

Yellowstone National Park is a treasure that inspires awe in travelers from around the world. New Zealand and Iceland are known for their geysers, but nowhere are there as many as in Yellowstone. At the heart of Yellowstone's past, present, and future lies volcanism. About 2 million years ago, then 1.2 million years ago, and then again 600,000 years ago, catastrophic volcanic eruptions occurred here. The latest eruption spewed out nearly 240 cubic miles of debris. What is now the park's central portion then collapsed, forming a 28- by 47-mile caldera, or basin. The magmatic heat powering those eruptions still powers the park's famous geysers, hot springs, fumaroles, and mud pots. The spectacular Grand

Canyon of the Yellowstone River provides a glimpse of Earth's interior. Its waterfalls highlight the boundaries of lava flows and thermal areas. Rugged mountains flank the park's volcanic plateau, rewarding both eye and spirit. Yellowstone's wildlife includes the American bison, elk, grizzly and black bears, trumpeter swans, and Yellowstone cutthroat trout. A variety of vegetation types is encountered, from near-desert vegetation around the North Entrance to subalpine meadows and forests on Mt. Washburn. Lodgepole pine covers about 60 percent of the park and constitutes about 80 percent of the forested areas. Yellowstone would be a premier national park for its scenery or its wildlife alone, but its history

also resonates with colorful tales of fur trappers—Jim Bridger and Osborne Russell—and explorers and surveyors, with their photographers and artists. William Henry Jackson's photographs and Thomas Moran's sketches influenced Congress to establish Yellowstone as the world's first national park in 1872. This national park idea has now become a land-use model for many nations, and Yellowstone has evolved from a pleasuring ground and wildlife refuge to be recognized today as an International Biosphere Reserve and World Heritage Site as well. The guide below can help you choose what to see within the time limits of your Yellowstone visit. We hope it will make your travel more

efficient and rewarding. The guide presents capsule advice on three segments of the park's Grand Loop. This figure-8 shaped road system was designed to present the park's major attractions to travelers. Facilities and services are shown on the maps, and may also be found in the gateway communities—Jackson and Cody, Wyo., and West Yellowstone, Gardiner, Silver Gate, and Cooke City, Mont. Ask at the visitor centers for other publications to help you explore the park. And remember: Park roads sample but a fraction of Yellowstone National Park. The rest is backcountry—traversed by 1,000 miles of trails.

Old Faithful Geyser, by Stan Osolinski

A Guide to the Park and Its Wildlife



Regulations to Protect You and the Park

All wildlife, especially bison and bears, can be dangerous. Keep your distance! Never approach, harass, or feed any animals, even small ones. Pets must be leashed; they are prohibited on trails and in the backcountry. Camp and build fires only in designated areas.

Hot springs and geyser areas are fragile and unstable; stay on trails to protect yourself and features. Throwing coins and other items into thermal pools damages them and is illegal. Climbing in the Canyon area is dangerous to you and others and is prohibited.

Swimming or bathing in thermal pools or streams whose waters originate entirely from a thermal spring or pool is prohibited.

Boating and fishing permits are required and available at ranger stations. Boating is allowed only on lakes, which are dangerously cold. Know the regulations before you fish; many streams are catch-and-release or fly-fishing only.

FOR EMERGENCIES, DIAL 911, or (307) 344-7381.

Backcountry permits are required for overnight trips. Discuss your plans with a ranger. It's safer never to hike alone. Always register at the trailhead before your trip. Know how to store your food in bear country. Vehicles are prohibited on trails.

Maximum speed limit is 45 mph, lower when posted. Drive defensively! Traffic accidents cause more injuries to visitors than natural hazards. Use pullouts to watch wildlife and allow faster traffic to pass. Be alert for pedestrians and bicyclists. Driving off roads is not permitted.

Defacing park features, collecting natural or archeological objects, picking wildflowers, and littering are illegal. Store your valuables securely and lock your vehicle. Report thefts or accidents promptly to a ranger.

Where to Watch for Wildlife

The best times to see wild animals in summer are early morning and late evening. The Hayden Valley between Fishing Bridge and Canyon, and Pelican Creek east of Fishing Bridge are prime moose territory. Watch for bison in the Hayden Valley, and waterfowl along

its Yellowstone River. Watch for elk, bison, pronghorn, and coyotes in the Lamar Valley, and for pronghorn in sagebrush flats near the North Entrance. Bighorn sheep frequent Mount Washburn in summer. Elk and occasional bison are seen in the Midway and Upper

Geyser Basins. The Lewis River environs near the South Entrance are good elk and moose habitat. Watch for mule deer near Old Faithful, Lake, Canyon, and the areas between the North Entrance and Tower

Bear Country

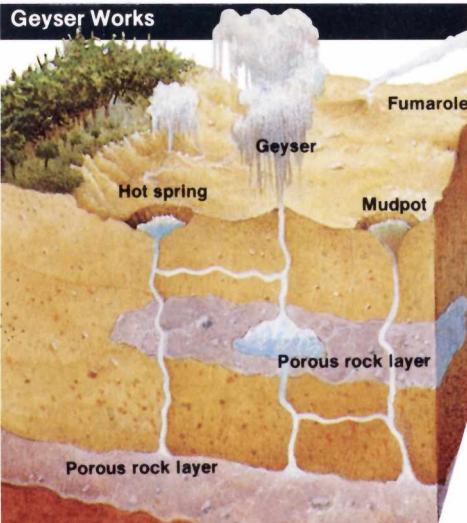
Grizzly and black bears are wild and dangerous. People have been seriously injured, maimed, and killed by both. Bears appear tolerant of people but may attack without warning. Always view bears from a safe distance. FEEDING WILDLIFE IS UNLAWFUL. Animals who receive

handouts often become aggressive, cause personal injury, and must be destroyed. Store all food in your car, never in your tent. Dispose of garbage in bear-proof garbage cans. Obtain information on hiking and camping in bear country at a ranger station or visitor center.



Minerva Terrace, Mammoth Hot Springs, by Jeff Gnass

Old Faithful to Mammoth Hot Springs



Surface water seeps down into porous rock layers to be heated under pressure and then rises back up as geysers or hot springs. As superheated water nears the surface, pressure drops and it flashes into the steam of a geyser. Hot

springs occur when water emerges that is not superheated or under pressure. Fumaroles, lacking enough moisture to flow, vent steam. Mud pots form over fumaroles whose acid gases decompose rocks into mud and clay.

One of the main routes to Old Faithful is from the south via Jackson, Wyo., and the South Entrance. The park road crosses the Continental Divide three times. Waters flow east of the divide to the Atlantic, or west to the Pacific. This park route passes five geyser basins—West Thumb, Upper (Old Faithful), Midway, Lower, and Norris—on its way to Mammoth Hot Springs. Sampling the world's largest concentration of geysers, you follow the beautiful Firehole and Gibbon rivers. A visitor center at Old Faithful and a museum at Norris tell aspects of the park story.

Old Faithful Old Faithful Geyser is the world's best-known geyser. Its eruption intervals have long varied around an average of 65 minutes, ranging from 32 to 120 minutes. A 1983 earthquake lengthened the interval's recent average from 69 to 76 minutes. Eruption times of other nearby geysers are available at the visitor center.

Old Faithful to Madison In Black Sand Basin the bright colors of Sunset Lake and Emerald Pool attract photographers. At Biscuit Basin, mineral deposits took on biscuit shapes before a 1959 earthquake triggered changes destroying the biscuits. At Midway Geyser Basin you may walk to Excelsior Geyser Crater and Grand Prismatic Spring. Firehole Lake Drive (one way, northbound) loops off the main road to Great Fountain Geyser, Firehole Lake, a hot pool, and the Three Senses Trail. The Lower Geyser Basin features the Fountain Paint Pots. Fountain Flat Drive exits west and ends at Goose Lake. Firehole Canyon loop drive (one way, southbound), starting south of Madison Junction, passes by Firehole Falls. The museum at Madison Junction portrays the evolution of the national park idea. Roadside forests are mainly lodgepole pine, some reddened by the feeding of mountain pine beetles. West Yellowstone, Mont., is 14 miles west of Madison Junction. From Madison to Norris you drive along the Yellowstone caldera's north-west rim. Gibbon Falls cascade over the caldera wall.

Norris Junction to Mammoth Hot Springs Norris Geyser Basin's array of thermal features is unparalleled. Steamboat Geyser, the world's largest, erupts at irregular intervals of days to years. Echinus Geyser erupts about once per hour. Porcelain Basin is Yellowstone's hottest exposed area. Exhibits at Norris Museum explain geyser workings.

At Norris Junction you can turn east toward the Canyon area. At Canyon you can go north to Tower or south to Lake (see tours at right). Continuing north of Norris you pass Obsidian Cliff. Obsidian, a volcanic glass excellent for projectile points and cutting tools, was traded across North America by Native Americans. Five miles south of Mammoth Hot Springs, at Swan Lake Flat's north end, a rough one-way dirt road goes around Bunsen Peak. Two miles south of Mammoth Hot Springs the Upper Terrace Loop Drive passes through a fascinating thermal area. Gnarled limber pine trees on some extinct formations are over 500 years old. At Mammoth Hot Springs the terraces are spectacular travertine (calcium carbonate) formations deposited daily. Most new rock from Yellowstone's geysers is called geyserite, a noncrystalline mineral chemically similar to glass. Exhibits at Albright Visitor Center portray the park's early history and wildlife and tell how the U.S. Army protected the park from 1886 to 1916. Park headquarters is in the buildings of Ft. Yellowstone, a late 19th-century cavalry post. Gardiner, Mont., lies 5 miles north. The Yellowstone River flows north, eventually to join the Missouri.



Lower Falls, Grand Canyon of the Yellowstone, by Jeff Gnass

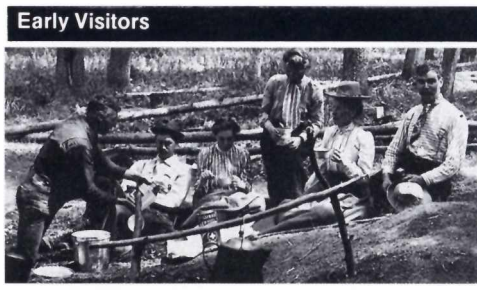
To Tower Junction and Canyon

The road east from Mammoth Hot Springs leads you 4 miles to Undine Falls, then 0.2 miles to Lava Creek (picnicking). Three miles further east look for waterfowl and muskrats at Blacktail Ponds. Next, Blacktail Plateau Drive, a one-way dirt road eastbound, leaves the main road to traverse grass- and sagebrush-covered hills and forests of Douglas-fir, Engelmann spruce, and lodgepole pine. Watch for pronghorn antelope, mule deer, and elk. Scattered groves of quaking aspen trees turn gold in autumn. The next side road leads to a petrified redwood tree. Such trees may be found over hundreds of square miles in northern Yellowstone. Some are still in an upright position.

Tower Junction to Northeast Entrance Lamar Valley, accessible all year, is winter range for elk and bison. You may camp at Slough Creek or Pebble Creek campgrounds en route to the Northeast Entrance, 29 miles from Tower Junction. Beyond lie Silver Gate (1 mile) and Cooke City (4 miles), Mont., and the Beartooth Highway climbs to 10,940 feet at Beartooth Pass.

Tower Junction to Canyon Tower Falls, tumbling 132 feet, was named for the adjacent volcanic pinnacles. Tower Creek flows into the Yellowstone River. South from Tower Falls, as you drive up Mount Washburn, look east, downslope, into prime grizzly bear country on Antelope Creek. This area is closed to human travel, to offer the bears refuge. **DO NOT ATTEMPT TO FEED OR APPROACH BEARS.** The main road next crosses Dunraven Pass at 8,850 feet elevation, amidst broad-topped whitebark pines and spire-shaped subalpine fir. Meadows produce a profusion of wildflowers during the brief summer. From the Washburn Hot Springs Overlook south of the pass, you can see the Yellowstone caldera. Its north boundary is Mount Washburn and its south boundary is the Red Mountains 35 miles away. You can see the Teton Range on clear days, on the right beyond the Red Mountains.

Canyon Because of bear activity here, camping is restricted to hard-sided units only. Exhibits at the Canyon Visitor Center explain the park's geology. A 2.5-mile loop road (one way) leads first to a spur road out to Inspiration Point. Here the Grand Canyon of the Yellowstone River plunges 1,000 feet below you. The canyon's colors were created by hot water acting on volcanic rock. It was not these colors, but the river's yellow banks at its distant confluence with the Missouri River, that occasioned the Minnetaree Indian name which French trappers translated as *roche jaune*, yellow stone. The canyon has been rapidly downcut



Early Visitors

Since the late 1800s Yellowstone has been a mecca for travelers. The world's first national park was soon a popular success. These folks hiked into the Grand Canyon of the Yellowstone, where Uncle Tom Richardson served their picnic.

more than once, perhaps by great glacial outburst floods. Little deepening takes place today.

Grandview Point affords a distant view of the 308-foot Lower Falls. Lookout Point affords a vista of Lower Falls, and a steep trail descends to a closer viewpoint. Back on the main road, turn left in 0.3 miles to view the brink of the 109-foot Upper Falls. Back on the main road again, go 0.6 miles south to Artist Point Road and cross Chittenden Bridge to Uncle Tom's Parking Area. Trails here offer close views of the Upper and Lower Falls. South Rim Drive leads to Artist Point for another view of the canyon and Lower Falls.

Hayden Valley The road here follows the Yellowstone River's meanderings across a former lakebed. After the great glaciers retreated, Yellowstone Lake was much larger than it is today, and this area was then flooded. The lake left fine silt and impermeable clay soil that permits little tree growth but allows rich shrubland that provides food for a variety of wild animals. Waterfowl, including white pelicans and trumpeter swans, abound in marshy areas. In this open parkland you may see moose, bison, and occasionally grizzly bears. **VIEW LARGE ANIMALS ONLY AT A DISTANCE, FROM YOUR CAR OR FROM ROADSIDES.** Do not stop in roadways; use roadside parking areas for your safety. No fishing is allowed for a 6-mile section in Hayden Valley. This provides quiet for the animals and views of untrammeled wilderness scenery for you. Stop at Mud Volcano and see the varied thermal features there. You might see spawning cutthroat trout jumping at Le Hardy Rapids, 3 miles north of Lake Junction, in June and July.



Yellowstone Lake, by Jeff Gnass

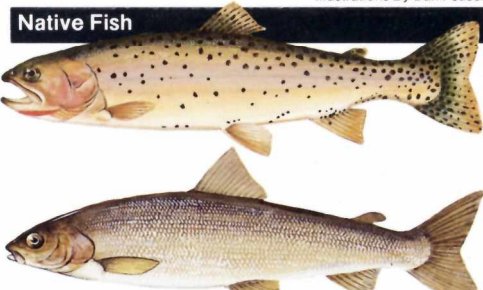
The Lake Area

East Entrance to Fishing Bridge Junction Cody, Wyo., lies 50 miles beyond the East Entrance. As you cross 8,530-foot elevation Sylvan Pass, watch for pikas and yellowbelly marmots, illustrated above, in the rocky debris of talus slopes. You descend the west slope of the Absaroka Mountains, an eroded volcanic range named for the Crow Indians. Near Yellowstone Lake a spur road leads to Lake Butte Overlook for a view of this immense body of water. Yellowstone Lake occupies only the southeast quarter of the Yellowstone caldera (see top text). At the overlook you are 4 miles outside the caldera's east boundary. Just north of the lake the Earth's surface is rising about 0.9 inches per year! This suggests future volcanic activity here. As you drive along the lake's edge, you can see Steamboat Springs. This is a hot spring remnant located on a line of faults, or fractures in the Earth, that also pass through Mary Bay and Indian Pond to the northwest. Bay and pond both occupy geologically recent hydrothermal explosion craters. The bottom sediments in Mary Bay are still very warm. Watch for moose browsing in the sedge meadows and marshes along Pelican Creek flats as you approach Fishing Bridge.

Exhibits at Fishing Bridge Museum feature the park's birds. Fishing Bridge itself spans the Yellowstone River, the lake's outlet. The bridge was closed to fishing in 1973. Fishing Bridge now offers one of the best wild trout spawning shows anywhere for most of the summer. White pelicans feed on the native cutthroat trout. Because of a high level of bear activity, only hard-sided units are allowed to camp in the Fishing Bridge area.

Yellowstone Lake is North America's largest mountain lake. Over geological time it has drained into the Pacific Ocean, the Arctic Ocean via Hudson Bay, and now drains into the Atlantic via the Gulf of Mexico. It is 20 miles long, 14 miles wide, and 320 feet deep at its deepest point. The average depth is about 139 feet. Trout generally inhabit the upper 60 feet because their foods rarely occur below that depth. The average surface temperature in August is about 60°F, and the bottom temperature never rises above 42°F. Swimming is discouraged even where not prohibited: Such cold waters can cause potentially fatal hypothermia or hyperventilation in minutes.

Boating is popular on some park lakes. Permits—required for all watercraft—and advice on canoeing and kayaking can be obtained at ranger stations at Lake Village or at Grant Village. A marina is at Bridge Bay and boat ramps are at Grant Village.



Native Fish

Yellowstone has 3 native subspecies of cutthroat trout (top), named for the red marks on lower jaws. Mountain whitefish are also park natives.

Traveling toward West Thumb you may take a rough spur road, starting south of Bridge Bay, to see the natural bridge for which the area is named. Gull Point Drive loops off the Grand Loop Road for a closer view of the lake's edge.

West Thumb and Grant Village Walk the boardwalk through the geyser basin at lake's edge at West Thumb. Intense heat measured in lake sediments below West Thumb indicates a shallow thermal system underlying this more recent caldera within the Yellowstone caldera. Should the lake level fall just a few feet, an immense steam (hydrothermal) explosion could occur here. That is what created the craters now filled by Mary Bay and Indian Pond, described above. Exhibits at Grant Village Visitor Center, two miles south of West Thumb, feature the park's immense wilderness. Fishing, boating, and backcountry use permits are available at the ranger station.

Yellowstone

Useful Road Distances	Old Faithful to Canyon via Madison and Norris	42mi	Old Faithful to Mammoth Hot Springs via Madison and Norris	51mi	Mammoth Hot Springs 80mi to East Entrance via Tower and Canyon	Fishing Bridge to 97mi South Entrance via Norris, and Old Faithful
Grand Loop road	142mi					
Lower Loop road	96mi	Old Faithful to Canyon via West Thumb and Lake Village	54mi	Mammoth Hot Springs 90mi to South entrance via Madison and Old Faithful		Fishing Bridge to 88mi West Entrance via West Thumb and Old Faithful
Upper Loop road	70mi					

