Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

NPS EPMT Annual Report: FY 2014

EPMT boundaries.

Background

Invasive species are actively transforming native ecosystems, ecological processes, visitor experiences, and negatively impacting NPS goals of preserving native species and processes. Invasive plant programs within the National Park Service (NPS) seek to prevent the introduction of invasive species, identify and remove new infestations, reduce the effects of existing infestations, and restore native plant communities. The Exotic Plant Management Teams (EPMT) were formed in 2000 to assist parks in achieving these goals and have become an integral part of the NPS response to a growing invasive species threat. The EPMT Program now consists of 17 teams that work throughout NPS. In 2014, the Teams served 283 park units and worked with many non-NPS partners as well.

Each Team is headquartered at one or more host park or Inventory and Monitoring Network facilities, and serves multiple parks over a wide geographic area. The activities and priorities for each Team are coordinated through a steering committee made up of representatives from the parks they serve.

The Teams expand the parks' ability to manage invasive plants by concentrating on large, technically challenging, and often-remote invasive plant infestations. In addition to treatment, the Teams play an important role in prevention, inventory, monitoring, restoration, and research. In fiscal year 2014, EPMTs across the country increasingly focused on early detection of new infestations and rapid response (EDRR) to eradicate them and follow-up restoration after removal of invasive plant infestations.

Early Detection/Rapid Response and Restoration

Early Detection and Rapid Response: After prevention, EDRR is the most effective way to manage invasive plants, preventing or reducing the environmental impacts and potentially saving the NPS and tax payers millions of dollars annually on control efforts and loss of ecosystem services, recreational opportunities, and land productivity. EDRR is widely practiced by the EPMTs. For example, the introduction of invasive plant species is among Hurricane Sandy's devastating environmental impacts. To mitigate this impact, the Northeast EPMT, in close cooperation with the Team's coastal partner parks, has kept close watch for the arrival of new invasive plant species. As a result of this vigilance, early discoveries of new patches of some challenging species were made and the new infestations were removed.

Restoration: Since its inception, the EPMT program has assisted parks with restoration after invasive plant treatment. These efforts continue to expand. The Southwest EPMT (SW EPMT) is especially active in restoration activities. With Tumacacori National Historic Park staff and Northern Arizona University, the SW EPMT developed a restoration plan and is conducting restoration, including invasive plant control, in the Santa Cruz River riparian area and floodplain after a devastating 2010 wildfire. The Florida/Carribean EPMT received a $75,000 grant from the U.S. Fish and Wildlife Service Division of Bird Habitat to establish a partnership to restore Biscayne Bay Coastal Wetlands and their associated uplands. This area provides critical habitat for a long list of migratory bird species and other important wildlife along Biscayne Bay in Miami-Dade County, Florida.

Santa Monica youth volunteers posing with their hard work, California EPMT. NPS Photo.

Youth crew restoration work along the Park Road in Denali National Park & Preserve, Alaska EPMT. NPS Photo.

Partnerships and Contributions

Partnerships and contributed support are vital to the EPMT program's success. Teams partner with other NPS programs, other agencies, tribes, private landowners, non-profit organizations, academic institutions, and youth corps groups. Partnerships allow treatments across political boundaries, and can increase resource sharing. Partnerships with youth corps groups such as the American Conservation Experience and the Conservation Corps of Iowa, an important partner of the Heartland Network EPMT, provide training and experience to future restoration professionals and the next generation of stewards of our unique park resources. The EPMT program's work with youth is outstanding. In fiscal year 2014, EPMTs worked with 1,180 young people who contributed 73,718 hours to invasive plant management control and restoration efforts across the country.

In 2014, the EPMTs received approximately $4.0 million in contributions, including funding and in-kind support from parks, regions, and Inventory and Monitoring networks. The types of in-kind support extended to the EPMTs included supplies, transportation, lodging, staff and VIP support in the field, administrative support, prescribed fire support, and more. These contributions substantially expand the service and positive impact of the EPMTs.

Summary of Accomplishments

The NPS EPMT Program has had a productive year and a year filled with change including two long-serving EMPT Liaisons leaving the NPS (Northern Rocky Mountain EPMT (NRM EPMT) & North Coast/Cascades EPMT), refilling the NRM EPMT Liaison position, and the newly formed SW EPMT completing its first full year of service. The EPMT program remains flexible and resilient in the face of changing budgets, increasingly garners support from a wide range of partnerships, and provides vital service to the entities it supports.

Among the NPS Invasive Plant Program's most significant accomplishments in 2014 is the adoption of a new data management system, the National Invasive Species Information Management System (NISIMS). NISIMS was created by the Bureau of Land Management and has been modified to maintain and manage NPS invasive plant management data. The new data management system is a relational geodatabase that has been designed to replace the former non-spatial database, Alien Plant Control and Management Database (APCAM).

The transition to NISIMS has resulted in changes to how data is collected and calculated. Most notable are the changes in acreage calculations. First, gross infestation acreages are now calculated based on

Summary of Accomplishments (cont.)

the geometry of the spatial feature as delineated by the EPMTs. Second, net infestation and treatment acreages are calculated as the percentage of the gross infestation feature that all identified species occupy. Third, all inventory and monitoring efforts are combined as a single summed acreage. Only those areas that have been surveyed as part of a formal inventory and monitoring effort are included in this sum. Because of these changes, acreages calculated in the 2014 report may not be comparable to those in previous annual reports.

To learn more about the activities of each EPMT, access individual EPMT program briefs via the following active links within this electronic document: Alaska, California, Florida/Caribbean, Great Lakes, Gulf Coast, Heartland Network, Lake Mead, Mid-Atlantic, National Capital Region, North Coast/Cascades Network, Northeast, Northern Great Plains, Northern Rocky Mountain, Pacific Islands, Southeast, Southeast Coast, Southwest.

Summarized Data for 2014

Measure	Acres
Treated	4,605
Inventoried/Monitored	94,329
Gross Infested Area	128,464
Net Infested Area	4,680
Youth Engagement	
Total Number of Youth Participants and Youth Employees	1,180
Total Hours for Youth Participants and Youth Employees	73,718

More Information

Terri Hogan
NPS Invasive Plant Program Manager
970-267-7306
terri_hogan@nps.gov

1201 Oakridge Drive, Suite 200
Fort Collins, CO 80525

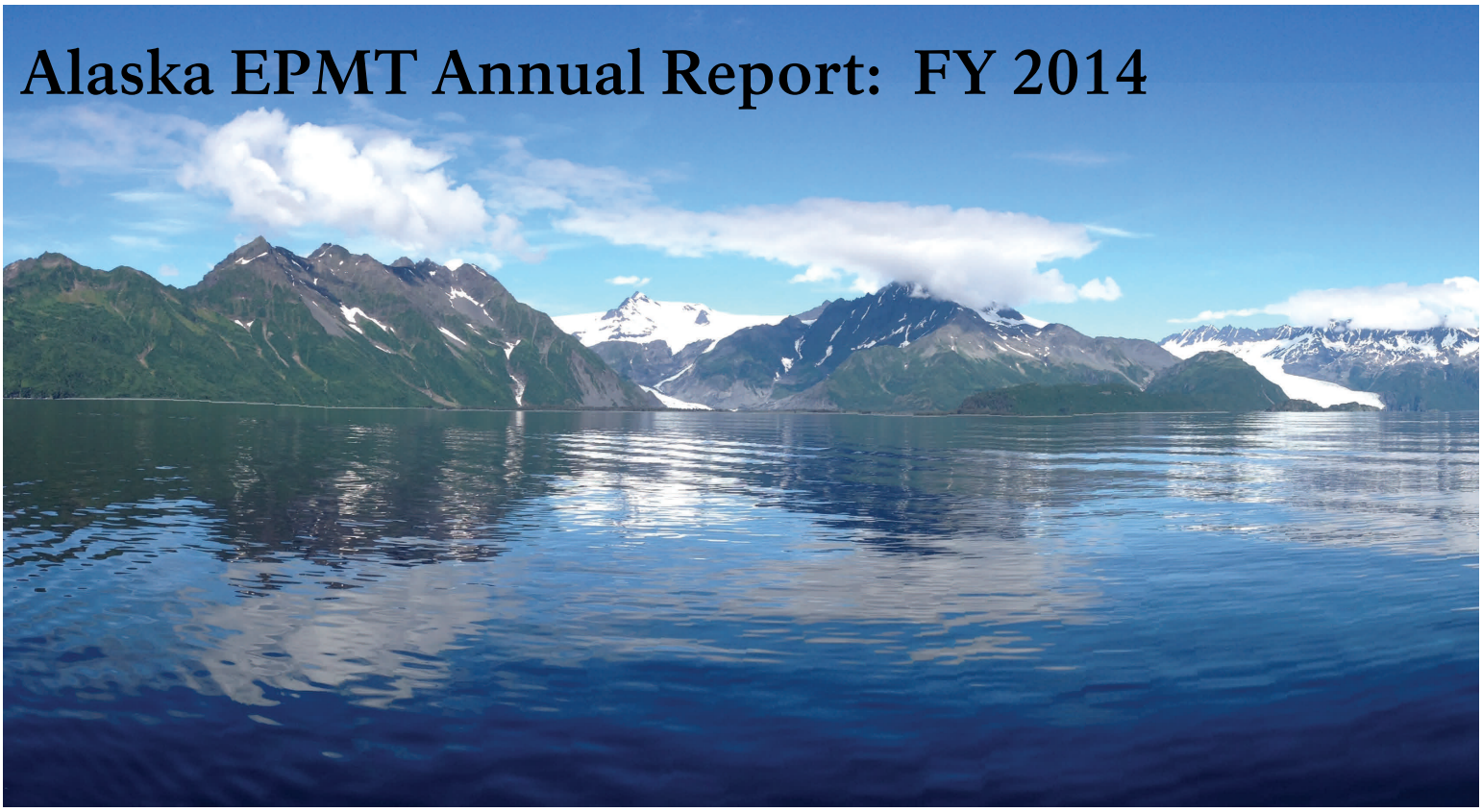
Jennifer Sieracki
NPS Invasive Plant Program Data Manager
970-225-3517
jennifer_sieracki@nps.gov

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

Alaska EPMT Annual Report: FY 2014



Aialik Bay in Kenai Fjords National Park. NPS Photo.

Background

The Alaska Exotic Plant Management Team (AK EPMT) provides invasive plant management assistance to 16 national parks in Alaska. These parks cover over 52 million acres of pristine natural areas and wilderness, including coastal fjords, glacial valleys, tundra, and boreal forests. The majority of national parks in Alaska contain healthy, intact, native ecosystems with few invasive plants. However, these species are making their way into areas used by humans.

The geography of Alaska makes invasive plant management strategies challenging, requiring backcountry or air travel to reach many park boundaries. Most parks have little or no road access. Recreation use is widely dispersed with access only by boat, backpacking or aircraft. Remote airstrips, cabins and concessionaires can provide avenues for invasive species introduction in wilderness sites where they are difficult to detect, treat and manage. The AK EPMT program relies heavily on knowledge and participation from the parks it serves.

This year, the AK EPMT conducted invasive plant work in Denali National Park (NP) & Preserve, Gates of the Arctic NP & Preserve, Glacier Bay NP & Preserve, Katmai NP & Preserve, Kenai Fjords NP, Klondike Gold Rush National Historical Park (NHP), Sitka NHP and Wrangell-St. Elias NP & Preserve. The AK EPMT team consisted of the Liaison, an NPS Biological Science Technician and Interns stationed at five parks. The Team also worked with various volunteers and youth crews that focused on specific invasive plant management projects.

Program Highlights

Restoration & Outreach for Prevention in and around the Parks

Fiscal year 2014 was a productive year for AK EPMT restoration and outreach efforts in Alaska's National Parks and involved a variety of interested participants.

Denali NP & Preserve has a very robust restoration program. This year, 26 pounds of native seed were collected and 2.28 acres restored through re-vegetation with plants and seeds gathered in previous years. An Invasive Plants Virtual Tour was created and is available for visitors to view at the Murie Science and Learning Center in Denali.

Kenai Fjords NP collaborated with the Forest Service to hold the 11th annual community weed pull event on Herman Leirer Road in Chugach National Forest. Close to 100 pounds of invasive plants were removed. Five sites located on trails and adjacent to glacier viewing areas were re-vegetated using native seeds.

Wrangell-St. Elias NP & Preserve hosted the 2nd annual Glennallen weed-pull event, which included 43 volunteers, a 4-fold increase from last year. Over 2,000 pounds of invasive plants were removed. The park also held a native seed collection event in Kennecott where locals and volunteers collected close to 10 pounds of native seeds.

These ongoing efforts and community events provide an opportunity to connect with Gateway communities and citizens concerned with the issue of invasive plants in and around Alaska's national parks.

A youth crew conducts restoration work along the Park Road in Denali National Park & Preserve. NPS Photo.

Chemical control of Reed Canary Grass (*Phalaris arundinacea*) in Glacier Bay National Park & Preserve. NPS Photo.

Program Highlights (cont.)

Invasive Plant Control at Glacier Bay NP & Preserve

Glacier Bay NP & Preserve is located in Southeast Alaska. It is renowned for its kayaking, sea life, and glacier viewing. Although the park is relatively isolated, backcountry visitation and its proximity to the town of Gustavus have made it vulnerable to non-native plant invasion.

A multi-year project to chemically control three plant species at various locations within the park was initiated in 2013 with very promising results. There were greater than 95% reductions of creeping buttercup (*Ranunculus repens* L.) in the residential area and of reed canary grass (*Phalaris arundinacea* L.) at the maintenance yard. A 0.7-acre perennial sowthistle (*Sonchus arvensis* L.) infestation at an abandoned fox farm site on Strawberry Island was reduced by 67%.

The remains of these populations were retreated this year and a population of creeping buttercup invading a heavily used coastal trail was added to the project. Native vegetation, such as horsetail (*Equisetum* L.), bluejoint grass (*Calamagrostis canadensis* (Michx.) P. Beauv.) and red alder (*Alnus rubra* Bong.) have responded and are moving into the voids at all sites.

Work at these sites will be continued with the hope that these results will be a continuing trend. Native species recovery at invasive plant removal sites enables the team to focus on other infestations.

Summary of Accomplishments

Two hundred and twenty-three acres were surveyed for non-native plants in eight parks. The efforts of NPS staff stationed at parks, interns, volunteers and youth crews led to the overall removal of close to six acres of invasive plants. Five lakes were surveyed in Wrangell-St. Elias for the presence of the aquatic invasive plant, *Elodea* spp. with none found, and a third of an acre infestation of orange hawkweed (*Hieracium aurantiacum* L.), oxeye daisy (*Leucanthemum vulgare* Lam.) and creeping buttercup was treated at the Juneau NPS office for the first time. Manual control continues to be the primary method employed at the parks. Chemical control has increased

Summary of Accomplishments (cont.)

each year in an effort to become more efficient with a limited workforce and potentially eradicate high priority species. The results of herbicide treatments have shown measurable density reductions within treated infestations.

Summarized Data for 2014

Measure	Acres
Treated	6
Inventoried/Monitored	223
Gross Infested Area	131
Net Infested Area	18
Youth Engagement	
Total Number of Youth Participants and Youth Employees	65
Total Hours for Youth Participants and Youth Employees	13,840

More Information

Chris Overbaugh
EPMT Liaison

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

907-644-3452
chris_overbaugh@nps.gov

Peter Frank
EPMT Data Manager

Wrangell St. Elias National Park & Preserve
PO Box 439
Copper Center, AK 99573

907-802-7283
peter_frank@nps.gov

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

California EPMT Annual Report: FY 2014

Jubata grass is one of the San Francisco Bay Area national parks highest priority invasives. NPS Photo.

Background

The California Exotic Plant Management Team (EPMT) serves 14 parks that are located within the California Floristic Province. Regarded for its exceptionally high concentration of endemic plants, this region is one of 25 world biodiversity hotspots. Of 3,500 vascular plants found in California, over two-thirds of the species are found nowhere else in the world.

Within the National Parks served by the EPMT, over 290,000 acres are infested with invasive plants and treatments are often complex, as project sites range from the remote and wild Channel Islands National Park, to rangeland projects at Point Reyes National Seashore. The enormity of the issue and the reduction in program funding demands judicious dedication of financial resources, careful prioritization of treatments, and promotion of partnerships that facilitate strategically robust treatments.

The California program operates as a grant, project management, and technical assistance model. This allows for enhanced project management flexibility to opportunistically capitalize on the strengths of each park. Programmatic flexibility helps parks that have challenging treatment timing issues, and variable practitioner expertise needs. The expense, complexity, and technical aspect of these particularly challenging projects require judicious allocation of funding to precisely tap the skill sets needed for the job. Our highlights this year illustrate the challenges associated with treating invasive species on particularly daunting terrain.

Program Highlights

Consistent Treatments Pay Off at Yosemite National Park

Yosemite National Park's invasive plant program with support from the EPMT has been battling a 300 gross-infested acre yellow star-thistle (*Centaurea solstitialis* L.) infestation that straddles National Park Service, US Forest Service, and private land. Collaboration has been easy between agencies and land owners, as all parties share the goal of preventing the infestation from creeping further into Yosemite National Park. However, site and environmental conditions have been daunting. These include drought, 100 plus degree temperatures, slopes so steep as to require fall protection, poison-oak forests, rattlesnakes, multiple fires burning over the project, fundamental human limitations, and a treatment window that gets shorter every year. It takes a crew of 10, three and a half months to treat the infestation. Despite these challenges, consistent treatments over the last six years have resulted in a population decrease from 21 canopy acres of yellow-star thistle to one canopy acre. Treatment success is attributed to precise mapping, careful applications, persistence, sweat, and a highly seasoned staff that revels in the challenges. EPMT funding has been used to leverage multiple funding sources to bolster the consistent operation needed to control what seemed an impossible infestation. All parties recognize the value of protecting Yosemite National Park's biodiversity and iconic views from the advancement of yellow star-thistle.

Melissa Booher sprays Yellow Star-Thistle on the slopes of the Merced River Canyon, Yosemite National Park. NPS Photo.

Shelterbelt Builders staff rappel down cliff-sides to treat jubata populations, Pirates Cove, Golden Gate National Recreation Area. Photo by Danny Franco, GGNPC.

Program Highlights (cont.)

High Stakes Jubata Grass Control on Golden Gate NRA's Coastal Bluffs

Jubata grass (*Cortaderia jubata* (Lemoine) Stapf) is a highly invasive perennial grass that can produce two million viable seeds per plant, often without pollination. It is a management priority at Golden Gate National Recreation Area (GGNRA) because of its invasiveness and ability to displace native species in sensitive habitats. EPMT funded treatment of a pivotal and particularly challenging population at Pirates Cove; located between other jubata grass management projects to the north and south. This site, south of Muir Beach, includes areas that are accessible by foot and other areas where plants are growing on vertical cliff faces. GGNRA worked with the Golden Gate National Parks Conservancy (GGNPC) to determine the most efficient and cost effective approach for treating jubata grass at this site. Because plants growing on cliff faces can be extremely difficult to spot from land, GGNPC staff partnered with NPS Law Enforcement to conduct surveys of the Pirates Cove site via boat. A technically sophisticated workforce carried out cliff-side rappelling treatments. The less-vertical portion of the project was completed by a more economical workforce with proven experience in rugged back-country environments. This flexible, multi-workforce approach allowed the park to maximize EPMT dollars and treat 12.7 acres of jubata grass. This year's effort was a critical step towards achieving the goal of bringing jubata to a maintenance level of control throughout the Marin Headlands within 5 years.

Summary of Accomplishments

The EPMT projects executed 1,486 individual treatments, compared with 285 treatments in 2011. Several factors contributed to this dramatic rise in number of treatments. In about half of the California EPMT parks, large, dense infestations have been successfully reduced. As infestations at sites are reduced and become more sparse, mapping units become smaller and more scattered, and net treated acreage drops. In 2014 the EPMT also transitioned to a more refined mapping scale that has helped track treatments with greater precision.

The California drought impacted the scope and timing of most projects in 2014. Even with the extended drought and the daunting site conditions, park units served by the EPMT have achieved or are very close to achieving maintenance control of the larger, more long-term invasive plant management projects. This trajectory of results lends promise to the future; as the parks are gaining ground in this Goliath-sized battle with invasive species.

Summary of Accomplishments (cont.)

Summarized Data for 2014

Measure	Acres
Treated	196
Inventoried/Monitored	1,975
Gross Infested Area	1,680
Net Infested Area	88
Youth Engagement	
Total Number of Youth Participants and Youth Employees	133

More Information

Bobbi Simpson
California EPMT Liaison
415-464-5190
bobbi_simpson@nps.gov

National Park Service
Point Reyes National Seashore
1 Bear Valley Road
Point Reyes Station, California 94956

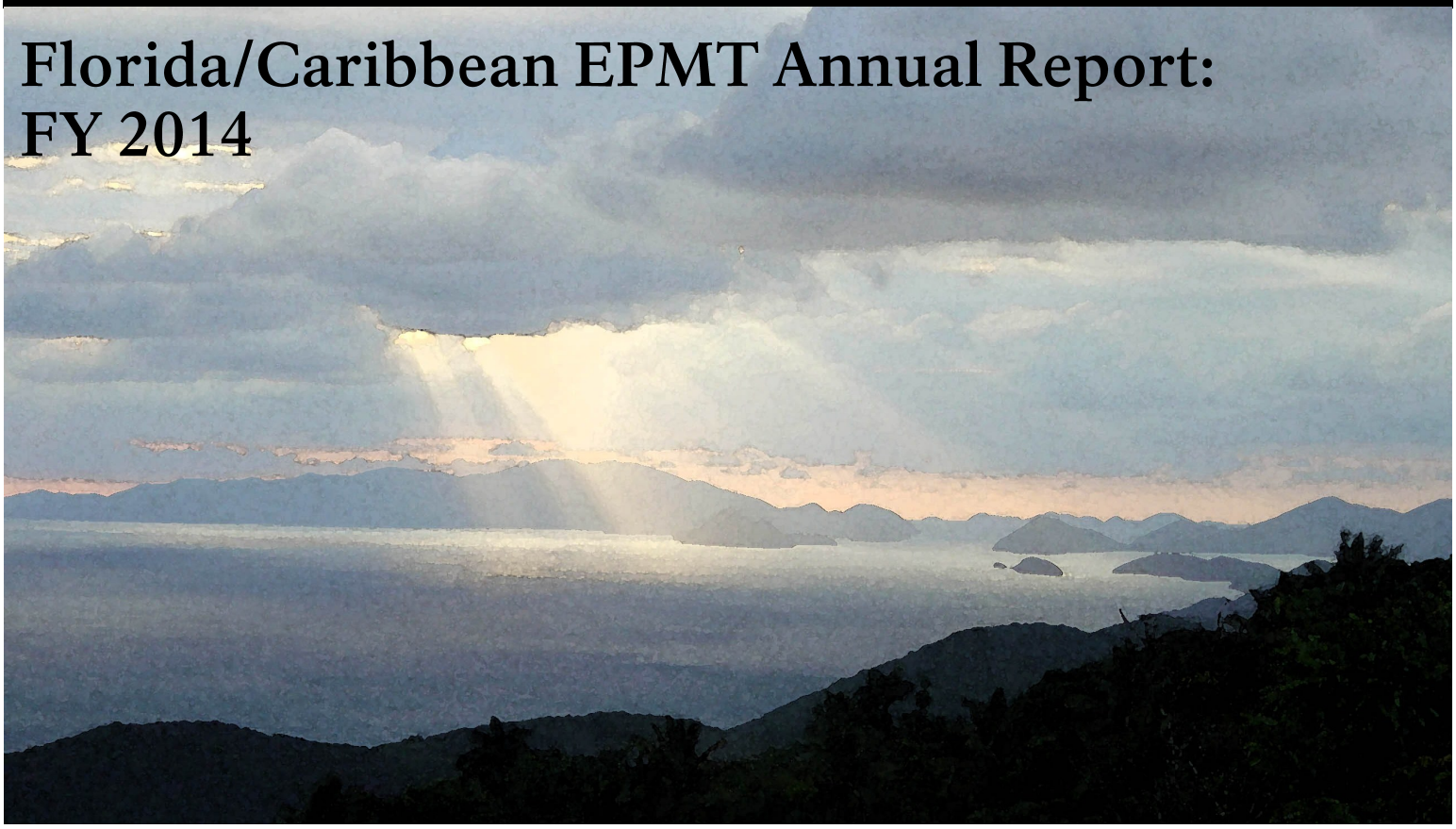
Elliot Gunnison
California EPMT Data Manager
415-464-5121
elliot_gunnison@partner.nps.gov

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

Florida/Caribbean EPMT Annual Report: FY 2014



Virgin Islands National Park. NPS Photo.

Background

Invasive plant species are particularly problematic in Florida and the Caribbean due to the tropical climate which favors the survival and establishment of invasive species as well as the sheer number of ornamental introductions. Over 1.5 million acres of conservation lands in Florida and the Caribbean are infested with invasive plants including National Park Service Units. These invasive plants are having a detrimental effect on native plant communities by reducing native plant diversity and altering ecological processes such as fire behavior and surface water conveyance.

The Florida/Caribbean Exotic Plant Management Team (EPMT) serves fifteen National Park Service units in Florida and the Caribbean by supplementing existing invasive plant management efforts. The Team assists the parks with identification, mapping, management and monitoring of invasive plant species. The management of invasive plant species is accomplished through a combination of cost-effective regional contractors, National Park Service (NPS) seasonal treatment crews and volunteers.

The Florida/Caribbean EPMT steering committee, with representatives from Florida and Caribbean NPS units, the US Army Corps of Engineers, US Fish and Wildlife Service, and the State of Florida meets annually. During the annual meeting the steering committee reviews the efficiency of the program and prioritizes and develops a treatment schedule for the fiscal year.

Program Highlights

Coastal Palmetto Bay Restoration Project

In 2014 the Florida/Caribbean EPMT received a $75,000 grant from the U.S. Fish and Wildlife Service Division of Bird Habitat to establish a partnership to restore Biscayne Bay Coastal Wetlands and their associated uplands. This area provide critical habitat for a long list of migratory bird species and other important wildlife along Biscayne Bay in Miami-Dade County, Florida. The Coastal Palmetto Bay Habitat Restoration Partnership includes the National Park Service, the Institute for Regional Conservation (IRC), South Florida Water Management District, Palmetto Bay Village Center, Tropical Audubon society and Fairchild Botanical Gardens. The goal of the project is to restore 300 acres of Coastal wetlands by removing invasive plant species, restoring native grasses, and restoring natural fire regimes. Through this project, nest boxes will also be installed and a long term habitat and species monitoring plan will be implemented.

2014 Accomplishments related to this project include:

- Prescribed burn conducted on 50 acres of coastal marsh,
- Invasive plants treated on 200 acres, including the mechanical removal of 10 acres of Brazilian pepper and lead tree,
- Over 9,000 native grass plants established within restoration site.

Coastal Palmetto Bay Volunteer Day. Photo by Sarah Martin, Institute for Regional Conservation.

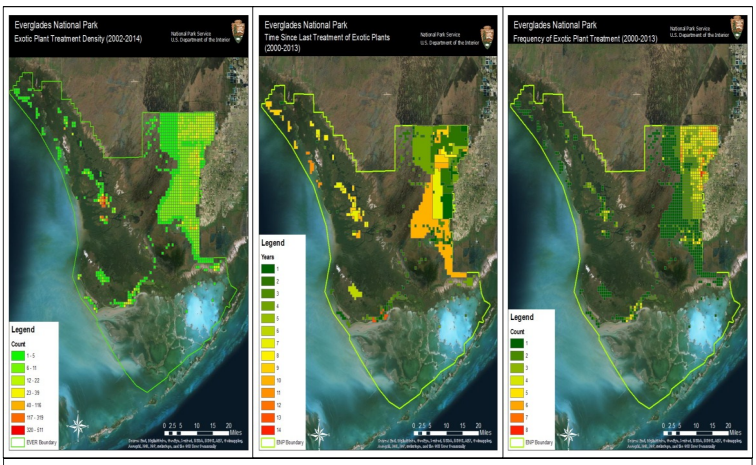


Figure 40. A visualization of three different aspects of exotic plant treatment history for Everglades National Park at a 1 kilometer scale.

Everglades National Park Treatment History Analysis. NPS.

Program Highlights (cont.)

Treatment History Analysis

The Florida/Caribbean EPMT utilized GIS to develop treatment history maps. The maps enable visualization of areas where treatment efforts are concentrated over multiple years of management effort. This is necessary for resource managers because it provides information about how and where exotic plant infestation challenges are centered over long periods of time. The process of creating cumulative treatment intensity maps can also yield several other types of management-relevant summary maps, including time since last treatment, treatment density, and treatment frequency. The treatment density map displays individual treatment data points within an area of interest. This is an accumulation of every year's data and allows managers to identify areas where treatment of invasive plant species has been most concentrated over the years. The treatment frequency map provides visual information on the number of years, within a given time frame, treatments were conducted at a particular site.

Eventually this approach to evaluating aspects of invasive plant management can be linked to soil and vegetation maps. Connections to other site features will help identify fundamental limitations and controlling processes that govern the spread of invasive exotic pest plants.

Summary of Accomplishments

In 2014 the Florida and Caribbean EPMT through a combination of private contractors and in-house seasonal crews treated over 1,383 canopy acres at 11 of the 15 NPS units served by the Team. The EPMT received considerable support from the Florida Fish and Wildlife Conservation Commission (FWC) Upland Invasive Plant Management Program. In 2014, FWC provided the team with over $500,000 in contract services for projects at Everglades National Park, Big Cypress National Preserve and Canaveral National Seashore.

In conjunction with the South Florida Water Management District, the EPMT mapped invasive plant distribution and abundance of four priority invasive plant species in the Everglades using Digital Aerial Sketch Mapping (DASM).

Program Highlights (cont.)

The EPMT assisted its Federal and state partners in various EDRR efforts including golden beardgrass (*Chrysopogon aciculatus* (Retz.) Trin.), Lumnitzera (*Lumnitzera racemosa* Willd.) and Mikania (*Mikania micrantha* Kunth).

Summarized Data for 2014

Measure	Acres
Treated	1,383
Inventoried/Monitored	22
Gross Infested Area	8,145
Net Infested Area	781
Youth Engagement	
Total Number of Youth Participants and Youth Employees	13
Total Hours for Youth Participants and Youth Employees	1,008

More Information

Tony Pernas — **786-249-0073**
Florida and Caribbean EPMT Coordinator — **tony_pernas@nps.gov**

18001 Old Cutler Road
Suite 419
Palmetto Bay, Florida 33157

Alan McKinley — **786-249-3014**
Florida and Caribbean EPMT Crew Leader — **alan_mckinleyt@nps.gov**

Shea Bruscia
Florida and Caribbean EPMT Data Manager — **shea_bruscia@nps.gov**

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

Great Lakes EPMT Annual Report: FY 2014

Pictured Rocks National Lakeshore shoreline from the Log Slide Overlook. NPS Photo.

Background

The Great Lakes Exotic Plant Management Team (GL EPMT) provides support to ten 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 encompasses diverse aquatic and terrestrial ecosystems. Multiple rare, significant, and globally threatened ecosystems are found within this region and 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. However, visitor use and necessary maintenance activities have introduced new invasive species. The GL EPMT 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 GL EPMT provides parks with focused regional expertise and skilled on-the-ground control work. Discipline specific knowledge and a network of partners allows the team to anticipate regional threats to individual parks and work toward site-specific management options. As a shared regional resource, the team works with partner parks to either augment existing management efforts or provide parks with management options.

Program Highlights

Management Success at Isle Royale National Park

Native cattails provide valuable habitat and are part of a healthy, functioning wetland community; however, non-native cattails can be destructive and possess the ability to hybridize with native broadleaf cattails. Invasive hybrid cattails (*Typha* X *glauca* Godr. (pro sp.)) were first reported at Isle Royale National Park in 2007 when wetland inventories identified two infestations on the north side of the Island. Since the Island is made up of 132,000 acres of remote wilderness that contains approximately 17,300 acres of high quality wetlands and 242 miles of perennial streams, cattail invasion represents a significant threat. Treatment of these populations was initiated in 2010.

Although initial treatments were extremely successful, challenges posed by work in remote areas necessitated additional control work before both infestations could be nearly eliminated. The remoteness of wilderness parks in the Great Lakes region buffers some effects of invasion, though this factor does not offer absolute protection. In some cases, remote wilderness locales become infested and invasive species populations go undetected due to an inability to routinely monitor these areas. Additionally, when populations are detected they are often logistically difficult to control. Coordinated efforts between park staff and the GL EPMT help to find and treat these remote infestations before they become larger issues.

Cattail treatment site on Isle Royale in 2010, one year after treatment. NPS Photo.

Cattail treatment site (2010 image to the left of this photo) on Isle Royale in 2014. NPS Photo.

Program Highlights (cont.)

Managing Invasives Unites Partners

Partnerships continue to play an important role for the GL EPMT in managing invasive species. In 2008, the National Park Service established a 160 acre interpretive site along the Ice Age National Scenic Trail in Cross Plains, Wisconsin to interpret the exceptional glacial features and native landscapes along the nearly 1,200 mile trail. Initially, fallow farm fields and woodlands infested with common buckthorn masked the tallgrass prairie and oak savanna that historically comprised the site.

The Team initiated control work shortly after the Cross Plains site was acquired by removing non-native invasive brush from the old farm fields. Wisconsin DNR Natural Areas crews, U.S. Fish and Wildlife Service, and numerous Ice Age Trail volunteers helped the team recapture and reconnect multiple acres of high quality remnant oak savanna that would have been lost in the near future. Several large multi-century old bur oak trees, which were hidden in the buckthorn infested woodlands, provide a glimpse of the historically prevalent but now rare native savanna community. While more invasive plant management and restoration work is needed, the network of partners is dedicated to reclaiming and restoring more of the rare plant community along the Ice Age National Scenic Trail.

Summary of Accomplishments

In 2014 the GL EPMT treated over 81 acres of land that contained invasive plant species. Many of those acres are located in sensitive areas that contain critical habitat or house early detection species. At Isle Royale NP known populations of non-native cattails (*Typha* X *glauca*) have virtually been eliminated after multiple years of successful treatments, while purple loosestrife (*Lythrum salicaria* L.) at the Apostle Islands National Lakeshore (NL) has been reduced to maintenance levels. Due to advancements in control options made possible through partnership collaboration, Japanese knotweed (*Fallopia japonica* (Houtt.) Ronse Decr.), an aggressive early invader to Apostle Islands and Pictured Rocks NL, has been significantly reduced. The team also made significant progress in removing early detection species, including bishop's goutweed (*Aegopodium podagraria* L.) and oriental bittersweet (*Celastrus orbiculatus* Thunb.), from St. Croix NSR. The continued maintenance of the globally-imperiled wetland pannes at Indiana Dunes NL ensures the continued reduction of phragmites (*Phragmites australis* (Cav.) Trin. ex Steud.) and cattails (*Typha* sp. L.), even after a year of optimal rainfall following a several year period of drought conditions.

Summary of Accomplishments

Summarized Data for 2014

Measure	Acres
Treated	81
Inventoried/Monitored	62
Gross Infested Area	661
Net Infested Area	85
Youth Engagement	
Total Number of Youth Participants and Youth Employees	0
Total Hours for Youth Participants and Youth Employees	0

More Information

Carmen Chapin
Great Lakes EPMT Liaison
715-682-0631 x230
carmen_chapin@nps.gov

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

Isaiah Messerly
Biologist/Crew Leader
715-682-0631 x233
isaiah_messerly@nps.gov

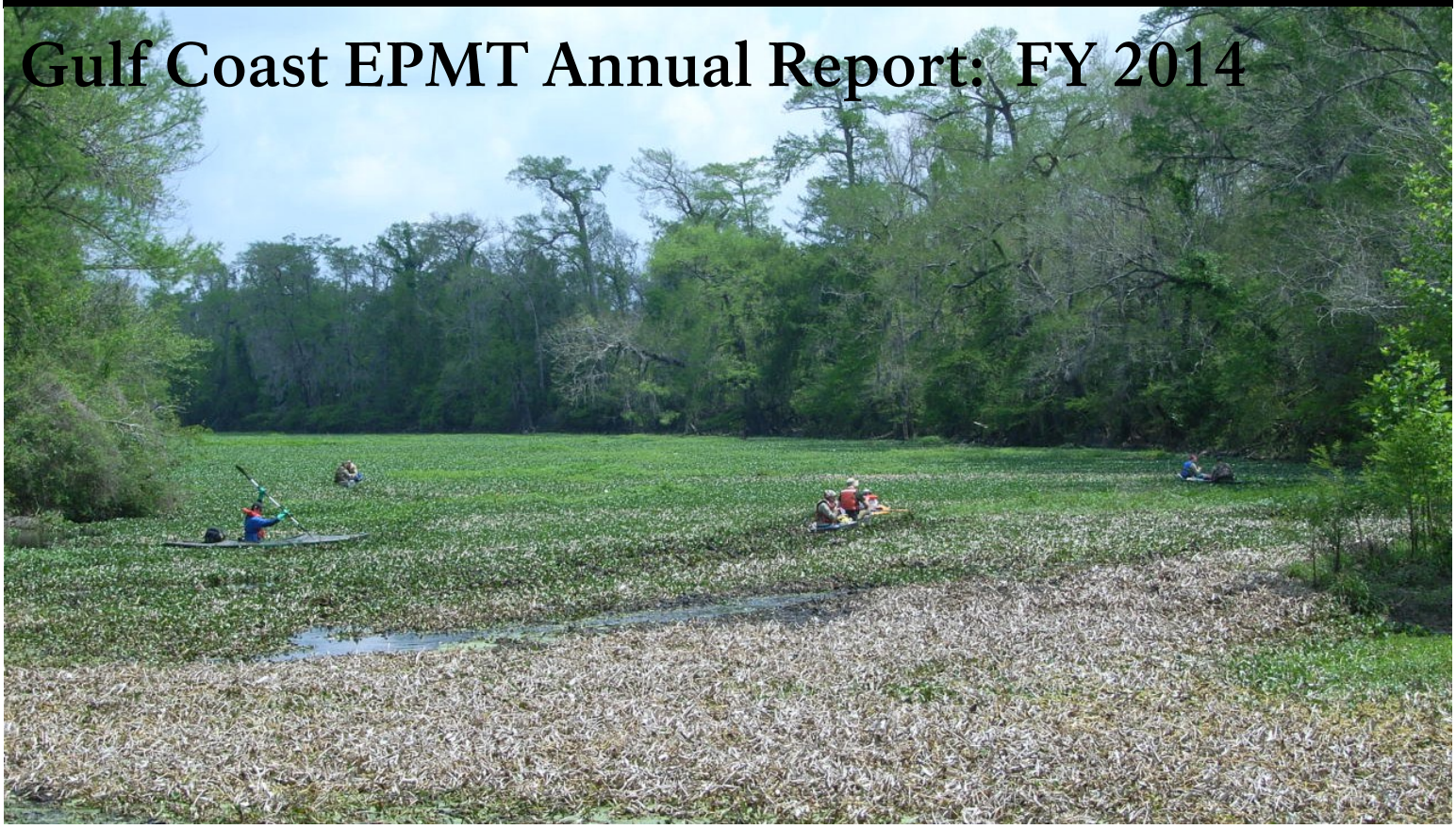
Rebecca Key
Data Manager
715-682-0631 x 232
rebecca_key@nps.gov

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

Gulf Coast EPMT Annual Report: FY 2014



Water Hyacinth control treatment with the American Youth Works AmeriCorps, Big Thicket National Preserve. NPS Photo.

Background

The Gulf Coast EPMT (GC EPMT) spans the Gulf Coast region from Mexico to Florida and includes six partner parks and two non-partner parks. This is a region of relatively warm year round temperatures, high precipitation, and high plant diversity, including a high diversity of exotic vegetation. The riparian corridors of San Antonio Missions National Historical Park (NHP) are heavily invaded by Chinaberry tree (*Melia azedarach* L.), Japanese privet (*Ligustrum japonicum* Thunb.), Japanese honeysuckle (*Lonicera japonica* Thunb.), giant cane (*Arundo donax* L.), golden bamboo (*Phyllostachys aurea* Carrière ex Rivière & C. Rivière) and cat's claw vine (*Dolichandra unguis-cati* (L.) L.G. Lohmann). Brazilian pepper-tree (*Schinus terebinthifolius* Raddi), Phragmites (*Phragmites australis* (Cav.) Trin. ex Steud.) and old world bluestems in the *Bothriochloa* Kuntze and *Dichanthelium* (Hitchc. & Chase) Gould genera are of primary concern of Texas coastal parks. Control efforts for these species have been initiated and are in the developmental stage, testing methodologies and developing best management practices. Coastal island parks such as Gulf Islands National Seashore share similar concerns with Texas coastal parks including invasive grasses such as cogongrass (*Imperata cylindrica* (L.) Raeusch.) and Phragmites which are adapted to low lying wet areas, as well as woody species of the lowland forest parks. Lowland forest parks in east Texas and Louisiana which include the Big Thicket National Preserve and the Barataria Preserve of Jean Lafitte NHP face threats from Chinese tallow tree (*Triadica sebifera* (L.) Small), mimosa (*Albizia julibrissin* Durazz.), and Japanese climbing fern (*Lygodium japonicum* (Thunb.) Sw.), Chinese privet (*Ligustrum sinense* Lour.),

Background (cont.)

Japanese honeysuckle and numerous aquatic invasive species. These species present an ongoing battle due to the large size of the parks and recurring hurricane disturbances. Kudzu (*Pueraria montana* (Lour.) Merr.) is the number one concern at both Vicksburg National Military Park and the Natchez Trace Parkway. Considerable progress has been made in recent years in controlling this species at both parks.

Program Highlights

Barataria Preserve Navigation Canal and Spoil Bank Chinese Tallow Tree Removal and Land Restoration.

Chinese tallow tree control efforts within the Barataria Preserve of Jean Lafitte NHP has achieved considerable success in recent years. All Chinese tallow trees, with the exception of recent seedlings, have been almost completely removed from the accessible areas of the preserve. Efforts now are directed to those previously considered low priority due to their remoteness and difficulty of access. The majority of the control efforts this year focused on those remote areas and a large portion of the Chinese tallow was completely removed from the marshlands adjacent to Lake Salvador. As much as possible, native species were protected during treatment of Chinese tallow and supplemented by native tree plantings. In other areas Chinese tallow trees have been removed and the canals filled to restore the pre-dredging hydrology and marsh plant communities.

Chinese tallow tree treatment in Big Thicket National Preserve. NPS Photo.

DOI/NPS briefing to the American Youth Works AmeriCorp team prior to start of work at San Antonio Missions NHP. NPS Photo.

Program Highlights (cont.)

Big Sandy Creek Trifoliate Orange Removal and Control

Historically EPMT activities at Big Thicket National Preserve have focused solely on treatment of Chinese tallow tree infestations. This effort has garnered some success but is hampered by the degree of the Chinese tallow infestation and limited GC EPMT resources. The park has recently shifted the focus of Chinese tallow treatment efforts to smaller, isolated populations within high priority areas enabling the achievement of demonstrable treatment success. Treatment efforts have also expanded to include isolated populations of other invasive plant species which can lead to the eradication of some species from the park and subsequent restoration of the native plant communities displaced by these species. For example, this year the EPMT targeted the only known large population of trifoliate orange (*Poncirus trifoliata* (L.) Raf.) in the Big Thicket with good results. Through follow up treatments, it is likely that this species will be removed from the park with the exception of a few scattered individuals. The GC EPMT makes every effort to protect existing native vegetation to facilitate rapid recovery of the treated area and many areas of the park are already showing signs of recovery.

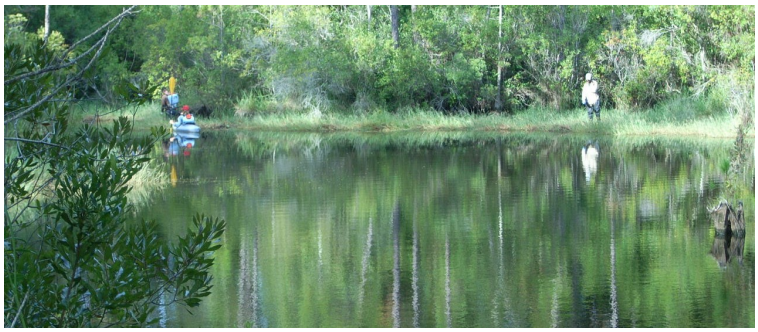
Summary of Accomplishments

San Antonio Missions NHP has experienced the highest level of success among the network of GC EPMT parks. Essentially, all perennial invasive vegetation has essentially been removed from the original park area. New land acquisitions offer new challenges each year. These new projects are accomplished with the assistance of the Austin, Texas based American Youth Works (AYW). San Antonio Missions NHP provides the perfect conditions for "substantial involvement", a necessary component of working with youth. The scale of these projects is appropriate and, the hands on attention provided by EPMT and park staff, assures a quality experience for AYW interns and quality products for the park.

Another unexpected accomplishment was achieved this year at Vicksburg National Military Park. The GC EPMT crew was outfitted to treat the expected ten plus acres of kudzu remaining of the original 50 plus acre infestation treated in previous years. To the EPMT's surprise upon arrival at the park very little kudzu could be located.

Summarized Data for 2014

Measure (Results below calculated from APCAM, previous EPMT Program Database no longer in use by program)	**Acres**
Treated	211
Inventoried/Monitored	8,056
Gross Infested Area	3,263
Net Infested Area	273
Youth Engagement	
Total Number of Youth Participants and Youth Employees	48
Total Hours for Youth Participants and Youth Employees	3,023



Treatment of torpedo grass (*Panicum repens* L.) invading a pond at Gulf Islands National Seashore. NPS Photo.

More Information

Eric D. Worsham
Gulf Coast EPMT Liaison

3755 Milam, Suite C
Beaumont, TX 77701

409-363-3609
eric_worsham@nps.gov

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

Heartland Network EPMT Annual Report: FY 2014

Effigy Mounds National Monument and Conservation Corps Iowa staff during a garlic mustard (*Alliaria petiolata* (M. Bieb.) Cavara & Grande) control project in the rugged Mississippi River bluff forests of Iowa's driftless region. NPS Photo.

Background

The Heartland Network Exotic Plant Management Team (EPMT) serves 15 parks in eight Midwestern and Mid-southern states. 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 theses parks commemorate important historical events, locations, people, and, cultural practices, which requires integrating invasive plant management into cultural and natural landscapes.

The Heartland Network EPMT exists solely to serve park managers and the resources that they are charged to 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 litmus 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; to rely on evidence-based scientific data to support projects; and to be cognizant of inherent project uncertainty and biases.

Program Highlights

Prairie Restoration at George Washington Carver NM (GWCA)

This year the EPMT continued to control the invasive natives smooth sumac (*Rhus glabra* L.) and winged sumac (*Rhus copallinum* L.) in restored prairies in GWCA. While the initial treatments using fluroxypyr+triclopyr were highly successful in areas of moderate plant density, treatments were not conducted in high density areas due to the lack of vegetation below the shrubs.

To handle this problem, crews from the Conservation Corps of Iowa cut and sprayed the stumps of sumac within the high density areas. The EPMT coordinated with the fire crew at Ozark National Scenic Riverways and the fire use module at Buffalo National River to burn the piles and oversee a prescribed fire to prepare the soil for planting.

EPMT staff then provided technical assistance on subsequent restorations, including consulting with Steve Clubine, a grasslands restoration expert in Missouri. In December 2014, the EPMT planted a mixture of Missouri-sourced little bluestem (*Schizachyrium scoparium* (Michx.) Nash), big bluestem (*Andropogon gerardii* Vitman), and indiangrass (*Sorghastrum nutans* (L.) Nash) to match the composition of the surrounding prairie.

Conservation Corps Iowa crew members, Pea Ridge National Military Park, Arkansas, with acting superintendent and former Northern Rocky Mountain Exotic Plant Management Team liaison Brenda Waters. NPS Photo.

Park-based crew from Effigy Mounds National Monument, Iowa assisting with invasive plant control in prairies at Herbert Hoover National Historic Site, Iowa. NPS Photo.

Program Highlights (cont.)

Vegetation Mapping and Invasive Plant Control

Between 2011 and 2014, the EPMT has undertaken several projects to control autumn olive (*Elaeagnus umbellata* Thunb.) in Ozark National Scenic Riverways (OZAR). During the planning work, the EPMT recognized that the work sites had been mapped as vegetation types, all historically defined as old fields (report here: http://www.cerc.usgs.gov/pubs/center/pdfDocs/MapVegONSR.pdf).

Based on earlier studies that the EPMT conducted in the park's high quality natural areas—areas of greatest concern—invasive plants were generally limited to roads, trails, and waterways. There was no indication that these plants had spread from those locations. Consequently, natural areas appeared to be resistant to invasion.

The insight gained from observation of invasion of old fields, however, led to an important change in the way that the EPMT viewed the work in OZAR. The best investment of resources, is in removing invasive trees and shrubs from mid-successional forests (formerly old fields) to allow these Ozarks forests to progress towards more typical and historical successional stages. In 2014, the EPMT surveyed 400 of a total of 7,000 acres of old fields in the park. Approximately 20% of the area supported autumn olive or burning bush (*Euonymus alatus* (Thunb.) Siebold). The Team currently manages four project areas in mid-successional forests that cover over 190 acres.

Summary of Accomplishments

The Heartland Network EPMT continued to strengthen its relationship with a key partner—Conservation Corps Iowa. This year, for the first time, the EPMT provided NPS-specific training to augment the 2-week training program that the Corps provides each team member.

The EPMT continued to develop its project portfolio, which currently consists of 25 projects covering 1,420 acres. In consultation with park managers, these are projects that all have jointly agreed to fund and sustain until completion. These projects have been posted to a shared site, so that all partner parks can access the portfolio. The EPMT will continue to develop existing work in to additional projects in 2015.

Summary of Accomplishments (cont.)

The Heartland Network EPMT continued to partner with the parks served by this team, leading to shared staff, funding, and accomplishments to protect park resources.

Summarized Data for 2014

Measure	Acres
Treated	76
Inventoried/Monitored	11,294
Gross Infested Area	4,490
Net Infested Area	76
Youth Engagement	
Total Number of Youth Participants and Youth Employees	24
Total Hours for Youth Participants and Youth Employees	5,724

More Information

Craig Young — **417-732-6438 x281**
Heartland Network EPMT Liaison
Craig_Young@nps.gov
Heartland Network (I&M/EPMT)
Wilson's Creek National Battlefield
6424 W. FR 182
Republic, Missouri 65738

Jordan Bell[1], Andrew Bishop[1], Jessica Salesman[3]
Field Crew Leaders
[1]Heartland Network (I&M/EPMT)
[2]Cuyahoga Valley National Park
[3]Effigy Mounds National Monument

[1]**417-732-6438 x405**
[1]**Jordan_Bell@nps.gov**
[2]**330-342-0764 x8**
[2]**Andrew_Bishop@nps.gov**
[3]**563-873-3491 x402**
[3]**Jessica_Salesman@nps.gov**

Chad Gross — **417-732-6438 x 401**
Data Manager — **Chad_Gross@nps.gov**

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

Lake Mead EPMT Annual Report: FY 2014

LAKE EPMT controlling Athel trees (*Tamarix aphylla* (L.) H. Karst.) along shoreline. NPS Photo.

Background

The Lake Mead Exotic Plant Management Team was established in 1996 serving as the prototype model for what eventually developed into the NPS EPMT program. The team has conducted on the ground projects with field crews in 37 NPS Units, 15 USFWS Refuges, seven BLM Districts, four National Forests, two Bureau of Indian Affairs Units, one Bureau of Reclamation Region and several state and local entities throughout the southwest conducting invasive plant control work on millions of acres of land. The Team has three primary goals: 1) Provide expertise in the control of invasive plants from high priority sites to preserve, restore and maintain native plant communities, 2) Professionalize invasive plant management within the NPS and its partners by developing staff expertise, and 3) Improve government efficiencies through interagency cooperation by developing partnerships to effectively manage weeds on a landscape level.

Partnerships are integral to the Team's success, leveraging each NPS base dollar with three additional dollars annually. These partnerships facilitate weed management across agency boundaries and increase our capacity to serve NPS Units. For example, BLM funds are provided to the team through an agreement to control weeds adjacent to many NPS Units. Funds garnered through partnerships total more than one million dollars annually and support a 20 person crew, and the largest EPMT in the nation, in the field throughout the year.

The EPMT conducts weed control projects continuously throughout the year during all seasons due to the Team's geographic locality and partnerships in the regional area. A year round operation maximizes

Background (cont.)

the Team's ability to serve its various partners, control a diversity of weeds, and improve efficiency and flexibility in scheduling projects.

Program Highlights

Partnering on the East Fork of the Virgin River, Utah

From 2002-2004 the Team completed Russian olive (*Elaeagnus angustifolia* L.) removal along several miles of the East Fork of the Virgin River within Zion National Park (NP). Russian olive is an invasive exotic tree species that has been expanding into river systems in the West during the last few decades. The Virgin River watershed includes the southwest portion of Utah, northwest Arizona, and southeast Nevada. The river flows into Lake Mead National Recreation Area (NRA) and is a tributary of the Colorado River. Building upon the control successes at Zion NP, upstream partners were interested in pursuing continued control of this aggressive tree. A National Fish and Wildlife Foundation Grant was obtained for $75,000 to fund the Team to control 13 riverine miles of Russian olive and tamarisk species (*Tamarix* spp. L.) on Bureau of Land Management lands upstream from Zion NP during 2013 and 2014. Matching funds were provided by The Nature Conservancy, Kane County (Utah), and in-kind funds were provided by volunteers working on private lands coordinated by the Canyon Country Cooperative Weed Management Area.

Timothy Marsh (left) and Tarl Norman (right) controlling Russian olive on the East Fork of the Virgin River on BLM lands above Zion NP, Utah. NPS Photo.

Tarl Norman, LAKE EPMT Supervisor, spraying ravenna grass at Cottonwood Gulch, Glen Canyon NRA, UT. NPS Photo.

Program Highlights (cont.)

Early Weed Detection on the Colorado River Watershed

In the arid west many exotic plant species spread via waterways and river corridors by wind and floods. It is important to detect invasive exotic species before they become widespread throughout a watershed. For several years, the team has been involved in the control of three high priority exotic species that are not yet widespread along the Colorado River. Isolated patches of ravenna grass (*Tripidium ravennae* ssp. *ravennae* (L.) H. Scholz; commonly used synonym *Saccharum ravennae (*L.) L.) dominated a few remote drainages in Glen Canyon NRA and were beginning to establish elsewhere. For the past five years the Team has nearly eliminated this tall bunchgrass from these areas with funding provided by the Southwest EPMT. Thousands of Athel (*Tamarix aphylla* (L.) H. Karst.) tamarisk trees were establishing throughout the shorelines of Lake Mead NRA and up into the lower Grand Canyon. These large trees consume high amounts of water which is a very limited resource in the Southwest. A combination of funding and labor sources have been used to control these trees and save thousands of gallons of water. The Team is also working with Havasu National Wildlife Refuge to control a forest of Athel trees on the river. Fountain grass (*Cenchrus setaceus* (Forssk.) Morrone; commonly used synonym *Pennisetum setaceum* (Forssk.) Chiov.) is beginning to spread in the region and the Team has successfully controlled the largest wildland population in the watershed which was located on Lake Mohave. Working with the local park staff at Lake Mead NRA the fountain grass has been reduced from 35,000 individuals to around 1,000 in less than 10 years. The Team is also partnering with the US Fish and Wildlife Refuges and Bureau of Reclamation to control this bunch grass along the river in addition to assisting Joshua Tree NP with emerging populations infesting canyons in the park.

Summary of Accomplishments

In FY14 the Team conducted projects in 14 NPS Units, seven National Wildlife Refuges, three National Forests, three BLM Districts, one Bureau of Reclamation Region and Clark County, NV. The Team managed 60 different weed species including 4,560 acres inventoried, 81 total cover acres treated within 8,620 gross infested acres

Summary of Accomplishments (cont.)

From 2013 to 2014, the Team also controlled Russian olive and tamarisk at five different USFWS Refuges in New Mexico. This work was accomplished with the support of USFWS Invasive Species Strike Team funding.

Summarized Data for 2014

Measure	Acres
Treated	81
Inventoried/Monitored	4,560
Gross Infested Area	8,620
Net Infested Area	295
Youth Engagement	
Total Number of Youth Participants and Youth Employees	18
Total Hours for Youth Participants and Youth Employees	9,440

More Information

Curt Deuser
Lake Mead EPMT Liaison

601 NV Way
Boulder City, NV. 89005

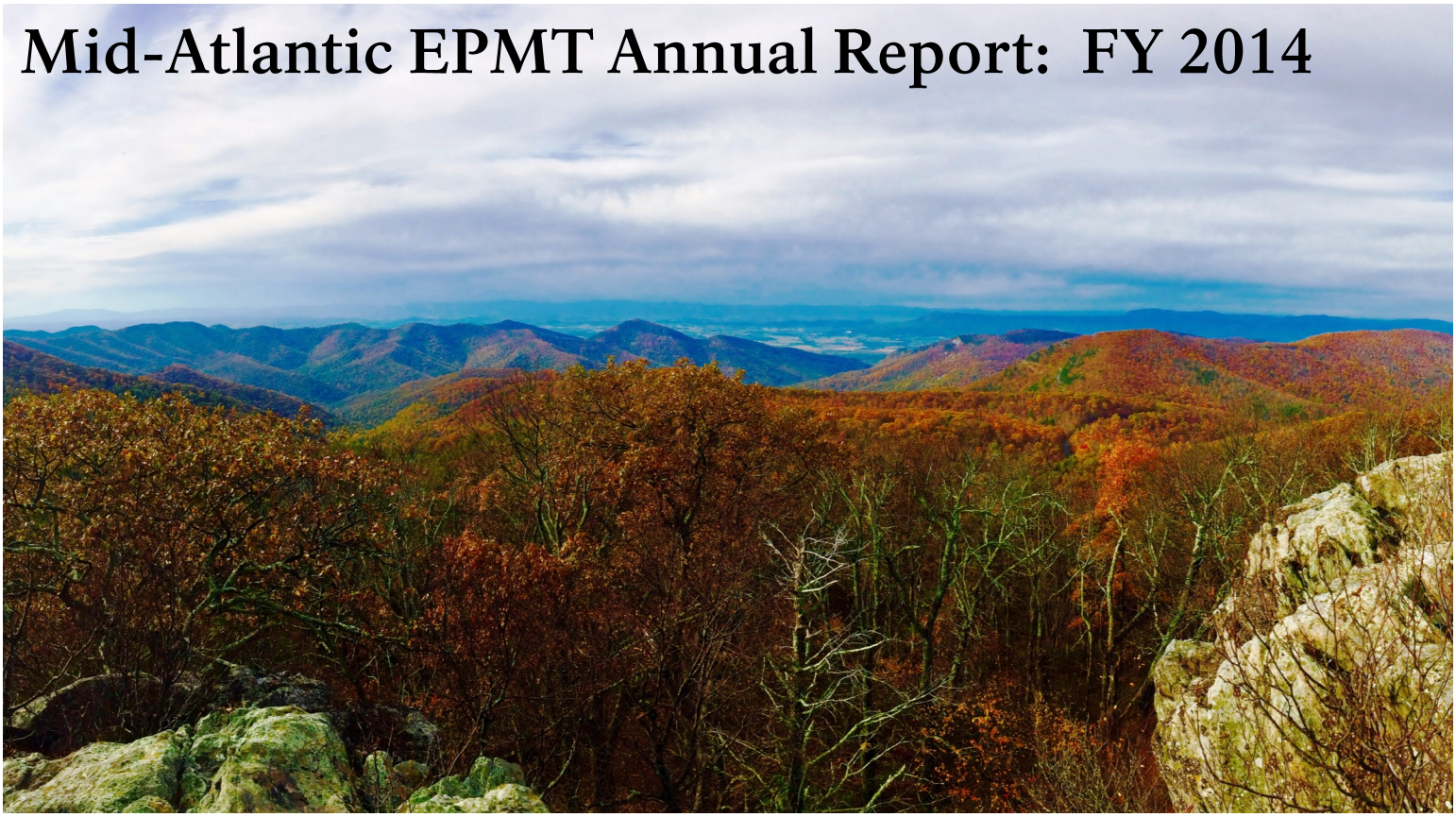
702-293-8979
curt_deuser@nps.gov

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

Mid-Atlantic EPMT Annual Report: FY 2014



Fall at Shenandoah National Park, Virginia. NPS Photo.

Background

The Mid-Atlantic EPMT (MA EPMT) is composed of two permanent staff members: a Liaison, and a Crew Leader. In addition to this, the EPMT hires two to three seasonal employees to make a team of a three to four person traveling crew. In 2014, the goals of the Team were to effectively monitor, survey, and control invasive plant species, and follow up with restoration activities where appropriate.

The Team serves Shenandoah National Park (host park); Eisenhower National Historic Park; Hopewell Furnace, Thomas Stone, and Hampton National Historic Sites; Appomattox Courthouse, Colonial, and Valley Forge National Historical Parks; Appalachian National Scenic Trail (APPA); Bluestone National Scenic River; Booker T. Washington and George Washington Birthplace National Monuments (GEWA); Gettysburg and Fredericksburg and Spotsylvania National Military Parks; Gauley River National Recreation Area; New River Gorge National River; Petersburg National Battlefield; and Richmond National Battlefield Park.

The Team uses an Integrated Pest Management approach where prevention, early detection, continued response, and the least-toxic methods of control are emphasized. Manual, cultural, chemical, and prescribed fire control methods are used in an integrated approach to gain the most effective control. The MA EPMT is reaching its goals by maintaining project continuity, training EPMT and partner park staff, and educating diverse audiences concerning the long-term mission of the EPMT.

Program Highlights

Wavyleaf basketgrass treatments at the Smithsonian Conservation Biology Institute

Wavyleaf basketgrass (*Oplismenus undulatifolius* (Ard.) P. Beauv.) was first reported from Maryland in 1996, and from Shenandoah National Park (SHEN) in 2005. In 2014 it was learned that wavyleaf basketgrass was present on the Smithsonian Conservation Biology Institute (SCBI) adjacent to both APPA and SHEN. The MA EPMT surveyed the infestation with staff from SCBI and the Virginia Department of Agriculture and Consumer Services. After determining the extent of the infestation and the proximity to APPA – literally across a fence – the Team consulted with APPA and all were in agreement that the SCBI infestation should be treated to prevent additional spread to APPA and beyond. The wavyleaf basketgrass was treated on August 19 and 20, 2014. During treatment, a small population was found, and treated, across the fence on APPA property. The MA EPMT will return next year for follow up treatments.

Wavyleaf basketgrass at the Smithsonian Conservation Biology Institute. Photo by Smithsonian Conservation Biology Institute.

MA-EPMT crew member releases mile-a-minute bio-control weevils near the Appalachian National Scenic Trail in Virginia. NPS Photo.

NPS staff and volunteers plant native cordgrass on the banks of the Potomac River at George Washington's Birthplace National Monument. NPS Photo.

Program Highlights (cont.)

Bio-control of the mile-a-minute vine at the Appalachian National Scenic Trail

The Team has been battling *Persicaria perfoliata* (L.) H. Gross (mile-a-minute vine) at multiple parks since the team's inception in 2002. One of the most significant areas where the plant has invaded is on a portion of APPA in northwestern Virginia. The infestation, covering twenty acres, has encroached upon a population of state-imperiled nodding trillium (*Trillium cernuum* L.). In collaboration with the state of Virginia Department of Agriculture and Consumer Services the MA EPMT released 3,000 mile-a-minute weevils (*Rhinoncomimus latipes* L.), these weevils are an NPS approved bio-control and were released at three sites along APPA closest to the nodding trillium populations. The weevil release was surveyed in the spring, summer, and fall of 2014. All three sites showed "medium" signs of weevil feeding activity and spread of the weevils to adjacent plants. Follow-up monitoring will continue next year. Research found that the most effective control method for mile-a-minute vine were threefold, by treating with a pre-emergent herbicide, release of the mile-a-minute weevil, and performing restoration at the site. The site was treated with a pre-emergent herbicide for three consecutive years, followed with the weevil release. The final phase of this project will be to restore the area with native plant species.

Summary of Accomplishments

In 2014, the seven member Team provided service to 16 of the 18 national parks in the MA EPMT network. In addition to this, the team also collaborated with the Northeast EPMT at three of their parks and with the National Capital Region EPMT at one of their parks while the Northeast and National Capital EPMTs collaborated at three and at one MA EPMT partner park respectively.

A National Park Foundation grant funded by Subaru supported a restoration project at GEWA on a spit of sand between the Potomac River and Pope's Creek. The MA EPMT planted a variety of grasses and shrubs with the help of GEWA 4-H, regular volunteers and staff members. This area had recently been controlled for common reed (*Phragmites australis* (Cav.) Trin. ex Steud). The MA EPMT will complete this project next year.

Summarized Data for 2014

Measure	Acres
Treated	228
Inventoried/Monitored	458
Gross Infested Area	3,312
Net Infested Area	412
Youth Engagement	
Total Number of Youth Participants and Youth Employees	343
Total Hours for Youth Participants and Youth Employees	2,301

Mile-a-minute bio-control weevils becoming aquatinted with their new surroundings near the Appalachian National Scenic Trail in Virginia. NPS Photo.

More Information

Brian Lockwood
Mid-Atlantic EPMT Liaison
540-999-3500 x 3496
Brian_Lockwood@nps.gov

Nathan Wender
Mid-Atlantic EPMT Crew Leader
540-999-3500 x 3498
Nathan_Wender@nps.gov

3655 U.S. Highway 211 East
Luray, VA 22835

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

National Capital Region EPMT Annual Report: FY 2014

The Potomac Gorge—protected by the Chesapeake & Ohio Canal National Historical Park and George Washington Memorial Parkway park units. NPS Photo.

Background

The National Capital Region Exotic Plant Management Team (NCR EPMT) supports parks from the center of 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: Assateague Island National Seashore, the Appalachian National Scenic Trail, the U.S. 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 works to:

1) preserve healthy habitats using Early Detection / Rapid Response to prevent invasive plant populations from establishing,
2) control invasive plants currently infesting ecologically sensitive areas, and
3) restore native habitats by removing exotic pest plants and re-establishing native plants and natural processes.

The NCR EPMT works closely with our 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

George Washington Memorial Parkway Cyclic Funding

Fiscal year 2014 was the first year that the National Capital Region set aside Cyclic Maintenance funds for use on natural resources projects. The George Washington Memorial Parkway secured funding for four projects using cyclic funds; the park asked the National Capital Region Exotic Plant Management Team to perform the work. Having the team perform the work allowed a close partnership with the park, ensured that NPS uniformed employees were performing the work, saved the park funds for the work performed and reduced the administrative burden on the park.

At one site, the NCR EPMT removed non-native plants threatening the conditions needed by the rare Virginia mallow (*Sida hermaphrodita* (L.) Rusby).

At a second site (Roaches Run) the Team treated a wide range of species across approximately 24 acres of forest. In particular, the NCR EPMT assisted the park on 9/11/2014 for a Day of Service event with the Student Conservation Association. Interior Secretary Sally Jewell asked to have an EPMT staff person work with her.

The National Capital Region Exotic Plant Management Team also worked at Great Falls Park and Dyke Marsh. The team covered approximately 152 acres combined in the four sites.

Park Staff and interns, Inventory & Monitoring staff, and volunteers learn to identify and map weeds. NPS Photo.

NCR EPMT member Aleksandra Voznitza with Department of the Interior Secretary Sally Jewell. Photo by Casey Cate.

Program Highlights (cont.)

Weed Scavenger Hunt

The National Capital Region Exotic Plant Management Team hosted our first ever weed scavenger hunt July 2nd at Great Falls, MD (Chesapeake & Ohio Canal National Historical Park).

The protected areas around Great Falls protect the Potomac Gorge—home to nationally-significant native plant communities. Because more than two million people live within a short drive of the Potomac Gorge the park gets many visitors, is surrounded by suburban development, and is affected by urban problems such as nitrogen deposition, heat island effect, and elevated white-tailed deer population. The combination of rare plant communities and environmental pressures presents an opportunity to protect the important resources of the area. One way to protect these resources is through the removal of invasive species.

Under sweltering conditions, roughly 25 volunteers and staff gathered about 500 weed occurrence records for the park. Participants used the Mid Atlantic Early Detection smart phone app to get data into the Early Detection & Distribution Mapping System online database (EDDMapS.org). These data will be used to prioritize future invasive plant control actions.

Summary of Accomplishments

The NCR EPMT started field work in March 2014 and continued into October. Thanks to collaborations with park and non-park partners the EPMT was able to cover 149 acres in 2014 (up from 99 treated and re-treated acres in 2013). Starting in June the crew size increased to seven or eight members for the rest of the season - allowing substantially more flexibility in completing tasks efficiently.

Outreach, partnerships, and a concerted focus lead to more mapped and treated populations of the NCR EPMT's Early Detection targets.

The Team's work will start up again in late February. The NCR EPMT looks forward to supporting parks in their cyclic funded-natural resources projects in the coming years.

Summarized Data for 2014

Measure	Acres
Treated	149
Inventoried/Monitored	0
Gross Infested Area	1790
Net Infested Area	149
Youth Engagement	
Total Number of Youth Participants and Youth Employees	31
Total Hours for Youth Participants and Youth Employees	6036

Casey Cate and Josh Rudder treat Japanese hop at Monocacy National Battlefield Gambrill Mill, Maryland. NPS Photo.

More Information

Mark Frey
National Capital Region EPMT Liaison
202-339-8317
mark_frey@nps.gov

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

Ryan Tietjen
National Capital Region EPMT Field Crew Leader
202-339-8319
ryan_tietjen@nps.gov

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

North Coast - Cascades Network Exotic Plant Management Team Annual Report: FY 2014

View of the Bailey Range from Hurricane Ridge, Olympic National Park. NPS Photo.

Background

From the open range of the Palouse prairie in Idaho and Washington to the high desert of eastern Oregon, along the creeks and rivers fed by the glacial North Cascades and Olympic mountains, and in the rainforests and remnant prairies of the northwest coast, the North Coast Cascades Network Exotic Plant Management Team (NCCN EPMT) provides professional invasive plant management services to its partner parks representing approximately 2.1 million acres of federal lands in the Pacific Northwest.

The Team focuses on fostering projects that assist with the restoration of degraded park resources, preventing the spread of non-native species into fragile wilderness areas, and expanding ecosystem-level partnerships to combat invasive plant species with other stakeholders. Crews perform work in a wide variety of environments from highway right-of-ways, agricultural fields, and reclaimed homesteads to coastal beaches, dynamic river valleys, and remote, mountainous wilderness environments. Projects range from Early-Detection, Rapid-Response (EDRR) scenarios to long-term, ecological restoration efforts. In addition to providing a skilled workforce for field work, EPMT staff also provide technical expertise and training for other stakeholders and work to foster cooperation among a diverse suite of land-management entities.

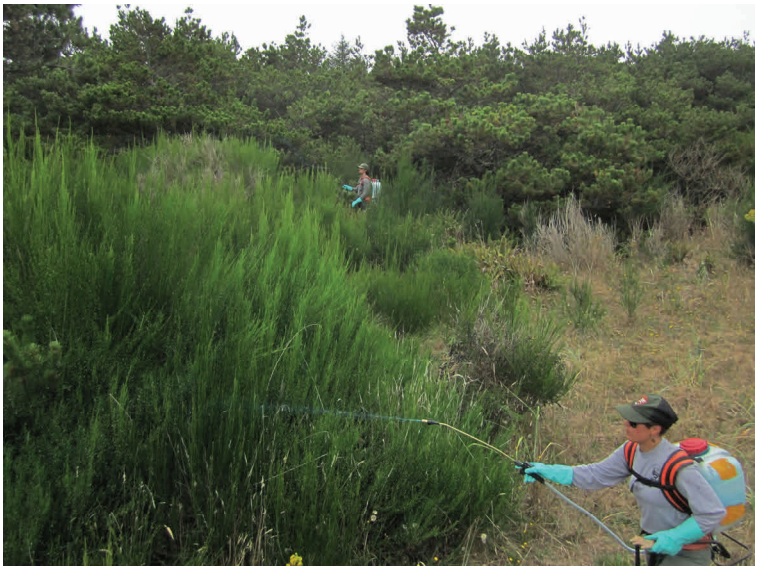
Program Highlights

Stehekin Valley Cheatgrass

The program continued to focus on reducing the impacts of invasive annual grasses in 2014. On the steep valley walls above the community of Stehekin, located in the Lake Chelan National Recreation Area / North Cascades National Park (NOCA), crews completed their third year of treatment on cheatgrass (*Bromus tectorum* L.) populations which expanded rapidly after the Rainbow Bridge wildfire in 2010. Monitoring conducted in conjunction with treatment efforts shows a significant reduction of cheatgrass and concomitant recovery of native vegetation after two years. The program anticipates that several more years of treatment will be necessary to bring cheatgrass populations under control.

EPMT treatments have been supported by contributions from NOCA staff and crews from the Washington Conservation Corps (WCC). Without these cooperative efforts, cheatgrass populations would quickly out-compete native species, resulting in more frequent wildfires that would not only threaten the native ecosystem, but also the residents of the Stehekin Valley.

Cheatgrass (*Bromus tectorum*) treatment in the Stehekin Valley of Lake Chelan National Recreation Area. Photo by Dan Campbell, NCCN-EPMT.



Treatment of Scotch broom (*Cytisus scoparius*) at Lewis and Clark National Historical Park. Photo by Dan Campbell, NCCN-EPMT.

Program Highlights (cont.)

Acquired Properties

Lewis and Clark National Historical Park (LEWI) has acquired formerly private lands that contain significant weed infestations. The Yeon Property spans 97 acres along the Pacific Coast of Oregon. EPMT, LEWI, and Student Conservation Association (SCA) staff continued a cooperative treatment of various invasive species: Scotch broom (*Cytisus scoparius* (L.) Link), spurge laurel (*Daphne laureola* L.), and English holly (*Ilex aquifolium* L.).

In addition to treating spurge laurel and English holly distributed throughout stands of shore pine (*Pinus contorta* Douglas ex Loudon), EPMT staff initiated treatments of Scotch broom infestations that are encroaching into the coastal dunegrass vegetation.

At Olympic National Park (OLYM), the team worked on treating both recent and historical acquisitions. Within the Quinault valley, work was performed to support the relatively-recent revegetation efforts of OLYM staff. In contrast, the team continued it's treatment of weed populations within former homesteads of the Queets valley. Past land-use, logistical considerations, and the vagaries of temperate -rainforest weather, posed unique challenges to treating sites in both valleys.

Summary of Accomplishments

The NCCN EPMT continued to assist its park partners in meeting management goals, forging new partnerships, and strengthening old ones. One such partnership was developed with the Quinault Indian Nation and Olympic National Forest to address cross-boundary infestations on the Olympic Peninsula of Washington state, setting the stage for work in fiscal year 2015. Through coordination with partner parks, and state and county agencies, the team was able to treat a suite of 25 species throughout eight NPS units in Washington and Oregon. The team continued it's yearly treatment of invasive weed populations in developed areas, agricultural fields, frequently-disturbed parklands, and remote wilderness areas and worked to promote science-based weed management efforts throughout the Pacific Northwest.

Summarized Data for 2014

Measure	Acres
Treated	59
Inventoried/Monitored	157
Gross Infested Area	2,580
Net Infested Area	1
Youth Engagement	
Total Number of Youth Participants and Youth Employees	19
Total Hours for Youth Participants and Youth Employees	1,600

Reed canarygrass (*Phalaris arundinacea* L.) treatment at Ross Lake NRA. NPS Photo.

More Information

Dan Campbell **360-565-3076**
North Coast-Cascades Network EPMT Acting Liaison, Data Manager **dan_campbell@nps.gov**

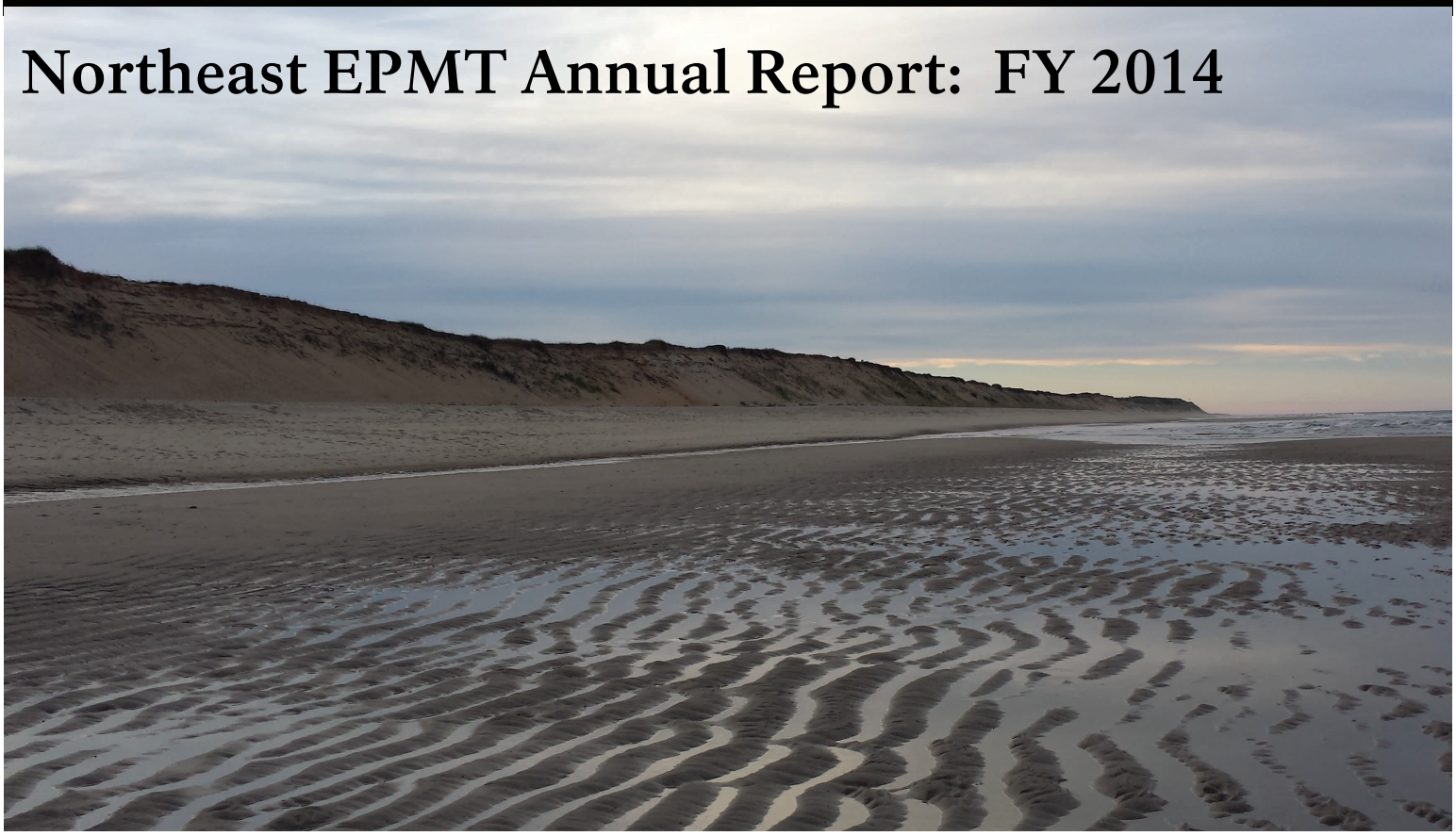
Olympic National Park
600 E Park Ave
Port Angeles, WA 98362

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

Northeast EPMT Annual Report: FY 2014



Low tide in late afternoon at Marconi Beach, Cape Cod National Seashore. NPS Photo.

Background

The Northeast Exotic Plant Management Team (EPMT or Team), stationed at Delaware Water Gap National Recreation Area, has been serving 25 parks in the northern portion of the National Park Service's Northeast Region (NER) since August 2003. The parks encompass over 335,000 acres and are located in eight states, from Pennsylvania to Maine. Generally, the Team visits nine to twelve parks annually but the number varies depending on park and regional priorities coupled with available resources.

The Team provides a broad range of services to its partner parks, including on-site control work, inventory and monitoring, technical advice and training, outreach, assistance with revegetation/restoration, partnerships, compliance, short and long term planning, and early detection of new species coupled with rapid response to control them before the infestation can spread.

The Team is small and sets priorities to ensure efficient, effective, and strategic use of resources. Early Detection and Rapid Response (EDRR) is an important tool, enabling the Team to control new occurrences of invasive plants before they become well established. Beyond EDRR, the Team concentrates on projects that are feasible, will have measurable effects at high-priority sites, and can be reasonably maintained by the park and/or its partners over time.

The Northeast EPMT, in partnership with the Mid-Atlantic EPMT which serves parks in the southern portion of the Region, provides leadership in invasive plant planning and management for NER parks.

Program Highlights

Hurricane Sandy's Legacy and EDRR

Since Hurricane Sandy hit the northeast in 2012, the Northeast EPMT's coastal partner parks that were in the path of Hurricane Sandy have kept close watch for the arrival of new invasive plant species as well as the spread of existing infestations. Park efforts, supplemented by input and on the ground assistance from the Team, have been rewarded by early discovery of new patches of some challenging species to treat. New patches of Japanese sedge (*Carex kobomugi* Ohwi), which has become a major problem in dune areas along the coast, was among these finds. The watch for new species and discovery of new infestations continues two years after Hurricane Sandy impacted the coast.

At Fire Island National Seashore, impacts of Hurricane Sandy included breaching of the dunes by storm surge on the ocean side of the island. In fiscal year 2014, the Team surveyed several miles of coastline and mapped the locations of new species and new infestations. In many cases, these occurrences can be controlled manually which is one of the rewards of Early Detection followed closely by control efforts (Rapid Response).

NE EPMT crew trek miles along Atlantic Ocean side of Fire Island looking for Early Detection species in dune washouts caused by Hurricane Sandy. NPS Photo.

Mid-Atlantic EPMT crew treat brown knapweed infestation at Saratoga National Historical Park, a Northeast EPMT partner park. NPS Photo.

Program Highlights (cont.)

Northeast Region EPMTs Join Forces and Future Strategies

In fiscal year 2014, the two Northeast Region EPMTs came together to work collaboratively at six parks. The Mid-Atlantic and Northeast EPMTs had worked together only once before. Parks and Teams both benefited from this collaborative effort. Bringing the two teams together provided more resources to the parks, such as a much larger crew, additional equipment and broader experience. Advantages for the both EPMTs included opportunities to compare practices, tools, control techniques, monitoring protocols, assessment of treatment efficacy, and herbicides used to treat a variety of species.

As constraints in resources, funding and staff continue, new strategies for providing greater impact on invasive plant populations over much longer time periods will be necessary. This means taking a regional as well as park view of the challenges, setting program priorities via evolving standards and focusing both Northeast and Mid-Atlantic EPMTs' staff, equipment and expertise on highly ranked projects. Combining this priority setting process with more intensive training of staff, seasonal employees and interns at parks where high priority sites are located is crucial. With trained park personnel managing these significant sites, the Teams can extend their efforts to other sites and parks in the region. Fiscal year 2014 heralds a more closely coordinated partnership between the Teams.

Summary of Accomplishments

The increase in early detection work at many parks, in part due to Hurricane Sandy, is heartening and a trend we continue to encourage. Although the Northeast EPMT might appear to be the obvious rapid responder to new invasive plant occurrences, through the parks' early detection work, plants are often discovered early enough in the infestation process that the EPMT is only needed for technical advice and guidance. Since infestations are generally small and not well established, trained park staff are able to address them.

The EPMT is working with the regional Inventory & Monitoring (I&M) Networks which have developed protocols for early detection monitoring. I&M Networks periodically update parks' lists of species identified for early detection. Some parks are developing their own protocols to increase the effectiveness of their searches for new species and infestations. The EPMT plans to work with some of these parks to test their protocols. Promoting effective early detection work and developing appropriate rapid response mechanisms is an imperative for the NE EPMT and the Northeast Region.

Summary of Accomplishments

Summarized Data for 2014

Measure	Acres
Treated	83
Inventoried/Monitored	416
Gross Infested Area	860
Net Infested Area	88
Youth Engagement	
Total Number of Youth Participants and Youth Employees	2
Total Hours for Youth Participants and Youth Employees	1,412

More Information

Betsy Lyman
Northeast EPMT Liaison
570-588-0513
betsy_lyman@nps.gov

Delaware Water Gap NRA
1978 River Road
Bushkill, PA 18324

Brian McDonnell
Northeast EPMT Team Leader
570-588-0534
brian_mcdonnell@nps.gov

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

Northern Great Plains EPMT Annual Report: FY 2014

Yellow sweet clover in Theodore Roosevelt National Park. 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 regions. The goal of the NGP EPMT is to help parks preserve native plant communities or historic landscapes by managing the spread of exotic invasive species. Where sites have been disturbed by activities such as road construction, the NGP EPMT will work with park personnel to restore vegetation to native or another desired condition. The area served by the NGP EPMT is large, approximately 452,000 park unit acres, and the ecology is diverse. Vast grasslands are found in some parks, others are part of the forested Black Hills, and others include parts of the Missouri, Niobrara or Knife River watersheds. Integrated Pest Management (IPM) strategies including chemical, biological, manual, and cultural methods are used to manage exotic and invasive plants. Education and training in IPM are also NGP EPMT priorities. Nearly every 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 fiscal year 2014, NGP EPMT members worked at eleven of the partner parks in the network. The Montana Conservation Corps and Minnesota Conservation Corps worked at five park units to increase capacity and efficiency of operations.

Background (cont.)

Working with these Public Land Corps programs provides opportunities for youth to engage in important and substantive work to further the NPS mission.

Program Highlights

Aerial Application at Theodore Roosevelt National Park

Since the 1990's, aerial application of herbicides utilizing helicopters has been conducted at Theodore Roosevelt National Park. The primary target of this application method continues to be leafy spurge (*Euphorbia esula* L.). Although a robust annual spraying program continues in high priority areas within both units of the park, the decrease in leafy spurge density has been striking over the past 10 years. Shawn Morten of Dakota Helicopters (a long time contractor to the park and program) stated, "It's a night and day difference between when we started and how the park looks this year, the program has been very effective in reducing leafy spurge abundance." The NGP EPMT has now added Canada thistle (*Cirsium arvense* (L.) Scop.) to the list of species treated by aerial application. Although the EPMT will remain vigilant against leafy spurge, the reduction has allowed the NGP EPMT to diversify its treatment program and target other problematic species.

Helicopter Spraying at Theodore Roosevelt National Park. NPS Photo.

Montana Conservation Corps, Badlands NP and Northern Great Plains EPMT treating Canada thistle in the Sage Creek Wilderness of Badlands NP. NPS Photo.

Program Highlights (cont.)

Public Land Corps - Sage Creek Wilderness at Badlands National Park

Badlands National Park in conjunction with NGP EPMT partnered with Public Land Corps groups to assist EPMT and park-based field crews in treating Canada thistle in the Sage Creek Wilderness. The Wilderness designation poses some logistical challenges that require a larger crew than the park or EPMT could provide. Working with the Montana Conservation Corps as well as the Minnesota Conservation Corps allowed treatment of many more acres of Canada thistle than would have been possible with the park and EPMT seasonal crews alone.

The wooded draws in the Sage Creek Wilderness are a unique resource at Badlands National Park. Treating problematic invasive species such as Canada thistle will allow the wooded draws to maintain ecological function without the need for active restoration.

In fiscal year 2014, engaging youth in protecting natural resources was an EPMT priority. This project demonstrates the benefits of employing youth to work in our national parks. Through this work, Conservation Corps crew members gained an understanding of the complexities associated with active management of natural resources in wilderness areas. The EPMT will continue to partner with youth organizations in the future and hopes to expand opportunities for youth to include other natural resource disciplines in the partner parks.

Summary of Accomplishments

The Northern Great Plains experienced high precipitation in 2014. This resulted in an abundance of invasive species such as leafy spurge, Canada thistle and yellow sweet-clover (*Melilotus officinalis* (L.) Lam.) and required continuing treatment work at 11 of the NG EPMT's partner parks. The EPMT also partnered with five parks using Public Land Corps funds to incorporate the Montana and Minnesota Conservation Corps into the Team's treatment work at those parks. Helicopter operations were continued in high priority areas at Theodore Roosevelt National Park. The EPMT also continued work with Colorado State University, local ranchers and Agate Fossil Beds National Monument on the Niobrara River researching control and treatment options for yellow flag iris (*Iris pseudacorus* L.).

Summary of Accomplishments (cont.)

The NG EPMT's native plant materials development project with the Natural Resources Conservation Service Plant Materials Center in Bismark, ND was successful. More species will be added in the coming year to support the Team's restoration efforts.

Summarized Data for 2014

Measure	Acres
Treated	260
Inventoried/Monitored	8,885
Gross Infested Area	3,263
Net Infested Area	254
Youth Engagement	
Total Number of Youth Participants and Youth Employees	40
Total Hours for Youth Participants and Youth Employees	4,050

More Information

Brennan Hauk
Northern Great Plains EPMT Liaison
605-341-2801
brennan_hauk@nps.gov

Northern Great Plains I&M Data Management Team
Angela Jarding
&
Stephen Wilson
605-341-2809
angela_jarding@nps.gov
605-341-2804
stephen_wilson@nps.gov

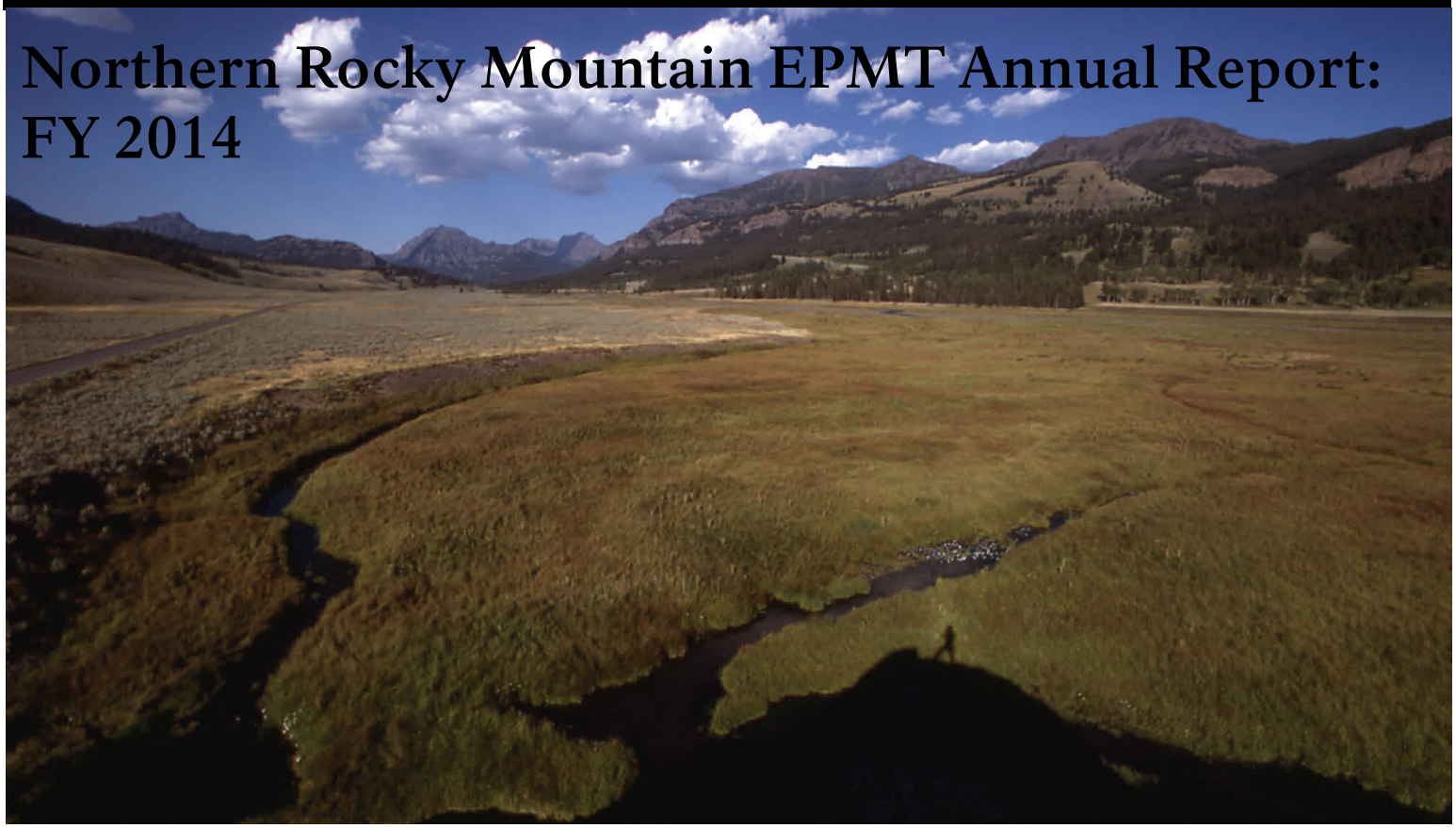
231 E St Joseph St
Rapid City, SD 57701

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

Northern Rocky Mountain EPMT Annual Report: FY 2014



Mountains and valleys of the Northern Rocky Mountain Region. NPS Photo.

Background

The Northern Rocky Mountain Region of the U.S. is a vast and diverse landscape encompassing high and low elevation sagebrush steppe, forests, sub-alpine meadows, and wetland and riparian areas. The Northern Rocky Mountain Exotic Plant Management Team (NRM EPMT) serves seventeen parks across this region that comprise more than four and a half million acres spread across Colorado, Idaho, Montana, Utah, and Wyoming. However, many parks are relatively small (median size is 14,464 acres) and many lack resource management staff to address even their highest priority invasive species. The NRM EPMT is currently a nine-person crew strategically divided into three small crews based at larger parks throughout the network and all partner parks receive work annually. Since its inception in 2003, the NRM EPMT has assisted its partner parks with protecting and improving the health of native habitats in these diverse landscapes. NRM EPMT's program goals emphasize the systematic, long-term management and control of invasive plant species. Much of the effort is focused on controlling state listed noxious weeds, as well as providing rapid response to new invaders. NRM EPMT employs scientifically-based integrated pest management so that its actions on the ground are effective, efficient and safe for the public and the environment.

Program Highlights

Woad Be Gone, Eradicating an Isolated Invader

In June 2007, isolated patches of Dyer's woad (*Isatis tinctoria* L.) were discovered in southern portions of Craters of the Moon National Monument and Preserve (CRMO) in southern Idaho. Dyer's woad is a short-lived perennial species in the mustard family and is listed as a noxious weed in the state. Nearest infestations are over 40 miles away so CRMO's annual management objective has been to prevent all plants from going to seed with a long term goal of local eradication. To date, 300 infestations, ranging from one-tenth to two acres in size, have been mapped on foot and by helicopter. The NRM EPMT crew treat these patches annually from mid-May to mid-June. In 2014, park and NRM EPMT staff used backpack sprayers and remote water caches to treat all infested acres. Late season treatments required manual control resulting in the double bagging and removal of several thousand plants. In total, over 77% of sites treated in 2014 were reduced from 2013 levels and some sites have shown dramatic reductions in just a few years of treatment. Moreover, Dyer's woad density has been reduced to one-tenth of its highest amount measured in 2009. With persistence and continued commitment by the park and the NRM EPMT, Dyer's woad can in fact "be gone" from CRMO's remote and unique lava landscape.

NRM EPMT crew members chemically treating Canada thistle along the Sun Road in Glacier National Park. NPS Photo.

Group photo of those involved in the Greater Yellowstone Area Coordinating Committee weed event in Yellowstone National Park. NPS Photo.

Program Highlights (cont.)

Invasive Plant Control by Committee: A Greater Yellowstone Area Spray Event

From August 5th through 7th, 2014, 65 invasive plant specialists from the Greater Yellowstone Area (GYA) gathered to treat noxious weeds. This was part of an annual cooperative weed treatment event sponsored by the long standing Greater Yellowstone Coordinating Committee (GYCC). Participants came from a three-state area, representing various county and federal government agencies including Yellowstone National Park (NP), the NRM EPMT, Teton and Park Counties, and Gallatin National Forest, non-profit groups, and private land owners. Almost 450 acres of Yellowstone NP was treated primarily for spotted knapweed (*Centaurea stoebe* L.), houndstongue (*Cynoglossum officinale* L.), and Dalmatian toadflax (*Linaria dalmatica* (L.) Mill.). These are high priority noxious weeds in the GYA. Through this event, these patches were treated in one coordinated and intensive effort, allowing Yellowstone NP staff to redirect invasive plant control efforts into more remote areas. Events such as this increase cooperation, provide educational opportunities and enhance the effectiveness of treatments, a goal of managers striving to treat invasive vegetation in a comprehensive manner.

Summary of Accomplishments

Fiscal year 2014 was a transition year for the Northern Rocky Mountain EPMT as the program welcomed a new liaison in August. Nevertheless, NRM EPMT field leads again relied on other staff continuity and the program's growing season dichotomy, working at southern parks in Utah and Idaho in the early season and northern parks in Wyoming and Montana late into the summer. The NRM EPMT made significant headway in all partner parks as nearly 720 acres were treated mainly by chemical means. A total of 34 species were addressed. More acres of yellow toadflax (*Linaria vulgaris* Mill.) were treated by the NRM EPMT than any other species (73 acres); Canada thistle (*Cirsium arvense* L.) was the most commonly treated species among NRM EPMT parks (10 parks).

Overall, the NRM EPMT continues to strike a balance between contributing to long-term, large-scale control and removal of early

Summary of Accomplishments (cont.)

detection species and eradication of nascent populations. Open and effective communication and agency partnerships are cornerstones of the NRM EPMT. Both help ensure that the team works as efficiently as possible to balance these needs.

Summarized Data for 2014

Measure	Acres
Treated	720
Inventoried/Monitored	0
Gross Infested Area	40,879
Net Infested Area	720
Youth Engagement	
Total Number of Youth Participants and Youth Employees	7
Total Hours for Youth Participants and Youth Employees	1,970

More Information

Steven Bekedam — **307-344-2185**
Northern Rocky Mountain EPMT Liaison — **steven_bekedam@nps.gov**
P.O. Box 168
Yellowstone National Park
Yellowstone, WY 82190

Gary Ludwig — **406-250-3928**
Northern Rocky Mountain EPMT Crew Leader — **gary_ludwig@nps.gov**
Glacier National Park
West Glacier, MT 59936

Northern Rocky Mountain EPMT Crew Co-Leaders — **307-344-2456**
Mickey Pierce — **mickey_pierce@nps.gov**
&
Andrew Ringholz — **andrew_ringholz@nps.gov**
P.O. Box 168
Yellowstone National Park
Yellowstone, WY 82190

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

Pacific Islands EPMT Annual Report: FY 2014

View of Haleakalā Crater from 8,000 feet elevation down to the Pacific Ocean, Haleakalā National Park. NPS Photo.

Background

From sea level to nearly 14,000 feet elevation, Hawaii's National Parks protect some of the most iconic landscapes and unique ecosystems remaining in America. Invasive plants threaten the diversity in what has been called the "Endangered Species Capital of the World." The Pacific Islands Exotic Plant Management Team (PI EPMT) utilizes dynamic partnerships to leverage effort and increase efficiencies to preserve six National Parks in Hawaii. Professional crews integrate proven invasive plant management strategies while continuously pursuing innovations that add efficiencies and effectiveness.

Island ecosystems are characterized by high levels of endemism, and are also notable for rampant invasion by non-native plants and animals. Hawaii is no exception. In Hawaii Volcanoes National Park alone, over 75% of plant species are alien. Nearly 140 of these species are considered problematic, and interdiction efforts are either active or under consideration. The most destructive invaders are often widespread, and control focuses in areas of high natural value. The EPMT continues to control invasive plants in priority areas, sometimes even expanding protected areas. A complementary strategy to protecting the highest value areas is to aggressively respond to incipient invasions, eradicating these prior to spread, thereby preventing more widespread infestations. The Team supports parks with critical detection, taxonomic identification, and control expertise. The severity and extent of alien plant invasions in the Hawaiian National Parks underscores the importance of EPMT efforts here.

Program Highlights

Continued Cooperation to Leverage Success and Increase Multi-Agency Efficiency and Effectiveness

Pampas grass (*Cortaderia* spp. Stapf) is a large, tussock-forming grass native to South America. Two species have proven to be aggressive invaders in natural areas of California, New Zealand, and South Africa. Distribution data in Hawaii shows that pampas grass has invaded numerous alpine, subalpine, bogs, and rain forest areas in East and West Maui, thereby threatening National Park Units. It has been detected and controlled in Haleakalā National Park and surrounding lands. It is also problematic in residential areas on the slopes of Haleakalā. If left unmanaged, it will displace irreplaceable ecosystems. Through collective efforts of the Maui Invasive Species Committee, the EPMT and other partners, pampas grass removal has been highly effective. Collaborative activities include joint ground and aerial surveys, ongoing communication about operations, and data sharing. During 2014, over 1,500 plants were removed from 16,902 surveyed acres. Of those plants, 369 were sexually mature. While the number of immature plants and acres surveyed were comparable in 2013, the number of mature plants has plummeted by more than half in 2014. Additionally, ground efforts over the past five years have resulted in a steady decline of 47 percent on average of detected plants. The Team and its partners provide valuable specialized assistance to Pacific Island Parks, protecting them from weed invasions.

An EPMT sawyer preparing for a hot day controlling woody invasive plants at Pu'u Honua O Honaunau NHP. Big Island of Hawaii. NPS Photo.

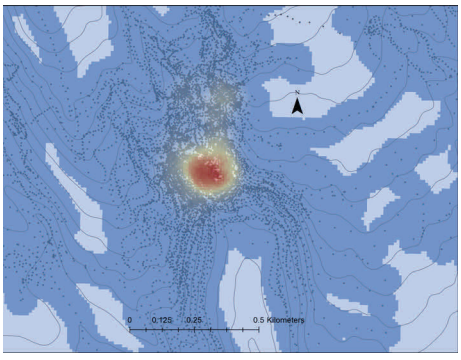
An NPS sawyer clearing invasive mesquite to prepare site for future native plant and cultural resources restoration. NPS Photo.

Program Highlights (cont.)

Success of Applied Research, Partnership, and Innovation
Herbicide Ballistic Technology (HBT) is a novel, innovative pest management system developed by the University of Hawaii (UH) in partnership with PI EPMT, County, State, and Island Invasive Species Committees. The method has been approved by the US Environmental Protection Agency (EPA). It is used for surgically treating outlier infestations of the uniquely invasive, ecosystem displacing plant species *Miconia calvescens. HBT* uses highly precise pneumatically propelled capsules. Miconia is colonizing remote parts of the almost 130,000 acre East Maui Watershed (EMW), directly threatening the ecological integrity of Haleakalā National Park (HALE). Since being registered in 2012, the EPMT and UH have collaborated on over 60 HBT missions; dispatching more than 11,000 incipient target plants; protecting over 17,000 acres of the EMW (~13% of the entire watershed) in less than 400 hours of helicopter flight time to protect Haleakalā National Park. Over this time period, we've measured an 83% improvement (reduction) in operational cost efficiency, and herbicide use reduction down to 0.26% of allowable rates. Our peer-reviewed study on the operational use of this new technology was recently recognized by the Weed Science Society of America as the 2014 Outstanding Paper in the journal Invasive Plant Science and Management. Continued refinement of the method is anticipated.

Summary of Accomplishments

With many invasive plant problems in Hawaii, the most significant challenge is access to nascent outlier populations in extreme, remote landscapes. This graphic depicts the arduous task of helicopter operations (blue dots represent flight lines) containing an outlier infestation in red on a mountain wall with over 70° slope and a 400 foot drop-off.



Helicopter flight lines (blue dots) surrounding outlier infestation (red) on a mountain wall. NPS Photo.

Summarized Data for 2014

Measure	Acres
Treated	510
Inventoried/Monitored	55,304
Gross Infested Area	44,625
Net Infested Area	500
Youth Engagement	
Total Number of Youth Participants and Youth Employees	216
Total Hours for Youth Participants and Youth Employees	5,501

More Information

Terrain and remote operations require extensive helicopter use. NPS Photo.

Jeremy Gooding
Pacific Islands EPMT Liaison
PO Box 369
Makawao, HI 96768
808-281-1542
jeremy_gooding@nps.gov

David Benitez
Pacific Islands EPMT Ecologist
PO Box 52
Hawaii National Park, HI 96718
808-985-6085
david_benitez@nps.gov

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

Southeast EPMT Annual Report: FY 2014

Removing tree-of-heaven (*Ailanthus altissima*) from cliff faces at Cumberland Gap National Historic Park, Middlesboro, KY. NPS Photo.

Background

The Southeast Exotic Plant Management Team (SE EPMT) has been assisting 20 national park units in Kentucky, Tennessee, Virginia, North Carolina, South Carolina, Alabama, and Georgia since the spring of 2004. From inception, the team has been based in Asheville, North Carolina at the Blue Ridge Parkway. The partner parks served by the SE EPMT encompass over 500,000 acres and lay primarily in the Piedmont, Appalachian Highlands and Cumberland Plateau physiographic provinces of the southeast US. All are located within the NPS Appalachian Highlands and the Cumberland Piedmont Inventory and Monitoring Networks.

In 2014, the SE EPMT continued to assist partner parks in the inventory of invasive plants, identification of priority treatment species, and implementation of control measures. An Integrated Pest Management approach to control provides the framework for all management strategies employed by the Team. Mechanical and chemical control methods used separately and in combination, are the most common control techniques. Currently, parks served by the SE EPMT do not utilize biological controls for invasive plant management.

The invasive plant species of primary concern for the SE EPMT are those that thrive in disturbed habitats or that can readily adapt to low light and moisture extremes. These include Chinese privet (*Ligustrum sinense* Lour.), multiflora rose (*Rosa multiflora* Thunb.), tree-of-heaven (*Ailanthus altissima* (Mill.) Swingle), princess tree (*Paulownia tomentosa* (Thunb.) Steud.), mimosa (*Albizia julibrissin* Durazz) and autumn olive (*Elaeagnus umbellate* Thunb.) in open disturbed sites

Background (cont.)

and Nepal grass (*Microstegium vimineum* (Trin.) A. Camus), garlic mustard (*Allaria petiolata* (M. Bieb.) Cavara & Grande) and Japanese honeysuckle (*Lonicera japonica* Thunb.) in closed canopy woodlands. Although a total of 32 invasive, exotic plant species were treated by the SE EPMT in 2014, those listed above account for more than 75% of the area treated.

Program Highlights

SE EPMT Early Detection/Rapid Response Efforts

During 2014 the implementation of Early Detection/Rapid Response protocols for our partner parks continued to be a major focus of the team. This included a review and update of the EDRR plant lists of possible new invasive species for each park. Technical assistance was provided in the form of identification information, probable pathways and treatment protocols. A major emphasis continues to be placed on prevention strategies including protocols for the movement of equipment and/or personnel within and outside of park boundaries. The Team will continue to integrate prevention and control in all NPS division operations to develop effective strategies to avoid the introduction of new exotic plant species and limit the spread of species already present. Cross training between the SE EPMT and other park divisions continued throughout this year including safe power tool operations and exotic plant control

ATV Safe Operations Certification class for SE EPMT staff and partner park personnel. NPS Photo.

Treating Chinese privet (Ligustrum sinense) seedlings from battlefield restoration area at Cowpens National Historic Site, Gaffney, SC. NPS Photo.

Program Highlights (cont.)

SE EPMT Early Detection/Rapid Response Efforts (cont.)

techniques as well as ATV Safety Institute certified training, clean vehicle and equipment transport, safe and effective herbicide use and plant identification.

Building Partnerships

As in previous years, the SE EPMT sought to develop partnerships that improve control efficiency and provide training opportunities for park staff and adjoining land managers. Invasive plant identification and control methods training programs were held for park staff at Cowpens National Battlefield (SC), Kings Mountain National Military Park (SC), and Fort Donelson National Battlefield (TN). Other partners the SE EPMT has continued to work with include the US Forest Service; Tennessee, North Carolina, and Southeast Exotic Pest Plant Councils; The Nature Conservancy; and the Student Conservation Association (SCA), and American Conservation Experience (ACE). Working with the SCA and ACE enables the SE EPMT to continue providing youth (25 years or younger) experience and training opportunities in natural resource management. This is accomplished while enhancing the visitor experience by protecting and reestablishing native vegetation in remote as well as high visibility, high use areas within our partner parks. Developing partnerships and educational opportunities continue to be key components of the success of the SE EPMT in invasive, exotic plant management.

Summary of Accomplishments

The primary highlight for the SE-EPMT in 2014 was the completion of another field season with no lost time due to accident or injury. In addition, support and active engagement from our partner parks continued to increase. In 2014, partner parks contributions of field staff totaled more than 400 hours. This, and other assistance from our partner parks, translates into more than $7,500 in in-kind contributions. Through this combined effort, the team was able to enhance and protect more than 147 acres containing sensitive biological and cultural resources in 16 of our partner parks. Equally important, more than 450 acres were inventoried for early detection of invasive, exotic plants further insuring that the unique resources of each park remain intact.

Summarized Data for 2014

Measure (Results below calculated from APCAM, previous EPMT Program Database no longer in use by program)	**Acres**
Treated	147
Inventoried/Monitored	0
Gross Infested Area	2,074
Net Infested Area	156
Youth Engagement	
Total Number of Youth Participants and Youth Employees	11
Total Hours for Youth Participants and Youth Employees	5,930

Treating and mapping newly acquired lands, Fern Lake, Cumberland Gap National Historic Park, Middlesboro, KY. NPS Photo.

More Information

Nancy Dagley
Southeast EPMT Liaison

67 Ranger Drive
Asheville, NC 28805

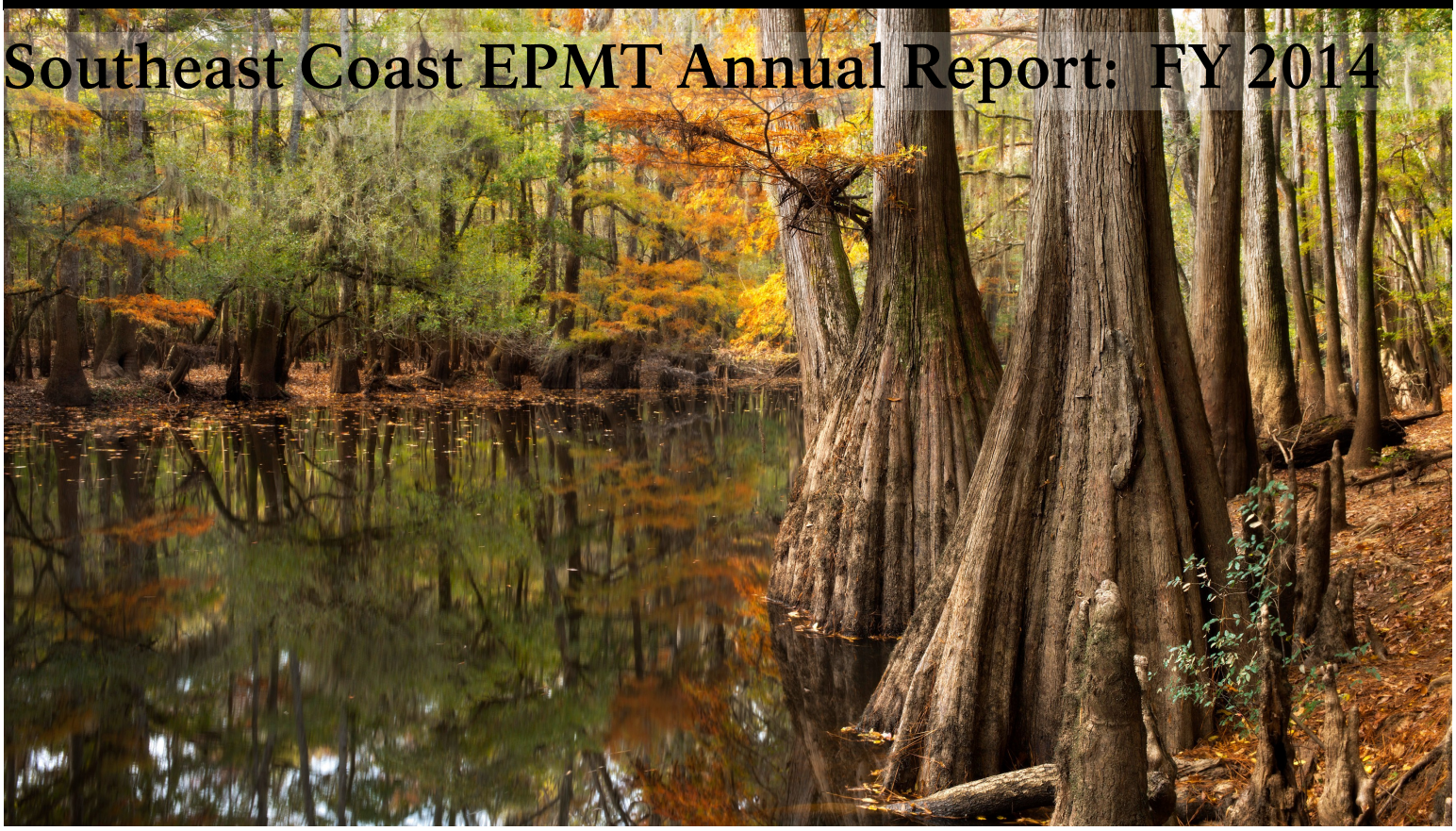
828-407-5651
Nancy_Dagley@nps.gov

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

Southeast Coast EPMT Annual Report: FY 2014



The wilderness of Congaree National Park where the Southeast Coast EPMT is based for operations. NPS Photo/jt-fineart.com.

Background

The Southeast Coast Exotic Plant Management Team (SEC EPMT) serves 15 park units in the Carolinas, Georgia, and Alabama. Network parks range from protected seashores and forested wilderness to urban recreational areas and preserved cultural landscapes (e.g., Revolutionary and Civil War forts and battlegrounds). The SEC EPMT is stationed at Congaree National Park, which encompasses one of the last remnants of intact old growth bottomland forest and designated wilderness. The team began as a pilot project in 2005, and unlike most EPMTs, was permanently funded through two base increases to Congaree's operating budget in 2009 and 2010. Although funded differently, the SEC EPMT goals for invasive plant management are similar to the National EPMT Program. In fiscal year 2014, the SEC EPMT was led by Lauren Serra (Liaison) and Amorita Brackett (Field Crew Leader). The crew was comprised of three Student Conservation Association (SCA) Americorps Direct youth interns. The SEC EPMT received field assistance from volunteers while working on projects at network parks at Chattahoochee National Recreation Area (CHAT) and Kennesaw Mountain National Battlefield Park (KEMO). Staff hours, housing, travel per diem, supplies, equipment, and training contributions from network parks, the Southeast Regional Office (SERO), and the Biological Resources Division (BRD) provided critical support for the SEC EPMT's travel in this challenging budget year.

Program Highlights

Phragmites australis Treatments

Cape Lookout National Seashore: The SEC EPMT returned to Cape Lookout National Seashore (CALO) this year after a seven year absence. CALO staff and volunteers attended the SEC EPMT's training on the appropriate and safe use of herbicides, and then worked alongside the SEC EPMT to treat the *Phragmites australis* (Cav.) Trin. ex Steud. that was threatening the nesting habitat for threatened and endangered bird species on the island. Within the treatment season, CALO staff retreated the area, conducting the follow-up work that is necessary to get this species under control. CALO understands this project will be ongoing for the next several years and has provided a staff member with a pesticide applicator's license. CALO provided funding and substantial logistical support for this work, including ferry service to transport the team and work truck to and from the island.

Cape Hatteras National Seashore: The SEC EPMT also treated *Phragmites* at Cape Hatteras National Seashore (CAHA) this year and was impressed at the follow-up maintenance work being done by park staff to retreat SEC EPMT work areas. After three seasons of multi-year treatments, a wetland at Cape Point has become dominated by native species and is approaching a controlled state. CAHA's efforts allowed the SEC EPMT to treat a new *Phragmites* infestation that has invaded along the Main Park Road.

A staff member at Cape Hatteras National Seashore works alongside the SEC EPMT treating *Phragmites australis.* NPS Photo.

SEC EPMT, FLC EPMT, and SERO staff join forces to treat *Panicum repens* at Gulf Islands National Seashore. NPS Photo.

Program Highlights (cont.)

Collaboration

Among EPMTs: The SEC EPMT had the opportunity to work with the Florida Caribbean EPMT (FLC EPMT) at Gulf Islands National Seashore (GUIS), a FLC EPMT network park. Both teams were joined by SERO's Chief of IPM, Invasives, and EPMT Programs, Chris Furqueron, who worked alongside the teams treating torpedograss (*Panicum repens* L.). This was a unique opportunity for the SEC EPMT and FLC EPMT to educate and train one-another on invasive plant species management techniques.

With National Parks and Partners: Support from parks and partners played a role in the SEC EPMT's success this year. Funding from Cumberland Island National Seashore (CUIS) made it possible for the team to serve additional parks, while BRD funded new backpack sprayers in time for the team to more efficiently treat kudzu (*Pueraria montana* (Lour.) Merr.) at two parks. Fort Pulaski National Monument provided funding towards the SEC EPMT's next team of interns, which fulfilled the SCA Americorps Direct program's "Youth in the Great Outdoors" grant that was awarded to Congaree National Park (CONG). The Kennesaw Mountain Trail Club provided assistance in the field and a donation that allowed the SEC EPMT to continue invasive plant projects at KEMO.

Summary of Accomplishments

During 2014, the SEC EPMT served 13 parks, including treatments at 10 of 11 network parks, treatments at one out-of-network park (GUIS), and one potential network park. The team was able to embark on new projects, as well as maintain the invasive plant management investments that have been made at parks over the past four years. Ongoing projects with continued park financial and logistical support included the treatment of Chinese privet (*Ligustrum sinense* Lour.) at Horseshoe Bend National Military Park, Chinese tallow (*Triadica sebifera* (L.) Small) at Ocmulgee National Monument, and kudzu at CHAT. The SEC EPMT treated 20 invasive plant species, including a cogongrass (*Imperata cylindrica* (L.) Raeusch) Early Detection Rapid Response effort at CUIS. The SEC EPMT Steering

Summary of Accomplishments (cont.)

Committee was instrumental in ranking and prioritizing these projects. The SEC EPMT crew members also served on CONG's Maintenance Trails crew and contributed more than 3,000 hours of service.

Summarized Data for 2014

Measure	Acres
Treated	11
Inventoried/Monitored	153
Gross Infested Area	212
Net Infested Area	12
Youth Engagement	
Total Number of Youth Participants and Youth Employees	15
Total Hours for Youth Participants and Youth Employees	2,464

More Information

Lauren Serra
Southeast Coast EPMT Liaison
803-695-0214
lauren_serra@nps.gov

Congaree National Park
100 National Park Rd
Hopkins, SC 29061

Amorita Brackett
Southeast Coast EPMT Field Crew Leader
803-647-3985
amorita_brackett@nps.gov

Program Brief

National Park Service
U.S. Department of the Interior

Natural Resource Stewardship and Science
Biological Resources Division

Southwest EPMT Annual Report: FY 2014

Rio Grande River Giant Reed Control and Monitoring at Big Bend National Park, Texas. NPS Photo.

Background

The Southwest Exotic Plant Management Team (SW EPMT) was formed in 2013 and serves 52 National Park Service (NPS) units in six Southwest states: AZ, NM, CO, TX, OK and UT.

The SW EPMT mission is to: 1) emphasize the restoration process over invasive plant eradication; 2) provide technically qualified crews to control major invasive plant infestations to a maintenance level for parks to effectively manage; 3) provide professional expertise to assist parks with natural resource management planning and activities; 4) support existing NPS crews and facilities that enhance invasive plant control and restoration processes; 5) provide opportunities for restoration research and education; 6) apply effectiveness monitoring and adaptive management; and 7) seek out partnerships and alternative funding sources for invasive plant control and restoration projects.

The network has been divided into five regions due to its size and the diversity of issues over such a large area. Thus, the following regions have been devised to efficiently treat and restore similar areas: 1) Sonoran Desert; 2) Chihuahuan Desert; 3)Eastern Colorado Plateau; 4) Great Plains Grassland; and 5) Western Colorado Plateau.

The SW EPMT is based in Tucson, AZ, with crews and crew members based in Tucson and in different parks throughout the region. This is to provide more efficiency in accessing project sites. The SW EPMT works extensively with youth conservation corps groups in order to provide training and experience to future restoration professionals.

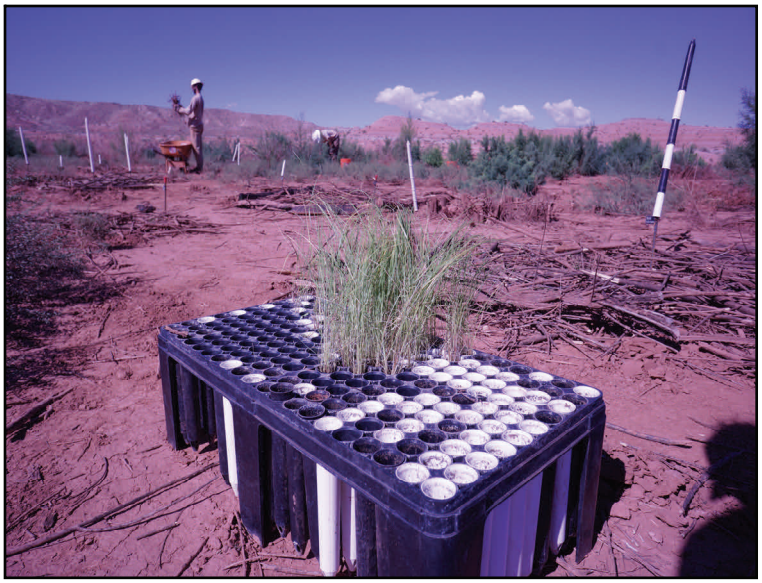
Program Highlights

Tumacacori National Historic Park Riparian Restoration Project

In 2014, the SW EPMT worked with Tumacacori National Historic Park (TUMA) staff to develop a restoration plan for the Santa Cruz River riparian area and floodplain. Huge cottonwoods (*Populus* spp. L.) and other native woody plants were severely damaged here during a 2010 wildfire. It is likely that competition with invasive species and altered river hydrology will hinder natural reestablishment of these species.

Park staff, the SW EPMT, and Northern Arizona University (NAU) worked as a team to develop a restoration plan that guides reestablishment of the native woody riparian species. First, to identify transplant sizes needed, NAU installed wells to monitor the depth to the water table. Then, the SW EPMT crew treated invasives in the project area. NAU collected cuttings of woody species to grow in the greenhouse in special deep pots designed to grow roots that can be planted deep and reach into the water table. The NAU team and a youth group, American Conservation Experience (ACE), planted the new plants at TUMA.

This first planting is a precursor to and will inform a much larger planting scheduled for 2015. Seed and cuttings have been collected from a wide variety of riparian woodland grasses, forbs, shrubs, and trees within TUMA. The SW EPMT plans to restore the floodplain to a wide diversity of culturally important and native plants.



Restoration by SWEPMT, NAU, and ACE crews at Wupatki National Monument, AZ. NPS Photo.

Giant reed (*Arundo donax* L.) control at Tumacacori NHP, AZ. NPS Photo.

Program Highlights (cont.)

SW EPMT Internship Program

The SW EPMT is partnering with Northern Arizona University to form an internship program that is designed to give college students from a number of member universities direct training and field experience in all aspects of invasive plant control and restoration.

The SW EPMT has initiated these internships to promote holistic, comprehensive, and adaptive strategies for restoring terrestrial and riparian ecosystems; to train the next generation of restoration practitioners; and to develop a centralized coordination network for long-term effectiveness monitoring of ecosystem restoration in the southwestern United States. The goal is to educate graduate and undergraduate students on the latest developments and tools for effective restoration and monitoring. It will also provide opportunities to educate park personnel, youth and conservation groups, and volunteers.

The SW EPMT will provide funds for NPS projects, which will be used to provide working crews and researchers for those projects. It is anticipated that additional funds from other state, federal, and private agencies will also be forthcoming as this program expands. For this support, the SW EPMT may receive individuals or a crew of interns that will perform invasive plant control, research, monitoring, and applied restoration at "select" projects in parks that make up the SW EPMT. Logistics for these crews will be managed by the SW EPMT liaison and university representatives. Logistics may also be facilitated by conservation groups such as ACE or other experienced youth and conservation groups.

Summary of Accomplishments

The SW EPMT committed over 9,400 person hours to youth working to stop the spread of invasive plants and on restoration projects throughout the network. Crews representing the SW EPMT worked in 31 of 52 network parks. The EPMT treated/retreated over 401 acres, and inventoried 2,313 acres of invasive plants. Numerous Southwest invasive species were treated as part of this work including: buffelgrass (*Cenchrus ciliaris* L.), Lehmann's lovegrass (*Eragrostis lehmanniana* Nees), tamarisk (*Tamarix* spp. L.), Russian thistle (*Salsola kali* L.), Siberian elm (*Ulmus pumila* L.), camelthorn (*Alhagi maurorum* Medik.), etc.

Summary of Accomplishments (cont.)

2014 was the first full year of operation for the SW EPMT. The Team spent much time developing relationships and partnerships with neighboring agencies, youth conservation groups, universities, and other restoration organizations. In early 2015, the SW EPMT will hire another crew leader and a botanist, both based out of Tucson, AZ. We foresee a very productive year working on a number of important restoration projects.

Summarized Data for 2014

Measure	Acres
Treated	401
Inventoried/Monitored	2,313
Gross Infested Area	1,880
Net Infested Area	771
Youth Engagement	
Total Number of Youth Participants and Youth Employees	195
Total Hours for Youth Participants and Youth Employees	9,420

More Information

Charles Schelz SW EPMT Liaison
Program Manager
National Park Service
12661 E. Broadway Blvd.
Tucson, AZ 85748
520-400-1011
charles_schelz@nps.gov

Patrick Wharton SW EPMT Crew Leader
Biological Technician
Capulin Volcano National Monument
Des Moines, New Mexico 88418
303.549.6305
patrick_wharton@nps.gov

Mark Jacobson SW EPMT Data Manager
Biological Technician
National Park Service
Tucson, AZ 85748
520-338-3170
mark_jacobson@nps.gov