



## EPMT Annual Report: FY 2018



Map of Exotic Plant Management Team (EPMT) boundaries across the US and territories. Each team's name appears within the polygon that includes the parks they serve.

### Background

Management of invasive species, a National Park Service (NPS) and federal mandate, is conducted by park staff and 17 Exotic Plant Management Teams (EPMT). The EPMTs are located across the US and serve 287 park units as well as many non-NPS partners. The EPMTs were formed in 2000 through the Natural Resource Challenge to assist parks in reducing the impact of invasive plants and restoring native plant communities. Over time, the EPMT program has become an integral part of the NPS response to a growing invasive species threat and a source of expertise in invasive plant management not otherwise available in most parks.

Since the program's inception, team liaisons have consistently demonstrated innovation, flexibility, and efficiency in managing their programs. Teams provided substantial on-the-ground invasive species management support (8,300 acres treated and approximately 210,000 acres inventoried in fiscal year (FY) 2018) and much more. They spearhead prevention and early detection and rapid response actions to prevent or eradicate incipient populations of invasive species dramatically reducing future costs. Teams initiate and lead restoration efforts to increase resiliency and reduce susceptibility to future invasion of native plant communities. They protect cultural landscapes and significant ethnographic resources. The teams also effectively leverage EPMT program dollars through resourceful, productive, and mutually beneficial partnerships with contributions to teams valued at more than \$5.5 million in FY2018, which is more than the amount that goes out to the teams from the national office. Teams engage youth on

### Background (cont.)

a substantial scale with over 1,300 youth participants contributing approximately 110,000 hours in 2018. They also provide a range of valuable training opportunities to park staff, engage the public and future stewards of our national parks through creative and effective outreach and education activities and initiatives, and develop creative solutions to utilize limited EPMT funds to assist parks.

### What the EPMTs Protect

The NPS EPMTs are proactive and innovative in their approaches to invasive plant management which they perform in collaboration with park staff and other partners in order to protect and preserve the natural and cultural resources entrusted to the NPS for this and future generations. These resources span the entire US and its territories, and many are recognized as globally important having garnered designations and recognitions such as international biosphere reserves, Ramsar Wetlands of International Importance, designated wilderness, biodiversity hotspots, and Important Bird and Biodiversity Areas.

The EPMTs strive to protect a range of natural resources and native ecosystems. EPMT territory covers coastal, wetland, and riparian native plant and animal communities including on the east, Gulf, and west coasts, the dunes along the shores of Lake Michigan, west coast rainforest valleys, riparian woodlands, southeastern old-growth bottomland forest, and a variety of wetland types. Teams cover



What the EPMTs Protect: View from the Dumpling Mountain Trail, the Brooks Camp area of Katmai National Park and Preserve, Alaska EPMT. NPS Photo.

## What the EPMTs Protect (cont.)

terrestrial communities such as the boreal forests of the US and Canada border, high and low elevation sagebrush steppe, sub-alpine meadows, cave features, tallgrass prairies, eastern deciduous forests, and mixed shortleaf pine-oak-hickory forests. The teams' invasive plant management work protects a range of species of concern and the habitat they require to survive including sea turtles, snowy plovers, least terns, and Coho salmon, as well as multiple rare, significant, and globally threatened ecosystems.

The EPMTs' work also helps protect and preserve cultural resources and significant historic sites and features. Many parks commemorate important historical events, locations, people, and cultural practices, which requires integrating invasive plant management into both cultural and natural landscapes. They include historic battlefields, archaeological sites, earthworks, scenic byways, and ethnographic and cultural landscapes.

## Science

EPMTs continue to provide resources and support to aid in invasive species research. Teams have initiated a range of modeling projects to help parks and teams focus their efforts. Teams also support and conduct research to improve treatment effectiveness.

The [Alaska EPMT](#) (AK EPMT) is engaged in a range of science based work that focuses on the management of *Elodea* species which are highly invasive aquatic plants that are threatening Alaska's freshwater ecosystems. AK EPMT and researchers developed a computer model to more accurately identify waterbodies most at-risk for invasion by *Elodea*. Using the model's output helps focus search efforts. The AK EPMT also collects water samples for *Elodea*-specific environmental DNA in waterbodies identified by the model as being at risk of invasion. To date, a total of 78 waterbodies in four parks have been surveyed with no *Elodea* species detected.

The US Geological Survey (USGS), Colorado State University, NPS, and Bureau of Land Management (BLM) have formed a scientist-practitioner partnership to create national models and a web application for high priority invasive plant species called the Invasive Species Habitat Tool (INHABIT). Practitioners provide feedback on the models and INHABIT's features to improve its effectiveness for land management decisions. The content and functionality of INHABIT are designed to provide practical information to enhance land



Science: NPS fire effects and USGS staff calibrate survey methods for annual brome abundance at Wind Cave National Park, Northern Great Plains EPMT. NPS photo.

## Science (cont.)

management actions, including mapped products with interactive thresholds based on management objectives, information on modeled environmental relationships, and proximity summaries to inform management area watch lists. This effort bridges the gap between scientists and practitioners to help land managers make strategic decisions about where to focus limited resources.

A research project to identify the best practices for managing invasive annual grasses in the Northern Great Plains continued in 2018. This project is a collaborative effort by the USGS, Northern Great Plains Inventory and Monitoring Network, Northern Great Plains Fire Management, [Northern Rockies](#) and [Northern Great Plains EPMTs](#), and several NPS units. The research resulted in an adaptive management plan and a predictive model to help parks make science-based decisions and test their effectiveness to better manage annual grasses in the Northern Great Plains.

In the northeastern US it is a challenge to treat invasive plants from November through March due to weather. The Northeast EPMT (NE EPMT) conducted several field trials to explore extending the treatment window for two invasive species. Through this work, the NE EPMT learned that the treatment window for wild chervil (*Anthriscus sylvestris*) can be extended later in the fall and earlier in the spring when many native plants are dormant. For Japanese stiltgrass (*Microstegium vimineum*), the team found that post-emergent pendimethalin in combination with the new pre-emergent indaziflam can be effective many months prior to germination and provide nearly a year of control at infested sites.

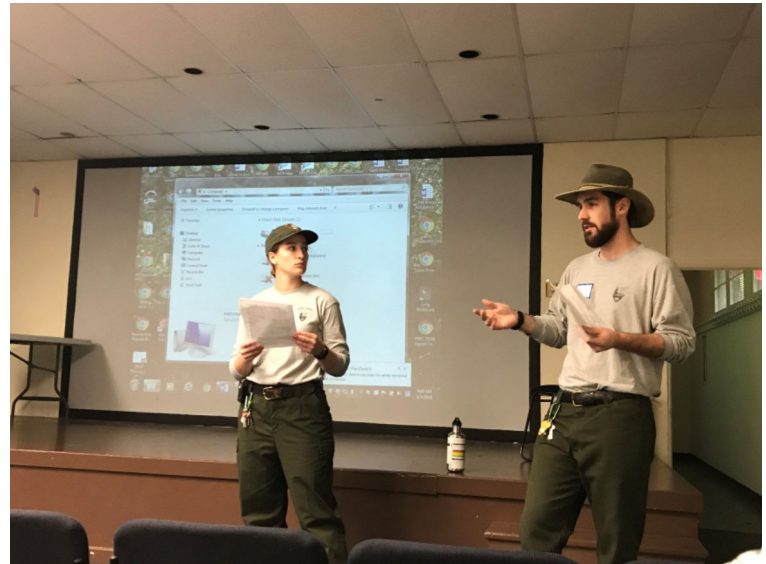
## Early Detection and Rapid Response (EDRR)

Early detection and rapid response to nascent populations of invasive species is one of the most effective means to control invasives. The [EPMTs](#) develop watch lists to help focus efforts on species that are new to their networks or are nearby. Examples of EPMT EDRR efforts include addressing species early and developing ways to find new species invasions. The [Florida Caribbean EPMT](#) and Gulf Islands National Seashore (GUIS) engaged citizen scientists to locate new early detection species before they became a problem. Beach vitex (*Vitex rotundifolia*), for example, was recently detected within the GUIS boundary. Sharing of invasive plant data among programs provided information that the [Southeast Coast EPMT](#) (SEC EPMT) needed to create a watch list of invasive plants for network parks





Restoration: Greenhouse production of plants for restoration, Southwest EPMT. NPS photo.



Safety: Allie Hay and Nate Finney teaching about pesticide labels and Safety Data Sheets for a training hosted by the NCR PRISM. NPS Photo.

## Early Detection and Rapid Response (EDRR) (cont.)

where EPMT, Inventory and Monitoring Networks, and Fire Effects Monitoring programs overlap. The watch list includes species that have been found or have the potential to occur within program parks. Online reporting of EDRR species was the focus of SEC EPMT citizen science outreach presentations at South Carolina Native Plant Society and North Carolina Invasive Plant Council meetings. Collaborative efforts increased efficiency and minimized resources needed to complete tasks which benefitted parks and programs.

## Restoration

EPMTs conduct a wide range of restoration activities including seed collection, planting, site preparation, and supporting the use of management tools (e.g., grazing, prescribed fire) to control invasive species, encourage native plant and animal community recovery, and protect at-risk species. A number of teams support grassland restoration work. The [Mid-Atlantic EPMT](#) assisted Valley Forge National Historic Park in efforts to improve 1,500 acres of grasslands and helped several parks convert areas to meadows and pollinator gardens. The [Southeast EPMT](#) continued to expand three warm season native grass plots which include native flowers to enhance habitat for native pollinators at Cow Pens National Battlefield. The [California EPMT](#) (CA EPMT) is an active partner in an exciting multi-jurisdictional effort to restore critical habitat for endangered species such as Coho Salmon and California freshwater shrimp along Lagunitas Creek, which traverses county, private, state park, and Golden Gate National Recreation Area lands. The biggest threat to the Lagunitas watershed is Japanese knotweed (*Fallopia japonica*). The CA EPMT hosted a series of meetings with countywide land managers to generate awareness and raise support for a cross-jurisdictional response which led to the establishment of the Marin Knotweed Action Team, an interagency and non-governmental task force focused on knotweed eradication and strategic treatment of knotweed. The [Heartland Network EPMT](#) worked on a project at Lincoln Boyhood National Memorial to restore the site to the forest stand conditions identified in the General Land Office notes which is the best approximation available to characterize the landscape that Abraham Lincoln would have lived in as a young boy. The EPMT removed a number of native trees to prepare a site for re-planting and led the effort to plant 1,500 oak and hickory seedlings on the 2.5 acres site. Natural regeneration is absent on this site, necessitating the use of artificial regeneration methods.

## Cross-jurisdictional partnerships

Recognizing the importance of protecting resources across jurisdictional boundaries, the EPMTs continued to provide valuable input to invasive species management through cross jurisdictional partnerships and collaborations. The [National Capital Region \(NCR\) EPMT](#) was instrumental in establishing an organization, the NCR Partnership for Regional Invasive Species Management (NCR PRISM), to encourage cross-border collaboration in the Washington, DC metropolitan area. The NCR PRISM is a collaborative effort to improve the response to invasive species issues in the National Capital Region, considers all taxa, and operates within DC and the adjacent counties. The [North Coast-Cascades Network EPMT](#) (NCCN EPMT) helps manage invasive plants at Ebey's Landing National Historical Reserve (EBLA) which is a unique NPS holding consisting of several actively managed farms and dairies, natural woodlands, and seaside slopes surrounded by working farms. It is jointly managed by the NPS, The Nature Conservancy (TNC), Island County, Washington State Parks, and the City of Coupeville. In early 2018, partners treated the seedbank of poison hemlock (*Conium maculatum*) at EBLA. This new treatment appears to have been extremely successful with no poison hemlock seedlings found within the treatment area nine months post-treatment and recolonization of the site by native horsetails (*Equisetum* spp.). The [Lake Mead EPMT](#) (LAKE EPMT) has a long history of reaching beyond NPS boundaries to manage invasive plants at a watershed scale. In FY18, LAKE EPMT conducted projects with 11 external agency partners that included five Federal entities, the Southern Nevada Water Authority, and Clark County, NV. In FY18 a new partnership was formed between the team and BLM's Battle Mountain District in Nevada.

## Safety

The EPMTs continued to exemplify safety in the field with no lost time injuries and only 11 field related injuries, for which teams took mitigation measures to reduce the chances of similar injuries occurring in the future. For example, to address repetitive use injuries, crew members now rotate work more frequently, alternate tasks, and more physically demanding tasks are being done over shorter periods. Team staff served on park safety committees, served as collateral duty safety officers, garnered certifications for safety training, provided training to park staff and regular annual training to EPMT crew members, and conducted safety inspections of equipment and pesticide storage for parks. Safety also continued to be highlighted



Safety: SE EPMT Chainsaw Training Chickamauga & Chattanooga NMP Photo Credit: Park Staff

## Safety (cont.)

during monthly EPMT meetings including safety training and information sessions.

The **GL EPMT** provides a stellar example of the proactive safety culture within the EPMT program. As an early adopter of the NPS National Chainsaw Safety Program standards and after completing Chainsaw Safety Maintenance and Operations (CSMO) courses the GL EPMT was qualified to assist parks with more complex invasive tree removal projects and served as a pilot to help provide training in CSMO courses. The team assisted with beta testing for the Journeyman Faller level of the NPS CSMO course and co-instructed one of the first faller level courses in the Midwest region.

The **PI EPMT** exemplifies the culture of safety promulgated by the EPMT program. The team routinely leads and participates in safety and operational briefings, implementation of Operational Leadership principles, use of effective Job Hazard Analysis, and rigorous near-miss reviews which fosters the safety culture.

A standing EPMT Safety Committee continued for the fifth year. This committee, composed of EPMT, park, and regional staff, provides invaluable support to the EPMTs by taking actions and providing recommendations that help to substantially mitigate program safety concerns. The committee that served the program for the past two years was extraordinarily productive and supportive of the EPMT program. Committee members included David Benitez (Hawai'i Volcanoes National Park) who served as committee chair, Brandon Seitz (Grand Portage National Monument), Jonathan Chase (Assateague Island National Seashore), Brian McDonnell (Northeast EPMT liaison), and Lauren Serra (Southeast Coast EPMT liaison). During the committee members' two year tenure, members produced a webinar on a team approach to creating and reviewing job hazard analyses that was recorded and can be used by NPS staff, developed a mechanism to report accidents and near misses that can be used to facilitate learning and development of mitigation measures to increase safety in the field, created guidance and field sheets on stretching to reduce injury while working in the field, and produced a chart of required personal protective equipment the work in which EPMTs engage. This committee also continued working on a process to extract information on common EPMT accidents and injuries from SMIS to create mitigation measures to reduce the occurrence of such accidents in the future. The EPMT program benefits greatly from the insight, expertise, and perspective of Safety Committee members and is grateful for committee members' service to the safe work of these teams.



Curt Deuser (center) accepts the NPS Director's Award for Professional Excellence in Natural Resources. NPS photo.

## EPMT Liaison Presented with NPS Director's Award

Curt Deuser, **LAKE EPMT** liaison, received the Director's Award for Professional Excellence in Natural Resources. Under Curt's leadership, the LAKE EPMT was started in 1996 and has managed thousands of invasive plant infested areas across many states and agency jurisdictions. Curt has been a leader on habitat restoration and in demonstrating how to control invasive plant species, both within and outside of the NPS. Curt has also set an example of what can be achieved when we work together in partnership across park and jurisdictional boundaries to address an issue that knows no boundaries.

## Summarized Data for 2018

Measure	Acres
Treated	8,331
Inventoried/Monitored	209,973
Gross Infested Area	305,195
Net Infested Area	6,305
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	1,329
Total Hours for Youth Participants and Youth Employees	110,283

## More Information

**Terri Hogan**  
NPS Invasive Plant Program Manager

(970) 267-7306  
terri\_hogan@nps.gov

1201 Oakridge Dr, Ste 200  
Fort Collins, CO 80525

**Alex Stoneburner**  
Data Manager

(970) 267-2107  
alexandra\_stoneburner@nps.gov





## Alaska EPMT Annual Report: FY 2018



View from the Dumpling Mountain Trail, located in the Brooks Camp area of Katmai National Park and Preserve. EPMT staff survey this heavily used trail annually. NPS Photo.

### Background

The Alaska Exotic Plant Management Team (EPMT) provides assistance to 16 national park units in Alaska. These units cover more than 52 million acres of high quality natural areas and wilderness, including coastal fjords, glacial valleys, tundra, and boreal forests. Most national parks in Alaska protect healthy, intact, native ecosystems; however, invasive plant species are making their way into areas used by people.

The geography of Alaska makes invasive plant management challenging, requiring back country or air travel to reach many parks. Recreational use is widely dispersed with access only by boat, backpacking, or aircraft. Remote airstrips, trails, cabins, and concessionaire activities can provide avenues for invasive species introduction into wilderness areas where they are difficult to detect, treat, and manage. Therefore, the Alaska EPMT program relies heavily on information, knowledge, and participation from park staff.

This year, the team conducted invasive plant surveys and control in six park units: Denali National Park and Preserve (DENA), Glacier Bay National Park and Preserve (GLBA), Katmai National Park and Preserve, Kenai Fjords National Park (KEFJ), Klondike Gold Rush National Historical Park, and Wrangell-St. Elias National Park and Preserve (WRST). The team included the liaison, data manager, and a biological science technician stationed at KEFJ, a biological science technician stationed at WRST, five Student Conservation Association (SCA) interns stationed at four parks, and one Youth Conservation Corps intern stationed at KEFJ. Volunteers and SCA youth crews focused on specific projects and assisted the team.

### Program Highlights

#### *Invasive Plant Control in Alaska Department of Transportation (DOT) Rights of Way in Denali*

In 2016, the team began treating invasive plant infestations in DOT right-of-way areas adjacent to DENA, targeting bird vetch (*Vicia cracca*). This is part of the team's early detection rapid response (EDRR) strategy, which reduces the ability for invasive plants to establish inside park boundaries. The EPMT created polygons in ArcGIS for these infestations to provide spatial comparison over time and allow for analysis of treatment efficacy.

After three seasons of treatments at the original five bird vetch sites, the EPMT reduced overall plant density by 97%. Many of the infestations first treated in 2016 have been eradicated. With this success, the team was able to add bird vetch sites in 2017 and 2018 (currently eleven total) and to treat six white sweet-clover (*Melilotus albus*) infestations. Through active treatment, the density of the additional bird vetch infestations was reduced by 50% over two seasons, and the density of white sweet-clover infestations was reduced by 53% after one season of treatment.

The EPMT follows a very rigorous, ten-step protocol to conduct treatments at these sites [per Alaska Department of Environmental Conservation (ADEC)], but the effort is worthwhile. Plans for the 2019 season include adding another half-dozen treatment sites. Re-treatments, application timing, and partnership coordination with DOT have been the key to successful control of these two species.





Surveys for aquatic invasive plants, Contact Lake, Katmai National Park and Preserve. Inset: Water sampling to detect the presence/absence of *Elodea* spp. environmental DNA (eDNA) in Wrangell-St. Elias National Park and Preserve. NPS Photo.



Wendy Mahovlic conducts treatments in a DOT Right of Way at the Denali National Park & Preserve entrance. NPS Photo.

## Program Highlights (cont.)

### *Aquatic Invasive Plant Early Detection Rapid Response (EDRR)*

*Elodea* is a highly invasive aquatic plant that is threatening Alaska's National Park Service (NPS) freshwater ecosystems. Since 2013, the team has used an EDRR approach for this species using an intuitive meander survey method within littoral zone hotspots (inflow/outflow areas, floatplane-use areas, and areas where debris tends to congregate). Until 2017, the team relied upon institutional knowledge of park staff to determine where to survey. The EPMT has since developed a computer model using a variety of criteria to more accurately identify waterbodies most at-risk for invasion.

In 2018, the Alaska EPMT began a multi-year project conducted by University of Alaska Anchorage botanists to create a statistically robust survey protocol (to supplement the meander) and to augment EPMT work by conducting surveys for all aquatic native and invasive plants at specified sites based on the computer model's hierarchical list of waterbodies at risk of invasion. Another aspect of the project involves collecting water samples for *Elodea*-specific environmental DNA (eDNA). This method is still being validated so cannot currently be relied upon solely for presence/absence determination. When validated, the EPMT will employ this method to more efficiently use time and labor. A total of 78 waterbodies in four parks have been surveyed to date with no *Elodea* detected.

## Summary of Accomplishments

### *Summary of Accomplishments*

In 2016, eight populations of dandelion (*Taraxacum officinale*) were delineated to help track treatment efficacy over time at the Exit Glacier Outwash Plain site in KEFJ. After three seasons of treatments, overall infestation density is reduced by 76%. The team has been conducting treatments on invasive plant infestations on Strawberry Island and in Bartlett Cove in GLBA since 2013. Sowthistle (*Sonchus arvensis*) density on Strawberry Island is reduced by 99% after six seasons of treatments. In Bartlett Cove, density at one reed canarygrass (*Phalaris arundinacea*) site is reduced by 97% after six seasons of treatments and on the roadsides by 50% after two seasons of treatments; creeping buttercup (*Ranunculus repens*) density is reduced by more than 54% after two seasons of treatments. Orange hawkweed (*Hieracium aurantiacum*) density at the Indian Point site is reduced by 82% since the first treatment in 2014.

## Summarized Data for 2018

Measure	Acres
Treated	5.74
Inventoried/Monitored	225
Gross Infested Area	251
Net Infested Area	5
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	185
Total Hours for Youth Participants and Youth Employees	7063

## More Information

**Chris Overbaugh**  
Liaison

907-644-3452  
chris\_overbaugh@nps.gov

National Park Service  
240 W 5th Avenue  
Anchorage, AK 99501

**Peter Frank**  
Data Manager

907-422-0554  
peter\_frank@nps.gov

Kenai Fjords National Park  
PO Box 1727  
Seward, AK 99664





## California EPMT Annual Report: FY 2018



Scotch broom along Drakes Estero in Point Reyes National Seashore. NPS Photo.

### Background

The California Exotic Plant Management Team (CA EPMT) serves 14 parks that are located within the California Floristic Province. This region is one of 25 world biodiversity hotspots. Of 7,031 vascular plants found in California, one third are endemic species that are found nowhere else in the world. To protect these and other state resources, California spends at least \$82 million annually for outreach, control, and monitoring of invasive plants (Cal-IPC: <http://www.cal-ipc.org/holding-pen/cost/>). Treatments of invasive plants within the CA EPMT's partner parks are often complex, with project sites ranging from burn scars at Lassen Volcanic National Park to remote riparian corridors at Channel Islands National Park.

The CA EPMT operates a grant program, with the team providing project management and implementation, and technical assistance, to recipients. This model fosters flexibility and allows project managers to capitalize on the strengths of each park to carry out effective treatments. Flexibility also benefits parks that have challenging issues with the timing of treatment or the need for outside expertise. Although most known for its grant model, 25% of fiscal year (FY) 2018's net acres were managed directly by CA EPMT staff at the host park, Point Reyes National Seashore (PORE), and much of the field work for all of the EPMT projects was made possible with leveraged funding. This season's highlights feature two projects that clearly demonstrate how essential partnerships are to successful invasive plant management.

### Program Highlights

#### *Partnering Across Boundaries to Manage Japanese Knotweed*

Lagunitas Creek originates in southern Marin County along the slopes of Mount Tamalpais and traverses county, private, state park, and Golden Gate National Recreation Area lands. It provides critical habitat for endangered species such as Coho Salmon and California freshwater shrimp. The biggest threat to the Lagunitas watershed is Japanese knotweed (*Fallopia japonica*), the tenth most invasive plant worldwide and an A-rated invasive species in the state of California.

The CA EPMT began surveying and treating Japanese knotweed in 2015 and in early 2016 hosted a series of meetings with countywide land managers to generate awareness and raise support for a cross-jurisdictional response. Those conversations led to the establishment of an interagency and non-governmental task force focused on knotweed eradication called the Marin Knotweed Action Team (MKAT). The MKAT is moving deliberately to assure knotweed is treated in a strategic fashion. Treatments by the EPMT in 2017 reduced knotweed numbers on NPS lands by 93%. By 2018 MKAT had spurred considerable participation from upstream landowners. With this type of success and the dedicated array of MKAT members we are optimistic about the prospects of eradicating Japanese knotweed from the Lagunitas watershed.





Forming a game plan for Japanese knotweed surveys with help from the San Francisco Bay Area Inventory and Monitoring Team. NPS Photo.



Searching for Japanese knotweed along Lagunitas Creek. NPS Photo.

## Program Highlights (cont.)

### *Partnering with Local Ranchers for Long-Term Management of Scotch Broom*

The CA EPMT program has been treating a 575-acre population of Scotch broom (*Cytisus scoparius*) within a grazing lease at PORE for seven years. Scotch broom is a prolific seeder, producing up to 10,000 seeds per plant that can remain viable for up to 80 years. The goals each year have been to treat the entire site and to eliminate seed production. Prescribed fire was used to eliminate or trigger germination of the decades-old seed bank. Although the site has received single and in some cases multiple treatments each season, it is anticipated that 20-30% of the site will require continued treatment because annual germination has not been markedly reduced. The initial three-year EPMT commitment was expanded to seven years as the team worked with the park to find a creative way to reduce the seed bank. After park staff met with the ranching leaseholder, the leaseholder agreed to adopt the site and continue site management with a small EPMT commitment of supplies and oversight. This creative outcome is a welcome win-win for the park and its ranching partners.

## Summary of Accomplishments

In 2018, the EPMT surveyed 3,241 acres for invasive species, and conducted target species treatments on 4,278 acres. California dominated the news cycle this year with intense and destructive fires that caused staff evacuations at Yosemite National Park and Whiskeytown National Recreation Area. Whiskeytown was hardest hit, with the Carr Fire burning close to 100% of the area inside the park boundary. Fire plays a dynamic role in conservation work in California, with approximately 80% of this year's net treatment acres occurring in areas that have burned in wild or prescribed fires in the past decade. This highlights not only the vulnerabilities and new disturbance caused by ever more frequent mega fires, but also the importance of fire as a tool in invasive plant management. Prescription burns have reduced biomass and seedbanks in densely invaded areas and allow for proactive management of invasive species in the following years. Conversely, catastrophic mega fires can open up long undisturbed areas to new invaders and trigger reactive management to minimize long-term damage. The EPMT will continue to navigate this delicate balance, as climate trends suggest that the role of fire in the California landscape will only increase in the future.

## Summarized Data for 2018

Measure	Acres
Treated	65
Inventoried/Monitored	3,241
Gross Infested Area	202,266
Net Infested Area	4,278
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	144
Total Hours for Youth Participants and Youth Employees	3,763

## More Information

**Bobbi Simpson**  
Liaison

Point Reyes National Seashore  
1 Bear Valley Rd  
Point Reyes Station, CA 94956

(415) 464-5190  
[bobbi\\_simpson@nps.gov](mailto:bobbi_simpson@nps.gov)

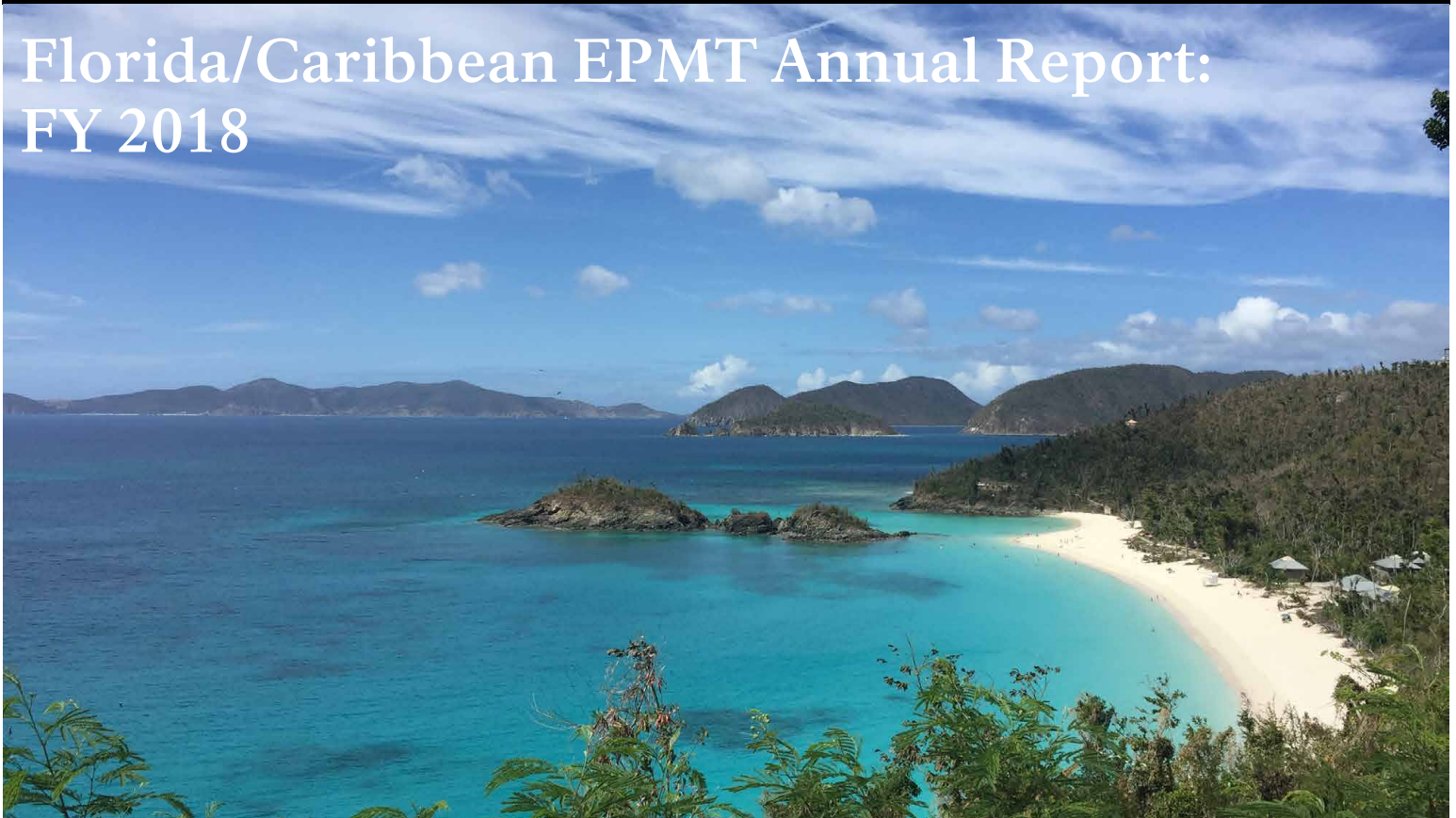
**Timothy Federal**  
Data Manager

(415) 464-5121  
[tim\\_federal@nps.gov](mailto:tim_federal@nps.gov)





# Florida/Caribbean EPMT Annual Report: FY 2018



Trunk Bay, Virgin Islands National Park. NPS Photo.

## Background

Invasive plants have a destructive effect on native plant communities by reducing native plant diversity and altering ecological processes such as fire behavior and ecosystem function. The Florida and Caribbean Exotic Plant Management Team (FLC EPMT) supports 15 National Park Service units in Florida and the Caribbean by expanding existing invasive plant control efforts including inventory and monitoring, control, education, restoration, and research. The FLC EPMT utilizes contracted crews from four private companies for large eradication projects within park units. Smaller projects are carried out by the team, parks, and volunteers. Due to the temperate, tropical, and sub-tropical climate zones found within the team's 2.68 million acre range, many of these invasive species create an enormous challenge. Just over 400,000 acres of those lands are infested with invasive species. Some common species that are targeted include: Brazilian pepper tree (*Schinus terebinthifolius*), Old World climbing fern (*Lygodium microphyllum*), Australian pine (*Casuarina equisetifolia*), Burma reed (*Neyraudia reynaudiana*), and punktree (*Melaleuca quinquenervia*).

An annual steering committee meeting is held to review and approve the strategic direction and financial plan of the team, rank projects, ensure the team provides useful information that is relevant to management, and develop a treatment schedule for the fiscal year (FY). The ranking committee consists of representatives from the Southeast Regional Office, the US Army Corps of Engineers, and the Florida Fish and Wildlife Conservation Commission (FWCC). These meetings are held at a different park unit each year.

## Program Highlights

### *Gulf Islands National Seashore Beach Vitex and Grasses Control*

Gulf Islands National Seashore (GUIS) is the largest national seashore in the country. The beaches are composed of 99% white quartz carried down rivers from thousands of years of erosion of the Appalachian mountains. GUIS provides protection for many important resources including sea turtles, snowy plovers, and least terns.

Invasive species have placed an increased number of the park's natural communities at risk including the explosive spread of several grass species, especially torpedo grass (*Panicum repens*). Citizen scientists have also begun to notice a new early detection species, beach vitex (*Vitex rotundifolia*), spreading outside of the park and, May of 2016, it was detected within the park boundary. In July 2015 a wildland fire opened up the canopy significantly to sunlight within a hardwood hammock. This change allowed cogongrass (*Imperata cylindrica*) to spread rapidly into the freshly burned area.

At the 2018 FLC EPMT ranking meeting, GUIS's proposal to hire two seasonal biological technicians to manage invasive plants was approved by the committee. The biological technicians have been focusing on treating grasses in the areas of Fort Pickens and Naval Live Oaks by systematically locating, mapping, and treating all invasive plants. Work will continue into the next FY with follow up surveys and retreatment of areas as needed.



Surveying for Beach Vitex at Gulf Islands National Seashore. NPS Photo.



Debris from invasive plant removal in Biscayne National Park. A restored spoil island can be seen in the background. NPS Photo.

## Program Highlights (cont.)

### *Biscayne National Park Team Treatments*

Ninety-five percent of Biscayne National Park is water with the land consisting of mainly mangrove forest. The park is also home to 16 endangered species. Unfortunately, on the westernmost boundary the park is in a constant battle with invasive plants such as latherleaf (*Colubrina asiatica*), Brazilian peppertree, Australian pine, and other Florida Exotic Pest Plant Council category 1 species (species that alter native plant communities by displacing native species, change community structures or ecological functions, or hybridize with native species). These species became established along on a spit of land adjacent to two fully restored spoil islands. The EPMT knew that this site would quickly become a seed source to reinvade the spoil islands.

Beginning in June, the FLC EPMT partnered with the Southeast EPMT, the City of Miami, the South Florida and Caribbean Network (SFCN), and volunteers to begin the arduous process of controlling invasive plants that covered 90% over 1.2 acres. Within one week of work, the team was able to remove roughly 80% of the invasive plants. Follow up treatments will be needed to remove the rest and keep it at a maintenance level. The team is currently working with the park to mulch the felled trees with a possible native planting volunteer work day in the upcoming fiscal year.

## Summary of Accomplishments

In January 2018, the FLC EPMT held its ranking meeting at Biscayne National Park where six park proposals were funded. Additional projects in Big Cypress National Preserve and Everglades National Park were funded by contributions from the FWCC.

The team collaborated with SFCN to complete the first plant list to be created for Desoto National Memorial. The team surveyed for invasive plants and helped park staff with plant identification. In June, the FLC EPMT released the biocontrol air potato leaf beetle (*Lilioceris cheni*) to help control air potato (*Dioscorea bulbifera*).

Additionally, the team assisted Everglades National Park in aerial plant surveys which will allow contractors to be more efficient in their ground treatments.

## Summarized Data for 2018

Measure	Acres
Treated	3,738
Inventoried/Monitored	14,989
Gross Infested Area	202,266
Net Infested Area	4,278
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	4
Total Hours for Youth Participants and Youth Employees	2,160

## More Information

Brian Lockwood  
Liaison

(786) 249-0073  
Brian\_Lockwood@nps.gov

Shea Bruscia  
Data Manager

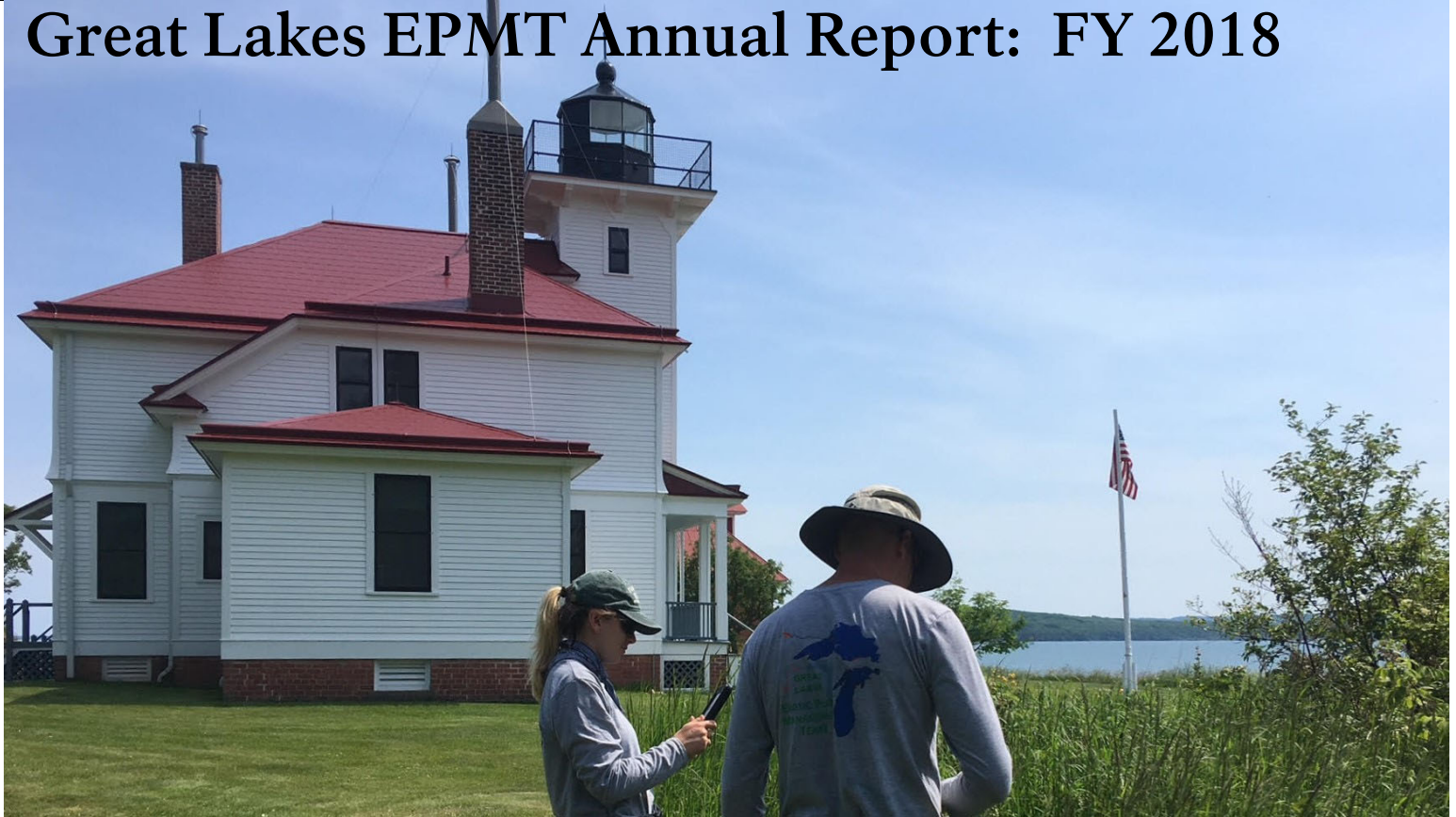
(786) 249-3005  
Shea\_Bruscia@nps.gov

18001 Old Cutler Road  
Suite 419  
Palmetto Bay, Florida 33157





# Great Lakes EPMT Annual Report: FY 2018



Raspberry Island, Apostle Islands National Lakeshore. NPS Photo.

## Background

The Great Lakes Exotic Plant Management Team (GL EPMT) provides support to 11 national parks across four states in the western Great Lakes Region. From the dunes along the shores of Lake Michigan, west to the scenic riverways of Wisconsin and Minnesota, and north to the boreal forests along the Canadian border, this region claims diverse aquatic and terrestrial ecosystems. The region contains multiple rare, significant, and globally threatened ecosystems. It is also home to an international biosphere reserve.

Geographical and environmental conditions have mostly limited the impact of invasive species to those of cultural origin (ornamentals / intentionally planted). However, visitor use and necessary maintenance activities have introduced new invasive species.

The team balances its activity to meet two vastly different needs: (1) long-term, large-scale control and restoration, and (2) early detection and eradication of nascent populations. To meet those needs, the team provides parks with focused regional expertise and skilled control work. Discipline specific knowledge and a network of partners allow the team to anticipate threats to individual parks and work toward site-specific management options. As a shared regional resource, the team either augments existing management efforts at parks or provides parks with management options.

## Program Highlights

### *Rapid Response to Slender False Brome at Sleeping Bear Dunes National Lake Shore*

One of the keys to the Great Lake EPMT's success is the ability to quickly mobilize and respond to park needs. Whether it's control of new invasive or existing plant populations, disaster relief, or technical support the team is able to use its specialized equipment and training to meet the need. In early 2017 Sleeping Bear Dunes National Lake Shore uncovered a large population of slender false brome (*Brachypodium sylvaticum*) in the park's Platte River district. Nationally only a few locations exist and this population represents the only known location in the state of Michigan.

During the summer of 2018 the GL EPMT initiated control. As with many invasive plant invasions the population of slender false brome was more extensive than initially thought, due in part to the plant's ability to spread easily by seed. Treatments focused on the larger infestation since the team has greater ability to handle larger areas with specialized equipment. In all, more than 34 acres of nearly continuous slender false brome were treated, removing a large seed source that was adjacent to several trails and a popular beach. Additional acres were inventoried and mapped to further understand the extent of the invasion. This effort will reduce the chance for further spread and allow park crews to focus on smaller satellite populations.





Biological Technician (GL EPMT) Stephen Mull treating slender false brome (*Brachypodium sylvaticum*) at Sleeping Bear Dunes National Lakeshore. NPS Photo.



Liaison (GL EPMT) Isaiah Messerly felling black locust (*Robinia pseudoacacia*) at Coldwater Springs (MISS). Isaiah is wearing technical chainsaw chap pants which provide more flexibility and reduces backstrap snags for more technical type chainsaw work. NPS Photo.

## Program Highlights (cont.)

### *Training and Safe Work Practices Builds Program Capacity*

Coldwater Springs, part of the Mississippi National River and Recreation Area (MISS) located in Minneapolis, Minnesota has undergone a dramatic transformation since 2010. What was once an abandoned Bureau of Mines research campus, has been transformed into an urban natural area. The GL EPMT, park staff, and numerous volunteers spent several years removing common buckthorn (*Rhamnus cathartica*) and other invasive plants from the highly disturbed 27 acre parcel.

While the majority of the site had been restored to prairie/savanna a small portion remained infested with mature black locust (*Robinia pseudoacacia*) trees. Many of the black locust trees had not been treated because their complexity was outside the qualifications of most staff. After adopting the National Park Service (NPS) National Chainsaw Safety Program (NCSP) standards and completing Chainsaw Safety Maintenance and Operations (CSMO) courses the GL EPMT was qualified to assist parks with more complex invasive tree removal projects. With the majority of the trees now removed the park has nearly finished restoring the entire site.

## Summary of Accomplishments

In fiscal year (FY) 2018 project work was completed at 11 national park units including an initial inventory and site assessment of a new NPS property on the North Country National Scenic Trail. This was the first year of the on-the-ground efforts of a new cooperative agreement between the Conservation Corps of Minnesota and Iowa (CCM&I) and the GL EPMT. Two CCM&I individual Placement Corps members worked directly with the team increasing field productivity while engaging youth in resource management work across network parks.

In 2018, the team began transitioning to the Arc Collector platform for its field data collection. Team data manager, Rebecca Key was instrumental in the transition that lead to greater field efficiency and data accuracy.

The team was lucky enough to assist with beta testing for the Journeyman Faller level of the NPS (CSMO) course and co-instructed one of the first faller level courses in the Midwest region.

## Summarized Data for 2018

Measure	Acres
Treated	101
Inventoried/Monitored	45
Gross Infested Area	899
Net Infested Area	116
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	24
Total Hours for Youth Participants and Youth Employees	5,966

## More Information

Isaiah Messerly  
Liaison

(715) 483-2299  
isaiah\_messerly@nps.gov

Vacant  
Field Crew Leader

(715) 483-2283

National Park Service - St. Croix National Scenic Riverway  
401 North Hamilton St.  
St. Croix Falls, WI 54024

Rebecca Key  
Data Manager

(715) 682-0631 ext. 232  
rebecca\_key@nps.gov

Tammy Keniry  
Administrative Officer

(715) 682-0631 x 225  
tammy\_keniry@nps.gov

National Park Service - Great Lakes Network Office  
2800 Lake Shore Drive East, Suite D  
Ashland, WI 54806





# Gulf Coast EPMT Annual Report: FY 2018



Ten Mile Bayou within Big Thicket National Preserve, Texas. NPS Photo.

## Background

The Gulf Coast Exotic Plant Management Team (GC EPMT) supports eight National Park Service (NPS) units within Louisiana, Mississippi, and Texas. These parks are in two different regions and are spread along 760 miles of the Gulf Coast.

The GC EPMT hired a contractor to conduct invasive plant control across all partner parks. In addition, the team relies on partnerships to identify and geospatially map priority infestations within its partner parks. Contracts and cooperative agreements are overseen by the GC EPMT liaison, and data management support is provided to the team by the Florida/Caribbean EPMT data manager.

Target invasive plant species occur in both terrestrial and aquatic habitats. Many terrestrial sites within partner parks are threatened by Chinese tallow (*Triadica sebifera*), which requires the use of chain-saws to remove. Johnsongrass (*Sorghum halepense*), buffelgrass (*Cenchrus ciliaris*), and kudzu (*Pueraria montana*) threaten terrestrial habitats of many parks along the Gulf Coast. Many aquatic sites are already invaded by common water hyacinth (*Eichhornia crassipes*). Crested floatingheart (*Nymphoides cristata*) has become an emerging aquatic threat to Big Thicket National Preserve (BITH).

## Program Highlights

### Collaboration

Dale McPherson traveled to Ninety Six National Historic Site (NISI) to assist the Southeast EPMT crew with woody plant treatments on Chinese privet (*Ligustrum sinense*) and autumn olive (*Elaeagnus umbellata*). The Gulf Coast EPMT partnered with the Gulf Coast Inventory and Monitoring Network (GULN) to co-host an all network parks meeting in May 2018. Discussion topics were wide-ranging, from data management, to vegetation monitoring, to the future direction of the GC EPMT program.

### Non-native Invasive Plant Treatments for Three Gulf Coast Parks

To increase operational efficiency the GC EPMT divided up the parks so only some parks are visited by the contractor each year. This change means that each park gets more treatment time because the contractor spends less time travelling. During fiscal year (FY) 2018 the contractor conducted treatments across 70 acres at three GC EPMT parks. In addition to treating large established populations, the contractor was tasked with searching for two early detection species, Chinaberry tree (*Melia azedarach*) at Jean Lafitte National Historical Park and Preserve and trifoliolate orange (*Poncirus trifoliata*) at Vicksburg National Military Park. Only a few Chinaberry trees were found and no trifoliolate orange was detected.





Mechanical removal of Brazilian peppertree (*Schinus terebinthifolius*) at Padre Island National Seashore, Texas. NPS Photo.



Mechanical removal of giant reed (*Arundo donax*) at Padre Island National Seashore, Texas. NPS Photo.

## Program Highlights (cont.)

### *New Partner Parks*

The GC EPMT traditionally served six partner parks and two non-partner parks. During 2017 Southeast Regional Office leadership, in coordination with leadership from the eight parks traditionally served by GULN, chose to include all eight GULN parks as GC EPMT partner parks. During 2018, Padre Island National Seashore and Palo Alto Battlefield National Historical Park will receive their first plant treatments as partner parks.

### *Exotic Plant Management Team Workshop*

The GC EPMT attended the national EPMT program workshop in August 2018, which was hosted by the Natural Resource Stewardship and Science Directorate Biological Resources Division in Fort Collins, CO. The event was an invaluable training and collaboration opportunity for all 17 EPMTs service wide.

## Summary of Accomplishments

The Gulf Coast EPMT supports eight NPS units within Louisiana, Mississippi, and Texas: Big Thicket National Preserve, Gulf Islands National Seashore, Jean Lafitte National Historical Park and Preserve, Natchez Trace Parkway, Padre Island National Seashore, Palo Alto Battlefield National Historical Park, San Antonio Missions National Historical Park, and Vicksburg National Military Park.

The Gulf Coast EPMT increased efficiency by visiting partner parks only every other year and oversaw 950 labor hours of treatment across three parks during this year. Additional accomplishments included assisting Southeast EPMT with treatments at NISI, co-hosting an all parks meeting with GULN, and attending the EPMT program workshop – an invaluable training and collaboration opportunity. Additionally, Dale McPherson completed his first full year as the GC EPMT liaison.

## Summarized Data for 2018

Measure	Acres
Treated	16
Inventoried/Monitored	-
Gross Infested Area	90
Net Infested Area	16

## More Information

**Dale McPherson**  
Liaison

**(404) 507-5795**  
[Dale\\_McPherson@nps.gov](mailto:Dale_McPherson@nps.gov)

National Park Service  
Southeast Regional Office  
100 Alabama St., SW  
Atlanta, GA 30303

**Shea Bruscia**  
Florida/Caribbean EPMT Data Manager

**(786) 249-3005**  
[Shea\\_Bruscia@nps.gov](mailto:Shea_Bruscia@nps.gov)

National Park Service  
18001 Old Culter Rd., Suite 419  
Palmetto Bay, FL 33157





# Heartland Network EPMT Annual Report: FY 2018



Conservation Corps of Iowa members treating crownvetch (*Securigera varia*) in Pipestone National Monument. NPS Photo.

## Background

The Heartland Network Exotic Plant Management Team (HTLN EPMT) serves 16 national parks in eight states of the Midwest and Mid-south. The parks include an array of plant communities ranging from unplowed and restored tallgrass prairie in the Flint Hills of Kansas and Sioux quartzite outcrops in Minnesota; eastern deciduous forests from northeastern Iowa and northeastern Ohio to southwest Missouri and southern Indiana; Midwestern riparian woodlands; mixed shortleaf pine-oak-hickory forests in the Ozark and Ouachita Mountains; and a variety of wetlands from southeastern cypress-tupelo swamps to emergent wetlands along tributaries to Lake Erie. The majority of these parks commemorate important historical events, locations, people, and cultural practices, which requires integrating invasive plant management into cultural and natural landscapes.

The HTLN EPMT exists solely to serve park managers and the resources that they protect. The EPMT follows the National Park Service's constructive model of identifying "prudent and feasible" invasive plant control projects. Because there is, unfortunately, no single test to assess the prudence or feasibility of a project, the EPMT works to ensure the connection of invasive plant management and restoration projects with larger park vegetation management goals; to assess the long-term costs of projects; and to rely on evidence-based scientific data to support projects.

## Program Highlights

### *Crownvetch Control in Pipestone National Monument*

Pipestone National Monument protects a sacred ethnographic landscape, protecting a quarry site where Native Americans continue a 3,000-year practice of quarrying pipestone. The site also protects remnant unplowed prairie and habitat for the threatened western prairie fringed orchid (*Platanthera praeclara*). Unfortunately, crownvetch (*Securigera varia*) invaded the prairies in the monument from plantings along an adjacent road.

In 2018, the team completed the fourth year of a project to control crownvetch. The project area spans 284 acres with the infestation occurring mostly in a 72 acre area. For this project, aminopyralid is applied to control crownvetch. More insidious than the plant's abundance, however, is the plant's twining habit within native prairie. As such the plant is difficult to spray directly without overspray onto adjacent native plants. In this case, the selectivity of the herbicide applicator in targeting the plant is every bit as important as the broadleaf selectivity of the herbicide.

Monitoring data from the monument show that while the distribution of crownvetch increased slightly between 2006 and 2017, the abundance decreased four to six-fold over that same time period. These results show the promise of effective treatment as well as the need to continue periodic treatments to delicately control this invasive plant.





U.S. Forest Service, Conservation Corps Iowa, and National Park Service staff work to plant oak and hickory trees at Lincoln Boyhood National Memorial. NPS Photo.



American Conservation Experience intern planting trees as part of oak-hickory restoration. NPS Photo.

## Program Highlights (cont.)

### *Oak-Hickory Restoration at Lincoln Boyhood National Memorial*

While the HTLN EPMT has focused largely on managing risks associated with invasive plants in national parks, the same tools can be used to prepare sites for restoration. At Lincoln Boyhood National Memorial, the EPMT removed a number of native trees using cut stump treatments with triclopyr to prepare a site for re-planting. The team also led the effort to plant 1,500 oak and hickory seedlings on the 2.5 acres site. Approximately 250 of these trees were protected from browsing using mesh sleeves.

The project was initially designed in 1988 and then incorporated into the park's cultural landscape plan. The project involves the removal of trees, especially red maple (*Acer rubrum*) within an area of large, white oak (*Quercus alba*) and northern red oak (*Q. rubra*) trees. Natural regeneration is absent on this site, necessitating the use of artificial regeneration methods. This project goal is to restore the site to the forest stand conditions identified in the General Land Office notes - the best approximation available to characterize the landscape that Abraham Lincoln would have lived in as a young boy.

A video of the project is available on Lincoln National Memorial's Facebook page: <https://www.facebook.com/LincolnBoyhoodNPS/videos/vb.122911947732953/1820750814615716/?type=2&theater>.

## Summary of Accomplishments

The HTLN EPMT manages 28 projects that span over 2,000 acres. In fiscal year 2018, the EPMT continued work on 13 of these projects that covered 1,036 acres and targeted over 27 species of woody and herbaceous plants. The team also monitored the 10,000 acre Tall-grass Prairie National Preserve, identifying 32 invasive plant species.

While the team continues to make progress on a number of projects, efforts on others are unlikely to be successful. In particular, garlic mustard (*Alliaria petiolata*) and Japanese stiltgrass (*Microstegium vimineum*) are difficult to control at scale, which supports the invaluable value of early detection and rapid response efforts.

The EPMT continued to strengthen its relationship with Conservation Corps Iowa by hosting six interns from March through October and 19 temporary crews throughout the year. This relationship benefited Effigy Mounds National Monument as the team helped implement an NRPP-funded landscape-scale garlic mustard project.

## Summarized Data for 2018

Measure	Acres
Treated	11
Inventoried/Monitored	-
Gross Infested Area	54,381
Net Infested Area	11
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	22
Total Hours for Youth Participants and Youth Employees	7,680

## More Information

**Craig Young**  
HTLN Terrestrial Program Leader

(417) 732-6438 x281  
[craig\\_young@nps.gov](mailto:craig_young@nps.gov)

**Jordan Bell**  
Project Manager

(417) 732-6438 x400  
[jordan\\_bell@nps.gov](mailto:jordan_bell@nps.gov)

**Chad Gross**  
Cartographer/Data Manager

(417) 732-6438 x401  
[chad\\_gross@nps.gov](mailto:chad_gross@nps.gov)

Wilson's Creek NB  
6424 W. FR 182  
Republic, MO 65738

**Jessica Salesman**  
Project Manager

(563) 873-3491 x142  
[jessica\\_salesman@nps.gov](mailto:jessica_salesman@nps.gov)

Effigy Mounds NM  
151 Hwy 76  
Harper's Ferry, IA 52146





# Lake Mead EPMT Annual Report: FY 2018



Three Lake Mead EPMT members surveying invasive hoary cress high up on a mountain to prepare for treatment in the BLM Battle Mountain District in Nevada. NPS Photo.

## Background

The Lake Mead Exotic Plant Management Team (LAKE EPMT), established in 1996, was the model for the National Park Service (NPS) EPMT program. The team has conducted on the ground projects with field crews in 37 NPS Units, 15 US Fish and Wildlife Service (USFWS) Refuges, seven Bureau of Land Management (BLM) Districts, four National Forests, two Bureau of Indian Affairs Units, Bureau of Reclamation (BOR), Marine Corps Yuma Air Station, and sites managed by state and local entities.

The team's primary goals are to 1) provide expertise in the control of invasive plants in priority areas to preserve, restore, and maintain native plant communities, 2) professionalize invasive plant management within the NPS and partner organizations by developing staff expertise, and 3) improve government efficiencies through interagency cooperation to effectively manage invasive plant species on a landscape scale. Partnerships are integral to the team's success, annually leveraging each NPS base dollar with three additional dollars totaling over one million dollars per year. These partnerships facilitate invasive plant management across agency boundaries and increase the LAKE EPMT's capacity to serve NPS units. These funds support up to a 20 person crew in the field throughout the year. The team's geographic locality and the many partnerships in the regional area also enable a year-round operation that maximizes LAKE EPMT's ability to serve a variety of partners and control a diversity of invasive plant species.

## Program Highlights

### *Russian Olive Management*

Russian olive (*Elaeagnus angustifolia*) is an invasive tree that occupies riparian habitat along rivers and streams in the western United States. Although it invades some of the same places as the invasive exotic tamarisk tree (*Tamarix* spp.), it has spread into these areas at a slower rate. Tamarisk spreads primarily by tiny windblown dispersed seed while the Russian olive seed is about the size of a common pea and is not wind dispersed. However, in recent decades Russian olive trees have been spreading into new areas, increasing in density and vegetative cover and competing with and reducing cover of desirable native riparian plants. In recent decades, land management has been directed at tamarisk control while Russian olive received less attention. The LAKE EPMT manages tamarisk and Russian olive simultaneously whenever they co-occur. In some cases, Russian olive establishes post treatment from the soil seed bank. Around 2007 the tamarisk leaf beetle biological control insect began spreading and suppressing tamarisk throughout much of the west. LAKE EPMT staff observed that after tamarisk was reduced by the beetle Russian olive readily filled in the gaps left by tamarisk. Therefore, the team shifted focus to Russian olive control leaving the tamarisk beetle to continue to spread and keep tamarisk in check.

The methods and chemicals used to control tamarisk are not as effective on Russian olive and Russian olive is more time consuming and difficult to manage because of its thorny branches. At the time,





Two LAKE EPMT members making frill cut “hacks” with a hatchet on Russian olive trees near Zion National Park, Utah. NPS Photo.



LAKE EPMT member applying herbicide to recent frill cuts on Russian olive trees near Zion National Park, Utah. NPS Photo.

## Program Highlights (cont.)

### *Russian Olive Management (cont.)*

Russian olive control methodologies were not well established, and less scientific literature existed on the species. In 2010, the team obtained funding through the Pahrangat Valley Cooperative Weed Management Area partnership with the Nevada Department of Wildlife to conduct some test plots to evaluate different treatment methods and herbicides. Through this work, the hack and squirt (frill cut) method using high concentrations of glyphosate herbicide was found to be very effective at controlling Russian olive and required less labor. These results were also consistent with work being concurrently conducted by the Utah State University Cooperative Extension. The LAKE EPMT deployed this method on a larger scale to successfully treat many more miles of streams and rivers with greater efficiency. A grant from the Bureau of Land Management funded Russian olive management along 13 miles of the East Fork of the Virgin River leading into Zion National Park.

It was important to educate and share new information derived from the research with other partners in the Russian olive control practice. This was accomplished through presentations at conferences and through demonstrations (e.g., to the Grand Staircase Escalante Partners (GSENM) who had been working on a large scale Russian olive control project that lead into the Glen Canyon National Recreation Area. The GSENM adopted this more efficient and effective treatment method and treated three times more acreage than with previous methodology. They recently completed the overall project ahead of schedule because of this information sharing.

## Summary of Accomplishments

In FY18 the team conducted projects in 10 NPS units and with 11 external agency partners that included BLM, USFWS, BOR, US Forest Service, US Marine Corps, Southern Nevada Water Authority, and four partnership agreements with Clark County, NV. In FY18 the team formed a new partnership with the BLM Battle Mountain District in Nevada to survey and treat invasive plants in multiples burn areas after wildfire and to treat an extensive Russian olive forest in the Big Smokey Valley, Nevada.

## Summarized Data for 2018

Measure	Acres
Treated	176
Inventoried/Monitored	131
Gross Infested Area	168
Net Infested Area	17
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	15
Total Hours for Youth Participants and Youth Employees	14,180

## More Information

**Curt Deuser**  
Liaison  
Supervisory Restoration Ecologist

601 Nevada Way  
Boulder City, NV 89005

(702) 293-8979  
curt\_deuser@nps.gov

**Tarl Norman**  
Supervisory Exotic Plant Specialist

(702) 293-8790  
tarl\_norman@nps.gov

**Rachel Skoza**  
Data/GIS Manager

(702) 293-8648  
rachel\_skoza@nps.gov

**Andy Pigg**  
Crew Leader/Exotic Plant Specialist

(702) 293-8976  
andy\_pigg@nps.gov

**Darrin Gobble**  
Crew Leader/Exotic Plant Specialist

(702) 271-9118  
darrin\_gobble@nps.gov





## Mid-Atlantic EPMT Annual Report: FY 2018



Previous pasture land being converted to native meadow at Appomattox Courthouse National Historical Park (APCO). The team treated this field to remove tall fescue and other invasive plants in the spring of 2018 (left). The same field four month later shows growth of native grasses and forbs (right). NPS Photos.

### Background

The Mid-Atlantic Exotic Plant Management Team (MA EPMT), stationed at Shenandoah National Park (SHEN), began in 1999 as the Virginia Invasive Vegetation Management Team (VIVMT). The VIVMT supported nine National Park units located in Virginia. In 2003, to meet a growing need for invasive plant management at the national level, the MA EPMT was established along with six other teams. The team now provides invasive plant management support to 21 National Park Service (NPS) units in Maryland, Pennsylvania, Virginia, and West Virginia, and to partner lands adjacent to some parks.

The parks served by the team range in size from 47 acres (Fort McHenry National Monument and Historic Site, FOMC) to over 193,000 acres (SHEN), and include wilderness, natural areas, and suburban and urban environments. They are located from the Appalachian Mountains, through the Piedmont, to the Coastal Plain. The majority have relatively small acreages with mandates to preserve and interpret culturally significant sites. Yet these small sites provide unique opportunities to enhance visitor experiences through natural resource preservation.

The MA EPMT uses integrated pest management strategies and best management practices to provide the most effective and efficient, but least toxic, solutions to control non-native invasive plants and protect the staff, visitors, and valuable resources within the parks. The team works with each park to help achieve their long-term natural resource management goals, and to act quickly when early detection rapid response (EDRR) is required. In addition to yearly visits for control work, the team advises parks as needed throughout the year.

### Program Highlights

#### *MA EPMT supports Meadow Management and Pollinator Habitat Goals*

Ten of the parks served by the team manage for native tall grass meadow, pollinator habitat, or a combination of the two. Eight of these ten parks were created for historical and cultural reasons, but within their mandate to manage for cultural resources, they have found unique ways to manage natural resources.

Natural resource management ranges in scale from the development of a formal plan to improve 1500 acres at Valley Forge National Historic Park (VAFO) to smaller meadow and garden projects. Small fields and lawns have been converted to meadow at Appomattox Court House National Historic Park and Hampton National Historic Site. Pollinator gardens have been created in small urban parks like FOMC. Meadows and pollinator gardens provide educational opportunities, and several parks leverage partnerships and volunteers to create and maintain these habitats.

In fiscal year (FY) 2018, the team contributed to the management of meadows and pollinator habitats in a variety of ways. They provided critical on-site control of invasive plants, funded seed purchases, and provided advice on short and long term management strategies. Invasive plants controlled to manage these habitats include Callery pear (*Pyrus calleryana*), Canada thistle (*Cirsium arvense*), golden bamboo (*Phyllostachys aurea*), Himalayan blackberry (*Rubus bifrons*), Japanese honeysuckle (*Lonicera japonica*), Johnson grass (*Sorghum halepense*), oriental bittersweet (*Celastrus orbiculatus*), and tall fescue (*Schedonorus arundinaceus*).





MA EPMT staff treating phragmites adjacent to George Washington National Monument. NPS Photo.



MA EPMT staff treating wavyleaf basketgrass at the PRISM town of Elkton trails site downstream from SHEN. NPS Photo.

## Program Highlights (cont.)

### Working Outside the Boundary

Invasive species know no boundaries, and one of the biggest challenges for our parks is the constant influx of outside propagules. To this end, the team and park staff have worked with private landowners and partners to allow the team to work outside park boundaries to address large populations, EDRR target species, and regional invasive plant issues.

The MA EPMT has been treating phragmites (*Phragmites australis*) at George Washington Birthplace National Monument (GEWA) since 2003, reducing coverage from 7 to 0.5 acres in the park. Future treatments will be more effective if phragmites on adjacent land is controlled, so the park and team reached out to the adjacent landowners and in FY2018 treated 2.7 acres of phragmites on adjacent private property.

The team also treated wavyleaf basketgrass (*Oplismenus undulatifolius*) at a site downstream from SHEN. Wavyleaf basketgrass is a regional EDRR target species. The park was already working as part of Blue Ridge Partnership for Regional Invasive Species Management (Blue Ridge PRISM) to address wavyleaf basketgrass in the park when PRISM volunteers discovered a new site in the town of Elkton, downstream from a known infestation at SHEN. The most efficient way to treat the new site was to use the MA EPMT's expertise and equipment. The team treated over 15 acres at this site.

## Summary of Accomplishments

In 2018, the MA EPMT provided direct in-the-field vegetation management service to 21 Northeast Region parks and one partner. Site visits by the team generally included chemical control of invasive plants beyond the capacity of the park, and visits to new acquisitions or areas designated for future treatments. The team also provided formal training for park staff at VAFO, and treated emerald ash-borer, a highly invasive insect, at two parks. Park staff provided guidance on topics such as pesticide storage and disposal, EDRR target species both in and near parks, and best practices for herbicide applications.

## Summarized Data for 2018

Measure	Acres
Treated	299
Inventoried/Monitored	1,257
Gross Infested Area	1,359
Net Infested Area	185
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	17
Total Hours for Youth Participants and Youth Employees	1,488

## More Information

Casey Reese, NER IPM Coordinator  
Supervisory Biologist  
Northeast Regional Office  
National Park Service

(267) 800-8503  
casey\_reese@nps.gov

1234 Market Street, 20th Floor  
Philadelphia, PA 19107

Kate Jensen  
Liaison, Acting

(540) 999-3500 x 3496  
kate\_jensen@nps.gov

Shenandoah National Park  
3655 US Hwy 211 East  
Luray, VA 22835

Nathan Wender  
Field Crew Leader

(540) 999-3500 x 3498  
nathan\_wender@nps.gov





# National Capital Region EPMT Annual Report: FY 2018



NCR EPMT staff and interns systematically search for and treat invasive plants in the Rock Creek Park Military Meadow area in Washington DC. NPS Photo.

## Background

The National Capital Region Exotic Plant Management Team (NCR EPMT) supports parks located from the District of Columbia to the foothills of the Appalachian Mountains. In addition to National Capital Region parks, the NCR EPMT assists non-National Capital Region parks and non-NPS partners: the Appalachian National Scenic Trail, the US Fish and Wildlife Service (at the National Conservation Training Center) and the Virginia Department of Conservation and Recreation (at Crow's Nest preserve).

The National Capital Region Exotic Plant Management Team:

- 1) Preserves habitats using Early Detection Rapid Response.
- 2) Controls invasive plants impacting ecologically sensitive areas.
- 3) Restores native habitats by removing exotic pest plants and re-establishing native plants and natural processes.
- 4) Prevents the spread of invasive species through training and careful stewardship of tools and equipment.

The NCR EPMT works closely with its partner parks and agencies to inventory and monitor invasive plants, train staff and volunteers, implement treatment and restoration efforts, and share resources and information.

## Program Highlights

### *NCR Partnership for Regional Invasive Species Management (PRISM)*

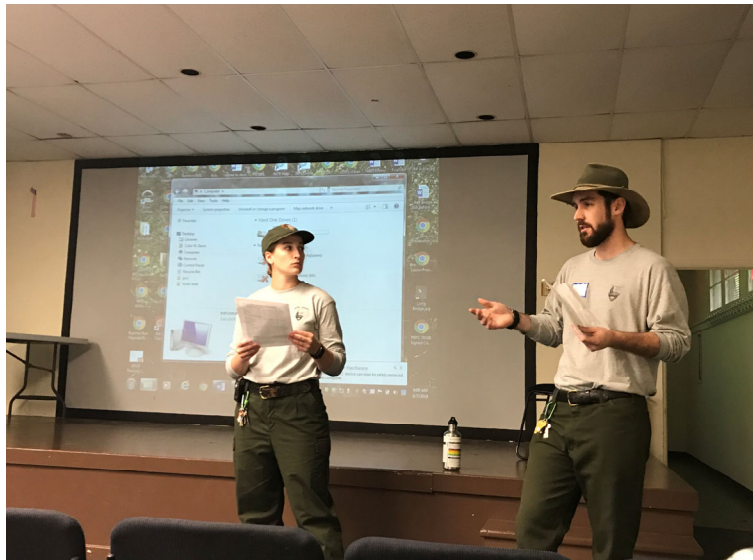
Invasive species are everywhere and they cross political boundaries, but at the start of the year there was no coordinating organization focused on invasive species in the National Capital Region. The NCR EPMT was instrumental in establishing an organization to encourage cross-border collaboration in the DC metropolitan area.

The NCR PRISM is a collaborative effort to improve the response to invasive species issues in the National Capital Region. The NCR PRISM replaces, and expands, the DC Cooperative Weed Management Area (DC-CWMA).

The DC-CWMA successfully connected land managers and land owners within the District and secured outside funds to conduct invasive plant control. But the CWMA only worked in DC and only dealt with plants. The NCR PRISM considers all taxa and operates in a wider region. The PRISM defines the NCR as DC and the adjacent counties but will consider expanding that definition in the future.

On July 31 the NCR PRISM hosted a launch event at the National Arboretum. Nearly 100 participants discussed how to collaborate, how to leverage data, and more.





Allie Hay and Nate Finney teaching about pesticide labels and Safety Data Sheets for a training hosted by the NCR PRISM. NPS Photo.



Alex Voznitza observing Reena Lam practicing a bore cut as part of the CSMO class. NPS Photo.

## Program Highlights (cont.)

### *Chainsaw Safety Maintenance and Operation*

Chainsaws are a crucial, but potentially dangerous, tool for managing vegetation. To safely serve NCR parks, Team Leader Alex Voznitza and Squad Leader Nate Finney took the Chainsaw Safety Maintenance and Operation (CSMO) trainer course hosted in the NCR.

In September, any NCR EPMT member who had not yet had CSMO training donned proper personal protective equipment (e.g., hardhats, ear muffs, safety goggles, chainsaw chaps, and boots). Under the guidance of Nate and Alex, they learned about field safety and emergency preparedness, equipment maintenance, and the safe and proper techniques for operating chainsaws.

Testing at the end of the course included written and field components. The field test covered personal protective equipment and inspection, site assessments, assessing tension in trees, as well as the performance of horizontal, vertical, and bore cuts. The written exam covered everything from parts of the chainsaw to the physics of common cuts.

This training is necessary for the NCR EPMT because chainsaws are used to remove many invasive woody species, including shrubs and trees like Amur honeysuckle bush (*Lonicera maackii*) and tree of heaven (*Ailanthus altissima*).

## Summary of Accomplishments

The NCR EPMT started field work in February 2018 and continued into October. Thanks to collaborations with park and non-park partners the EPMT was able to cover 421 acres in 2018. Starting in May, the crew size expanded to include two seasonal staff and three interns, which increased the team's flexibility and efficiency.

Although the team faced significant challenges with hiring, they were able to collaborate with the local Inventory & Monitoring (I&M) program to hire three seasonal staff from the I&M applicant pool. In addition, an intern with a regional museum program volunteered with the team two days each week.

The NCR EPMT looks forward to supporting parks in the coming months and years.

## Summarized Data for 2018

Measure	Acres
Treated	421
Inventoried/Monitored	4
Gross Infested Area	5,765
Net Infested Area	219
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	11
Total Hours for Youth Participants and Youth Employees	9,600

## More Information

**Mark Frey**  
Liaison

(202) 339-8317  
mark\_frey@nps.gov

Center for Urban Ecology  
4598 MacArthur Blvd., NW  
Washington, DC 20007

**Alex Voznitza**  
Field Crew Leader

(202) 339-8319  
aleksandra\_voznitza@nps.gov

**Allie Hay**  
Squad Leader

Allison\_Hay@nps.gov

**Nate Finney**  
Squad Leader

Nathan\_Finney@nps.gov





# North Coast-Cascades Network EPMT Annual Report: FY 2018



Crew Lead Sophie Wilhoit surveys the dense rainforest underbrush for Japanese knotweed (*Fallopia japonica*) at Mount Rainier National Park. Credit, Priscilla Le.

## Background

From the towering peaks of North Cascades National Park, west to the rainforest valleys of Olympic National Park (OLYM), and south to the ecologically rich coastlines of Lewis & Clark National Historical Park (LEWI), the North Coast-Cascades Network Exotic Plant Management Team (NCCN EPMT) provides invasive plant mitigation for our partners within the network. In addition to the parks listed above, the NCCN EPMT provides invasive plant control assistance to Ebey's Landing National Historic Reserve (EBLA), Mount Rainier National Park, and San Juan Islands National Historical Park (SAJH).

The NCCN EPMT utilizes current methods, conducts research, and works with industry specialists to ensure that the EPMT's work is effective and environmentally friendly. The team is becoming adept at performing carefully calibrated winter applications of pre-emergent herbicides to combat invasive plants before they can outcompete native vegetation; this approach often alleviates the need for treatments during the growing season.

The team provides a variety of services in addition to ecosystem based invasive plant control. These services include helping to design riparian restoration projects, collecting native seed for propagation, and managing invasive plant populations in a range of environments with specialization in large-scale, comprehensive invasive plant control. The EPMT is particularly in demand for treating invasive plant populations in hard-to-reach areas or in the backcountry.

## Program Highlights

### *Invasive Blackberry Control at Lewis & Clark's Netul Landing*

The NCCN EPMT has long partnered with resource management staff at LEWI to control invasive plant species within the boundaries of the park. These efforts have been largely successful. However, due to nearby landowner concerns over the safety of local honeybees, the NCCN EPMT had been unable to perform adequate foliar treatment of a sizable Himalayan blackberry (*Rubus bifrons*) infestation at the park's Netul Landing.

In response to the landowner's concerns, EPMT staff did a significant amount of research on treatment options, developed outreach materials, and calibrated an effective herbicide mix that would balance both environmental and human safety. Through research, a new aquatic approved surfactant, Hasten EA, was identified as meeting project requirements. This adjuvant is the new industry standard for human safety and is relatively non-toxic to both humans and pollinators. Consequently, staff at LEWI were able to convince the concerned neighbor that an appropriate foliar treatment of blackberries would be both safer for humans and the environment and more effective than the previous cut stump treatment.

In Spring 2018, the NCCN EPMT displayed interpretive signboards and completed the treatment quickly and effectively. This enabled LEWI staff to remove over 1100 pounds of blackberry from the site.





Staff perform foliar application of herbicide to control Himalayan blackberry (*Rubus bifrons*) at Lewis & Clark National Historical Park's Netul Landing. NPS Photo.



NCCN EPMT staff perform pre-emergent control of poison hemlock (*Conium maculatum*) at Ebey's Landing National Historic Reserve. NPS Photo.

## Program Highlights (cont.)

### Controlling Poison Hemlock at Ebey's Landing

Poison hemlock (*Conium maculatum*) at EBLA has long been a serious concern for National Park Service (NPS) managers as well as members of the local community in the nearby town of Coupeville. Possibly a unique holding in the NPS, EBLA consists of several actively-managed farms and dairies, natural woodlands, and seaside slopes surrounded by working farms.

The historic reserve is jointly managed by the NPS, The Nature Conservancy (TNC), Island County, Washington State Parks, and the City of Coupeville. The NCCN EPMT and EBLA staff have been controlling poison hemlock for more than a decade, with limited success. Prior treatments focused on emerged plants. Although these treatments have been successful, the seed bank has remained largely unaffected. This species germinates throughout the year requiring multiple treatments each year. Untreated poison hemlock readily spreads to adjacent lands, causing problems for farmers.

In early 2018, the NCCN EPMT partnered with TNC, Washington State Parks, and Island County to manage the seedbank using the pre-emergent herbicide imazapic. This new treatment appears to have been extremely successful. Nine months post-treatment, poison hemlock seedlings have not appeared within the treatment area, and the treated site has been heavily recolonized by native horsetails (*Equisetum* spp.).

## Summary of Accomplishments

The NCCN EPMT had a very productive year and managed to address all project requests submitted for FY 2018. New project sites included reed canary grass (*Phalaris arundinacea*) at Irely Lake in OLYM, and rush skeletonweed (*Chondrilla juncea*) in the historic orchard and surrounding area at Lake Chelan National Recreation Area. The team also made progress on many ongoing projects. In addition to the highlighted LEWI and EBLA projects, a variety of invasive thistles and post-prescribed fire experimental plots were treated at SAJH. The NCCN EPMT completed many other projects in the larger parks served by the team.

## Summarized Data for 2018

Measure	Acres
Treated	83
Inventoried/Monitored	20
Gross Infested Area	3,747
Net Infested Area	117
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	5
Total Hours for Youth Participants and Youth Employees	4,400

## More Information

**Cheryl Decker**  
Liaison

(360) 854-7336  
cheryl\_decker@nps.gov

810 State Route 20  
Sedro-Woolley, WA 98284

**Sophie Wilhoit**  
Crew Lead; Data Manager

(360) 565-3076  
sophie\_wilhoit@nps.gov

600 E Park Ave  
Port Angeles, WA 98362

**Collin McAvinchey**  
Crew Lead

(360) 565-3076  
collin\_mcavinchey@nps.gov





## Northeast EPMT Annual Report: FY 2018



Hamilton Park, Gateway National Recreation Area, New York, view towards Jamaica Bay. Top, before invasive plant treatments, 9/3/2016. Bottom, after mechanical and chemical treatments, 9/27/18. NPS Photos.

### Background

The Northeast Exotic Plant Management Team (NE EPMT), duty stationed at Delaware Water Gap National Recreation Area (DEWA), was established in 2003 and serves 25 partner parks in eight states, from Pennsylvania to Maine, in the National Park Service's Northeast Region.

The parks served by the NE EPMT range in size from 9 acres to over 100,000 acres. The majority of these parks have relatively small acreages with mandates to preserve and interpret culturally significant sites, including National Battlefields and National Historic Sites. The NE EPMT works effectively with parks to define and rank invasive species priorities and to establish achievable, cost-effective management goals that lead to measurable results over time.

Beginning in 2016, the NE EPMT adapted its approach to ensure that parks continue to receive high quality technical support and continued service as costs increase and the budget remains static. In addition to site visits with a reduced crew, the team provides small grants to parks through a competitive proposal and ranking process. In 2018, nine exotic plant management projects were funded at nine different parks. The team also provided treatment, training, and technical support to many other parks in the region.

### Program Highlights

#### *Invasive Plant Management in Urban Areas, Gateway National Recreation Area*

Public parks in New York City have invasive plants too. Hamilton Park, Queens, New York (NY), is part of Gateway National Recreation Area (GATE) and is located on the shore of Jamaica Bay. The beach side of the park has been invaded by Japanese knotweed (*Fallopia japonica*), common reed (*Phragmites australis*), and other invasive plants. In addition to the ecological impacts of the invasive plants, the view to the water was obstructed, impacting the visitor experience and creating a safety concerns for people on the beach.

One of the best management strategies for controlling invasive plants is to integrate different types of treatment. In Hamilton Park, plants were weakened by cutting, then treated chemically, requiring less herbicide. Knotweed and common reed were cut in September 2016 by the fuels crew from Kings Mountain National Military Park (KIMO), Blacksburg, South Carolina. Cutting was followed by mowing in June 2017, by GATE Fire and Interpretation staff. Then the NE EPMT chemically treated regrowth in August 2017 and August 2018. One more mechanical cutting and one more chemical treatment should severely limit the invasive plant cover, reducing it to a maintenance level that requires treatment every two or three years.





A single 12 foot wide treatment path through wild chervil, two weeks after treatment with 1/2 oz per acre Escort® XP. Treated plants did not produce seeds. DEWA. NPS Photo.



A Japanese stiltgrass plot 10 months after treatment, treated with 7 fl oz per acre pre-emergent Esplanade® 200 SC at Valley Forge National Historic Park. NPS Photo.

## Program Highlights (cont.)

### *How NE EPMT uses Weed Science to Inform Park Managers*

In the Northeast, it is a challenge to extend the treatment window beyond the April to October period. How can that window be opened into the rest of the year when many plants are dormant?

Wild chervil (*Anthriscus sylvestris*) is a biennial invasive species that emerges early in spring and stays green until severe frost. Two trials using a post-emergent herbicide, Escort XP, were conducted in late November and mid-April. The trials showed that the operational window can be extended to treat chervil at DEWA in late fall and early spring during the period when many plants are dormant.

Traditional pre-emergent treatments usually occur within two months of germination. The NE EPMT conducted trials to test post-emergent pendimethalin versus pre-emergent indaziflam. The NE EPMT's trials have shown that these two herbicides can be effective many months prior to germination and provide nearly a year of control. For example, treating Japanese stiltgrass (*Microstegium vimineum*) with a pre-emergent herbicide as early as five or six months before the expected May germination is an effective management strategy.

## Summary of Accomplishments

In 2018, the NE EPMT provided direct in-the-field vegetation management service to 11 Northeast Region parks. Most site visits focused on invasive plant projects that were beyond the parks' capacities. The team also provided training for park staff in the western PA parks and in the greater Boston, MA area.

Through the grant process, the team distributed approximately \$111,000 to support invasive plant projects in nine parks. Seasonal staff were hired at two parks, and interns were funded at two others. Contracts to provide invasive plant control were awarded at four park units and a cooperative agreement between the NPS and the non-profit New Jersey Invasive Species Strike Team was funded to support one of the NE EPMT's partner parks. Many of these parks contributed to the grant program's success by leveraging time and resources at several times the value of the grants.

## Summarized Data for 2018

Measure	Acres
Treated	127
Inventoried/Monitored	160
Gross Infested Area	6,844
Net Infested Area	303
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	445
Total Hours for Youth Participants and Youth Employees	10,445

## More Information

**Casey Reese**  
NER IPM Coordinator

(267) 800-8503  
casey\_reese@nps.gov

Northeast Regional Office  
National Park Service  
1234 Market Street, 20th Floor  
Philadelphia, PA 19107

**Brian McDonnell**  
Liaison

(570) 588-0534  
brian\_mcdonnell@nps.gov

Delaware Water Gap National Recreation Area  
1978 River Rd  
Bushkill, PA 18324





# Northern Great Plains EPMT Annual Report: FY 2018



Fort Union Trading Post National Historic Site, North Dakota. NPS Photo.

## Background

The Northern Great Plains Exotic Plant Management Team (NGP EPMT) works with fourteen partner parks in four states and two National Park Service (NPS) regions. The goal of the NGP EPMT is to help parks preserve native plant communities and historic landscapes by managing the spread of invasive exotic species. The team also works with park personnel to accomplish restoration activities such as implementing prescribed fires, developing native plant materials, and seeding sites to restore desired resource conditions. The area served by the NGP EPMT is approximately 452,000 acres and ecologically diverse, with vast grasslands, forests, and integral river systems. Integrated pest management (IPM) strategies used to manage invasive plants include chemical, biological, mechanical, and cultural methods. Education and training in IPM are priorities of the team. Each year NGP EPMT staff offer a week-long training session in the principles and practices of IPM for park staff, partners, and NGP EPMT seasonal employees.

Field crews for the NGP EPMT are based at either Badlands National Park or Theodore Roosevelt National Park and travel to other parks in the network. Over the course of this year, NGP EPMT members completed field work at 12 parks. Members of the Montana Conservation Corps and Minnesota Conservation Corps were integrated into the field crews to increase capacity and efficiency of operations. This allowed youth on the Conservation Corps crews to engage in important and substantive work to further the NPS mission.

## Program Highlights

### *Cattle Grazing to Control Invasive Grasses*

Fort Union Trading Post National Historic Site (FOUS) has a 30 year history of successfully restoring native prairie using tillage, herbicide treatments, and native plant seeding. Currently, invasive perennial grasses, crested wheatgrass (*Agropyron cristatum*) and smooth brome grass (*Bromus inermis*), are encroaching into previously restored areas. These two grasses are very difficult to manage using conventional techniques like mowing or herbicide treatment because their growth cycles are similar to those of native grass species. With limited success using herbicide and mowing, different management options are needed to maintain the restored areas in the park.

Cattle grazing has decreased the abundance of crested wheatgrass and smooth brome in areas that are ecologically similar to FOUS. To investigate whether cattle grazing is a viable management option to control these invasive grasses, a pilot grazing plan was developed for the Bodmer area of FOUS. This area was selected because it contains areas of diverse native prairie and would not require supplemental drill seeding if grazing performs as expected. Cattle were introduced in early June for a short period of time to implement this multi-year project. Early results were positive and the project will be expanded in the upcoming year.





Management of invasive plant species (leafy spurge, *Euphorbia esula*, and Canada thistle, *Cirsium arvense*) at Theodore Roosevelt National Park. NPS Photo.



Vegetation height monitoring for cattle grazed plots at Fort Union Trading Post National Historic Site. NPS Photo.

## Program Highlights (cont.)

### *Invasive Annual Brome Adaptive Management Project*

A research project to identify the best practices for managing invasive annual grasses in the Northern Great Plains continued in 2018. This project is a collaborative effort by the US Geological Survey (USGS), Northern Great Plains Inventory and Monitoring Network, Northern Great Plains Fire Management, Northern Rocky Mountain EPMT, several NPS units, and the NGP EPMT. The research resulted in an adaptive management plan and a predictive model to help parks make science-based decisions to manage annual grasses in the Northern Great Plains.

The NGP EPMT, in partnership with several parks, will now begin large scale herbicide treatments using recommendations produced by the model. Treated areas will then be monitored and data analyzed to refine the model and its outputs over time. The treatment implementation phase of this complex, multi-park project will be critical to its ongoing success.

## Summary of Accomplishments

During the 2018 field season, partnerships with the Montana and Minnesota Conservation Corps continued to increase the number of personnel helping parks manage invasive species. Conservation Corps crews were able to implement treatment at 6 parks this past year and included crews trained specifically in invasive species management.

Helicopter operations were continued in high priority areas at Theodore Roosevelt, Wind Cave, and Badlands National Parks. Aerial spraying allowed for treatment of invasive plants in areas that are too remote for timely and cost-efficient treatment using conventional methods. Wind Cave experienced several large wildfires which resulted in the need for increased aerial and ground treatment during the year.

Our regional seed storage facility at Wind Cave is nearing completion with a seed freezer and climate-controlled space ready for use by partners.

## Summarized Data for 2018

Measure	Acres
Treated	2,318
Inventoried/Monitored	188,132
* Gross Infested Area	16
* Net Infested Area	5
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	39
Total Hours for Youth Participants and Youth Employees	7,320

\*Due to data collection methods, reported infested acreage is not comprehensive

## More Information

**Brennan Hauk**  
Liaison

231 E St Joseph St  
Rapid City, SD 57701

(605) 341-2801  
brennan\_hauk@nps.gov

**Angela Jarding**  
Data Manager

(605) 341-2809  
angela\_jarding@nps.gov





# Northern Rocky Mountain EPMT Annual Report: FY 2018



Great Sand Dunes National Park, CO. Public Photo.

## Background

The Northern Rocky Mountain Exotic Plant Management Team (NRM EPMT) serves 25 parks across Colorado, Idaho, Montana, northern New Mexico, Utah, and western Wyoming. This region is vast and diverse, encompassing high and low elevation sagebrush steppe, forests, sub-alpine meadows, and wetland and riparian areas. Many parks in this network are relatively small (median size is 20,000 acres) and a number of them do not have staff to address even their highest priority invasive species. Since its inception in 2003, the NRM EPMT program has emphasized the systematic, long-term management and control of invasive plant species in these parks.

The NRM EPMT is currently a nine-person crew strategically divided into three smaller crews based at two of the larger parks in the network. The program also partners with other work crews to address distant parks. Nearly all 25 parks receive work annually and 12 parks received multiple visits in 2018. Repeat visits are critical for many project areas to ensure that all invasive plants are located and removed. Much of the team's effort is focused on controlling state listed noxious weeds, as well as providing rapid response to new and/or particularly problematic invaders. The NRM EPMT program relies heavily on the region's seasonal dichotomy, working lower elevation parks in Utah and Idaho early in the growing season and higher elevation parks in Colorado, Wyoming, and Montana later in the summer. Crews continue into the early fall to address perennial invasive plants as they enter dormancy.

## Program Highlights

### *New Partnership Along the Northern Boundary of Yellowstone National Park*

In 2018, the NRM EPMT worked with Yellowstone National Park (YELL) to establish an interagency partnership with the Custer Gallatin National Forest and Gardiner Ranger District. Although these federal partners have worked together every few years, YELL and the EPMT program decided to formalize an annual partnership.

Members of the US Forest Service (USFS), YELL, and NRM EPMT met in July to address high priority areas on the park's northern boundary where the communities of Cooke City and Gardiner, Montana are vectors for infestations within YELL. Crews surveyed and treated invasive plants across campgrounds, popular trailheads, and several tracts of private land. Newly discovered infestations for these portions of Park County, Wyoming include houndstongue (*Cynoglossum officinale*), oxeye daisy (*Leucanthemum vulgare*), and meadow hawkweed (*Hieracium caespitosum*). A total of 140 hours were spent on these areas and five infested acres were treated.

The partnership reached out to community members to reiterate the importance of cleaning gear, tackling infestations early, and cooperating with other land owners. Staff from the EPMT, YELL, and USFS worked at a local community center for six hours and provided support to residents who were interested in and capable of spraying their own properties.





NRM EPMT crew members partnering on USFS lands near the northeastern entrance to Yellowstone National Park's. NPS Photo.



Members of the Utah Conservation Corps assisting with a treatment of sweet clover and St. John's wort at Little Bighorn National Battlefield, MT. NPS Photo.

## Program Highlights (cont.)

### *Greater Effort to Reduce Invasive Plants at Little Bighorn NB*

The NRM EPMT has historically provided Little Bighorn National Battlefield (LIBI) with targeted early spring treatment of St. John's wort (*Hypericum perforatum*) and fall treatment of Russian olive (*Elaeagnus angustifolia*) and tamarisk (*Tamarix ramosissima*) trees along the shores of Onion Creek at the battlefield's southern boundary. Though effective, these efforts have not addressed other landscape-level invasive plant problems in the park.

In the summer of 2018, park staff and the NRM EPMT used recreation fee dollars to develop agreements to partner with both the Utah and Montana Conservation Corps to get more crew members into the park. These crews began addressing problematic invasive plants at trailheads, along roads and trails, at recreation sites, and around administrative areas. Their herbicide applications (see photo above right) targeted small patches of early invaders including Russian knapweed (*Rhaponticum repens*) and Dalmatian toadflax (*Linaria dalmatica*) while treating larger areas of field bindweed (*Convolvulus arvensis*), sweet clover (*Melilotus officinalis*), and Canada thistle (*Cirsium arvense*). A total of 240 hours (7.5 infested acres) were spent on these various areas and species. The EPMT and park will build on these efforts to reverse the impacts of these invasive species to LIBI.

## Summary of Accomplishments

The NRM EPMT treated 38 species across 153 infested acres in 20 National Parks in 2018. In total, just over 4,300 person hours were spent on treatment of invasive plant species in parks served by the NRM EPMT program. The team also provides other services to parks beyond invasive plant treatment.

The NRM EPMT continues to strike a balance between contributing to long-term large-scale control efforts, early detection and removal of nascent populations, and opportunistic restoration of native species. Several steering committee meetings are held annually to review and approve the team's strategic direction and financial plan, ensure the team provides information that is relevant to management, and develop an invasive plant treatment schedule for the fiscal year.

## Summarized Data for 2018

Measure	Acres
Treated	153
Inventoried/Monitored	-
Gross Infested Area	3,531
Net Infested Area	54
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	42
Total Hours for Youth Participants and Youth Employees	8,540

## More Information

**Steven Bekedam**  
Liaison

(307) 344-2185  
steven\_bekedam@nps.gov

P.O. Box 168  
Yellowstone National Park  
Yellowstone, WY 82190

**Gary Ludwig**  
Crew Leader

(406) 250-3928  
gary\_ludwig@nps.gov

Glacier National Park  
West Glacier, MT 59936

**Andrew Ringholz**  
Crew Leader

(307) 344-2654  
andrew\_ringholz@nps.gov

Yellowstone National Park  
Yellowstone, WY 82190





## Pacific Islands EPMT Annual Report: FY 2018



Pacific Islands EPMT crew members hiking to guinea grass (*Megathyrsus maximus*) field site in a remote section of Hawai'i Volcanoes National Park. NPS Photo.

### Background

More than 85 species of invasive plants threaten the integrity of the highly biodiverse Pacific Island ecosystems. The Pacific Islands Exotic Plant Management Team (PI EPMT) manages invasive species by addressing high priority projects across watershed and landowner boundaries. The team serves six national park units, as well as collaborators and partners, including the University of Hawai'i College of Tropical Agriculture and Human Resources, Leeward Haleakalā Watershed Partnership, and The Nature Conservancy Hawaii.

For over 19 years, the EPMT concept has helped to leverage resources and address invasive species-related needs across the Pacific Islands Parks Network. Larger parks such as Hawai'i Volcanoes and Haleakalā National Parks serve as duty stations and resource bases, while smaller park units benefit from resource and knowledge sharing as needed to address their most critical invasive species issues.

Because the Hawaiian Islands also contain the vast majority of the nation's threatened and endangered plant species, proactive and innovative management is a critical component of protecting and preserving natural resources for future generations. Collaborative partnerships play a significant role in developing capacity. The team focuses on three strategies to maximize efficacy: 1) control incipient invasive species inside and outside parks, 2) control threatening infestations in Special Ecological Areas within existing management units, and 3) serve as a technical support entity to parks and cooperators in the Pacific Basin to protect and restore native ecosystems, foster cooperation among shareholders, and ensure public safety.

### Program Highlights

*Pursuing Early Detection and Rapid Response (EDRR) Activities to Protect Parks: A Success at Haleakala National Park (HALE)*

Haleakala Crater is a unique alpine cinder habitat that hosts a rich habitat and stunning scenery. In past years, the EPMT has been actively controlling an aggressive large-scale invasion of invasive pine trees. Continuous surveillance and monitoring for incipient threats are ongoing as part of these larger invasive plant management efforts. In 2018, the team initiated a response plan to a newly-detected species in Haleakala Crater, German knotweed (*Scleranthus annuus*). The Team provided survey parameters and treatment recommendations to fulfill EDRR goals, reviewed first order survey and treatment actions, and conducted follow-up surveys. Fewer than 100 plants were treated over approximately 0.1 acre. Future monitoring and treatment of the single known infestation can keep this new invasive plant species from becoming further established.



Iconic view of Haleakala Crater with endangered silversword (*Argyroxiphium sandwicense* subsp. *macrocephalum*) plants, Haleakala National Park. NPS Photo.





PI EPMT crew members using chainsaws to remove invasive Faya Tree (*Morella faya*) at Hawai'i Volcanoes National Park. NPS Photo.



PI EPMT crew members inspecting and clearing a site of invasive vegetation to begin restoration at Pu'u Honua o Hōnaunau National Historic Park. NPS Photo.

## Program Highlights (cont.)

### *Addressing Emerging Threats and Keeping In Front of Wildfire-Like Invasive Species Invasions at Hawai'i Volcanoes National Park (HAVO)*

Rapid Ohi'a Death (ROD), a relatively new fungal disease, is decimating Hawaiian forest trees and spreading like wildfire on the Big Island of Hawai'i. Native Ohi'a trees, when infected by this pathogen, die within weeks to months, and there are no known treatments or cure for the disease. The HAVO-based EPMT staff provided technical guidance to other parks and land managers to prepare for and manage ROD infestations. The team conducted over 150 worker days, leading field monitoring and sanitation efforts and collaborating with other agencies and universities. They provided technical falling (chainsaw) support to isolate contaminated trees, reduce spread of the pathogen, and increase scientific knowledge while sampling over 200 trees. Recognizing the threat of inter-island spread from the Big Island of Hawai'i to others such as Maui, home to Haleakala, the PI EPMT is facilitating the development and implementation of refined bio-security protocols for Hawaii National Parks. As these measures are refined, expect further implementation by the HALE vegetation management program to protect remaining unaffected forests.

## Summary of Accomplishments

Safely accomplishing mission goals and objectives has been the cornerstone principle for the PI EPMT. The culture of safety within the PI EPMT and its partner parks has developed progressively over almost two decades. Routinely leading and participating in safety and operational briefings, implementing Operational Leadership principles, using effective Job Hazard Analyses, and rigorously reviewing near-misses are all factors that foster this culture. At HAVO alone in 2018, EPMT invested nearly 1,000 worker days controlling over 75 different species of invasive plants in the field with zero reportable incidents. All of this despite challenges faced by more than three months of volcanic eruptions and park closure, hazardous air quality, and near-daily earthquakes. Continuous diligence will achieve future successes.

## Summarized Data for 2018

Measure	Acres
Treated	263
Inventoried/Monitored	-
Gross Infested Area	18,882
Net Infested Area	422
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	199
Total Hours for Youth Participants and Youth Employees	4,273

## More Information

**Jeremy Gooding**  
Liaison

(808) 281-4781  
Jeremy\_gooding@nps.gov

PO Box 880896  
Pukalani, HI 96788

**David Benitez**  
Ecologist and EPMT Data Manager

(808) 985-6085  
david\_benitez@nps.gov

Hawaii Volcanoes National Park  
P.O. Box 52  
Hawaii National Park, HI 96718

**J. Woody Mallinson**  
Natural Resource Program Manager

(808) 572-4480  
Jeffrey\_Mallinson@nps.gov

Haleakala National Park  
P.O. Box 369  
Makawao, HI 96768





## Southeast Coast EPMT Annual Report: FY 2018



The Earth Lodge at Ocmulgee Mounds National Historical Park, formerly Ocmulgee National Monument, is a mound protected by the park. This NPS site was once home to Native American cultures. NPS Photo.

### Background

The Southeast Coast Exotic Plant Management Team (SEC EPMT) serves 15 park units in North and South Carolina, Georgia, and Alabama. Network parks range from protected seashores and forested wilderness to urban recreational areas and preserved cultural landscapes. Along the coast are the National Seashores from the lighthouses of Cape Hatteras (CAHA) to the wild horses of Cumberland Island, with historic battle sites in between, including those of the Revolutionary War at Fort Frederica National Monument and the Civil War at Fort Sumter National Monument (FOSU). Inland, the SEC EPMT serves parks like Chattahoochee River National Recreation Area (CHAT) in the Atlanta metro to the prehistoric settlements at Ocmulgee Mounds National Historical Park (OCMU). The SEC EPMT is stationed at Congaree National Park (CONG), which encompasses one of the last remnants of intact old growth bottomland forest and of which approximately 80% is designated wilderness.

The SEC EPMT was initiated as a pilot project in 2005 and by 2010 was permanently funded through CONG's base operating budget. Although funded differently than the majority of EPMTs, the SEC EPMT strives to achieve similar goals for invasive plant management. In fiscal year (FY) 2018, the SEC EPMT was led by Lauren Serra (liaison) and Amorita Brackett (field crew leader). The SEC EPMT crew was comprised of three American Conservation Experience youth interns. The crew was shared with Chattahoochee River National Recreation Area, as in FY 2017.

### Program Highlights

#### *Collaboration Among Network Parks*

In FY 2018 the EPMT, with staff from parks both inside and outside of its network, engaged in many exciting collaborative efforts. Field assistance, technical support, and training were among the team's significant contributions to invasive plant management. With financial and field assistance from parks, SEC EPMT provided service to several parks multiple times during the year. Cape Lookout National Seashore projects included treatment of white poplar (*Populus alba*) and common reed (*Phragmites australis*) with the help of CONG staff. Joint trips increased the acreage treated at parks, promoted sharing of skills among staff, and facilitated training by the EPMT.

The SEC EPMT worked at FOSU and Charles Pinckney National Historic Site after a ten-year lapse and provided training in invasive plant management to park staff. The building of relationships with these parks also facilitated invasive plant inventory and mapping by the team at an affiliated and new park, Reconstruction Era National Monument. New projects are being undertaken at long-served parks as invasive plants are under control. At Kennesaw Mountain National Battlefield, the team controlled a golden bamboo (*Phyllostachys aurea*) infestation and moved to new treatment sites. Revegetation projects with native species were conducted, including longleaf pine planting at CONG. SEC EPMT provided technical assistance to OCMU on a youth crew agreement and CAHA to plan for aerial treatment of common reed by drone in FY 2019.





SEC EPMT interns treat white poplar (*Populus alba*) at Cape Lookout National Seashore. NPS Photo.

## Program Highlights (cont.)

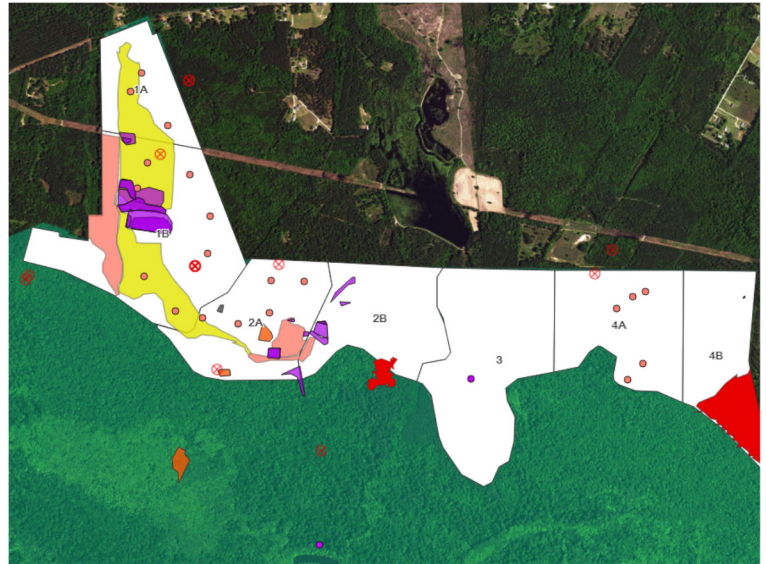
### *Collaboration Among Programs and Partners*

SEC EPMT collaborations extended to parks within other EPMT program networks. Kings Mountain National Military Park, in the Southeast EPMT network, provided training to EPMT interns. The Fire Effects Monitoring Program in the Appalachian/Piedmont/Coastal Fire Management Zone and the Southeast Coast Network Inventory and Monitoring (SECN I&M) program collaborated with the SEC EPMT through CONG to share park vegetation data at the annual SECN I&M Steering Committee meeting to aid park management decisions.

The sharing of invasive plant data among programs provided SEC EPMT with location data for treatments and the EPMT created a watch list of invasive plants for network parks where these programs overlap. The watch list included species that have been found or have the potential to occur within program parks as early detection and rapid response (EDRR) species. Online reporting of EDRR species was the focus of SEC EPMT citizen science outreach presentations at South Carolina Native Plant Society and North Carolina Invasive Plant Council meetings. Collaborative efforts increased efficiency and minimized resources needed to complete tasks which benefitted parks and programs.

## Summary of Accomplishments

The SEC EPMT served 14 partner parks and one out-of-network park and treated approximately 40 plant species. EPMT staff further developed and strengthened partnerships among network parks, among programs, and externally. The liaison served on the South Carolina Exotic Pest Plant Council, EPMT Safety Committee, and CONG Safety and Wellness Committee. Safety, essential to team function, continued to be a high priority. This fiscal year SEC EPMT completed yearly Job Hazard Analysis and Safety Data Sheet reviews. The field crew leader maintained Wilderness First Responder certification and the entire team attended the Innovations in Invasive Species Management Conference in Nashville, TN. In-kind funding, in conjunction with field assistance from park staff and volunteers, travel per diem, park housing, supplies, equipment, and training contributions from network parks provided critical support for SEC EPMT program accomplishments.



### LEGEND:

- orange and purple polygons = epmt data
- pale red polygons and pale yellow polygons = mastication completed
- orange points = fem plots
- crosshairs = wildland fires
- bright red polygons = wildfires (park data)
- purple points = I&M Vegetation Plots

Overlay of EPMT treatments, CONG mastication treatment, Fire Effects Monitoring (FEM) vegetation study plots, wildland fires, and SEC Network Inventory and Monitoring (I&M) vegetation plots at CONG, a collaborative sharing of information across NPS programs to guide park management decisions. NPS Photo.

### Summarized Data for 2018

Measure	Acres
Treated	57
Inventoried/Monitored	938
Gross Infested Area	2,139
Net Infested Area	102
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	76
Total Hours for Youth Participants and Youth Employees	6,641

## More Information

Lauren Serra  
Liaison

Congaree National Park  
100 National Park Rd  
Hopkins, SC 29061

Amorita Brackett  
Field Crew Leader

(803) 695-0214  
lauren\_serra@nps.gov

(803) 647-3985  
amorita\_brackett@nps.gov





## Southeast EPMT Annual Report: FY 2018



Southeast EPMT treating Chinese privet (*Ligustrum sinense*) in the floodplain, Ninety-Six National Historic Site. NPS Photo.

### Background

In its 15th year, the Southeast Exotic Plant Management Team (SE EPMT) provided support to 20 national park units across seven states in the Southeast Region. During 2018 the Team provided on-the-ground control, monitoring, and surveys for invasive plant management to 16 partner parks and technical assistance, training, and/or materials to eight partner parks and one non-partner park. Parks served by the SE EPMT lie within the physiographic provinces of the Cumberland Plateau, the Appalachian Highlands, and the Piedmont. Unique habitats and cultural resources include river scour prairies, archeological sites, historic battlefields, cave features, remnant cedar glades, earthworks, and scenic byways. Many of these sites include federal and state listed plant and animal species or significant cultural resources that are frequently threatened by competition from invasive plants. The SE EPMT strategy in the management of these resources is an integrated one designed to include all the available tools adapted to suit the long term management goals of the individual park and the protocols of the regulating state or federal agencies.

The SE EPMT functions as a self-contained, mobile strike team comprised of a Team Leader and two to four team members. Traditionally, the SE EPMT has included student interns as team members allowing for hands-on experience in natural resource management and an introduction to general National Park Service (NPS) operations.

### Program Highlights

#### *Floodplain Restoration—South Carolina Piedmont*

In 2018 a high priority for the SE EPMT was control and eradication of Chinese privet (*Ligustrum sinense*) in the floodplain areas of Cowpens National Battlefield (COWP) and Ninety-Six National Historic Site. This effort resulted in the treatment of just over 28 acres that were dominated by this species. In past years, the Team worked to remove the larger mature stems of this woody shrub which opened the canopy and allowed the germination of thousands of privet seed-lings. Although privet seed only remains viable for approximately two years, the floodplain is continually replenished with seed from plants located outside park boundaries. The team will continue to treat these floodplain sites indefinitely in an effort to prevent the reestablishment of privet from outside seed sources. Monitoring of the floodplains in 2018 showed the establishment and spread of native species including river oats (*Chasmanthium latifolium*) and native river cane (*Arundinaria gigantea*).

The Team also continued to expand three warm season native grass plots located along the main park road at COWP. These plots include native flowering plants to enhance habitat for native pollinators. These areas are available for public view and enjoyment and to use for interpretative activities with local school groups.





Pretreatment native grass plot expansion, Cowpens National Battlefield. NPS Photo.



Southeast EPMT providing chainsaw training at Chickamauga & Chattanooga National Military Park. NPS Photo.

## Program Highlights (cont.)

### *Collaborative Restoration at Chickamauga & Chattanooga National Military Park*

In the early fall of 2018 the SE EPMT was invited to collaborate with the Cumberland Piedmont Inventory and Monitoring Network and the Appalachian/Piedmont/Coastal Fire Management Program in the restoration of a historic landscape, including glade areas and oak-woodlands, at Chickamauga & Chattanooga National Military Park (CHCH). This project promotes collaborative efforts to manage the unique natural and historical resources at CHCH and take advantage of the relationship between invasive plant management and prescribed fire. The Viniard-Alexander unit was identified as the first site slated for prescribed burn. Invasive species make up a significant portion of the cover there due to past disturbance. Treatment of these species prior to burning will greatly increase the likelihood of the expansion of native species. This site has been inventoried by the team and a preliminary treatment plan is under development. Winter treatment of woody invasive species is scheduled for early 2019 and will continue after the burn event. Following the anticipated success of this effort, restoration of additional glade areas within CHCH will be undertaken collaboratively.

## Summary of Accomplishments

As in past years, the SE EPMT has supported partner and non-partner parks through various means. In addition to inventory and treatment (385 acres) of invasive plants, the SE EPMT continued to provide support to two parks in treating hemlock wooly adelgid, a forest pest. Eight training sessions were held in 2018 for parks, including NPS Chainsaw Operations and Safety, herbicide application, and utility terrain/all terrain vehicle operator's certification. The Team also assisted non-partner NPS parks units with hurricane recovery activities and safety inspections of equipment and pesticide storage. Lastly, and most importantly, the SE EPMT completed their 15<sup>th</sup> year of safe operation with no time lost due to accident or injury.

## Summarized Data for 2018

Measure	Acres
Treated	386
Inventoried/Monitored	-
Gross Infested Area	3,777
Net Infested Area	385
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	8
Total Hours for Youth Participants and Youth Employees	6,768

## More Information

**Nancy Dagley**  
Liaison

(828) 407-5651  
nancy\_dagley@nps.gov

Blue Ridge Parkway  
67 Ranger Drive  
Asheville, NC 28805

**Toby Obenauer**  
Field Crew Leader

(828) 407-5652  
toby\_obenauer@nps.gov

**Shea Bruscia**  
Data Manager

(786) 249-3005  
shea\_bruscia@nps.gov

18001 Old Cutler Rd  
Suite 419  
Palmetto Bay, FL 33157





# Southwest EPMT Annual Report: FY 2018



Pecos National Historic Park. NPS photo.

## Background

The Southwest Exotic Plant Management Team (SW EPMT) of the National Park Service (NPS) is ideally situated to play a central role in the restoration of disturbed native ecosystems and habitat throughout the Southwest.

The SW EPMT's vision is: *to collaborate with park staff, with other programs within the NPS, and with park neighbors, local communities and organizations, and other state and federal agencies, to restore the native ecosystems of our parks and surrounding lands.*

The Team's primary mission is to provide planning, logistics, education, and field crews that support the control of invasive plant species and the restoration of disturbed areas to functioning ecosystems in 45 NPS units and adjacent lands in the Southwest.

Because the SW EPMT serves parks that border Mexico, the EPMT supports a number of programs related to issues of invasive plants, ecosystem fragmentation, and habitat restoration. Significant activities beyond treating invasives include research in control and restoration methods, the production of appropriate native plant materials, and collaboration with communities and partners. The SW EPMT is working with and supports a diverse coalition of universities, land management agencies, non-profits, and conservation groups to restore native plant biodiversity and the ecosystems that sustain our native flora and faunal heritage.

## Program Highlights

### *Investing in Research for Improved Restoration*

NPS staff often have tools and knowledge on how to eliminate an invasive plant but encounter challenges when working across multiple states, ecoregions, and sites that may have constraints on what tools can be used. To improve site-specific treatments and restoration, the SW EPMT partners with parks and researchers to improve our effectiveness and ultimately reduce costs over time.

Beginning in 2015, after many years of trying to control kochia (*Bassia scoparia* ssp. *scoparia*) with mechanical and herbicide treatments at the Pecos Pueblo and adjacent to Tavasci Marsh, the SW EPMT partnered with park staff and University of Nevada-Las Vegas researchers Scott Abella and Lindsay Chiquoine to test the sequence and timing of treatments, site specific restoration methods, and the ability of native species to persist or compete with kochia. The addition of carbon was found to be ineffective at these sites (an effective tool for some invasive annuals in the Mojave Desert) but kochia was decreased by any herbicide or mechanical treatment associated with rhizomatous grasses. Treatment of western wheatgrass (*Pascopyrum smithii*) at both sites and wolftail (*Muhlenbergia alopecuroides*) at Pecos resulted in increased native vegetation cover.

Similar studies are ongoing for different issues at Glen Canyon National Recreation Area and Guadalupe Mountains National Park.





Tuzigoot National Monument experimental plots with University of Nevada Las Vegas. NPS photo.



Greenhouse production of plants for restoration. NPS photo.

## Program Highlights (cont.)

### *From Seeds to Restoration—Fostering a Network of Partnerships*

Partnerships are an effective way of leveraging knowledge, resources, skills, and funding to create and contribute to a larger, more holistic, and sustainable program. The SW EPMT actively works with several non-profits that act as regional hubs by connecting the efforts of additional non-profits and agencies.

In 2018 the SW EPMT initiated financial assistance agreements with the [Institute for Applied Ecology](#) and [Borderlands Restoration Network](#). In addition to coordinating regional efforts, these organizations host seed collection crews doing work with agencies and organizations across the southwest. This creates an economy of scale by monitoring plant phenology and conducting seed collections across ecoregions. In 2018 these crews made 83 seed collections of 63 species at eight parks within the SW EPMT network. Seeds are collected for various park restoration and research needs, for contribution to the [Southwest Seed Partnership](#), and for the improvement of wildlife habitats with an emphasis on pollinators. Seeds are then cleaned and stored until they're needed for a seed mix or to be grown out by one of several partner nurseries specializing in native plant production. Many of these partnerships emphasize working with youth, underserved communities, or tribes (e.g., the [Santa Ana Pueblo](#)).

## Summary of Accomplishments

The Southwest Exotic Plant Management Team worked with 29 park units to treat 105 invasive plant acres and participated in the active restoration of 4 acres. The SW EPMT engaged 93 youth who contributed 9,996 hours towards invasive plant management to help complete this work. To facilitate a smooth transition of eight parks to the Northern Rocky Mountain EPMT, the SW EPMT Valles Caldera crew leader, Jeanine Foley, continued to provide assistance on projects at five of those park units.

The SW EPMT coordinated extensively with numerous federal, state, and local agencies as well as universities, non-profit organizations, and private landowners in order to promote a cross-jurisdictional approach to invasive plant management and restoration activities.

## Summarized Data for 2018

Measure	Acres
Treated	105
Inventoried/Monitored	827
Gross Infested Area	2
Net Infested Area	0.5
<b>Youth Engagement</b>	
Total Number of Youth Participants and Youth Employees	93
Total Hours for Youth Participants and Youth Employees	9,996

\*Due to data collection methods, reported infested acreage is not comprehensive

## More Information

Jeff Conn  
Liaison

(520) 400-1011  
jeffery\_conn@nps.gov

12661 E. Broadway Ave.  
Tucson, Arizona 85748

Eric Lassance  
Crew Leader

(520) 549-7755  
eric\_lassance@nps.gov

Marcus Jernigan  
Botanist/GIS Technician

(520) 561-0538  
marcus\_jernigan@nps.gov

Jeanine Foley  
Crew Leader

(303) 549-6305  
jeanine\_foley@nps.gov

Valles Caldera National Preserve  
PO Box 359, 90 Villa Louis Martin  
Jemez Springs, NM 87025





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## FY2018 Exotic Plant Management Team – Program Participants

### *Alaska EPMT Program Participants*

#### **Leadership**

Chris Overbaugh (Liaison), Peter  
Frank (Data Manager), Joel  
Reynolds (Supervisor)

#### **Crew (Interns based at parks)**

Alyssa Schaefer; Kayla Sherman,  
Thomas Hatton; Laura Gould;  
Damaris Chenoweth and  
Araya Fejes (YCC)

#### **Region/Network Support**

Joel Reynolds, Joel Cusick,  
Angie Southwould. Angela Holeton

#### **Park Support**

Denali NPP -  
Wendy Mahovlic  
Glacier Bay NPP -  
Lewis Sharman  
Katmai NPP -  
Alyssa Reischauer and  
Robert Peterson  
Kenai Fjords NP -  
Christina Kriedeman and  
Geoffrey Geier  
Klondike Gold Rush NHP -  
Jami Belt  
Wrangell-St. Elias NPP -  
Caroline Ketron

#### **Partners**

Alaska Association of Conservation  
Districts  
Skagway Traditional Council (STC)  
Taiya Inlet Watershed Council (TIWC)  
Resurrection Bay Conservation  
Alliance

Skagway Public Library  
New Community Project  
Copper Basin Cooperative Weed  
Management Area  
Student Conservation Association  
Chugach National Forest  
USFWS  
Copper Basin Watershed Council  
DOT - Fairbanks Division

#### **Volunteers**

Student Conservation Association,  
Andres Santini-Laabes, Kirby  
Delgado, Claire Wilber, Tyler  
Young, Deb Boettcher, Nicole  
Kovacs, Stephanie Palmer, Colleen  
Marinucci, Sue Salmons and many  
more

#### **Steering Committee**

Alaska Regional Office – Joel Reynolds  
Central Alaska Park Representative –  
Carl Roland  
Southeast Alaska Park Representative  
– Lewis Sharman  
Southwest Alaska Park Representative  
– Sharon Kim  
Arctic Parks Representative – Dave  
Swanson  
I&M Program Manager – Mike Bower

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### *California EPMT Program Participants*

#### **Leadership**

Bobbi Simpson (Liaison), Gordon  
White (Supervisor)

#### **Crew**

Park Staff



Golden Gate National Recreation Area,  
Whiskeytown National  
Recreation Area, Lassen Volcanic  
National Park,  
Pinnacles National Park  
Santa Monica Mountains National  
Recreation Area,  
Sequoia and Kings Canyon National  
Parks, Yosemite National Park,,  
and Point Reyes National  
Seashore Association)  
Timothy Federal, Nikk Novero, Tara  
Larson, and Sarah Reed

### **Region/Network Support**

Pacific West Regional Office – Jay  
Goldsmith (Chief, Resource  
Management)  
Pacific West Regional Office – Irina  
Irvine (Ocean and Coastal  
Resources Program Manager)

### **Park Support**

Host Park – Point Reyes National  
Seashore, Cicely Muldoon  
(Superintendent)

### **Partners and Cooperators**

Cabrillo National Monument  
Conservancy  
Cabrillo National Monument  
Foundation  
California Invasive Plant Council  
Geoscientists-in-parks  
Golden Gate National Parks  
Conservancy  
Mountains Restoration Trust  
Pinnacles National Park Foundation  
Point Reyes National Seashore  
Association  
Santa Monica Mtns Fund  
Student Conservation Association  
Susanville Indian Rancheria  
University of California at Davis  
via Cooperative Ecosystems  
Studies Unit  
Yosemite Conservancy  
Youth Conservation Corps

### **Volunteers**

American Conservation Corps  
Point Reyes National Seashore  
Association  
Student Conservation Association  
Golden Gate National Parks  
Conservancy  
Yosemite Conservancy  
Youth Conservation Corps

### **Steering Committee**

Golden Gate National Parks, Alison  
Forrestel (Vegetation Chief)  
Redwoods National Park, Stassia  
Samuels (Plant Ecologist)  
Yosemite National Park, Garrett  
Dickman (Botanist)  
Pacific West Region, Irina Irvine  
(Ocean and Coastal Resources  
Program Manager)  
CaEPMT, Bobbi Simpson (Liaison)

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### ***Florida / Caribbean EPMT Program Participants***

### **Leadership**

Brian Lockwood (Liaison), Shea  
Bruscia (Data Manager)

### **Region/Network Support**

Southeast Region – Nancy Dagley  
(Acting IPM Coordinator), Darrell  
Echols (Chief, Division of Science  
and Natural Resources  
Management)  
South Florida and Caribbean  
Inventory and Monitoring  
Network – Brooke Shamblin,  
Mario Londono, Judd Patterson

### **Park Support**

Big Cypress National Preserve – Tony  
Pernas, William Snyder  
Biscayne National Park – Shelby  
Moneysmith,  
Vanessa McDonough  
Buck Island Reef National  
Monument/Christiansted  
National Historic Site/Salt River  
National Historic Park and  
Ecological Reserve – Zandy Hillis-



Starr, Clayton Pollock  
Canaveral National Seashore – Kristen  
Kneifl  
DeSoto National Memorial – Nathan  
Souder, Kyle Messina, Kristen  
Kneifl  
Dry Tortugas National Park – Kayla  
Nimmo, Meghan Johnson  
Everglades National Park – Hillary  
Cooley, Jonathan Taylor  
Fort Matanzas National Monument,  
Castillo de San Marcos – Kurt  
Foote  
Gulf Islands National Seashore – Mark  
Nicholas, Joe Ingram, Jon Brandon  
Timucuan Ecological and Historic  
Preserve, Fort Caroline – Daniel  
Tardona, Liz Struhar  
Virgin Islands National Park – Thomas  
Kelly

#### **Partners and Cooperators**

Florida Fish and Wildlife Conservation  
– Linda King, Dennis Giardina,  
Jackie Smith  
Miami-Dade County – Dallas Hazelton,  
Gwen Burzycki  
US Army Corps of Engineers – Jon  
Lane, Jessica Spencer  
South Florida Water Management  
District – LeRoy Rodgers,  
Christen Mason, Christina  
Stylianios, Manny Porras

#### **Steering Committee**

Big Cypress National Preserve –  
Tamara Whittington  
Biscayne National Park – Margaret  
Goodro  
Buck Island Reef National Monument/  
Christiansted National Historic  
Site/Salt River National Historic  
Park and Ecological Reserve – Joel  
Tutein  
Canaveral National Seashore – Myrna  
Palfrey  
Desoto National Memorial – Nathan  
Souder  
Everglades National Park/Dry  
Tortugas National Park – Pedro

Ramos  
Fort Matanzas National  
Monument/Castillo de San  
Marcos National Monument –  
Gordie Wilson  
Gulf Islands National Seashore –  
Daniel Brown  
Timucuan Ecological and Historic  
Preserve/Fort Caroline National  
Memorial – Chris Hughes  
Virgin Islands National Park – Jayne  
Schaeffer

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#### ***Great Lakes EPMT Program Participants***

##### **Leadership**

Isaiah Messerly (Liaison), Rebecca Key  
(Data Manager), Tammy Keniry  
(Admin Officer), Kelly Garrison  
(IT Support)

##### **Field Crew**

Biological Technicians: Sarah  
Jasienowski, Stephen Mull  
Conservation Corps of MN. and IA:  
Daniel Weipert, Morgan  
Kramschuster

##### **Park Field Crews**

Apostle Islands National Lakeshore –  
Jenna Miles  
Mississippi National River and  
Recreation Area – Neil Smarjesse,  
Kodi McLean  
Saint Croix National Scenic Riverway –  
Michael Rhoades, Ben Heins,  
Chloe Ross, and Emily Gregor  
Sleeping Bear Dunes National  
Lakeshore - Daniel McConnell  
Voyageurs National Park – John  
Snyder

##### **Region/Network Support**

Midwest Region Office – Carmen  
Thomson (GL-EPMT Supervisor)



**Park Support**

See Steering Committee section

Additional Contacts: Dan Watson  
(IATR), Pam Schuler (IATR), Neil  
Smarjesse (MISS), Scott  
Weyenberg (SACN), Chris  
Loudenslager (NOCO)

**Partners and Cooperators**

Conservation Corps of Minnesota and  
Iowa

Northwood Cooperative Weed  
Management Area

St. Croix Red Cedar Cooperative Weed  
Management Area

Grand Portage Reservation Tribal  
Council

**Steering Committee**

Apostle Islands National Lakeshore –  
Peggy Burkman

Grand Portage National Monument –  
Brandon Seitz

Ice Age National Scenic Trail – Dan  
Watson

Isle Royale National Park – Lynette  
Potvin

Indiana Dunes National Lakeshore –  
John Kwilosz

Keweenaw National Historical Park -  
Steve DeLong

Mississippi River and Recreation Area  
– Neil Smarjesse

Pictured Rocks National Lakeshore –  
Bruce Leutscher

St. Croix National Scenic Riverway –  
Scott Weyenberg

Sleeping Bear Dunes National  
Lakeshore – Julie Christian

Voyageurs National Park – John  
Snyder

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***Gulf Coast EPMT Program  
Participants*****Leadership**

Dale McPherson (Liaison), Shea  
Bruscia (Data Manager)

**Region/Network Support**

Southeast Region – Darrell Echols  
(Chief, Division of Science and  
Natural Resources Management),  
Christopher Barrow (SER GIS  
Coordinator), Demetria Smith-  
Wilson (Contracting Officer)  
Gulf Coast Inventory and Monitoring  
Network – Martha Segura  
(Network Coordinator)

**Park Support**

Big Thicket National Preserve –  
Herbert Young, Andrew Bennett  
Gulf Islands National Seashore – Gary  
Hopkins, Jolene Williams, Mark  
Nicholas

Jean LaFaitte National Historical Park  
and Preserve – Dusty Pate

Natchez Trace Parkway – Deanna  
Boensch, Lisa McInnis

Palo Alto Battlefield National  
Historical Park – Rolando Garza

Padre Island National Seashore –  
Charles Sassine, Travis Clapps

San Antonio Missions National  
Historical Park – Greg Mitchell  
Vicksburg National Military Park –  
Sara Strickland

**Partners and Cooperators**

University of Texas at Austin - Lady  
Bird Johnson Wildflower Center

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***Heartland EPMT Program  
Participants*****Leadership**

Carmen Thomson (Regional I&M  
Program Manager), Mike  
DeBacker (Network  
Coordinator/Supervisory  
Ecologist), Gareth Rowell (Data  
Management Program Leader),  
Craig Young (Terrestrial Program  
Leader)

**Crew**

Jordan Bell (Project Coordinator),



Jessica Salesman (Project Coordinator), Chad Gross (Cartographer/Data Manager)

### **Partners and Cooperators**

Conservation Corps of Iowa

### **Region/Network Support**

Midwest Region – Carmen Thomson (I&M Program Manager)

### **Board of Directors**

Cuyahoga Valley National Park – Craig Kenkel (Superintendent)

George Washington Carver National Monument – Jim Heaney (Superintendent)

Herbert Hoover National Historic Site – Pete Swisher (Superintendent, Chair)

Homestead National Monument of America – Mark Engler (Superintendent)

Pea Ridge National Military Park – Kevin Eads (Superintendent)

Midwest Regional Office – Carmen Thomson (Regional I&M Program Manager)

Heartland Network – Mike DeBacker (HTLN Program Coordinator)

### **Technical Committee**

Arkansas Post National Memorial – Kirby McCallie

Buffalo National River – Caven Clark  
Cuyahoga Valley National Park – Meg Plona

Effigy Mounds National Monument – Rodney Rovang

George Washington Carver National Monument – Chris Reed

Herbert Hoover National Historic Site – Mike Wilson

Homestead National Monument of America – Jesse Bolli

Hopewell Culture National Historical Park – Bret Ruby

Hot Springs National Park – Shelley Todd

Lincoln Boyhood National Memorial – Mike Capps

Ozark National Scenic Riverways – Victoria Grant

Pea Ridge National Military Park – Nolan Moore

Pipestone National Monument – Seth Hendriks

Tallgrass National Preserve – Kristen Hase

Wilson's Creek National Battlefield – Gary Sullivan

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### ***Lake Mead EPMT Program Participants***

#### **Leadership**

Curt Deuser (Liaison), Tarl Norman (Crew Supervisor), Rachel Skoza (Data Manager), Andy Pigg (Crew Leader), Darrin Gobble (Crew Leader), Carrie Norman (Data Support)

#### **Crew**

Nicholas Brasier, Maura Schumacher, Travis Fulton, Anna Wheeler, Brandon Blackburn, Nathan Schwarting, Jessica McCulloch, Jamie Shurnitski, Corbin Gentzler, Mike Hittle, Matt D'Ambrosi, Katharine Lynch, Nick Prasser, James Roberts, Wayne Heideman, Andrew Barnes and Jason Harris

#### **Region Support**

Pacific West Region Office – Jay Goldsmith, Denise Louie

Inter-Mountain Region Office – Mike Wrigley

#### **Lake Mead NRA Host Park Support**

Lila Klein (Acting Chief of Resource Management and Visitor Services), Sue Knowles (Administrative Assistant), Tammy Morris (Acting Administrative Officer), Scott Briggs (Budget Specialist), Patrick Gubbins (Deputy



Superintendent), Lizette  
Richardson (Supt)

### **Park Support**

Arches National Park and Canyonlands  
National Park (Southeast Utah  
Group): Liz Ballenger, Kelli Quinn,  
Jacob Suter  
Joshua Tree National Park: Neil Frakes  
and Jane Rodgers  
Death Valley National Park: Josh  
Hoines and Kirtsen Lund  
Bryce Canyon National Park: Eric  
Vasquez  
Capitol Reef National Park: Sandra  
Borthwick and Terry Fisk  
Great Basin National Park: Ben  
Roberts, Meg Horner, Julie Long  
Mojave National Park: Andrew Kaiser  
and Deb Reardon  
Zion National Park: David Firmage and  
Laura Schrage  
Lake Mead NRA: Carrie Norman and  
Kelly Wallace  
Parashant National Monument:  
Jennifer Fox  
Pipe Spring National Monument: Brian  
Black  
Manzanar National Historic Site: Jeff  
Burton, Troy Strawn, Dave Goto,  
Daron Hayes  
Tule Springs Fossil Beds National  
Monument: Erin Eichenberg and  
Diane Keith  
Organ Pipe Cactus NM: Jeanne Taylor

### **Partners and Cooperators**

Bureau of Land Management -  
Southern NV District: JJ Smith,  
Sean McEldery, Aleta Nafus,  
Corrin Floyd, Tyler Hecht, and  
Tyler Warner  
Battle Mountain District: Anna  
O'Brien and Brock Uhlig  
US Fish and Wildlife Service -  
Pahranagat NWR: James (Rob)  
Vinson, Jim Docktor; Desert NWR:  
Amy Sprunger, Sarah Bullock; Bill  
Williams NWR: Kathleen Blair; AZ  
ISST Coordinator: Ashley Hall,

Heather Whitlaw

US Forest Service - Spring Mountains  
NRA: Jennifer Brickey and Corrin  
Floyd; Coconino NF: Lindsay  
Smythe, Julia Camp and Katherine  
Landry  
Bureau of Reclamation - Lower  
Colorado River Region: Marc  
Maynard, Bill Martin, Brandon  
Barrow, Andrew Trouette and  
Heidi McMaster. LCR MSCP  
Program: Keith Hannon and John  
Swatzell.  
Clark County, Nevada Desert  
Conservation Program - Muddy  
River Reserve: Caryn Wright;  
Boulder City Conservation  
Easement: John Brekke, Stefanie  
Ferrazzano  
Clark County Wetlands Park and  
Nature Preserve - Liz Bickmore  
Marine Corps Yuma Air Station -  
Abigail Rosenberg, Bobby Law,  
Del Maslen, Richard Cerka, Randy  
English  
University of Arizona - Jim Malusa and  
Max Li (Research Botanist)  
Mohave County, AZ Parks  
Department/Davis Camp Staff

### **Volunteers**

Lamar and Daryl, fleet management

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### ***Mid-Atlantic EPMT Program Participants***

### **Leadership**

Kate Jensen (Liaison), Nathan Wender  
(Crew Leader)

### **Crew**

Danielle Drumheller, June Harris,  
Michael Martin, Tandena Nelson

### **Region Support**

Northeast Regional Office - Casey  
Reese, Supervisor (Regional IPM  
Coordinator), Carmen Chapin  
(Chief Natural Resource



Management)

### **Park Support**

Host Park – Shenandoah National Park

– Jennifer Flynn

(Superintendent), Jim Schaberl

(Chief, Natural and Cultural

Resources), Jake Hughes

(Biologist – Invasive

Plants/Restoration), Solim Garcia

(IT), Cary Wood (IT)

Appomattox Courthouse National

Historical Park – Brian Eick

Appalachian National Scenic Trail –

James Von Haden

Assateague Island National Seashore –

Bill Hulslander, Jonathan Chase

Booker T. Washington National

Monument – Timothy Sims

Cedar Creek and Belle Grove National

Historical Park – Karen Beck-

Herzog

Colonial National Historical Park –

Dorothy Geyer

Fredericksburg and Spotsylvania

County Battlefields Memorial

National Military Park – Gregg

Kneipp

Gettysburg National Military Park and

Eisenhower National Historic site

– Zach Bolitho, Randy Krichten

George Washington Birthplace

National Monument and Thomas

Stone National Historic Site –

Melissa Cobern, Amy Muraca, Tim

Sveum

Hampton National Historic Site and

Fort McHenry National

Monument and Historic Shrine –

Tina Capetta, Elizabeth Derr

Hopewell Furnace National Historic

Site and Valley Forge National

Historical Park – Amy Ruhe, Kate

Jensen

New River Gorge National River,

Bluestone National Scenic River,

and Gauley River National

Recreation Area – John Perez,

Layne Strickler

Petersburg National Battlefield – Tim

Blumenschine

Richmond National Battlefield Park –

Kristen Allen

### **Partners and Cooperators**

PRISM

Smithsonian Conservation Biology

Institute

Jim Latane

Lawrence Latane

Town of Elkton, VA

### **Volunteers**

James Akerson

### **Steering Committee**

Appomattox Courthouse National

Historical Park – Brian Eick

Appalachian National Scenic Trail –

James Von Haden

Booker T. Washington National

Monument – Timothy Sims

Colonial National Historical Park –

Dorothy Geyer

Fredericksburg and Spotsylvania

County Battlefields Memorial

National Military Park – Gregg

Kneipp

Gettysburg National Military Park and

Eisenhower National Historic Site

– Zach Bolitho

George Washington Birthplace NM and

Thomas Stone National Historic

Site – Melissa Cobern, Amy

Muraca

Hampton National Historic Site – Tina

Capetta, Elizabeth Derr

Hopewell Furnace National Historic

Site and Valley Forge National

Historical Park – Amy Ruhe, Kate

Jensen

New River Gorge National River,

Bluestone National Scenic River,

and Gauley River National

Recreation Area – John Perez,

Lizzie Watts

Petersburg National Battlefield –

Timothy Blumenschine

Richmond National Battlefield Park –

Kristen Allen



Shenandoah National Park – Jim Schaberl

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***National Capital Region EPMT  
Program Participants***

**Leadership**

Mark Frey (Liaison), Alex Voznitza (Team Leader), Vacant (Data Manager)

**Crew**

Allison Hay (Squad Leader), Nathan Finney (Squad Leader), Dana Reid, Kaitlyn Parness, Zane Baker, Racho Moutafov, Reena Lam, Blaine MacKenzie, Rozy Mori Millet, Marina Peterson

**Region Support**

National Capital Region Office – Pat Campbell (Chief of Natural Resources and Science)

**Park Support**

Antietam National Battlefield – Joe Calzarette (Natural Resources Program Manager)  
Appalachian National Scenic Trail – Jim Von Haden (Integrated Resources Program Manager)  
Catoclin Mountain Park – P. Scott Bell (Chief, Resources Management), Becky Loncosky (Biologist)  
Chesapeake and Ohio Canal National Historical Park – Michele Carter (Natural Resources Program Manager), Andrew Landsman (Biologist)  
George Washington Memorial Parkway – Brent Steury (Natural Resources Program Manager), Colin Davis (Biologist)  
Harpers Ferry National Historical Park – Mia Parsons (Chief, Resource Management), Dale Nisbet (Natural Resource Specialist), Darlene Hassler-Godwin (Archeologist)

Manassas National Battlefield Park – Bryan Gorsira (Natural Resources Program Manager), Courtney Asher (Biological Science Technician)

Monocacy National Battlefield– Andrew Banasik (Natural Resources Program Manager)

National Capital Parks - East – Mike Comisso (Chief, Resource Management), Mikaila Milton (Biologist)

National Mall and Memorial Parks – Leslie Frattaroli (Natural Resource Specialist)

Prince William Forest Park – David Ek (Chief, Resource Management), Eric Kelley (Biologist)

Rock Creek Park – Nick Bartolomeo (Chief, Resource Management), Ana Chuquin (Botanist)

Wolf Trap National Park for the Performing Arts – Steve Hay (Facility Manager)

**Partners and Cooperators**

Animal and Plant Health Inspection Service – Matt Travis (APHIS State Program Director)

Appalachian Trail Conservancy – Michele Miller (Resource Program Manager) and Marian Orlousky (Northern Resource Management Coordinator)

United States Fish and Wildlife Service – Phil Pannill (NCTC Land Manager)

Virginia Department of Conservation and Recreation – Michael Lott (Crow's Nest Manager/Northern Region Steward)

Anacostia Watershed Society – Jorge Bogantes Montero (Natural Resource Specialist)

NCR PRISM – Damien Ossi (Wildlife Biologist)

**Volunteers (hours contributed)**

Lina Arcila (4), Alex Ashby (8), Mary

Nell Bryant (4), Keith Coombs (4),  
Connie Cowan (4), Nicole Dutcher  
(4), Jesse Fujikawa (4), Peggy  
Hammond (4), Darcy Herman (8),  
Sylvan Kaufman (4), Lauren Kelly  
(5), Andrea Maquire (4),  
Stephanie Martin (8), Sara  
McClure (4), Laura Plaze (8),  
Mary Randolph (4), Tom Reyes  
(4), Lindsay Ringer (4), Dave  
Sperry (4), Lisa Stelzner (4), Chris  
Traft (4), Eric Walberg (5),  
Rebecca White (4), Alex Zelles (4)

### **Steering Committee**

Antietam National Battlefield – Joe  
Calzarette  
Catoctin Mountain Park –Beck  
Loncosky  
Chesapeake and Ohio Canal National  
Historical Park – Michele Carter  
George Washington Memorial  
Parkway – Colin Davis  
Harpers Ferry National Historical Park  
– Darlene Hassler-Godwin  
Manassas National Battlefield Park –  
Bryan Gorsira  
Monocacy National Battlefield–  
Andrew Banasik  
National Capital Parks-East – Mike  
Comisso  
National Mall and Memorial Parks –  
Leslie Fratarolli  
Piscataway Park – Christine Smith  
Prince William Forest Park – David Ek  
Rock Creek Park – Nick Bartolomeo  
Wolf Trap National Park for the  
Performing Arts – George Liffert  
NCR-EPMT Liaison – Mark Frey  
NCR Chief of Natural Resources and  
Science – Pat Campbell  
NCR Integrated Pest Management  
Specialist – Vacant  
NCR Research Coordinator – Diane  
Pavek  
NCR Inventory & Monitoring Network  
Program Manager – Geoff Sanders

### ***North Coast / Cascades Network EPMT Program Participants***

#### **Leadership**

Cheryl Decker (Liaison), Sophie  
Wilhoit (Crew Lead and acting  
Data Manager), Collin  
McAvinchey (Crew Lead)

#### **Crew**

Alysha Mitchell, Miles Berkey, Priscilla  
Le, Karli Miller (biotech  
seasonals)

#### **Region/Network Support**

Pacific West Region Office – Denise  
Louie, Jay Goldsmith

#### **Park Support**

Host Parks: North Cascades National  
Park – Karen Taylor-Goodrich  
(Superintendent), Jack Oelfke  
(Chief Resource Management);  
Olympic National Park – Sarah  
Creachbaum (Superintendent),  
Louise Johnson (Chief Resource  
Management); Ebey's Landing  
National Historical Reserve--Roy  
Zipp (Area Manager)

#### **Partners and Cooperators**

Clallum County Noxious Weed Control  
Olympic Peninsula knotweed working  
group  
Washington State Extension Service  
Island County Noxious Weed Control  
The Nature Conservancy  
Whidbey Island Poison Hemlock  
working group  
Trust Board of Ebey's Landing  
National Historical Reserve  
Washington State Parks  
Pacific Northwest Invasive Plant  
Council  
Skagit Fisheries Enhancement Group  
Quinalt Nation  
Quileute Nation  
Washington Conservation Corps



**Steering Committee**

Olympic National Park – Janet Coles,  
Louise Johnson  
North Cascades National Park –  
Mignonne Bivin, Jack Oelfke  
Mount Rainier National Park – Arnie  
Peterson  
Lewis and Clark National Historical  
Park – Carla Cole, Chris  
Clatterbuck  
Ebey's Landing National Historical  
Reserve – Roy Zipp  
San Juan Island National Historical  
Park – Elexis Freddy, Sara Dolan  
Fort Vancouver National Historic Site  
– Tracy Fortman

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***Northeast EPMT Program  
Participants*****Leadership**

Brian McDonnell (Liaison), Casey  
Reese (NER IPM Coordinator)

**Crew**

Michelle Stevens (Biotech Seasonal,  
William Fuchs (Biotech Seasonal,  
Boston Metro Parks), Dan  
Robbins, (Biotech Seasonal,  
MIMA)

**Region/Network Support**

Northeast Regional Office – Casey  
Reese, (NER IPM Coordinator);  
Carmen Chapin, (NER Chief of  
Natural Resources)

**Park Support**

Allegheny Portage Railroad National  
Historic Site – Doug Snavelly (JOFL  
Maintenance) Lindsey Bocian,  
Biotech Seasonal, WEPA)  
Boston Harbor Islands National  
Recreation Area – Marc Albert,  
Andrew Petit de Mange, William  
Fuchs  
Cape Cod National Seashore – Stephen  
M. Smith  
Delaware Water Gap National  
Recreation Area – Larry Hilaire,

Tom Witter (DEWA VIP)  
Fire Island National Seashore – Jordan  
Raphael  
First State NHP - Alan McLoughlin  
Flight 93 NM - Stephen Clark, Nancy  
Smith, Doug Snavelly, Brynn  
Bender  
Frederick Law Olmsted National  
Historic Site - Elliott Doughty  
Gateway National Recreation Area –  
Doug Adamo, Patricia Rafferty,  
Dana Filippini, George Frame,  
Jeanne McArthur-Heuser  
Home of Franklin D. Roosevelt  
National Historic Site - Dave  
Hayes  
Minuteman NHP - Margie Coffin-  
Brown, Geff Grossman; Lars Boyd,  
Lyndon Langthorne, Ethan Parker  
and Matthew Quaglia (American  
Conservation Experience Interns)  
Morristown National Historical Park –  
Robert Masson  
Sagamore Hill NHS - Scott Gurney,  
Kelly Furhmann  
Saratoga NHP - Chris Martin, Linda  
White, Cindy VanDerwerker, Jeff  
Wells  
Upper Delaware Scenic and  
Recreational River – Don  
Hamilton, Jessica Newbern

**Partners and Cooperators**

Appalachian National Scenic Trail –  
Marian Orlousky (Appalachian  
Trail Conservancy (ATC)), Linda  
Rohleder (New York-New Jersey  
Trail Conference (also ATC))  
Morristown National Historical Park -  
New Jersey Invasive Species  
Strike Team

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***Northern Great Plains EPMT  
Program Participants*****Leadership**

Brennan Hauk (Liaison), Carmen  
Thomson (Supervisor)

**Crew**

Mark Slovek, Lee Vaughan, Anna Wheeler, Megan Davenport, Zach Hoyer, Montana Conservation Corps, Minnesota Conservation Corps

**Region/Network Support**

Midwest Region Office – Carmen Thomson, supervisor (I&M Program Manager)

**Park Support**

Host Parks - Badlands National Park and Theodore Roosevelt National Park

**Partners and Cooperators**

Northern Great Plains I&M Network  
Colorado State University  
NRCS Bismark Plant Materials Center – Wayne Duckwitz  
USGS  
Northern Great Plains Fire Management

**Volunteers**

Montana Conservation Corps  
Minnesota Conservation Corps

**Steering Committee**

Badlands National Park – Eddie Childers (Wildlife Biologist)  
Ft. Union Trading Post National Historic Site – Andy Banta (Superintendent)  
Midwest Region I&M-EPMT Program Manager – Carmen Thomson (I&M Program Manager)  
Niobrara National Scenic River – Steve Thede (Superintendent)  
Theodore Roosevelt National Park – Blake McCann (Natural Resource Program Manager)  
Northern Great Plains Fire Management – Dan Swanson (Fire Ecologist)  
Wind Cave National Park – Greg Schroeder (Natural Resource

Program Manager)

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***Northern Rocky Mountain EPMT  
Program Participants***

**Leadership**

Steven Bekedam (Liaison), Gary Ludwig (Glacier National Park (GLAC) Team Leader), Andrew Ringholz (Yellowstone National Park (YELL) Team Leader)

**Crew**

Arley Canfield (GLAC biotech), Tyler Jack (GLAC biotech), Tim Wilson (YELL biotech), Russell Hicks (YELL biotech), Clint Rader (YELL biotech)

**Regional Support**

Intermountain Regional Office – Mike Wrigley (Biological Resources Lead), Julie Ziruolo (Program Administrative Assistant), Natalie McKenry (Budget Analyst)

**Park Support**

Bent's Old Fort NHS - Adam Heberlie (Biological Science Technician)  
Bear Paw National Battlefield – Heidi Tamm (Natural Resources Program Manager)  
Bighole National Battlefield – Jimmer Stevenson (Maintenance Foreman)  
Bighorn Canyon National Recreation Area – Ryan Felkins (Natural Resource Manager)  
Black Canyon of the Gunnison NP – Danguole Bockus (Park Biologist)  
Capulin Volcano NM – Zach Cartmell (Natural Resource Manager)  
City of Rocks National Reserve – Tara McClure-Cannon (Chief, Integrated Resource Management)  
Craters of the Moon National Monument and Preserve – Linda



Manning (Chief, Integrated Resource Management), 6 members of the CRMO vegetation crew

Curecanti National Recreation Area – Danguole Bockus (Park Biologist)

Dinosaur National Monument – Emily Spencer (Park Biotech),

Fossil Butte National Monument – Arvid Aase (Archaeologist)

Glacier National Park – Dawn LaFleur (IPM Biologist), Matt Kennedy (GLAC Crew Leader), Debbie Gilk (Administrative Assistant)

Golden Spike National Historic Site – Leslie Crossland (Park Superintendent)

Grant–Kohrs Ranch National Historic Site – Jason F. Smith (Natural Resource Specialist)

Grand Teton National Park – Dan Reinhart (Vegetation Branch Lead), Jason McDannold (GRTE Crew Leader)

Hagerman Fossil Beds National Monument – JoAnn Blalack (Chief, Integrated Resource Management), Ray Vader (Maintenance Foreman)

John D. Rockefeller Memorial Parkway – Jason McDannold (GRTE Crew Leader)

Little Bighorn National Battlefield – Staffan Peterson (Chief, Integrated Resource Management), Mariane Doane (Biologist)

Minidoka National Historic Site – JoAnn Blalack, (Chief, Integrated Resource Management), Ray Vader (Maintenance Foreman)

Rocky Mountain National Park – Jim Bromberg (Vegetation Ecologist), 6 members of ROMO vegetation crew

Yellowstone National Park – Roy Renkin (Vegetation Ecologist), Sue Mills (Natural Resource Specialist), Alana Darr

(Administrative Assistant), Brian Teets (North District Crew Leader), Vince Nagashima (Lake District Crew Leader)

### **Partners and Cooperators**

US Forest Service, Custer Gallatin NF – Sheri Renck

Montana Conservation Corp – Chris Nessel, James Gassaway

Utah Conservation Corp – Dave Bastian

Box Elder County (UT) Cooperative Weed Management Area – Steve Johnson, weed superintendent

Wyoming Game and Fish Department – Jerry Altermatt

### **Steering Committee**

Bear Paw National Battlefield – Heidi Tamm

Bighole National Battlefield – Jimmer Stevenson

Bighorn Canyon National Recreation Area – Ryan Felkins

Black Canyon of the Gunnison NP – Danguole Bockus

Capulin Volcano National Monument – Zach Cartmell

City of Rocks National Reserve – Tara McClure-Cannon

Colorado National Monument – Laura Jones

Craters of the Moon National Monument and Preserve – Linda Manning

Dinosaur National Monument – Emily Spencer

Florissant Fossil Beds NM – Katherine Jervik

Fossil Butte National Monument – Arvid Aase

Glacier National Park – Dawn LaFleur

Golden Spike National Historic Site – Leslie Crossland

Grant–Kohrs Ranch National Historic Site – Jason Smith

Grand Teton National Park – Dan Reinhart

Great Sand Dunes NP and Preserve –

Dewane Mosher  
Hagerman Fossil Beds National  
Monument – JoAnn Blalack  
Little Bighorn Battlefield National  
Monument – Staffan Peterson  
Rocky Mountain National Park – Jim  
Bromberg  
Yellowstone National Park – Sue Mills  
NRM EPMT Liaison – Steven Bekedam  
IMR Biological Resources Program  
Lead – Mike Wrigley

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***Pacific Islands EPMT Program  
Participants***

**Leadership**

Jeremy Gooding (Liaison), Steve  
Robertson (Chief, Integrated  
Resources Management Division,  
Haleakalā National Park), Dr.  
Rhonda Loh (Chief, Natural  
Resource Management Division,  
Hawai'i Volcanoes National Park),  
David Benitez (Ecologist, Hawai'i  
Volcanoes National Park), Woody  
Mallinson (Natural Resource  
Program Manager, Haleakalā  
National Park)

**Field Crews (Parks and Partners)**

Hawai'i Volcanoes National Park  
Natural Resources Management:  
Jon Maka'ike and Dwayne  
Montoya-Aiona, Operations  
Leaders. Haleakalā National Park  
Vegetation Management: Stacey  
Torigoe, Biologist. Data Manager,  
Maui Program: Jon Marshall  
(NPS),

Student Conservation Association  
(SCA): Andrew DellaVilla, Intern  
Maui Invasive Species Committee  
(MISC) Field Crews, Partner Park  
on-site experts. Big Island  
Invasive Species Committee  
(BIISC) Field Crews

**Region/Network Support**

Pacific West Regional Office – Jay  
Goldsmith (Chief, Natural

Resources), Denise Louie (Acting  
Chief, Natural Resources)  
Pacific Islands Office – Melia Lane-  
Kamahele (Manager)

**Park Support**

Haleakalā National Park – Diane Butler  
Hawai'i Volcanoes National Park –  
Malia Banashek

**Partners and Cooperators**

Partner Parks - Haleakalā National  
Park (Host), Hawai'i Volcanoes  
National Park, Kalaupapa  
National Historic Park, Kaloko-  
Honokōhau National Historic  
Park, Pu'uhonua o Hōnaunau  
National Historic Park,  
Pu'ukoholā National Historic Site  
University of Hawai'i College of  
Tropical Agriculture and Human  
Resources (CTAHR) – Dr. James  
Leary, Associate Specialist for  
Invasive Plant Management  
Science.

Relocated: University of Florida (UFL)  
– Dr. James Leary, Assistant  
Professor, Center for Aquatic and  
Invasive Plants.

University of Hawai'i, Hilo (UHH) – Dr.  
Ryan Perroy (Associate  
Professor)

Plant Extinction Prevention Program  
(PEPP), Hawai'i – Hank  
Oppenheimer (Maui Nui PEPP  
Coordinator)

Maui Invasive Species Committee  
(MISC) & Molokai-Maui Invasive  
Species Committee (MoMISC)  
Partners & Affiliates – Research  
Corporation of the University of  
Hawai'i, University of Hawai'i  
Pacific Cooperative Studies Unit,  
National Park Service Haleakalā  
National Park, National Park  
Service Pacific Islands Exotic  
Plant Management Team,  
Coordinating Group on Alien Pest  
Species, Hawai'i Invasive Species



Council, University of Hawai'i – College of Tropical Agriculture and Human Resources, Maui County Department of Water Supply, Maui County Office of Economic Development, Hawai'i Department of Agriculture, Hawai'i Department of Land and Natural Resources, Hawai'i Invasive Species Council, The Nature Conservancy of Hawai'i, U.S. Department of Agriculture Forest Service, U.S. Fish and Wildlife Service, Hawai'i Ant Lab, Molokai Land Trust, Kalaupapa National Historical Park

Leeward Haleakalā Watershed Restoration Partnership (LHWRP) – See: <http://lhwrp.org/>

East Maui Watershed Partnership (EMWP)-Hawai'i Department of Land and Natural Resources, Haleakala Ranch, County of Maui Department of Water Supply, The Nature Conservancy Hawai'i, East Maui Irrigation, University of Hawai'i PCSU, Haleakalā National Park

Three Mountain Alliance – University of Hawai'i PCSU, Hawai'i Department of Public Safety, Hawai'i Department of Land and Natural Resources, Kamehameha Schools, National Park Service, The Nature Conservancy, US Fish and Wildlife Service, USDA Forest Service, US Geological Survey, USDA Natural Resources Conservation Service

### **Volunteers**

Friends of Hawai'i Volcanoes National Park, Hawai'i Ocean View Community Association (OVCA), Paul and Jane Field

Friends of Haleakalā National Park, Maui Job Corps, Pacific Whale Foundation, Ron Nagata Ohana, AmeriCorps

### **Steering Committees**

*Maui Nui* (Islands of Maui, Molokai, Lanai, & Kahoolawe) - Liaison Pacific Islands EPMT, Resources Management Chief Haleakalā National Park, Active Members of Maui Invasive Species Committee, Manager Molokai Invasive Species Committee, Resources Management Chief Kalaupapa National Historic Park, relevant subject experts as appropriate

*Island of Hawai'i* (Big Island): Resources Management Chief, Park Ecologist, and Pest Control Workers from Hawai'i Volcanoes National Park, Resources Management Chief Kaloko-Honokōhau and Pu'uuhonua o Hōnaunau National Historic Parks, Staff at Pu'ukoholā National Historic Site, relevant subject experts as appropriate

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### ***Southeast EPMT Program Participants***

#### **Leadership**

Nancy Dagley (Liaison), Toby Obenauer (Crew Leader)

#### **Crew**

Stephen Mull, Ben Smith, Daniel Beatty, David Arcuri

#### **Region/Network Support**

Southeast Region Office – Darrell Echols, Chief, Science and Natural Resources

#### **Park Support**

Abraham Lincoln Birthplace National Historical Park – Jennifer Jones

Andrew Johnson National Historic Site – Vacant

Big South Fork National River & Recreation Area – Marie Tackett

Blue Ridge Parkway – Bambi Teague

Carl Sandburg Home National Historic Site – Irene Van Hoff

Chickamauga & Chattanooga National  
Military Park – Jim Szykowski  
Cowpens National Battlefield – Chris  
Revels  
Cumberland Gap National Historical  
Park – Jenny Beeler  
Fort Donelson National Battlefield –  
David Hamby  
Guilford Courthouse National Military  
Park – Vicki Boyce  
Great Smoky Mountains National Park  
– Kris Johnson  
Kings Mountain National Military Park  
– Chris Revels  
Little River Canyon National Preserve  
– Mary Shew  
Mammoth Cave National Park – Tim  
Pinion, Brice Leech  
Ninety Six National Historic Site –  
Chris Revels  
Obed Wild & Scenic River – Marie  
Tackett  
Russell Cave National Monument –  
Mary Shew  
Shiloh National Military Park – Marcus  
Johnson  
Stones River National Battlefield –  
Brenda Waters

#### **Partners and Cooperators**

Appalachian Trail Conservancy  
American Conservation Experience  
North Carolina Exotic Pest Plant  
Council  
South Carolina Exotic Pest Plant  
Council  
SC Cogongrass Taskforce  
SE Exotic Pest Plant Council  
South Carolina Native Plant Society  
North Carolina Native Plant Society  
Appalachian Highlands I&M Network  
Cumberland Piedmont I&M Network  
North Carolina Forestry Commission  
USDA National Forests of NC  
USDA APHIS Columbia SC  
Federal Highways Administration

#### **Steering Committee**

Big South Fork National River &  
Recreation Area/Obed – Marie

Tackett  
Chickamauga & Chattanooga National  
Military Park – Jim Szykowski  
Cumberland Gap National Historical  
Park – Jenny Beeler  
Kings Mountain National Military Park  
– Chris Revels  
Little River Canyon National  
Preserve/Russell Cave – Mary  
Shew

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### ***Southeast Coast EPMT Program Participants***

#### **Leadership**

Lauren Serra (Liaison), Amorita  
Brackett (Crew Leader)

#### **Crew**

Damaris Crews, Thomas Hennessey,  
Byanca Moreno, Aaron Root  
(American Conservation  
Experience Interns)

#### **Region/Network Support**

Southeast Region Office - Nancy  
Dagley (SE-EPMT Liaison),  
Darrell Echols (Chief, Science and  
Natural Resources), Christopher  
Barrow (Southeast Region GIS  
Coordinator/Geographer), Shea  
Bruscia (FLC-EPMT Data  
Manager)

SECN Inventory & Monitoring Division  
- Brian Gregory (Program  
Manager/Aquatic Ecologist),  
Sarah Corbett Heath (Botanist),  
Paula Capece (Ecologist/Data  
Manager)

Appalachian/Piedmont Fire  
Management Zone - Rob Klein  
(Fire Ecologist)

BRD's Invasive Plant Program

#### **Park Support**

Host Park Congaree National Park –  
Mark Kinzer (Acting  
Superintendent), Giselle Mora-  
Bourgeois (Acting  
Superintendent), Liz Struhar



(Chief, Resource Management), Theresa Yednock (Biological Science Technician), Laura Tyler (Administrative Officer), Alice DaRosa (Administrative Support Assistant), William Reilly (Chief, Facilities Management), John Torrence and Leona McManus (Maintenance), Jonathan Manchester (Interpretive Park Ranger), Jason Johnson (Chief Ranger, Visitor & Resource Protection), Trey Kelley (Visitor & Resource Protection), Dominique Sanchez (Mosaics in Science Intern), Nikki Mauro (NCPE Intern), James Collins (GIP Intern), Kellie Weidinger (Americorps Stewards)

Cape Hatteras National Seashore/Fort Raleigh National Historic Site/Wright Brothers National Monument – Dave Hallac (Superintendent), Stacey Sigler (Safety, Health and Wellness Program Manager), , Sabrina Henry (Environmental Protection Specialist)

Cape Lookout National Seashore – Jeffrey West (Superintendent), Jon Altman (Biologist), Sarah Bodine (Biological Science Technician)

Chattahoochee River National Recreation Area - Deanna Greco (Chief, Planning and Resource Management), Joseph Jarquin (GIS Specialist/Geographer), Allyson Read (Biologist)

Cumberland Island National Seashore – Doug Hoffman (Biologist), John Fry (Chief, Resource Management)

Fort Frederica National Monument – Michael Seibert (Chief, Resource Management), Steve Theus (Site Manager)

Fort Pulaski National Monument – Melissa Memory (Superintendent), Candice Wyatt

(Biological Science Technician), Emily Harte (Chief of Facilities and Resource Management), Ivan Lum and George Toomer (Maintenance)

Fort Sumter National Monument (Fort Moultrie)/Charles Pinckney National Historic Site – Tracy Stakely (Superintendent), Shannon Woolfolk (Compliance), Benjamin Byrnes (Chief Ranger, Visitor & Resource Protection)

Horseshoe Bend National Military Park – Barbara Tagger (Superintendent), Tammie Renicker (Administrative Officer), Brian Robinson and Steve Crowder (Maintenance)

Kennesaw Mountain National Battlefield Park – Carlos Hurston (Facility Manager, Acting), Joan West and Jake Boling (Interpretation)

Moore's Creek National Battlefield – James Sutton (Chief, Resource Management), Ricardo Perez (Superintendent), Isabelle Barnhill (Maintenance)

Ocmulgee National Monument – Allen Huckabee (Biotech), Kevin Wyrick (Chief, Operations), Jim David (Superintendent), Chelesi White, Travis Gant, Ashley Pitt, Jason Rannaw, Jake Corriher and Kate Basinger (American Conservation Experience Crew)

### **Out-Of-Network Park Support**

Assateague Island National Seashore - Jonathan Chase (Biological Science Technician)

Kings Mountain National Battlefield - Alex Scronce (Forestry Technician), Chris Revels (Chief Ranger)

Reconstruction Era National Monument - Dawn Davis (Acting Superintendent), Scott Teodorski (Acting Superintendent)

**Partners and Cooperators**

University of Georgia – Nancy O'Hare  
(SEC-EPMT Data Manager)

American Conservation Experience -  
Peter Woodruff

Old-Growth Bottomland Forest  
Research and Education Center -  
David Shelley (Director)

Kennesaw Mountain Trail Club  
South Carolina Exotic Pest Plant  
Council - David Jenkins  
(President)

South Carolina Native Plant Society  
Upstate Chapter - Eva Pratt, Janie  
Marlow, Dan Whitten

Town of Sullivan's Island, SC

North Carolina Invasive Plant Council

North Carolina Department of  
Transportation

North Carolina Coastal Federation,  
Phragmites Task Force - Ann  
Daisey, Tracy Skrabal

North Carolina Department of  
Environment and Natural  
Resources - Rob Emens

Georgia Forestry Commission - Chip  
Bates (Forest Health) and Dry  
Branch Office

**Volunteers**

Chattahoochee River National  
Recreation Area - Jordan French,  
Doug Jones

Congaree National Park - Keith A.  
Bradley (Botanist), Dane Cole,  
Dave Scheutrum, Cait Henry,  
University of Wisconsin-  
Platteville, University of South  
Carolina, Eagle Scouts

Kennesaw Mountain National  
Battlefield Park – Danny Leigh  
and Harry Carpenter (Kennesaw  
Mountain Trail Club)

Ocmulgee National Monument – Ron  
Hoppel, Nick Phan, Sarah  
Williams, Casey Hammons

**Steering Committee**

Chattahoochee River National

Recreation Area – Deanna Greco

Congaree National Park – Tracy

Stakely

Cumberland Island National Seashore

– John Fry

Moore's Creek National Battlefield –

Ricardo Perez

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**Southwest EPMT Program  
Participants****Leadership**

Jeff Conn (Liaison), Eric Lassance  
(Crew Leader/GIS), Jeanine Foley  
(Crew Leader), Marcus Jernigan  
(Botanist/GIS)

**Crew**

Texas Youth Conservation Corp,  
American Conservation  
Experience, Southwest  
Conservation Corps  
(Conservation Legacy and  
Ancestral Lands Programs), Sky  
Island Alliance, Borderlands  
Restoration,

**Regional/Network Support**

Intermountain Region Office Mike  
Wrigley, supervisor (Natural  
Resources Division, Biological  
Resource Program Manager),  
John Nelson (IPM Coordinator)

**Park Support**

Host Park 1 – Desert Research  
Learning Center/Sonoran Desert  
Inventory and Monitoring  
Program – Andy Hubbard  
(Program Manager)

Host Park 2 – Valles Caldera National  
Preserve - Jorge Silva-Banuelos  
(Superintendent), Robert  
Parmenter (Chief Science and  
Resource Management)

**Partners and Cooperators**

US National Park Service, Inventory  
and Monitoring Program  
(Federal)



Texas Youth Conservation Corps  
 American Conservation Experience  
 Arizona Youth Conservation Corps  
 Sky Island Alliance (Arizona, New Mexico, NGO)  
 Colorado State University, Fort Collins  
 Arizona State University  
 Desert Southwest Cooperative  
     Ecosystem Studies Unit  
     (University of Arizona)  
 Northern Arizona University  
 University of Nevada, Las Vegas  
 Borderlands Restoration, L3C  
 (Arizona)  
 Commission for Environmental  
     Cooperation (Federal)  
 Cuenca Los Ojos (Mexico)  
 University of Arizona Cooperative  
     Extension  
 Institute for Applied Ecology–  
     Southwest Program (NGO)  
 Madrean Archipelago Plant  
     Propagation Center (MAPP)  
 Natural Resources Conservation  
     Service, Los Lunas PMC (New Mexico)  
 Natural Resources Conservation  
     Service, Tucson PMC (Arizona)  
 Santa Ana Pueblo Nursery  
 Southwest Monarch Study (Southwest, NGO)  
 US Fish and Wildlife Service (Federal)  
 US Forest Service, Coronado National  
     Forest (Federal)  
 US Forest Service, Region 3 (Federal)  
 US Bureau of Land Management  
     (Federal)  
 US National Park Service, Desert

Research Learning Center  
 (Federal)  
 The Xerces Society (National, NGO)  
 Fred Phillips Consulting (Flagstaff, AZ)  
 Yuma Crossing Natural Heritage  
     Corporation

### **Volunteer**

AmeriCorps, Texas Youth  
     Conservation Corps, American  
     Conservation Experience, Arizona  
     Youth Conservation Corps, Sky  
     Island Alliance, Borderlands  
     Restoration

### **Steering Committee**

Carlsbad Caverns National Park – Luis  
     Florez  
 Mesa Verde National Park – George  
     San Miguel  
 Montezuma Castle National Monument  
     – Tina Greenawalt  
 El Malpais/El Morro National  
     Monuments – Mitzi Frank  
 Washita Battlefield National Historic  
     Site – Dick Zahm  
 Saquaro National Park –  
 Petrified Forest National Park –  
     Andrew Bridges  
 Aztec Ruins National Monument –  
     Dana Hawkins  
 Southern Plains Network I&M  
     Program – Rob Bennetts  
 Intermountain Region Office – Mark  
     Sturm  
 National Exotic Plant Management  
     Team – Terri Hogan