth Hot Springs, Wyoming, where the Park headquarters is located (project start), and the North Entrance check station gate (North Entrance) in Gardiner, Montana (project end).

The North Entrance Road is the second most popular entrance, and one of the two year-round entrances to the Park. The North Entrance and Northeast Entrance (Figure 1) are the only entrances open year-round and serve as the only winter vehicle access in and out of the Park (Highway 212 between Cooke City and the Pilot Creek parking lot is closed early November through mid-May). Additionally, the North Entrance Road provides the only year-round access to Cooke City, Montana. The road is a popular scenic drive that includes the Roosevelt Arch at the northern boundary near Gardiner and generally follows the Gardner River to Mammoth Hot Springs. The North Entrance Road provides vehicular access for Park staff, visitors, and Cooke City residents and critical access for emergency vehicles.

2.2 BACKGROUND

On June 12 and 13, 2022, the Park experienced record-breaking flood events (2022 flood) in several locations, primarily along the Yellowstone River, Gardner River, and tributaries in Park County, Montana and Park County, Wyoming. Devastating flood impacts occurred in the Park on multiple sections of the North Entrance Road between Gardiner and Mammoth Hot Springs, necessitating closure of the road and temporary closure of the North Entrance on June 13, 2022. During the summer and fall of 2022, the FHWA, in cooperation with the NPS, improved the existing gravel OGR using FHWA Emergency Relief for Federally Owned Roads funding. The road now serves as the temporary entrance road, and the North Entrance was re-opened to the public on October 30, 2022. The temporary entrance road has an estimated 5- to 10-year design life because it is partially located on slow-moving geologic slides. Currently, wastewater is being diverted to existing emergency treatment ponds near Mammoth Hot Springs.

The NPS, in cooperation with the FHWA, is considering construction of a new permanent North Entrance Road in the Park. Action is needed because the North Entrance Road was washed out during the catastrophic 2022 flood. NEPA requires federal agencies to evaluate the environmental effects of their proposed actions. The project goal is to have a road that will be more resilient to floods and other natural hazards and will protect natural and cultural resources.

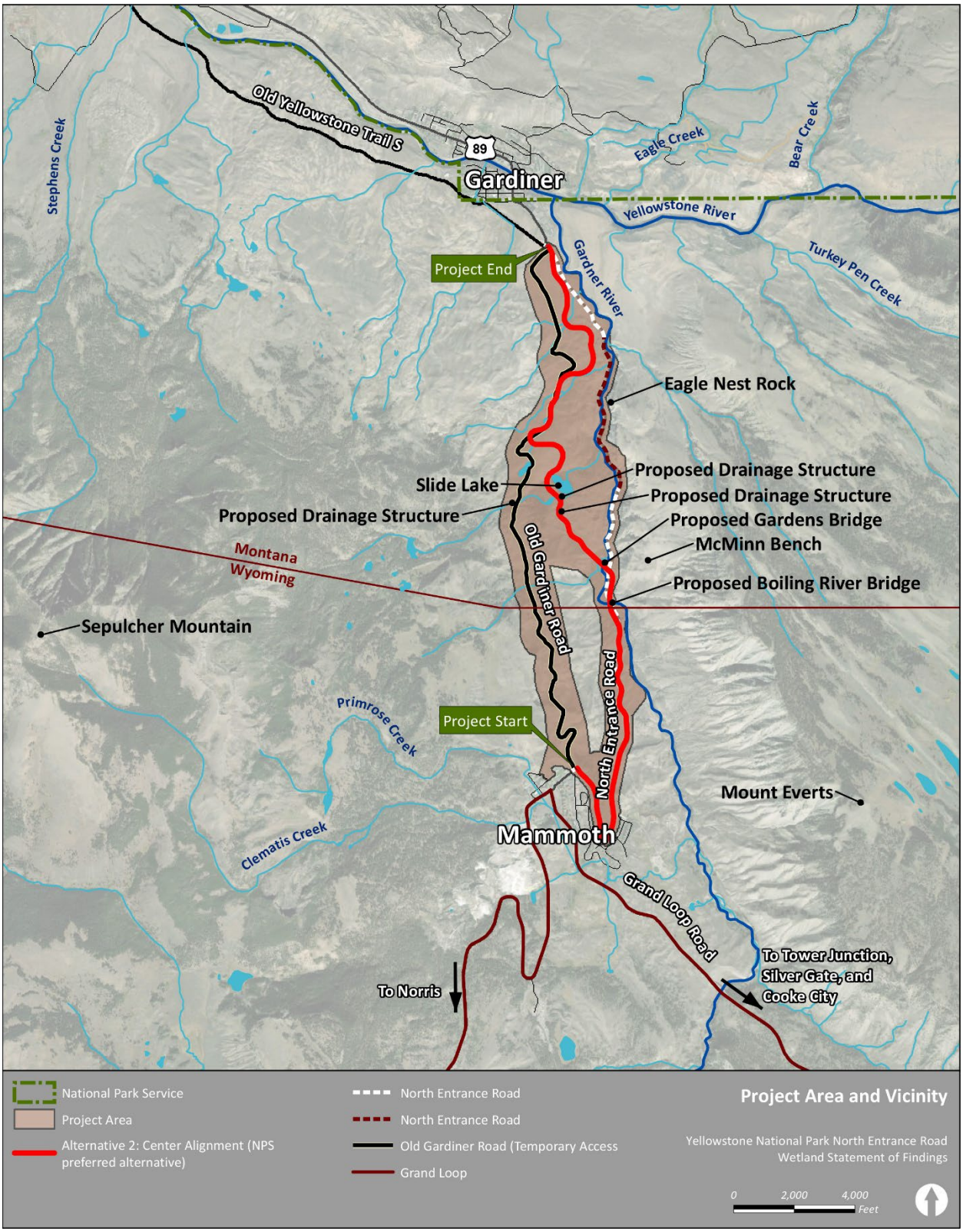


FIGURE 1. PROJECT AREA AND VICINITY.

2.3 PROPOSED ACTION

A detailed description of the project (Alternative 2: Center Alignment, the preferred alternative) is provided in Chapter 2 of the Environmental Assessment (EA). Under the preferred alternative, the NPS and FHWA Western Federal Lands Highway Division would construct the North Entrance Road following the pre-flood North Entrance Road alignment for 2 miles north out of Mammoth Hot Springs, first crossing the Gardner River with an elongated and elevated (260-foot-long, single-span) Boiling River Bridge (Figure 2). The alignment would continue along the pre-flood North Entrance Road to Chinese Gardens, where a new 715-foot-long, multispan bridge structure would provide a high second crossing of the Gardner River. Past the second river crossing, the new road alignment would flow in a northwestern direction to pass west of Slide Lake, where it would converge with the temporary entrance road for 0.4 mile before diverging northeast back toward the former North Entrance Road on the approach to Gardiner.

Once construction of the new road alignment is complete, the OGR would be narrowed to a multi-use pedestrian and bicyclist trail (multi-use trail). The OGR would also serve as access for emergency vehicles when needed. During construction of the 0.4-mile overlap segment (described above), a new 22-foot construction bypass road would be constructed adjacent to the existing road for public traffic. After construction, the bypass would be narrowed and converted into a multi-use path. The northern access/parking area for the multi-use trail would be in Gardiner or two connection points along the route. At the southern/Mammoth end of the multi-use trail, the existing OGR would remain 22 feet wide from Mammoth up the first hill to an overlook parking area that would serve as the north end of the multi-use trail as well as parking for the Beaver Ponds Trailhead.

As part of the project, segments of the old North Entrance Road canyon alignment would be removed along with all other old flood-damaged infrastructure such as the old sewer line. The segment from the new Gardens Bridge to the large washout would be removed and replaced with a 6-foot Architectural Barriers Act (ABA) trail to the washout. Along this segment, interpretive wayside exhibits highlighting the 2022 flood may be present. The relocated segment of the North Entrance Road is not within the NPS regulatory floodplain.

The project also includes construction of a new sewer line beneath the new alignment (as described in the Sewer Line Alignment section below), reestablishing the connection between Mammoth and Gardiner that was destroyed during the 2022 flood.

The road alignment was designed to avoid wetlands, waterways, and cultural resources to the greatest extent practical. Where such areas could not be avoided entirely, structures, such as walls, would be used to minimize impacts.

2.3.1 Access, Staging, and Construction Equipment

Construction access to the project area would use existing roads. Where roads have been damaged, temporary construction structures and access roads would need to be constructed. After the permanent road and infrastructure are built, the temporary roads and temporary structures would be removed. Disturbed ground would be returned to preexisting conditions to the greatest extent feasible.

Various areas along the OGR, which is the temporary entrance road, would be used for construction staging, material stockpiling, and equipment storage. Staging and stockpiling also could occur in existing pullouts along the North Entrance Road including at the Rescue Creek parking area, at the Boiling River Picnic Area, and at the Reese Creek Pit. Areas in the project area where road realignment or new or changed parking areas are planned could also be used for staging and stockpiling. Staging areas would also be needed around bridges to temporarily place bridge materials, such as girders, before cranes place them on the bridge foundation. Staging areas for bridge construction would be approximately 4 to 5 acres for each bridge and would include areas near the Boiling River Bridge and the Gardens Bridge construction location.

General construction equipment and materials would be staged at existing and proposed road pullouts. Various types of construction equipment would be needed such as excavators, front-end loaders, cranes, pavers, and material delivery trucks. Resource Protection Measures and Best Management Practices (BMPs) would be implemented during construction to minimize impacts on resources.

Potential staging and stockpiling areas for the project include the following:

- Lava Creek Trailhead (0.27 acre)
- Boiling River (staging area southeast of the existing bridge; 3.1 acres)
- Boiling River/Gardens Bridge construction staging (2.6 acres)
- Yellowstone Northern Range parking area staging and material storage for canyon restoration (5.81 acres)
- (Proposed) Beaver Ponds Trailhead staging area (2.0 acres)

Staging and stockpiling would use existing parking areas or would be subsequently used to construct new parking areas to avoid additional disturbance to the greatest extent possible. Delineated resource impacts would be avoided. Proposed temporary features of the project would overlap permanent features to avoid additional impacts on resources.

The Reese Creek Pit (approximately 5.0 acres) could be used as a concrete or asphalt batch plant, for material storage and staging, or as a material waste site during some phases of the project. A batch plant would require the space to accommodate semi-trucks, deliveries of materials, and placement of temporary propane tanks for fuel to heat materials to produce asphalt. Propane tanks would be protected and contained within 110 percent containment capacity systems. No washing of concrete materials would occur at any of these sites.

2.3.2 Construction Schedule

The anticipated construction time for all the work would be five construction seasons (beginning of April to mid-November each year with winter work as weather allows). Under this schedule, the new road would be open to public traffic in the fourth year and would include the following anticipated steps:

- Construction of the realigned construction bypass segment (0.04 mile) of the OGR in the first construction season.

- Construction of the new road alignment, including demolition of the old Boiling River Bridge, and construction of the new Boiling River Bridge and Gardens Bridge during the first four construction seasons.
- Restoration of Gardner River Canyon from the second through fourth construction seasons.
- The OGR, from the Beaver Ponds Trailhead to the North Entrance Station, would be narrowed to a multi-use trail during the fifth construction season.

2.3.3 Road Elements

The road would be constructed to the Park-wide standard of 30 feet wide. This paved width would consist of two 11-foot travel lanes and two 4-foot paved shoulders. Segments of the road that follow existing alignments not impacted by the flood would be reconstructed to the same 30-foot paved width.

Both new bridges, the Boiling River Bridge and the Gardens Bridge, would be constructed to the full 30-foot paved width. In addition, both bridges would have 6-foot-wide sidewalks on both sides that meet accessibility standards.

The posted speed limit would be 35 miles per hour (mph) with certain area posted for 25 mph. The advisory speed limit would be 25 mph where tighter curves still exist.

The narrowed OGR multi-use trail would be reconstructed to a width of 12 feet. A center stripe would delineate two 6-foot multi-use lanes.

The segment of the OGR connecting Mammoth to the Beaver Ponds Trailhead would not be reconstructed and would remain at its current 22-foot paved width, consisting of two 10-foot travel lanes and two 1-foot paved shoulders.

2.3.4 Road Construction Methods

The road width would be designed with 11-foot-wide travel lanes and 4- to 6-foot-wide shoulders. The pavement would consist of 4 inches of asphalt underlain by 8 inches of aggregate base and 12 inches of select borrow. Damaged road sections would be removed, and materials would be reused in the reconstruction to the greatest extent feasible. The post-construction speed limit would be 35 mph for most of the corridor but may be reduced in congested areas or curved sections. The maximum grade along the corridor would be 8 percent.

2.3.4.1 Parking Areas and Pullouts

Parking areas and pullouts would not be in floodplains or wetlands. Parking areas would be constructed in previously disturbed areas, such as staging and stockpiling areas, to the greatest extent feasible.

2.3.4.2 Water Quality

To avoid or reduce water quality effects, roads would be designed to allow for water to flow off the road surface and to infiltrate into adjacent land. On bridges, water would be routed to the bridge end and infiltrated (i.e., no direct discharge to surface water would occur). In areas of wetlands, road runoff would be routed away from wetlands to infiltrate into upland soils.

2.3.4.3 Architectural Barriers Act (ABA) Accessibility

The Boiling River Picnic Area at the east side parking area would be enhanced to provide ABA-accessible restroom facilities and ABA-compliant parking.

2.3.5 Sewer Line Alignment

A sewer line would be installed in the project area using open-trenching, pipe-bursting, and cured-in-place pipe techniques. Installation would require excavation to an average depth of 5 to 10 feet and width of 30 to 34 feet. Two lift stations would be constructed along the alignment (40-foot by 40-foot footprint) that would be connected to a 3- to 5-mile underground power line. The sewer line alignment would follow the OGR alignment and would not be within the regulatory floodplain.

2.3.6 Retaining Walls

Retaining walls would be used to minimize impacts on resources including wetlands, riparian zones, and archeological sites as well as to reduce the need to remove hundreds of feet of hillside. Approximately six retaining walls are anticipated for the project, ranging from approximately 150 feet to 1,200 feet long. The heights would vary as the terrain varies. The walls would be faced with natural stone.

2.3.7 Drainage Structures

Drainage structures are anticipated to be constructed at three locations (Figure 1). Two structures would be on the new alignment, and one structure would be on the OGR multi-use trail. All three structures would be reinforced concrete box culverts. Wingwalls would be constructed to protect the structures from stream erosion damage. These structures would not be within the regulatory floodplain but are included in the project description due to impacts on streams and wetlands. The drainage structure on the new alignment, just above Slide Lake, would consist of two box culverts: a 9-foot by 9-foot box culvert with a length of 83 linear feet, and a 6-foot by 8-foot box culvert with a length of 90 linear feet. A second drainage structure on the new alignment would be south of Slide Lake, where a small wetland drainage would be crossed by the alignment. This structure would consist of a 4-foot by 4-foot box culvert with a length of 66 linear feet. The concrete box culvert at the OGR multi-use trail would be located upstream from Slide Lake and would be 9-foot by 9-foot, although length has not been designed yet. The culverts were designed to convey at least the 100-year flow; however, they would be oversized beyond the 100-year flow capacity to accommodate wildlife passage.

In addition to these box culverts, smaller drainages along both the new North Entrance Road and the OGR multi-use trail would be sized to not restrict natural flow rates and patterns to the maximum extent practical. Wingwalls and headwalls on culverts would be constructed or faced with stone masonry. All culverts were designed to comply with FHWA WFLHD guidelines including Chapter 7 of the Project Design and Development Manual (PDDM) and the WFLHD Chapter 7 Supplement (FHWA 2024). For culvert sites subject to debris flows, or installed along landslide complexes, the project would increase pipe capacity to provide slip-lining opportunities, remove deposited material from the inlet area, and enlarge the inlet area as much as possible.

2.3.8 Bridge Elements

Both new bridges would have steel girders spanning the piers and abutments. The bridge decks would be reinforced concrete.

2.3.8.1 Boiling River Bridge

The new Boiling River Bridge would have both of its abutments constructed from cast-in-place concrete, which would be constructed on-site. Use of vertical abutments, with deep foundations, would help to minimize bridge length and structure thickness. Both abutments would be set above the ordinary high water mark (OHWM) of the Gardner River. Wingwalls would be constructed for both abutments. Both abutments and wingwalls would be faced with stone masonry.

The Boiling River Bridge would be a single-span plate girder structure 260 feet long (Figure 2). A pedestrian underpass to be located before the bridge would provide access to the west side of the road from the east side parking area. The new bridge would replace an existing bridge with a 150-foot span at this location. The bridge would be designed without piers in the channel due to potential for woody debris and sediment. The existing embankment would be graded to match the existing overbank, removing fill that was placed in the floodplain when the road and bridge were originally constructed. Excavating this fill material would provide additional floodplain capacity during high flow.

The new bridge would be designed to pass the 100-year and 500-year floods with a lower chord elevation of 5,632.9 feet to provide 5 feet of freeboard above the 100-year water surface for woody debris and ice passage. The abutments and wingwalls of the new bridge would be outside the NPS Regulatory Floodplain, as modeled (FHWA 2025).

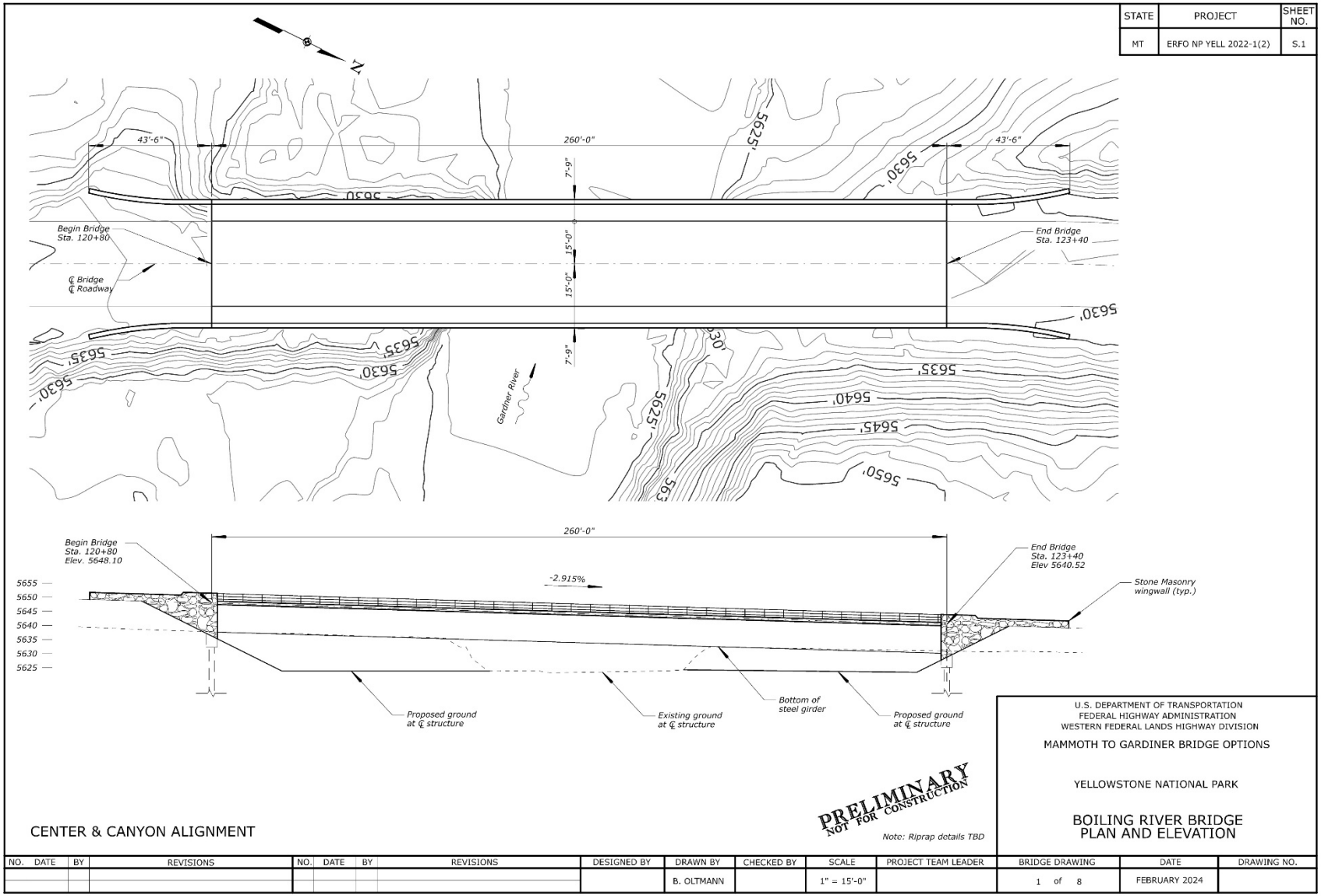


FIGURE 2. BOILING RIVER BRIDGE PLAN AND ELEVATION (500-YEAR FLOODPLAIN ELEVATION: 5,632.05 FEET)

2.3.8.2 The Gardens Bridge

The new Gardens Bridge would have cast-in-place concrete abutments at its west and east ends (Figure 3). Use of vertical abutments with deep foundations within the abutment footprint would help to minimize bridge length and structure thickness. The west abutment would have cast-in-place concrete wingwalls, constructed on-site. This abutment and its wingwalls would be faced with stone masonry. The east abutment would be wrapped with walls on the front and sides, which would be constructed on-site. The walls would have a stone masonry veneer.

The new Gardens Bridge would be a 715-foot three-span, steel plate girder structure (Figure 3). The bridge would have two piers located 215 feet from the abutments and a center span of 285 feet. The two piers would be constructed from reinforced concrete. The piers would be 12 feet in diameter or less. The use of single column piers would limit debris accumulation potential along the skewed alignment. Both piers would require foundations. One of the piers would be constructed in the floodplain of the Gardner River, adjacent to the active channel. In-water work to construct this pier would be timed to have the least impact on fish and other aquatic organisms. Construction of this pier would require isolating the pier from the active river channel, which would be done using a cofferdam – a watertight steel and concrete temporary structure that is built surrounding the pier location. Pumps would be used to dewater the area inside the cofferdam, allowing the pier to be constructed safely. The other pier would be located away from the active channel.

The Gardens Bridge would be designed to pass the 100-year and 500-year floods. The abutments of the new bridge would be outside the 100-year and 500-year floodplains, as modeled (FHWA 2025). The bridge would have a low chord elevation of 5,634.74 feet and would have a minimum of 5 feet of vertical clearance above the 100-year floodplain elevation to allow for the passage of woody debris and ice.

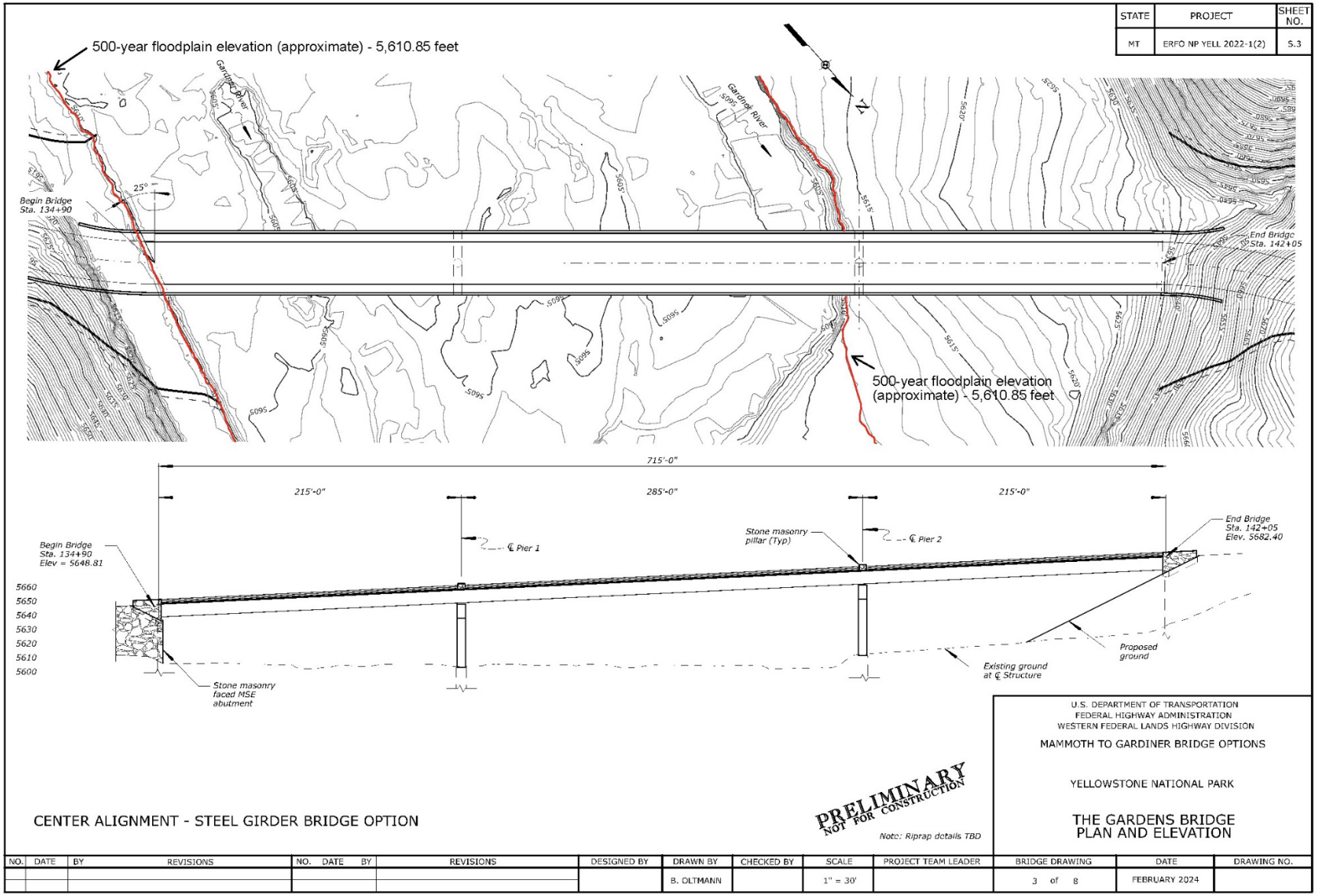


FIGURE 3. THE GARDENS BRIDGE PLAN AND ELEVATION

2.4 SITE DESCRIPTION

The project area is between Mammoth, Wyoming and Gardiner, Montana in the Yellowstone Headwaters (10070001) Hydrologic Unit Code (HUC) watershed. The project area is in the Lower Gardner River sub-watershed (12-digit HUC 100700010906) (USGS 2025).

The Gardner River is in the northwestern corner of the Park (Figure 1). The Gardner River is listed in the Nationwide Rivers Inventory and is believed to possess one or more "outstandingly remarkable" natural or cultural values. The river is approximately 25 miles long and forms below Cache Lake near Electric Peak, one of the Park's highest peaks. The Gardner River is a tributary of the Yellowstone River and originates in the northwest corner of the Park, initially flowing southward. After merging with Panther Creek, Indian Creek, and Obsidian Creek, the Gardner River then turns north and flows through a steep canyon at Sheepeater Cliffs. Below Sheepeater Cliffs, Glen Creek and Lava Creek join the Gardner River near Mammoth Hot Springs. In the project area, the Gardner River flows to the north through Gardner River Canyon and empties into the Yellowstone River near Gardiner, Montana. Hydrothermal water from Mammoth Hot Springs flows into the Gardner River, primarily from the Boiling River south of the project area.

The Gardner River crosses the damaged (pre-flood) North Entrance Road multiple times and, during the catastrophic 2022 flood, washed out portions of the North Entrance Road. The Gardner River is approximately 25 to 60 feet wide in the project area with a water depth of several inches to several feet, as observed during the 2023 site visit (NPS 2023). The substrate of the Gardner River is sand, gravel, cobble, and boulders with limited areas of exposed bedrock (see the *Gardner River (GAMA001s)* section for further discussion). The U.S. Geological Survey (USGS) monitors the Gardner River near Mammoth at station 06191000 (USGS 2024). At the Gardner River near Mammoth, an average gage height of approximately 2 feet is typically recorded with flows increasing from May through July associated with spring runoff. Median daily flows during spring runoff range from approximately 200 to 800 cubic feet per second (cfs) with flows averaging approximately 100 cfs from August through April. Over the last 10 years of monitoring, the highest recorded discharge was 2,540 cfs, measured on June 13, 2022, which was associated with a rain-on-snow event.

2.4.1 Floodplain Delineation and Characterization

The Federal Emergency Management Agency (FEMA) National Flood Hazard Layer data was reviewed for the project area (FEMA 2025). The Gardner River and surrounding areas are shown on FEMA mapping as *Zone D: Areas with possible but undetermined flood hazards*, indicating that no flood hazard analysis has been conducted.

The existing floodplain in the project area was mapped along the Gardner River by the FHWA, Western Federal Lands Highway Division (FHWA 2025). The modeled 500-year floodplains in the project area are shown on Figure 4 through Figure 6. The project requires work within the 100-year and 500-year floodplains.



FIGURE 4. PROJECT AREA WITH 500-YEAR FLOODPLAIN



FIGURE 5. PROJECT AREA WITH 500-YEAR FLOODPLAIN

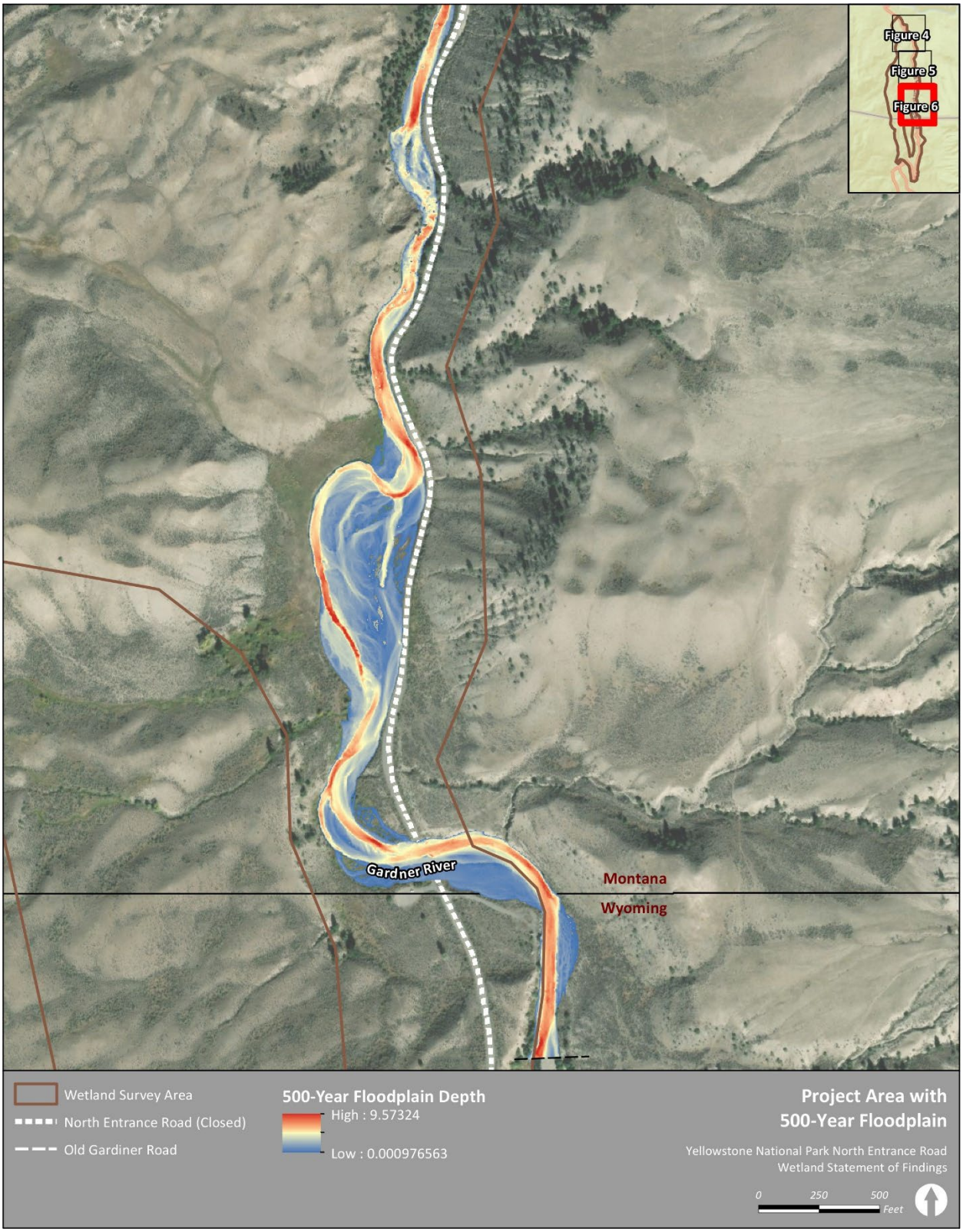


FIGURE 6. PROJECT AREA WITH 500-YEAR FLOODPLAIN

2.4.1.1 Floodplain and Riverine Wetlands Functions and Values

Floodplain values in the project area are associated with the Gardner River and include the ability of the floodplain to absorb increased water flows, recharge groundwater, and provide floodplain habitat. Floodplains in the project area provide wildlife habitat for wetland and riparian species, allow for flood storage, and facilitate conveyance. The Gardner River and its abutting wetlands were evaluated for functions and values using the Montana Wetland Assessment Method (MWAM), which determined that the Gardner River provides fish habitat and is highly functioning for sediment/nutrient/toxicant removal, sediment/shoreline stabilization, and production export/food chain support (NPS 2023). Functions and values for wetlands in the project area are described in greater detail in the *Wetland Delineation Results* section and in the *Wetland Mapping* section (NPS 2023).

2.4.1.2 Flood Risk in the Project Area

Flood risk in the Gardner River Canyon includes risk associated with flash floods and debris flows. The Gardner River is a non-alluvial bedrock, cobble, and boulder channel with high sediment loads. The channel bottom is covered by sediment at low stages and is exposed by scour during floods. Past flooding events in the project area are described in the *Preliminary Line-and-Grade Hydraulics Report* (FHWA 2023).

Flash floods are sudden, intense, localized events that occur in response to rainfall that often accompanies thunderstorms. The most significant risk of flash flooding along the Gardner River results from rain-on-snow events, when heavy rainfall coincides with melting snowpack. The flood risk in the project area is further exacerbated by the Gardner River's narrow canyon with steep walls, which concentrates floodwater. As previously described, the Park experienced flooding events on June 12 and 13, 2022 that resulted in damage to the North Entrance Road. On the morning of June 13, Yellowstone experienced a 500-year flood event with the northern portions of the Park receiving up to 9.5 inches of rain and snowmelt in a 24-hour period (NPS 2025). Several sections of the North Entrance Road were destroyed in the flood. Wastewater lines in Gardner River Canyon were also severed in the flood. USGS gage data collected for the gage on the Gardner River near the Montana/Wyoming border indicates that peak flows during the 2022 flow were 2,940 cfs (FHWA 2023). For context, the highest flows previously recorded at this gage were 2,000 cfs in 1996 and 2,050 cfs in 1997.

Debris flow hazards were also identified as a consideration in the FHWA report (FHWA 2023). Past mudslides and debris flows have created concerns that the Gardner River channel could be temporarily dammed by channel spanning debris flows, resulting in flooding at the site of the temporary dam. The FHWA report cites concerns of catastrophic temporary dam failure, and a subsequent high discharge flood down the Gardner River Canyon, that poses a safety risk to road users and the downstream town of Gardiner (FHWA 2023).

2.4.2 Wetland Mapping

An aquatic resources inventory was conducted in the project area from July 31 through August 4, 2023 to delineate wetlands and other waters of the U.S. (WOTUS) (NPS 2023). Results of the aquatic resources inventory are presented in the Aquatic Resources Inventory Report and summarized below (NPS 2023).

2.4.2.1 Wetland Delineation Methods

ERO reviewed National Wetlands Inventory maps; USGS topographic maps; U.S. Department of Agriculture, Natural Resources Conservation Service soil mapping; and aerial photographs of the wetland in the project area before conducting fieldwork. During the 2023 site visit, ERO ecologists Moneka Worah, Marie Russo, Jared Watson, and Isabel Mansour visited the wetlands in the project area to map the boundaries of wetlands and other waters. The weather during fieldwork varied from sunny and clear to overcast with rain.

Wetlands were delineated using methods outlined in the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), the *Regional Supplement to the Corps Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*, and *NPS Procedural Manual #77-1: Wetland Protection* (Environmental Laboratory 1987; Corps 2010; NPS 2024). Wetlands were determined based on the presence of three wetland indicators: hydrophytic vegetation, wetland hydrology, and hydric soils. Wetland data were collected using a global positioning system (GPS) unit. GPS data were differentially corrected to achieve submeter accuracy. All differential correction was completed using Trimble Pathfinder Office 5.9 software.

2.4.2.2 Wetland Functional Assessment

Wetland functions were evaluated using the MWAM (Berglund and McEldowney 2008). The MWAM uses a classification system that combines the U.S. Fish and Wildlife Service's (USFWS) Cowardin classification system with a hydrogeomorphic (HGM) approach and provides a landscape context to the USFWS classification (Cowardin et al. 1979; Brinson 1993). The MWAM is a rapid functional assessment process designed primarily to address wetland resources associated with linear projects, such as highways and pipelines, although it can be applied to all types of projects. The MWAM is commonly used throughout the western United States and is accepted by the U.S. Army Corps of Engineers (Corps). HGM classes found in Montana and Wyoming are mineral soil flats, organic soil flats, riverine, lacustrine fringe, slope, and depressional.

For each function and value, the MWAM provides a rating of low, moderate, high, exceptional, or not applicable based on observations and responses to questions. For each wetland, the MWAM scores each function or value on a scale of 0.1 (lowest) to 1.0 (highest) functional points. When all functional points are totaled, the maximum number of functional points is 12. Typically, wetlands that are larger and more diverse receive more points. Once the total functional points for wetlands are calculated, each wetland is assigned to one of the following four categories based on total functional points and other criteria described in the MWAM:

- **Category I**: Wetlands of exceptionally high quality that are generally rare. Category I wetlands can provide primary habitat for federally listed threatened or endangered species; represent a high-quality example of a rare wetland type; provide irreplaceable ecological functions (e.g., are not replaceable within a human lifetime, if at all); exhibit exceptionally high flood attenuation capability; or are assigned high ratings for most of the assessed functions and values resulting in total actual functional points greater than 80 percent of the total possible functional points.
- **Category II**: Wetlands that are more common than those in Category I provide habitat for sensitive plants or animals, function at very high levels for wildlife/fish habitat, are

unique in a given area, or are assigned high ratings for many of the assessed functions and values, resulting the total actual functional points greater than 65 percent of the total possible functional points.

- **Category III**: Wetlands that are more common, generally less diverse, and often smaller and more isolated than those in Categories I and II. These wetlands can provide many functions and values, although they may not be assigned high ratings for as many parameters as Category I and II wetlands (30 percent to 65 percent of possible points).
- **Category IV**: Wetlands that are generally small, isolated, and lack vegetative diversity. These wetlands provide little in the way of wildlife habitat and are often directly or indirectly disturbed. Category IV wetlands rate low for uniqueness and production export/food chain support, and the total actual functional points are less than 30 percent of the total possible functional points.

Functional assessments were conducted for wetlands grouped based on location in the project area and either water source or wetland type. Wetlands in each group generally have similar plant communities, have similar hydrology, and provide similar functions on a whole.

2.4.2.3 Wetland Delineation Results

The project area was surveyed for wetlands and other waters as described below. Data were collected from various locations in the project area to document the characteristics of uplands and wetlands and the transition areas between them. Figure 7 through Figure 9 show a summary of the wetlands in the project area. Under NPS DO #77-1, wetlands include both vegetated wetlands and other waters such as lakes, ponds, and streams, which are considered unvegetated wetlands (NPS 2024). Wetlands in the project area that have hydrophytic vegetation, hydric soil, and wetland hydrology are described as vegetated wetlands in this statement of findings. The Gardner River, Slide Lake, and other ponds and streams in the project area are described as unvegetated wetlands. Vegetated wetlands and riverine wetlands in the project area are described below and are shown in detail in Attachment A. The acreage and type of each wetland are provided in Table 1 and Table 2. Approximately 32.71 acres of lakes, ponds, rivers, and streams (unvegetated wetlands) and 18.0 acres of vegetated wetlands occur in the project area (Table 1 and Table 2; Attachment A, Figure 2a through Figure 2n).

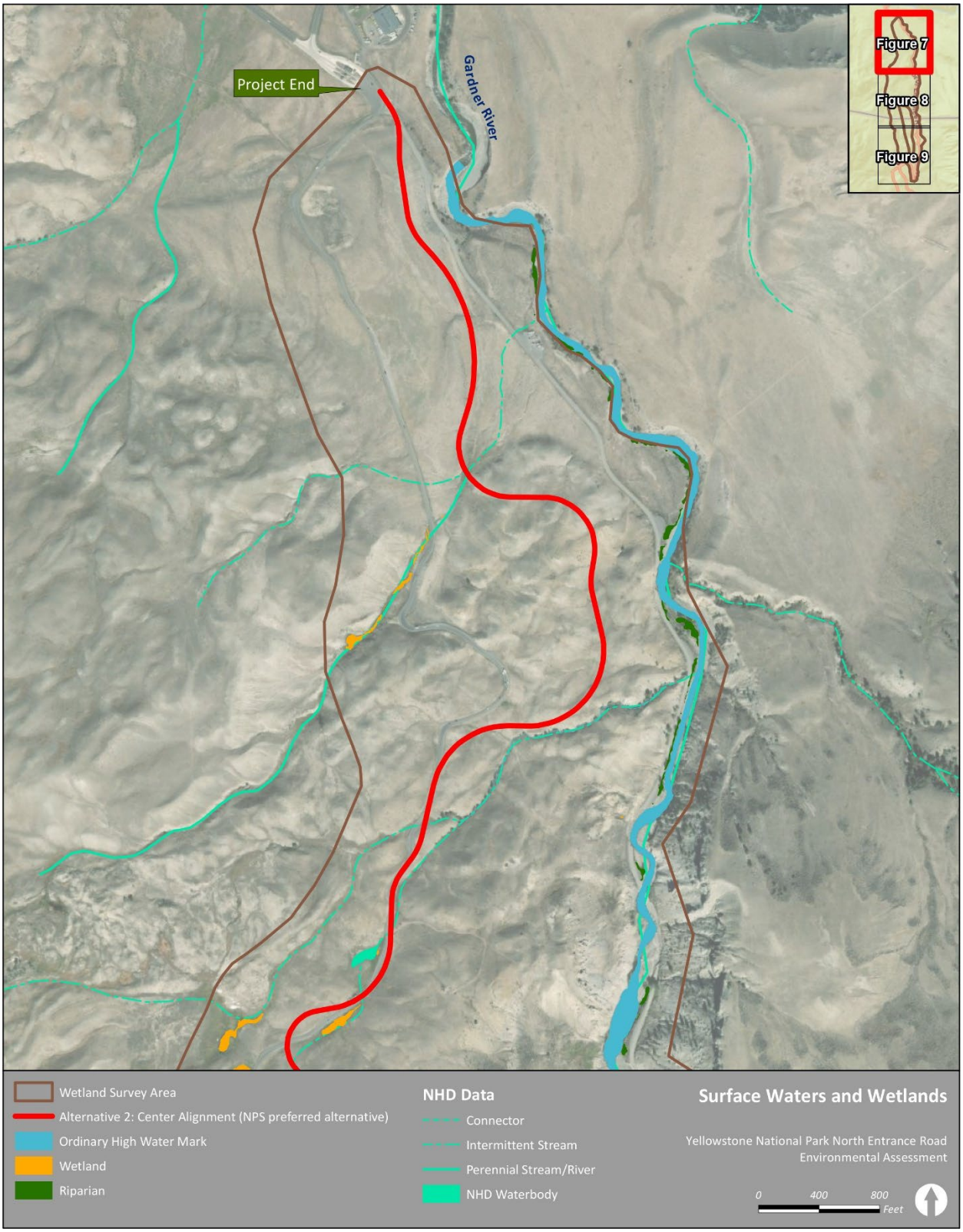


FIGURE 7. SURFACE WATERS AND WETLANDS

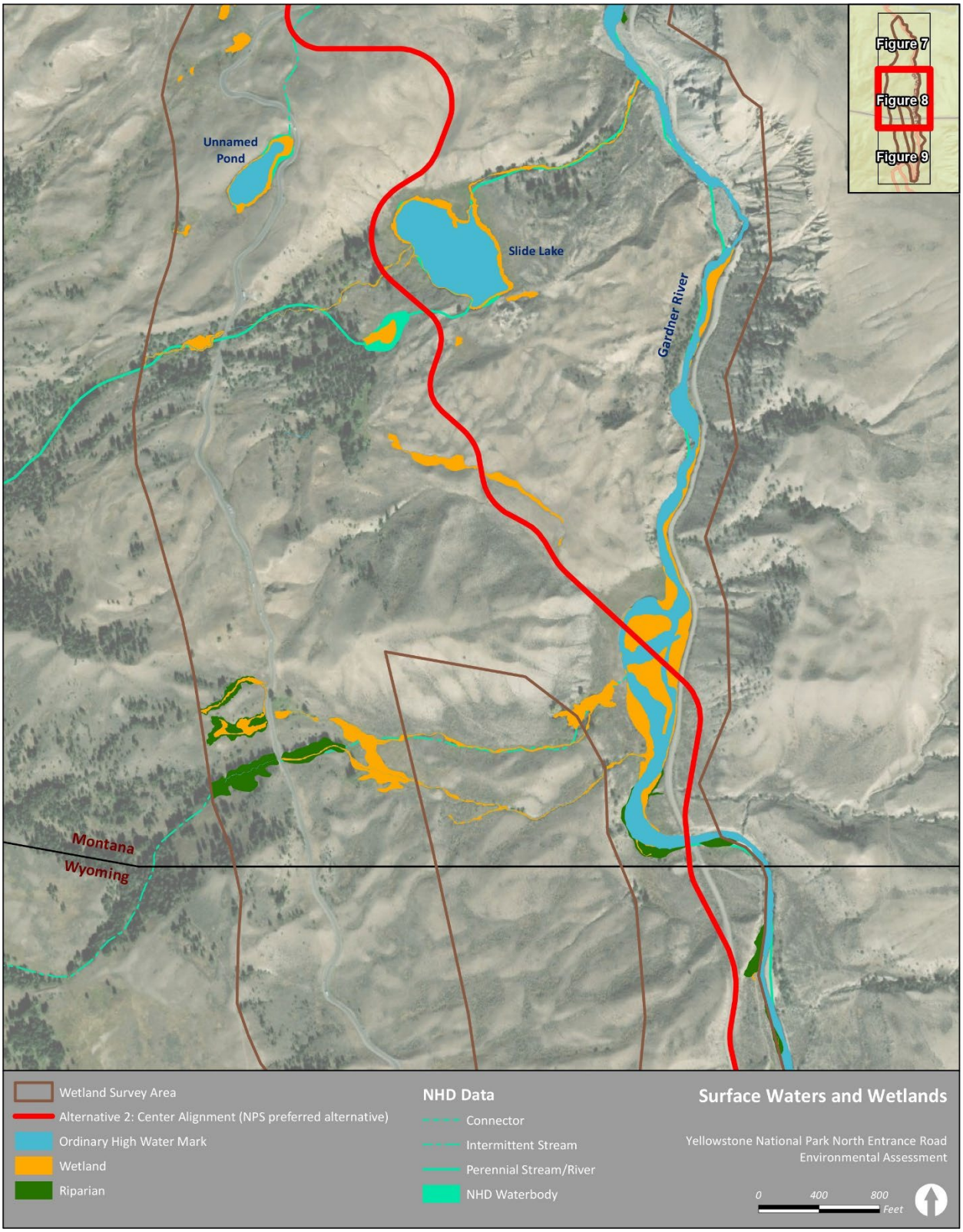


FIGURE 8. SURFACE WATERS AND WETLANDS

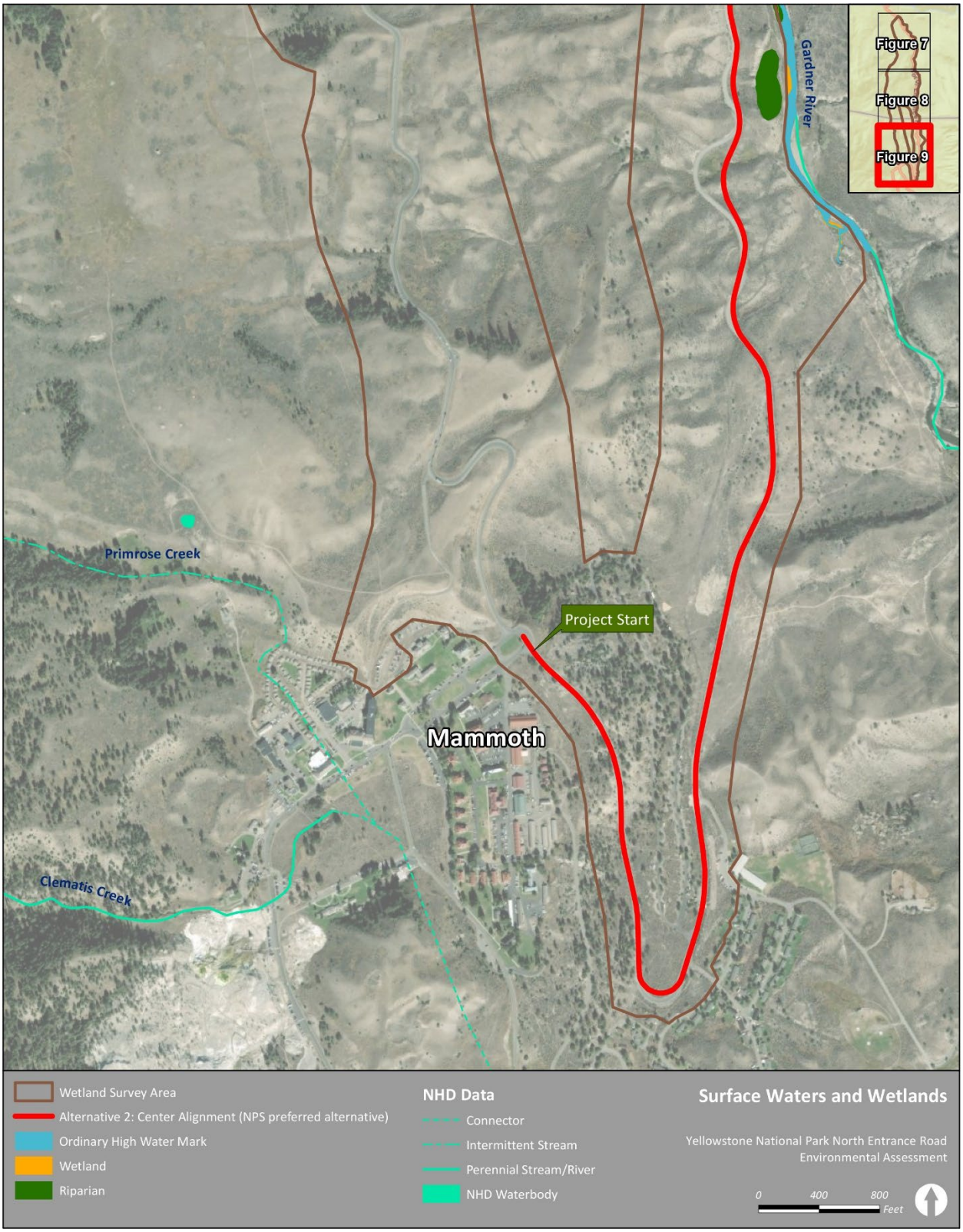


FIGURE 9. SURFACE WATERS AND WETLANDS

TABLE 1. SUMMARY OF VEGETATED WETLANDS IN THE PROJECT AREA.

Feature Label	Cowardin Classification[1]	Acres of Wetlands in the Project Area	Longitude	Latitude
GAMA001	PEM1A	0.062	-110.69928797	45.017856054
GAMA002	PEM1A	0.276	-110.7014258	45.015697686
GAMA003	PEM1A	0.002	-110.69289270	45.015970682
GAMA004	PEM1A	0.005	-110.69472613	45.012404093
GAMA005	PEM1A	0.008	-110.70097741	45.009970669
GAMA006	PEM1A	0.241	-110.70198907	45.008702778
GAMA007	PSSA	0.318	-110.70463040	45.008523359
GAMA008	PEM1A	0.263	-110.70452924	45.007767368
GAMA009	PEM1A	0.022	-110.70574146	45.007263978
GAMA010	PEM1A	0.018	-110.70604280	45.0071242943
GAMA011	PEM1A	0.349	-110.69593502	45.005926618
GAMA012	PEM1A	0.611	-110.70382093	45.005484006
GAMA013	PEM1A	1.231	-110.69892607	45.004278860
GAMA014	PEM1A	0.078	-110.70599664	45.004372815
GAMA015	PEM1A	0.007	-110.70096518	45.003732419
GAMA016	PEM1A	0.192	-110.70164528	45.003340899
GAMA017	PEM1A	0.137	-110.69730425	45.003161645
GAMA018	PEM1A	0.513	-110.69245545	45.003243629
GAMA019	PEM1A	0.418	-110.70567372	45.00231385
GAMA020	PEM1A	0.417	-110.7008778	-45.0024735
GAMA021	PEM1A	0.050	-110.6989468	45.0023483
GAMA022	PEM1A	0.006	-110.6930279	45.0079306
GAMA023	PEM1A	0.008	-110.6930431	45.0012658
GAMA024	PEM1A	1.389	-110.6933569	44.9974209
GAMA025	PEM1A	1.117	-110.6987980	45.0000194
GAMA026	PEM1A	0.015	-110.6963750	44.9987042
GAMA027	PSSA	1.541	-110.6943416	44.9953473
GAMA028	PSSA	2.323	-110.6942197	44.9971081
GAMA029	PEM1C	0.880	-110.6956389	44.9957379
GAMA030	PEM1B	0.629	-110.7045633	44.9955949
GAMA031	PSSB	2.662	-110.6963924	44.9951070
GAMA032	PEM1C	0.008	-110.6941218	44.9931943
GAMA033	PEM1B	0.002	-110.6911494	44.9924827
GAMA034	PEM1B	0.009	-110.6911788	44.9920756
GAMA035	PEM1A	0.243	-110.6912499	44.9911347
GAMA036	PEM1B	0.071	-110.6894257	44..9857443
GAMA037	PEM1C	0.202	-110.7408763	44.8918706
GAMA038	PSSC	1.684	-110.7397012	44.8910707
Subtotal of PEM1A wetlands		7.678		
Subtotal of PEM1B wetlands		0.711		
Subtotal of PEM1C wetlands		1.090		
Subtotal of PSSA wetlands		4.182		
Subtotal of PSSB wetlands		2.662		
Subtotal of PSSC wetlands		1.684		
Total		**18.007**		

[1]PEM1A = palustrine emergent persistent, temporarily flooded; PEM1B = palustrine emergent persistent, seasonally saturated; PEM1C = palustrine emergent persistent, seasonally flooded; PSSA = palustrine scrub-shrub temporarily flooded; PSSB = palustrine scrub-shrub, seasonally saturated; PSSC = palustrine scrub-shrub, seasonally flooded.
[2]Based on topographic position observed in the field and review of aerial photography.

TABLE 2. UNVEGETATED WETLANDS IN THE PROJECT AREA.

Feature Label	Cowardin Classification[1]	Area (acres)[2]	Length (feet)[3]	Hydrology Source[4]	Longitude	Latitude
Boiling River (GAMA012s)	R3UBH	0.356	434.8	Spring	-110.6894593	44.9857573
Gardner River (GAMA001s)	R3UBH	23.255	17,733.1	Surface flow/snowmelt	-110.6936458	45.0038699
Slide Lake (GAMA040)	PABG	6.668	834.4	Surface flow/snowmelt	-110.6991045	45.0039776
Unnamed Pond (GAMA039)	PABF	1.493	509.5	Surface flow/snowmelt	-110.7041640	45.0053301
GAMA002s	R4SBC	0.003	109.3	Surface flow/snowmelt	-110.6986401	45.0229188
GAMA003s	R4SBC	0.006	139.9	Surface flow/snowmelt	-110.6989836	45.0180593
GAMA004s	R4SBC	0.159	2,111.3	Surface flow/snowmelt	-110.6961204	45.0138779
GAMA005s	R5UBH	0.003	64.7	Surface flow/snowmelt	-110.6981597	45.0053428
GAMA006s	R4SBC	0.143	2,192.1	Surface flow/snowmelt	-110.7059654	45.0022243
GAMA007s	R4SBC	0.017	211.8	Surface flow/snowmelt	-110.7030414	45.0006674
GAMA008s	R5UBH	0.065	1,686.6	Surface flow/snowmelt	-110.7008301	44.9951069
GAMA009s	R5UBH	0.127	3,680.2	Surface flow/snowmelt	-110.6985426	44.9937273
GAMA010s	R4SBC	0.389	844	Surface flow/snowmelt	-110.7165522	45.0328476
GAMA011s	R5UBH	0.026	423.7	Surface flow/snowmelt	-110.7408801	44.8918706
Total	**32.71**		**30,975.4**			

[1]R3UBH = riverine upper perennial, unconsolidated bottom, permanently flooded; R4SBC = riverine intermittent, streambed, seasonally flooded; R5UBH riverine unknown perennial, unconsolidated bottom, permanently flooded.
[2]Area in the wetland in the project area.
[3]Length in the wetland in the project area.
[4]Based on topographic position observed in the field and review of aerial photography.

2.4.2.3.1 Streams, Lakes, and Ponds (Unvegetated Wetlands)

The project area is in HUC 1007000109 (U.S. Geological Survey 2021). During the 2023 site visit, the following areas of streams/open water were identified in the project area: the Gardner River (GAMA001s); Boiling River (GAMA012s); Slide Lake (GAMA040); an Unnamed Pond (GAMA039); four ephemeral drainages (GAMA002s, GAMA003s, GAMA004s, and GAMA007s); and six intermittent or perennial drainages (GAMA005s, GAMA006s, GAMA008s, GAMA009s, GAMA010s, and GAMA011s). Each of these features is described in more detail in the *Aquatic Resources Inventory Report* (NPS 2023). Only aquatic resources that would be directly affected by the project are described in greater detail below.

2.4.2.3.1.1 Gardner River (GAMA001s)

The Gardner River flows roughly southward to northward along the east side of the project area (Attachment A, Figure 2c through Figure 2n). The river crosses the damaged North Entrance Road multiple times and, during the catastrophic flooding, washed out portions of the North Entrance Road. The Gardner River is approximately 25 to 60 feet wide in the project area with a water depth of several inches to several feet observed during the 2023 site visit. The substrate of the Gardner River is sand, gravel, cobble, and boulders with limited areas of exposed bedrock. Wetlands of variable sizes occur along both banks and are primarily palustrine emergent (PEM)

and riverine. The Gardner River drains into the Yellowstone River approximately 0.40 mile north of the northern terminus of the project area.

2.4.2.3.1.1.1 Functional Assessment

The Gardner River and its abutting wetlands were evaluated using the MWAM. The wetlands along the river consist of emergent and some scrub-shrub communities that provide habitat for wildlife including the federally threatened grizzly bear. The river also provides fish habitat and is highly functioning for sediment/nutrient/toxicant removal, sediment/shoreline stabilization, and production export/food chain support. The overall MWAM score was 64.5 percent, and, based on this percentage, the wetlands would be classified as Category II with a score of 0.9 or 1 for general wildlife habitat.

2.4.2.3.1.2 GAMA006s

GAMA006s is an unnamed perennial stream that feeds into Slide Lake and connects to the Gardner River in the project area (Attachment A, Figure 2g). GAMA006s is 3 to 6 feet wide in the project area with a more defined channel upstream of Slide Lake. The stream had a depth of less than 1 foot in the project area during the 2023 site visit. The stream bottom consists of unconsolidated cobble-gravel and boulders and would be classified as riverine under Cowardin et al. (1979). GAMA006s has relatively permanent water and flows into the Gardner River.

2.4.2.3.2 Vegetated Wetlands

Approximately 18.0 acres of vegetated wetlands were mapped in the project area (Attachment A, Figure 2a through Figure 2n). A majority of the wetlands are PEM wetlands with some PSS wetlands scattered throughout the project area. Data points were completed at each wetland feature to document wetland/upland boundaries. Data sheets are provided in the *Aquatic Resources Inventory Report* (NPS 2023).

2.4.2.3.2.1 Gardner River Wetlands (GAMA024 and GAMA028)

PEM wetlands are along the Gardner River with limited areas of PSS wetlands (Attachment A, Figure 2h). Due to the dynamic nature of the active stream channel, some wetlands have developed more recently because of flooding, and more wetlands were likely present pre-flooding than are currently in the project area. The primary water source for this wetland community is surface water and subsurface seepage. The dominant species in these wetlands are crack willow (*Salix fragilis* – facultative [FAC]), bluejoint (*Calamagrostis canadensis* – facultative wetland [FACW]), water sedge (*Carex aquatilis* – obligate [OBL]), Baltic rush (*Juncus balticus* – FACW), American licorice (FAC), and redtop (*Agrostis gigantea* – FAC). Hydrology indicators included drift deposits, sediment deposits, oxidized rhizospheres on living roots, geomorphic position, and a positive FAC-neutral test. Hydric soil was indicated by loamy mucky mineral and redox dark surface.

2.4.2.3.2.1.1 Functional Assessment

The wetlands abutting the Gardner River were evaluated together using the MWAM based on their proximity and common hydrology source. The wetlands are all supported by surface water from the Gardner River. The wetlands consist of emergent and some scrub-shrub communities that provide habitat for wildlife including the federally threatened grizzly bear. The wetlands provide wildlife habitat, fish habitat, and are highly functioning for sediment/nutrient/toxicant removal, sediment/shoreline stabilization, and production export/food chain support. The overall MWAM score was 64.5 percent, and, based on this score, the wetlands would be classified as Category II with a score of 0.9 or 1 for general wildlife habitat.

2.4.2.3.2.2 Depressional Wetlands (GAMA005, GAMA021, and GAMA025)

Many isolated, depressional PEM wetlands are in the project area, including wetland GAMA005 (Attachment A, Figure 2e). The primary water source for this wetland community is precipitation. The dominant species in this wetland are common spikerush (*Eleocharis palustris* – OBL), Baltic rush (FACW), Nebraska sedge (*Carex nebrascensis* – OBL), foxtail barley (*Hordeum jubatum* – FAC), black creeper sedge (*Carex praegracillis*), hardstem bulrush (*Schoenoplectus acutus* – OBL), and western wheatgrass (*Pascopyrum smithii* – FACU). Hydrology indicators included surface water, a high water table, saturation, algal mat or crust, surface soil cracks, oxidized rhizospheres on living roots, drainage patterns, geomorphic position, and a positive FAC-neutral test. Hydric soil was indicated by depleted below dark surface, loamy mucky mineral; depleted matrix; redox dark surface; the positive presence of indicators of wetland hydrology; and the dominance of hydrophytic vegetation. The depressional wetlands are isolated and do not have surface connections to the Gardner River.

2.4.2.3.2.2.1 Functional Assessment

The depressional wetlands are supported by subsurface flows and seeps. The wetlands consist of emergent communities that provide important habitat for wildlife. Disturbances in the wetlands are few with most occurring in the Park surrounded by uplands. The wetlands provide shoreline stabilization, groundwater discharge/recharge, and recreation/education potential. The overall MWAM score was 70 percent, and, based on this score, the wetlands would be classified as Category II due to an overall percent score greater than 65 percent.

2.4.2.3.2.3 Wetlands in Slide Lake Drainage (GAMA013, GAMA015, and GAMA016)

Drainages above and below Slide Lake contain PSS and PEM wetlands. The primary water source for this wetland community is surface flow from upgradient beaver ponds, surface water from precipitation, and subsurface seepage. The dominant species in these wetlands are Rocky Mountain juniper (*Juniperus scopulorum* – upland [UPL]), Wolf's willow (*Salix wolfii* – OBL), speckled alder (*Alnus incana* – FACW), red osier dogwood (*Cornus sericea* – FACW), Northwest Territory sedge (OBL), redtop (*Agrostis stolonifera* – FAC), water hemlock (*Cicuta maculata* – OBL), Baltic rush (FACW), fowl bluegrass (*Poa palustris* – FAC), and sweet clover (*Melilotus officinalis* – facultative upland [FACU]). Wetland hydrology was indicated by surface water, a high water table, saturation, saturation visible on aerial imagery, geomorphic position, and a positive FAC-neutral test. Hydric soil was indicated by an assumption of hydric soil based on the positive presence of wetland hydrology and the dominance of hydrophytic vegetation. The wetlands upstream and downstream of Slide Lake have surface connections to the Gardner River.

2.4.2.3.2.3.1 Functional Assessment

The wetlands provide habitat for wildlife by offering a water source and wetland vegetation. The wetlands also provide high functions for sediment/shoreline stabilization, groundwater discharge/recharge, and recreational/educational potential. The overall MWAM score was 60 percent with the wetlands rating as Category III.

2.4.2.4 Jurisdictional Status

The proximity and potential surface water connection of wetlands and other waters to known jurisdictional WOTUS was evaluated using aerial photo interpretation. Wetlands or waters that have a surface water connection to the Gardner River or its tributaries and that have relatively permanent flow and are contiguous to one another are potentially considered jurisdictional WOTUS under Corps guidelines. It is important to note that regardless of the jurisdictional

status of wetlands or other waters, the NPS has a "a no net loss of wetlands" goal (NPS 2024), and impacts on wetlands could require mitigation. The potential jurisdictional status of impacted wetlands is shown in Table 3.

TABLE 3. POTENTIAL WETLAND JURISDICTIONAL STATUS.

Wetland ID	Cowardin Classification[1]	NPS Jurisdiction	Corps Jurisdiction	Notes
GAMA001s (Gardner River)	R3UBH	Yes	Yes	Flows into Yellowstone River.
GAMA006s	R4SBC	Yes	Yes	Flows into Gardner River.
GAMA005	PEM1A	Yes	No	Depressional wetland with no surface connection to known WOTUS.
GAMA013	PEM1A	Yes	Yes	Surface connection to Gardner River
GAMA015	PEM1A	Yes	Yes	Surface connection to Gardner River
GAMA016	PEM1A	Yes	Yes	Surface connection to Gardner River
GAMA021	PEM1A	Yes	No	Depressional wetland with no surface connection to known WOTUS.
GAMA024	PEM1A	Yes	Yes	Abuts Gardner River.
GAMA025	PEM1A	Yes	No	Depressional wetland with no surface connection to known WOTUS.
GAMA028	PSSA	Yes	Yes	Abuts Gardner River.

[1]R3UBH = riverine upper perennial, unconsolidated bottom, permanently flooded; R4SBC = riverine intermittent, streambed, seasonally flooded; PEM1A = palustrine emergent persistent, temporarily flooded; PSSA = palustrine scrub-shrub temporarily flooded.

3 JUSTIFICATION FOR THE USE OF THE FLOODPLAIN AND WETLANDS

The impacts on floodplains and wetlands are justified because impacts are unavoidable; none of the other proposed options would eliminate impacts on floodplains and wetlands. The preferred alternative and potential alternative alignments are constrained by steep terrain that would require substantial grading and recontouring. Wetland and floodplain impacts have been avoided and minimized to the greatest extent practicable while also considering constructability and road alignment issues. Therefore, it is not feasible to reconstruct the North Entrance Road while completely avoiding wetlands and floodplains.

3.1 EVALUATION OF ALTERNATIVES

If practicable alternative sites are identified, it is NPS policy, as set forth in NPS DO #77-2, to give preference to locating, or relocating, the project at an alternative site outside and not affecting the regulatory floodplain. Non-flood-prone sites must be identified and evaluated for all proposed actions when it is determined that the action will occur in a floodplain or wetland.

The EA prepared for the project evaluated three alternatives in addition to the proposed project. The alternatives considered included No Action, the OGR Alignment, and the Gardner River Canyon Alignment.

- Under the No Action alternative, the NPS would not construct the North Entrance Road. The alignment would remain on the temporary entrance road, which is the OGR, with narrow lanes, substandard road geometry, and no frost-free pavement section.
- Under the OGR alignment, the road alignment follows the temporary entrance road from Mammoth Hot Springs to Gardiner, while widening the road template from its current width of approximately 22 feet to a proposed 34 feet. Existing retaining and drainage structures would be replaced or enlarged to fit the wider road template. The

alignment would be fitted with wider curves than the temporary entrance road to improve drivability. This alignment diverges from the temporary entrance road toward the pre-flood North Entrance Road on the approach into Gardiner.

- The Gardner River Canyon Alignment follows the pre-flood North Entrance Road alignment and includes structures through the Gardner River Canyon. The first river crossing coming north out of Mammoth Hot Springs is the location of the existing Boiling River Bridge, which would be replaced with a longer and higher profile structure (260 feet long, single span or two span). At the site of the first major road embankment washout from the 2022 flood, a two-span bridge structure (approximate 590 feet long) is proposed to parallel the river channel while avoiding the eroding east side slope, debris flow chutes, and landslide toe on the west side. The road would transition into a rock shed structure (1,070 feet long) to protect the road from the rockfall hazard along the east bank of the Gardner River before making the final bridge crossing (600 feet long, four span) toward Gardiner. The existing bin wall structure past the final river crossing would be retained and reinforced, and a fascia would be added. A detailed description of the proposed project and alternatives are provided in Chapter 2 of the EA.

While the No Action alternative would not result in new impacts on wetlands and floodplains, the alternative would not meet the purpose and need for the project. Under the No Action alternative, the travel lanes would remain 11 feet wide, which does not comply with the FHWA standards for permanent roads, and additional safety issues with the existing road would not be addressed. The OGR alternative would result in more impacts on wetlands than the preferred alternative and would not affect floodplains, while the Gardner River Canyon Alignment would result in more impacts on both wetlands and floodplains compared to the preferred alternative.

4 IMPACT AVOIDANCE AND MINIMIZATION

The NPS followed the sequence of avoiding, minimizing, and compensating for wetland and floodplain impacts. Impacts on wetlands would be avoided in selected locations by realigning the road out of wetlands to the greatest extent possible during project design. During the design process, when complete avoidance was not possible, soil and vegetation removal for cut/fill slopes and grading were limited to the smallest area possible. Impacts on existing wetlands outside of the construction area would be avoided by restricting ground disturbance outside of construction limits. No construction materials would be stockpiled in wetland areas. A complete list of resource protection measures is provided in Appendix A of the EA. In addition to the Resource Protection Measures listed in the EA, the NPS would adhere to the conditions of any Clean Water Act Section 404 and Section 401 Permits to minimize potential impacts on streams and wetlands.

5 PROJECT IMPACTS

5.1 FLOODPLAIN IMPACTS

Constructing two new bridges over the Gardner River and its floodplain would result in permanent and temporary impacts on terrestrial and aquatic habitats in the floodplain. Temporary impacts on floodplains would also result from project activities to remove flood-damaged infrastructure in the Gardner River Canyon and regrade the channel banks to a more natural condition. Additional project features such as the multi-use path, parking areas

(new/expansion/relocation), sewer lines, pump stations, electrical lines, retaining walls, pullouts, vault toilets, and wingwalls would not be within the regulatory floodplain.

Permanent impacts on the floodplain would result from placement of a pier for the Gardens Bridge in the floodplain of the Gardner River. The pier would be up to 12 feet in diameter and would have a permanent footprint in the floodplain of approximately 115 square feet (0.003 acre) in the 500-year and 100-year floodplains. The second pier for the Gardens Bridge would be outside the NPS regulatory floodplain. The bridge abutments for both bridges would also be outside the regulatory floodplain.

The project would also result in temporary impacts on the floodplain. Based on conservative estimates, construction and restoration work in the Gardner River Canyon would temporarily impact approximately 1.2 acres of floodplains. Installation of the pier in the active channel would require containment to separate the work area for pier construction from the channel. The pier would be isolated from the river using a cofferdam, a watertight steel and concrete temporary structure that is built surrounding the pier location. Pumps would be used to dewater the area inside the cofferdam, allowing the pier to be constructed safely.

Construction of both bridges would require temporary work bridges. These temporary bridges would be constructed with two rows of temporary piles installed in the channel for the length of the temporary crossing. The temporary work bridges would be removed once the proposed new Boiling River and Gardens Bridges are constructed. The temporary work bridge for the Boiling River would be in place for two years, and the temporary work bridge for the Gardens Bridge would be in place for three years. Because the work bridges would be in place for multiple years, they would be designed, at a minimum, to pass the 10-year flood event, with additional freeboard of 5 feet to the low chord. Temporary work bridges and other temporary impacts are shown on Figure 10 and Figure 11.

Temporary structures are also being considered for access in the Gardner River Canyon where segments of the old North Entrance Road canyon alignment would be removed along with all other old flood-damaged infrastructure, such as the old sewer line. Temporary access for construction/restoration may include backfilling along existing washouts (northern washouts) and temporary structures (southern washout). The eroded streambanks along the Gardner River would be regraded and recontoured after removal of flood-damaged infrastructure to re-create a more natural condition. No material would be added to the floodplain during removal of the damaged infrastructure.



FIGURE 10. PROPOSED TEMPORARY FLOODPLAIN IMPACTS.

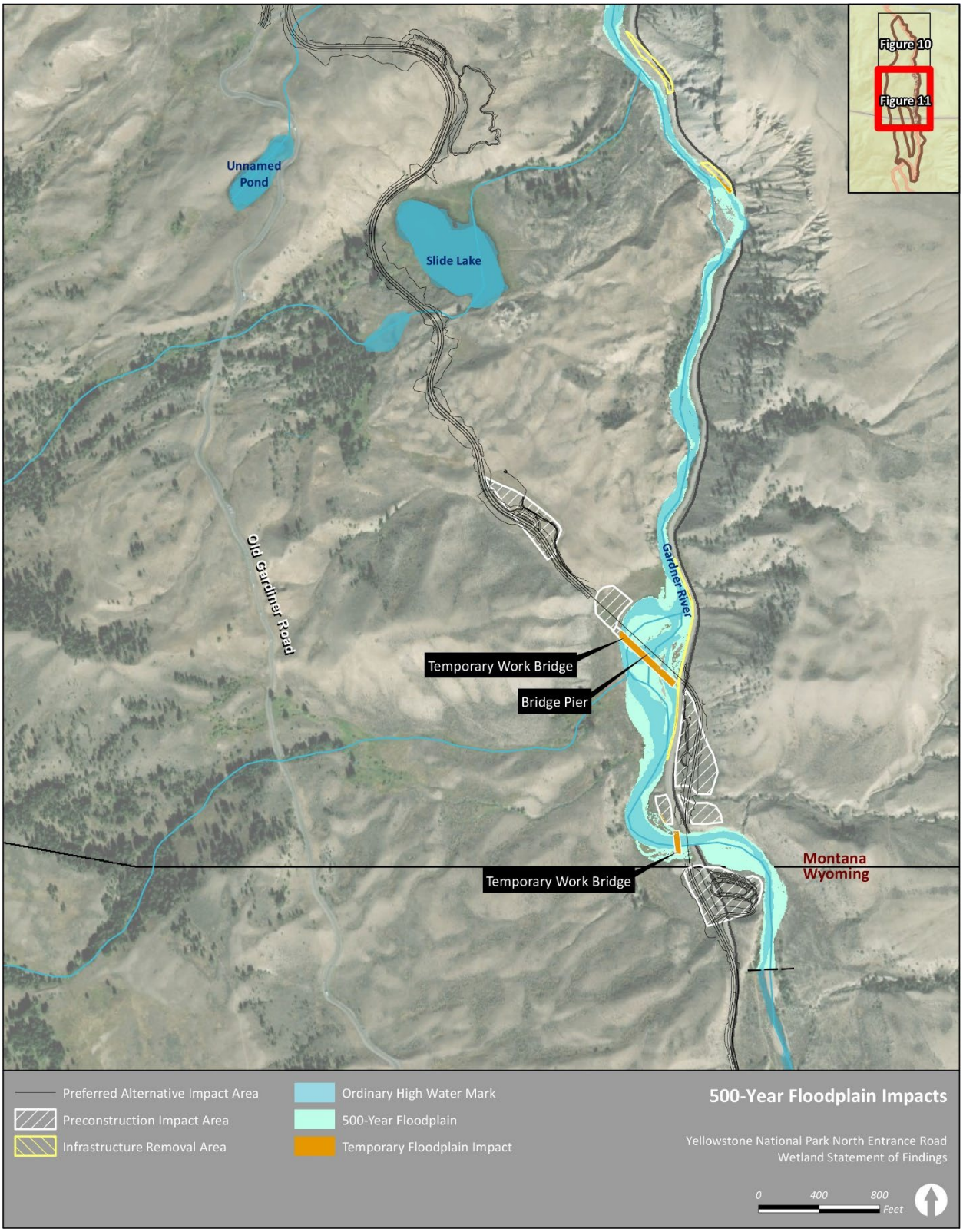


FIGURE 11. PROPOSED TEMPORARY FLOODPLAIN IMPACTS.

5.1.1 Determination of Action Class and Regulatory Floodplain

Following Procedural Manual #77-2, three action classes were considered when establishing the regulatory floodplain:

1. Class I Actions (i.e., non-critical actions) include location or construction of administrative, residential, warehouse, and maintenance buildings; non-excepted parking lots; or other man-made features, which by their nature entice or require individuals to occupy the site, are prone to flood damage, or result in impacts on natural floodplain values.
2. Class II Actions (i.e., critical actions) include any activity for which even a slight chance of flooding is too great, such as construction of schools, medical facilities, emergency services, hazardous material storage, and records/collections storage.
3. Class III Actions include any action that involves human occupation or substantial human exposure in high hazard areas, such as drainages subject to flash flooding.

Because the project does not include actions related to schools, medical facilities, or other Class II actions, and does not involve human occupation in high hazard areas, the project meets the definition of a Class I Action.

Proposed actions on NPS lands must comply with Federal Flood Risk Management Standard (FFRMS) for new construction, substantial improvement, or repairing substantial damage. Per departmental guidance, agencies may select one of three approaches to implement flood resiliency measures:

- **Climate-Informed Science Approach (CISA)** – The elevation and flood hazard area that result from using the best available, actionable hydrologic and hydraulic data and methods that integrate current and future changes in flooding, including climate change and other physical processes (e.g., land use change).
- **Freeboard Value Approach (FVA)** – The elevation and flood hazard area that result from adding an additional 2 feet to the base flood elevation (BFE) for non-critical actions and by adding an additional 3 feet to the BFE for critical actions.
- **0.2 Percent Annual-Chance Flood Approach (0.2PFA)** – The area subject to flooding by the 0.2 percent (500-year) annual chance flood.

A 0.2PFA was used to establish the FFRMS flood elevations and the NPS regulatory floodplain. The NPS regulatory floodplain elevations for proposed actions in floodplains are listed in Table 4.

TABLE 4. PROPOSED ACTIONS AND NPS REGULATORY FLOODPLAIN ELEVATION.

Proposed Action Element	NPS Regulatory Floodplain Elevation (0.2PFA, feet)	Low Chord (feet)
Gardner Bridge at Chinese Gardens	5,610.85	5,634.74
Boiling River Bridge	5,632.05	5,632.90

Based on the floodplain delineation by FHWA (2025), all proposed structural components, except for the Gardens Bridge piers proposed for construction in the 100-year floodplain, would be above the 500-year floodplain. Gardner Bridge at Boiling River is excluded from further analysis. Temporary structures, including temporary work platforms for the Gardens Bridge and Boiling River Bridge, and temporary structures for infrastructure removal work in Gardner River Canyon would be located in the 500-year and 100-year floodplains. Temporary effects on the floodplain are generally excepted under DO #77-2, and are not discussed further in the floodplain portion of this statement of findings.

5.1.2 Site-Specific Flood Hazard

Hydrology and hydraulics information for the project area is taken from the *Preliminary Line-and-Grade Hydraulics Report* (FHWA 2023). The Gardner River drainage basin has a total drainage area of 200.4 square miles and a mean annual rainfall of 31.71 inches. The drainage basin is mountainous, with an average slope of 20.4 percent. More than 23.1 percent of the basin has slopes greater than 30 percent, and 8.4 percent has slopes greater than 50 percent. Peak flows at the gage on the Gardner River near Mammoth were 2,940 cfs during the 2022 flood. This was approximately 1,000 cfs higher than the highest flows previously recorded at this gage were 2,000 cfs in 1996 and 2,050 cfs in 1997. The *Preliminary Line-and-Grade Hydraulics Report* modeled peak discharge summary for the Gardner River at Gardens Bridge (Table 5).

TABLE 5. PEAK DISCHARGE SUMMARY.

Site	Drainage Area (square miles)	Peak Discharge (cfs)					
		2-Year	10-Year	25-Year	50-Year	100-Year	500-Year
Gardner River – full drainage area	201	1,206	1,812	2,075	2,257	2,428	2,797
Gardens Bridge	199.0	1,206	1,812	2,075	2,257	2,428	2,797

Source: FHWA 2023.

Water surface elevations (WSE) and velocities were also calculated for the proposed Boiling River Bridge and Gardens Bridge locations (Table 6 and Table 7).

TABLE 6. WATER SURFACE ELEVATION DURING FLOOD EVENTS.

Site	WSE (feet)						
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
Gardens Bridge	5,609.90	5,610.25	5,610.40	5,610.55	5,610.60	5,610.70	5,610.85

Source: FHWA 2023.

TABLE 7. VELOCITY DURING FLOOD EVENTS.

Site	Velocity (feet per second)						
	2-Year	5-Year	10-Year	25-Year	50-Year	100-Year	500-Year
Gardens Bridge	6.1	7.0	7.4	7.7	7.9	8.1	8.4

Source: FHWA 2023.

5.1.3 Potential Risks to Human Health and Safety

5.1.3.1 Time Required for Flooding to Occur

As previously described, flooding in the project area generally results from slow-moving summer thunderstorms. Floods from these events can occur within a few minutes to hours of

heavy rainfall. The 500-year flood event that occurred in June 2022 developed over several hours.

5.1.3.2 Egress from the Site in the Event of Flooding

The project does not include construction of habitable (human-occupied) structures in the floodplain. The North Entrance Road serves Park visitors and Park staff travelling between Gardiner and Mammoth. Both bridges would be designed to pass the 500-year flood event and would provide at least 5 feet of clearance above the water surface during a 100-year flood event. In the event of flooding, motorists traveling along the North Entrance Road would not be within the floodplain of the Gardner River when crossing the Gardens Bridge and Boiling River Bridge. NPS personnel and visitors would use the North Entrance Road to evacuate the area, if necessary.

As previously described, the temporary work bridges would be designed, at a minimum, to pass the 10-year flood event, with additional freeboard of 5 feet to the low chord. The temporary work bridge for the Boiling River would be in place for two years, and the temporary work bridge for the Gardens Bridge would be in place for three years. In the event of a flood during the construction period that exceeds the 10-year event plus 5 feet of freeboard, construction personnel would be able to evacuate the temporary work bridges by moving to the adjacent North Entrance Road.

Additional measures to reduce the potential for adverse effects on floodplains are described below under the *Floodplain Mitigation* section. With the implementation of these measures, the risks to human health and safety from flooding of the proposed project would be negligible.

5.1.4 Potential Risks to Property

The project would include infrastructure in the regulatory floodplain. Bridge piers would be placed to reduce risks to NPS property. No damage to the bridge pier within the floodplain is expected because the pier would have a deep foundation and be designed to withstand expected flood flows, velocity, and scour. The section of road between the proposed Gardens Bridge and the proposed Boiling River Bridge is currently adjacent to the 500-year floodplain boundary. This section of road would be realigned to the east, further from the floodplain boundary, which would reduce the risk of flood damage to the road.

The temporary work bridges for the Boiling River Bridge and the Gardens Bridge would be constructed to pass the 10-year flood with 5 feet of additional clearance. The temporary bridges would be designed to withstand expected velocity and scour at each location.

Increased flooding upstream of the bridges is not expected to occur because the bridges would be designed to ensure a "no- rise condition" in upstream water surface elevations. As previously described, the bridges would be designed to pass the 100-year flood event with an additional 5 feet of clearance for woody debris and ice passage. In addition, the existing embankment at the Boiling River Bridge would be graded to match the existing overbank, removing fill that was placed within the floodplain when the road and bridge were originally constructed. Excavating this fill material would provide additional floodplain capacity during high flow and reduce the risk of upstream flooding. Risks to property would be minimized by following FHWA *Design Standards for Highways in National Flood Insurance Program Mapped Floodplains* (FHWA 1986).

The installation of the bridges would not cause any potential for increased flood risk to property.

5.1.5 Potential Risks to Floodplain Values

The Gardner River Floodplain is adjacent to the river and serves important functions, such as reducing downstream flood risks, by absorbing and storing excess water during flood events, improving water quality by filtering contaminants during flood events, providing habitat for plants and animals, and recharging groundwater aquifers. The floodplain natural values in the project area have been altered by human activities including construction of infrastructure such as bridges, roads, and parking areas. Past construction of the North Entrance Road through Gardner River Canyon resulted in increased impervious surface adjacent to the floodplain.

Activities during construction of the Boiling River Bridge and Gardens Bridge over the Gardner River would occur in the regulatory floodplain. Construction activities would temporarily impact natural floodplain values along the river. The floodplain would be negatively impacted during construction due to the presence of the temporary access bridges, construction equipment, and materials in the floodplain and possible erosion from bare soils prior to revegetation. However, construction activities would be monitored, and erosion and sediment control BMPs would be implemented to minimize erosion and sediment movement. Disturbed areas would be revegetated following construction with native species.

The impervious surface in the project area would increase following construction from construction of the new North Access road. Although the overall impervious surface in the project area would increase, the amount of impervious surface in the modeled floodplain would decrease after construction, after accounting for removal of the existing bridge at Boiling River. Land cover changes would result from increased impervious surface, soil compaction, and changes in existing drainage patterns. Changes in land cover could alter the hydrology of the project area and increase the volume of runoff. Impervious areas also collect pollutants, which are then mobilized after rainfall and potentially transported to streams or other waters. Decreasing impervious surface in the floodplain would benefit floodplain functions and values by increasing flood storage capacity and the ability of the floodplain to recharge and infiltrate stormwater. To reduce the risk of pollutants entering waterways, fuel storage and hazardous waste storage during construction would be at least 3 feet above the regulatory floodplain elevation.

The new road would be outside the regulatory floodplain and would not be expected to alter the natural flow of water during floods. The Gardens Bridge pier in the floodplain would have a footprint of approximately 115 square feet and would not alter or constrict floodwaters. Both new bridges would be designed to pass the 100-year floodplain with 5 feet of additional clearance for woody debris and ice flow and, thus, would not be expected to alter or constrict flood waters. In addition, the Gardner River would be less constricted after the removal of the existing bridge at the Boiling River, removal of the existing abutment and associated fill, and construction of a new Boiling River Bridge with a longer span.

Installation of temporary work bridges could also temporarily alter streamflow; however, these temporary bridges would be removed after construction of the Boiling River Bridge and Gardens Bridge is complete. As previously described, the temporary bridges would be designed, at a minimum, to pass the 10-year flood event, with additional freeboard of 5 feet to the low

chord. To minimize stormwater impacts, the NPS would obtain the appropriate National Pollutant Discharge Elimination System Permit for Discharges of Stormwater Associated with Construction Activities and would develop a site-specific stormwater pollution prevention plan. Overall impacts of stormwater on floodplain values would be temporary with these and other protective measures in place.

Overall, the project would have minimal permanent impacts on floodplain values because the 115 square feet of impacts from the Gardens Bridge pier would not alter or constrict floodwaters. Increasing the span of the new Boiling River Bridge compared to the existing bridge would also reduce the potential for increased flooding. In addition, the project would likely not significantly reduce water infiltration because the increase in impervious surface near the floodplain would be minor compared to the existing road. The project would not noticeably alter the existing stormwater runoff volumes or patterns.

5.2 WETLAND IMPACTS

Proposed impacts on rivers and streams (unvegetated wetlands) are shown in Table 8. Proposed impacts on vegetated wetlands are shown in Table 9. Proposed impacts are also shown in Figure 12 and Figure 13.

TABLE 8. PROPOSED UNVEGETATED WETLAND IMPACTS.

Wetland ID	Cowardin Classification	Permanent Impacts (Acres)	Temporary Impacts (Acres)	Permanent Impacts (Linear feet)	Temporary Impacts (Linear feet)	Notes
GAMA001s (Gardner River)	R3UBH	0	0.396	0	1,430	Temporary impacts from construction of the Boiling River Bridge, Gardens Bridge, and restoration work in Gardner River Canyon.
GAMA006s	R4SBC	0.0017	0.007	30	90	New road alignment and associated cut and fill.
Total		**0.0017**	**0.403**	**30**	**1,520**	

[1]R3UBH = riverine upper perennial, unconsolidated bottom, permanently flooded; R4SBC = riverine intermittent, streambed, seasonally flooded.

TABLE 9. PROPOSED VEGETATED WETLAND IMPACTS.

Wetland ID	Cowardin Classification	Permanent Impacts (Acres)	Temporary Impacts (Acres)	Notes
GAMA005	PEM1A	0	0.001	New road alignment and associated cut and fill.
GAMA013	PEM1A	0	0.00004	New road alignment and associated cut and fill.
GAMA015	PEM1A	0.006	0.001	New road alignment and associated cut and fill.
GAMA016	PEM1A	0.011	0.022	New road alignment and associated cut and fill.
GAMA021	PEM1A	0	0.013	New road alignment and associated cut and fill.
GAMA024	PEM1A	0	0.062	Temporary impacts from construction of the Gardens Bridge.
GAMA025	PEM1A	0.011	0.030	New road alignment and associated cut and fill.
GAMA028	PSSA	0.003	0.201	Permanent impacts from the bridge pier (115 square feet). Temporary impacts from construction of the Gardens Bridge.
Total		**0.031**	**0.330**	

[1]PEM1A = palustrine emergent persistent, temporarily flooded; PSSA = palustrine scrub-shrub temporarily flooded.



FIGURE 12. PROPOSED WETLAND IMPACTS.

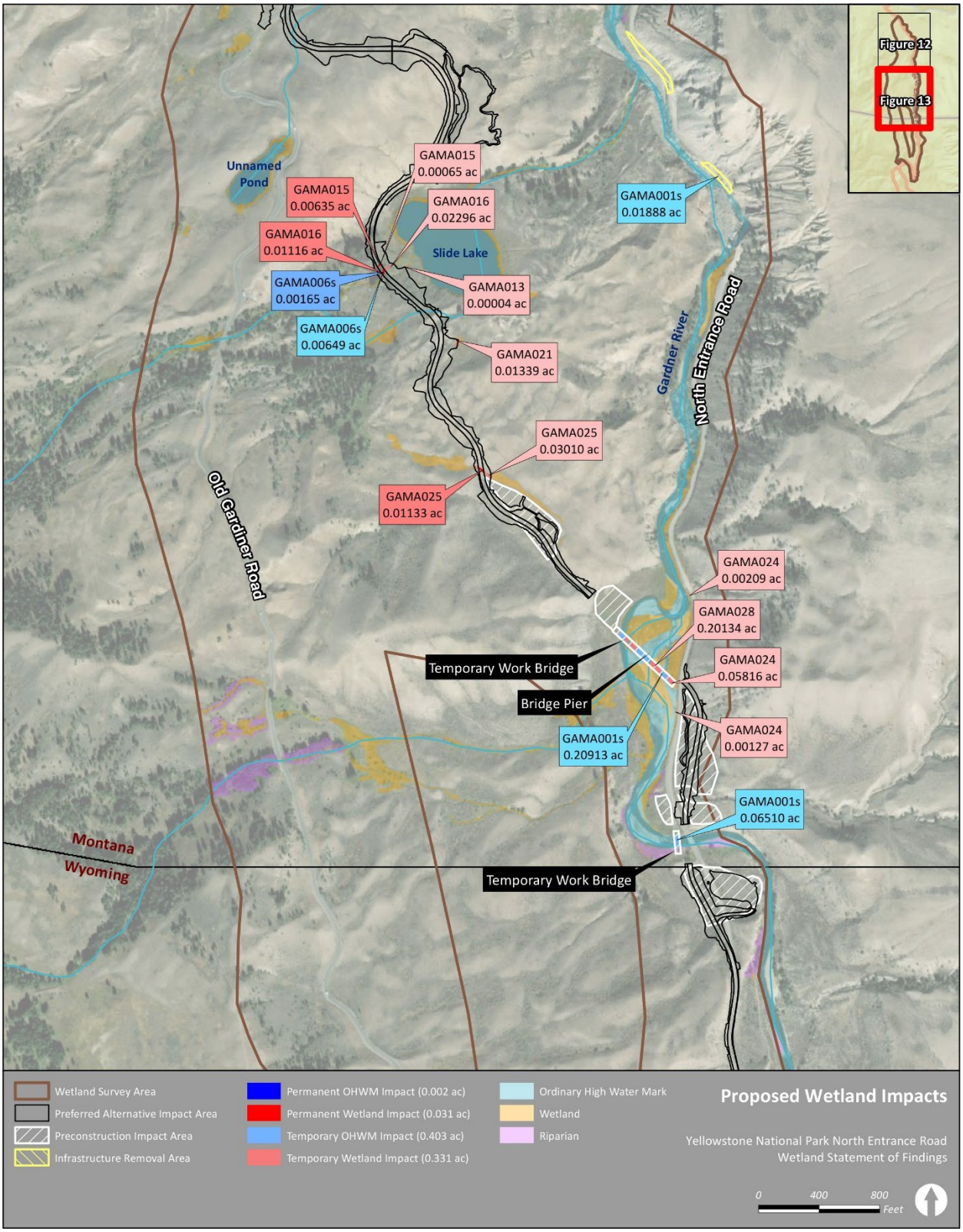


FIGURE 13. PROPOSED WETLAND IMPACTS.

5.2.1 Permanent Wetland Impacts

Permanent impacts on vegetated PEM wetlands (GAMA015, GAMA016, and GAMA025) would occur from cut and fill to construct the new road, from placement of a pier for the construction of the Gardens Bridge (GAMA028) and would total 0.031 acre. Permanent impacts on streams (unvegetated wetlands) would also occur from cut and fill associated with the new road alignment (GAMA006s) and would total approximately 0.0017 acre and approximately 30 linear feet. Table 8 and Table 9 provide a summary of permanent impacts on wetlands.

5.2.2 Temporary Wetland Impacts

Construction of the Boiling River Bridge and Gardens Bridge would result in 0.403 acre of temporary impacts on the Gardner River (GAMA001s) and an unnamed tributary (GAMA006s). The length of temporary streambed impacts would be approximately 1,520 feet. Table 8 and Table 9 provide a summary of temporary impacts on wetlands.

Temporary impacts on vegetated wetlands would total approximately 0.33 acre. Temporary impacts on PEM wetlands would occur from the construction of the Gardens Bridge (GAMA024). Temporary impacts on vegetated PEM wetlands (GAMA05, GAMA013, GAMA015, GAMA016, GAMA021, and GAMA025) would also occur from cut and fill to construct the new road. Temporary impacts on PSS wetlands would also occur from the construction of the Gardens Bridge (GAMA028). Temporary impacts would generally be restored in less than one year and would be monitored as required under Corps permits.

As described above under *Floodplain Impacts* section, construction of both bridges would require temporary work bridges, which would be constructed with two rows of temporary piles installed in the channel for the length of the temporary crossing. The temporary work bridge for the Boiling River Bridge construction would be in place for approximately two years. The temporary work bridge for the Gardens Bridge would be in place for approximately three years. The temporary work bridges would be removed once the proposed new Boiling River Bridge and Gardens Bridge are constructed. Temporary structures are also being considered for access in Garner River Canyon where restoration work will include obliteration of existing paved surfaces and grading to restore natural bank and slopes along the canyon.

5.2.3 Impacts on Wetland Functions and Values

As previously described, wetland functions and values were evaluated using the MWAM and are summarized below. The following functions and values were evaluated: groundwater recharge/discharge, sediment/nutrient/toxicant retention, production export/food chain support, sediment/shoreline stabilization, fish habitat, wildlife habitat, endangered species habitat, recreation/education potential, and uniqueness. Wetland functions and values and impacts on functions and values are presented in Table 10.

TABLE 10. IMPACTS ON WETLAND FUNCTIONS AND VALUES.

Wetland Function or Value	Description	Summary of Impacts
Groundwater Recharge/Discharge	Groundwater recharge is the movement of surface water (usually downward), whereas groundwater discharge is defined as the movement of groundwater into surface water (usually laterally or upward). Evaluation of this function includes observations of springs and seeps and the presence of inlets and outlets. Groundwater discharge and rechange occurs in the Gardner River and in seep-supported wetlands in the project area, one of which would be affected by the project (GAMA006). Wetlands in the project area were rated moderate to high for this function (NPS 2023).	The permanent loss of 30 linear feet of streambed and 0.031 acre of vegetated wetlands would have an adverse effect on groundwater recharge and discharge, but this impact would be mitigated by restoring and enhancing wetlands and implementing the additional mitigation measures as described below in the *Wetland Mitigation* section.
Sediment/Toxicant/Nutrient Retention	Sediment/toxicant/nutrient retention is the ability of an area to retain sediments, and retain and remove toxicants and nutrients. Assessment of this function is based on the site's proximity to sediment/toxicant/nutrient sources, transport potential of these constituents to the area via surface water, potential for the site to detain the constituents to the area via surface water, and the potential of the site to filter and/or process (uptake) the constituents. Wetlands in the project area have the potential to retain sediment and toxicants in runoff from nearby roads. Wetlands in the project area were rated high for this function (NPS 2023).	The permanent loss of 30 linear feet of streambed and 0.031 acre of vegetated wetlands would have an adverse effect on this function, but this impact would be mitigated by restoring and enhancing wetlands and implementing the additional mitigation measures as described below in the *Wetland Mitigation* section.
Production Export/Food Chain Support	Production export/food chain support is the potential of an area to produce and export food/nutrients for living organisms. Production export typically refers to the flushing of organic material from the wetland to downstream habitats or adjacent deeper waters (Adamus et al. 1991). Wetlands in the project area were rated moderate to high for this function (NPS 2023).	The permanent loss of 30 linear feet of streambed and 0.031 acre of vegetated wetlands would have an adverse effect on this function, but this impact would be mitigated by restoring and enhancing wetlands and implementing the additional mitigation measures as described below in the *Wetland Mitigation* section.
Sediment/Shoreline Stabilization	Sediment/shoreline stabilization is the ability of an area to dissipate flow or wave energy to reduce shoreline erosion. This function only applies if the area occurs on or in the banks of a river, stream, or other natural or man-made drainage or on the shoreline of a standing water body subject to wave action. Wetlands in the project area were rated high for this function (NPS 2023).	Construction of streambank protection for erosion control as part of the proposed project is likely to have a beneficial effect on this function by reducing the potential for future streambank erosion.
Fish Habitat	This function is assessed based on the effectiveness of seasonal and permanent water bodies associated with the wetland for fish habitat. The Gardner River is known to be occupied by native fish species, and its associated wetlands were rated moderate for this function (NPS 2023).	The permanent loss of 30 linear feet of streambed and 0.031 acre of vegetated wetlands would have an adverse effect on fish habitat, but this impact would be mitigated by restoring and enhancing wetlands and implementing the additional mitigation measures as described below in the *Wetland Mitigation* section.

Wetland Function or Value	Description	Summary of Impacts
Wildlife Habitat	Wildlife habitat is assessed based on the effectiveness of the wetlands to provide habitat for both resident and migrating wildlife species typically associated with wetlands. Wetland and riparian areas are among the most biologically diverse habitat types. The wetlands and riparian areas in the project area provide habitat to multiple wildlife species and provide a water source for larger mammals. Wetlands in the project area were rated moderate to high for this function (NPS 2023).	The permanent loss of 30 linear feet of streambed and 0.031 acre of vegetated wetlands would have an adverse effect on groundwater recharge and discharge, but this impact would be mitigated by restoring and enhancing wetlands and implementing the additional mitigation measures as described below in the *Wetland Mitigation* section.
Endangered Species Habitat	Endangered species habitat relates to the effectiveness of the wetland and associated water bodies to support threatened and endangered species. The grizzly bear is the only federal- or state-listed species known to occur in the project area. No designated critical habitat for any federally listed species is present in the project area. Wetlands in the project area were rated low for this function (NPS 2023). Additional information about endangered species habitat is presented in the EA under "Special Status Species."	The permanent loss of 30 linear feet of streambed and 0.031 acre of vegetated wetlands would not be expected to affect grizzly bears and would be mitigated by implementing the mitigation measures as described below in the *Wetland Mitigation* section. Potential direct and indirect effects on grizzly bears could result from increased noise and activity during construction or food habituation. Impacts are described in greater detail in the EA under "Special Status Species." Impacts would be mitigated by implementing food storage restrictions to reduce the risk of grizzly conflicts with humans, as described in the EA.
Uniqueness	Uniqueness is assessed based on the general uniqueness of an area relative to the abundance of similar sites occurring in the same major watershed basin, the replacement potential and habitat diversity of an area, and the degree of human disturbance in the area. Wetlands in the project area were rated low to moderate for this function (NPS 2023).	Because the wetlands in the project area were not rated highly for this uniqueness, this value would not be affected.
Recreation/Educational Potential	Recreation potential is assessed based on the potential of an area to support recreational activities. Educational potential is the potential of an area to support educational activities or scientific research. The wetlands in the project area are not likely to be directly used for recreation; however, wetlands in the project area contribute to the recreational experience of visitors driving along the road. Wetlands in the project area were rated high for this function (NPS 2023).	Construction of the road would improve access to the project area for visitors, which would benefit recreation. Impacts on recreation are described in greater detail in the EA in the "Visitor Use and Experience" section.

6 MITIGATION

6.1 FLOODPLAIN MITIGATION

6.1.1 Measures to Reduce Risk to Human Life, Health, and Safety

- Bridge design places the bridge deck elevation for both new bridges well above the level of a 100-year or 500-year flood event.
- Egress to higher ground is readily available for motorists and pedestrians.

6.1.2 Measures to Reduce Risk to NPS Infrastructure and Capital Investment

- The bridge pier within the floodplain would have a deep foundation and be designed to withstand expected flood flows, including the highly erosive effects of sediment and ice. The bridge abutments outside of the regulatory floodplain would be constructed with deep foundations to reduce the risk of flood damage to the bridges.
- The two new bridges would be constructed to pass the 100-year flood with an additional 5 feet of clearance for ice and debris flows. This would reduce the risk of flood damage to the newly constructed bridges.
- The section of road between the proposed Gardens Bridge and the proposed Boiling River Bridge is currently adjacent to the 500-year floodplain boundary. This section of road would be realigned to the east, further from the floodplain boundary, which would reduce the risk of flood damage to the road.
- Structures within the regulatory floodplain would be designed to be consistent with the intent of the standards and criteria of the National Flood Insurance Program "Floodplain Management Criteria for Flood-Prone Areas" (44 Code of Federal Regulations [CFR] Part 60.3) and in accordance with any state or county requirements for flood-prone areas.
- All culverts would be designed to comply with FHWA WFLHD guidelines including Chapter 7 of the PDDM and the WFLHD Chapter 7 Supplement (FHWA 2024).
- For culvert sites subject to debris flows, or installed along landslide complexes, the project would increase pipe capacity to provide slip-lining opportunities, remove deposited material from the inlet area, and enlarge the inlet area as much as possible.
- Potential risks to property would be mitigated by following the FHWA's *Design Standards for Highways in National Flood Insurance Program Mapped Floodplains* (FHWA 1986).

6.1.3 Measures to Reduce Risk to Floodplain Values

- Any in-water work needed to protect the piers from potential future flood events would be isolated from the active river flow by using temporary protective measures such as sandbag dams. Work that would be done below the OHWM would occur at times that would have the least effect on fish and other aquatic organisms.
- The flood-damaged road in the Gardner River Canyon (including bridges) between the Boiling River Picnic Area and Rescue Creek parking area would be removed and restored by removing the asphalt and road base materials and recontouring and revegetating the area. Remaining structures, existing utilities, and sewer lines would be removed. The eroded streambanks along the Gardner River would be regraded and recontoured to create a natural condition after removal of flood-damaged infrastructure.
- To mitigate risk to floodplain values (stormwater storage capacity and infiltration), elevation of fuel storage and hazardous materials or waste storage above the 500-year floodplain would reduce the risk of a release that could adversely affect floodplain values.
- To minimize stormwater impacts, NPS would obtain the appropriate National Pollutant Discharge Elimination System Permit for Discharges of Stormwater Associated with

Construction Activities and would develop a site-specific stormwater pollution prevention plan.

- The project would not alter flood elevations, would not have permanent effects on floodplain functions, and would have negligible effects on floodplain values.

6.2 WETLAND MITIGATION

Approximately 0.403 acre or 1,520 linear feet of streambed and 0.33 acre of vegetated wetlands would be temporarily disturbed by construction. This temporary impact would be mitigated in place by removing temporary fill (such as the temporary work bridges) and restoring preconstruction contours after construction is complete. Restored wetland functions would include sediment/nutrient/toxicant removal, sediment/shoreline stabilization, and production export/food chain support. Temporarily disturbed areas would be monitored to determine success of restoration and corrective actions taken if needed. Monitoring and restoration standards would be developed as described below.

Approximately 0.0017 acre or 30 linear feet of streambed and 0.031 acre of vegetated wetlands would be permanently filled by road reconstruction, road realignment, and bridge construction. Compensatory mitigation is required for permanent impacts on wetlands, in accordance with NPS DO #77-1.

Compensation for permanent impacts on wetlands would be accomplished by enhancing or restoring existing wetlands (Table 11). A *Conceptual Restoration Plan* has been prepared, which shows four areas that are available for restoration or enhancement (Jacobs 2024). The four areas available for restoration or enhancement are described below. Additional information on wetland compensation is provided in the *Conceptual Restoration Plan* (Jacobs 2024; Attachment B). Location maps of the proposed compensation sites are provided in Attachment B.

TABLE 11. WETLAND COMPENSATION SITE DESCRIPTIONS.

Site	Habitat Type	Mitigation Type	Activity	Ratio	Potential Credit (Acres)
Landslide Creek Cattail Marsh	Spring- and surface water-fed vegetated wetland (PEM) and riverine (Landslide Creek)	Enhancement	Enhance up to 1.44 acres of marsh by establishing riparian shrubs along wetland margins, controlling noxious weeds, and replacing the existing culvert with a pedestrian bridge to improve hydrologic connectivity across an abandoned railroad bed.	2:1	0.72
OGR	Two small streams with fringe wetlands (PEM/PSS) and riparian vegetation	Enhancement	Enhance up to 0.10 acre of wetland by installing an additional culvert under the OGR to mimic natural flow patterns, installing a one-rock dam at the proposed culvert outlet to slow and spread out the water flow to reduce erosion while wetting a larger area and establishing a riparian buffer with shrub plantings.	2:1	0.05
Gardner River Canyon	Unvegetated riverine wetland (Gardner River) with scattered riparian areas and fringe wetlands (PEM/PSS)	Enhancement	Enhance up to 23.26 acres of the Gardner River and 6.02 acres of existing fringe wetlands along the river by establishing riparian plantings.	2:1	14.64
Gardner River Canyon	Unvegetated riverine wetland (Gardner River) with scattered riparian habitat	Restoration	Remove the existing road embankment to allow natural processes to reshape the riverbed and bank.	1:1	1.01
Total					16.42

PEM – palustrine emergent, PSS – palustrine scrub-shrub.

The NPS has identified up to 16.42 acres of potential wetland compensation (Table 11), compared with 0.0017 acre of unvegetated wetlands/streambed and 0.031 acre of vegetated wetlands, that would be permanently filled. Adequate mitigation sites are available to provide compensation for impacts on both vegetated and unvegetated wetlands. The NPS, with coordination and input from the Corps, will identify selected areas for compensation at the 70% design stage.

6.3 PERFORMANCE STANDARDS AND MONITORING

Ecological performance standards based on the MWAM (Berglund and McEldowney 2008) would be used to track the success of wetland compensation. Depending on the wetland compensation site or sites selected, the restored or enhanced functions would include habitat for threatened and endangered species, general fish and wildlife habitat, flood attenuation, and surface water storage. Performance standards and monitoring will be developed in detail in cooperation with Park staff, the NPS Wetlands Program, FHWA and the Corps later in the design and permitting process.

Annual monitoring of the mitigation areas would be completed by a qualified wetland biologist. Mitigation sites would be monitored and corrective action will be taken when appropriate. Post-construction and monitoring will follow requirements established during the permitting process with the Corps, typically over a five-year period. Vegetative monitoring plots would be used to identify invasive species and evaluate their presence and extent. If it is determined through the monitoring plots the vegetative cover contains more than 5 percent noxious invasive species, then corrective actions would be required. Additionally, the entire site would be evaluated for invasive species by ocular assessment. If distinct populations of noxious-invasive species are identified, then corrective actions would be required. Individual invasive species identified in the project area would be hand pulled, placed in a plastic trash bag, and disposed of properly. If distinct populations of invasive species have been identified, the individuals would be hand pulled and disposed of properly and the location of the population noted and monitored in subsequent years.

6.3.1 Funding Source for Compensatory Mitigation

The cost of compensatory mitigation has been factored into the construction cost of the project and is consistent with DO #77-1, Section 5.2.3.

7 COMPLIANCE

This document is required to comply with EO 11990. The NPS DO #77-1 and *Procedural Manual #77-1* provide policies and procedures to comply with EO 11990. Compliance with other agency regulations will be completed as appropriate and separately from this document; however, the mitigation measures set forth herein may be relied upon in fulfilling compliance with other applicable regulatory requirements.

8 CONCLUSIONS

8.1 FLOODPLAINS

The proposed project includes two bridges, the Boiling River Bridge and Gardens Bridge, that would span the floodplain of the Gardner River. Permanent impacts on the floodplain would include placement of a pier for the Gardens Bridge within the regulatory floodplain of the Gardner River. The pier would be up to 12 feet in diameter and would have a permanent footprint in the floodplain of approximately 115 square feet (0.003 acre) in the 500-year and 100-year floodplains.

The project would incorporate the impact avoidance and minimization techniques described above to protect human health and safety, minimize risk to property, and preserve floodplain values. By spanning over the floodplain, the two bridges would minimize the disruption to the natural floodplain and help maintain the natural floodplain values. Other avoidance and minimization measures would limit impacts to the degree that overall risks from temporary impacts to floodplains would be minor. The project would not alter the role of periodic floods in maintaining the health and diversity of floodplain ecosystems. Both bridges would be designed to pass the 100-year flood event with an additional 5 feet of clearance for woody debris and ice passage. In addition, the existing embankment at the Boiling River Bridge would be graded to match the existing overbank, removing fill that was placed within the floodplain when the road and bridge were originally constructed. Excavating this fill material would provide

additional floodplain capacity during high flow and reduce the risk of upstream flooding. As a result, the project would have negligible effects on floodplain functions and values.

8.2 WETLANDS

The project would permanently impact 0.031 acre of vegetated wetlands (GAMA15, GAMA16, and GAMA25) from placement of fill for the new road alignment and from construction of a pier for the construction of the Gardens Bridge (GAMA024). Permanent impacts on 0.0017 acre or 30 linear feet of rivers and streambed (unvegetated wetlands) would occur from cut and fill associated with the new road alignment (GAMA006s). Temporary impacts on 0.33 acre of vegetated wetlands would occur from construction of the Gardens Bridge and from cut and fill for the new alignment. Construction of the Boiling River Bridge and Gardens Bridge would also result in temporary impacts on 0.403 acre or 1,520 linear feet of streambed.

The total acreage of permanent wetland impacts would be offset through compensatory mitigation by enhancing and restoring wetlands, as described in the *Conceptual Restoration Plan* (Jacobs 2024; Attachment B). Up to 16.42 acres of potential mitigation credit has been identified in the Conceptual Restoration Plan.

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ATTACHMENT A DELINEATED WETLANDS AND STREAMS

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Aquatic Resources Inventory
North Entrance – Gardiner to Mammoth
YELL 326069B
Yellowstone National Park, Montana/Wyoming

Prepared for—

National Park Service
Department of the Interior

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Aquatic Resources Inventory
North Entrance – Gardiner to Mammoth
YELL 326069B
Yellowstone National Park, Montana/Wyoming

November 28, 2023

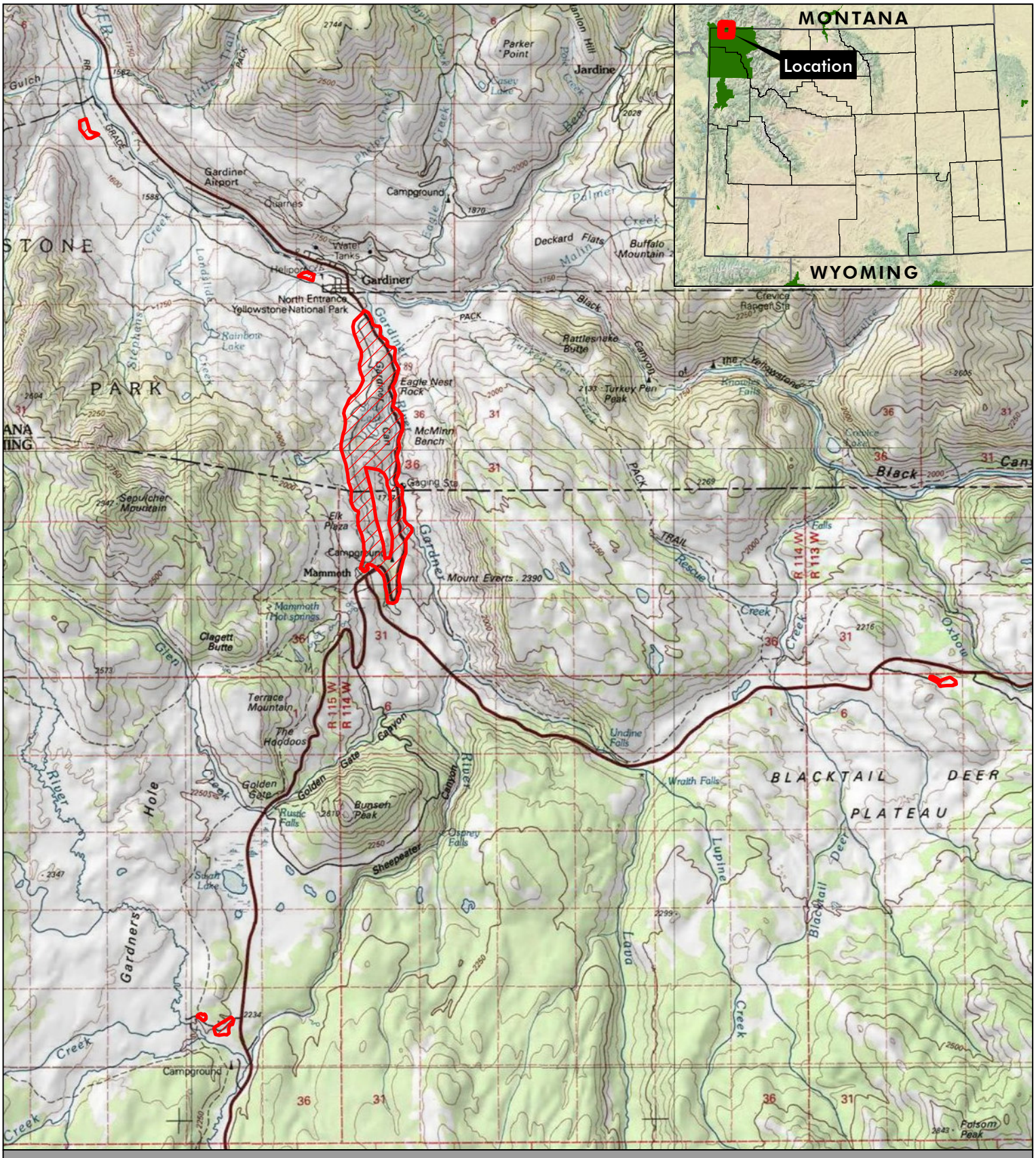
Introduction

ERO Resources Corporation (ERO), under contract to the National Park Service (NPS), conducted an aquatic resources inventory (wetland delineation) in support of the North Entrance Road Project (project) in Yellowstone National Park (Park), Montana/Wyoming (Figure 1; project area) from July 31 through August 4, 2023 (2023 site visit). On June 12 and 13, 2022, the Park experienced record-breaking flooding events in several locations, primarily along the Yellowstone River, Gardner River, and tributaries in Park County, Montana and Park County, Wyoming. Devastating flooding impacts occurred in the Park on multiple sections of the North Entrance Road between Gardiner, Montana and Mammoth, Wyoming – one of only two Park entrances open year-round. During the summer and fall of 2022, the Federal Highway Administration (FHWA) improved Old Gardiner Road to serve as the temporary North Entrance Road. The NPS, in cooperation with FHWA, Western Federal Lands (WFL), is proposing permanent reconstruction of a north entrance road in the Park. The purpose of the action is to restore reliable long-term access from the north entrance of the Park that is resilient to future flooding events and other natural hazards while protecting natural and cultural resources. As part of compliance for the proposed project, wetland functions were assessed to help evaluate the project's potential impacts on wetlands and to determine appropriate mitigation for unavoidable wetland impacts as required by the U.S. Army Corps of Engineers (Corps) for Section 404 permits and by the NPS for compliance with Director's Order #77-1 (DO 77-1): *Wetland Protection* (NPS 2016b).

A jurisdictional wetland delineation was conducted using criteria established in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region* (*Version 2.0)* (Corps 2010). Potential wetlands delineated were characterized by a dominance of hydrophytic vegetation, the presence of hydric soil indicators, and the evidence or presence of wetland hydrology. Wetlands were also classified under the *Classification of Wetlands and Deepwater Habitats of the United States* (Cowardin et al. 1979) following NPS guidelines.

Figure 1. Vicinity Map

September 12, 2023



Yellowstone National Park North Entrance Road Environmental Assessment

Project Area

Sections 8 and 23, T9S, R8E; Sections PB43, PB44, PB53, and PB54,T9S, R8E; Montana Meridian
Sections 19, 30, and 31, T58N, R114W; Section 26, T57N, R115W; Section 5, T57N, R113W; 6th PM
UTM NAD 83: Zone 12N; 523856mE, 4982803mN
Longitude, Latitude: 110.697323°W, 44.998276°N
Electric Peak and Gardiner, MT and Mammoth and Blacktail Deer Creek, WY Quadrangles
Park County, Wyoming and Yellowstone Park County, Montana

0 1 2 Miles

Project Area Location

The project area is directly south of the North Entrance Station in Gardiner, Montana between the Gardner River and just west of the newly constructed North Entrance Road/U.S. Highway 89 (US-89) (Figures 1 and 2). Additional borrow areas that are part of the project area are scattered, with two sites northwest of Gardiner, Montana; one site south of Grand Loop Road in the Park; and one site west of US-89 in the Park (wetland survey area; Figure 1). The wetland survey area is approximately 1,100 acres.

The project area is in Sections 8 and 23, Township 9 South, Range 8 East; and Sections PB43, PB44, PB53, and PB54, Township 9 South, Range 8 East of the Montana Meridian; Section 5, Township 57 North, Range 113 West; Sections 19, 30, and 31, Township 58 North, Range 114 West; and Section 26, Township 57 North, Range 115 West of the 6th Principal Meridian in Park County, Wyoming and Yellowstone Park County, Montana (Figure 1). The UTM coordinates of the approximate center of the project area are NAD 83 523856mE, 4982803mN, Zone 12N. The longitude/latitude of the project area is 110.697323°W/44.998276°N. The elevation of the project area ranges from 5,275 to 6,300 feet above sea level. Appendix A includes photos of the project area.

Background

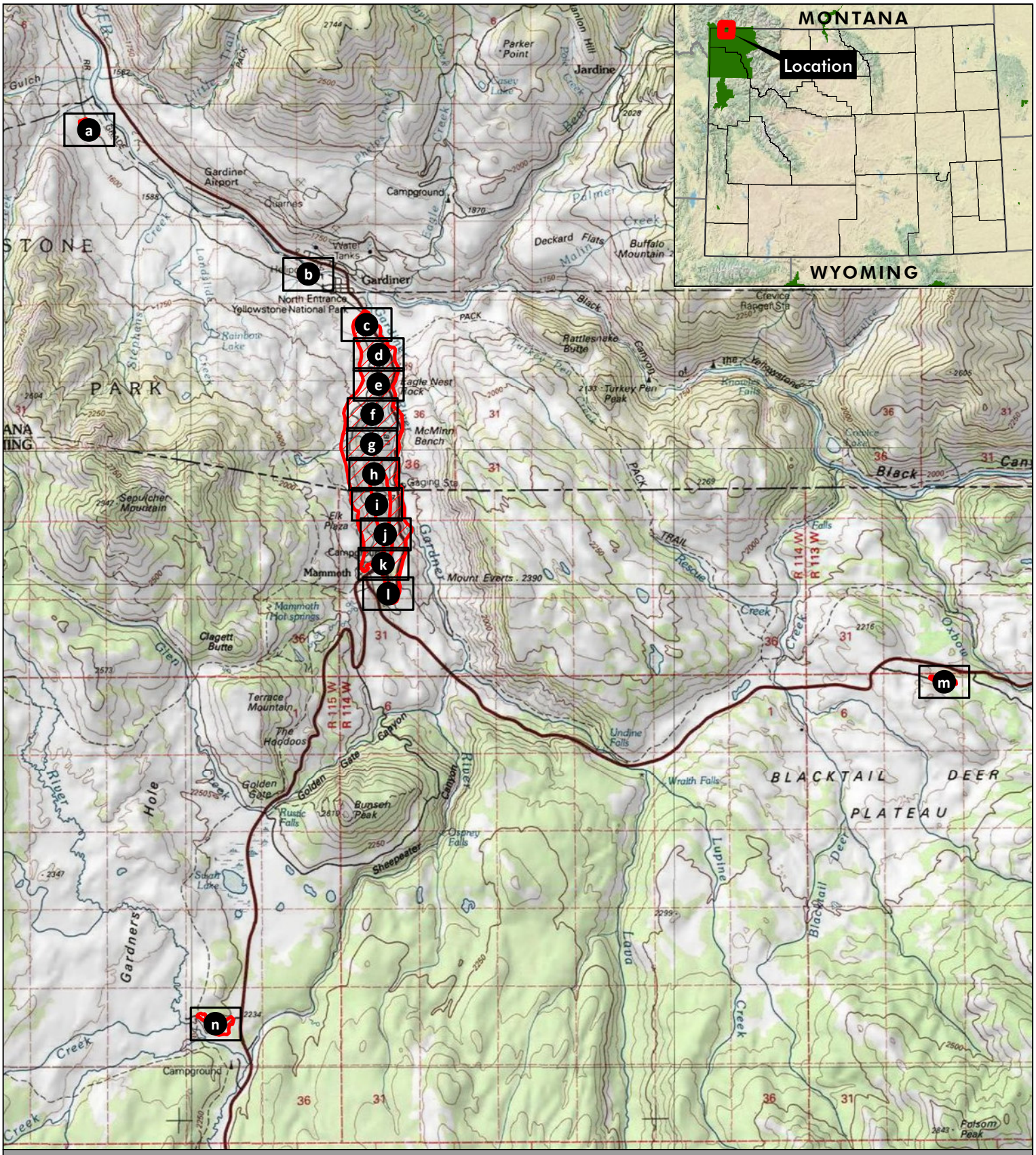
Ecological Setting

The U.S. Department of Agriculture (USDA) has mapped the project area within the Central Rocky Mountains Major Land Resource Area (MLRA), which contains numerous national forests and lakes (U.S. Department of Agriculture (USDA), Natural Resources Conservation Service (NRCS) 2006). The climate of the area typically consists of dry summers, except for brief but intense convective thunderstorms that occur during most afternoons in the mountains. Most of the precipitation during fall, winter, and spring is snow (USDA, NRCS 2006). The average annual precipitation is between 25 and 60 inches, but can be as much as 121 inches at higher elevations (USDA, NRCS 2006). At the time of the 2023 site visit, the project area had received 7.81 inches of precipitation (Walking Shadow Ecology 2023).

Additionally, the natural surface water hydrology of the area consists of several water bodies and features in the Yellowstone River-Gardner River watershed that are all tributaries to the Yellowstone River to the north. The surface water features include several perennial and intermittent streams, wetland complexes, and ponds. The area is characterized by a continental climate with long cold winters and a short growing season, typically May to mid-September. More than half of the precipitation occurs as snow that accumulates in a seasonal snowpack between October and April.

Figure 2. Map Index

September 12, 2023



Yellowstone National Park North Entrance Road Environmental Assessment

Sections 8 and 23, T9S, R8E; Sections PB43, PB44, PB53, and PB54,T9S, R8E; Montana Meridian
Sections 19, 30, and 31, T58N, R114W; Section 26, T57N, R115W; Section 5, T57N, R113W; 6th PM
UTM NAD 83: Zone 12N; 523856mE, 4982803mN
Longitude, Latitude: 110.697323°W, 44.998276°N
Electric Peak and Gardiner, MT and Mammoth and Blacktail Deer Creek, WY Quadrangles
Park County, Wyoming and Yellowstone Park County, Montana

Map Index Page
Project Area

0 1 2 Miles

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Project Area Description

The topography of the project area generally slopes downward from the west side of US-89 eastward to the Gardner River and its floodplain (Figures 1 and 2). Soils observed during the 2023 site visit consisted primarily of loams, clay loams, sandy loams, and silty clay loams, which is consistent with the NRCS mapping of the project area (USDA, NRCS 2023; Appendix D). Soils in the valley floor along the Gardner River that comprise the lower elevations of the Park generally developed from alluvium of sedimentary rock or rhyolite. The USDA, NRCS mapped several primary soil series types (with multiple subseries) in the project area (USDA, NRCS 2023). The largest soil series mapped as occurring in the project area includes Lepner-Gladlow-Beartooth families complex. This families complex has well-drained soils that formed in earthflow deposits derived from sedimentary rock; the Bolack subseries is mapped in the project area and is listed on the national hydric soils list (USDA, NRCS 2023).

Montane forb-grassland communities were the dominant vegetation community observed in the project area during the 2023 site visit. Sagebrush shrub steppe occurs throughout the project area in lower occurrences. Limited mixed-conifer woodlands occur along several of the drainages in the project area. A brief description of the observed vegetation communities is provided below. Many streams and wetlands occur in the project area. A list of plant species identified in the project area is provided in Appendix B.

Montane Forb-Grassland

Montane grassland is present throughout the majority of the project area GAMAupland_77_pp and GAMAupland_314_pp). Vegetation in this community is dominated by crested wheatgrass (*Agropyron cristatum*), western wheatgrass (*Pascopyrum smithii*), Kentucky bluegrass (*Poa pratensis*), Canada bluegrass (*Poa compressa*), redtop (*Agrostis gigantea*), Timothy (*Phleum pratense*), basin wildrye (*Leymus cinerius*), and smooth brome (*Bromus inermis*). Common forbs in this community included American licorice (*Glycyrrhiza lepidota*), common yarrow (*Achillea millefolium*), annual sunflower (*Helianthus annuus*), dogbane (*Apocynum cannabinum*), prickly pear (*Opuntia polyacantha*), and Rocky Mountain beeplant (*Cleome serrulata*).

Sagebrush Shrub Steppe

Sagebrush shrub steppe predominantly occur on hillslope terraces throughout the project area (GAMA031_285_pp). Vegetation in this community was dominated by mountain big sagebrush (*Artemisia tridentata*) with other species such as western snowberry (*Symphoricarpos occidentalis*), prickly rose (*Rosa acicularis* or *Rosa acicularis spp. sayi*), rubber rabbitbrush (*Ericameria nauseosa*), fourwing saltbrush (*Atriplex canescens*), and golden currant (*Ribes aureum*). Dominant grass species included Kentucky bluegrass, Canada bluegrass, redtop, Timothy, basin wildrye, and smooth brome. Common forbs in this community included curlycup gumweed *(Grindelia squarrosa*), false goldenaster (*Heterotheca villosa*), American licorice, and common yarrow.

Mixed-Conifer Woodland

Mixed-conifer woodlands are limited to locations along or near drainages in the project area or higher along the hillslopes in the western section of the project area (GAMA009s_75_pp). Tree species included quaking aspen (*Populus tremuloides*), Douglas fir (*Pseudotsuga menzeii*), western juniper (*Juniperus occidentalis*), and lodgepole pine (*Pinus contorta*). Understory shrubs in the woodlands included, but were not limited to, red osier dogwood (*Cornus sericea* or *Cornus alba*), western snowberry, rose, grouseberry (*Vaccinium scoparium*), buckthorn (*Rhamnus cathartica*), and common juniper (*Juniperus communis*). Common herbaceous and forb species included Kentucky bluegrass, redtop, smooth brome, common yarrow, harebell (*Campanula rotundifolia*), and aster *(Symphyotrichum spp*.).

Riparian

Riparian areas are concentrated along the Gardner River and the Slide Lake drainages in the project area (Figure 2c and Figure 2j). These areas are interspersed with dominant upland vegetation such as conifers and montane grasses outlining creeks and drainages, and on steep hillslopes. Riparian vegetation in the project area is dominated by red osier dogwood, Canada goldenrod *(Solidago canadensis*), and American licorice. Other shrubs observed included snowberry (*Symphoricarpos* spp.), chokecherry (*Prunus virginiana*), huckleberry, and prickly rose.

The riparian community above the Gardner River and Slide Lake contains riparian woodland and riparian shrublands. In the upstream Gardner River and Slide Lake drainage, mixed conifers including lodgepole pine and Engelmann spruce (*Picea engelmannii*) dominate the overstory along ordinary high water mark (OHWM) GAMA008s and GAMA009s (GAMA030_upland01 and GAMA009s_upland01). Red osier dogwood, speckled alder (*Alnus incarna*), water birch (*Betula occidentalis*), and buckthorn are the primary shrubs with some rubber rabbitbrush and mountain big sagebrush typically found along the outer edge (GAMA030_200_pp and GAMA030_260_pp). Herbaceous species include native and nonnative grasses such as smooth brome, redtop, Timothy, and western wheatgrass. Forbs such as yarrow, Canada goldenrod, and American licorice are common.

The riparian community along the Gardner River occurs as a mosaic of multiple communities that are tree-dominated with a diverse shrub component. Douglas fir, lodgepole pine, and Rocky Mountain juniper (*Juniperus scopulorum*) were present in drier areas along the Gardner River (GAMA035_upland, GAMA003_dp, and GAMA003_upland). Limited occurrences of plains cottonwood (*Populus deltoides*) were observed during the 2023 site visit. More commonly observed shrubs included narrowleaf willow (*Salix exigua*), red osier dogwood, common juniper, rose, common snowberry (*Symphoricarpos albus*), and rubber rabbitbrush. The herbaceous understory had native forbs such as yarrow, Canada goldenrod, American licorice, and sawtooth sunflower (*Helianthus nuttallii*). Native and nonnative grasses observed included western wheatgrass, smooth brome, redtop, Timothy, western wheatgrass, and bluejoint (*Calamagrostis canadensis*) (GAMAupland_258_pp).

Noxious Weeds

During the 2023 site visit, ERO observed a few noxious weed species in the project area; however, a detailed survey was not conducted at that time. Species observed included diffuse knapweed (*Centaurea diffusa*), cheatgrass (*Bromos tectorum*), Dalmatian toadflax (*Linaria dalmatica*), field bindweed (*Convolvulus arvensis*), and Canada thistle (*Cirsium arvense*). These species were more commonly observed near areas of disturbance such as road edges and trails.

Methods

Wetland Survey Area Description

ERO delineated wetlands and other waters in the project area that was provided by the NPS. The project area is shown on Figure 1 and Figures 2a through 2n. Photo points of the project area are shown on Figures 2a through 2n and the photo log is in Appendix A. The wetland delineation data sheets are provided in Appendix C.

Wetland Delineation

ERO reviewed National Wetland Inventory maps, U.S. Geological Survey topographic maps, USDA, NRCS soil mapping, and aerial photographs of the wetland survey area before conducting fieldwork. During the 2023 site visit, ERO ecologists Moneka Worah, Marie Russo, Jared Watson, and Isabel Mansour visited the wetland survey area to map the boundaries of wetlands and other waters. The weather during fieldwork varied from sunny and clear to overcast with rain.

Wetlands were delineated using methods outlined in the *1987 Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987), the *Regional Supplement to the Corps Wetland Delineation Manual: Western Mountains, Valleys, and Coast Region (Version 2.0)*, and *NPS Procedural Manual #77-1: Wetland Protection* (Environmental Laboratory 1987; Corps 2010; NPS 2016b). Wetlands were determined based on the presence of three wetland indicators: hydrophytic vegetation, wetland hydrology, and hydric soils.

Figure 2a. Wetlands and Other Waters

- Photo Point
- Data Point
- Vegetation Point
- Ordinary High Water Mark
- Riparian
- Wetland
- Project Area

Yellowstone River

Old Yellowstone Trail S

GAMAupland02

GAMAupland_314_pp

GAMAupland01

0 100 200 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 2b. Wetlands and Other Waters

- Photo Point
- Data Point
- Vegetation Point
- Ordinary High Water Mark
- Riparian
- Wetland
- Project Area

Gardiner

89

Yellowstone River

GAMA010s

GAMA010s_99_pp

GAMA010s_upland

Old Yellowstone Trail S

100 200 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 2c. Wetlands and Other Waters

- Photo Point
- Data Point
- Vegetation Point
- Ordinary High Water Mark
- Riparian
- Wetland
- Project Area

North Entrance Road

Gardner River

Old Gardiner Road

GAMA001s

GAMA002s

GAMA002s_66_pp

GAMAupland_77_pp

GAMAupland_258_pp

0 100 200 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 2d. Wetlands and Other Waters

- Photo Point
- Data Point
- Vegetation Point
- Ordinary High Water Mark
- Riparian
- Wetland
- Project Area

Old Gardiner Road

North Entrance Road

Gardner River

GAMAupland03

GAMA003s

GAMA003s_50_pp

GAMA001_dp

GAMA003s

GAMA001

GAMA002

GAMA002

GAMA003s

GAMA002

GAMA002

GAMA002_55_pp

GAMA002_dp

GAMA002_upland

GAMA001s

GAMA003_upland

GAMA003_dp

GAMA003

0 100 200 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 2e. Wetlands and Other Waters

- Photo Point
- Data Point
- Vegetation Point
- Ordinary High Water Mark
- Riparian
- Wetland
- Project Area

GAMA002
GAMA002_55_pp
GAMA002_dp
GAMA002_upland
GAMA004s_245_pp
GAMA004s
Gardner River
GAMA004
GAMA001s
GAMAupland04
GAMAupland_40_pp
GAMA005
GAMA005_dp
GAMA005_upland01
GAMA005_upland02
GAMA007_upland
GAMA007_dp
GAMA006
Old Gardiner Road

0 125 250 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 2f. Wetlands and Other Waters

- Photo Point
- Data Point
- Vegetation Point
- Ordinary High Water Mark
- Riparian
- Wetland
- Project Area

GAMA005
GAMA005_upland01
GAMA005_dp
GAMA005_upland02
GAMA007_upland
GAMA007_dp
GAMA007_180_pp
GAMA007
GAMA006
Old Gardiner Road
GAMA006_upland
GAMA006_dp
GAMA008_upland
GAMA008_dp
GAMA008
GAMA009
GAMA010
GAMA010_20_pp
GAMA001s_135_pp
GAMA001s
Gardner River
North Entrance Road
GAMA011
GAMA012_dp
GAMA012_126_pp
GAMA039
GAMA012
GAMA011_upland
GAMA011_260_pp
GAMA011_dp
GAMA005s
GAMA013
GAMA013_dp01
GAMA013_dp02
GAMA013_upland
GAMA014
GAMA014_dp
GAMA014_upland
Slide Lake
GAMA040
GAMA015_dp
GAMA015_upland
GAMA015
GAMA040_81_pp
GAMA006s
GAMA016
GAMA018
GAMA017_dp
GAMA017_285_pp
GAMA019
GAMA006s
GAMA020_upland
GAMA020_dp
GAMA020
GAMA019
GAMA019_upland
GAMA006s_92_pp
GAMA019_dp02
GAMA021_dp
Mammoth Terrace Road

0 150 300 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 2g. Wetlands and Other Waters

- Photo Point
- Data Point
- Vegetation Point
- Ordinary High Water Mark
- Riparian
- Wetland
- Project Area

GAMA039
GAMA012
GAMA014
GAMA014_dp
GAMA014_upland
GAMA013
GAMA013_dp01
GAMA013_dp02
GAMA013_upland
GAMA011_dp
GAMA005s
Slide Lake
GAMA040
GAMA040_81_pp
GAMA015_dp
GAMA015_upland
GAMA015
GAMA006s
GAMA016
GAMA018
GAMA017_dp
GAMA017_285_pp
GAMA019
GAMA006s
GAMA019
GAMA019_upland
GAMA019_dp01
GAMA006s_92_pp
GAMA019_dp02
GAMA006s
GAMA020_upland
GAMA020_dp
GAMA020
GAMA021_dp
GAMA021
GAMA022
GAMA022_upland
North Entrance Road
GAMA023
GAMA001s
GAMAupland09
GAMA007s_270_pp
GAMA007s
GAMA025_106_pp
GAMA025
GAMA026
Old Gardiner Road
Gardner River
GAMA027_upland
GAMA027_dp
GAMA027_155_pp
GAMA027
GAMA027
GAMA028
GAMA024

0 150 300 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 2h. Wetlands and Other Waters

- Photo Point
- Data Point
- Vegetation Point
- Ordinary High Water Mark
- Riparian
- Wetland
- Project Area

GAMA026
GAMA027_upland
GAMA027_dp
GAMA027_155_pp
GAMA027
GAMA027
GAMA028
GAMA024
GAMA027
GAMA028
GAMA029_218_pp
GAMA029
GAMA001s
GAMA008s
GAMA027
GAMA030_260_pp
GAMA030_dp02
GAMA030_upland02
GAMA030_dp01
GAMA031
GAMA008s
GAMA030
GAMA008s_270_pp
GAMA030_200_pp
GAMA030_upland01
GAMA031_285_pp
GAMA031_dp
GAMA031_upland
GAMA008s
GAMA031
GAMA009s
GAMA009s_75_pp
GAMA009s_upland01
GAMA009s_88_pp
GAMA031
GAMA027
GAMA009s_upland02
GAMA009s
GAMA009s
GAMA031
Old Gardiner Road
North Entrance Road
Gardner River
GAMA001s_108_pp
GAMA035
GAMA032
MONTANA
WYOMING
GAMA033
GAMA034
0 125 250 Feet
Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 2i. Wetlands and Other Waters

- Photo Point
- Data Point
- Vegetation Point
- Ordinary High Water Mark
- Riparian
- Wetland
- Project Area

MONTANA

WYOMING

River

GAMA001s_108_pp

GAMA035

GAMA032

GAMA033

GAMA034

GAMA035

GAMA001s

GAMA035

North Entrance Road

Old Gardiner Road

Gardner River

GAMA035

GAMA035_upland

GAMAupland10

Gardner River

0 125 250 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 2j. Wetlands and Other Waters

- Photo Point
- Data Point
- Vegetation Point
- Ordinary High Water Mark
- Riparian
- Wetland
- Project Area

GAMAupland10

GAMAupland06

GAMAupland05

Old Gardiner Road

North Entrance Road

Gardner River

GAMA001s

GAMA036

GAMA012s

GAMA036_20_pp

GAMA036

0 125 250 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 2k. Wetlands and Other Waters

- Photo Point
- Data Point
- Vegetation Point
- Ordinary High Water Mark
- Riparian
- Wetland
- Project Area

Old Gardiner Road

Mammoth Street

Mammoth Street

North Entrance Road

North Entrance Road

Officers Row

0 100 200 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 2l. Wetlands and Other Waters

- Photo Point
- Data Point
- Vegetation Point
- Ordinary High Water Mark
- Riparian
- Wetland
- Project Area

Washtub Row

Officers Row

Grand Loop Road

North Entrance Road

Lower Mammoth

0 100 200 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 2m. Wetlands and Other Waters

- Photo Point
- Data Point
- Vegetation Point
- Ordinary High Water Mark
- Riparian
- Wetland
- Project Area

Grand Loop Road

0 100 200 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Figure 2n. Wetlands and Other Waters

- Photo Point
- Data Point
- Vegetation Point
- Ordinary High Water Mark
- Riparian
- Wetland
- Project Area

GAMAupland08

GAMAupland07

Pipeline

Gardner River

GAMA037_325_pp

GAMA037_dp

GAMA037_upland

GAMA037

GAMA011s

GAMA038

0 100 200 Feet

Service Layer Credits: Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community

Wetland indicator status for vegetation (Appendix B) was based on the most current National Wetland Plant List (Corps 2020). The authority for nomenclature for plant species was taken from *The PLANTS Database* (USDA, NRCS 2023a). Soil data were collected at representative observation points for each vegetation community. A Munsell soil color chart was used to determine soil color (*Munsell Soil-Color Charts: With Genuine Munsell Color Chips*, n.d.).

Wetland determination data forms were completed at 56 data points (Appendix C). The global positioning system (GPS) data were differentially corrected to achieve submeter accuracy. All differential correction was completed using Trimble Pathfinder Office 5.9 software. All GPS information was recorded as NAD 1983 UTM Zone 12 North coordinates. The GPS data were incorporated onto aerial photography at a scale of 1 inch equals 200 feet. Photos of the project area are in Appendix A.

Cowardin Classification

Classification of wetland or deep-water system, subsystem, class, and subclass were based on Cowardin et al. (1979). The Cowardin classification uses a hierarchical structure of systems, subsystems, and classes to classify both wetlands and deepwater habitats. Wetlands with persistent vegetation are classified in the Cowardin system as palustrine, which typically includes wetlands referred to as marshes, fens, wet meadows, and sloughs. The palustrine system also includes small, shallow, permanent, or intermittent water bodies such as ponds. Palustrine wetlands may be situated shoreward of lakes and river channels, on river floodplains, in isolated catchments, or on slopes (Cowardin et al. 1979). Under the palustrine system, wetlands are classified as emergent (erect, rooted, herbaceous, and usually perennial hydrophytes that remain standing until at least the next growing season); scrub-shrub (woody vegetation less than 20 feet tall); or forested (woody vegetation 20 feet or taller).

The riverine system includes wetlands and deepwater habitats contained within a channel, with the exception of wetlands dominated by trees, shrubs, and emergent vegetation. The riverine system usually contains flowing water and is bounded on the landward side by uplands, channel banks, or other wetlands. Within the riverine system, wetlands are divided into the tidal, lower perennial (low gradient and slow water), upper perennial (high gradient and fast water), and intermittent subsystems. Within these subsystems, riverine wetlands are further classified as unconsolidated bottom, aquatic bed, streambed, rocky shore, unconsolidated shore, and emergent wetland (nonpersistent).

The lacustrine system includes wetlands and deepwater habitats that are situated in a topographic depression or a dammed river channel; lack trees, shrubs, persistent emergents, emergent mosses, or lichens with greater than 30% areal coverage; and have a total area exceeding 20 acres. Wetland and deepwater habitats totaling less than 20 acres are also included in the lacustrine system if an active wave-formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin exceeds 6.6 feet at low water.

Wetland Functional Assessment

ERO evaluated wetland functions using the Montana Wetland Assessment Method (MWAM) (Berglund and McEldowney 2008). The MWAM uses a classification system that combines the U.S. Fish and Wildlife Service's (USFWS) Cowardin classification system with a hydrogeomorphic (HGM) approach and provides a landscape context to the USFWS classification (Cowardin et al. 1979; Brinson 1993). The MWAM is a rapid functional assessment process designed primarily to address wetland resources associated with linear projects such as highways and pipelines, although it can be applied to all types of projects. The MWAM is commonly used throughout the western United States and is accepted by the Corps. HGM classes found in Montana and Wyoming are mineral soil flats, organic soil flats, riverine, lacustrine fringe, slope, and depressional. The Cowardin classification is discussed above.

For each function and value, the MWAM provides a rating of low, moderate, high, exceptional, or not applicable based on observations and responses to questions. For each wetland, the MWAM scores each function or value on a scale of 0.1 (lowest) to 1.0 (highest) functional points. When all functional points are totaled, the maximum number of functional points is 12. Typically, wetlands that are larger and more diverse receive more points. Once the total functional points for wetlands are calculated, each wetland is assigned to one of the following four categories based on total functional points and other criteria described in the MWAM:

- **Category I**: Wetlands of exceptionally high quality that are generally rare. Category I wetlands can provide primary habitat for federally listed threatened or endangered species; represent a high-quality example of a rare wetland type; provide irreplaceable ecological functions (e.g., are not replaceable within a human lifetime, if at all); exhibit exceptionally high flood attenuation capability; or are assigned high ratings for most of the assessed functions and values resulting in the total actual functional points greater than 80% of the total possible functional points.
- **Category II**: Wetlands that are more common than those in Category I, provide habitat for sensitive plants or animals, function at very high levels for wildlife/fish habitat, are unique in a given area, or are assigned high ratings for many of the assessed functions and values resulting in the total actual functional points greater than 65% of the total possible functional points.
- **Category III**: Wetlands that are more common, generally less diverse, and often smaller and more isolated than those in Categories I and II. These wetlands can provide many functions and values, although they may not be assigned high ratings for as many parameters as Category I and II wetlands (30% to 65% of possible points).
- **Category IV**: Wetlands that are generally small, isolated, and lack vegetative diversity. These wetlands provide little in the way of wildlife habitat and are often directly or indirectly disturbed. Category IV wetlands rate low for uniqueness, production export/food chain support, and the total actual functional points are less than 30% of the total possible functional points.

Functional assessments were conducted for wetlands grouped based on location in the project area and either water source or wetland type. Wetlands in each group generally have similar plant communities, have similar hydrology, and provide similar functions on a whole. The following groupings were used for the MWAM assessments in the wetland survey area: (1) Gardner River and Boiling River and abutting

wetlands (GAMA001s, GAMA012s, GAMA003, GAMA018, GAMA022-GAMA024, GAMA027, GAMA028, and GAMA032-GAMA038; (2) Slide Lake and Unnamed Lake (GAMA012, GAMA013, GAMA039, and GAMA040); (3) Slide Lake Tributary – wetlands and streams upstream and downstream of Slide Lake (GAMA005s, GAMA006s, GAMA011, GAMA015, GAMA016, and GAMA019); (4) Seep Supported Wetlands – wetlands in the project area associated with seeps/springs (GAMA001, GAMA002, GAMA006, GAMA008, and GAMA029-GAMA031); and (5) Depressional Wetlands (GAMA005, GAMA005, GAMA007, GAMA009, GAMA010, GAMA014, GAMA017, GAMA020, GAMA021, GAMA025, and GAMA026). Functional assessment data forms are in Appendix E.

Assessment of Potential Jurisdictional Status

On August 29, 2023, the U.S. Environmental Protection Agency (EPA) and Corps announced a final rule amending the 2023 definition of "waters of the U.S." to conform with the United States Supreme Court (Supreme Court) ruling under *Sackett v. Environmental Protection Agency*, No. 21-454. The amended rule reduces the jurisdiction of the Clean Water Act over wetlands adjacent to bodies of water that do not have a continuous surface connection to other known waters of the U.S., as well as streams that do not have continuous flowing or relatively permanent water. The amended rule removes the "significant nexus" standard that was created under *Rapanos v. United States*, removes interstate wetlands from the definition of waters of the U.S., and revises the definition of "adjacent" to mean "having a continuous surface connection." Wetlands that do not have a contiguous surface connection to a jurisdictional traditionally navigable water or tributary are no longer jurisdictional, as well as ephemeral streams that do not have relatively permanent water.

ERO reviewed the proximity and potential surface water connection of wetlands and other waters to known jurisdictional waters of the U.S. using aerial photo interpretation. The volume, duration, and frequency of flow in the wetlands and streams were not determined during the 2023 site visit. Wetlands or waters that have a surface water connection to the Gardner River or its tributaries and that have relatively permanent flow and are contiguous to one another are potential jurisdictional waters. It is important to note that regardless of the jurisdictional status of wetlands or other waters, the NPS has a "a no net loss of wetlands" goal (NPS 2016a) and impacts to wetlands could require mitigation.

Survey Results

ERO assessed the project area for wetlands and other waters as described below. Data were collected from various locations in the project area to document the characteristics of uplands and wetlands and the transition areas between them. Wetlands and other waters in the project area are described below and are shown on Figures 2a through 2n. Commonly occurring plant species in the project area are shown in Appendix B. Wetland delineation data sheets are provided in Appendix C, and representative site images are provided in Appendix A. The acreage and type of each wetland and other water are provided in Table 1 and Table 2. Approximately 32.71 acres of OHWM and 18.0 acres of wetlands occur in the project area (Table 1; Figures 2a through 2n).

Table 1. Summary of vegetated wetlands in the project area.

Feature Label	Cowardin Classification[1]	Acres in Wetland Survey Area	Longitude	Latitude
GAMA001	PEM1A	0.062	-110.69928797	45.017856054
GAMA002	PEM1A	0.276	-110.7014258	45.015697686
GAMA003	PEM1A	0.002	-110.69289270	45.015970682
GAMA004	PEM1A	0.005	-110.69472613	45.012404093
GAMA005	PEM1A	0.008	-110.70097741	45.009970669
GAMA006	PEM1A	0.241	-110.70198907	45.008702778
GAMA007	PSSA	0.318	-110.70463040	45.008523359
GAMA008	PEM1A	0.263	-110.70452924	45.007767368
GAMA009	PEM1A	0.022	-110.70574146	45.007263978
GAMA010	PEM1A	0.018	-110.70604280	45.0071242943
GAMA011	PEM1A	0.349	-110.69593502	45.005926618
GAMA012	PEM1A	0.611	-110.70382093	45.005484006
GAMA013	PEM1A	1.231	-110.69892607	45.004278860
GAMA014	PEM1A	0.078	-110.70599664	45.004372815
GAMA015	PEM1A	0.007	-110.70096518	45.003732419
GAMA016	PEM1A	0.192	-110.70164528	45.003340899
GAMA017	PEM1A	0.137	-110.69730425	45.003161645
GAMA018	PEM1A	0.513	-110.69245545	45.003243629
GAMA019	PEM1A	0.418	-110.70567372	45.00231385
GAMA020	PEM1A	0.417	-110.7008778	-45.0024735
GAMA021	PEM1A	0.050	-110.6989468	45.0023483
GAMA022	PEM1A	0.006	-110.6930279	45.0079306
GAMA023	PEM1A	0.008	-110.6930431	45.0012658
GAMA024	PEM1A	1.389	-110.6933569	44.9974209
GAMA025	PEM1A	1.117	-110.6987980	45.0000194
GAMA026	PEM1A	0.015	-110.6963750	44.9987042
GAMA027	PSSA	1.541	-110.6943416	44.9953473
GAMA028	PSSA	2.323	-110.6942197	44.9971081
GAMA029	PEM1C	0.880	-110.6956389	44.9957379
GAMA030	PEM1B	0.629	-110.7045633	44.9955949
GAMA031	PSSB	2.662	-110.6963924	44.9951070
GAMA032	PEM1C	0.008	-110.6941218	44.9931943
GAMA033	PEM1B	0.002	-110.6911494	44.9924827
GAMA034	PEM1B	0.009	-110.6911788	44.9920756
GAMA035	PEM1A	0.243	-110.6912499	44.9911347
GAMA036	PEM1B	0.071	-110.6894257	44..9857443
GAMA037	PEM1C	0.202	-110.7408763	44.8918706
GAMA038	PSSC	1.684	-110.7397012	44.8910707
PEM1A subtotal	7.678			
PEM1B subtotal	0.711			
PEM1C subtotal	1.090			
PSSA subtotal	4.182			
PSSB subtotal	2.662			
PSSC subtotal	1.684			
Total	**18.007**			

[1]PEM1A = palustrine emergent persistent, temporarily flooded; PEM1B = palustrine emergent persistent, seasonally saturated; PEM1C = palustrine emergent persistent, seasonally flooded; PSSA = palustrine scrub-shrub temporarily flooded; PSSB = palustrine scrub-shrub, seasonally saturated; PSSC = palustrine scrub-shrub, seasonally flooded.

[2]Based on topographic position observed in the field and review of aerial photography.

Table 2. Ordinary high water marks in the project area.

Feature Label	Cowardin Classification[1]	Area (acres)[2]	Length (feet)[3]	Hydrology Source[4]	Longitude	Latitude
Boiling River (GAMA012s)	R3UBH	0.356	434.8	Spring	-110.6894593	44.9857573
Gardner River (GAMA001s)	R3UBH	23.255	17,733.1	Surface flow/snowmelt	-110.6936458	45.0038699
Slide Lake (GAMA040)	PABG	6.668	834.4	Surface flow/snowmelt	-110.6991045	45.0039776
Unnamed Pond (GAMA039)	PABF	1.493	509.5	Surface flow/snowmelt	-110.7041640	45.0053301
GAMA002s	R4SBC	0.003	109.3	Surface flow/snowmelt	-110.6986401	45.0229188
GAMA003s	R4SBC	0.006	139.9	Surface flow/snowmelt	-110.6989836	45.0180593
GAMA004s	R4SBC	0.159	2,111.3	Surface flow/snowmelt	-110.6961204	45.0138779
GAMA005s	R5UBH	0.003	64.7	Surface flow/snowmelt	-110.6981597	45.0053428
GAMA006s	R4SBC	0.143	2,192.1	Surface flow/snowmelt	-110.7059654	45.0022243
GAMA007s	R4SBC	0.017	211.8	Surface flow/snowmelt	-110.7030414	45.0006674
GAMA008s	R5UBH	0.065	1,686.6	Surface flow/snowmelt	-110.7008301	44.9951069
GAMA009s	R5UBH	0.127	3,680.2	Surface flow/snowmelt	-110.6985426	44.9937273
GAMA010s	R4SBC	0.389	844	Surface flow/snowmelt	-110.7165522	45.0328476
GAMA011s	R5UBH	0.026	423.7	Surface flow/snowmelt	-110.7408801	44.8918706
Total	**32.71**		**30,975.4**			

[1]PABF = palustrine, aquatic bed, semipermanently flooded; PABG = palustrine, aquatic bed, intermittently exposed; R3UBH = riverine upper perennial, unconsolidated bottom, permanently flooded; R4SBC riverine intermittent, streambed, seasonally flooded; R5UBH riverine unknown perennial, unconsolidated bottom, permanently flooded.
[2]Area in the wetland survey area.
[3]Length in the wetland survey area.
[4]Based on topographic position observed in the field and review of aerial photography.

Uplands

Uplands dominate the project area and include montane forb-grasslands and shrub steppe, with mixed-conifer woodlands limited to high terraces above creeks and drainages, and on steep hillslopes. Soil samples were not taken at data points that lacked hydrophytic vegetation and indicators of wetland hydrology. These points were used to characterize the upland community or taken to determine a wetland boundary (GAMA002_upland, GAMA003_upland, GAMA005_upland01, GAMA005_upland02 GAMA006_upland, GAMA007_upland, GAMA008_upland, GAMA009s_upland01, GAMA009s_upland02, GAMA010s_upland, GAMA011_upland, GAMA013_upland, GAMA014_upland, GAMA015_upland, GAMA019_upland, GAMA020_upland, GAMA022_upland, GAMA027_upland, GAMA030_upland01, GAMA030_upland02, GAMA031_upland, GAMA035_upland, GAMA037_upland, GAMAupland01, GAMAupland02, GAMAupland03, GAMAupland04, GAMAupland05, GAMAupland06, GAMAupland07, GAMAupland08, GAMAupland09, and GAMAupland10). Upland vegetation in the project area is described above in the Montane Forb-Grassland, Sagebrush Shrub Steppe, and Mixed-Conifer Woodland sections.

Streams and Open Water

The project area is in Hydrologic Unit 1007000109 (U.S. Geological Survey 2021). During the 2023 site visit, the following areas of streams/open water were identified in the project area: the Gardner River (GAMA001s); Boiling River (GAMA012s); Slide Lake (GAMA040); an Unnamed Pond (GAMA039); four ephemeral drainages (GAMA002s, GAMA003s, GAMA004s, and GAMA007s); and six intermittent or

perennial drainages (GAMA005s, GAMA006s, GAMA008s, GAMA009s, GAMA010s, and GAMA011s). Each of these features is described in more detail below.

Gardner River (GAMA001s)

The Gardner River flows roughly southward to northward along the east side of the project area (Figures 2c through 2n, GAMA001s_108_pp, GAMA001s_135_pp, and GAMA027_155_pp). It crosses the damaged North Entrance Road multiple times and, during the catastrophic flooding, washed out portions of the North Entrance Road. It is approximately 25 to 60 feet wide in the project area with a water depth of several inches to several feet observed during the 2023 site visit. The substrate of the Gardner River is sand, gravel, cobble, and boulders with limited areas of exposed bedrock. Wetlands of variable sizes occur along both banks and are primarily palustrine emergent (PEM) and riverine.

Jurisdictional Status

The Gardner River drains into the Yellowstone River approximately 0.40 mile north of the northern terminus of the project area. Because the Gardner River is a relatively permanent water, it would be considered jurisdictional.

Functional Assessment

The Gardner River and its abutting wetlands were evaluated using the MWAM. The wetlands along the river consist of emergent and some scrub-shrub communities that provide habitat for wildlife, including the federally threatened grizzly bear. The river also provides fish habitat and is highly functioning for sediment/nutrient/toxicant removal, sediment/shoreline stabilization, and production export/food chain support. The overall percent of possible score was 64.5% and based on the percent of possible score, the wetlands would be classified as category II because of a score of 0.9 or 1 for general wildlife habitat.

Boiling River (GAMA012s)

The Boiling River flows into the Gardner River in the southeast corner of the project (Figure 2j, GAMA036_20_pp). It is approximately 6 to 15 feet wide in the project area with a water depth of several inches to several feet observed during the 2023 site visit. The substrate of the Boiling River is sand, gravel, and cobble with limited areas of exposed bedrock. Wetlands of variable sizes occur along both banks and are primarily PEM and riverine.

Jurisdictional Status

The Boiling River drains into the Gardner River in the project area. Because the Boiling River is a relatively permanent water, it would be considered jurisdictional.

Functional Assessment

The Boiling River and its abutting wetlands were evaluated using the MWAM and were combined with the Gardner River wetland evaluation due to their similar communities, hydrology, and location. The wetlands along the Boiling River consist of emergent communities that provide habitat for wildlife, including the federally threatened grizzly bear. The river also provides fish habitat and is highly

functioning for sediment/nutrient/toxicant removal, sediment/shoreline stabilization, and production export/food chain support. The overall percent of possible score was 64.5% and based on the percent of possible score, the wetlands would be classified as category II because of a score of 0.9 or 1 for general wildlife habitat.

Slide Lake (GAMA040)

Slide Lake is a perennial lake located in the central portion of the project area (Figures 2f and 2g, GAMA040_81_pp). It appeared to have a depth of greater than 2 feet during the 2023 site visit. Due to the depth of the water, the bottom substrate of Slide Lake is unknown. A PEM wetland fringe is present around the lake and is discussed in more detail below in the Pond/Fringe Wetlands section. Slide Lake appears to receive runoff from upstream to the west and drains eastward to the Gardner River.

Jurisdictional Status

Because Slide Lake has a connection to the Gardner River and is a relatively permanent water, it is likely the lake would be considered jurisdictional.

Functional Assessment

Slide Lake was combined with the Unnamed Pond (GAMA039) due to their similar classifications as ponds/lakes and were evaluated jointly using the MWAM. The lakes provide habitat for wildlife by offering a water source and wetland vegetation. The lakes also provide high functions for short- and long-term surface water storage, sediment/shoreline stabilization, production export/food chain support, and groundwater discharge/recharge. The overall percent of possible score was 67.5%, with the wetlands rating as category II due to a score above 65%.

Unnamed Pond (GAMA039)

An unnamed perennial pond is located on the west side of US-89 (Figures 2f and 2g, GAMA012_126_pp). It appeared to have a depth of greater than 2 feet during the 2023 site visit. Due to the depth of the water, the bottom substrate is unknown but likely contains silt. A PEM wetland fringe is present around the pond and is discussed in more detail below in the Pond/Fringe Wetlands section. The Unnamed Pond appears to receive runoff from upstream to the southwest and west. It appears this pond may have drained to the northeast during high-flow events, but the additional development of US-89 appears to have resulted in a disconnect from its historical drainage.

Jurisdictional Status

The Unnamed Pond does not appear to have an outlet. Because it lacks a surface connection to a known water of the U.S. (Gardner River), it is likely nonjurisdictional.

Functional Assessment

The Unnamed Pond was combined with Slide Lake due to their similar classifications as ponds/lakes and were evaluated jointly using the MWAM. The lakes provide habitat for wildlife by offering a water source and wetland vegetation. The lakes also provide high functions for short- and long-term surface water storage, sediment/shoreline stabilization, production export/food chain support, and

groundwater discharge/recharge. The overall percent of possible score was 67.5%, with the wetlands rating as category II due to a score above 65%.

GAMA002s

GAMA002s occurs on the northern end of the project area (Figure 2c, GAMA002s_66_pp). GAMA002s is a 1- to 3-foot-wide ephemeral drainage that dissipates into uplands in a terrace above the Gardner River. The adjacent side slopes are steep and are generally devoid of wetland vegetation; the channel bottom consists of unconsolidated boulders and cobble-gravel.

Jurisdictional Status

Because GAMA002s is an ephemeral drainage that does not have relatively permanent flow, and does not have a direct surface connection to the Gardner River, it is likely nonjurisdictional.

GAMA003s

GAMA003s is an unnamed ephemeral drainage that is supported by seeps west/upslope of the temporary North Entrance Road/US-89 and flows northeast through the project area (Figure 2d, GAMA003s_50_pp). GAMA003s is approximately 1 to 4 feet wide and had intermittent sections of channel vegetated with wetlands during the 2023 site visit (described below in Seep Supported Wetlands). GAMA003s dissipates into uplands northeast of the temporary North Entrance Road and does not appear to continue northeast to connect to the Gardner River. The stream bottom consists of unconsolidated cobble-gravel and sand.

Jurisdictional Status

Because GAMA003s is an ephemeral drainage that does not have relatively permanent flow, and does not have a direct surface connection to the Gardner River, it is likely nonjurisdictional.

GAMA004s

GAMA004s is an unnamed ephemeral drainage that is a tributary to the Gardner River and connects to the Gardner River in the northeast section of the project area (Figure 2e, GAMA004s_245_pp). The upslope/southwestern sections of the drainage near US-89 is an upland vegetated swale with no indicators of OHWM or wetland vegetation (GAMAupland_40_pp). Further downstream, the drainage has a defined OHWM approximately 4 to 8 feet wide; however, no flowing water was present during the 2023 site visit. The adjacent side slopes are steep and generally devoid of wetland vegetation; the channel bottom consists of unconsolidated boulders, cobble-gravel, and sand.

Jurisdictional Status

Because GAMA004s is an ephemeral drainage that does not have relatively permanent flow, it is likely nonjurisdictional.

GAMA005s and GAMA006s

GAMA005s and GAMA006s are unnamed perennial streams that feed into Slide Lake and connect to the Gardner River in the project area (Figures 2f and 2g, GAMA011_260_pp and GAMA006s_92_pp).

GAMA005s and GAMA006s are 3 to 6 feet wide through the project area, with a more defined channel upstream of Slide Lake (GAMA040). Downstream of Slide Lake, the channel is predominantly vegetated with wetland species and was mapped as GAMA011 (described in more detail below), with only one defined section of OHWM (GAMA005s). The stream had a depth of less than 1 foot in the project area during the 2023 site visit. The stream bottom consists of unconsolidated cobble-gravel and boulders and would be classified as riverine under Cowardin et al. (1979).

Jurisdictional Status

Because GAMA005s and GAMA006s have relatively permanent water and flow into the Gardner River, a known water of the U.S., they would likely be considered jurisdictional.

GAMA007s

GAMA007s is a small section of OHWM that is southwest/upslope of Slide Lake (Figure 2g, Photo GAMA007s_270_pp). GAMA007s is 1 to 2 feet wide and is an unnamed ephemeral drainage that appears to dissipate into uplands in the project area. The stream bottom consists of unconsolidated cobble-gravel and sand.

Jurisdictional Status

Because GAMA007s is an ephemeral drainage that does not have relatively permanent flow and does not have a surface connection to a known waters of the U.S., it is likely nonjurisdictional.

GAMA008s

GAMA008s is an unnamed intermittent/perennial drainage that is supported by seeps west/upslope of US-89 (Figure 2h, GAMA008s_270_pp). GAMA008s is surrounded by wetland vegetation on either side and dissipates into a large wetland (GAMA031) just west of the Gardner River in the project area (Figure 2h). GAMA008s had a depth of 1 to 3 feet during the 2023 site visit and the channel bottom consists of unconsolidated boulders and cobble-gravel.

Jurisdictional Status

Because GAMA008s does not appear to directly connect to the Gardner River, it may be considered nonjurisdictional by the Corps.

GAMA009s

GAMA009s is an unnamed intermittent drainage that is a tributary to the Gardner River and connects to the Gardner River in the northeast middle of the project area (Figure 2h, GAMA009s_88_pp). The upslope/western section of the drainage upstream of US-89 is a steep drainage approximately 4 to 6 feet wide in a coniferous forest with fringe wetlands present. Further downstream, the drainage has wetland vegetation abutting it throughout the project area (GAMA031). The channel bottom consists of unconsolidated boulders and cobble-gravel.

Jurisdictional Status

Because GAMA009s has relatively permanent flow and connects to the Gardner River, a known water of the U.S., it is likely jurisdictional.

GAMA010s

GAMA010s is an unnamed ephemeral drainage that is a tributary to the Yellowstone River near the town of Gardiner and connects to the Yellowstone River just north of the project area (Figure 2b, Photo GAMA010s_99_pp). The drainage is 5 to 25 feet wide and the channel bottom consists of unconsolidated cobble-gravel and sand. No wetland vegetation is present along the drainage, with uplands immediately abutting either slope of the drainage in the project area.

Jurisdictional Status

Because GAMA010s is an ephemeral drainage that does not contain relatively permanent water, it is likely nonjurisdictional.

GAMA011s

GAMA011s is an unnamed intermittent/perennial drainage that is a tributary to the Gardner River and connects to the Gardner River just west of the project area (Figure 2n, GAMA037_325_pp). The drainage is 3 to 5 feet wide and the channel bottom consists of unconsolidated cobble-gravel and sand. Herbaceous wetland vegetation is present along the drainage (GAMA037).

Jurisdictional Status

Because GAMA011s is an intermittent/perennial drainage that contains relatively permanent water and connects to the Gardner River, it is likely jurisdictional.

Wetlands

ERO mapped approximately 18.0 acres of wetlands in the project area (Figures 2a through 2n). A majority of the wetlands are PEM wetlands, with some PSS wetlands scattered throughout the project area. As discussed above, ERO completed data points at each wetland feature to document wetland/upland boundaries. Along with the data points in Appendix C, as mentioned above, vegetation points were collected to determine the wetland boundary or to provide additional information about the wetlands in the project area (GAMA001_dp, GAMA002_dp, GAMA003_dp, GAMA005_dp, GAMA006_dp, GAMA007_dp, GAMA008_dp, GAMA011_dp, GAMA012_dp, GAMA013_dp01, GAMA013_dp02, GAMA014_dp, GAMA015_dp, GAMA017_dp, GAMA019_dp01, GAMA019_dp02, GAMA020_dp, GAMA021_dp, GAMA027_dp, GAMA030_dp01, GAMA030_dp02, GAMA031_dp, and GAMA037_dp).

Gardner River Wetlands (GAMA003, GAMA018, GAMA022-GAMA024, GAMA027, GAMA028, GAMA032-GAMA035, GAMA037, and GAMA038)

Along the Gardner River are PEM wetlands with limited areas of PSS wetlands (GAMA003, GAMA018, GAMA022-GAMA024, GAMA027, GAMA028, GAMA032-GAMA035, GAMA037, and GAMA038, Figures

2c through 2n). Due to the dynamic nature of the active stream channel, some wetlands have developed more recently as a result of flooding, and it is likely more wetlands were present pre-flooding than what are currently in the project area (GAMA027_155_pp). The primary water source to this wetland community is surface water and subsurface seepage. The dominant species in these wetlands are crack willow (facultative (FAC)), bluejoint (facultative wetland (FACW)), water sedge (*Carex aquatilis* – obligate (OBL)), Baltic rush (*Juncus balticus* – FACW), American licorice (FAC), and redtop (FAC) (see GAMA027_dp and GAMA003_dp). Hydrology indicators included drift deposits, sediment deposits, oxidized rhizospheres on living roots, geomorphic position, and a positive FAC-neutral test. Hydric soil was indicated by loamy mucky mineral and redox dark surface.

Included in this wetland group is a wet meadow complex that is located in the southernmost borrow area (Wetlands 37 and 38, Figure 2n, Photo GAMA037_325_pp). The primary water source to this wetland is surface water, subsurface seepage, and groundwater upwelling. In this wetland, the dominant species are water sedge (OBL), Wolf's willow (*Salix wolfii* – OBL), and shrubby cinquefoil (*Potentilla fruticosa* – FAC) (GAMA037_dp). Hydrology indicators included oxidized rhizospheres on living roots, saturation visible on aerial imagery, geomorphic position, and a positive FAC-neutral test. Hydric soil was indicated by redox dark surface.

Jurisdictional Status

Because the wetlands are abutting the Gardner River, a known water of the U.S., they would likely be considered jurisdictional.

Functional Assessment

The wetlands abutting the Gardner River were evaluated together using the MWAM based on their proximity and common hydrology source. The wetlands are all supported by surface water from the Gardner River. The wetlands consist of emergent and some scrub-shrub communities that provide habitat for wildlife, including the federally threatened grizzly bear. The wetlands provide wildlife habitat, fish habitat, and are highly functioning for sediment/nutrient/toxicant removal, sediment/shoreline stabilization, and production export/food chain support. The overall percent of possible score was 64.5% and based on the percent of possible score, the wetlands would be classified as category II because of a score of 0.9 or 1 for general wildlife habitat.

Seep Supported Wetlands (GAMA001, GAMA002, GAMA006, GAMA008, and GAMA029-GAMA031)

Seep supported wetlands are predominantly PEM wetlands that occur throughout the project area (Figures 2d, 2e, 2f, and 2h, Photos GAMA002_55_pp, GAMA030_260_pp, and GAMA029_218_pp). The primary water source is groundwater upwelling. The dominant species in the wetlands include softstem bulrush (*Schoenoplectus tabernaemontani* – OBL), Northwest Territory sedge *(Carex utriculata* – OBL), water sedge *(*OBL), redtop (FAC), seep monkeyflower (*Mimulus guttatus* – OBL), and Nebraska sedge (*Carex nebrascensis* – OBL) (Appendix C, GAMA002_dp, GAMA030_dp02, and GAMA031_dp). Wetland hydrology indicators in this wetland type include surface water, a high water table, saturation,

geomorphic position, and a positive FAC-neutral test. Hydric soil indicators observed included redox dark surface and an assumption of hydric soil based on the positive presence of inundation and OBL dominant vegetation.

Jurisdictional Status

GAMA001, GAMA002, GAMA006, and GAMA008 do not appear to have surface connections to known waters of the U.S. and end in uplands before a possible connection to the Gardner River. Due to the lack of surface connections, and because the wetlands are not abutting a relatively permanent water, it is likely GAMA001, GAMA002, GAMA006, and GAMA008 are nonjurisdictional. GAMA029, GAMA030, and GAMA031 have surface connections to the Gardner River, with GAMA031 directly abutting the Gardner River. Due to their connections to the river, it is likely GAMA029, GAMA030, and GAMA031 would be considered jurisdictional.

Functional Assessment

The seep supported wetlands were evaluated together using the MWAM based on their proximity and hydrology source. These wetlands provide wildlife habitat and habitat for sensitive listed species. Disturbances in the wetland survey area are primarily associated with the temporary North Entrance Road, but overall has limited disturbances. These wetlands provide some functions including production export/food chain support, groundwater discharge/recharge, and overall uniqueness. The overall percent of possible score was 51% and based on the percent of possible score, the wetlands would be classified as category III.

Unnamed Pond/Fringe Wetlands (GAMA012 and GAM013)

Slide Lake (GAMA040) and an Unnamed Pond (GAMA039) are located in the central portion of the project area (Figures 2f and 2g, GAMA012_126_pp and GAMA040_81_pp). Fringe PEM wetlands surround these open waters (GAMA012 and GAMA013). The primary water source to the fringe wetlands is surface water and subsurface seepage. The dominant species in the fringe wetlands include softstem bulrush (OBL), redtop (FAC), Northwest Territory sedge (OBL), and broadleaf cattail (*Typha latifolia* – OBL) (Appendix C, GAMA012_dp, GAMA013_dp01, and GAMA013_dp02). Wetland hydrology was indicated by surface water, a high water table, saturation, saturation visible on aerial imagery, geomorphic position, and a positive FAC-neutral test. Hydric soil was indicated by depleted below dark surface, depleted matrix, redox dark surface, and an assumption of hydric soil based on the positive presence of inundation and OBL dominant vegetation.

Jurisdictional Status

Because Slide Lake has a connection to the Gardner River and is a relatively permanent water, it is likely the wetlands abutting Slide Lake would be considered jurisdictional. The Unnamed Pond does not appear to have a surface connection to any known waters of the U.S. and appears to be isolated. Because of the lack of a connection to a known water of the U.S., it is likely the Unnamed Pond and associated wetlands are nonjurisdictional.

Functional Assessment

Slide Lake was combined with the Unnamed Pond due to their similar classifications as ponds/lakes and were evaluated jointly using the MWAM. The lakes provide habitat for wildlife by offering a water source and wetland vegetation. The lakes also provide high functions for short- and long-term surface water storage, sediment/shoreline stabilization, production export/food chain support, and groundwater discharge/recharge. The overall percent of possible score was 67.5%, with the wetlands rating as category II due to a score above 65%.

Slide Lake Drainage Wetlands (GAMA011, GAMA015, GAMA016, and GAMA019)

Drainages above and below Slide Lake contain scrub-shrub (PSS) and PEM wetlands (GAMA011, GAMA015, GAMA016, and GAMA019) (GAMA011_260_pp). The primary water source to this wetland community is surface flow from upgradient beaver ponds, surface water from precipitation, and subsurface seepage. The dominant species in these wetlands are Rocky Mountain juniper (upland [UPL]), Wolf's willow (OBL), speckled alder (FACW), red osier dogwood (FACW), golden currant (FAC), Northwest Territory sedge (OBL), spreading bent (*Agrostis stolonifera* – FAC), water hemlock (*Cicuta maculata* – OBL), Baltic rush (FACW), fowl bluegrass (*Poa palustris* – FAC), redtop (FAC), and sweet clover (*Melilotus officinalis* – facultative upland [FACU]) (Appendix C, GAMA015_dp and GAMA019_dp01). Wetland hydrology was indicated by surface water, a high water table, saturation, saturation visible on aerial imagery, geomorphic position, and a positive FAC-neutral test. Hydric soil was indicated by an assumption of hydric soil based on the positive presence of wetland hydrology and the dominance of hydrophytic vegetation.

Jurisdictional Status

Because the wetlands upstream and downstream of Slide Lake have surface connections to the Gardner River and abut a relatively permanent water, they would likely be considered jurisdictional.

Functional Assessment

The wetlands along the tributary upstream and downstream of Slide Lake were combined due to their hydrology source and location and were evaluated jointly using the MWAM. The wetlands provide habitat for wildlife by offering a water source and wetland vegetation. The wetlands also provide high functions for sediment/shoreline stabilization, groundwater discharge/recharge, and recreational/educational potential. The overall percent of possible score was 60% with the wetlands rating as category III.

Depressional Wetlands (GAMA004, GAMA005, GAMA007, GAMA009, GAMA010, GAMA014, GAMA017, GAMA020, GAMA021, GAMA025, and GAMA026)

Many isolated, depressional PEM wetlands are located in the project area (GAMA004, GAMA005, GAMA007, GAMA009, GAMA010, GAMA014, GAMA017, GAMA020, GAMA021, GAMA025, and GAMA026; Figures 2e, 2f, 2g, and 2h). Several of these wetlands appear to be located in dry pond depressions (Photos GAMA007_180_pp, GAMA010_20_pp, GAMA017_285_pp, and GAMA025_106_pp). The primary water source to this wetland community is precipitation. The

dominant species in these wetlands are common spikerush (*Eleocharis palustris* – OBL), Baltic rush (FACW), Nebraska sedge (OBL), foxtail barley (*Hordeum jubatum* – FAC), softstem bulrush (OBL), and western wheatgrass (FACU) (Appendix C, GAMA005_dp, GAMA007_dp, GAMA014_dp, GAMA017_dp, GAMA020_dp, and GAMA021_dp). Hydrology indicators included surface water, a high water table, saturation, algal mat or crust, surface soil cracks, oxidized rhizospheres on living roots, drainage patterns, geomorphic position, and a positive FAC-neutral test. Hydric soil was indicated by depleted below dark surface, loamy mucky mineral, depleted matrix, redox dark surface, the positive presence of indicators of wetland hydrology, and the dominance of hydrophytic vegetation.

Jurisdictional Status

Because all of the depressional wetlands are isolated and do not have surface connections to a known water of the U.S., including the Gardner River, they would likely be considered nonjurisdictional.

Functional Assessment

The depressional wetlands are supported by subsurface flows and seeps. The wetlands consist of emergent communities that provide important habitat for wildlife. Disturbances in the wetlands are few, with most occurring in the Park surrounded by uplands. The wetlands provide shoreline stabilization, groundwater discharge/recharge, and recreation/education potential. The overall percent of possible score was 70% and based on the percent of possible score, the wetlands would be classified as category II due to an overall percent score greater than 65%.

Conclusions and Recommendations

During the 2023 site visit, ERO delineated 18.0 acres of wetlands, 32.7 acres of OHWM, and 30,975 linear feet of stream channel (Figures 2a through 2n). A total of 56 data points were evaluated in the project area (Appendix C). The majority of the wetlands in the project area are classified as PEM wetlands, with some scattering of PSS wetlands. The majority of the wetlands in the project area were categorized as category III using the MWAM. The depressional wetlands scored as category II based on the relative rating of multiple functions including shoreline stabilization, groundwater discharge/recharge, and recreational/educational potential. The Gardner River and abutting wetlands, the Boiling River and abutting wetlands, Slide Lake and abutting wetlands, the tributary to Slide Lake and its abutting wetlands, GAMA009s, GAMA011s, and GAMA029-GAMA031 are likely jurisdictional because they are relatively permanent waters or have a direct/abutting connection to a relatively permanent water. All other wetlands and waters in the project area may not be jurisdictional waters of the U.S. because they are not relatively permanent waters or do not connect to a relatively permanent water.

The proposed North Entrance Road project is anticipated to cause direct and permanent impacts on wetlands in the wetland survey area. Due to the nature of the project, which may include road widening, realignment, and rehabilitation, and the proximity of the existing road corridor aquatic resources, efforts to avoid impacts on wetlands may not be possible. ERO recommends that where possible, road widening and realignment should be implemented in nonwetland habitats. In areas where widening or realignment is needed and would result in wetland impacts, ERO recommends that the project design

integrate infrastructure to allow hydrological connectivity between adjacent wetland features, which could include placement of drainage culverts or bridge crossings.

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Appendix A Photo Log



GAMAupland_77_pp – Montane grasslands in the project area. View is to the northeast.



GAMAupland_314_pp – Montane grasslands in the project area. View is to the northwest.



GAMA031_285_pp – Sagebrush shrublands in the project area. View is to the west.



GAMA009s_75_pp – Mixed conifer woodlands in the project area. View is to the east.



GAMA030_200_pp – Riparian vegetation adjacent to seep wetlands. View is to the southwest.



GAMA030_260_pp – Riparian vegetation adjacent to seep wetland. View is to the northwest.



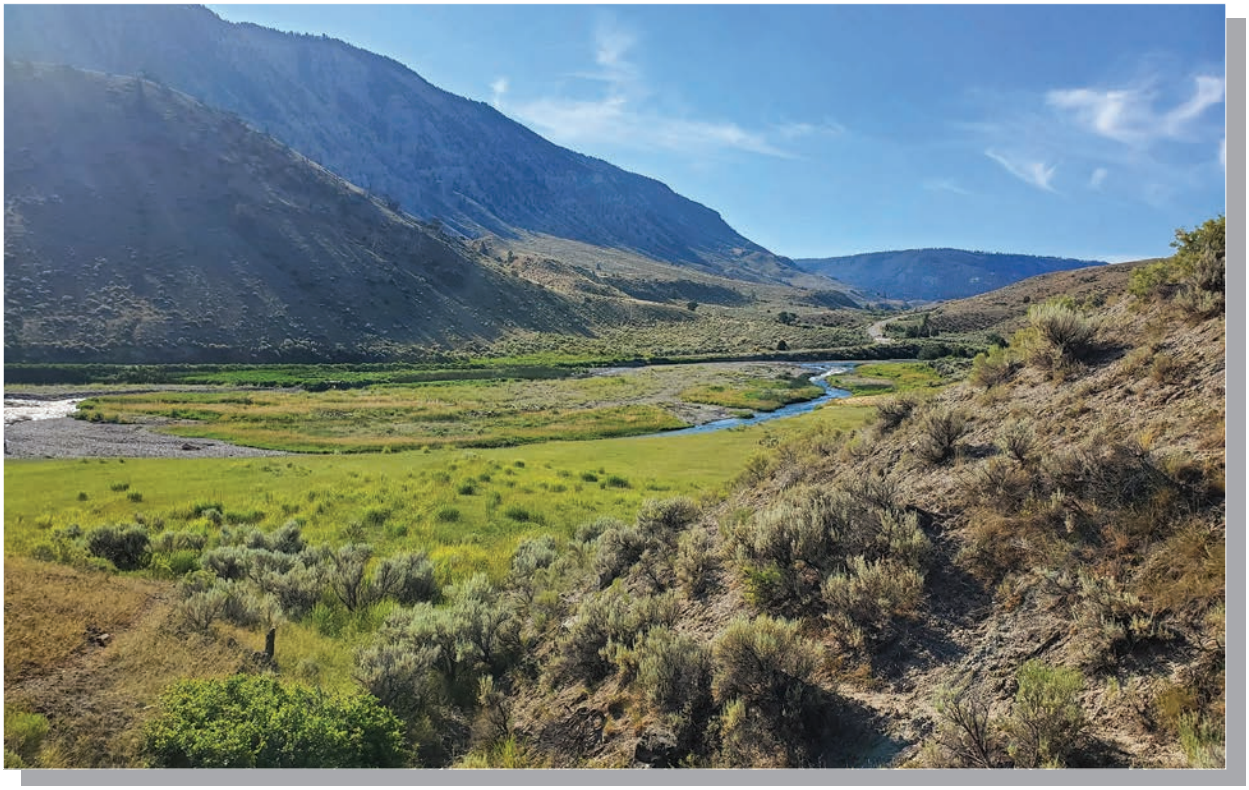
GAMAupland_258_pp – Riparian vegetation along Gardner River (GAMA001s). View is to the west.



GAMA001s_108_pp – Gardner River (GAMA001s) in the project area. View is to the southeast.



GAMA001s_135_pp – Road damage along Gardner River (GAMA001s). View is to the southeast.



GAMA027_155_pp – Gardner River (GAMA001s) and GAMA027 in the project area. View is to the southeast.



GAMA036_20_pp – Boiling River (GAMA012s) abutting Gardner River (GAMA001s). View is to the northeast.



GAMA040_81_pp – Slide Lake (GAMA040) in the project area. View is to the east.



GAMA012_126_pp – Unnamed pond (GAMA039) and GAMA012 in the project area. View is to the southeast.



GAMA002s_66_pp – GAMA002s in the northern section of the project area. View is to the north.



GAMA003s_50_pp – GAMA003s in the project area. View is to the northeast.



GAMA004s_245_pp – GAMA004s in the project area. View is to the southwest.



GAMAupland_40_pp – Upland vegetated swale southwest of GAMA004s. View is to the northeast.



GAMA011_260_pp – GAMA005s and GAMA011 in the project area. View is to the west.



GAMA006s_92_pp – GAMA006s and Slide Lake tributary. View is to the northeast.



GAMA007s_270_pp – GAMA007s in the project area. View is to the southwest.



GAMA008s_270_pp – GAMA008s in the project area. View is to the southwest.



GAMA009s_88_pp – GAMA009s in the project area. View is to the east.



GAMA010s_99_pp – GAMA010s in the project area. View is to the southeast.



GAMA037_325_pp – GAMA011s and GAMA037 in the project area. View is to the west.



GAMA002_55_pp – GAMA002 in the northern section of the project area. View is to the northeast.



GAMA029_218_pp – GAMA029 in the project area. View is to the southwest.



GAMA007_180_pp – GAMA007 in the project area. View is to the south.



GAMA017_285_pp – GAMA017 just south of Slide Lake (GAMA040). View is to the southwest.



GAMA010_20_pp – GAMA009 and GAMA010 in the project area. View is to the northeast.



GAMA025_106_pp – GAMA025 in the project area. View is to the east.

Appendix B Plant Species List

Scientific Name	Common Name	Life Form*	Status	Wetland Indicator**
Achillea millefolium	Common yarrow	F	Native	FACU
Actaea rubra	Red baneberry	F	Native	FACU
Antennaria rosea	Rosy pussytoes	F	Native	UPL
Apocynum cannabinum	Clasping-leaf dogbane	F	Native	FAC
Atriplex canescens	Four-wing saltbush	F	Native	UPL
Campanula rotundifolia	American harebell	F	Native	FACU
Chenopodium album	White goosefoot	F	Introduced	FACU
Centaurea diffusa	Diffuse knapweed	F	Introduced	UPL
Cicuta maculata	Spotted water hemlock	F	Native	OBL
Cirsium arvense	Canada thistle	F	Introduced	FAC
Conium maculatum	Poison-hemlock	F	Introduced	FAC
Convolvulus arvensis	Field bindweed	F	Introduced	UPL
Epilobium angustifolium	Fireweed	F	Native	FACU
Epilobium ciliatum	Fringed willowherb	F	Native	FACW
Eriogonum heracleoides	Parsnip-flower buckwheat	F	Native	UPL
Fragaria virginiana	Virginia strawberry	F	Native	FACU
Gentiana affinis	Prairie gentian	F	Native	FACU
Geum aleppicum	Yellow avens	F	Native	FACW
Glycyrrhiza lepidota	Wild licorice	F	Native	FAC
Grindelia squarrosa	Curlycup gumweed	F	Native	FACU
Helianthus annuus	Common sunflower	F	Native	FACU
Helianthus nuttallii	Nuttall's Sunflower	F	Native	FACW
Iris missouriensis	Western blue iris	F	Native	FACW
Lactuca serriola	Prickly lettuce	F	Introduced	FACU
Lemna minor	Lesser duckweed	F	Native	OBL
Linaria dalmatica	Dalmation toadflax	F	Introduced	UPL
Lupinus argenteus	Silvery lupine	F	Native	UPL
Lycopus americanus	American bugleweed	F	Native	OBL
Medicago sativa	Yellow alfalfa	F	Introduced	UPL
Melilotus officinalis	Sweetclover	F	Introduced	FACU
Mentha arvensis	Wild mint	F	Native	FACW
Mimulus guttatus	Common large monkeyflower	F	Native	OBL
Nasturtium officinale	Watercress	F	Introduced	OBL
Opuntia polyacantha	Plains pricklypear	F	Native	UPL
Polygonum aviculare	Knotweed	F	Introduced	FAC
Polygonum bistortoides	American Bistort	F	Native	FACW
Potentilla anserina	Silverweed cinquefoil	F	Native	OBL
Potentilla pensylvanica	Pennsylvania cinquefoil	F	Native	FACU
Rumex crispus	Curly dock	F	Introduced	FAC
Sisymbrium altissimum	Tall tumble-mustard	F	Introduced	FACU
Solidago canadensis	Canada goldenrod	F	Native	FACU
Solidago gigantea	Giant goldenrod	F	Native	FACW
Sonchus arvensis	Field sowthistle	F	Introduced	FACU
Symphyotrichum spathulatum	Western mountain aster	F	Native	FAC
Taraxacum officinale	Common dandelion	F	Introduced	FACU
Trifolium hybridum	Alsike clover	F	Introduced	FAC
Trifolium pratense	Red clover	F	Introduced	FACU
Urtica dioica	Stinging Nettle	F	Native	FAC
Veronica anagallis-aquatica	Brook-pimpernell	F	Introduced	OBL
Agropyron cristatum	Crested wheatgrass	G	Introduced	UPL
Agrostis gigantea	Redtop	G	Introduced	FAC
Agrostis stolonifera	Creeping bentgrass	G	Introduced	NI
Beckmannia syzigachne	American sloughgrass	G	Native	OBL
Bromus arvensis	Bromus arvensis	G	Introduced	UPL
Bromus inermis	Smooth brome	G	Introduced	UPL
Bromus tectorum	Cheatgrass	G	Introduced	UPL

Scientific Name	Common Name	Life Form*	Status	Wetland Indicator**
Calamagrostis canadensis	Blue-joint reedgrass	G	Native	FACW
Calamagrostis stricta	Slimstem reedgrass	G	Native	FACW
Carex aquatilis	Water sedge	G	Native	OBL
Carex bebbii	Bebb's sedge	G	Native	OBL
Carex microptera	Small-wing sedge	G	Native	FACU
Carex nebrascensis	Nebraska Sedge	G	Native	OBL
Carex utriculata	Common beaked sedge	G	Native	OBL
Eleocharis palustris	Creeping spikerush	G	Native	OBL
Elymus lanceolatus	Thickspike wheatgrass	G	Native	FACU
Equisetum arvense	Common horsetail	G	Native	FAC
Equisetum hyemale	Rough horsetail	G	Native	FACW
Festuca idahoensis	Idaho fescue	G	Native	FACU
Glyceria grandis	American managrass	G	Native	OBL
Hordeum jubatum	Foxtail barley	G	Native	FAC
Juncus articulatus	Jointed rush	G	Native	OBL
Juncus balticus	Baltic Rush	G	Native	FACW
Koeleria macrantha	Junegrass	G	Native	UPL
Leymus cinereus	Basin wildrye	G	Native	FAC
Pascopyrum smithii	Western wheatgrass	G	Native	FACU
Phleum pratense	Timothy	G	Introduced	FAC
Poa compressa	Canada bluegrass	G	Introduced	FACU
Poa pratensis	Kentucky bluegrass	G	Introduced	FAC
Polypogon monspeliensis	Rabbit's-foot grass	G	Introduced	FACW
Schoenoplectus americanus	Three-square bulrush	G	Native	OBL
Schoenoplectus tabernaemontani	Softstem bulrush	G	Native	OBL
Stipa nelsonii	Nelson's needlegrass	G	Native	UPL
Stipa viridula	Green needlegrass	G	Native	UPL
Typha latifolia	Broadleaf cattail	G	Native	OBL
Typha X glauca	Cattail hybrid	G	Native	OBL
Vulpia octoflora	Six-week fescue	G	Native	UPL
Artemisia frigida	Prairie sagewort	F/S	Native	UPL
Artemisia tridentata	Big sagebrush	S	Native	UPL
Betula occidentalis	Spring birch	S	Native	FACW
Cornus sericea/Cornus alba	Redosier dogwood	S	Native	UPL
Dasiphora fruticosa	Shrubby cinquefoil	S	Native	FAC
Ericameria nauseosa	Rubber rabbitbrush	S	Native	UPL
Juniperus occidentalis	Western juniper	S/T	Native	UPL
Lonicera utahensis	Utah honeysuckle	S	Native	FAC
Prunus virginiana	Chokecherry	S	Native	FACU
Rhamnus cathartica	Common buckthorn	S	Introduced	UPL
Ribes aureum	Golden currant	S	Native	FAC
Rosa acicularis	Prickly rose	S	Native	FACU
Salix bebbiana	Bebb's willow	S	Native	FACW
Salix exigua	Narrowleaf willow	S	Native	FACW
Salix wolfii	Wolf willow	S	Native	OBL
Symphoricarpos albus	Common snowberry	S	Native	FACU
Symphoricarpos occidentalis	Western snowberry	S	Native	FAC
Vaccinium scoparium	Grouseberry	S	Native	FACU
Alnus incana	Speckled alder	T	Native	FACW
Juniperus scopulorum	Rocky Mountain juniper	T	Native	UPL
Populus tremuloides	Quaking aspen	T	Native	FACU
Pseudotsuga menziesii	Douglas-fir	T	Native	FACU
Pinus contorta	Lodgepole pine	T	Native	FAC

*F-Forb; G-Graminoid; S-Shrub; T-Tree.

**Facultative Wetland (FACW_—Estimated 67%–99% probability of occurrence in wetlands; Facultative (FAC)—Equally likely to occur in wetlands and nonwetlands (34%–66% probability); Facultative Upland (FACU)—67%–99% probability in nonwetlands, 1%–33% in wetlands; Upland (UPL)—>99% probability in nonwetlands in this region; NI—No Indicator or no information available.

Source: U.S. Army Corps of Engineers 2020.

Appendix C Wetland Delineation Data Sheets

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/1/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA001_dp

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: Protracted Block 44 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0178420162 Long: -110.699314458 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetland pocket along ephemeral swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Schoenoplectus tabernaemontani*	25	Yes	OBL
2. *Pascopyrum smithii*	35	Yes	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 40

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	25	x 1 =	25
FACW species	0	x 2 =	0
FAC species	0	x 3 =	0
FACU species	35	x 4 =	140
UPL species	0	x 5 =	0
Column Totals:	60 (A)		165 (B)

Prevalence Index = B/A = 2.75

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- ____ 2 - Dominance Test is >50%
- X 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vacular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA001_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Soils - hard clay, difficult to dig, assumed soils based on vegetation and hydrology indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/1/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA002_dp

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: Protracted Block 44 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): wetland hillslope, seep Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR E Lat: 45.0154873462 Long: -110.701602759 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: R5UBH

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetland seep along hillside.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Pascopyrum smithii*	5	No	FACU
2. *Carex nebrascensis*	10	No	OBL
3. *Schoenoplectus tabernaemontani*	70	Yes	OBL
4. *Juncus balticus*	5	No	FACW
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA002_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Soils assumed based on obligate species and inundation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 0.5		
Water Table Present?	Yes X	No ___	Depth (inches): 0		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/1/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA002_upland

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: Protracted Block 44 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): LRR E Lat: 45.0154734305 Long: -110.701589429 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Rosa acicularis*	5	Yes	FACU
2.			
3.			
4.			
5.			
	5 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Phleum pratense*	10	No	FAC
2. *Achillea millefolium*	10	No	FACU
3. *Glycyrrhiza lepidota*	15	Yes	FAC
4. *Bromus inermis*	5	No	UPL
5. *Poa compressa*	20	Yes	FACU
6. *Cirsium arvense*	2	No	FAC
7. *Koeleria macrantha*	15	Yes	UPL
8.			
9.			
10.			
11.			
	77 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum 23

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)
Prevalence Index = B/A = ____	

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1](Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA002_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Assumed no soils because of lack of vegetation indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No hydrology indicators observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/2/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA003_dp

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: Protracted Block 43 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0159733261 Long: -110.692894904 Datum: NAD83

Soil Map Unit Name: Pesowyo family-Rock outcrop-Kadygulch family, complex NWI classification: R3UBH

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetland abutting Gardiner River on sediment deposit.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix sp.*	15	Yes	FAC*
2.			
3.			
4.			
	15	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
		=Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Carex aquatilis*	20	Yes	OBL
2. *Juncus balticus*	20	Yes	FACW
3. *Pascopyrum smithii*	10	No	FACU
4. *Equisetum hyemale*	5	No	FACW
5. *Poa compressa*	15	No	FACU
6. *Calamagrostis canadensis*	15	No	FACW
7. *Glycyrrhiza lepidota*	25	Yes	FAC
8.			
9.			
10.			
11.			
	110	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		=Total Cover	

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vacular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks: *The majority of Salix species have indicators of at least facultative in the Western Mountains, Valleys, and Coast Region.

SOIL

Sampling Point: GAMA003_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/2						Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Along sediment deposit abutting river. Likely recent deposition from flooding.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- X Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/2/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA003_upland

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: Protracted Block 43 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): sediment deposit Local relief (concave, convex, none): convex Slope (%): 0

Subregion (LRR): LRR E Lat: 45.0159550135 Long: -110.692920105 Datum: NAD83

Soil Map Unit Name: Pesowyo family-Rock outcrop-Kadygulch family, complex NWI classification: R3UBH

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Mesic area along sediment deposit.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix sp.*	20	Yes	FAC*
2.			
3.			
4.			
	20	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Symphoricarpos albus*	10	Yes	FACU
2. *Rosa acicularis*	5	Yes	FACU
3.			
4.			
5.			
	15	=Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Pascopyrum smithii*	15	Yes	FACU
2. *Melilotus officinalis*	5	No	FACU
3. *Glycyrrhiza lepidota*	20	Yes	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	40	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum 60

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 40.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks: *The majority of Salix species have indicators of at least facultative in the Western Mountains, Valleys and Coast Region.

SOIL

Sampling Point: GAMA003_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Rock deposit - couldn't dig. Upland/mesic area with bare ground.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

No indicators observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/1/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA005_dp

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0099535074 Long: -110.70098836 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetlands within swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Juncus balticus*	50	Yes	FACW
2. *Hordeum jubatum*	25	Yes	FAC
3. *Iris missouriensis*	5	No	FACW
4. *Carex bebbii*	15	No	OBL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		
% Bare Ground in Herb Stratum 5			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA005_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1	100					Loamy/Clayey	high organic material
4-12	10YR 2/1	98	7.5YR 3/4	2	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/1/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA005_upland01

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0099937489 Long: -110.703024394 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Mesic swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Phleum pratense*	15	Yes	FAC
2. *Pascopyrum smithii*	10	No	FACU
3. *Juncus balticus*	20	Yes	FACW
4. *Trifolium hybridum*	10	No	FAC
5. *Carex bebbii*	25	Yes	OBL
6. *Poa pratensis*	10	No	FAC
7. *Conium maculatum*	10	No	FAC
8.			
9.			
10.			
11.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA005_upland01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
No indicators observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes ___	No X	Depth (inches): ___		
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA005_upland02

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR E Lat: 45.0094520 Long: -110.7013780 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ___ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ___

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ___	No X	**Is the Sampled Area within a Wetland?** **Yes** ___ **No** X
Hydric Soil Present?	Yes ___	No X	
Wetland Hydrology Present?	Yes ___	No X	

Remarks:
Upland swale

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	___ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Rosa acicularis*	5	Yes	FACU
2.			
3.			
4.			
5.			
	5 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Juncus balticus*	35	Yes	FACW
2. *Pascopyrum smithii*	20	Yes	FACU
3. *Phleum pratense*	10	No	FAC
4. *Chenopodium album*	5	No	FACU
5. *Poa pratensis*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	75 =Total Cover		
Woody Vine Stratum (Plot size: ___)			
1.			
2.			
	___ =Total Cover		

% Bare Ground in Herb Stratum 25

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ___	x 1 = ___
FACW species ___	x 2 = ___
FAC species ___	x 3 = ___
FACU species ___	x 4 = ___
UPL species ___	x 5 = ___
Column Totals: ___ (A)	___ (B)

Prevalence Index = B/A = ___

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vacular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ___ **No** X

Remarks:

SOIL

Sampling Point: GAMA005_upland02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	100					Loamy/Clayey	Organic material

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/1/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA006_dp

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR E Lat: 45.0085824 Long: -110.702088299 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetlands along swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Juncus balticus*	50	Yes	FACW
2. *Carex nebrascensis*	20	Yes	OBL
3. *Calamagrostis stricta*	10	No	FACW
4. *Iris missouriensis*	3	No	FACW
5. *Pascopyrum smithii*	5	No	FACU
6. *Typha latifolia*	5	No	OBL
7. *Lycopus americanus*	5	No	OBL
8.			
9.			
10.			
11.			
	98 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 2

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA006_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Redox Features Type[1]	Redox Features Loc[2]	Texture	Remarks
0-11	10YR 2/1	100					Mucky Loam/Clay	high organic content

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- X Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes X	No ___	Depth (inches): 10		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/1/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA006_upland

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR E Lat: 45.0085679228 Long: -110.702055694 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Ericameria nauseosa*	5	Yes	UPL
2.			
3.			
4.			
5.			
	5 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Melilotus officinalis*	30	Yes	FACU
2. *Phleum pratense*	15	Yes	FAC
3. *Poa pratensis*	10	No	FAC
4. *Glycyrrhiza lepidota*	3	No	FAC
5. *Pascopyrum smithii*	5	No	FACU
6. *Juncus balticus*	5	No	FACW
7. *Stipa viridula*	5	No	UPL
8.			
9.			
10.			
11.			
	73 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum 27

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)
Prevalence Index = B/A = ____	

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1](Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vacular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA006_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Did not dig because of dominance of upland vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Nop hydrology indicators observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/1/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA007_dp

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB53, T9S; R8E; Montana Meridian

Landform (hillside, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR E Lat: 45.0087246121 Long: -110.704467446 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Mesic area adjacent to wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Juncus balticus*	30	Yes	FACW
2. *Carex nebrascensis*	40	Yes	OBL
3. *Agrostea gigantea*	10	No	FAC
4. *Hordeum jubatum*	2	No	FAC
5. *Poa pratensis*	5	No	FAC
6. *Epilobium ciliatum*	5	No	FACW
7.			
8.			
9.			
10.			
11.			
	92 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 8

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)
Prevalence Index = B/A = ____	

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vacular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA007_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					Loamy/Clayey	Organic material
3-12	10YR 4/2	85	10YR 4/6	5	C	M	Loamy/Clayey	Prominent redox concentrations
			N 2.5/	10	C	M		Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ? Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/1/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA007_upland

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.008780884 Long: -110.704545974 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Mesic area adjacent to wetland.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Pascopyrum smithii*	10	No	FACU
2. *Phleum pratense*	15	Yes	FAC
3. *Hordeum jubatum*	5	No	FAC
4. *Bromus inermis*	5	No	UPL
5. *Juncus balticus*	25	Yes	FACW
6. *Carex bebbii*	20	Yes	OBL
7. *Lactuca serriola*	5	No	FACU
8. *Poa pratensis*	10	No	FAC
9.			
10.			
11.			
	95 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA007_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1							
3-12	10YR 3/2		N 2.5/	10	C	PL		Faint redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA008_dp

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0077393053 Long: -110.704512673 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wet meadow

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Carex utriculata*	90	Yes	OBL
2. *Gentiana affinis*	5	No	FACU
3. *Glycyrrhiza lepidota*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vacular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA008_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric soil assumed present due to dominance of hydrophytic vegetation and indicators of wetland hydrology.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA008_upland

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR E Lat: 45.0079798093 Long: -110.703681747 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland swale

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Rosa acicularis*	5	Yes	FACU
2.			
3.			
4.			
5.			
	5 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Juncus balticus*	35	Yes	FACW
2. *Pascopyrum smithii*	20	Yes	FACU
3. *Phleum pratense*	10	No	FAC
4. *Chenopodium album*	5	No	FACU
5. *Poa pratensis*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	75 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 25

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)
Prevalence Index = B/A = ____	

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA008_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	100					Loamy/Clayey	Organic material

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/3/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA009s_upland01

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 44.9944093404 Long: -110.704911831 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus tremuloides*	5	Yes	FACU
2. *Pseudotsuga menziesii*	20	Yes	FACU
3.			
4.			
	25	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Rosa acicularis*	5	Yes	FACU
2. *Cornus sericea*	5	Yes	FACW
3.			
4.			
5.			
	10	=Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Equisetum arvense*	40	Yes	FAC
2. *Phleum pratense*	10	Yes	FAC
3. *Agrostis gigantea*	10	Yes	FAC
4. *Actaea rubra*	5	No	FACU
5. *Glyceria grandis*	5	No	OBL
6. *Marchantia polymorpha*	10	Yes	UPL
7.			
8.			
9.			
10.			
11.			
	80	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 4 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:		Multiply by:	
OBL species	5	x 1 =	5
FACW species	5	x 2 =	10
FAC species	60	x 3 =	180
FACU species	35	x 4 =	140
UPL species	10	x 5 =	50
Column Totals:	115 (A)		385 (B)

Prevalence Index = B/A = 3.35

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA009s_upland01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 2/1	100					Loamy/Clayey	
3-7	10YR 2/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Difficult to dig because of bedrock at 7", hydric soils assumed present.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- X Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes ___	No X	Depth (inches): ___		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Park Sampling Date: 8/3/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA009s_upland01

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 3

Subregion (LRR): LRR E Lat: 44.994334 Long: -110.704850 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation ____, Soil ____, or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation ____, Soil ____, or Hydrology ____ naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pseudotsuga menziesii*	20	Yes	FACU
2.			
3.			
4.			
	20 =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Melilotus officinalis*	15	Yes	FACU
2. *Achillea millefolium*	5	No	FACU
3. *Poa compressa*	5	No	FACU
4. *Sonchus arvensis*	5	No	FACU
5. *Antennaria rosea*	10	Yes	UPL
6. *Leymus cinereus*	5	No	FAC
7. *Vulpia octoflora*	10	Yes	UPL
8.			
9.			
10.			
11.			
	55 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum 45

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)
Prevalence Index = B/A = ____	

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA009s_upland01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Did not dig due to upland vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No hydrology inidicators observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/3/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA010s_upland

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: Section 23 T9S, R8E; 6th PM

Landform (hillside, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0323149212 Long: -110.715711079 Datum: NAD83

Soil Map Unit Name: Pesowyo-Beartooth-Sawbuck families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No x	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Artemisia tridentata*	5	Yes	UPL
2. *Atriplex canescens*	10	Yes	UPL
3.			
4.			
5.			
	15 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Agropyron cristatum*	45	Yes	UPL
2. *Pascopyrum smithii*	5	No	FACU
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 50

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA010s_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Soil not sampled due to the dominance of upland vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? Yes ___ No ___ Depth (inches): ___
(includes capillary fringe)

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
None observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA011_dp

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 54, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): rocky streambank Local relief (concave, convex, none): concave Slope (%): 3

Subregion (LRR): LRR E Lat: 45.0054723332 Long: -110.697303863 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: R5UBH

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetlands within stream along hillside.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juniperus scopulorum*	5	Yes	UPL
2.			
3.			
4.			
	5 =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Cornus sericea*	20	Yes	FACW
2. *Rosa acicularis*	3	No	FACU
3.			
4.			
5.			
	23 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Carex utriculata*	30	Yes	OBL
2. *Mentha arvensis*	10	No	FACW
3. *Melilotus officinalis*	15	Yes	FACU
4. *Agrostis stolonifera*	15	Yes	FAC
5. *Helianthus nuttallii*	5	No	FACW
6. *Veronica anagallis-aquatica*	10	No	OBL
7.			
8.			
9.			
10.			
11.			
	85 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 15

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vacular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA011_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Soils assumed based on vegetation and inundation. Along stream slope.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 1		
Water Table Present?	Yes X	No ___	Depth (inches): 0		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA011_upland

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 54, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): convex Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0054565641 Long: -110.697309769 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: R5UBH

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Uplands adjacent to creek.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Cornus sericea*	5	Yes	FACW
2.			
3.			
4.			
5.			
	5 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Melilotus officinalis*	50	Yes	FACU
2. *Solidago canadensis*	5	No	FACU
3. *Equisetum arvense*	15	No	FAC
4. *Poa compressa*	10	No	FACU
5. *Glycyrrhiza lepidota*	10	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	90 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)
Prevalence Index = B/A = ____	

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1](Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA011_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA012_dp

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): toe of slope Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0056957277 Long: -110.703977092 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Fringe wetland around unnamed pond.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Schoenoplectus tabernaemontani*	25	Yes	OBL
2. *Typha latifolia*	25	Yes	OBL
3. *Polypogon monspeliensis*	10	No	FACW
4. *Hordeum jubatum*	5	No	FAC
5. *Eleocharis palustris*	5	No	OBL
6. *Epilobium angustifolium*	2	No	FACU
7. *Juncus balticus*	2	No	FACW
8. *Agrostis gigantea*	5	No	FAC
9. *Grindelia squarrosa*	5	No	FACU
10. *Lemna minor*	3	No	OBL
11.			
	87 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 13

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)
Prevalence Index = B/A = ____	

Hydrophytic Vegetation Indicators:

x 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vacular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA012_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric soil assumed present based on dominance of hydrophytic vegetation and inundation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): 0.5

Water Table Present? Yes X No ___ Depth (inches): 0

Saturation Present? Yes X No ___ Depth (inches): 0

(includes capillary fringe)

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA013_dp01

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Lake fringe Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR E Lat: 45.0043988688 Long: -110.700551401 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Fringe of Slide Lake.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Schoenoplectus tabernaemontani*	70	Yes	OBL
2. *Typha latifolia*	3	No	OBL
3. *Carex utriculata*	5	No	OBL
4. *Agrostis gigantea*	5	No	FAC
5. *Scirpus americanus*	5	No	OBL
6.			
7.			
8.			
9.			
10.			
11.			
	88 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 12

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA013_dp01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-4	10YR 2/1						Loamy/Clayey	organic material
4-12	N 3/		10YR 3/6	2	C	M	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes X	No ___	Depth (inches): 2		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA013_dp02

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0043912955 Long: -110.700586054 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Concave depression fringe of lake.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Juncus balticus*	5	No	FACW
2. *Schoenoplectus tabernaemontani*	10	No	OBL
3. *Helianthus nuttallii*	5	No	FACW
4. *Solidago gigantea*	5	No	FACW
5. *Agrostis gigantea*	35	Yes	FAC
6. *Glycyrrhiza lepidota*	5	No	FAC
7. *Carex utriculata*	35	Yes	OBL
8.			
9.			
10.			
11.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)
Prevalence Index = B/A = ____	

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA013_dp02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 3/1	100					Loamy/Clayey	
1-12	2.5YR 4/1	93	10YR 4/4	7	C	PL	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- X Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- X Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ? Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes X	No ___	Depth (inches): 10		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA013_upland

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Lake Local relief (concave, convex, none): convex Slope (%): 1

Subregion (LRR): LRR E Lat: 45.004354392 Long: -110.700643933 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Edge of wetlands along Slide Lake - mesic and higher ground.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Agrostis gigantea*	35	Yes	FAC
2. *Phleum pratense*	10	No	FAC
3. *Juncus balticus*	10	No	FACW
4. *Carex utriculata*	15	Yes	OBL
5. *Helianthus nuttallii*	5	No	FACW
6. *Potentilla anserina*	15	Yes	OBL
7. *Cicuta maculata*	5	No	OBL
8.			
9.			
10.			
11.			
	95 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA013_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100						organic material
6-20	10YR 3/2	90	2.5Y 4/1	10	D	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes ___	No X	Depth (inches): ___		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 8	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
Saturation at 8" but no water table.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/4/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA014_dp

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0043070 Long: -110.7059120 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetland depression along hillside.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Carex utriculata*	45	Yes	OBL
2. *Cicuta maculata*	5	No	OBL
3. *Phleum pratense*	10	No	FAC
4. *Juncus balticus*	10	No	FACW
5. *Agrostis gigantea*	5	No	FAC
6. *Poa compressa*	5	No	FACU
7. *Iris missouriensis*	5	No	FACW
8.			
9.			
10.			
11.			
	85 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		
% Bare Ground in Herb Stratum 15			

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA014_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-8	10YR 2/1	100					Loamy/Clayey	
8-12	10YR 2/1	90	10YR 4/2	10	D	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Difficult to see redoximorphic features in dark soil, likely increase in depletions below 12 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes X	No ___	Depth (inches): 0		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/4/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA014_upland

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0042461 Long: -110.7058343 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Rosa acicularis*	15	Yes	FACU
2.			
3.			
4.			
5.			
	15 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Phleum pratense*	40	Yes	FAC
2. *Achillea millefolium*	5	No	FACU
3. *Vulpia octoflora*	15	Yes	UPL
4. *Juncus balticus*	5	No	FACW
5. *Eriogonum heracleoides*	5	No	UPL
6.			
7.			
8.			
9.			
10.			
11.			
	70 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 30

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA014_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Dig not dig due to dominance of upland vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA015_dp

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Swale Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0037301118 Long: -110.700963658 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Agrostis gigantea*	50	Yes	FAC
2. *Phleum pratense*	10	No	FAC
3. *Juncus balticus*	10	No	FACW
4. *Carex bebbii*	3	No	OBL
5. *Equisetum arvense*	20	Yes	FAC
6. *Carex microptera*	10	No	FACU
7.			
8.			
9.			
10.			
11.			
	103 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)
Prevalence Index = B/A = ____	

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vacular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA015_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	N 2.5/	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes X No ___ Depth (inches): ___

Water Table Present? Yes X No ___ Depth (inches): 0

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA015_upland

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 7

Subregion (LRR): LRR E Lat: 45.003759527 Long: -110.701021963 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Juniperus occidentalis*	12	Yes	UPL
2.			
3.			
4.			
5.			
	12 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Vaccinium scoparium*	10	No	FACU
2. *Achillea millefolium*	15	Yes	FACU
3. *Linaria dalmatica*	20	Yes	UPL
4. *Melilotus officinalis*	15	Yes	FACU
5. *Equisetum arvense*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	65 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 35

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA015_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Did not dig due to dominance of upland vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA017_dp

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 54, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): depression Local relief (concave, convex, none): convex Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0032030548 Long: -110.696917465 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology ____ significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetlands within depression/pond.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Eleocharis palustris*	70	Yes	OBL
2. *Hordeum jubatum*	5	No	FAC
3. *Beckmannia syzigachne*	10	No	OBL
4. *Artemisia frigida*	5	No	UPL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vacular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA017_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Soils assumed because of inundation and mainly obligate plant species. Could not dig because within archeological site.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 1		
Water Table Present?	Yes X	No ___	Depth (inches): 0		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/3/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA019_dp01

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Swale Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR E Lat: 45.002277698 Long: -110.706001171 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: R5UBH

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetland swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Salix wolfii*	5	Yes	OBL
2. *Alnus incana*	10	Yes	FACW
3.			
4.			
	15	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Ribes aureum*	3	Yes	FAC
2. *Cornus alba*	10	Yes	FACW
3. *Lonicera utahensis*	2	No	FAC
4.			
5.			
	15	=Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Urtica dioica*	5	No	FAC
2. *Helianthus grosseserratus*	2	No	FAC
3. *Symphyotrichum spathulatum*	7	No	FAC
4. *Solidago gigantea*	7	No	FACW
5. *Juncus balticus*	20	Yes	FACW
6. *Cicuta maculata*	20	Yes	OBL
7. *Agrostis gigantea*	15	Yes	FAC
8. *Equisetum arvense*	5	No	FAC
9. *Poa palustris*	15	Yes	FAC
10.			
11.			
	96	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
		=Total Cover	

% Bare Ground in Herb Stratum 4

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 8 (A)

Total Number of Dominant Species Across All Strata: 8 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vacular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA019_dp01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					Loamy/Clayey	Silty clay loam

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: rock

Depth (inches): 6

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric soil assumed present based on positive presence of hydrophytic vegetation and wetland hydrology. Rock was encountered at 6 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ? Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No x Depth (inches): ___

Water Table Present? Yes ___ No x Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes X No ___ Depth (inches): 6

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA019_dp02

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: Long: -110.705052415 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No (If no, explain in Remarks.)

Are Vegetation N, Soil N, or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No

Are Vegetation N, Soil N, or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No

Hydric Soil Present? Yes X No

Wetland Hydrology Present? Yes X No

Is the Sampled Area within a Wetland? **Yes** X **No**

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	=Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Typha latifolia*	30	Yes	OBL
2. *Typha X glauca*	30	Yes	OBL
3. *Urtica dioica*	5	No	FAC
4. *Cicuta maculata*	3	No	OBL
5. *Agrostis gigantea*	10	No	FAC
6. *Carex utriculata*	15	No	OBL
7. *Phleum pratense*	2	No	FAC
8. *Equisetum arvense*	5	No	FAC
9.			
10.			
11.			
	100 =Total Cover		
Woody Vine Stratum (Plot size:)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)

Prevalence Index = B/A =

Hydrophytic Vegetation Indicators:

- 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- 3 - Prevalence Index is ≤3.0[1]
- 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- 5 - Wetland Non-Vacular Plants[1]
- Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No**

Remarks:

SOIL

Sampling Point: GAMA019_dp02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric soil assumed present based on dominance of hydrophytic vegetation and inundation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 1		
Water Table Present?	Yes X	No ___	Depth (inches): 0		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/3/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA019_upland

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 2

Subregion (LRR): LRR E Lat: 45.0023421421 Long: -110.706032159 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Hillslope above wetland swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Juniperus occidentalis*	20	Yes	UPL
2.			
3.			
4.			
	20	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Lonicera utahensis*	5	No	FAC
2. *Symphoricarpos occidentalis*	15	Yes	FAC
3. *Rosa acicularis*	10	Yes	FACU
4. *Rhamnus cathartica*	3	No	UPL
5. *Vaccinium globulare*	2	No	FACU
	35	=Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Lupinus argenteus*	15	Yes	UPL
2. *Medicago sativa*	10	No	UPL
3. *Phleum pratense*	15	Yes	FAC
4. *Poa pratensis*	25	Yes	FAC
5. *Juncus balticus*	5	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
	70	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum 30

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 6 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA019_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-1	10YR 3/2	100						refusal rock cobble

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Rock/cobble

Depth (inches): 1

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Soil could not be sampled below 1 inch due to the presence of rock and cobble.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ? Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

None observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA020_dp

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR E Lat: 45.0025670611 Long: -110.700698954 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PUSC

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Eleocharis palustris*	50	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	50 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 50

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA020_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 2/2	85	10YR 3/6	15	C	PL	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ? Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- X Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- X Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA020_upland

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 5

Subregion (LRR): LRR E Lat: 45.0026347845 Long: -110.700854149 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Terrace above wetland depression.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Hordeum jubatum*	15	No	FAC
2. *Agrostis gigantea*	25	Yes	FAC
3. *Poa pratensis*	25	Yes	FAC
4. *Pascopyrum smithii*	25	Yes	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vacular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA020_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 4/3	95	10YR 5/8	5	C	M	Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ? Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
No indicators met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/1/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA021_dp

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 53 T9S, R8E; Montana Meridia

Landform (hillside, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0023417371 Long: -110.698907125 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Eleocharis palustris*	85	Yes	OBL
2. *Hordeum jubatum*	5	No	FAC
3. *Phleum pratense*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	95 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA021_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- X Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

Hydric soil assumed present based on the dominance of hydrophytic vegetation and wetland hydrology indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA022_upland

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 54, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): depression Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR E Lat: 45.0018504849 Long: -110.693939832 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Depression that is drying out.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Artemisia tridentata*	3	No	UPL
2.			
3.			
4.			
5.			
	3 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Hordeum jubatum*	10	No	FAC
2. *Eleocharis palustris*	75	Yes	OBL
3. *Rumex crispus*	5	No	FAC
4. *Polygonum bistortoides*	3	No	FACW
5. *Festuca idahoensis*	3	No	FACU
6.			
7.			
8.			
9.			
10.			
11.			
	96 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 4

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vacular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA022_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-3	10YR 3/2	100					Loamy/Clayey	
3-10	2.5YR 4/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA027_dp

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 54 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Floodpain terrace Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 44.9979598332 Long: -110.69365652 Datum: NAD83

Soil Map Unit Name: Pesowyo family-Rock outcrop-Kadygulch family, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Gardiner River floodplain.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Schoenoplectus tabernaemontani*	15	No	OBL
2. *Agrostis gigantea*	25	Yes	FAC
3. *Glycyrrhiza lepidota*	10	No	FAC
4. *Helianthus nuttallii*	10	No	FACW
5. *Equisetum hyemale*	3	No	FACW
6. *Calamagrostis canadensis*	30	Yes	FACW
7.			
8.			
9.			
10.			
11.			
	93 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 7

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vacular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA027_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-6	10YR 3/2	100					Loamy/Clayey	
6-20	10YR 3/1	90	7.5YR 5/8	10	C	PL	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- X Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA027_upland

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 54 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Terrace Local relief (concave, convex, none): slightly convex Slope (%): 2

Subregion (LRR): LRR E Lat: 44.9980636153 Long: -110.693693807 Datum: NAD83

Soil Map Unit Name: Pesowyo family-Rock outcrop-Kadygulch family, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland floodplain.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Artemisia tridentata*	5	Yes	UPL
2. *Rosa acicularis*	3	Yes	FACU
3. *Ribes aureum*	3	Yes	FAC
4.			
5.			
	11 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Glycyrrhiza lepidota*	35	Yes	FAC
2. *Agrostis gigantea*	45	Yes	FAC
3. *Apocynum cannabinum*	10	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	90 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 60.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA027_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 3/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
No indicators met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/2/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA030_dp01

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 0

Subregion (LRR): LRR E Lat: 44.9953489457 Long: -110.704079063 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present? Yes X No ____

Hydric Soil Present? Yes X No ____

Wetland Hydrology Present? Yes X No ____

Is the Sampled Area within a Wetland? **Yes** X **No** ____

Remarks:
Wetlands along hillslope.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	=Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Juniperus scopulorum*	5	Yes	UPL
2. *Betula occidentalis*	15	Yes	FACW
3. *Salix bebbiana*	3	No	FACW
4.			
5.			
	23 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Carex utriculata*	70	Yes	OBL
2. *Agrostis gigantea*	15	No	FAC
3. *Epilobium ciliatum*	5	No	FACW
4. *Helianthus nuttallii*	5	No	FACW
5. *Equisetum hyemale*	2	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
	97 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	=Total Cover		

% Bare Ground in Herb Stratum 3

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 66.7% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species	x 1 =
FACW species	x 2 =
FAC species	x 3 =
FACU species	x 4 =
UPL species	x 5 =
Column Totals: (A)	(B)
Prevalence Index = B/A =	

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

X 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA030_dp01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- X Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- X Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes ___	No X	Depth (inches): ___		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/3/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA030_dp02

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 44.9957745 Long: -110.7052165 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
wet seep/ swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft)			
1. *Erythranthe guttata*	20	Yes	OBL
2. *Agrostis gigantea*	15	Yes	FAC
3. *Phleum pratense*	10	No	FAC
4. *Carex nebrascensis*	20	Yes	OBL
5. *Epilobium ciliatum*	5	No	FACW
6. *Nasturtium officinale*	10	No	OBL
7. *Carex microptera*	10	No	FACU
8. *Juncus balticus*	5	No	FACW
9. *Equisetum hyemale*	3	No	FACW
10. *Trifolium hybridum*	5	No	FAC
11.			
	103 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)
Prevalence Index = B/A = ____	

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vacular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA030_dp02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:
Soils assumed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- X Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes X	No ___	Depth (inches): 1
Water Table Present?	Yes X	No ___	Depth (inches): 0
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/2/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA030_upland01

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 1

Subregion (LRR): LRR E Lat: 44.9953269013 Long: -110.704050092 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Uplands adjacent to wet seep.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Juniperus scopulorum*	10	Yes	UPL
2. *Betula occidentalis*	10	Yes	FACW
3.			
4.			
5.			
	20 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Solidago canadensis*	15	No	FACU
2. *Helianthus nuttallii*	15	No	FACW
3. *Bromus inermis*	20	Yes	UPL
4. *Glycyrrhiza lepidota*	30	Yes	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA030_upland01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1						Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Park Sampling Date: 8/3/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA030_upland02

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB53, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): wet seep/swale Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 44.995775 Long: -110.705220 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Bromus inermis*	20	Yes	UPL
2. *Helianthus nuttalli*	15	No	FACW
3. *Solidago canadensis*	15	No	UPL
4. *Glycyrrhiza lepidota*	30	Yes	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	80 =Total Cover		
Woody Vine Stratum (Plot size: 30 ft.)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 20

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vacular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA030_upland02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No soils assumed due to upland vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/1/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA031_dp

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 54 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Slope swale Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR E Lat: 44.9949769508 Long: -110.696624912 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
Wetland in swale.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Carex utriculata*	100	Yes	OBL
2.			
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	100 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: ____ (A)

Total Number of Dominant Species Across All Strata: ____ (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: ____ (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

X 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA031_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/1	95	10YR 3/3	5	C	M	Loamy/Clayey	Distinct redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ? Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- X High Water Table (A2)
- X Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___		
Water Table Present?	Yes X	No ___	Depth (inches): 0		
Saturation Present? (includes capillary fringe)	Yes X	No ___	Depth (inches): 0	**Wetland Hydrology Present?**	**Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/1/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA031_upland

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 54 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 44.9949400158 Long: -110.696615831 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Uplands adjacent to wetland swale

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Artemisia tridentata*	15	Yes	UPL
2. *Ericameria nauseosa*	5	Yes	UPL
3.			
4.			
5.			
	20 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Phleum pratense*	30	Yes	FAC
2. *Poa pratensis*	30	Yes	FAC
3. *Pascopyrum smithii*	10	No	FACU
4. *Cirsium arvense*	5	No	FAC
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	75 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 25

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA031_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Did not dig due to lack of hydrology and vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/2/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA035_upland

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: Section 19 T58N, 114W; 6th PM

Landform (hillside, terrace, etc.): hillside Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 44.9880982802 Long: -110.691225445 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Old oxbow

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Apocynum cannabinum*	5	No	FAC
2. *Glycyrrhiza lepidota*	50	Yes	FAC
3. *Equisetum hyemale*	5	No	FACW
4. *Poa compressa*	20	Yes	FACU
5. *Juncus balticus*	15	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
	95 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA035_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 3/3	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
No indicator met.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/2/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMAupland10

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: Section 19 T58N, 114W; 6th PM

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR E Lat: 44.9868054091 Long: -110.700009618 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland depression from road runoff.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Elymus lanceolatus*	35	Yes	FACU
2. *Poa compressa*	30	Yes	FACU
3. *Bromus inermis*	15	No	UPL
4. *Achillea millefolium*	5	No	FACU
5. *Artemisia frigida*	5	No	UPL
6.			
7.			
8.			
9.			
10.			
11.			
	90 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 10

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMAupland10

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-12	10YR 2/2	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: ___

Depth (inches): ___

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
No redox features observed.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/3/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA037_dp

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: Section 25 T57N, 115W; 6th PM

Landform (hillside, terrace, etc.): Depression Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 44.8920046707 Long: -110.740651107 Datum: NAD83

Soil Map Unit Name: Shook, Sawpit and Kegsprings families, soils NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes X	No ____	**Is the Sampled Area within a Wetland?** **Yes** X **No** ____
Hydric Soil Present?	Yes X	No ____	
Wetland Hydrology Present?	Yes X	No ____	

Remarks:
In large wet meadow/seep complex.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Salix wolfii*	15	Yes	OBL
2. *Dasiphora fruticosa*	5	Yes	FAC
3.			
4.			
5.			
	20 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Carex aquatilis*	85	Yes	OBL
2. *Geum aleppicum*	5	No	FACW
3. *Symphyotrichum spathulatum*	5	No	FAC
4. *Phleum pratense*	5	No	FAC
5. *Equisetum hyemale*	2	No	FACW
6.			
7.			
8.			
9.			
10.			
11.			
	102 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 0

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 3 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 100.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

- ____ 1 - Rapid Test for Hydrophytic Vegetation
- X 2 - Dominance Test is >50%
- ____ 3 - Prevalence Index is ≤3.0[1]
- ____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)
- ____ 5 - Wetland Non-Vacular Plants[1]
- ____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** X **No** ____

Remarks:

SOIL

Sampling Point: GAMA037_dp

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth	Matrix		Redox Features					
(inches)	Color (moist)	%	Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks
0-20	10YR 2/1	90	7.5YR 4/6	10	C	PL	Loamy/Clayey	Prominent redox concentrations

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- X Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ? Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** X **No** ___

Remarks:

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- X Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- X Saturation Visible on Aerial Imagery (C9)
- X Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- X FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** X **No** ___

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/3/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMA037_upland

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: Section 25 T57N, 115W; 6th PM

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 1

Subregion (LRR): LRR E Lat: 44.891979 Long: -110.740610 Datum: NAD83

Soil Map Unit Name: Shook, Sawpit and Kegsprings families, soils NWI classification: PEM1C

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Hillslope above wetland complex.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Ericameria nauseosa*	20	Yes	UPL
2. *Artemisia tridentata*	50	Yes	UPL
3. *Dasiphora fruticosa*	10	No	FAC
4.			
5.			
	80	=Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Phleum pratense*	10	Yes	FAC
2. *Equisetum hyemale*	5	No	FACW
3. *Trifolium pratense*	5	No	FACU
4. *Bromus inermis*	10	Yes	UPL
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	30	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum 70

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMA037_upland

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	Matrix %	Redox Features Color (moist)	Redox Features %	Type[1]	Loc[2]	Texture	Remarks
0-2	10YR 3/1	100					Loamy/Clayey	

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: Cobble/gravel

Depth (inches): 2

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Gravel cobble, refusal below 2 inches.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ? Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/3/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMAupland01

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: Section 8 T9S, R8E; 6th PM

Landform (hillside, terrace, etc.): terrace Local relief (concave, convex, none): slightly convex Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0599180325 Long: -110.774027349 Datum: NAD83

Soil Map Unit Name: Haugan-Swiftcreek-Bitton families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Ericameria nauseosa*	15	Yes	UPL
2.			
3.			
4.			
5.			
	15 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Agropyron cristatum*	30	Yes	UPL
2. *Opuntia polyacantha*	10	Yes	UPL
3.			
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	40 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 60

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMAupland01

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Soil not sampled due to dominance of upland vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
None observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/3/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMAupland02

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: Section 8 T9S, R8E; 6th PM

Landform (hillside, terrace, etc.): upland swale Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.060252463 Long: -110.773314825 Datum: NAD83

Soil Map Unit Name: Haugan-Swiftcreek-Bitton families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Old ditch line.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Agropyron cristatum*	45	Yes	UPL
2. *Opuntia polyacantha*	10	No	UPL
3. *Pascopyrum smithii*	5	No	FACU
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 40

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 1 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)
Prevalence Index = B/A = ____	

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMAupland02

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Soil not sampled due to dominance of upland vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
none observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/3/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMAupland03

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: Protracted Block 44 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): Upland slope Local relief (concave, convex, none): concave Slope (%): 1

Subregion (LRR): LRR E Lat: 45.018473236 Long: -110.700096495 Datum: NAD83

Soil Map Unit Name: Haugan-Swiftcreek-Bitton families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Upland along blue line.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Pascopyrum smithii*	30	Yes	FACU
2. *Bromus tectorum*	15	Yes	UPL
3. *Bromus arvensis*	15	Yes	UPL
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	60 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 40

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

___ 1 - Rapid Test for Hydrophytic Vegetation

___ 2 - Dominance Test is >50%

___ 3 - Prevalence Index is ≤3.0[1]

___ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

___ 5 - Wetland Non-Vacular Plants[1]

___ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMAupland03

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Did not dig because of upland vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
No indicators observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/1/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMAupland04

Investigator(s): Moneka Worah, Isabel Mansour Section, Township, Range: PB 53, T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): swale Local relief (concave, convex, none): concave Slope (%): 2

Subregion (LRR): LRR E Lat: 45.0113429331 Long: -110.700117341 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Rosa acicularis*	5	Yes	FACU
2.			
3.			
4.			
5.			
	5 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Juncus balticus*	35	Yes	FACW
2. *Pascopyrum smithii*	20	Yes	FACU
3. *Phleum pratense*	10	No	FAC
4. *Chenopodium album*	5	No	FACU
5. *Poa pratensis*	5	No	FAC
6.			
7.			
8.			
9.			
10.			
11.			
	75 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 25

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 33.3% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMAupland04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Did not dig for soil.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No X Depth (inches): ___

Water Table Present? Yes ___ No X Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No X Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
None observed

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/2/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMAupland05

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: Section 30 T58N, R114W; 6th PM

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 1

Subregion (LRR): LRR E Lat: 44.9838305667 Long: -110.69049098 Datum: NAD83

Soil Map Unit Name: Haugan-Swiftcreek-Bitton families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: ____)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: ____)			
1.			
2.			
3.			
4.			
5.			
	____ =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Helianthus annuus*	5	No	FACU
2. *Convolvulus arvensis*	10	No	UPL
3. *Grindelia squarrosa*	30	Yes	FACU
4. *Bromus tectorum*	10	No	UPL
5. *Leymus cinereus*	15	Yes	FAC
6. *Sisymbrium altissimum*	5	No	FACU
7.			
8.			
9.			
10.			
11.			
	75 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 25

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 2 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMAupland05

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
No soil sample taken due to dominance of upland vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
None observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/2/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMAupland06

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: Section 30 T58N, R114W; 6th PM

Landform (hillside, terrace, etc.): Hillslope Local relief (concave, convex, none): convex Slope (%): 1

Subregion (LRR): LRR E Lat: 44.9844283098 Long: -110.701513429 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Pseudotsuga menziesii*	15	Yes	FACU
2.			
3.			
4.			
	15	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Artemisia tridentata*	5	Yes	UPL
2.			
3.			
4.			
5.			
	5	=Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Bromus inermis*	75	Yes	UPL
2. *Stipa nelsonii*	10	No	UPL
3. *Achillea millefolium*	5	No	FACU
4. *Campanula rotundifolia*	3	No	FACU
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	93	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum 7

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 0 (A)

Total Number of Dominant Species Across All Strata: 3 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 0.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMAupland06

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
No sample taken due to dominance of upland vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
none observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/3/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMAupland07

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: Section 26 T57N, R115W; 6th PM

Landform (hillside, terrace, etc.): slight depression Local relief (concave, convex, none): concave Slope (%): 0

Subregion (LRR): LRR E Lat: 44.8938683758 Long: -110.744222961 Datum: NAD83

Soil Map Unit Name: Shook, Sawpit and Kegsprings families, soils NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No x	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Artemisia tridentata*	5	Yes	UPL
2.			
3.			
4.			
5.			
	5 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Bromus tectorum*	20	Yes	UPL
2. *Poa pratensis*	2	No	FAC
3. *Polygonum aviculare*	5	No	FAC
4. *Phleum pratense*	10	Yes	FAC
5. *Taraxacum officinale*	10	Yes	FACU
6. *Stipa nelsonii*	3	No	UPL
7.			
8.			
9.			
10.			
11.			
	50 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 50

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 25.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMAupland07

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:
Soil not sampled due to dominance of upland vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:
None observed.

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 8/3/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMAupland08

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: Section 26 T57N, R115W; 6th PM

Landform (hillside, terrace, etc.): Terrace Local relief (concave, convex, none): none Slope (%): 0

Subregion (LRR): LRR E Lat: 44.8940891977 Long: -110.744562671 Datum: NAD83

Soil Map Unit Name: Shook, Sawpit and Kegsprings families, soils NWI classification: NA

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:
Uplands adjacent to wetland complex.

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1.			
2.			
3.			
4.			
	____ =Total Cover		
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Ericameria nauseosa*	15	Yes	UPL
2.			
3.			
4.			
5.			
	15 =Total Cover		
Herb Stratum (Plot size: 5 ft.)			
1. *Trifolium pratense*	5	No	FACU
2. *Equisetum hyemale*	5	No	FACW
3. *Cirsium arvense*	15	Yes	FAC
4. *Phleum pratense*	30	Yes	FAC
5. *Equisetum arvense*	10	No	FAC
6. *Potentilla pensylvanica*	15	Yes	FACU
7. *Fragaria virginiana*	5	No	FACU
8. *Achillea millefolium*	10	No	FACU
9.			
10.			
11.			
	95 =Total Cover		
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____ =Total Cover		

% Bare Ground in Herb Stratum 5

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 2 (A)

Total Number of Dominant Species Across All Strata: 4 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 50.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMAupland08

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

No soil sampled due to the dominance of upland vegetation.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present? Yes ___ No ___ Depth (inches): ___

Water Table Present? Yes ___ No ___ Depth (inches): ___

Saturation Present? (includes capillary fringe) Yes ___ No ___ Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

WETLAND DETERMINATION DATA FORM – Western Mountains, Valleys, and Coast Region

Project/Site: Yellowstone National Park North Entrance Road City/County: Gardiner/Park Sampling Date: 7/31/23

Applicant/Owner: National Park Service State: MT Sampling Point: GAMAupland04

Investigator(s): Marie Russo, Jared Watson Section, Township, Range: PB 53 T9S, R8E; Montana Meridian

Landform (hillside, terrace, etc.): hillslope Local relief (concave, convex, none): convex Slope (%): 1

Subregion (LRR): LRR E Lat: 45.0008719165 Long: -110.701959562 Datum: NAD83

Soil Map Unit Name: Lepner-Gladlow-Beartooth families, complex NWI classification: PEM1A

Are climatic / hydrologic conditions on the site typical for this time of year? Yes X No ____ (If no, explain in Remarks.)

Are Vegetation N , Soil N , or Hydrology N significantly disturbed? Are "Normal Circumstances" present? Yes X No ____

Are Vegetation N , Soil N , or Hydrology N naturally problematic? (If needed, explain any answers in Remarks.)

SUMMARY OF FINDINGS – Attach site map showing sampling point locations, transects, important features, etc.

Hydrophytic Vegetation Present?	Yes ____	No X	**Is the Sampled Area within a Wetland?** **Yes** ____ **No** X
Hydric Soil Present?	Yes ____	No X	
Wetland Hydrology Present?	Yes ____	No X	

Remarks:

VEGETATION – Use scientific names of plants.

Tree Stratum (Plot size: 30 ft.)	Absolute % Cover	Dominant Species?	Indicator Status
1. *Populus tremuloides*	5	Yes	FACU
2. *Juniperus occidentalis*	10	Yes	UPL
3.			
4.			
	15	=Total Cover	
Sapling/Shrub Stratum (Plot size: 15 ft.)			
1. *Rhamnus cathartica*	5	Yes	UPL
2. *Symphoricarpos occidentalis*	5	Yes	FAC
3. *Rosa acicularis*	3	No	FACU
4. *Vaccinium scoparium*	3	No	FACU
5. *Prunus virginiana*	3	No	FACU
	19	=Total Cover	
Herb Stratum (Plot size: 5 ft.)			
1. *Bromus inermis*	60	Yes	UPL
2. *Phleum pratense*	10	No	FAC
3. *Cirsium arvense*	5	No	FAC
4.			
5.			
6.			
7.			
8.			
9.			
10.			
11.			
	75	=Total Cover	
Woody Vine Stratum (Plot size: ____)			
1.			
2.			
	____	=Total Cover	

% Bare Ground in Herb Stratum 25

Dominance Test worksheet:

Number of Dominant Species That Are OBL, FACW, or FAC: 1 (A)

Total Number of Dominant Species Across All Strata: 5 (B)

Percent of Dominant Species That Are OBL, FACW, or FAC: 20.0% (A/B)

Prevalence Index worksheet:

Total % Cover of:	Multiply by:
OBL species ____	x 1 = ____
FACW species ____	x 2 = ____
FAC species ____	x 3 = ____
FACU species ____	x 4 = ____
UPL species ____	x 5 = ____
Column Totals: ____ (A)	____ (B)

Prevalence Index = B/A = ____

Hydrophytic Vegetation Indicators:

____ 1 - Rapid Test for Hydrophytic Vegetation

____ 2 - Dominance Test is >50%

____ 3 - Prevalence Index is ≤3.0[1]

____ 4 - Morphological Adaptations[1] (Provide supporting data in Remarks or on a separate sheet)

____ 5 - Wetland Non-Vacular Plants[1]

____ Problematic Hydrophytic Vegetation[1] (Explain)

[1]Indicators of hydric soil and wetland hydrology must be present, unless disturbed or problematic.

Hydrophytic Vegetation Present? **Yes** ____ **No** X

Remarks:

SOIL

Sampling Point: GAMAupland04

Profile Description: (Describe to the depth needed to document the indicator or confirm the absence of indicators.)

Depth (inches)	Matrix Color (moist)	%	Redox Features Color (moist)	%	Type[1]	Loc[2]	Texture	Remarks

[1]Type: C=Concentration, D=Depletion, RM=Reduced Matrix, CS=Covered or Coated Sand Grains. [2]Location: PL=Pore Lining, M=Matrix.

Hydric Soil Indicators: (Applicable to all LRRs, unless otherwise noted.)

- ___ Histosol (A1)
- ___ Histic Epipedon (A2)
- ___ Black Histic (A3)
- ___ Hydrogen Sulfide (A4)
- ___ Depleted Below Dark Surface (A11)
- ___ Thick Dark Surface (A12)
- ___ Sandy Mucky Mineral (S1)
- ___ 2.5 cm Mucky Peat or Peat (S2) **(LRR G)**
- ___ Sandy Gleyed Matrix (S4)
- ___ Sandy Redox (S5)
- ___ Stripped Matrix (S6)
- ___ Loamy Mucky Mineral (F1) **(except MLRA 1)**
- ___ Loamy Gleyed Matrix (F2)
- ___ Depleted Matrix (F3)
- ___ Redox Dark Surface (F6)
- ___ Depleted Dark Surface (F7)
- ___ Redox Depressions (F8)

Indicators for Problematic Hydric Soils[3]:

- ___ 2 cm Muck (A10)
- ___ Red Parent Material (F21)
- ___ Very Shallow Dark Surface (F22)
- ___ Other (Explain in Remarks)

[3]Indicators of hydrophytic vegetation and wetland hydrology must be present, unless disturbed or problematic.

Restrictive Layer (if observed):

Type: _____

Depth (inches): _____

Hydric Soil Present? **Yes** ___ **No** X

Remarks:

Not sampled due to lack of hydrophytic vegetation and wetland hydrology indicators.

HYDROLOGY

Wetland Hydrology Indicators:

Primary Indicators (minimum of one is required; check all that apply)

- ___ Surface Water (A1)
- ___ High Water Table (A2)
- ___ Saturation (A3)
- ___ Water Marks (B1)
- ___ Sediment Deposits (B2)
- ___ Drift Deposits (B3)
- ___ Algal Mat or Crust (B4)
- ___ Iron Deposits (B5)
- ___ Surface Soil Cracks (B6)
- ___ Inundation Visible on Aerial Imagery (B7)
- ___ Sparsely Vegetated Concave Surface (B8)
- ___ Water-Stained Leaves (B9) (**except MLRA 1, 2, 4A, and 4B**)
- ___ Salt Crust (B11)
- ___ Aquatic Invertebrates (B13)
- ___ Hydrogen Sulfide Odor (C1)
- ___ Oxidized Rhizospheres on Living Roots (C3)
- ___ Presence of Reduced Iron (C4)
- ___ Recent Iron Reduction in Tilled Soils (C6)
- ___ Stunted or Stressed Plants (D1) (**LRR A**)
- ___ Other (Explain in Remarks)

Secondary Indicators (2 or more required)

- ___ Water-Stained Leaves (B9) (**MLRA 1, 2 4A, and 4B**)
- ___ Drainage Patterns (B10)
- ___ Dry-Season Water Table (C2)
- ___ Saturation Visible on Aerial Imagery (C9)
- ___ Geomorphic Position (D2)
- ___ Shallow Aquitard (D3)
- ___ FAC-Neutral Test (D5)
- ___ Raised Ant Mounds (D6) (**LRR A**)
- ___ Frost-Heave Hummocks (D7)

Field Observations:

Surface Water Present?	Yes ___	No X	Depth (inches): ___
Water Table Present?	Yes ___	No X	Depth (inches): ___
Saturation Present? (includes capillary fringe)	Yes ___	No X	Depth (inches): ___

Wetland Hydrology Present? **Yes** ___ **No** X

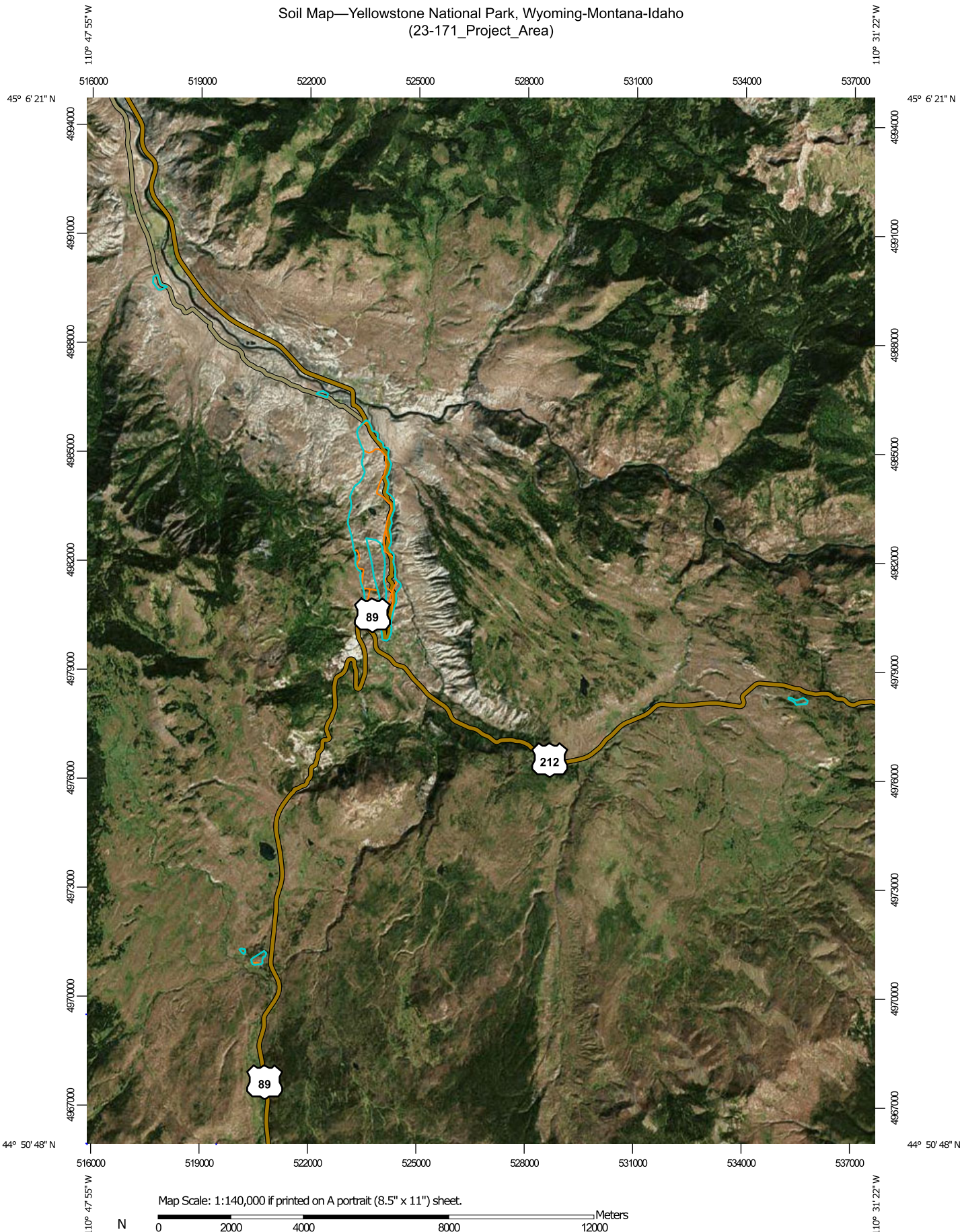
Describe Recorded Data (stream gauge, monitoring well, aerial photos, previous inspections), if available:

Remarks:

None observed.

Appendix D Soils Map

Soil Map—Yellowstone National Park, Wyoming-Montana-Idaho
(23-171_Project_Area)



Map Scale: 1:140,000 if printed on A portrait (8.5" x 11") sheet.

N

Meters
0 2000 4000 8000 12000

Feet
0 5000 10000 20000 30000

Map projection: Web Mercator Corner coordinates: WGS84 Edge tics: UTM Zone 12N WGS84

MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils
- Soil Map Unit Polygons
- Soil Map Unit Lines
- Soil Map Unit Points

Special Point Features
- Blowout
- Borrow Pit
- Clay Spot
- Closed Depression
- Gravel Pit
- Gravelly Spot
- Landfill
- Lava Flow
- Marsh or swamp
- Mine or Quarry
- Miscellaneous Water
- Perennial Water
- Rock Outcrop
- Saline Spot
- Sandy Spot
- Severely Eroded Spot
- Sinkhole
- Slide or Slip
- Sodic Spot
- Spoil Area
- Stony Spot
- Very Stony Spot
- Wet Spot
- Other
- Special Line Features

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:62,500.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL:
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Yellowstone National Park, Wyoming-Montana-Idaho
Survey Area Data: Version 5, Sep 9, 2022

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jan 1, 1999—Dec 31, 2003

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Map Unit Legend

Map Unit Symbol	Map Unit Name	Acres in AOI	Percent of AOI
295F	Pesowyo-Beartooth-Sawbuck families, complex	10.6	0.9%
423Z	Arrowpeak, Midfork families and Lithic Udorthents soils	85.2	7.3%
1267	Como-Ledgefork families-Typic Cryaquepts, complex	0.7	0.1%
1721F	Haugan-Swiftcreek-Bitton families, complex	163.3	13.9%
1795	Kegsprings-Agneston-Quietus families, complex	1.0	0.1%
2216	Shook, Sawpit and Kegsprings families, soils	22.9	2.0%
2751	Midfork, Telcher families, soils and Rock outcrop	0.4	0.0%
2924	Hobacker-Libeg-Greyback families, complex	42.7	3.6%
2996	Shook-Badwater-Passcreek families, complex	67.3	5.7%
5217F	Pesowyo family-Rock outcrop-Kadygulch family, complex	84.1	7.2%
7172F	Lepner-Gladlow-Beartooth families, complex	692.6	59.1%
8261	Kangas, Ledgefork families and Typic Cryaquolls, soils	1.9	0.2%
Totals for Area of Interest		**1,172.7**	**100.0%**

Appendix E Montana Wetland Assessment Data Forms

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project Name: North Entrance -- Gardiner to Mammoth **2. MDT Project #:** _____ **Control #:** _____

3. Evaluation Date: Mo. 8 Day 31 Yr. 23 **4. Evaluator(s):** Moneka Worah **5. Wetlands/Site #(s):** Depressional wetlands

6. Wetland Location(s): i. Legal: T 9S N or S; R 8E E or W; S PB 43, 44, 53, 54 ; T ____ N or S; R ____ E or W; S _____ ;
ii. Approx. Stationing or Mileposts: _____

iii. Watershed: __ __ __ __ __ __ __ __ **Watershed Name, County:** _____

7. a. **Evaluating Agency:** _____;
b. **Purpose of Evaluation:**
1. X Wetlands potentially affected by MDT project
2. ____ Mitigation wetlands; pre-construction
3. ____ Mitigation wetlands; post-construction
4. ____ Other _____

8. Wetland size: (total acres) _____ (visually estimated)
2.185 (measured, e.g. by GPS [if applies])

9. Assessment area (AA): (acres, see instructions on determining AA) _____ (visually estimated)
_____ (measured, e.g. by GPS [if applies])

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
LF	EM		PP	100

Abbreviations: (*see manual for definitions*)

HGM Classes: Riverine (**R**), Depressional (**D**), Slope (**S**), Mineral Soil Flats (**MSF**), Organic Soil Flats (**OSF**), Lacustrine Fringe (**LF**);

Cowardin Classes: Rock Bottom (**RB**), Unconsolidated bottom (**UB**), Aquatic Bed (**AB**), Unconsolidated Shore (**US**), Moss-lichen Wetland (**ML**), Emergent Wetland (**EM**), Scrub-Shrub Wetland (**SS**), Forested Wetland (**FO**)

Modifiers: Excavated (**E**), Impounded (**I**), Diked (**D**), Partly Drained (**PD**), Farmed (**F**), Artificial (**A**)

Water Regimes: Permanent / Perennial (**PP**), Seasonal / Intermittent (**SI**), Temporary / Ephemeral (**TE**)

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)

(Circle one) Unknown Rare Common Abundant

12. General condition of AA:

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) AA*		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is ≤15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is ≤15%.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	moderate disturbance	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc.):

ii. Prominent noxious, aquatic nuisance, & other exotic vegetation species:

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: wetlands in small ponds in project area.

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	**Initial Rating**	**Is current management preventing (passive) existence of additional vegetated classes?**		**Modified Rating**
≥3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	←NO	YES→	L
1 class, monoculture (1 species comprises ≥90% of total cover)	L	NA	NA	NA

Comments:

SECTION PERTAINING to FUNCTIONS & VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	D S	_____
Secondary habitat (**list species**)	D S	_____
Incidental habitat (**list species**)	D (S)	Grizzly bear
No usable habitat	S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8M	.7M	.3L	(.1L)	0L

Sources for documented use (e.g. observations, records, etc):

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	D S	_____
Secondary habitat (**list species**)	D (S)	Western toad, other species
Incidental habitat (**list species**)	D S	_____
No usable habitat	S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	(.5M)	.2L	.1L	0L

Sources for documented use (e.g. observations, records, etc.):

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (circle substantial, moderate, or low based on supporting evidence):

Substantial (based on any of the following [check]):
- X observations of abundant wildlife #s or high species diversity (during any period)
- X abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- __ presence of extremely limiting habitat features not available in the surrounding area
- __ interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):
- __ few or no wildlife observations during peak use periods
- __ little to no wildlife sign
- __ sparse adjacent upland food sources
- __ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):
- __ observations of scattered wildlife groups or individuals or relatively few species during peak periods
- __ common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- __ adequate adjacent upland food sources
- __ interviews with local biologists with knowledge of the AA

ii. Wildlife habitat features (Working from top to bottom, circle appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms])

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	(E)	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	(.9H)	.7M	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments:

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then circle **NA** here and proceed to 14E.)

Type of Fishery: Cold Water (**CW**)____ Warm Water (**WW**)____ **Use the CW or WW guidelines in the user manual to complete the matrix**

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [circle] the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)

*a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity **or** is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support, **or** do aquatic nuisance plant or animal species (see **Appendix E**) occur in fish habitat?* **Y N** *If yes, reduce score in **i** above by 0.1:*_____

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? **Y N** *If yes, add 0.1 to the adjusted score in **i** or **iia** above:*_____

iii. Final Score and Rating: _____ **Comments:**

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, circle **NA** here and proceed to 14F.)

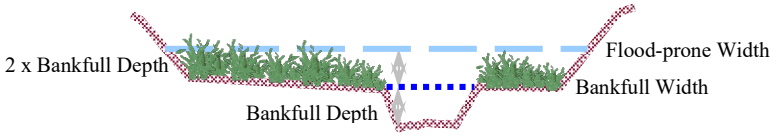
i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

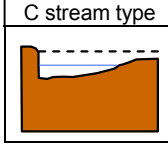
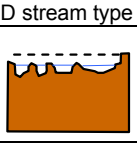
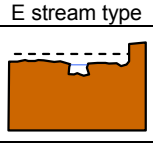
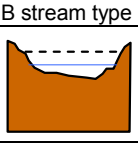
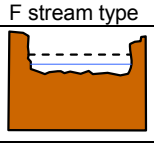
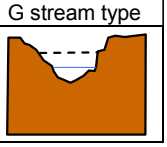
Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Entrenchment ratio (ER) estimation – see User's Manual for additional guidance. Entrenchment ratio = (flood-prone width)/(bankfull width)
Flood-prone width = estimated horizontal projection of where 2 x maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____

Flood-prone width / *Bankfull width* = *Entrenchment ratio (ER)*



Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (circle)? **Y N** **Comments:**

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, circle **NA** here and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ **5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, circle **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments:

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, circle **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments:

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [circle])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

ii. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14I.i.); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P, S/I, and T/E are as previously defined, and A = "absent" [see instructions for further definitions of these terms].)

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1H	.7M	.8H	.5M	.6M	.4M	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.5M	.5M	.3L	.3L	.2L
T/E/ A	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).
a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** **N** *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:*_____

iv. Final Score and Rating: 0.7 **Comments:**

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

____ The AA is a slope wetland
__X__ Springs or seeps are known or observed
____ Vegetation growing during dormant season/drought
____ Wetland occurs at the toe of a natural slope
____ Seeps are present at the wetland edge
____ AA permanently flooded during drought periods
__X__ Wetland contains an outlet, but no inlet
____ Shallow water table and the site is saturated to the surface
____ Other:_____

ii. Recharge Indicators

____ Permeable substrate present without underlying impeding layer
____ Wetland contains inlet but no outlet
____ Stream is a known 'losing' stream; discharge volume decreases
____ Other:_____

iii. Rating (use the information from i and ii above and the table below to arrive at [circle] the functional points and rating)

Criteria	**Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM***			
	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information	N/A			

Comments:

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7M	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (circle) **Y** **N** (if 'Yes' continue with the evaluation; if 'No' then circle **NA** here and proceed to the overall summary and rating page)

ii. Check categories that apply to the AA: ___ Educational/scientific study; ___ Consumptive rec.; ___ Non-consumptive rec.; ___Other

iii. Rating (use the matrix below to arrive at [circle] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S):_____

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0.1	1		
B. MT Natural Heritage Program Species Habitat	M	0.5	1		
C. General Wildlife Habitat	H	0.9	1		
D. General Fish Habitat	NA				
E. Flood Attenuation	NA				
F. Short and Long Term Surface Water Storage	M	0.7	1		
G. Sediment/Nutrient/Toxicant Removal	NA				
H. Sediment/Shoreline Stabilization	H	1	1		
I. Production Export/Food Chain Support	M	0.7	1		
J. Groundwater Discharge/Recharge	H	1	1		
K. Uniqueness	M	0.5	1		
L. Recreation/Education Potential (bonus points)	H	0.2	NA		
Totals:		5.6	8		
Percent of Possible Score			70 %		

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
___ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
___ Score of 1 functional point for Uniqueness; **or**
___ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
___ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
___ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
_X_ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
___ Score of .9 or 1 functional point for General Fish Habitat; **or**
___ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
___ Score of .9 functional point for Uniqueness; **or**
_X_ Percent of possible score > 65% (round to nearest whole #).

Category III Wetland: (Criteria for Categories I, II, or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; otherwise go to Category III)
___ "Low" rating for Uniqueness; **and**
___ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
___ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA RATING: (circle appropriate category based on the criteria outlined above) **I** **II** **III** **IV**

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project Name: North Entrance – Gardiner to Mammoth **2. MDT Project #:** _____ **Control #:**_____

3. Evaluation Date: Mo. 8 Day 31 Yr. 23 **4. Evaluator(s):** Moneka Worah **5. Wetlands/Site #(s):** Gardner River wetlands and Boiling River

6. Wetland Location(s): i. Legal: T 9S N or S; R 8E E or W; S PB 43, 54 ; T 58N N or S; R 114W E or W; S 19, 30 ;

ii. Approx. Stationing or Mileposts:_____

iii. Watershed: __ __ __ __ __ __ __ __ **Watershed Name, County:** Upper Yellowstone, Park County

7. a. **Evaluating Agency:** NPS ;

b. **Purpose of Evaluation:**

1. X Wetlands potentially affected by MDT project
2. ____ Mitigation wetlands; pre-construction
3. ____ Mitigation wetlands; post-construction
4. ____ Other _____

8. Wetland size: (total acres) _____ (visually estimated)
7.93 (measured, e.g. by GPS [if applies])

9. Assessment area (AA): (acres, see instructions on determining AA) _____ (visually estimated)
_____ (measured, e.g. by GPS [if applies])

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Riverine	PEM		PP	100

Abbreviations: (*see manual for definitions*)

HGM Classes: Riverine (**R**), Depressional (**D**), Slope (**S**), Mineral Soil Flats (**MSF**), Organic Soil Flats (**OSF**), Lacustrine Fringe (**LF**);

Cowardin Classes: Rock Bottom (**RB**), Unconsolidated bottom (**UB**), Aquatic Bed (**AB**), Unconsolidated Shore (**US**), Moss-lichen Wetland (**ML**), Emergent Wetland (**EM**), Scrub-Shrub Wetland (**SS**), Forested Wetland (**FO**)

Modifiers: Excavated (**E**), Impounded (**I**), Diked (**D**), Partly Drained (**PD**), Farmed (**F**), Artificial (**A**)

Water Regimes: Permanent / Perennial (**PP**), Seasonal / Intermittent (**SI**), Temporary / Ephemeral (**TE**)

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)

(Circle one) Unknown Rare Common Abundant

12. General condition of AA:

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) AA*		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is ≤15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is ≤15%.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	moderate disturbance	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc.):
Old road adjacent to some wetlands, but mainly has low disturbance in and around wetlands.

ii. Prominent noxious, aquatic nuisance, & other exotic vegetation species:
Bindweed, knapweed, bull thistle

iii. Provide brief descriptive summary of AA and surrounding land use/habitat:
Wetlands abutting Gardner River in Yellowstone National Park

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	Initial Rating	Is current management preventing (passive) existence of additional vegetated classes?		Modified Rating
≥3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	←NO	YES→	L
1 class, monoculture (1 species comprises ≥90% of total cover)	L	NA	NA	NA

Comments:

SECTION PERTAINING to FUNCTIONS & VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	D S	_____
Secondary habitat (**list species**)	D S	_____
Incidental habitat (**list species**)	D (S)	Grizzly bear
No usable habitat	S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8M	.7M	.3L	(1L)	0L

Sources for documented use (e.g. observations, records, etc):

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	D (S)	Yellowstone cutthroat trout, Western toad
Secondary habitat (**list species**)	D S	_____
Incidental habitat (**list species**)	D S	_____
No usable habitat	S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	(.7M)	.6M	.5M	.2L	.1L	0L

Sources for documented use (e.g. observations, records, etc.):

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (circle substantial, moderate, or low based on supporting evidence):

Substantial (based on any of the following [check]):
__ observations of abundant wildlife #s or high species diversity (during any period)
__ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
__ presence of extremely limiting habitat features not available in the surrounding area
__ interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):
__ few or no wildlife observations during peak use periods
__ little to no wildlife sign
__ sparse adjacent upland food sources
__ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):
X observations of scattered wildlife groups or individuals or relatively few species during peak periods
X common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
__ adequate adjacent upland food sources
__ interviews with local biologists with knowledge of the AA

ii. Wildlife habitat features (Working from top to bottom, circle appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms])

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	(E)	H	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	(.9H)	.7M	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments:

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then circle **NA** here and proceed to 14E.)

Type of Fishery: Cold Water (**CW**)____ Warm Water (**WW**)____ **Use the CW or WW guidelines in the user manual to complete the matrix**

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [circle] the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)

*a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity **or** is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support, **or** do aquatic nuisance plant or animal species (see **Appendix E**) occur in fish habitat?* **Y** (**N**) *If yes, reduce score in **i** above by 0.1:*_____

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? **Y** (**N**) *If yes, add 0.1 to the adjusted score in **i** or **iia** above:*_____

iii. Final Score and Rating: 0.7M **Comments:**

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, circle **NA** here and proceed to 14F.)

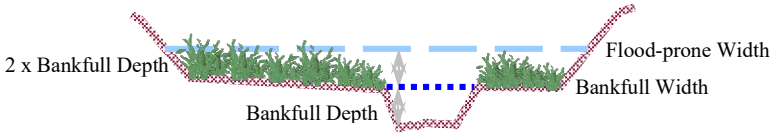
i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

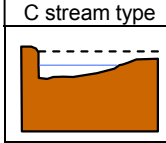
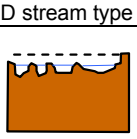
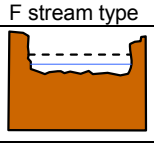
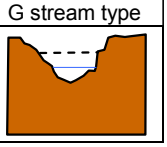
Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	(.3L)	.2L	.1L

Entrenchment ratio (ER) estimation – see User's Manual for additional guidance. Entrenchment ratio = (flood-prone width)/(bankfull width)
Flood-prone width = estimated horizontal projection of where 2 x maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____

Flood-prone width / *Bankfull width* = *Entrenchment ratio (ER)*



Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (circle)? **Y** (**N**) **Comments:**

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, circle **NA** here and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ **5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	(.3L)	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, circle **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments:

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, circle **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments:

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [circle])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

ii. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14I.i.); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P, S/I, and T/E are as previously defined, and A = "absent" [see instructions for further definitions of these terms].)

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1H	.7M	.8H	.5M	.6M	.4M	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.5M	.5M	.3L	.3L	.2L
T/E/ A	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).
a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** **N** *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:* 0.9H

iv. Final Score and Rating: 0.9H **Comments:**

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

____ The AA is a slope wetland
_X_ Springs or seeps are known or observed
____ Vegetation growing during dormant season/drought
_X_ Wetland occurs at the toe of a natural slope
____ Seeps are present at the wetland edge
____ AA permanently flooded during drought periods
____ Wetland contains an outlet, but no inlet
____ Shallow water table and the site is saturated to the surface
____ Other:_____

ii. Recharge Indicators

____ Permeable substrate present without underlying impeding layer
____ Wetland contains inlet but no outlet
____ Stream is a known 'losing' stream; discharge volume decreases
____ Other:_____

iii. Rating (use the information from i and ii above and the table below to arrive at [circle] the functional points and rating)

Criteria	**Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM***			
	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information	N/A			

Comments:

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7M	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (circle) **Y** **N** (if 'Yes' continue with the evaluation; if 'No' then circle **NA** here and proceed to the overall summary and rating page)

ii. Check categories that apply to the AA: _X_ Educational/scientific study; ___ Consumptive rec.; ___ Non-consumptive rec.; ___Other

iii. Rating (use the matrix below to arrive at [circle] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S):_____

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0.1	1		
B. MT Natural Heritage Program Species Habitat	M	0.7	1		
C. General Wildlife Habitat	H	0.9	1		
D. General Fish Habitat	M	0.7	1		
E. Flood Attenuation	M	0.4	1		
F. Short and Long Term Surface Water Storage	L	0.3	1		
G. Sediment/Nutrient/Toxicant Removal	H	0.9	1		
H. Sediment/Shoreline Stabilization	H	0.1	1		
I. Production Export/Food Chain Support	H	0.9	1		
J. Groundwater Discharge/Recharge	M	0.7	1		
K. Uniqueness	L	0.3	1		
L. Recreation/Education Potential (bonus points)	H	0.2	NA		
Totals:		7.1	11		
Percent of Possible Score			64.5 %		

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
___ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
___ Score of 1 functional point for Uniqueness; **or**
___ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
___ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
___ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
_X_ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
___ Score of .9 or 1 functional point for General Fish Habitat; **or**
___ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
___ Score of .9 functional point for Uniqueness; **or**
___ Percent of possible score > 65% (round to nearest whole #).

Category III Wetland: (Criteria for Categories I, II, or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; otherwise go to Category III)
___ "Low" rating for Uniqueness; **and**
___ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
___ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA RATING: (circle appropriate category based on the criteria outlined above) **I** **II** **III** **IV**

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project Name: North Entrance – Gardiner to Mammoth **2. MDT Project #:** _____ **Control #:** _____

3. Evaluation Date: Mo. 8 Day 31 Yr. 23 **4. Evaluator(s):** Moneka Worah **5. Wetlands/Site #(s):** Seep supported wetlands

6. Wetland Location(s): i. Legal: T 9S N or S; R 8E E or W; S PB 44, 53 ; T ____ N or S; R ____ E or W; S _____ ;
ii. Approx. Stationing or Mileposts: _____

iii. Watershed: __ __ __ __ __ __ __ __ **Watershed Name, County:** Upper Yellowstone, Park County

7. a. **Evaluating Agency:** NPS ;
b. **Purpose of Evaluation:**
1. X Wetlands potentially affected by MDT project
2. ____ Mitigation wetlands; pre-construction
3. ____ Mitigation wetlands; post-construction
4. ____ Other _____

8. Wetland size: (total acres) _____ (visually estimated)
3.892 (measured, e.g. by GPS [if applies])

9. Assessment area (AA): (acres, see instructions on determining AA) _____ (visually estimated)
_____ (measured, e.g. by GPS [if applies])

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Slope	PEM		SI	75
Slope	SS		SI	25

Abbreviations: (*see manual for definitions*)

HGM Classes: Riverine (**R**), Depressional (**D**), Slope (**S**), Mineral Soil Flats (**MSF**), Organic Soil Flats (**OSF**), Lacustrine Fringe (**LF**);

Cowardin Classes: Rock Bottom (**RB**), Unconsolidated bottom (**UB**), Aquatic Bed (**AB**), Unconsolidated Shore (**US**), Moss-lichen Wetland (**ML**), Emergent Wetland (**EM**), Scrub-Shrub Wetland (**SS**), Forested Wetland (**FO**)

Modifiers: Excavated (**E**), Impounded (**I**), Diked (**D**), Partly Drained (**PD**), Farmed (**F**), Artificial (**A**)

Water Regimes: Permanent / Perennial (**PP**), Seasonal / Intermittent (**SI**), Temporary / Ephemeral (**TE**)

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)

(Circle one) Unknown Rare Common Abundant

12. General condition of AA:

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) AA*		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is ≤15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is ≤15%.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	moderate disturbance	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc.): road adjacent to wetlands

ii. Prominent noxious, aquatic nuisance, & other exotic vegetation species: dalmatian toadflax

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: wetlands supported by seeps in project area.

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	**Initial Rating**	**Is current management preventing (passive) existence of additional vegetated classes?**		**Modified Rating**
≥3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	←NO	YES→	L
1 class, monoculture (1 species comprises ≥90% of total cover)	L	NA	NA	NA

Comments:

SECTION PERTAINING to FUNCTIONS & VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	D S	_____
Secondary habitat (**list species**)	D S	_____
Incidental habitat (**list species**)	D (S)	Grizzly bear
No usable habitat	S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8M	.7M	.3L	(.1L)	0L

Sources for documented use (e.g. observations, records, etc):

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	D S	_____
Secondary habitat (**list species**)	D (S)	Western toad, other species
Incidental habitat (**list species**)	D S	_____
No usable habitat	S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	(.5M)	.2L	.1L	0L

Sources for documented use (e.g. observations, records, etc.):

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (circle substantial, moderate, or low based on supporting evidence):

Substantial (based on any of the following [check]):
- __ observations of abundant wildlife #s or high species diversity (during any period)
- __ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- __ presence of extremely limiting habitat features not available in the surrounding area
- __ interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):
- __ few or no wildlife observations during peak use periods
- __ little to no wildlife sign
- __ sparse adjacent upland food sources
- __ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):
- X observations of scattered wildlife groups or individuals or relatively few species during peak periods
- X common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- __ adequate adjacent upland food sources
- __ interviews with local biologists with knowledge of the AA

ii. Wildlife habitat features (Working from top to bottom, circle appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms])

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	H	H	M	E	(H)	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	(.7M)	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments:

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then circle **NA** here and proceed to 14E.)

Type of Fishery: Cold Water (**CW**)____ Warm Water (**WW**)____ **Use the CW or WW guidelines in the user manual to complete the matrix**

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [circle] the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)

*a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity **or** is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support, **or** do aquatic nuisance plant or animal species (see **Appendix E**) occur in fish habitat?* **Y N** *If yes, reduce score in **i** above by 0.1:*_____

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? **Y N** *If yes, add 0.1 to the adjusted score in **i** or **iia** above:*_____

iii. Final Score and Rating: _____ **Comments:**

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, circle **NA** here and proceed to 14F.)

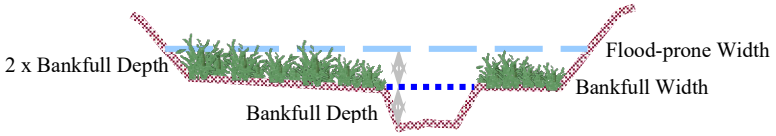
i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

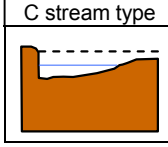
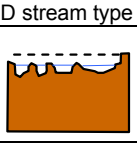
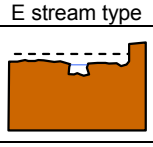
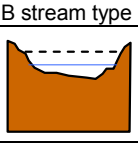
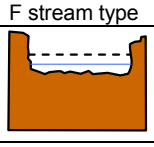
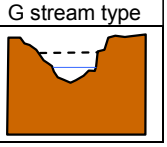
Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Entrenchment ratio (ER) estimation – see User's Manual for additional guidance. Entrenchment ratio = (flood-prone width)/(bankfull width)
Flood-prone width = estimated horizontal projection of where 2 x maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____

Flood-prone width *Bankfull width* *Entrenchment ratio (ER)*



Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (circle)? **Y N** **Comments:**

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, circle **NA** here and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ **5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, circle **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments:

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, circle **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments:

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [circle])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

ii. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14I.i.); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P, S/I, and T/E are as previously defined, and A = "absent" [see instructions for further definitions of these terms].)

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1H	.7M	.8H	.5M	.6M	.4M	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.5M	.5M	.3L	.3L	.2L
T/E/ A	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).
a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** **N** *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:*_____

iv. Final Score and Rating: 0.7M **Comments:**

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

- X The AA is a slope wetland
- X Springs or seeps are known or observed
- ____ Vegetation growing during dormant season/drought
- ____ Wetland occurs at the toe of a natural slope
- X Seeps are present at the wetland edge
- ____ AA permanently flooded during drought periods
- ____ Wetland contains an outlet, but no inlet
- ____ Shallow water table and the site is saturated to the surface
- ____ Other:_____

ii. Recharge Indicators

- ____ Permeable substrate present without underlying impeding layer
- ____ Wetland contains inlet but no outlet
- ____ Stream is a known 'losing' stream; discharge volume decreases
- ____ Other:_____

iii. Rating (use the information from i and ii above and the table below to arrive at [circle] the functional points and rating)

Criteria	**Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM***			
	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information	N/A			

Comments:

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7M	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (circle) **Y** **N** (if 'Yes' continue with the evaluation; if 'No' then circle **NA** here and proceed to the overall summary and rating page)

ii. Check categories that apply to the AA: _X_ Educational/scientific study; ___ Consumptive rec.; ___ Non-consumptive rec.; ___Other

iii. Rating (use the matrix below to arrive at [circle] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S):_____

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0.1	1		
B. MT Natural Heritage Program Species Habitat	M	0.5	1		
C. General Wildlife Habitat	M	0.7	1		
D. General Fish Habitat	NA				
E. Flood Attenuation	NA				
F. Short and Long Term Surface Water Storage	L	0.2	1		
G. Sediment/Nutrient/Toxicant Removal	NA				
H. Sediment/Shoreline Stabilization	NA				
I. Production Export/Food Chain Support	M	0.7	1		
J. Groundwater Discharge/Recharge	M	0.7	1		
K. Uniqueness	M	0.5	1		
L. Recreation/Education Potential (bonus points)	H	0.2	NA		
Totals:		3.6	7		
Percent of Possible Score			51 %		

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
___ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
___ Score of 1 functional point for Uniqueness; **or**
___ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
___ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
___ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
___ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
___ Score of .9 or 1 functional point for General Fish Habitat; **or**
___ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
___ Score of .9 functional point for Uniqueness; **or**
___ Percent of possible score > 65% (round to nearest whole #).

Category III Wetland: (Criteria for Categories I, II, or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; otherwise go to Category III)
___ "Low" rating for Uniqueness; **and**
___ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
___ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA RATING: (circle appropriate category based on the criteria outlined above) **I** **II** **III** **IV**

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project Name: North Entrance – Gardiner to Mammoth **2. MDT Project #:** _____ **Control #:** _____

3. Evaluation Date: Mo. 8 Day 31 Yr. 23 **4. Evaluator(s):** Moneka Worah **5. Wetlands/Site #(s):** Slide Lake and Unnamed Lake

6. Wetland Location(s): i. Legal: T 9S N or S; R 8E E or W; S PB 53, 54 ; T ____ N or S; R ____ E or W; S _____ ;
ii. Approx. Stationing or Mileposts: _____

iii. Watershed: __ __ __ __ __ __ __ __ **Watershed Name, County:** Upper Yellowstone, Park County

7. a. **Evaluating Agency:** NPS ;
b. **Purpose of Evaluation:**
1. X Wetlands potentially affected by MDT project
2. ____ Mitigation wetlands; pre-construction
3. ____ Mitigation wetlands; post-construction
4. ____ Other _____

8. Wetland size: (total acres) _____ (visually estimated)
1.842 (measured, e.g. by GPS [if applies])

9. Assessment area (AA): (acres, see instructions on determining AA) _____ (visually estimated)
_____ (measured, e.g. by GPS [if applies])

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Riverine	PEM		PP	100

Abbreviations: (*see manual for definitions*)

HGM Classes: Riverine (**R**), Depressional (**D**), Slope (**S**), Mineral Soil Flats (**MSF**), Organic Soil Flats (**OSF**), Lacustrine Fringe (**LF**);

Cowardin Classes: Rock Bottom (**RB**), Unconsolidated bottom (**UB**), Aquatic Bed (**AB**), Unconsolidated Shore (**US**), Moss-lichen Wetland (**ML**), Emergent Wetland (**EM**), Scrub-Shrub Wetland (**SS**), Forested Wetland (**FO**)

Modifiers: Excavated (**E**), Impounded (**I**), Diked (**D**), Partly Drained (**PD**), Farmed (**F**), Artificial (**A**)

Water Regimes: Permanent / Perennial (**PP**), Seasonal / Intermittent (**SI**), Temporary / Ephemeral (**TE**)

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)

(Circle one) Unknown Rare Common Abundant

12. General condition of AA:

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) AA*		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is ≤15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is ≤15%.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	moderate disturbance	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc.): Road adjacent to wetland at unnamed lake

ii. Prominent noxious, aquatic nuisance, & other exotic vegetation species: Dalmation toadflax

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: Wetlands abutting Slide Lake and unnamed lake

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	**Initial Rating**	**Is current management preventing (passive) existence of additional vegetated classes?**		**Modified Rating**
≥3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	←NO	YES→	L
1 class, monoculture (1 species comprises ≥90% of total cover)	L	NA	NA	NA

Comments:

SECTION PERTAINING to FUNCTIONS & VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	D S	_____
Secondary habitat (**list species**)	D S	_____
Incidental habitat (**list species**)	D (S)	Grizzly bear
No usable habitat	S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8M	.7M	.3L	(.1L)	0L

Sources for documented use (e.g. observations, records, etc):

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	D S	_____
Secondary habitat (**list species**)	D (S)	Western toad, other species
Incidental habitat (**list species**)	D S	_____
No usable habitat	S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	(.5M)	.2L	.1L	0L

Sources for documented use (e.g. observations, records, etc.):

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (circle substantial, moderate, or low based on supporting evidence):

Substantial (based on any of the following [check]):
- __ observations of abundant wildlife #s or high species diversity (during any period)
- __ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- __ presence of extremely limiting habitat features not available in the surrounding area
- __ interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):
- __ few or no wildlife observations during peak use periods
- __ little to no wildlife sign
- __ sparse adjacent upland food sources
- __ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):
- X observations of scattered wildlife groups or individuals or relatively few species during peak periods
- X common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- __ adequate adjacent upland food sources
- __ interviews with local biologists with knowledge of the AA

ii. Wildlife habitat features (Working from top to bottom, circle appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms])

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	(H)	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	(.7M)	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments:

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then circle **NA** here and proceed to 14E.)

Type of Fishery: Cold Water (**CW**)____ Warm Water (**WW**)____ **Use the CW or WW guidelines in the user manual to complete the matrix**

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [circle] the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)

*a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity **or** is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support, **or** do aquatic nuisance plant or animal species (see **Appendix E**) occur in fish habitat?* **Y N** *If yes, reduce score in **i** above by 0.1:*_____

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? **Y N** *If yes, add 0.1 to the adjusted score in **i** or **iia** above:*_____

iii. Final Score and Rating: _____ **Comments:**

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, circle **NA** here and proceed to 14F.)

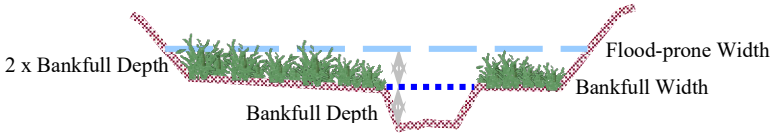
i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

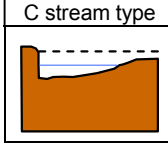
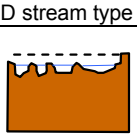
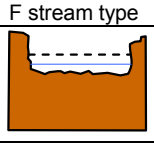
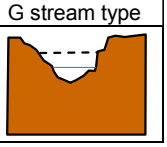
Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Entrenchment ratio (ER) estimation – see User's Manual for additional guidance. Entrenchment ratio = (flood-prone width)/(bankfull width)
Flood-prone width = estimated horizontal projection of where 2 x maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____

Flood-prone width *Bankfull width* *Entrenchment ratio (ER)*



Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (circle)? **Y N** **Comments:**

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, circle **NA** here and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ **5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, circle **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments:

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, circle **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments:

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [circle])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

ii. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14I.i.); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P, S/I, and T/E are as previously defined, and A = "absent" [see instructions for further definitions of these terms].)

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1H	.7M	.8H	.5M	.6M	.4M	.9H	.6M	7M	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.5M	.5M	.3L	.3L	.2L
T/E/ A	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).
a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** **N** *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:*_____

iv. Final Score and Rating: 0.8H **Comments:**

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

____ The AA is a slope wetland
X Springs or seeps are known or observed
____ Vegetation growing during dormant season/drought
____ Wetland occurs at the toe of a natural slope
____ Seeps are present at the wetland edge
____ AA permanently flooded during drought periods
____ Wetland contains an outlet, but no inlet
____ Shallow water table and the site is saturated to the surface
____ Other:_____

ii. Recharge Indicators

____ Permeable substrate present without underlying impeding layer
____ Wetland contains inlet but no outlet
____ Stream is a known 'losing' stream; discharge volume decreases
____ Other:_____

iii. Rating (use the information from i and ii above and the table below to arrive at [circle] the functional points and rating)

Criteria	**Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM***			
	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information	N/A			

Comments:

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7M	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (circle) **Y N** (if 'Yes' continue with the evaluation; if 'No' then circle **NA** here and proceed to the overall summary and rating page)

ii. Check categories that apply to the AA: X Educational/scientific study; ___ Consumptive rec.; ___ Non-consumptive rec.; ___Other

iii. Rating (use the matrix below to arrive at [circle] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S):_____

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0.1	1		
B. MT Natural Heritage Program Species Habitat	M	0.5	1		
C. General Wildlife Habitat	M	0.7	1		
D. General Fish Habitat	NA				
E. Flood Attenuation	NA				
F. Short and Long Term Surface Water Storage	H	0.8	1		
G. Sediment/Nutrient/Toxicant Removal	NA				
H. Sediment/Shoreline Stabilization	H	1	1		
I. Production Export/Food Chain Support	H	0.8	1		
J. Groundwater Discharge/Recharge	H	1	1		
K. Uniqueness	L	0.3	1		
L. Recreation/Education Potential (bonus points)	H	0.2	NA		
Totals:		5.4	8		
Percent of Possible Score			67.5 %		

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
___ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
___ Score of 1 functional point for Uniqueness; **or**
___ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
___ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
___ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
___ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
___ Score of .9 or 1 functional point for General Fish Habitat; **or**
___ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
___ Score of .9 functional point for Uniqueness; **or**
_X_ Percent of possible score > 65% (round to nearest whole #).

Category III Wetland: (Criteria for Categories I, II, or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; otherwise go to Category III)
___ "Low" rating for Uniqueness; **and**
___ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
___ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA RATING: (circle appropriate category based on the criteria outlined above) **I** **II** **III** **IV**

MDT Montana Wetland Assessment Form (revised March 2008)

1. Project Name: North Entrance – Gardiner to Mammoth **2. MDT Project #:** YELL 326069B **Control #:**

3. Evaluation Date: Mo. 8 Day 31 Yr. 23 **4. Evaluator(s):** Moneka Worah **5. Wetlands/Site #(s):** Slide Lake Tributary

6. Wetland Location(s): i. Legal: T 9S N or S; R 8E E or W; S PB 53, 54 ; T ____ N or S; R ____ E or W; S ____ ;
ii. Approx. Stationing or Mileposts:

iii. Watershed: __ __ __ __ __ __ __ __ **Watershed Name, County:** Upper Yellowstone, Park County

7. a. **Evaluating Agency:** NPS ;
b. **Purpose of Evaluation:**
1. X Wetlands potentially affected by MDT project
2. ____ Mitigation wetlands; pre-construction
3. ____ Mitigation wetlands; post-construction
4. ____ Other ____

8. Wetland size: (total acres) ____ (visually estimated)
0.966 (measured, e.g. by GPS [if applies])

9. Assessment area (AA): (acres, see instructions on determining AA) ____ (visually estimated)
____ (measured, e.g. by GPS [if applies])

10. Classification of Wetland and Aquatic Habitats in AA

HGM Class (Brinson)	Class (Cowardin)	Modifier (Cowardin)	Water Regime	% of AA
Slope	PEM		PP	20
Riverine	PEM		PP	65
Riverine	SS		PP	15

Abbreviations: (*see manual for definitions*)

HGM Classes: Riverine (**R**), Depressional (**D**), Slope (**S**), Mineral Soil Flats (**MSF**), Organic Soil Flats (**OSF**), Lacustrine Fringe (**LF**);

Cowardin Classes: Rock Bottom (**RB**), Unconsolidated bottom (**UB**), Aquatic Bed (**AB**), Unconsolidated Shore (**US**), Moss-lichen Wetland (**ML**), Emergent Wetland (**EM**), Scrub-Shrub Wetland (**SS**), Forested Wetland (**FO**)

Modifiers: Excavated (**E**), Impounded (**I**), Diked (**D**), Partly Drained (**PD**), Farmed (**F**), Artificial (**A**)

Water Regimes: Permanent / Perennial (**PP**), Seasonal / Intermittent (**SI**), Temporary / Ephemeral (**TE**)

11. Estimated relative abundance: (of similarly classified sites within the same Major Montana Watershed Basin, see definitions)

(Circle one) Unknown Rare Common Abundant

12. General condition of AA:

i. Disturbance: (use matrix below to determine [circle] appropriate response – see instructions for Montana-listed noxious weed and aquatic nuisance vegetation species (**ANVS**) lists)

Conditions within AA	*Predominant conditions adjacent to (within 500 feet of) AA*		
	Managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or buildings; and noxious weed or ANVS cover is ≤15%.	Land not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to minor clearing; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	Land cultivated or heavily grazed or logged; subject to substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.
AA occurs and is managed in predominantly natural state; is not grazed, hayed, logged, or otherwise converted; does not contain roads or occupied buildings; and noxious weed or ANVS cover is ≤15%.	low disturbance	low disturbance	moderate disturbance
AA not cultivated, but may be moderately grazed or hayed or selectively logged; or has been subject to relatively minor clearing, fill placement, or hydrological alteration; contains few roads or buildings; noxious weed or ANVS cover is ≤30%.	moderate disturbance	moderate disturbance	high disturbance
AA cultivated or heavily grazed or logged; subject to relatively substantial fill placement, grading, clearing, or hydrological alteration; high road or building density; or noxious weed or ANVS cover is >30%.	high disturbance	high disturbance	high disturbance

Comments: (types of disturbance, intensity, season, etc.): Road adjacent to wetlands

ii. Prominent noxious, aquatic nuisance, & other exotic vegetation species: dalmation toadflax

iii. Provide brief descriptive summary of AA and surrounding land use/habitat: wetlands upstream and downstream

13. Structural Diversity: (based on number of "Cowardin" ***vegetated*** classes present [do not include unvegetated classes], see #10 above)

Existing # of "Cowardin" Vegetated Classes in AA	**Initial Rating**	**Is current management preventing (passive) existence of additional vegetated classes?**		**Modified Rating**
≥3 (or 2 if 1 is forested) classes	H	NA	NA	NA
2 (or 1 if forested) classes	M	NA	NA	NA
1 class, but not a monoculture	M	←NO	YES→	L
1 class, monoculture (1 species comprises ≥90% of total cover)	L	NA	NA	NA

Comments:

SECTION PERTAINING to FUNCTIONS & VALUES ASSESSMENT

14A. Habitat for Federally Listed or Proposed Threatened or Endangered Plants or Animals:

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	D S	
Secondary habitat (**list species**)	D S	
Incidental habitat (**list species**)	D (S)	Grizzly bear
No usable habitat	S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
Functional Points and Rating	1H	.9H	.8M	.7M	.3L	(.1L)	0L

Sources for documented use (e.g. observations, records, etc):

14B. Habitat for plant or animals rated S1, S2, or S3 by the Montana Natural Heritage Program: (not including species listed in14A above)

i. AA is Documented (D) or Suspected (S) to contain (circle one based on definitions contained in instructions):

Primary or critical habitat (**list species**)	D S	
Secondary habitat (**list species**)	D (S)	toad, other species
Incidental habitat (**list species**)	D S	
No usable habitat	S	

ii. Rating (use the conclusions from i above and the matrix below to arrive at [circle] the functional points and rating)

Highest Habitat Level	doc/primary	sus/primary	doc/secondary	sus/secondary	doc/incidental	sus/incidental	None
S1 Species: *Functional Points and Rating*	1H	.8H	.7M	.6M	.2L	.1L	0L
S2 and S3 Species: *Functional Points and Rating*	.9H	.7M	.6M	(.5M)	.2L	.1L	0L

Sources for documented use (e.g. observations, records, etc.):

14C. General Wildlife Habitat Rating:

i. Evidence of overall wildlife use in the AA (circle substantial, moderate, or low based on supporting evidence):

Substantial (based on any of the following [check]):
- __ observations of abundant wildlife #s or high species diversity (during any period)
- __ abundant wildlife sign such as scat, tracks, nest structures, game trails, etc.
- __ presence of extremely limiting habitat features not available in the surrounding area
- __ interviews with local biologists with knowledge of the AA

Minimal (based on any of the following [check]):
- __ few or no wildlife observations during peak use periods
- __ little to no wildlife sign
- __ sparse adjacent upland food sources
- __ interviews with local biologists with knowledge of the AA

Moderate (based on any of the following [check]):
- X observations of scattered wildlife groups or individuals or relatively few species during peak periods
- X common occurrence of wildlife sign such as scat, tracks, nest structures, game trails, etc.
- __ adequate adjacent upland food sources
- __ interviews with local biologists with knowledge of the AA

ii. Wildlife habitat features (Working from top to bottom, circle appropriate AA attributes in matrix to arrive at rating. Structural diversity is from #13. For class cover to be considered evenly distributed, the most and least prevalent **vegetated** classes must be within 20% of each other in terms of their percent composition of the AA (see #10). Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; T/E = temporary/ephemeral; and A = absent [see instructions for further definitions of these terms])

Structural diversity (see #13)	High								Moderate								Low			
Class cover distribution (all vegetated classes)	Even				Uneven				Even				Uneven				Even			
Duration of surface water in ≥ 10% of AA	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A	P/P	S/I	T/E	A
Low disturbance at AA (see #12i)	E	E	E	H	E	E	H	H	E	(H)	H	M	E	H	M	M	E	H	M	M
Moderate disturbance at AA (see #12i)	H	H	H	H	H	H	H	M	H	H	M	M	H	M	M	L	H	M	L	L
High disturbance at AA (see #12i)	M	M	M	L	M	M	L	L	M	M	L	L	M	L	L	L	L	L	L	L

iii. Rating (use the conclusions from i and ii above and the matrix below to arrive at [circle] the functional points and rating)

Evidence of wildlife use (i)	*Wildlife habitat features rating (ii)*			
	Exceptional	High	Moderate	Low
Substantial	1E	.9H	.8H	.7M
Moderate	.9H	(.7M)	.5M	.3L
Minimal	.6M	.4M	.2L	.1L

Comments:

14D. General Fish Habitat Rating: (Assess this function if the AA is used by fish or the existing situation is "correctable" such that the AA could be used by fish [i.e., fish use is precluded by perched culvert or other barrier, etc.]. If the AA is not used by fish, fish use is not restorable due to habitat constraints, or is not desired from a management perspective [such as fish entrapped in a canal], then circle **NA** here and proceed to 14E.)

Type of Fishery: Cold Water (**CW**)____ Warm Water (**WW**)____ **Use the CW or WW guidelines in the user manual to complete the matrix**

i. Habitat Quality and Known / Suspected Fish Species in AA (use matrix to arrive at [circle] the functional points and rating)

Duration of surface water in AA	Permanent / Perennial						Seasonal / Intermittent						Temporary / Ephemeral					
Aquatic hiding / resting / escape cover	Optimal		Adequate		Poor		Optimal		Adequate		Poor		Optimal		Adequate		Poor	
Thermal cover optimal / suboptimal	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S	O	S
FWP Tier I fish species	1E	.9H	.8H	.7M	.6M	.5M	.9H	.8H	.7M	.6M	.5M	.4M	.7M	.6M	.5M	.4M	.3L	.3L
FWP Tier II or Native Game fish species	.9H	.8H	.7M	.6M	.5M	.5M	.8H	.7M	.6M	.5M	.4M	.4M	.6M	.5M	.4M	.3L	.2L	.2L
FWP Tier III or Introduced Game fish	.8H	.7M	.6M	.5M	.5M	.4M	.7M	.6M	.5M	.4M	.4M	.3L	.5M	.4M	.3L	.2L	.2L	.1L
FWP Non-Game Tier IV or No fish species	.5M	.5M	.5M	.4M	.4M	.3L	.4M	.4M	.4M	.3L	.3L	.2L	.2L	.2L	.2L	.1L	.1L	.1L

Sources used for identifying fish sp. potentially found in AA:

ii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1)

*a) Is fish use of the AA significantly reduced by a culvert, dike, or other man-made structure or activity **or** is the waterbody included on the current final MDEQ list of waterbodies in need of TMDL development with listed "Probable Impaired Uses" including cold or warm water fishery or aquatic life support, **or** do aquatic nuisance plant or animal species (see **Appendix E**) occur in fish habitat?* **Y N** *If yes, reduce score in **i** above by 0.1:*_____

b) Does the AA contain a documented spawning area or other critical habitat feature (i.e., sanctuary pool, upwelling area, etc.- specify in comments) for native fish or introduced game fish? **Y N** *If yes, add 0.1 to the adjusted score in **i** or **iia** above:*_____

iii. Final Score and Rating: _____ **Comments:**

14E. Flood Attenuation: (Applies only to wetlands subject to flooding via in-channel or overbank flow. If wetlands in AA are not flooded from in-channel or overbank flow, circle **NA** here and proceed to 14F.)

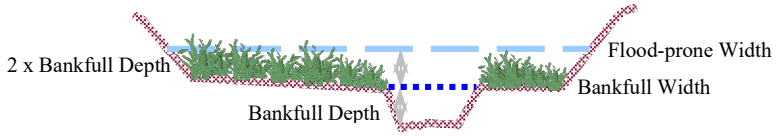
i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

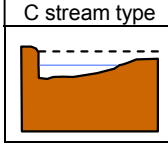
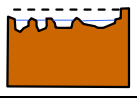
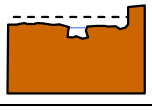
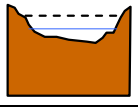
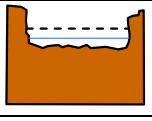
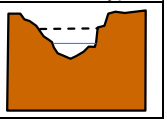
Estimated or Calculated Entrenchment (Rosgen 1994, 1996)	Slightly entrenched - C, D, E stream types			Moderately entrenched – B stream type			Entrenched-A, F, G stream types		
% of flooded wetland classified as forested and/or scrub/shrub	75%	25-75%	<25%	75%	25-75%	<25%	75%	25-75%	<25%
AA contains **no outlet or restricted outlet**	1H	.9H	.6M	.8H	.7M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.8H	.5M	.7M	.6M	.4M	.3L	.2L	.1L

Entrenchment ratio (ER) estimation – see User's Manual for additional guidance. Entrenchment ratio = (flood-prone width)/(bankfull width)
Flood-prone width = estimated horizontal projection of where 2 x maximum bankfull depth elevation intersects the floodplain on each side of the stream.

_____ / _____ = _____

Flood-prone width / *Bankfull width* = *Entrenchment ratio (ER)*



Slightly Entrenched ER = >2.2			**Moderately Entrenched ER = 1.41 – 2.2**	**Entrenched ER = 1.0 – 1.4**		
C stream type	D stream type	E stream type	B stream type	A stream type	F stream type	G stream type
						

ii. Are ≥10 acres of wetland in the AA subject to flooding **AND** are man-made features which may be significantly damaged by floods located within 0.5 mile downstream of the AA (circle)? **Y N** **Comments:**

14F. Short and Long Term Surface Water Storage: (Applies to wetlands that flood or pond from overbank or in-channel flow, precipitation, upland surface flow, or groundwater flow. If no wetlands in the AA are subject to flooding or ponding, circle **NA** here and proceed to 14G.)

i. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Abbreviations for surface water durations are as follows: P/P = permanent/perennial; S/I = seasonal/intermittent; and T/E = temporary/ephemeral [see instructions for further definitions of these terms].)

Estimated maximum acre feet of water contained in wetlands within the AA that are subject to periodic flooding or ponding	>5 acre feet			1.1 to 5 acre feet			≤1 acre foot		
Duration of surface water at wetlands within the AA	P/P	S/I	T/E	P/P	S/I	T/E	P/P	S/I	T/E
Wetlands in AA flood or pond ≥ **5 out of 10 years**	1H	.9H	.8H	.8H	.6M	.5M	.4M	.3L	.2L
Wetlands in AA flood or pond **< 5 out of 10 years**	.9H	.8H	.7M	.7M	.5M	.4M	.3L	.2L	.1L

Comments:

14G. Sediment/Nutrient/Toxicant Retention and Removal: (Applies to wetlands with potential to receive sediments, nutrients, or toxicants through influx of surface or ground water or direct input. If no wetlands in the AA are subject to such input, circle **NA** here and proceed to 14H.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating [H = high, M = moderate, or L = low])

Sediment, nutrient, and toxicant input levels within AA	AA receives or surrounding land use with potential to deliver levels of sediments, nutrients, or compounds at levels such that other functions are not substantially impaired. Minor sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.				Waterbody on MDEQ list of waterbodies in need of TMDL development for "probable causes" related to sediment, nutrients, or toxicants **or** AA receives or surrounding land use with potential to deliver high levels of sediments, nutrients, or compounds such that other functions are substantially impaired. Major sedimentation, sources of nutrients or toxicants, or signs of eutrophication present.			
% cover of wetland vegetation in AA	≥ 70%		< 70%		≥ 70%		< 70%	
Evidence of flooding / ponding in AA	Yes	No	Yes	No	Yes	No	Yes	No
AA contains **no or restricted outlet**	1H	.8H	.7M	.5M	.5M	.4M	.3L	.2L
AA contains **unrestricted outlet**	.9H	.7M	.6M	.4M	.4M	.3L	.2L	.1L

Comments:

14H Sediment/Shoreline Stabilization: (Applies only if AA occurs on or within the banks or a river, stream, or other natural or man-made drainage, or on the shoreline of a standing water body which is subject to wave action. If 14H does not apply, circle **NA** here and proceed to 14I.)

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

*% Cover of **wetland** streambank or shoreline by species with stability ratings of ≥6 (see **Appendix F**).*	*Duration of surface water adjacent to rooted vegetation*		
	Permanent / Perennial	Seasonal / Intermittent	Temporary / Ephemeral
≥ 65%	1H	.9H	.7M
35-64%	.7M	.6M	.5M
< 35%	.3L	.2L	.1L

Comments:

14I. Production Export/Food Chain Support:

i. Level of Biological Activity (synthesis of wildlife and fish habitat ratings [circle])

General Fish Habitat Rating (14D.iii.)	**General Wildlife Habitat Rating (14C.iii.)**		
	E/H	M	L
E/H	H	H	M
M	H	M	M
L	M	M	L
N/A	H	M	L

ii. Rating (Working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating. Factor A = acreage of vegetated wetland component in the AA; Factor B = level of biological activity rating from above (14I.i.); Factor C = whether or not the AA contains a surface or subsurface outlet; the final three rows pertain to duration of surface water in the AA, where P/P, S/I, and T/E are as previously defined, and A = "absent" [see instructions for further definitions of these terms].)

A	Vegetated component >5 acres						Vegetated component 1-5 acres						Vegetated component <1 acre					
B	High		Moderate		Low		High		Moderate		Low		High		Moderate		Low	
C	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No	Yes	No
P/P	1H	.7M	.8H	.5M	.6M	.4M	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.6M	.6M	.4M	.3L	.2L
S/I	.9H	.6M	.7M	.4M	.5M	.3L	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.5M	.5M	.3L	.3L	.2L
T/E/ A	.8H	.5M	.6M	.3L	.4M	.2L	.7M	.4M	.5M	.2L	.3L	.1L	.6M	.4M	.4M	.2L	.2L	.1L

iii. Modified Rating (**NOTE:** Modified score cannot exceed 1 or be less than 0.1.) **Vegetated Upland Buffer (VUB)**: Area with ≥ 30% plant cover, ≤ 15% noxious weed or ANVS cover, and that is not subjected to periodic mechanical mowing or clearing (unless for weed control).
a) Is there an average ≥ 50 foot-wide vegetated upland buffer around ≥ 75% of the AA circumference? **Y** **N** *If yes, add 0.1 to the score in **ii** above and adjust rating accordingly:*_____

iv. Final Score and Rating: 0.7M **Comments:**

14J. Groundwater Discharge/Recharge: (check the appropriate indicators in i & ii below)

i. Discharge Indicators

- X The AA is a slope wetland
- X Springs or seeps are known or observed
- ____ Vegetation growing during dormant season/drought
- ____ Wetland occurs at the toe of a natural slope
- X Seeps are present at the wetland edge
- ____ AA permanently flooded during drought periods
- ____ Wetland contains an outlet, but no inlet
- ____ Shallow water table and the site is saturated to the surface
- ____ Other:_____

ii. Recharge Indicators

- ____ Permeable substrate present without underlying impeding layer
- ____ Wetland contains inlet but no outlet
- ____ Stream is a known 'losing' stream; discharge volume decreases
- ____ Other:_____

iii. Rating (use the information from i and ii above and the table below to arrive at [circle] the functional points and rating)

Criteria	**Duration of saturation at AA Wetlands *FROM GROUNDWATER DISCHARGE OR WITH WATER THAT IS RECHARGING THE GROUNDWATER SYSTEM***			
	P/P	S/I	T	None
Groundwater Discharge or Recharge	1H	.7M	.4M	.1L
Insufficient Data/Information	N/A			

Comments:

14K. Uniqueness:

i. Rating (working from top to bottom, use the matrix below to arrive at [circle] the functional points and rating)

Replacement potential	AA contains fen, bog, warm springs or mature (>80 yr-old) forested wetland **or** plant association listed as "S1" by the MTNHP			AA does not contain previously cited rare types **and** structural diversity (#13) is high **or** contains plant association listed as "S2" by the MTNHP			AA does not contain previously cited rare types or associations **and** structural diversity (#13) is low-moderate		
Estimated relative abundance (#11)	rare	common	abundant	rare	common	abundant	rare	common	abundant
Low disturbance at AA (#12i)	1H	.9H	.8H	.8H	.6M	.5M	.5M	.4M	.3L
Moderate disturbance at AA (#12i)	.9H	.8H	.7M	.7M	.5M	.4M	.4M	.3L	.2L
High disturbance at AA (#12i)	.8H	.7M	.6M	.6M	.4M	.3L	.3L	.2L	.1L

Comments:

14L. Recreation/Education Potential: (affords "bonus" points if AA provides recreation or education opportunity)

i. Is the AA a known or potential rec./ed. site: (circle) **Y** **N** (if 'Yes' continue with the evaluation; if 'No' then circle **NA** here and proceed to the overall summary and rating page)

ii. Check categories that apply to the AA: ___ Educational/scientific study; ___ Consumptive rec.; ___ Non-consumptive rec.; ___Other

iii. Rating (use the matrix below to arrive at [circle] the functional points and rating)

Known or Potential Recreation or Education Area	Known	Potential
Public ownership or public easement with general public access (no permission required)	.2H	.15H
Private ownership with general public access (no permission required)	.15H	.1M
Private or public ownership without general public access, or requiring permission for public access	.1M	.05L

Comments:

General Site Notes

FUNCTION & VALUE SUMMARY & OVERALL RATING FOR WETLAND/SITE #(S):_____

Function & Value Variables	Rating	Actual Functional Points	Possible Functional Points	Functional Units: (Actual Points x Estimated AA Acreage)	Indicate the four most prominent functions with an asterisk (*)
A. Listed/Proposed T&E Species Habitat	L	0.1	1		
B. MT Natural Heritage Program Species Habitat	M	0.5	1		
C. General Wildlife Habitat	M	0.7	1		
D. General Fish Habitat	NA				
E. Flood Attenuation	M	0.5	1		
F. Short and Long Term Surface Water Storage	L	0.2	1		
G. Sediment/Nutrient/Toxicant Removal	NA				
H. Sediment/Shoreline Stabilization	H	1	1		
I. Production Export/Food Chain Support	M	0.7	1		
J. Groundwater Discharge/Recharge	H	1	1		
K. Uniqueness	M	0.5	1		
L. Recreation/Education Potential (bonus points)	H	0.2	NA		
Totals:		5.4	9		
Percent of Possible Score			60 %		

Category I Wetland: (must satisfy **one** of the following criteria; otherwise go to Category II)
___ Score of 1 functional point for Listed/Proposed Threatened or Endangered Species; **or**
___ Score of 1 functional point for Uniqueness; **or**
___ Score of 1 functional point for Flood Attenuation **and** answer to Question 14E.ii is "yes"; **or**
___ Percent of possible score > 80% (round to nearest whole #).

Category II Wetland: (Criteria for Category I not satisfied **and** meets any **one** of the following criteria; otherwise go to Category IV)
___ Score of 1 functional point for MT Natural Heritage Program Species Habitat; **or**
___ Score of .9 or 1 functional point for General Wildlife Habitat; **or**
___ Score of .9 or 1 functional point for General Fish Habitat; **or**
___ "High" to "Exceptional" ratings for **both** General Wildlife Habitat **and** General Fish/Aquatic Habitat; **or**
___ Score of .9 functional point for Uniqueness; **or**
___ Percent of possible score > 65% (round to nearest whole #).

Category III Wetland: (Criteria for Categories I, II, or IV not satisfied)

Category IV Wetland: (Criteria for Categories I or II are not satisfied and all of the following criteria are met; otherwise go to Category III)
___ "Low" rating for Uniqueness; **and**
___ Vegetated wetland component < 1 acre (do not include upland vegetated buffer); **and**
___ Percent of possible score < 35% (round to nearest whole #).

OVERALL ANALYSIS AREA RATING: (circle appropriate category based on the criteria outlined above) **I** **II** **III** **IV**

ATTACHMENT B CONCEPTUAL RESTORATION PLAN

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Conceptual Restoration Plan

Date:	December 13, 2024
Project name:	Mammoth to Gardiner Permanent Road Project
Project no:	MT ERFO NP YELL 2022-1(2)
Attention:	Nate Jones and Melissa Hogan, WFLHD
Prepared by:	Rachel Newton and Diane Yates, Jacobs

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1. Introduction

This memorandum describes the conceptual design approach for potential restoration sites to compensate for permanent wetland impacts resulting from the Mammoth to Gardiner Road project (project) (MT ERFO NP YELL 2022-1[2]). The 500-year flood event of June 13, 2022, destroyed infrastructure in the northern portion of the park including several sections of the North Entrance Road between Mammoth Hot Springs and Gardiner, Montana (NPS 2024a). The road is open year-round and serves as the only winter vehicle access in and out of the park. After temporarily closing to regular visitor traffic on June 13, 2022, a temporary road between Gardiner and Mammoth Hot Springs opened to the public on October 30, 2022. This project would construct a new permanent North Entrance Road in Yellowstone National Park (YNP). Goals for the new road include providing year-round access between Gardiner and Mammoth, natural hazard resiliency, and the protection of natural and cultural resources.

The design concepts presented herein serve as the first steps of a collaborative design process to restore and enhance wetland and stream functions at select locations near YNP's North Entrance and are intended to support the development of a Wetland Statement of Findings. These design concepts were developed in compliance with the National Park Service's (NPS's) goal for "no net loss of wetlands" as found in the NPS Director's Order #77-1 (D.O. #77-1). As recommended in D.O. #77-1, "Highest priority should be placed on removing such damaging facilities, structures, or activities and restoring pre-existing wetland habitats and processes. Where removing such facilities or activities is not practicable, the NPS should seek ways to minimize and, to the extent possible, reverse the adverse impacts" (NPS 2016). The sites proposed for restoration have been degraded by human activities, primarily by historic road construction activities. The goal for all restoration sites is to restore wetland ecological processes that were functioning prior to disturbance, to the extent practicable.

1.1 Wetland Restoration and Enhancement

In compliance with the Clean Water Act and D.O. #77-1 (NPS 2016), compensatory mitigation is required for permanent impacts to wetlands and other waters. Within the NPS, compensation refers primarily to restoring natural wetland functions in degraded or former natural wetland habitats on NPS-managed lands. Wetlands cannot be created where they did not previously exist. For the purposes of this memorandum, wetland mitigation refers to two different approaches: restoration and enhancement. In keeping with D.O. #77-1, wetland restoration occurs within degraded or former natural wetland habitats on NPS lands.

Wetland enhancement refers to a modification to hydrologic conditions, vegetation communities, and/or other habitat components of an existing wetland in favor of a specific wetland function or value (NRCS 2007). The wetland functions and values considered in the development of this conceptual mitigation plan were taken from the Montana Wetland Assessment Method (MWAM) (Berglund and McEldowney 2008). Functions are self-sustaining properties of a wetland ecosystem related to ecological significance and include habitat for federally and state-listed threatened and endangered species, general fish and

wildlife habitat, flood attenuation, and surface water storage. Values are benefits derived from functions and are based on human judgment of the worth or importance of those functions. Values evaluated by MWAM include uniqueness and recreation/education potential.

2. Proposed Compensation

Potential restoration sites were investigated during field surveys on August 6 through 9, 2024, and included the alignment options for the permanent North Entrance Road and three stream locations along Old Yellowstone Trail South. Survey results and potential restoration sites were presented to YNP staff on September 19, 2024. Three sites were selected for further evaluation: Landslide Creek cattail marsh, Old Gardiner Road, and Gardner River Canyon (Figure 1).

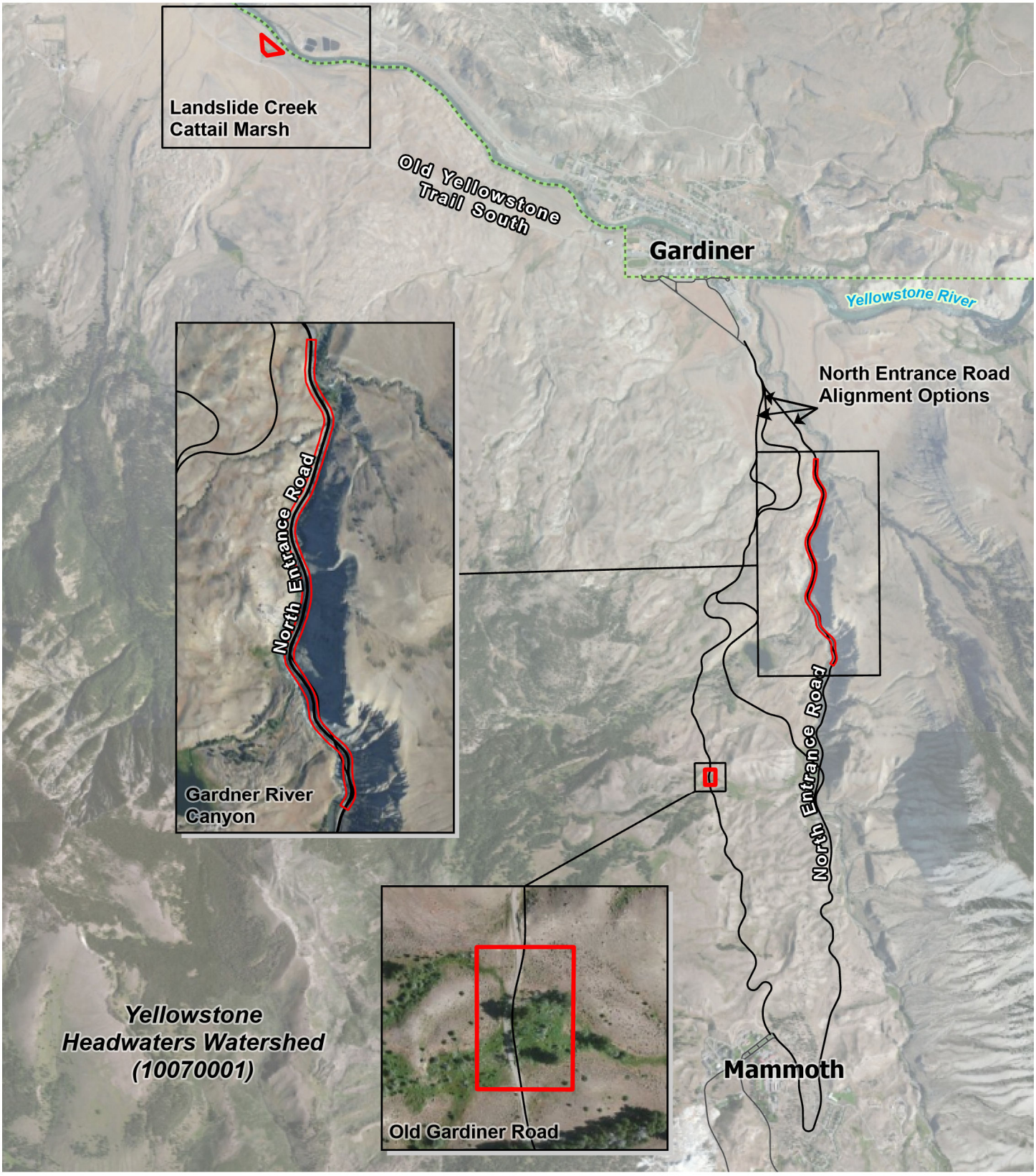
As shown in Table 1, the conceptual mitigation presented in this memorandum identified up to 31.83 acres of mitigation with a preliminary estimate of up to 16.42 acres in potential mitigation credit. These values present a best-case scenario and assume each restoration activity qualifies for advance mitigation credits. Ratios presented in the table are based on previous project experience and permit verifications within YNP and location and type of mitigation. All acreages and ratios are considered preliminary and subject to U.S. Army Corps of Engineers (USACE) approval. Potential mitigation acreage may be adjusted from the values reported in Table 1, pending further field data collection and analysis and design progression. Additional opportunities may develop as design progresses on the selected North Entrance Road alignment option.

Table 1. Summary of Conceptual Restoration Sites and Potential Mitigation Acreage

Restoration Site Name	Restoration Type	Potential Restoration Acreage	Ratio	Net Credit Acres
Landslide Creek Cattail Marsh	Enhancement	1.44	2:1	0.72
Old Gardiner Road	Enhancement	0.10	2:1	0.05
Gardner River Canyon	Enhancement	29.28	2:1	14.64
Gardner River Canyon	Restoration	1.01	1:1	1.01
Total		**31.83**	N/A	**16.42**

The conceptual design presented in this memorandum was developed based on aquatic resources delineations in 2023 and 2024 (ERO 2023; Jacobs 2024), review of light detection and ranging (LiDAR) data, and desktop review of historical aerials and topographic mapping. Existing site conditions, proposed restoration and enhancement activities, and recommendations for additional data collection are discussed in the following sections.

Typical design details from the Yellowstone River Bridge Project are in Attachment 1. A preliminary list of recommended plant species is included in Attachment 2. A list of culvert design best management practices is included in Attachment 3. Mark-ups to 30 percent conceptual design drawings for Gardner River Canyon are presented in Attachment 4.



Legend

- Proposed Restoration Site
- Yellowstone National Park
- Major Road

N

0 0.5
Miles

1:41,000

Figure 1
Proposed Restoration Sites
Conceptual Restoration Plan
Mammoth to Gardiner Road
MT ERFO NP YELL 2022-1(2)
Yellowstone National Park

\\dc1vs01\GISProj\W\WFL\MammothToGardiner\MapFiles\Report\M2G_Conceptual_Restoration_2024\M2G_Conceptual_Restoration_2024.aprx

3. Conceptual Design

The following subsections describe the conceptual mitigation design for each proposed restoration site. Details drawings from the Yellowstone River Bridge Project demonstrating these concepts are included in Attachment 1. The following activities are common to all mitigation sites and share the intention of minimizing adverse impacts to natural vegetation, soils, and waterways adjacent to mitigation sites:

- Prior to starting construction activities, mark limits of construction, access routes, and storage locations for equipment and materials with stakes. Trips on access routes located off the main road corridor will be limited.
- Use equipment and construction methods that will minimize compaction of upland vegetation and soils on access roads, topsoil stockpiles, and equipment/material storage locations.
- Mulch disturbed slopes greater than 10 percent with shredded native bark. Top access routes with mulch and seed after construction activities are completed.
- Through coordination and concurrence with a YNP botanist, re-establish native vegetation with plant materials sourced from within YNP to the extent practicable (onsite/neighboring locations) or other approved sources.
- Control weeds and protect new planting areas from browsing with fencing for a minimum of 5 years.
- Monitor mitigation sites yearly for at least 5 years. Identify and implement additional restoration work if goals are not met.

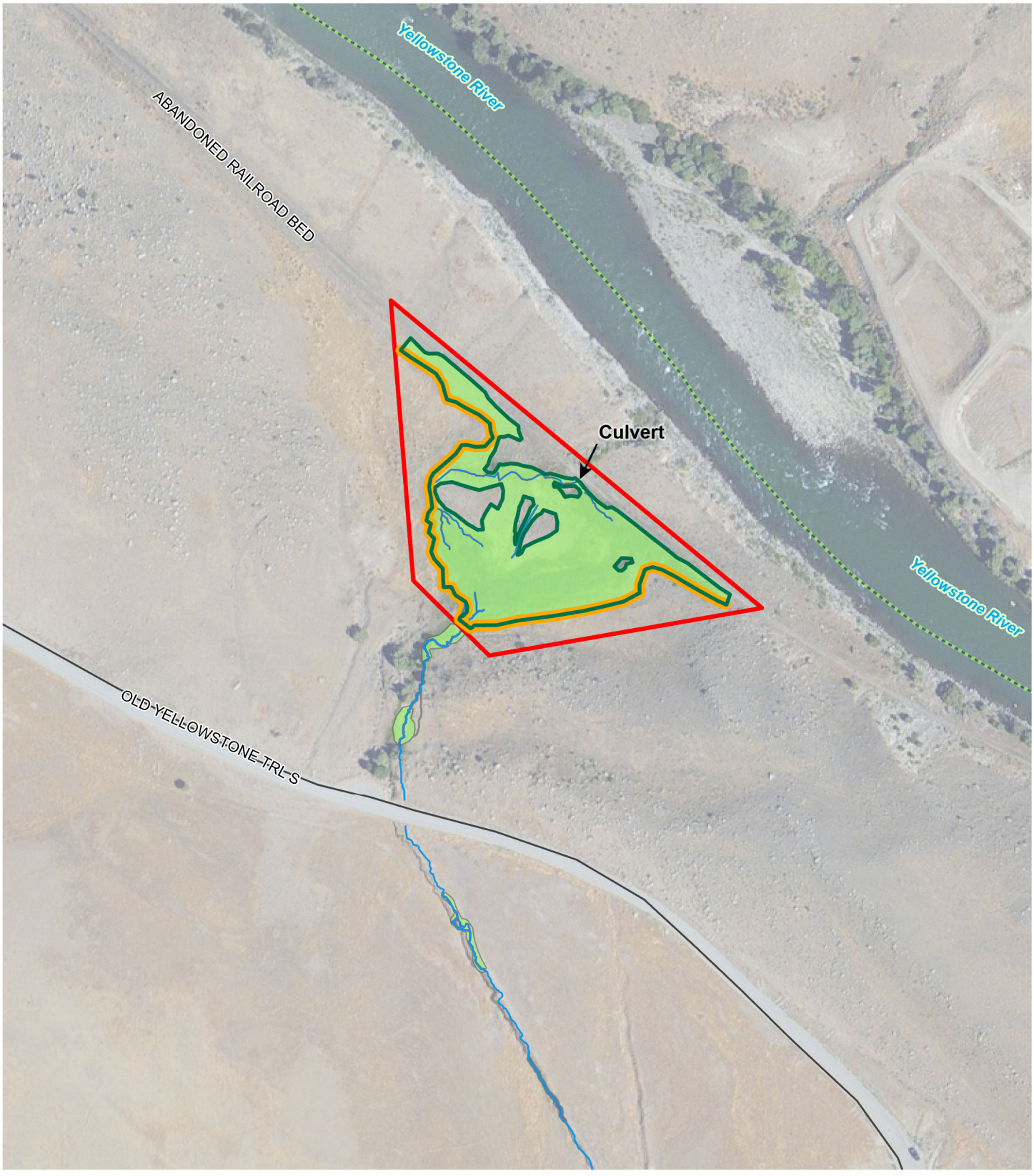
3.1 Landslide Creek Cattail Marsh

3.1.1 Existing Conditions

The Landslide Creek cattail marsh restoration site occupies a small alluvial fan on a terrace above the Yellowstone River (Figure 2). Prior to human intervention, flow from Landslide Creek was unimpeded on its way to the river. Construction of the Northern Pacific Railway in 1903 disturbed natural patterns (Kraft 1999); the railroad embankment acts as an earthen dam, and stream flow is restricted through a narrow metal culvert. The railway was abandoned in 1948 and now serves as a bike trail (NPS 2024b).

The marsh receives hydrologic inputs from the perennial Landslide Creek and groundwater seeps. Surface water, although shallow, is likely present throughout the year. Concentrated flow paths were variable and discontinuous. During the 2024 delineation, the main stem of Landslide Creek flowed on the western boundary of the marsh, with side channels scattered throughout (Jacobs 2024). Hydrologic conditions on site are variable, likely because of poorly sorted landslide material (Williams, pers. comm. 2024). A review of historical aerial imagery indicates the marsh has expanded since the early 2000s. Furthermore, the small upland patches shown in Figure 2 were previously connected. These islands were dominated by upland vegetation, including rubber rabbitbrush (*Ericameria nauseosa,* upland [UPL]), pricklypear cactus (*Opuntia polyacantha,* UPL), and Sandberg's bluegrass (*Poa secunda,* facultative upland [FACU]) (Photos 1 and 2).

Vegetation within the marsh is dominated by broad-leaved cattail (*Typha latifolia,* obligate [OBL]), with two smaller concentrations of water sedge (*Carex aquatilis,* OBL) and hardstem bulrush (*Schoenoplectus acutus,* OBL). Other graminoids present include Baltic rush (*Juncus balticus,* facultative wetland [FACW]), meadow barley (*Hordeum brachyantherum,* FACW) and Nebraska sedge (*Carex nebrascensis,* OBL). Forbs are more common along the wetland margins and include field mint (*Mentha arvensis,* FACW) and hairy evening-primrose (*Oenothera villosa* var. *strigosa,* facultative [FAC]). Investigation of the soil profile indicated silt loam.



Legend

- Proposed Restoration Site
- Yellowstone National Park
- Major Road

Delineated Features

- Wetlands
- Waters

Proposed Restoration

- Wetland Enhancement
- Riparian buffer

N

0 200

US Feet

1:2,400

Figure 2
Landslide Creek Cattail Marsh
Conceptual Restoration Plan
Mammoth to Gardiner Road
MT ERFO NP YELL 2022-1(2)
Yellowstone National Park

\\dc1vs01\GISProj\W\WFL\MammothToGardiner\MapFiles\Report\M2G_Conceptual_Restoration_2024\M2G_Conceptual_Restoration_2024.aprx



Photo 1. View to the southeast of an upland island in the middle of the Landslide Creek cattail marsh.



Photo 2. View to the northwest of the Landslide Creek cattail marsh and the abandoned railroad bed (red line).

Wildlife usage of the marsh is high, and ranges from invertebrates to ungulates. Red-winged blackbirds (*Agelaius phoeniceus*), Wilson's snipe (*Gallinago delicata*), unidentified small rodents, and a common garter snake (*Thamnophis sirtalis*) were observed during the 2024 delineation. Ungulate usage is very high; signs of bison (*Bison bison*), mule deer (*Odocoileus hemionus*), Rocky Mountain elk (*Cervus canadensis nelsoni*), and pronghorn (*Antilocapra americana*) were present in the vicinity.

The surrounding sagebrush steppe was subject to cattle and wildlife ranching until 1995 (NPS 2002) and is largely degraded. Upland vegetation is dominated by nonnative grasses, primarily crested wheatgrass (*Agropyron cristatum,* UPL). Native bunchgrasses are present but restricted; Sandberg's bluegrass is common on rocky microsites, and Great Basin wildrye (*Leymus cinereus,* FAC) is found along the wetland margins. Cover by woody species is low, but diversity is high: Wyoming big sagebrush (*Artemisia tridentata* ssp. *tridentata,* UPL), broom snakeweed (*Gutierrezia sarothrae,* UPL), winterfat (*Krascheninnikovia lanata,* UPL),

prickly rose (*Rosa acicularis,* FACU), skunkbush sumac (*Rhus trilobata,* UPL), and Rocky Mountain juniper (*Juniperus scopulorum,* UPL) are present. Forb cover is also low, and species diversity is limited; dominant species include Hood's phlox (*Phlox hoodii,* UPL) and pricklypear cactus. Moderate cover by Canada thistle (*Cirsium arvense,* FAC), a Montana state-listed Priority 2B noxious weed (MNHP 2024), was observed.

3.1.2 Proposed Restoration Action

Potential restoration activities at the Landslide Creek cattail marsh are limited. As stated in D.O. #77-1, NPS's priority is removing damaging facilities and structures, where possible, and minimizing impacts to existing wetlands. The primary damaging facilities to the marsh and Landslide Creek are the railroad embankment and culvert. Enhancing wildlife habitat functions of the marsh could be achieved by adding more physical structure, but these opportunities are limited. Creating areas of open water within the marsh would be unsustainable in the long-term because natural successional processes would result in the areas filling in. Open water would also likely increase the likelihood of wildlife-human interaction on the bike trail. Large areas of riparian plantings would require fencing to ensure success, and the amount of construction and maintenance required to fence off the entire marsh is cost-prohibitive relative to the potential functional lift. Refer to Attachment 2, Preliminary Plant List, for a list of suggested plants for this project.

However, smaller clumps of shrub plantings could be protected using t-posts and wire fencing spaced at sufficient distance from each other to deter grazing by large ungulates while allowing movement of smaller animals. Brush piles could also be constructed using native materials; plantings would be protected by the brush pile during the establishment phase (Attachment 1, Sheet N.19). Plantings would occur along the upslope margins to accommodate shifting wetland margins downslope and would include prickly rose, skunkbush sumac, serviceberry (*Amelanchier alnifolia,* FACU), and silverberry (*Elaeagnus commutata,* FAC) (Photo 3). Planting with these berry-producing shrubs would increase woody vegetation cover in the area while providing a food source for birds and small mammals. To minimize disturbance, plant materials and fencing would be installed using hand tools. Typical details for shrub plantings are in Attachment 1, Sheets N.16 and N.17). Spacing plantings within a 5-foot-wide buffer would create up to 0.25 acre of riparian buffer and potentially enhance up to 1.44 acres of the marsh. Noxious weeds, including Canada thistle, would also be treated. Additional data collection to better understand site conditions would include digging more soil test pits along the margins to identify preferred soil text and moisture locations for the plantings.



Photo 3. View to the west of the Landslide Creek cattail marsh. Shrub plantings could create up to 0.25 acre of habitat (yellow line) and enhance the cattail marsh.

Restoration activities at this marsh could also include replacing the existing culvert with a pedestrian bridge (Photo 4). This would increase hydrologic connectivity across the abandoned railroad bed while maintaining usage of the existing bike trail. This reach of Landslide Creek could be enhanced through the placement of post-assisted diffusion structures and riparian shrub plantings. The diffusion structures would slow flow and raise the existing groundwater levels. Shrub plantings would increase physical structure and improve sediment retention before reaching the Yellowstone River. This reach of Landslide Creek was not included in the 2024 delineation. If restoration activities proceed in this area, an aquatic resource delineation of Landslide Creek and the fringe wetlands would be required before potential credit acres could be quantified.



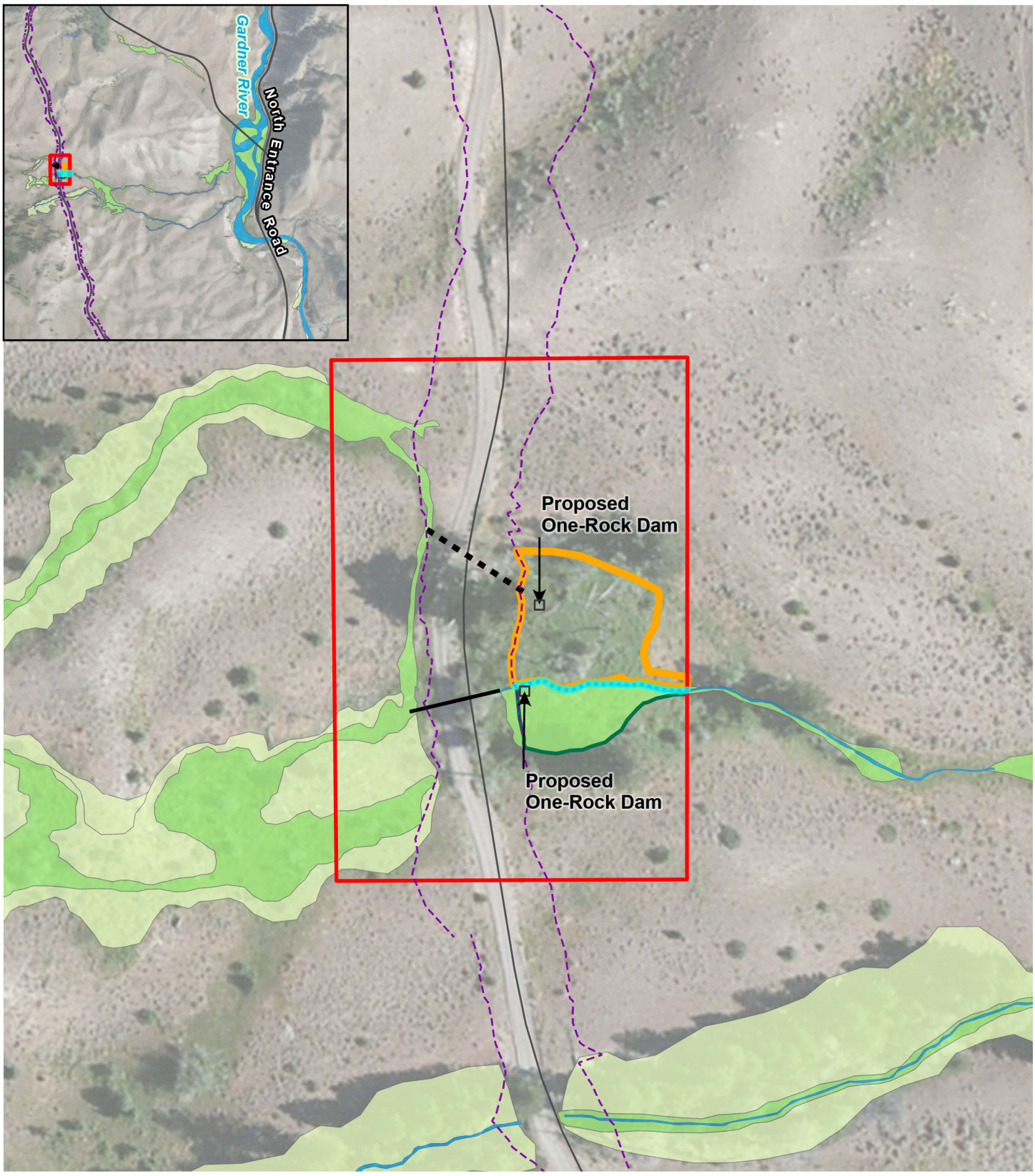
Photo 4. View to the north of Landslide Creek (blue line) flowing from the existing culvert towards the Yellowstone River. Proposed restoration activities would include replacing the culvert with a pedestrian bridge and enhancing the existing fringe wetlands with shrub plantings.

3.2 Old Gardiner Road

3.2.1 Existing Conditions

The proposed restoration site on the Old Gardiner Road alignment option presents an opportunity to redirect stream flow away from the existing roadbed while enhancing an existing stream channel and wetland (Figure 3). This alignment option would improve the existing Old Gardiner Road, which was constructed after the 2022 flood to serve as the temporary North Entrance Road connecting Mammoth to Gardiner (NPS 2024c).

The 2023 aquatic resource delineation identified wetland and riparian areas along two small streams upslope of the existing Old Gardiner Road (ERO 2023). The northwestern stream flows towards the road embankment then travels in a roadside ditch for approximately 160 feet before joining the southwestern stream. The southwestern stream flows through a 36-inch corrugated metal pipe (CMP) culvert and continues downslope to the Gardner River. Fringe wetlands are present along both streams. Hydrology appears to be driven primarily by perennial streamflow originating from springs upslope. Soils were not investigated in the immediate vicinity, but the 2023 delineation data indicated loam is present upslope. Wetland vegetation is relatively uniform on both sides of the road. Herbaceous vegetation consists of water sedge, common timothy (*Phleum pratense*, FAC), spreading bentgrass (*Agrostis stolonifera,* FAC) and field horsetail (*Equisetum arvense,* FAC) (Photo 5). Woody species, including water birch (*Betula occidentalis,* FACW), common snowberry (*Symphoricarpos albus*, FACU) and Bebb's willow (*Salix bebbiana,* FACW), form a sparse overstory on the eastern side of the road. Douglas-fir (*Pseudotsuga menziesii,* FACU) is also present.



Legend

- Proposed Restoration Site
- Existing Culvert
- Cut/Fill
- Old Gardiner Road
- Proposed One-Rock Dam

Delineated Features

- Riparian
- Wetlands
- Waters

Proposed Restoration

- Wetland Enhancement
- Riparian buffer
- Proposed Culvert
- Stream Enhancement

N

0 100

US Feet

1:1,200

Figure 3
Old Gardiner Road
Conceptual Restoration Plan
Mammoth to Gardiner Road
MT ERFO NP YELL 2022-1(2)
Yellowstone National Park

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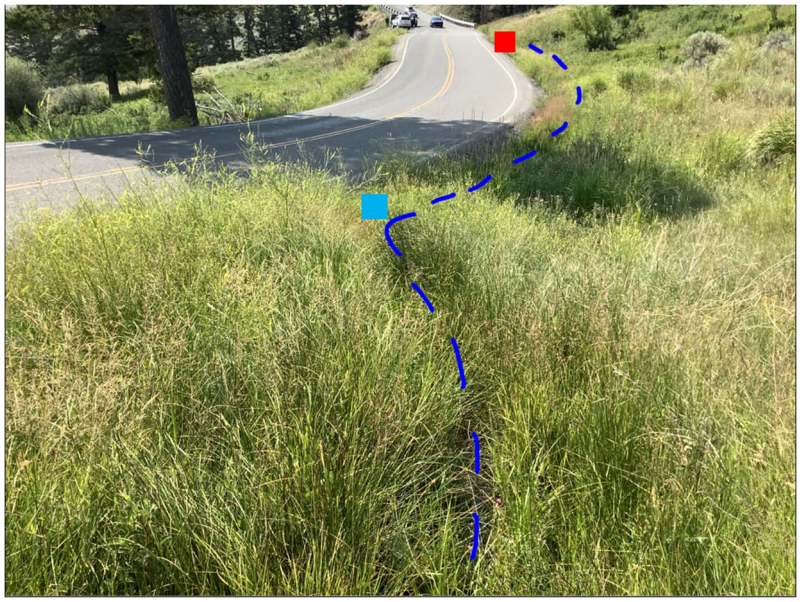


Photo 5. View to the south at the Old Gardiner Road restoration site. A small stream (dashed blue line) flows along the edge of the road embankment before joining another stream and flowing through the existing 36-inch CMP culvert (red square). Installing an additional culvert (aqua square) would divert flow under the road prism.

3.2.2 Proposed Restoration Action

Wetland and stream enhancement would occur through the installation of an additional CMP culvert where the northwestern stream hits the road embankment (Photo 5). Diverting flow under the road through a culvert would mimic natural topographical patterns while improving the integrity of the road embankment. A list of best management practices to consider when installing culverts is included in Attachment 3. Typical details for channel treatments are included in Attachment 3-1.

To further facilitate the establishment of a riparian buffer on the downstream end, a one-rock dam similar to a Zeedyk structure (Photo 6) would be constructed of native materials and installed at the proposed culvert outlet to slow water permeation into the soil.



Photo 6. Example of Zeedyk structure (Maestas et al. 2018).

This would spread out flow and reduce erosion potential while wetting a larger area. Additional one-rock dams could be installed at the culvert outlet for the southern stream. Riparian shrubs would be planted at the one-rock dams and between the toe of the adjacent hillslope, the road embankment, and the stream, creating up to 0.20 acre of riparian buffer. This buffer would improve sediment retention and removal, enhancing up to 0.10 acre of fringing palustrine emergent (PEM) wetland and <0.01 acre (129 linear feet) of stream channel. Shrub species would include Bebb's willow, common snowberry, black twinberry (*Lonicera involucrata,* FAC), water birch, and quaking aspen (*Populus tremuloides,* FACU). Typical details for shrub plantings are in Attachment 1, Sheets N.16 and N.17.

In addition to characterizing soils for a cross-section of the proposed riparian buffer, two-dimensional hydraulic modeling may be required to correctly site the proposed additional culvert. The use of piezometers to track seasonal fluctuations in groundwater is also recommended. Topographic survey likely exists from post-flood recovery operations.

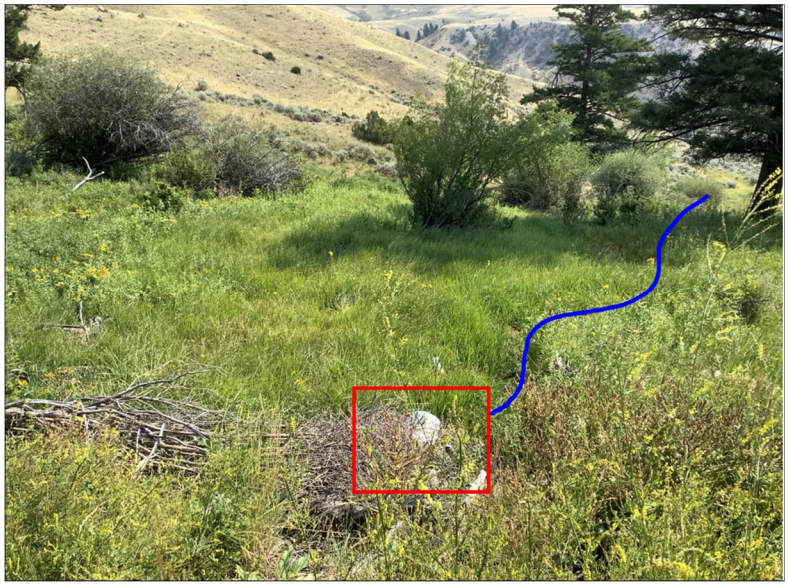


Photo 7. View to the northeast (downslope) of the Old Gardiner Road restoration site. The photo shows the existing culvert outlet (red square), stream (blue line), and wetland (foreground).

3.3 Gardner River Canyon

3.3.1 Existing Conditions

The North Entrance Road connected Mammoth to Gardiner until the June 2022 flood, when several sections of the road were washed out (Photo 8). Other sections of the road and associated infrastructure remain in place but continue to deteriorate. Vegetation along the Gardner River consists of scattered shrubs and trees, including Rocky Mountain juniper, prickly rose, assorted willows (*Salix* spp.), and balsam poplar (*Populus balsamifera,* FAC). Cobbles and gravels dominate the soil profile.



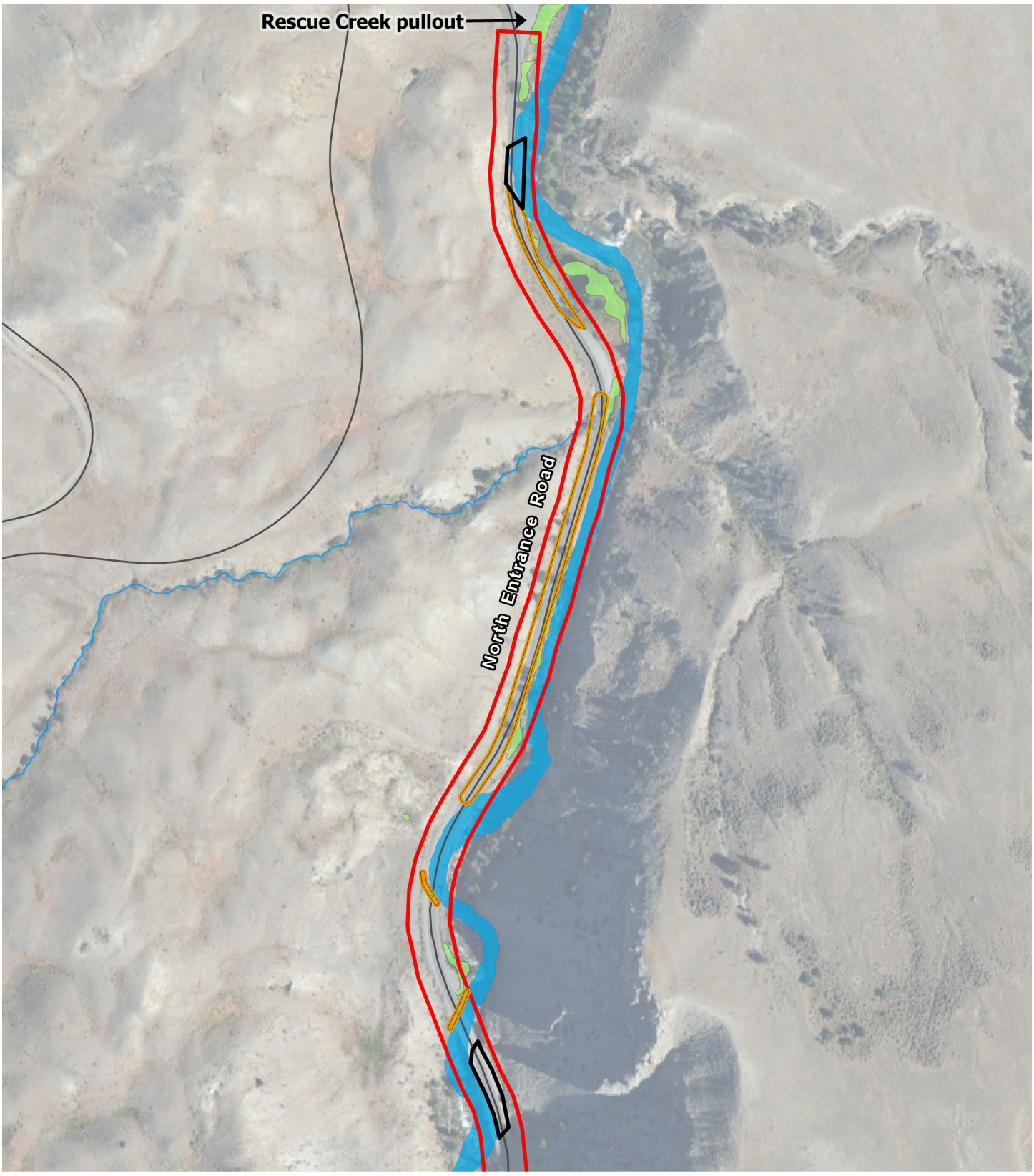
Photo 8. Overhead view of Gardner River Canyon post-2022 flood (source: NPS). Bank stabilization and riparian buffers (red circles) in select locations would enhance the Gardner River and fringe wetlands.

3.3.2 Proposed Restoration Action

Reclamation activities within Gardner River Canyon present opportunities to enhance up to 23.26 acres (17,733 linear feet) of the Gardner River and 6.02 acres of existing fringe wetlands delineated in 2023 (ERO 2023). Desktop review of 30 percent conceptual design plans for road reclamation identified several locations for restoration activities (Figures 4 and 5; Attachment 4). Based on this assessment, approximately 1.01 acres of floodplain could be restored simply by removing the existing road embankment so natural processes reshape the bed and bank. At select areas, bank stabilization would likely be required to prevent additional scour and sedimentation within the river (Photos 8 and 9). Three conceptual cross sections have been developed (Attachment 4, Sheet G.12); identification of appropriate places to apply these cross sections would be made following two-dimensional hydraulic modeling and additional site visits.



Photo 9. Overhead view of Gardner River Canyon (source: NPS). Bank stabilization (red circle) would maintain the integrity of remaining road elements converted to pedestrian trails.



Legend

- Proposed Restoration Site
- Road

Delineated Features

- Wetlands
- Waters

Proposed Restoration

- Floodplain Restoration
- Riparian Buffer

N

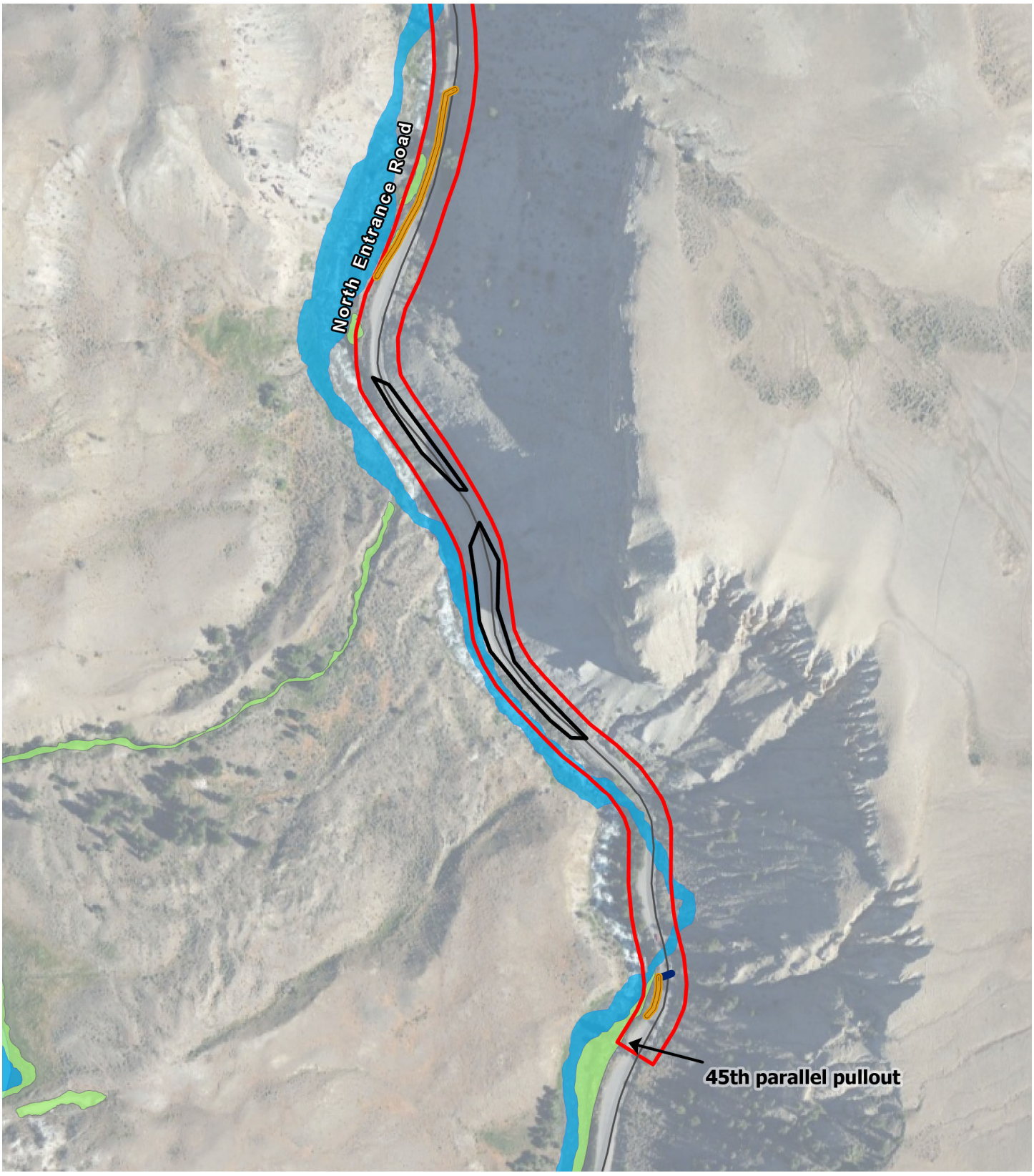
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US Feet

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Figure 4-1
Gardner River Canyon
Conceptual Restoration Plan
Mammoth to Gardiner Road
MT ERFO NP YELL 2022-1(2)
Yellowstone National Park

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Legend

- Proposed Restoration Site
- Road

Delineated Features

- Wetlands
- Waters

Proposed Restoration

- Floodplain Restoration
- Bank Stabilization
- Riparian Buffer

N

0 325

US Feet

1:3,900

Figure 4-2
Gardner River Canyon
Conceptual Restoration Plan
Mammoth to Gardiner Road
MT ERFO NP YELL 2022-1(2)
Yellowstone National Park

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Approximately 1.28 acres of riparian buffer would be restored after road reclamation activities are complete. Supplemental plantings of balsam poplar, prickly rose, skunkbush sumac, and other shrubs native to Gardiner Basin would provide food and shade sources for fish and wildlife. Existing road elements remaining in place, such as bridge abutments, would be amended to improve the likelihood of vegetation establishment. The positioning of boulders in select locations would create microsites for riparian vegetation plantings while providing additional scour protection. Additional information regarding flow velocity and other river dynamics and topographical survey would be required.

Early coordination with the USACE Montana Regulatory Office is advised to ensure proper application of the Montana Stream Mitigation Procedure in determining credits for the Gardner River Canyon site. The Montana Stream Mitigation Procedure considers several restoration factors when assessing mitigation credit; these include removal of riprap from below the ordinary high water mark, the addition of woody debris in the floodplain, and restoration of channel morphology (USACE 2010). Locations for these and other restoration activities will be refined as design progresses, allowing for a more accurate tally of mitigation credits.

3.4 Summary and Next Steps

The conceptual restoration discussed in this memo could restore and enhance up to 31.83 acres of existing wetlands, streams, and the Gardner River. This could potentially provide up to 16.42 net credit acres. These numbers are early estimates and likely represent an overestimate. Early coordination with the USACE Montana Regulatory Office is advised.

Upon Western Federal Lands Highway Division and Park review of this conceptual memo, and if approved, Jacobs will revise concepts based on feedback provided. Approved concepts will be carried forward into the Wetland Statement of Findings scheduled for preparation in 2025. Opportunities for restoration and enhancement will also be further explored and quantified as they relate to proposed road improvements and alignment options to be carried forward for further consideration.

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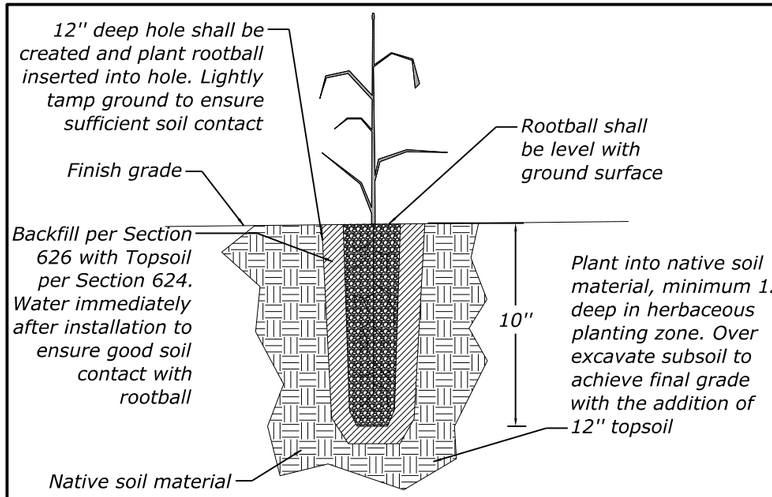
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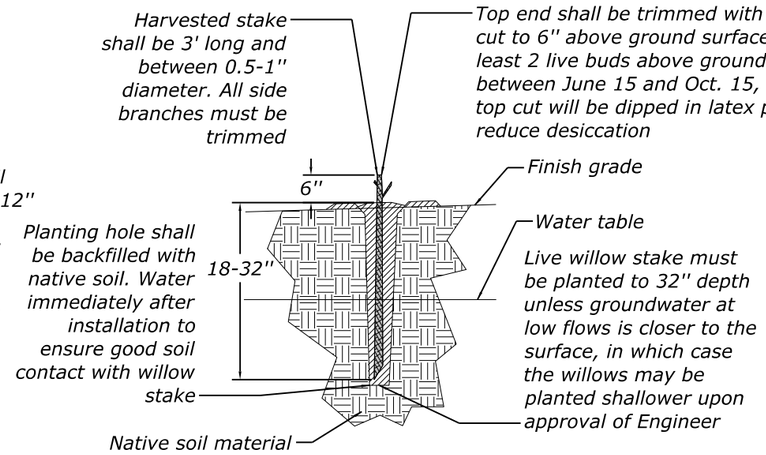
Attachment 1
Typical Design Details from the Yellowstone River Bridge Project

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WY	NPS YELL 12(2)	N.16



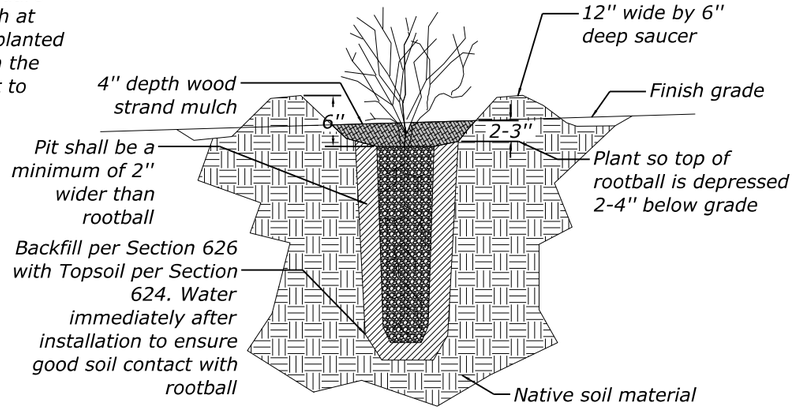
DEEP ROOTED HERBACEOUS SEEDLING CONTAINER PLANTING - SECTION VIEW

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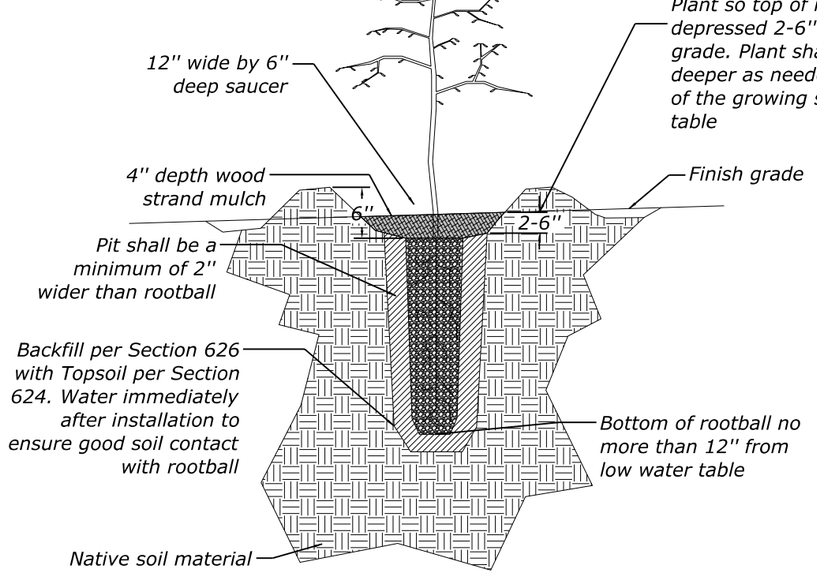
LIVE WILLOW STAKES PLANTING - SECTION VIEW

NOT TO SCALE



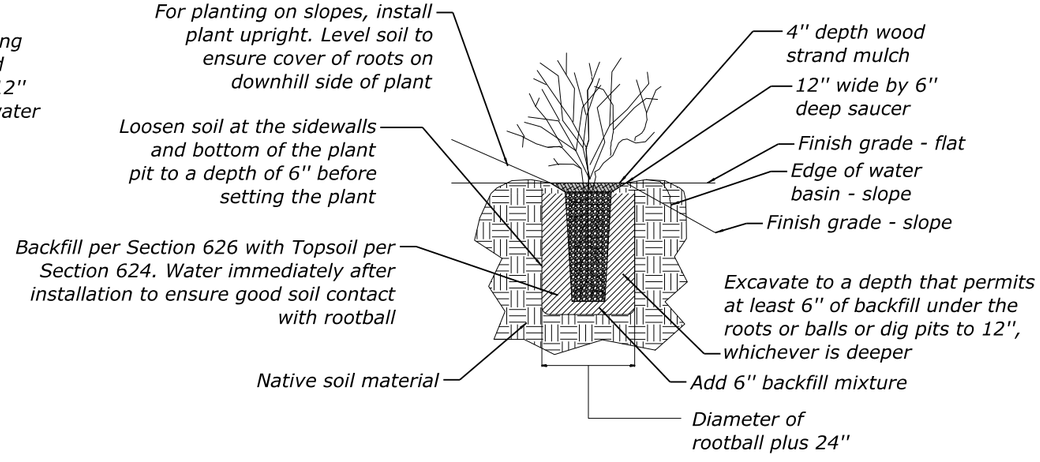
DEEP ROOTED SHRUB CONTAINER PLANTING - SECTION VIEW

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DEEP ROOTED DECIDUOUS AND EVERGREEN TREE CONTAINER PLANTING - SECTION VIEW

NOT TO SCALE



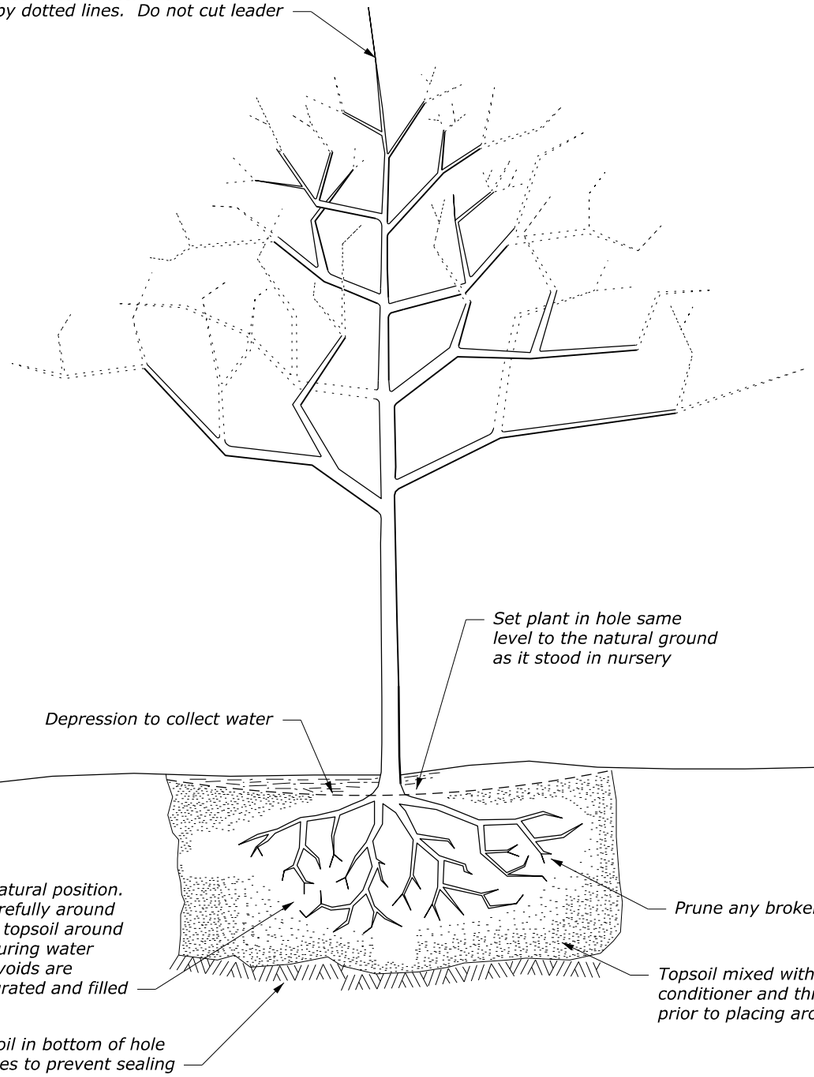
SHRUB/TREE MEDIUM CONTAINER PLANTING - SECTION VIEW

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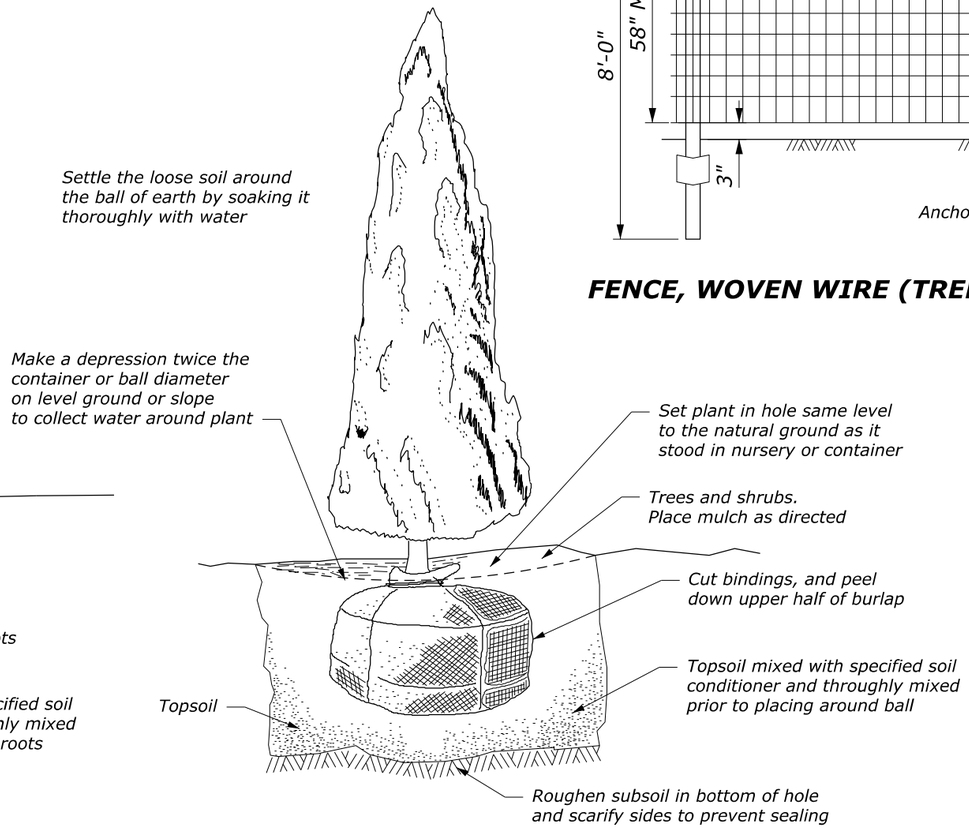
REVEGETATION DETAILS

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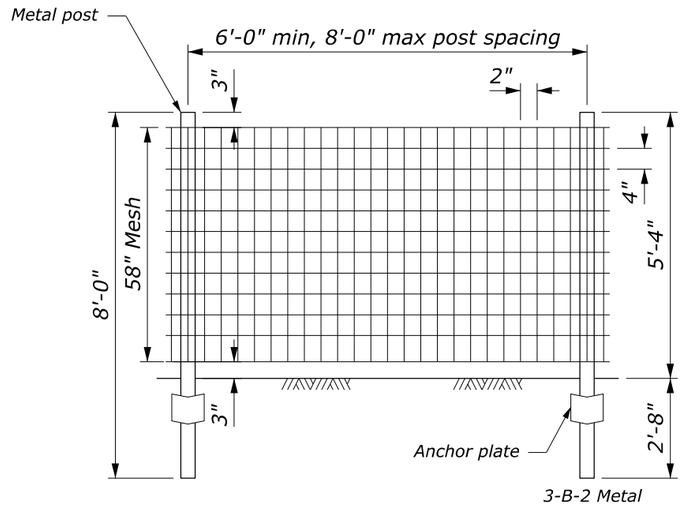
STATE	PROJECT	SHEET NUMBER
WY	NPS YELL 12(2)	N.17



METHOD OF PLANTING TREES AND SHRUBS



METHOD OF PLANTING BALLED AND BURLAPPED TREES AND SHRUBS



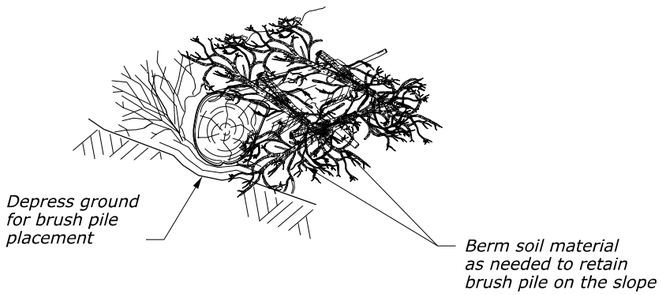
FENCE, WOVEN WIRE (TREE PROTECTION)

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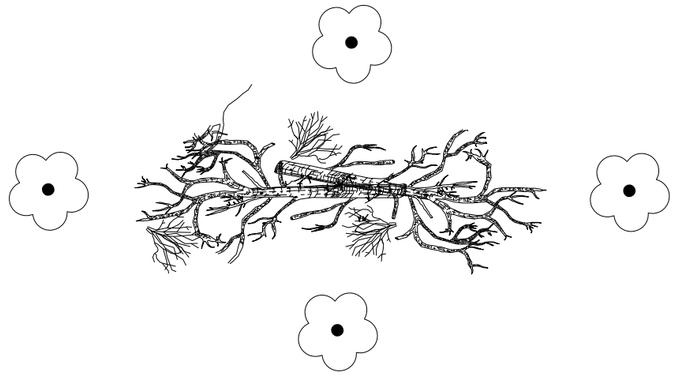
TREE PLANTING AND FENCE DETAIL

NPS PMIS No. 225354 NPS Drwg No. 101/177426

STATE	PROJECT	SHEET NUMBER
WY	NPS YELL 12(2)	N.19



BRUSH PILE PLACEMENT DETAIL



BRUSH PILE SPACING DETAIL

NOTE:

1. *Brush pile dimensions: 6' to 7' diameter, 2' to 3' high.*
2. *Place brush piles according to Subsection 647.08(B).*
3. *Plant containerized shrubs or trees around brush piles as shown on the detail on this sheet. Spacing varies by species as shown on sheets N.2, N.3, and N.4, or as directed by CO.*

LEGEND:

Containerized shrub or tree

SLOPE TREATMENT DETAILS (SHEET 2 OF 2)

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Attachment 2
Preliminary Plant List

Table 1-1. Preliminary Plant List by Plant Material Type and Restoration Site

Vegetation Type	Plant Species	Wetland Indicator Status[a]	Plant Material Type		Restoration Site		
			Field-collected Plug or Stake	Nursery-grown Container Plant	Landslide Creek Cattail Marsh	Old Gardiner Road	Gardner River Canyon
Shrub	Serviceberry *Amelanchier alnifolia*	FACU		X	X	X	X
Shrub	Silverberry *Elaeagnus commutata*	FAC		X	X	X	X
Shrub	Black twinberry *Lonicera involucrata*	FAC		X	X	X	X
Shrub	Skunkbush sumac *Rhus trilobata*	UPL		X	X	X	X
Shrub	Prickly rose *Rosa acicularis*	FACU		X	X	X	X
Shrub	Bebb's willow *Salix bebbiana*	FACW	X	X		X	X
Shrub	Common snowberry *Symphoricarpos albus*	FACU		X		X	X
Shrub/Tree	Quaking aspen *Populus tremuloides*	FACU		X	X	X	X
Tree	Water birch *Betula occidentalis*	FACW		X		X	X
Tree	Rocky Mountain juniper *Juniperus scopulorum*	UPL		X	X	X	X
Tree	Balsam poplar *Populus balsamifera*	FAC	X	X		X	X
Tree	Douglas-fir *Pseudotsuga menziesii*	FACU		X		X	X

[a] USACE 2020
FAC = facultative
FACU = facultative upland
FACW = facultative wetland
UPL = upland

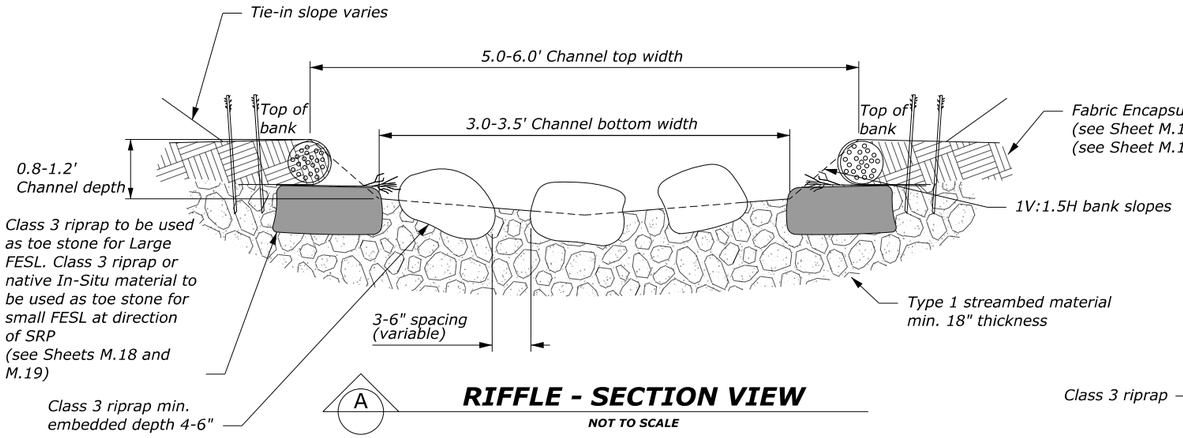
Attachment 3
Culvert Design and Installation Best Management Practices

Best Management Practices for Culvert Design and Installation

- Size culverts to both convey water under the road and restore streambanks to conditions typical of pre-disturbance construction.
- Maintain existing flow patterns and velocities but design culvert inlets and outlet to mimic natural channel forms. Refer to Typical Channel Treatment, Riffle and Glide Detail (M.13), Step Pool –Detail (M.14), Cascade Detail (M.15), and Grade Control Details from the Yellowstone River Bridge project (Attachment 3-1).
- Place rocks and boulders along culvert wingwalls to provide additional scour protection and re-create natural channel forms.
- Place rocks at the culvert mouth to dissipate force, if necessary.
- Use multiple culverts to spread flow over a larger area.
- Consider creating small animal underpasses along the sides of the culverts.

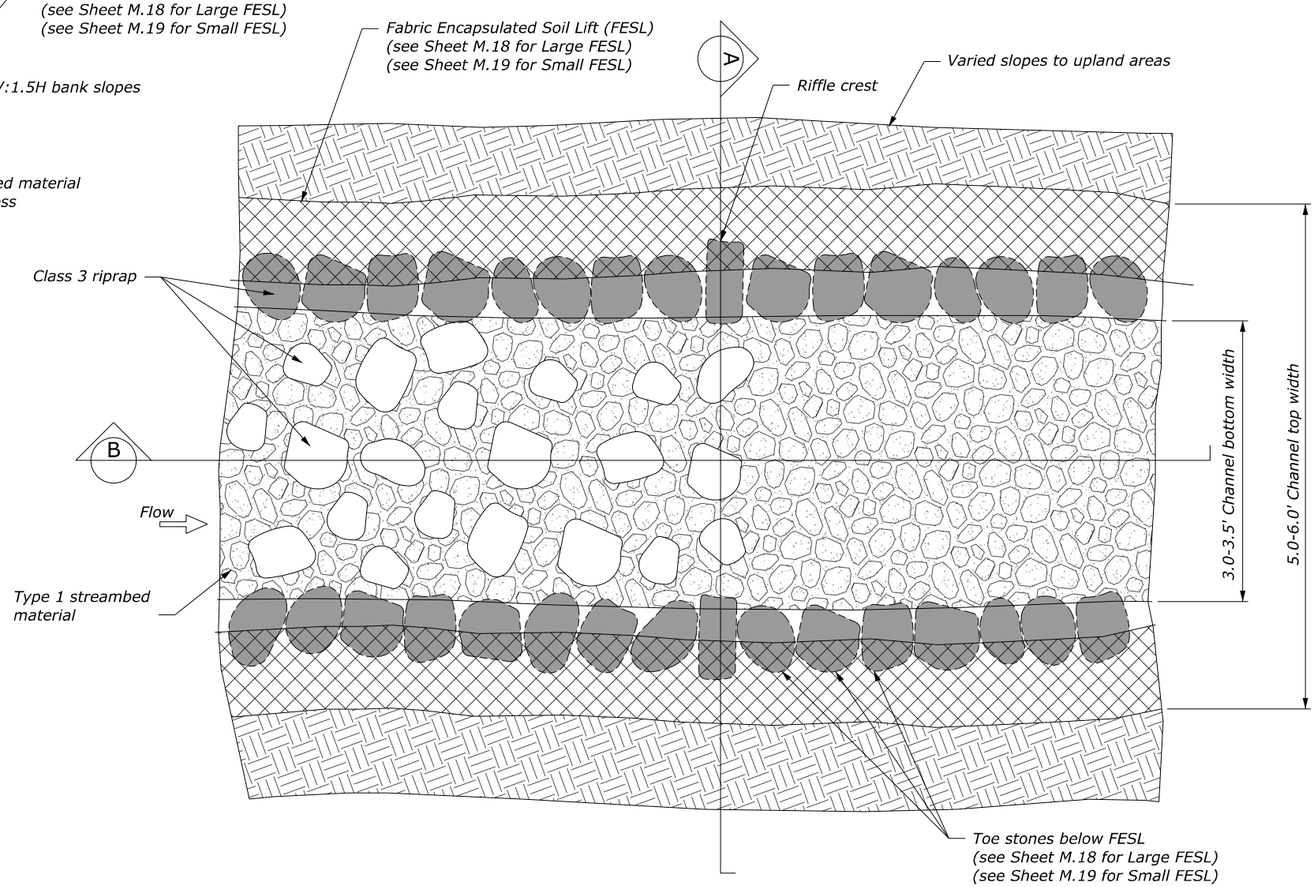
Attachment 3-1
Typical Channel Treatments from Yellowstone River Bridge Project

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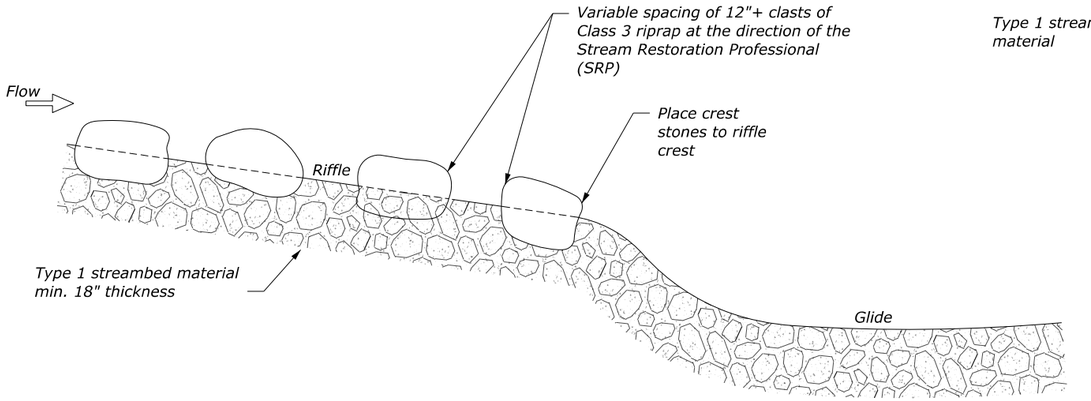
RIFFLE - SECTION VIEW

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RIFFLE AND GLIDE - PLAN VIEW

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RIFFLE AND GLIDE - PROFILE VIEW

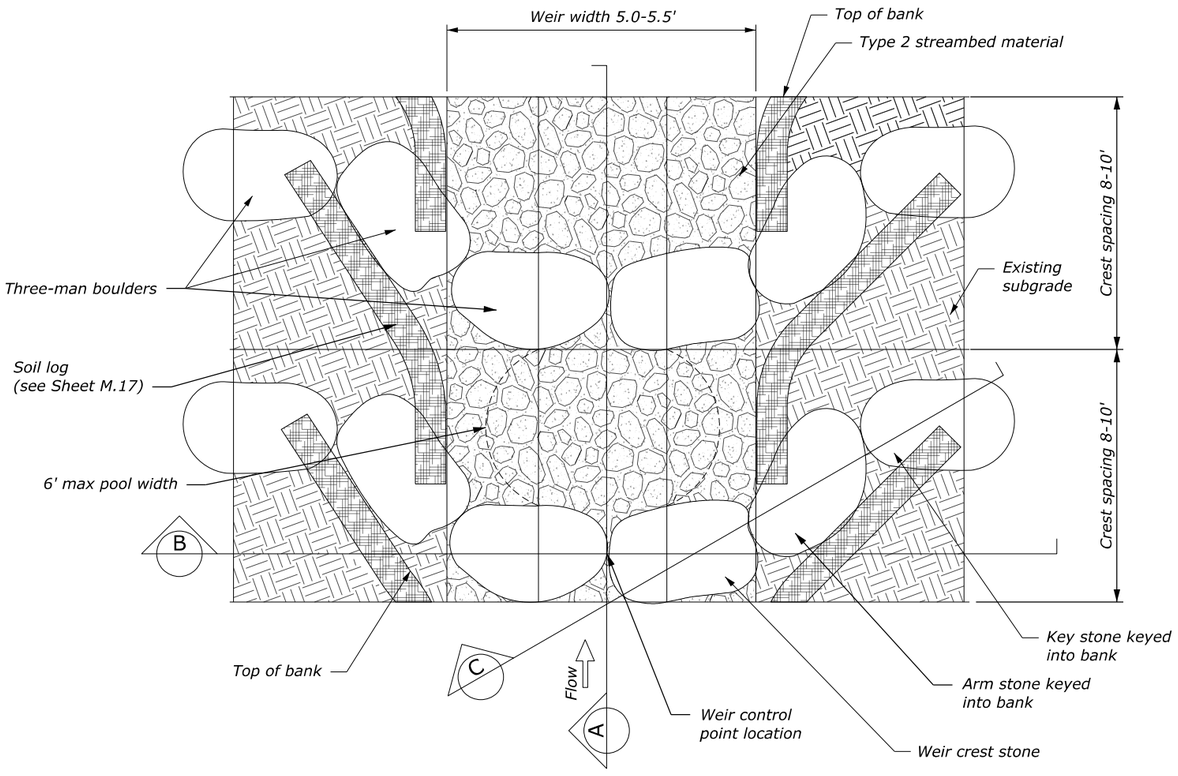
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NOTE:
1. SRP = Stream Restoration Professional
2. WSEL = Water Surface Elevation
3. FESL = Fabric Encapsulated Soil Lift

TYPICAL CHANNEL TREATMENT RIFFLE AND GLIDE DETAIL

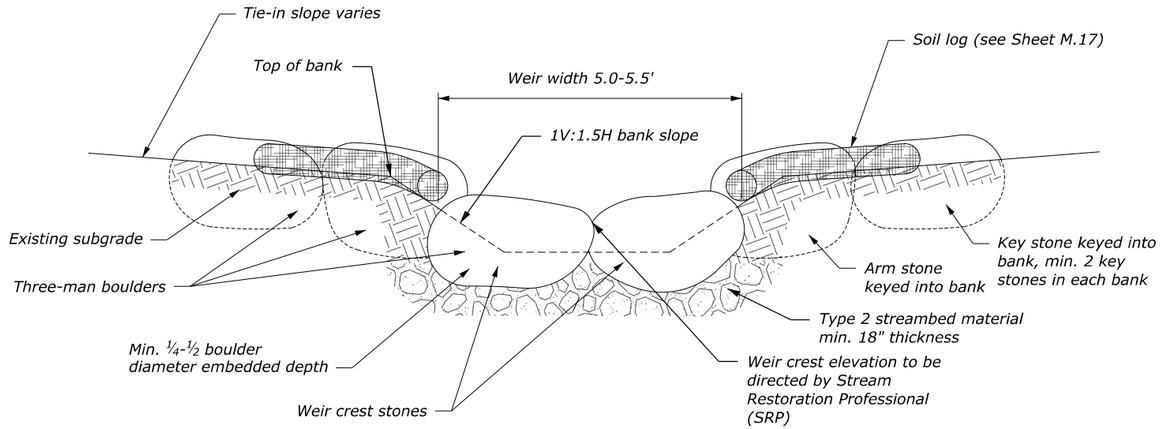
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STATE	PROJECT	SHEET NUMBER
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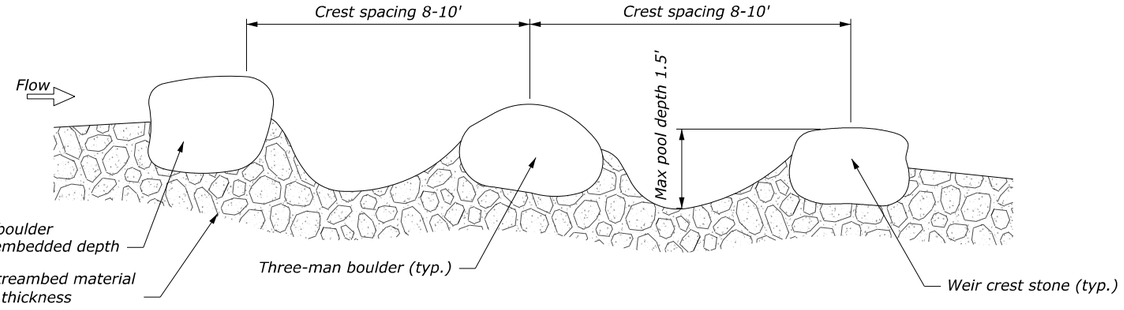
STEP POOL - PLAN VIEW

NOT TO SCALE



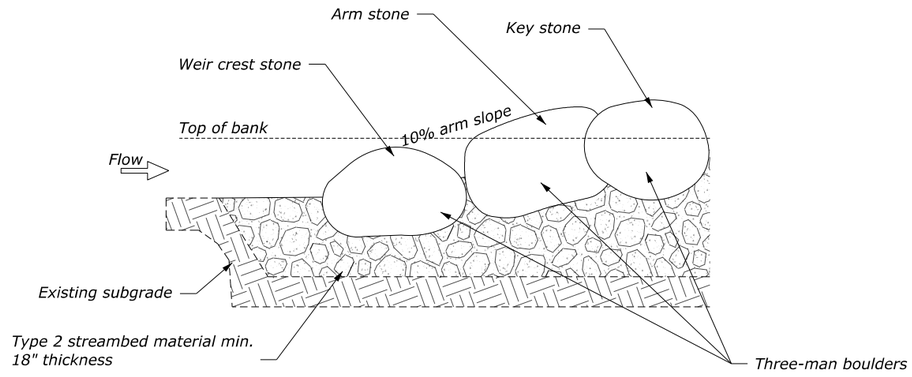
B **STEP POOL - CREST CROSS SECTION**

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A **STEP POOL - PROFILE VIEW**

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C **STEP POOL - ARM CROSS SECTION**

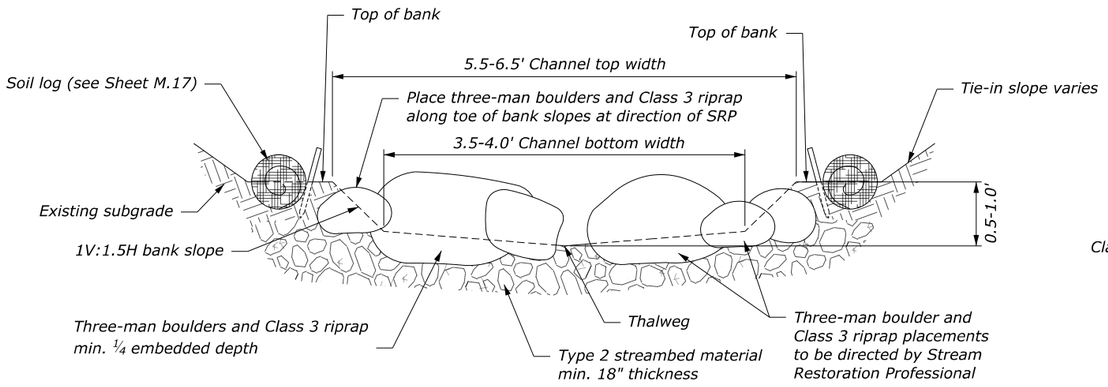
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NOTE:
1. SRP = Stream Restoration Professional

TYPICAL CHANNEL TREATMENT STEP POOL DETAIL

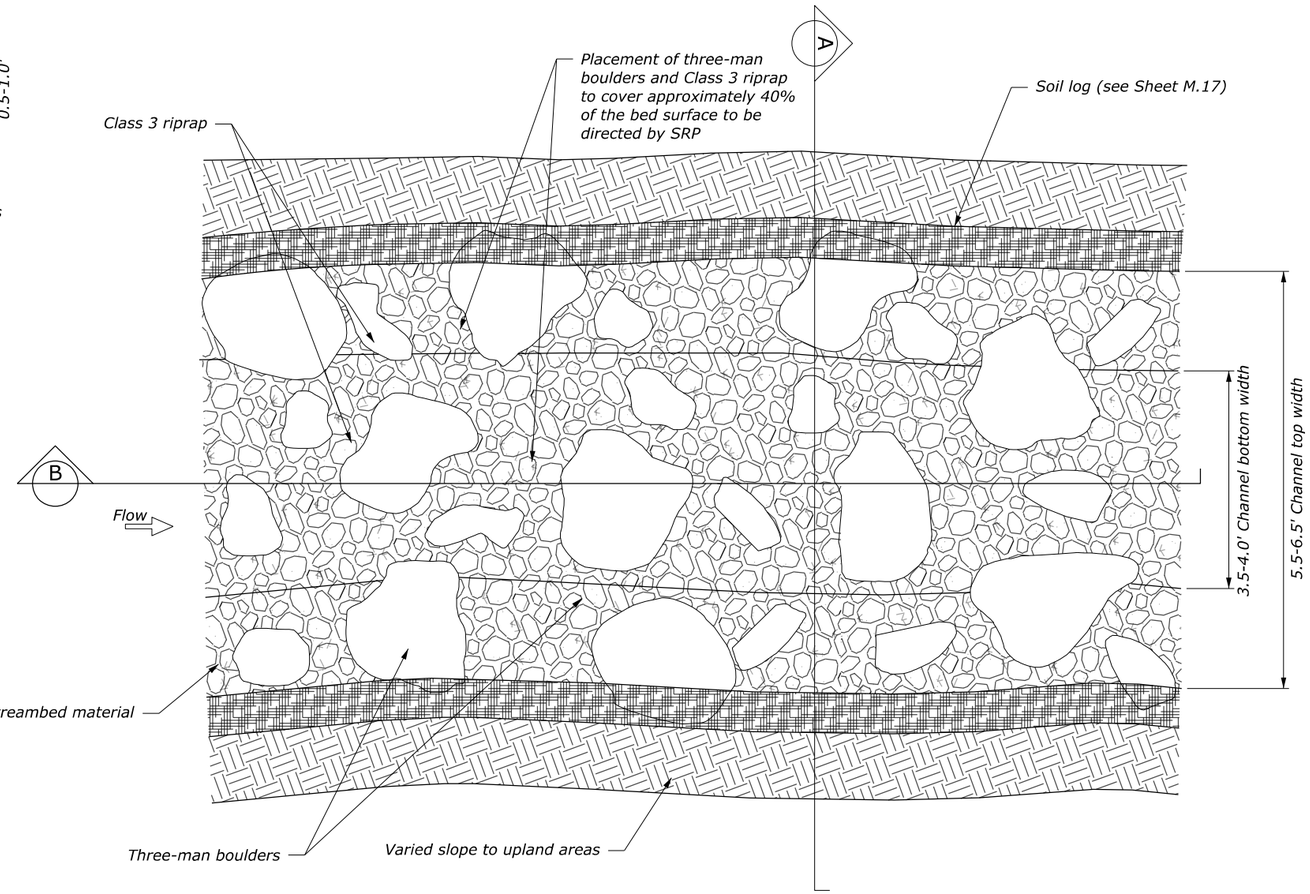
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21 December 2021 8:03 PM

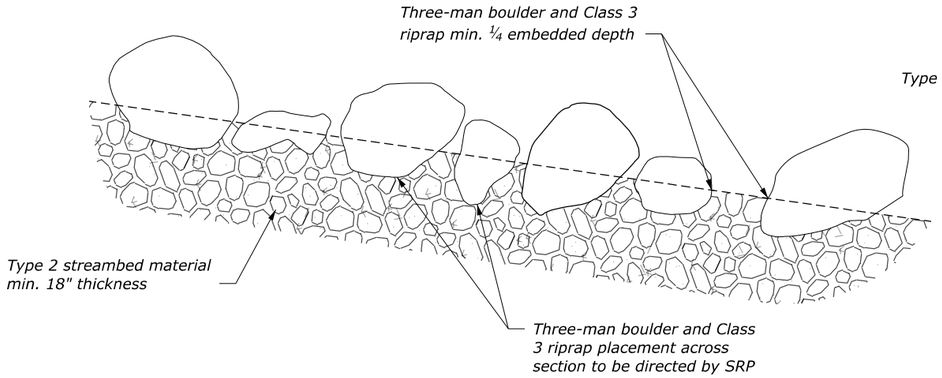
STATE	PROJECT	SHEET NUMBER
WY	NPS YELL 12(2)	M.15



A **CASCADE - SECTION VIEW**

NOT TO SCALE





B **CASCADE- PROFILE VIEW**

NOT TO SCALE

CASCADE - PLAN VIEW

NOT TO SCALE

NOTE:
1. SRP = Stream Restoration Professional

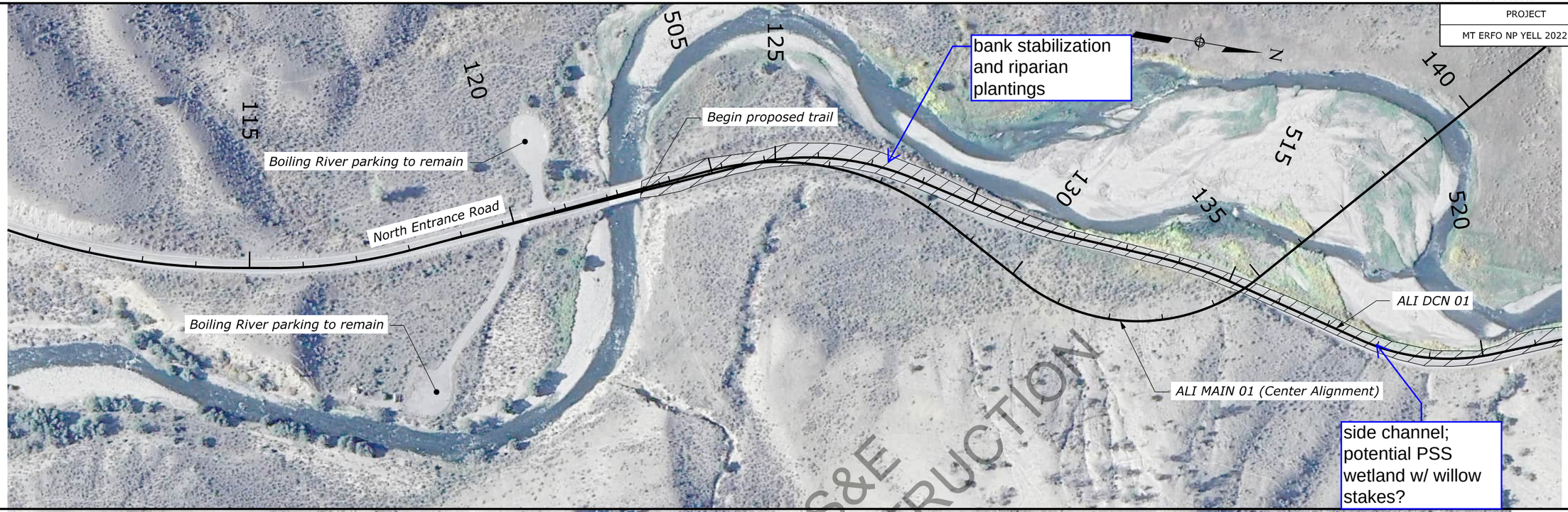
TYPICAL CHANNEL TREATMENT CASCADE DETAIL

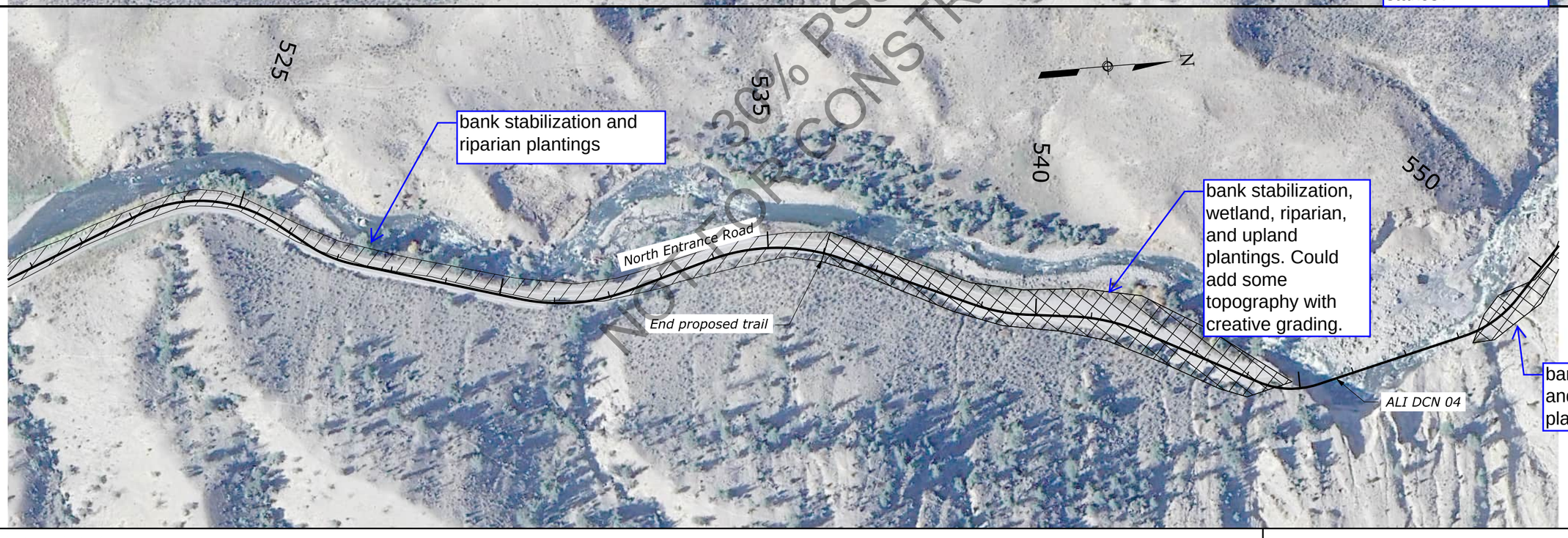
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21 December 2021 8:04 PM

Attachment 4
30 Percent Design Drawings

NPS PMIS No. 326069 NPS Drwg No. xxxxxx

PROJECT	SHEET NUMBER
MT ERFO NP YELL 2022-1(2)	G.1





30% PS&E
NOT FOR CONSTRUCTION

Asphalt concrete pavement milling / roadway reconditioning

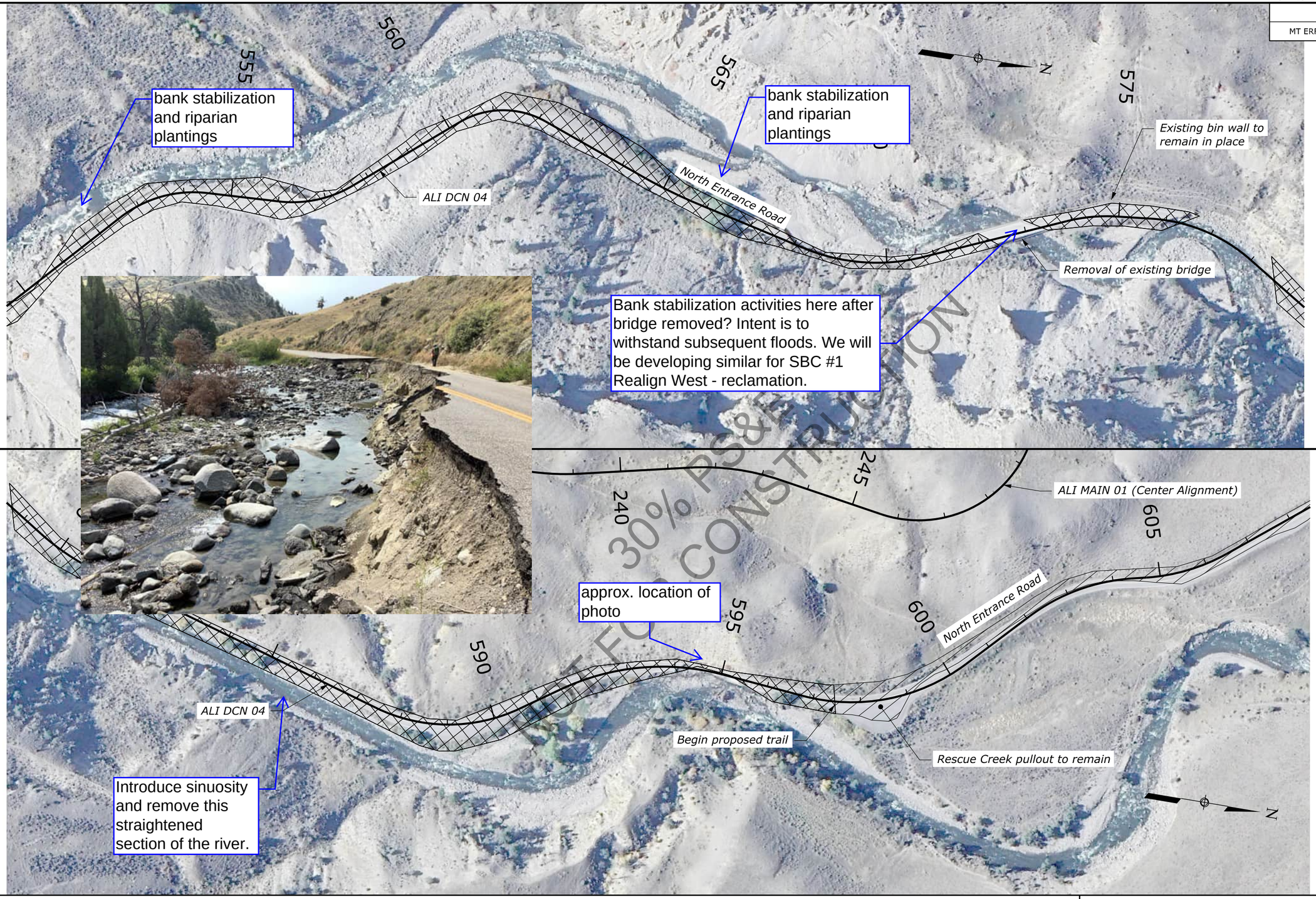
Roadway obliteration

NORTH ENTRANCE RD. DECONSTRUCTION (CENTER ALIGNMENT)

c:\pw-work\d0627346\mt-ep-vdl2022-1-2_PP_DCN_01.dgn [DCN_01]
25 January 2024 4:32 PM

NPS PMIS No. 326069 NPS Drwg No. xxxxxx

PROJECT	SHEET NUMBER
MT ERFO NP YELL 2022-1(2)	G.2



30% PS&E NOT FOR CONSTRUCTION

Asphalt concrete pavement milling / roadway reconditioning

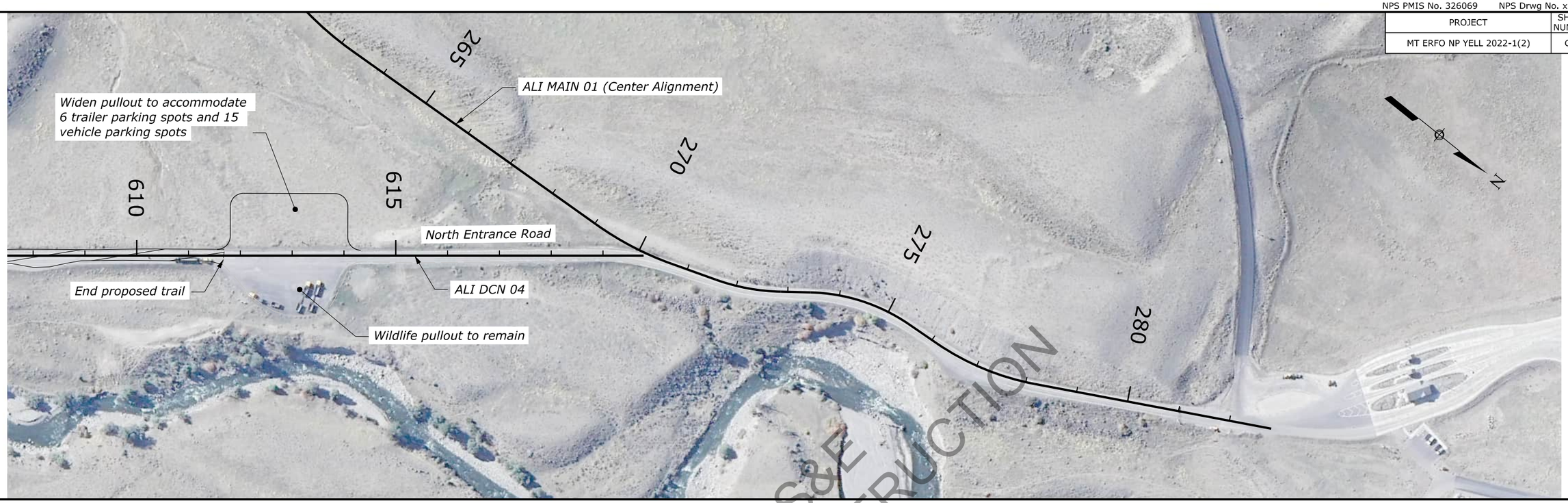
Roadway obliteration

NORTH ENTRANCE RD. DECONSTRUCTION (CENTER ALIGNMENT)

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25 January 2024 4:32 PM

NPS PMIS No. 326069 NPS Drwg No. xxxxxx

PROJECT	SHEET NUMBER
MT ERFO NP YELL 2022-1(2)	G.3



30% PS&E
NOT FOR CONSTRUCTION

Asphalt concrete pavement milling / roadway reconditioning

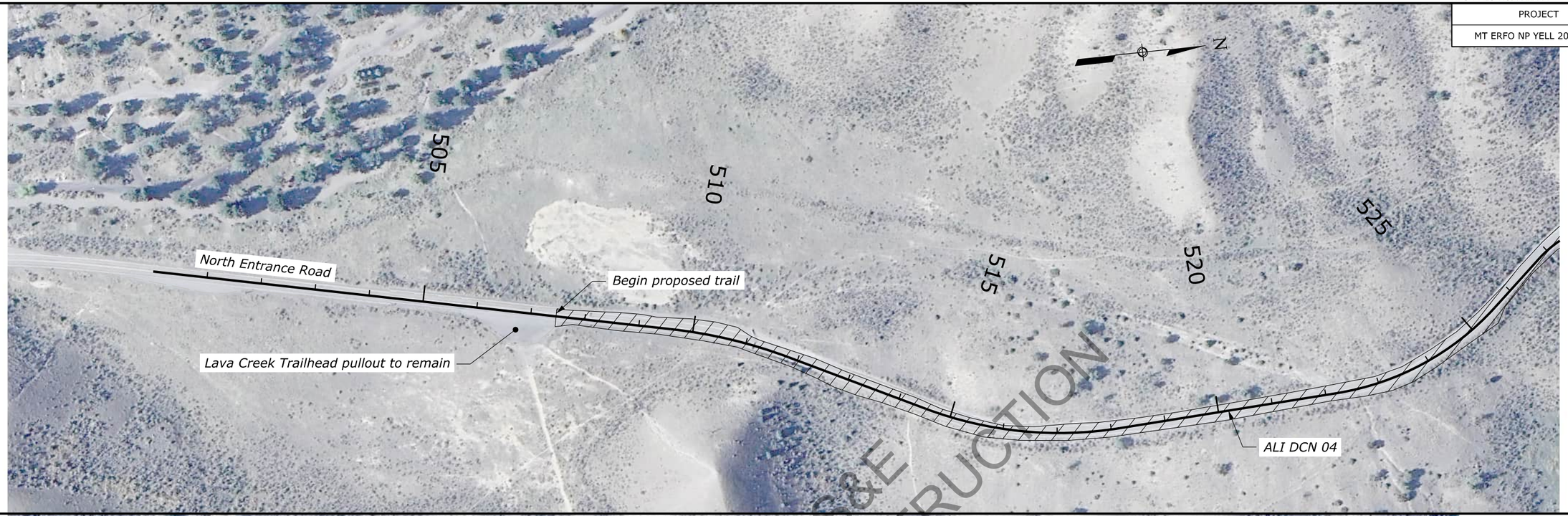
Roadway obliteration

NORTH ENTRANCE RD. DECONSTRUCTION (CENTER ALIGNMENT)

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25 January 2024 4:32 PM

NPS PMIS No. xxxxxx NPS Drwg No. xxxxxx

PROJECT	SHEET NUMBER
MT ERFO NP YELL 2022-1(2)	G.4





30% PS&E
NOT FOR CONSTRUCTION

Asphalt concrete pavement milling / roadway reconditioning

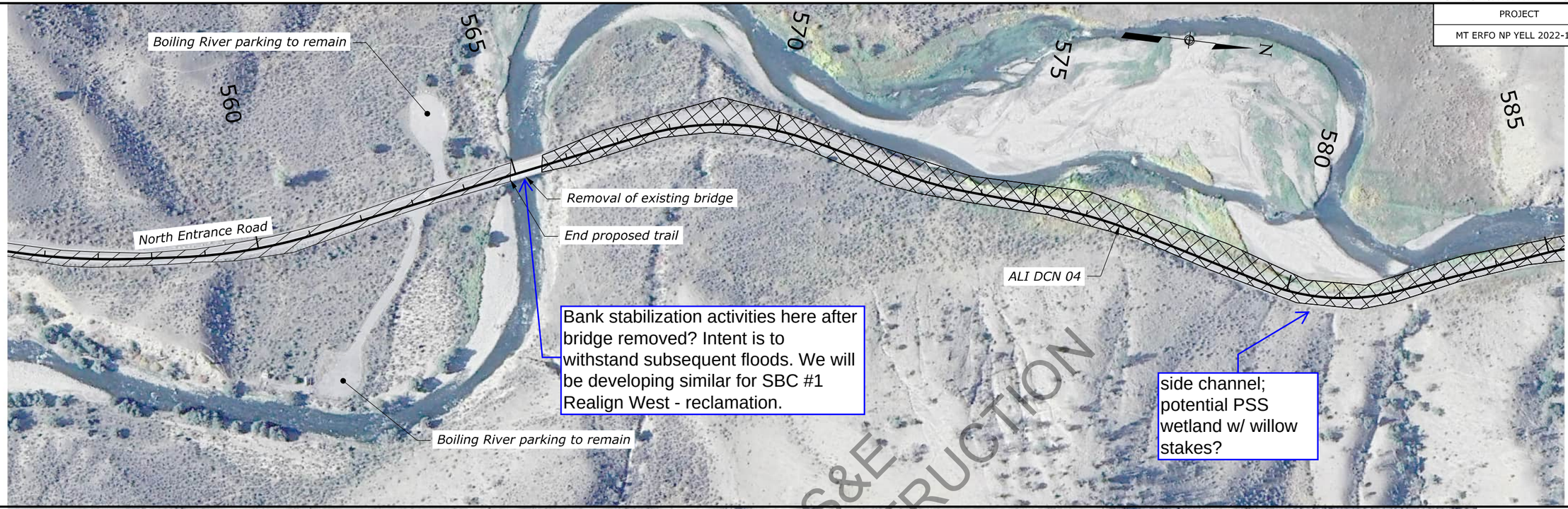
Roadway obliteration

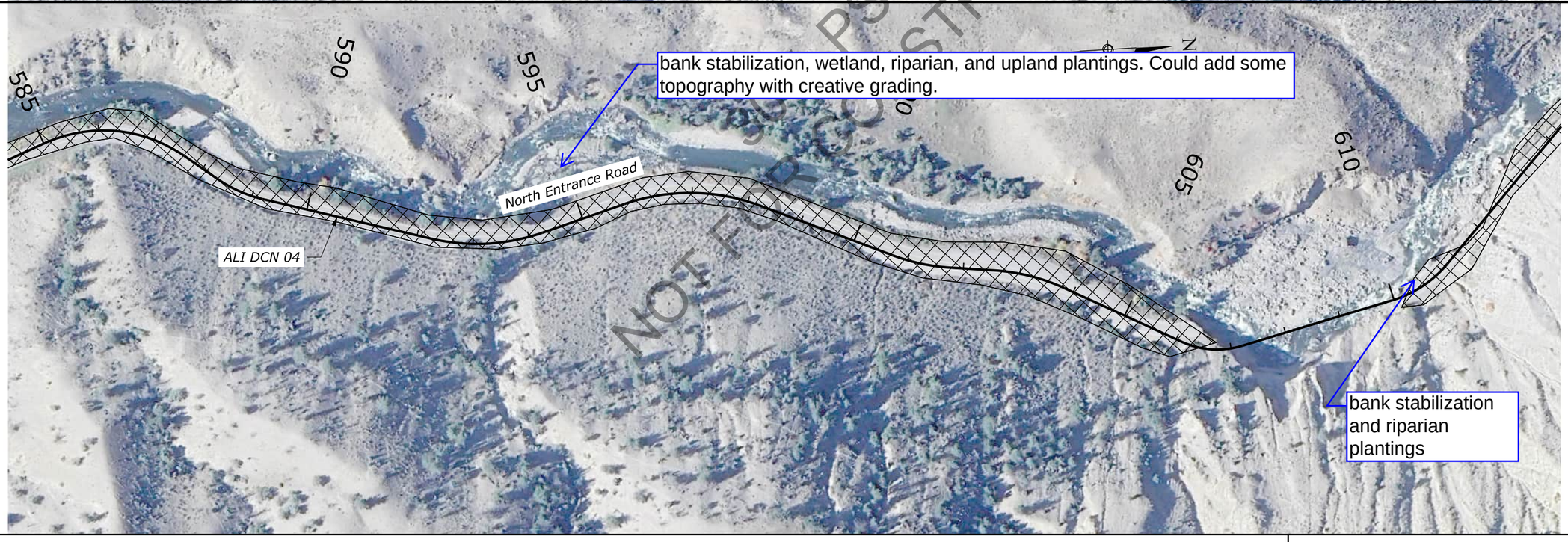
NORTH ENTRANCE RD. DECONSTRUCTION (OGR ALIGNMENT)

c:\pw-work\d0627346\mt-ep-vell2022-1-2_PP_DCN_04.dgn [ALI_DCN_04 - Plan 1 (Sheet)]
25 January 2024 1:31 PM

NPS PMIS No. xxxxxx NPS Drwg No. xxxxxx

PROJECT	SHEET NUMBER
MT ERFO NP YELL 2022-1(2)	G.5





PS&E NOT FOR CONSTRUCTION

Asphalt concrete pavement milling / roadway reconditioning

Roadway obliteration

NORTH ENTRANCE RD. DECONSTRUCTION (OGR ALIGNMENT)

c:\pw-work\dd0627346\mt-ep-vatl2022-1-2_PP_DCN_04.dgn [ALI_DCN_04 - Plan 3 (Sheet)]
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NPS PMIS No. xxxxxx NPS Drwg No. xxxxxx

PROJECT	SHEET NUMBER
MT ERFO NP YELL 2022-1(2)	G.6

620 625 630 635 640 615

N

ALI DCN 04

North Entrance Road

Existing bin wall to remain in place

Removal of existing bridge

Bank stabilization activities here after bridge removed? Intent is to withstand subsequent floods. We will be developing similar for SBC #1 Realign West - reclamation.



655 660 665 670

N

Begin proposed trail

approx location of photo

ALI DCN 04

Rescue Creek pullout to remain (gravel only)

30% PS&E NOT FOR CONSTRUCTION

Asphalt concrete pavement milling / roadway reconditioning

Roadway obliteration

NORTH ENTRANCE RD. DECONSTRUCTION (OGR ALIGNMENT)

c:\pw-work\dd0627346\mt-ep-vatf2022-1-2_PP_DCN_04.dgn [ALI_DCN_04 - Plan 5 [Sheet]]
25 January 2024 4:35 PM

NPS PMIS No. xxxxxx NPS Drwg No. xxxxxx

PROJECT	SHEET NUMBER
MT ERFO NP YELL 2022-1(2)	G.7



30% PS&E
NOT FOR CONSTRUCTION

Asphalt concrete pavement milling / roadway reconditioning

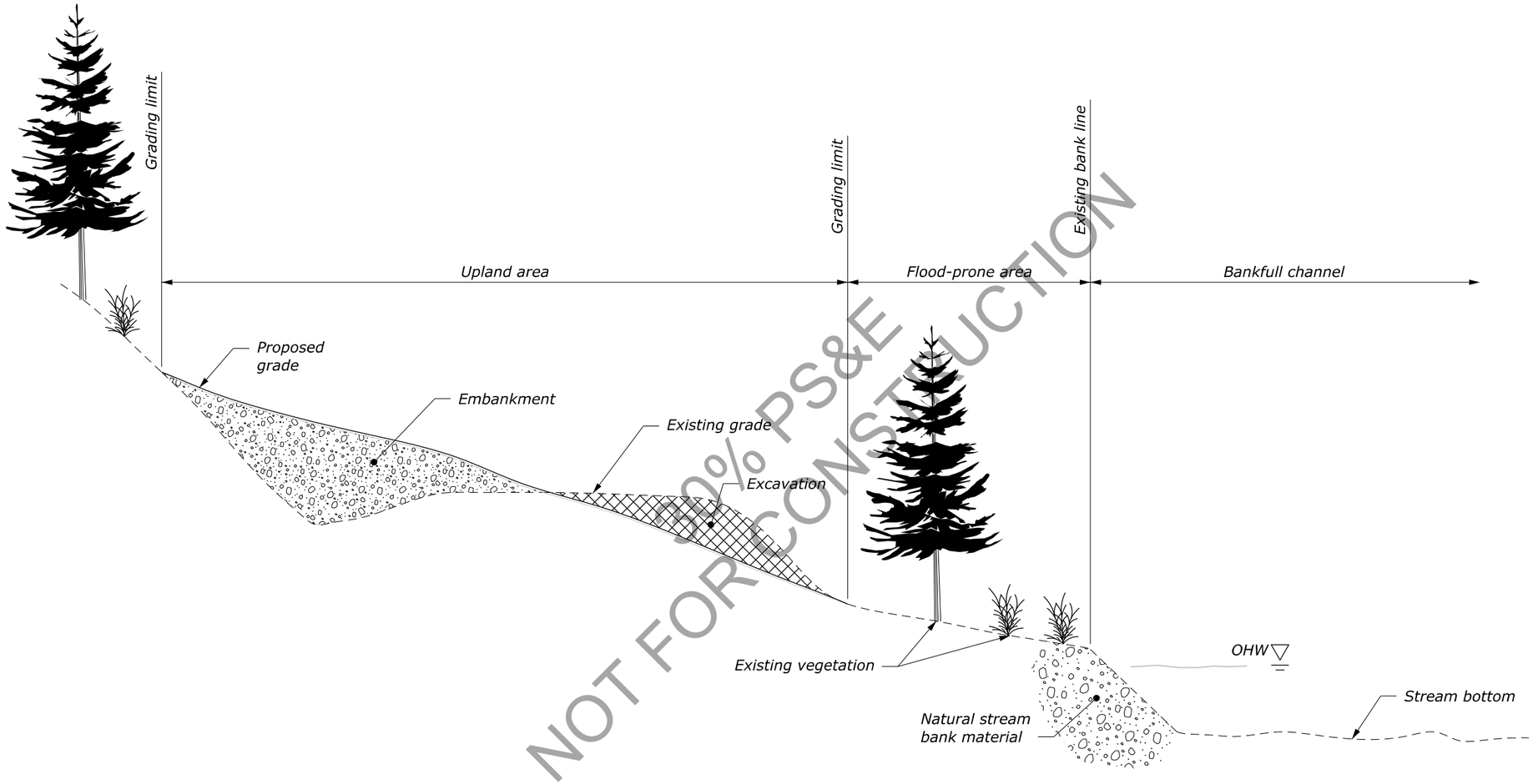
Roadway obliteration

NORTH ENTRANCE RD. DECONSTRUCTION (OGR ALIGNMENT)

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NPS PMIS No. xxxxxx NPS Drwg No. xxxxxx

PROJECT	SHEET NUMBER
MT ERFO NP YELL 2022-1(2)	G.8



90% PS&E NOT FOR CONSTRUCTION

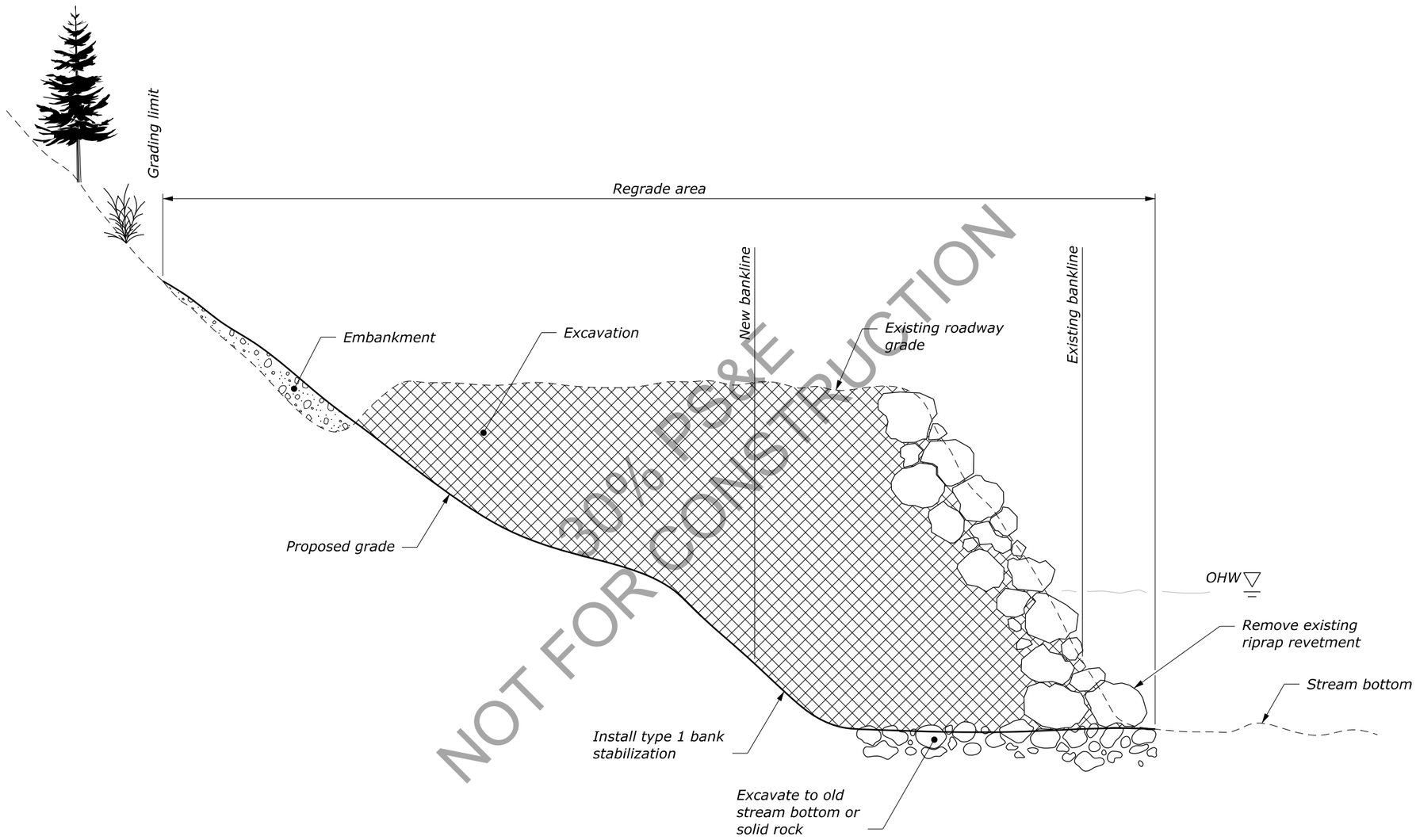
NOTE:
1. Preserve vegetation and bank materials beyond regrade area).
2. Place mulch, landscape woody debris, and vegetation over regrade area above ordinary high water.

BEYOND FLOOD PRONE AREA

c:\pw-work\d0627346\mt-ep-yell2022-1-2_HYD.dgn [BEYOND FLOOD PRONE AREA]
26 February 2024 8:57 AM

NPS PMIS No. xxxxxx NPS Drwg No. xxxxxx

PROJECT	SHEET NUMBER
MT ERFO NP YELL 2022-1(2)	G.9

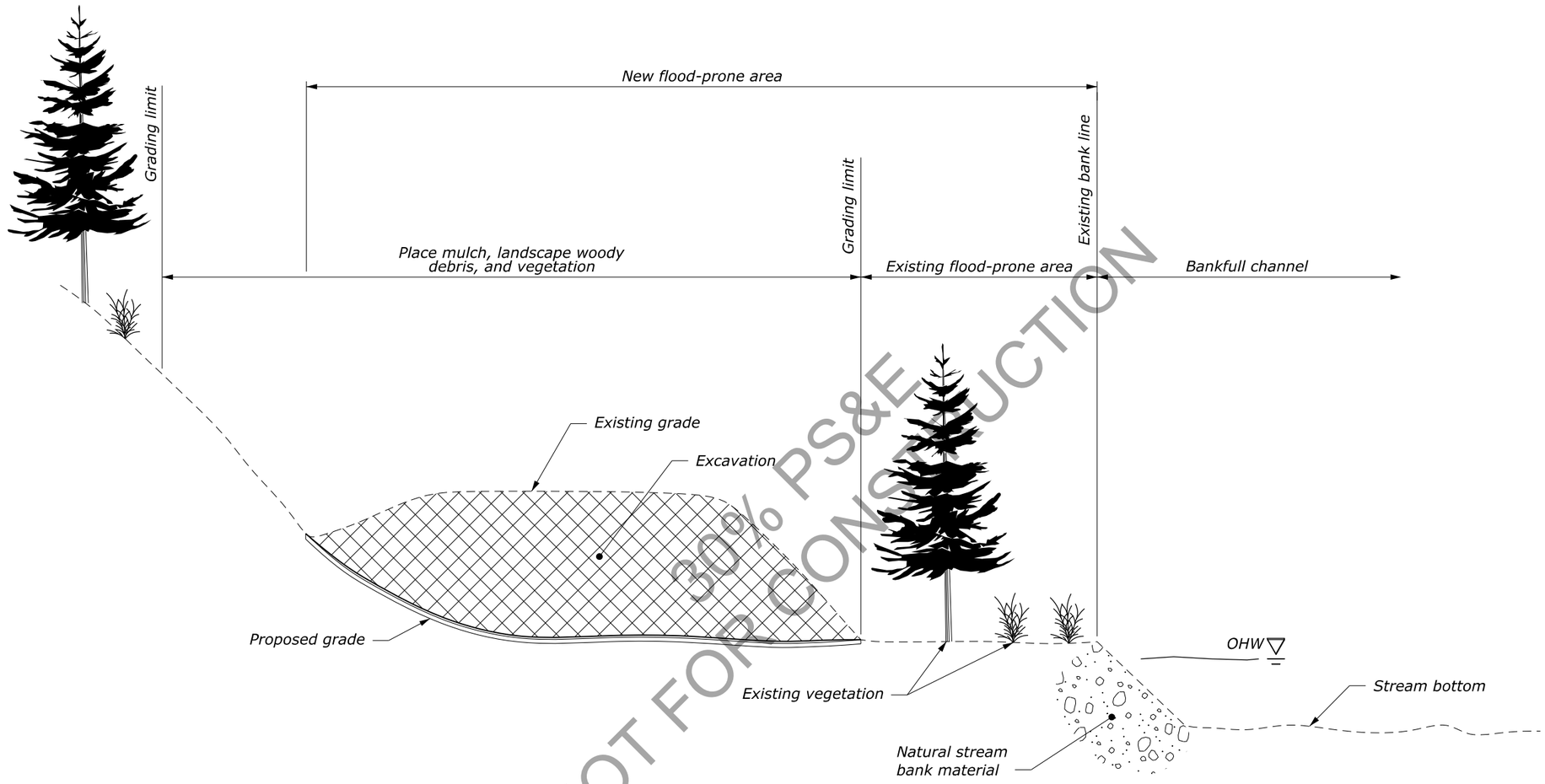


50% PS&E NOT FOR CONSTRUCTION

NOTE:
1. Place mulch, landscape woody debris, and vegetation over regrade area above ordinary high water.
2. Excavate and remove roadbed material to pre-road ground surface elevation. Verify depth in field.

STREAM BANK REALIGNMENT

c:\pw-work\d0627346\vnt-ep-ynl2022-1-2_HYD.dgn [STREAM BANK REALIGNMENT]
12 February 2024 10:18 AM



60% PS&E
NOT FOR CONSTRUCTION

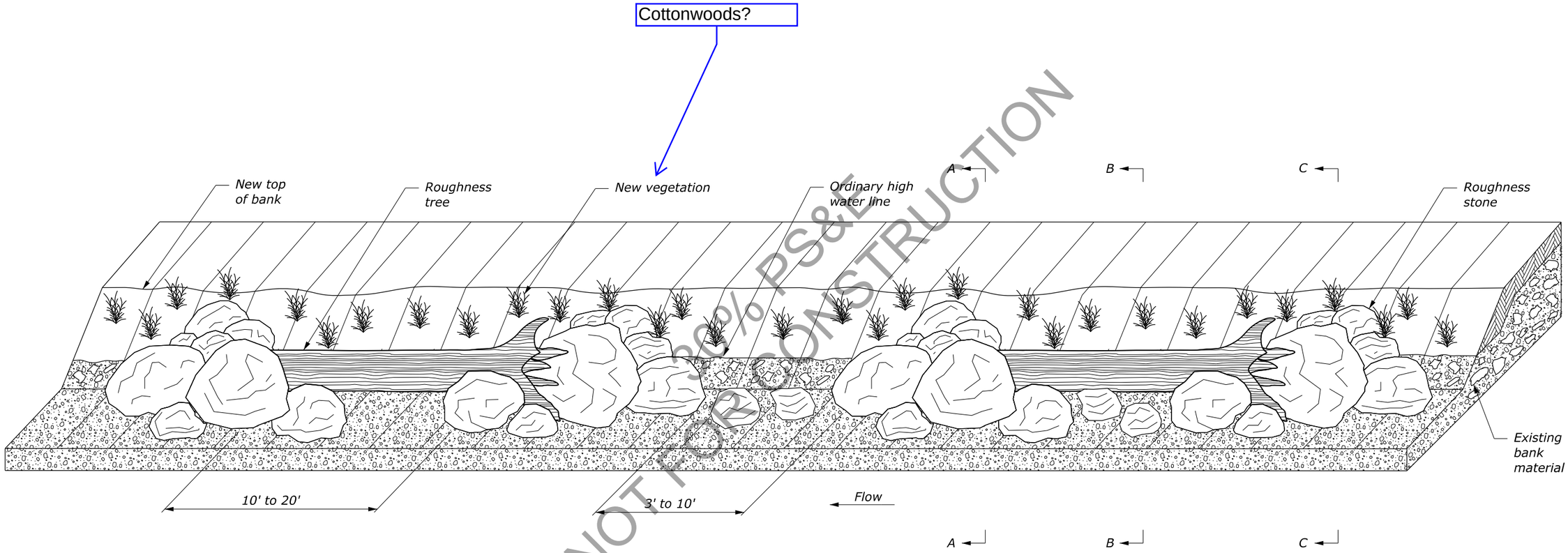
NOTE:
1. Preserve vegetation and bank materials beyond regrade area.

DEVELOPMENT FLOOD-PRONE AREA

c:\pw-work\d0627346\mt-ep-vatl2022-1-2_HYD.dgn [DEVELOPMENT FLOOD-PRONE AREA]
12 February 2024 10:21 AM

NPS PMIS No. xxxxxx NPS Drwg No. xxxxxx

PROJECT	SHEET NUMBER
MT ERFO NP YELL 2022-1(2)	G.11

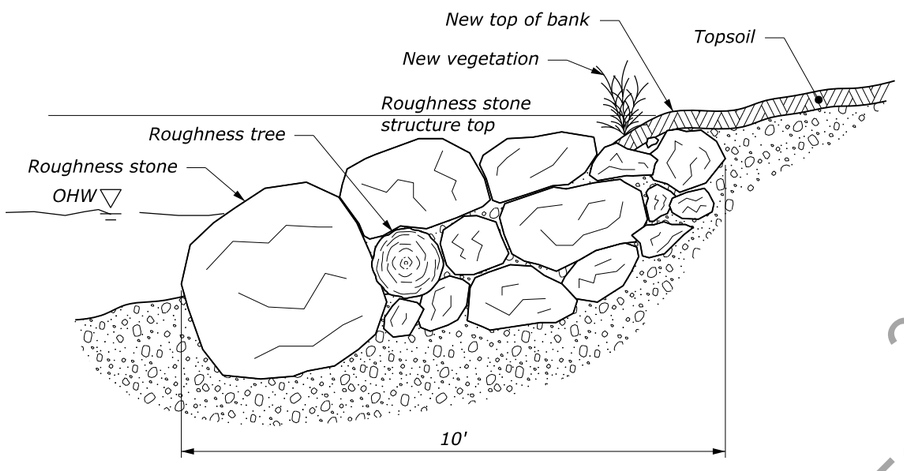


30% PS&E
NOT FOR CONSTRUCTION

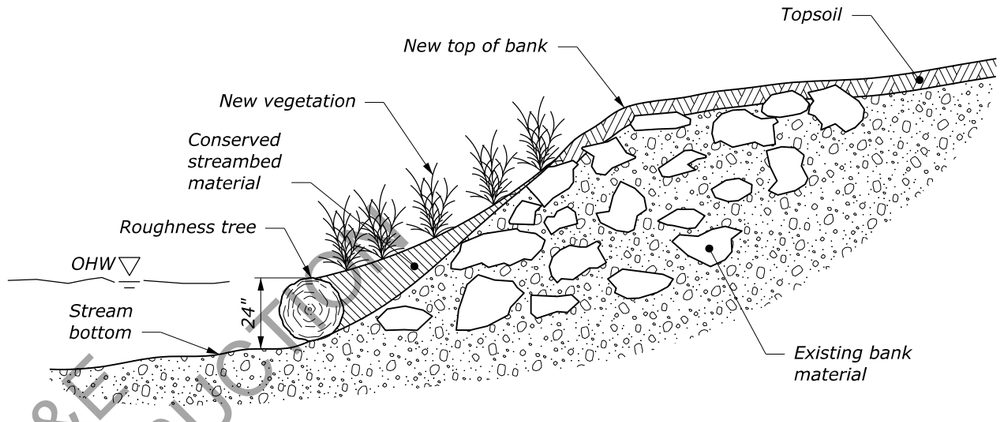
NOTE:
1. Field verify existing bank material gradation. Adjust spacing per CO.

TYPE 1 BANK STABILIZATION ELEVATION

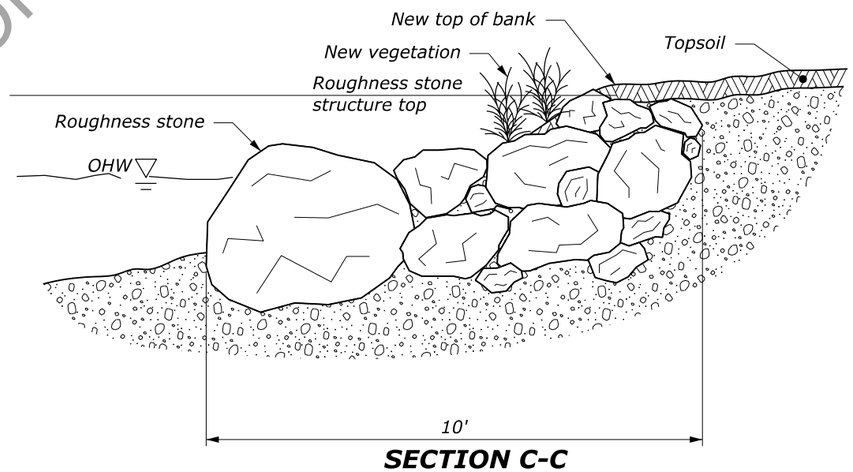
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26 February 2024 9:05 AM



SECTION A-A



SECTION B-B



SECTION C-C

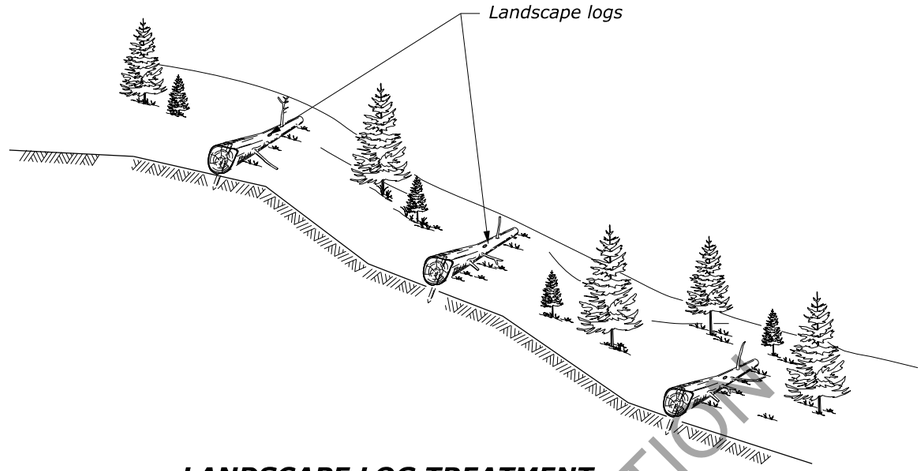
30% PS&E
NOT FOR CONSTRUCTION

NOTE:
1. Field verify existing bank material gradation.
2. Place top of roughness stone at least 3 ft above adjacent floodplain elevations.

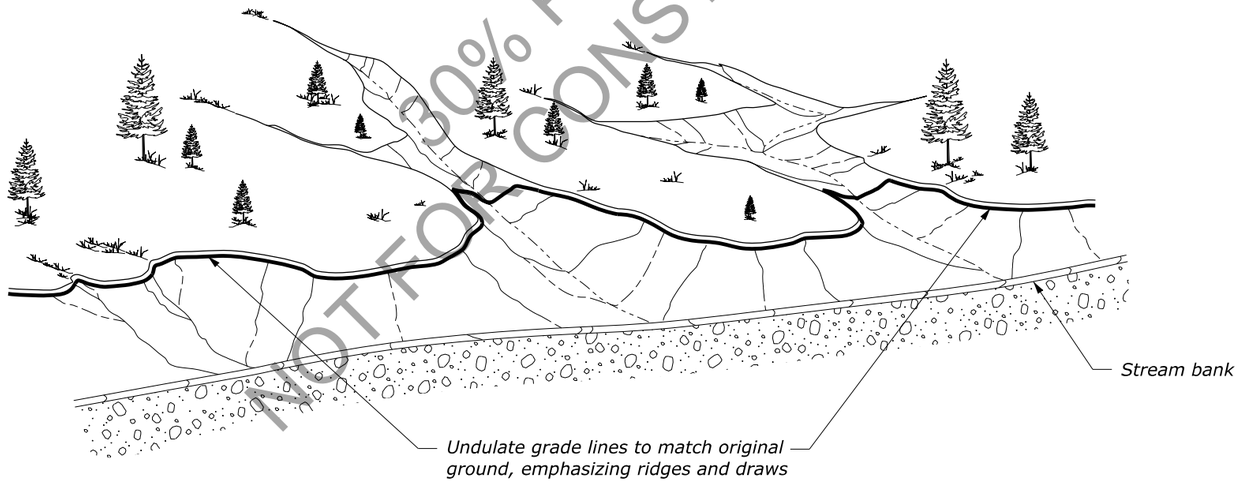
TYPE 1 BANK STABILIZATION SECTION AND DETAILS

c:\pw~work\d0627346\mt-cip-vatl2022-1-2_HYD.dgn [TYPE 1 BANK STABILIZATION SECTION AND DETAILS]
12 February 2024 10:18 AM

PROJECT	SHEET NUMBER
MT ERFO NP YELL 2022-1(2)	G.13



LANDSCAPE LOG TREATMENT PLAN

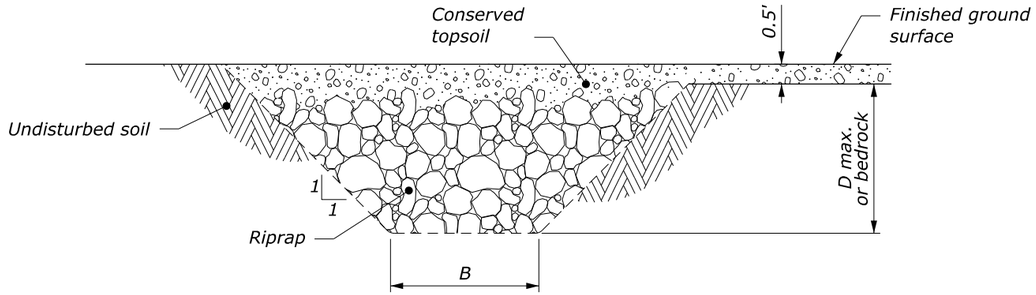


GRADE SLOPE TREATMENT (TYPICAL)

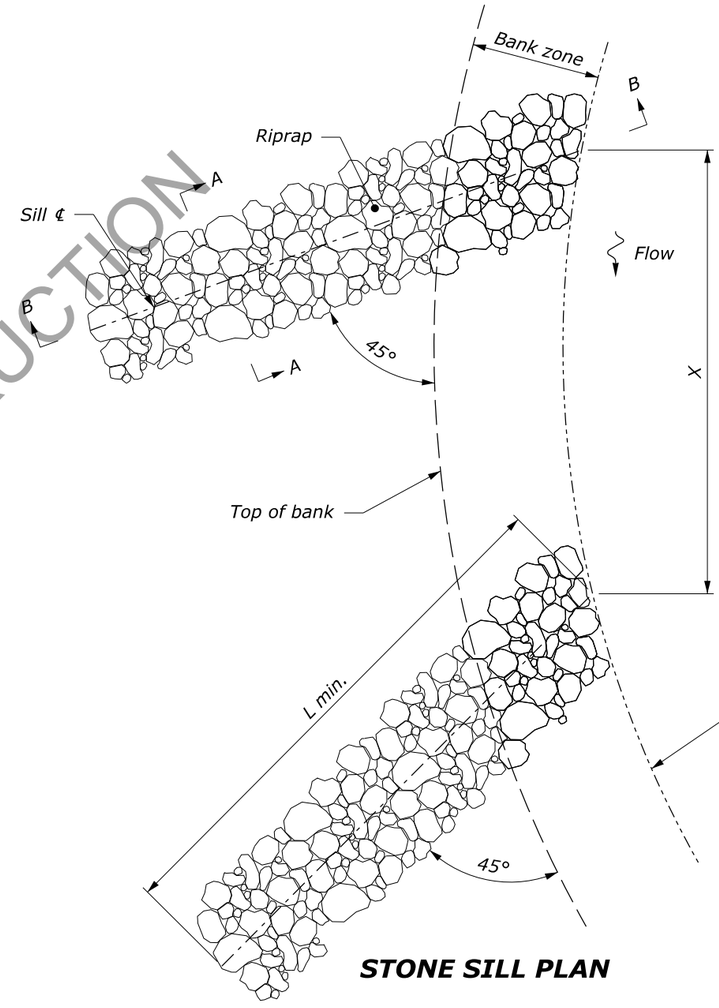
30% PS&E
NOT FOR CONSTRUCTION

UPLAND AREA DEVELOPMENT

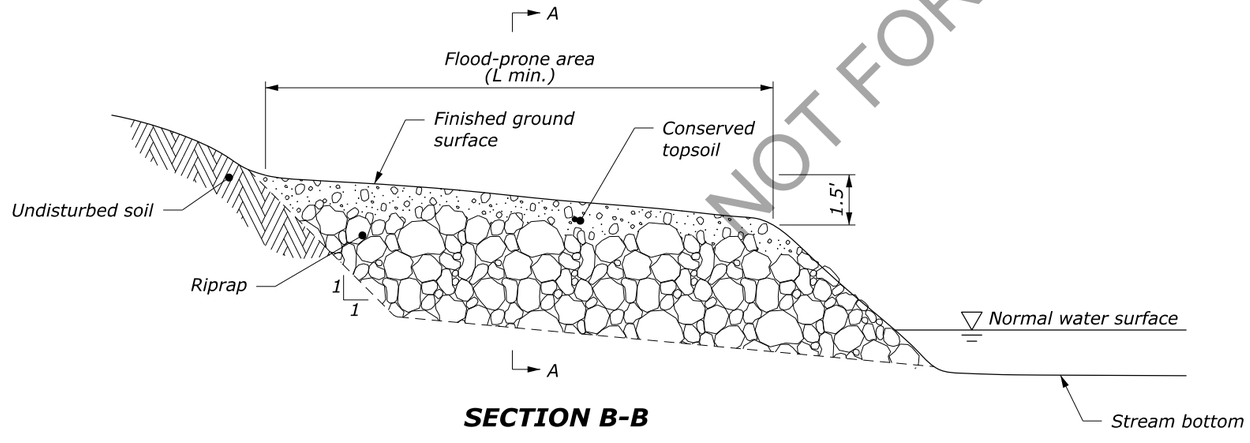
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12 February 2024 10:18 AM



SECTION A-A



STONE SILL PLAN



SECTION B-B

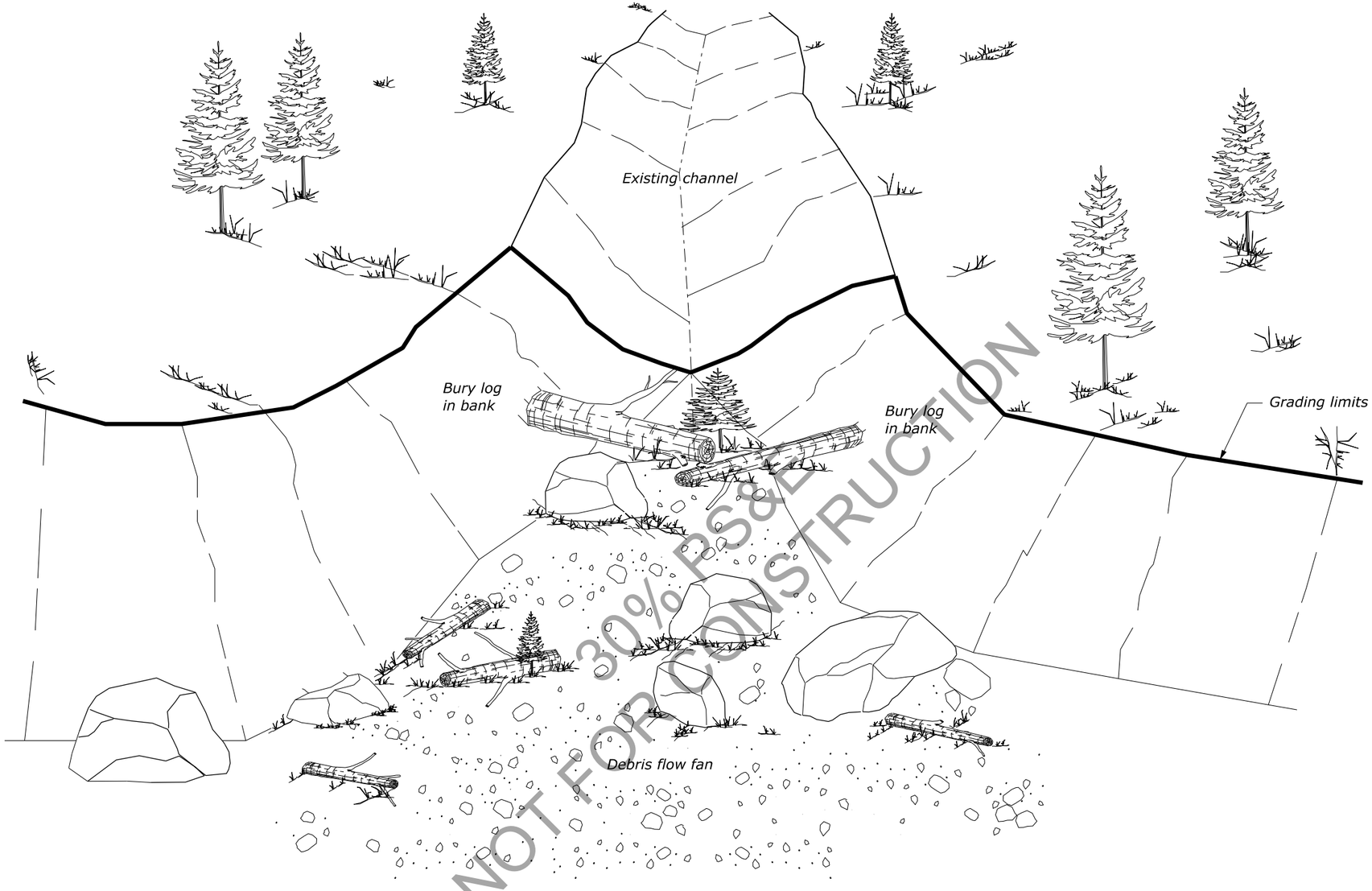
30% PS&E
NOT FOR CONSTRUCTION

STONE SILLS

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12 February 2024 10:18 AM

NPS PMIS No. xxxxxx NPS Drwg No. xxxxxx

PROJECT	SHEET NUMBER
MT ERFO NP YELL 2022-1(2)	G.15



30% PS&E
NOT FOR CONSTRUCTION

DEBRIS FLOW CHANNEL
CONCEPTUAL LANDSCAPE PLAN

NOTE:
1. Shape and outlet channel to provide natural appearance.
2. Place logs and boulders to dissipate velocities of future flows.
3. Use excavated materials from the immediate area to create a natural channel.

DEBRIS CONE REDEVELOPMENT

c:\pw-work\d0627346\mt-gp-vatl2022-1-2_HYD.dgn [DEBRIS CONE REDEVELOPMENT]
12 February 2024 10:18 AM

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APPENDIX H. REFERENCES

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APPENDIX I. ABBREVIATIONS AND ACRONYMS

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AASHTO	American Association of State Highway and Transportation Officials
ABA	Architectural Barriers Act
APE	area of potential effects
BMP	Best Management Practice
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
cfs	cubic feet per second
DO	Director's Order
DOI	Department of the Interior
EA	environmental assessment
EIS	Environmental Impact Statement
EMS	emergency medical service
ERO	ERO Resources Corporation
FEMA	Federal Emergency Management Agency
FHWA	Federal Highway Administration
FR	Federal Register
HRC	Yellowstone Heritage and Research Center
IBMP	Interagency Bison Management Plan
LOS	level of service
mile post	mile post
mph	miles per hour
MWAM	Montana Wetland Assessment Method
NEPA	National Environmental Policy Act
NHL	National Historic Landmark
NHPA	National Historic Preservation Act
NPS	National Park Service
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
OGR	Old Gardiner Road
Park	Yellowstone National Park
PEM	palustrine emergent

PEPC	NPS Planning, Environment, and Public Comment
PPV	person per vehicle
PSS	palustrine scrub-shrub
RV	recreational vehicle
USACE	U.S. Army Corps of Engineers
USC	U.S. Code
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
ULTO	Ute ladies'-tresses orchid
WFLHD	Western Federal Lands Highway Division
WSOF	Wetland Statement of Findings
WUS	waters of the United States

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APPENDIX J. COORDINATION AND CONSULTATION

APPENDIX J. CONSULTATION AND COORDINATION

This appendix describes the consultation and coordination conducted during the preparation of the Environmental Assessment (EA). A detailed description of the civic engagement/early consultation process and the agency consultation initiated during the development of the EA is described below.

Civic Engagement

Public involvement is an essential component of the National Environmental Policy Act (NEPA) planning process. Two public engagement opportunities have been offered for this project: one in 2024 during the pre-NEPA process to gather input on preliminary alternatives and identify issues of concern and the current 2025 public comment period for the Draft EA.

Pre-NEPA Civic Engagement

The Park issued a press release on February 2, 2024 to announce a 30-day public comment period that began on February 12, 2024 and ended on March 13, 2024. The press release included proposed project information; a Planning, Environment and Public Comment (PEPC) link to submit comments; and links to attend two virtual public meetings (webinars) on February 12 and 14. A project newsletter was provided on PEPC and included a project overview, purpose of and need for the project, an overview of the preliminary alternatives and alignment development, current project status and schedule, and information on how to comment on the project. A second press release was issued on February 16 to announce additional webinars on March 1 and March 6, 2024.

In total, the Park hosted four virtual webinars during the comment period, one each on February 12, February 14, March 1, and March 6, 2024, to explain the planning process, present preliminary alternatives, showcase methods for public comment, and answer participants' questions. In total, approximately 370 people participated in the virtual webinars.

During the 30-day public comment period, 154 pieces of correspondence were received from the public. Correspondences were submitted by the public in opposition to or in support of all three preliminary action alternatives (Alternative 2 – Center Alignment, Alternative 3 – OGR Alignment, and Alternative 4 – Gardner Canyon Alignment) (Table J-1). The top 10 issues of concern raised in public comments are listed below in Table J-2.

TABLE J-1. PUBLIC OPINION REGARDING PRELIMINARY ALTERNATIVES.

Public Opinion Regarding Alternatives	Total Correspondences
Alternative 2 Center Alignment Support	77
Alternative 2 Center Alignment Opposition	22
Alternative 3 OGR Alignment Support	42
Alternative 3 OGR Alignment Opposition	27
Alternative 4 Canyon Alignment Support	35
Alternative 4 Canyon Alignment Opposition	40

TABLE J-2. TOP ISSUES OF CONCERN RAISED IN PUBLIC COMMENTS.

Issues of Concern	Total Correspondences
Geological Stability and Soils: Commenters expressed concerns about geologic stability (e.g., earthflows, rockfalls, etc.) and advocated for National Park Service (NPS) to consider the alignment with the greatest stability.	53
Road Closures and Traffic: Commenters expressed concerns about the impacts that road construction-related closures and traffic delays would have on the Park's visitor experience, Park employees and their families, and businesses in Gardiner. Commenters urged NPS to select a road option that would minimize traffic delays.	47
Construction Costs: Commenters expressed concern about construction costs and urged the NPS to include costs for each alternative in the EA and to weigh those costs in the NPS decision-making process.	45
Wildlife and Wildlife Habitat: Commenters expressed concern about impacts on wildlife, including wildlife movement and migration corridors, and especially if the road density in the Park increased. Commenters encouraged NPS to minimize impacts on fish and wildlife species.	42
Human Safety: Commenters expressed concerns about human safety on the access road, providing suggestions for road grades, speeds, and vehicular limits.	35
Flood Risk: Commenters expressed concerns about resiliency of the road given the potential for future flooding and urged NPS to balance the public's desire for river access with flood risk.	24
Scenery: Commenters stressed the importance of maintaining scenic views of the Park from the North Entrance Road.	24
Visitor Use or Experience Issues: Commenters encouraged NPS to consider the visitor experience in the planning process for the new access road.	24
New Disturbance: Commenters expressed concern about new ground disturbance and encouraged NPS to select a road route that would minimize disturbance of new untouched areas of the Park.	19
Cultural Resource Issues: Commenters expressed concern about impacts on the Park's cultural resources and archeological sites.	18

Public Comment on the Environmental Assessment

Comments will be accepted for 30 days, beginning on October 13, 2025. Please submit your comments online at the National Park Service's (NPS) PEPC website: https://parkplanning.nps.gov/NorthEntranceRoad

Comments may also be hand delivered to the Park's headquarters in Mammoth Hot Springs, Wyoming, or mailed to:

Yellowstone Center for Resources

Attn: North Entrance Road
Yellowstone National Park
P.O. Box 168
Yellowstone National Park, WY 82190

Comments will not be accepted by phone or e-mail. We strongly encourage you to submit your comments through PEPC. Simply select "Yellowstone NP" from the drop-down box and follow the link for the North Entrance Road.

During the 30-day comment period, one in-person open house and two webinars will be provided. Yellowstone National Park invites the public to learn about and provide input on the North Entrance Road Project on November 4, 2025 at an in-person open house or virtually at

one of the webinars (November 3 and 12, 2025). The goals of this outreach effort are to engage and solicit comments from various agencies, stakeholders, and the public regarding the project alternatives and the associated environmental impacts analyses presented in the EA.

During the public meetings, the three revised road alignment action alternatives will be presented along with two video flyovers to explain the damage, environmental challenges, constraints, and opportunities of each alignment. Meeting details are available on the PEPC website: https://parkplanning.nps.gov/NorthEntranceRoad.

Agency Consultation

The NPS initiated consultation with relevant agencies during the preparation of this EA, as discussed in more detail below.

Section 7 of the Endangered Species Act

Impacts on Canada lynx, Canada lynx critical habitat, and grizzly bear from the proposed action would be covered under a programmatic biological assessment developed in cooperation with Federal Highway Administration-Western Federal Lands Highway Division to fulfill the requirements for Section 7 consultation with the U.S. Fish and Wildlife Service (USFWS) under the Endangered Species Act (ESA) (NPS 2008). The NPS is also preparing a project-specific BA for the proposed project to address potential impacts to other federally listed species. The BA will be submitted to the USFWS as part of informal consultation under the ESA.

Section 106 of the National Historic Preservation Act

The NPS initiated Section 106 consultation with the Montana State Historic Preservation Office and the Wyoming State Historic Preservation Office regarding this undertaking on March 14, 2024. In a response dated April 10, 2024, the Montana SHPO concurred with the NPS's definition of the area of potential effects and provided general recommendations for future correspondence. In a letter dated June 26, 2024, the NPS provided design updates and an opportunity to review and comment on preliminary (30 percent) construction plans, and request concurrence on preliminary identification of historic properties that may be affected by the project. In a response dated July 26, 2024, the Montana SHPO provided concurrence with NPS determinations. The Wyoming SHPO provided concurrence with NPS determinations in a response dated June 19, 2024.

Tribes

The NPS sent letters to 27 tribes on February 29, 2024 to notify them of the start of the planning process.

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