The National Park Service
U.S. Department of the Interior
Natural Resource Program Center
Biological Resource Management Division

FINAL 06/25/04

EXOTIC PLANT MANAGEMENT TEAM Annual Report – FY 2003

The mission of the NPS Exotic Plant Management Teams is:

"To protect natural resources from the impacts caused by non-native invasive plant species, through prevention, control, restoration, and education. These goals are achieved through a framework of safe work practices, quality service to parks, positive partnerships, and a spirit of team harmony."

Table of Contents

Introduction	1
EPMT Program Accomplishments	2
EPMT Program Highlights	3
EPMT Location Map	4
Alaska	5
Alaska – Overview Map of Partner Parks	6
Alaska – Map of Selected Treatment Area	7
California	8
California – Overview Map of Partner Parks	9
California– Map of Selected Treatment Area	10
Chihuahuan Desert/Southern Shortgrass Prairie	11
Chihuahuan Desert/Southern Shortgrass Prairie – Overview Map of Partner Parks	12
Chihuahuan Desert/Southern Shortgrass Prairie– Map of Selected Treatment Area	13
Colorado Plateau	14
Colorado Plateau – Overview Map of Partner Parks	15
Florida Caribbean Partnership	16
Florida Caribbean Partnership – Overview Map of Partner Parks	17
Florida Caribbean Partnership– Map of Selected Treatment Area	18
Great Lakes	19
Great Lakes – Overview Map of Partner Parks	20
Gulf Coast	21
Gulf Coast – Overview Map of Partner Parks	22
Lake Mead	23
Lake Mead – Overview Map of Partner Parks	24
Lake Mead– Map of Selected Treatment Area	25
Mid-Atlantic Cooperative	26
Mid-Atlantic Cooperative – Overview Map of Partner Parks	27
National Capital Region	28
National Capital Region – Overview Map of Partner Parks	29
National Capital Region– Map of Selected Treatment Area	30
North Coast/Cascade Network	31
North Coast/Cascade Network– Overview Map of Partner Parks	32
North Coast/Cascade Network– Map of Selected Treatment Area	33
North East	34
North East– Overview Map of Partner Parks	35
Northern Great Plains	36
Northern Great Plains– Overview Map of Partner Parks	37
Northern Great Plains– Map of Selected Treatment Area	38
Northern Rocky Mountain	39
Northern Rocky Mountain– Overview Map of Partner Parks	40
Pacific Islands	41
Pacific Islands– Overview Map of Partner Parks	42
Southeast	43
Southeast– Overview Map of Partner Parks	44
Appendix 1 – Alien Plant Control and Monitoring (APCAM) Database Overview	45
Appendix 2 – Acreage Definitions	46

Introduction

The national parks are home to complex communities of native plants and animals that have developed over millions of years. The delicate natural balance within these communities is threatened by the invasion of exotic plants. These exotic plants are able to reproduce rapidly because the animals and diseases that keep them in check in their home ranges are missing. For example, melaleuca trees from Australia threaten to replace the wet prairies of the Everglades. Leafy spurge, an import from Eurasia, easily replaces the grasslands of the Northern Great Plains. When the populations of native plants are reduced, the animals that depend upon them lack the food and shelter needed for survival.

Today, exotic plants infest approximately 2.6 million acres in the national park system, reducing the natural diversity of these special places. Drawing funds from the Natural Resource Challenge, the National Park Service Biological Resource Management Division (BRMD) established rapid response Exotic Plant Management Teams (EPMT) to control exotic plants. Modeled after the approach used in wildland fire fighting, EPMTs provide highly trained, mobile strike forces of plant management specialists who assist parks in the control of exotic plants.

In fiscal year (FY) 2003, seven new tactical EPMTs joined the 9 existing EPMTs. These sixteen EPMTs have been lauded for their work in controlling harmful invasive plants. These field- or park-based teams are as follows:

(1) Florida Partnership EPMT (based at Everglades NP, Florida)
(2) National Capital Region EPMT (based at Rock Creek Park, Washington, DC)
(3) Chihuahuan Desert/ Southern Shortgrass Prairie EPMT (based at Carlsbad Caverns NP, New Mexico)
(4) Pacific Islands EPMT (based at Haleakala NP, Hawaii)
(5) Lake Mead EPMT (based at Lake Mead National Recreation Area, Arizona and Nevada)
(6) Northern Great Plains EPMT (based at Theodore Roosevelt National Park, North Dakota)
(7) California EPMT (based at Point Reyes National Seashore, California)
(8) Gulf Coast EPMT (based at Big Thicket National Park, Texas)
(9) Columbia Cascades EPMT (based at North Cascades and Olympic National Parks, Washington)
(10) Mid Atlantic Cooperative EPMT (based at Shenandoah NP)
(11) Northeast EPMT (based at Delaware Water Gap NRA)
(12) Northern Rockies EPMT (based at Yellowstone NP)
(13) Alaska EPMT (based at the Alaska Regional Office)
(14) Southeast EPMT (based at Blue Ridge Pky)
(15) Colorado Plateau (based at Petrified Forest NP)
(16) Great Lakes EPMT (based at the Great Lakes Network Office)

Each EPMT serves multiple parks within a broad geographic area. They work through steering committees to identify, develop, conduct, and evaluate exotic species removal projects and undertake appropriate native species restoration efforts. Each of the sixteen established teams has developed site-specific strategies for combating exotic plants that reflect the needs and resources of the more than 208 parks they serve.

The success of the EPMT derives from its ability to adapt to local conditions and needs. Each team employs the expertise of local experts and the capabilities of local agencies. Each sets its own work priorities based on the following factors: severity of threat to high-quality natural areas and rare species; extent of targeted infestation; probability of successful control and potential for restoration; opportunities for public involvement; and park commitment to follow-up monitoring, treatment and restoration.

EPMTs are part of the long-term control of invasive plants set by the Natural Resource Challenge. Actions by EPMTs also address GPRA goal IA1B "Containing exotic plant disturbances." They also satisfy agencies needs to implement Executive Order 13112 on Invasive Species, which includes the Invasive Species Council National Management Plan.

Accomplishments

Update on a Successful Model for Control of Invasive Plants

EPMTs continue to make substantial gains in the control of harmful invasive plants on parklands. In FY 2003 specialized EPMT's have inventoried over 627,000 acres of land and found gross infestation of weeds on 520,516 acres. They have traversed these acres and treated harmful weeds to the benefit of natural resources. Since the teams inception in 2000 at least 12 exotic plant species that were previously identified have been controlled to a maintenance level in park units.

Partnerships enhance NPS-EPMT invasive plant control work. The NPS entered a partnership with the University of Florida and the US Department of Agriculture to address the Impacts of Invasive Non-Native Agricultural Plants in U.S. Virgin Islands Natural Areas project. A unique and beneficial partnership has been awarded with the Student Conservation Corps to build Nature Plant Corps. The corps will increase park capacity to control invasive plants and restore native plants and to provide invasive plant management training to young professionals. Several EPMTs received grants to work with partners for invasive weed control to restore parklands through the Secretary's Cooperative Conservation Initiative. Overall, $2.8 million dollars has been leveraged with NPS partners.

Adaptive management is a critical part of the EPMT response. As teams have grown, the need for increased capability to set park priorities for control and restoration has been recognized. As a result, a field study partnership with the Colorado Plateau Cooperative Ecosystem Study Unit (CESU) and Intermountain Restoration Ecologist has been entered into with the intent of developing and implementing a restoration tool. This tool will assist parks in setting priorities for control and will be operational by 2005. Additionally, to improve the assessment of weed control technologies; the Florida/Caribbean Partnership EPMT is collaborating with the Environmental Quality Division and parks in south Florida to develop a landscape scale Environmental Impact Statement (EIS) for vegetation management. This is the first such landscape scale planning effort for vegetation management in the park system and will serve to streamline compliance actions. A similar landscape scale compliance action is being conducted with Northern Great Plains EPMT partner parks.

EPMTs utilize the Alien Plant Control and Monitoring (APCAM) database which was designed in collaboration with EPMTs for the purpose of ongoing monitoring and data analysis. In addition to collecting data related to the inventory, monitoring, and controlling of exotic plants, APCAM allows the team to store weather data, information on collected plant material, digital photographs, and information on spatial relationships. APCAM is additionally used for accurate and concise reporting. (See Appendix 1)

The NPS EPMT model has been reviewed with interest and aspects of the model have been adopted by other agencies. Individual teams have shared information about their operations and implementation techniques with private and public sector organizations. Fundamentals of APCAM were highlighted at the Heinz Center Workshop on Invasive Species Databases.

This is a critical time for management of invasive species in national parks. There is broad recognition from partners, visitors, and institutions that invasive species are a major threat to our natural heritage. Increased funding for invasive species management reflects this recognition as well as commitment. Control of invasive species in national parks is within our grasp if we stay the course.

The remainder of this report details parks and states served, accomplishment statistics, targeted weed species, and FY 2003 activities and achievements for each of the 16 EPMTs. Throughout the report exotic plants, invasive species, invasive plants, weeds, alien plants, etc. are used interchangeably to describe non-native invasive plants.

EPMT Program Highlights

- EPMT efforts for FY03 by species

Inventoried acres	627,112
Gross infested acres	520,515
Infested acres	73,421
Treated acres	10,666
Monitored acres	340
Retreated acres	1039
Restored acres	191
Time lost due to injury	16
Total person hours	88,829

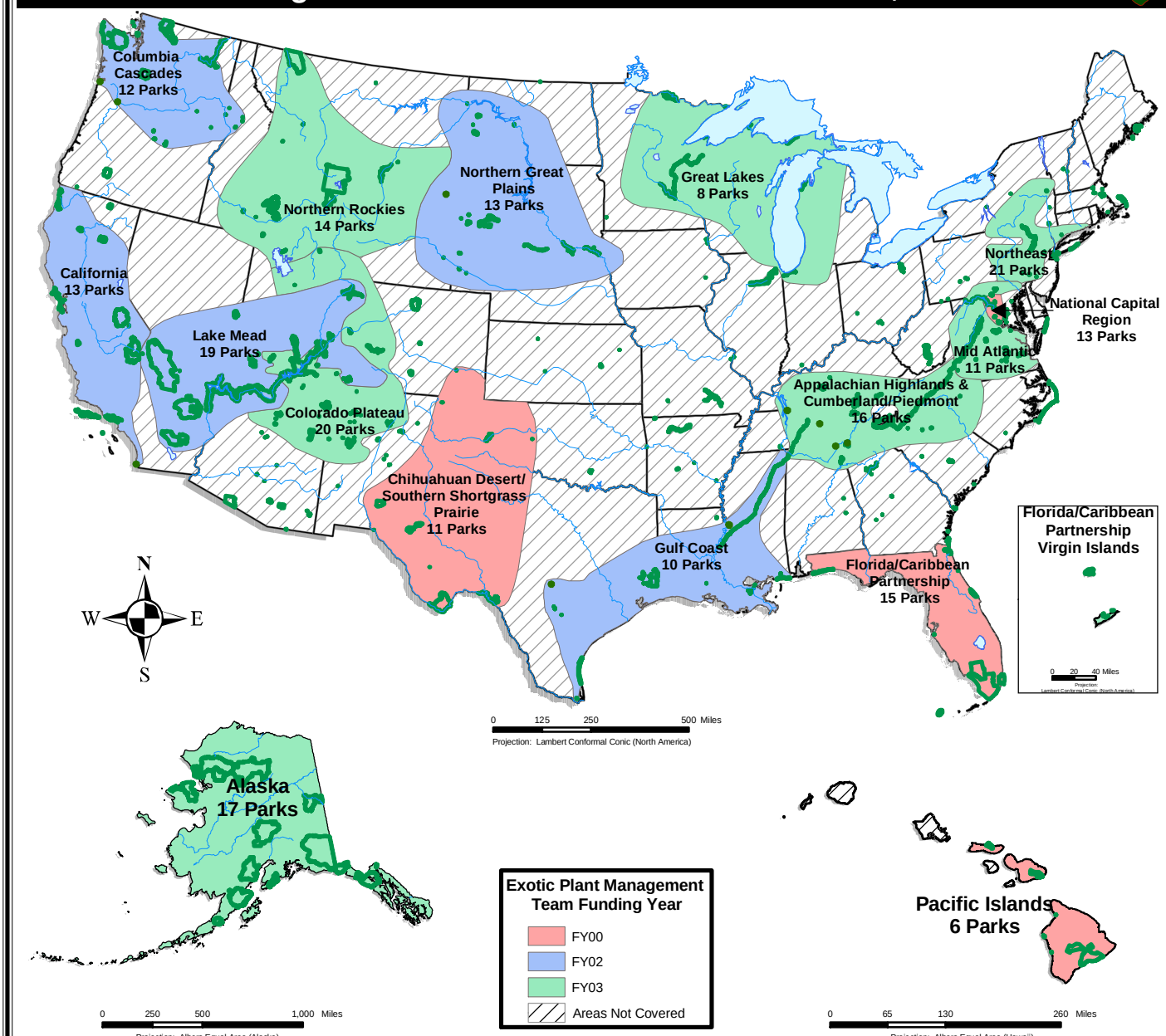
- Florida/Caribbean Partnership EPMT and Northern Great Plains are working with Environmental Quality Division to develop landscape scale environmental compliance documents thus improving effectiveness and efficiency of decision making.

- Colorado Plateau Cooperative Ecosystem Study Unit (CESU) and the EPMTs are developing a restoration decision tool for land manager to assist in setting priorities for control.

- EPMTs have leveraged over $2.8 million in dollars through partnerships to enhance invasive plant control

Biological Resource Management Division
Exotic Plant Management Teams

National Park Service
U.S. Department of the Interior



Produced by Judy Daniels, Fort Collins, Colorado Data from Natural Resource Information Division Date 25 November 2003

Alaska

Exotic Plant Management Team

Partner parks (all located in the state of Alaska): Alagnak NW&SR, Aleutian WWII NHA, Aniakchak NM&Pr, Bering Land Bridge NPr, Cape Krusenstern NM, Denali NP&Pr, Gates of the Arctic NP&Pr, Glacier Bay NP&Pr, Katmai NP&Pr, Kenai Fjords NP, Klondike Gold Rush NHP, Kobuk Valley NP, Lake Clark NP&Pr, Noatak NPr, Sitka NHP, Wrangell- St. Elias NP&Pr, Yukon-Charley Rivers NPr

Accomplishments

Inventoried Acres	6,060
Gross Infested Acres	2,082
Infested Acres	9.342
Treated Acres	2.013
Monitored Acres	0
Retreated Acres	0
Restored Acres	0
Time Lost due to Injury	0

Pulling up white sweetclover at the entrance to Denali NP&Pr

Due to Alaska's climate, latitude, and relative isolation, it does not strike most people as a place where exotic plants would be of great concern. While exotic plants are mostly limited in distribution to areas of human disturbance, there are indications that they are quickly spreading and that several species may be able to colonize native ecosystems. The potential for these species to disperse via glacial river systems and benefit from climatic warming presents a very real ecological threat to Alaska's vast wilderness. Unlike the rest of the country, Alaska still has the chance to prevent the arrival of exotic plants in most areas of the state. To accomplish this goal, the Alaska EPMT has adopted the approach of early detection and rapid response to exotic plant infestations.

This year was the first year for the EPMT program in Alaska and the third season for an exotics inventory (conducted through an interagency agreement with the BRMD of the USGS) in National Park units. The inventory is essential for providing baseline information on the current distribution and abundance of each exotic species. The Alaska EPMT is working with the US Forest Service and the University of Alaska to develop a statewide database and website for collaborative tracking of exotic plant arrivals and distributions. The species of current greatest concern are white and yellow sweetclover and bird vetch, all of which are on the move and tend to form thick infestations.

An EPMT Liaison was hired in June to build upon the inventory with control efforts, education and outreach, and strategic prevention of exotic plant proliferation. Control is still possible in Alaska using manual and mechanical methods, with techniques that vary by species and according to the resources and logistical challenges of the far-flung parks. Rather than hiring a crew to perform this work, the Alaska EPMT is working with park staff, volunteers, and other agencies to find creative ways to accomplish control.

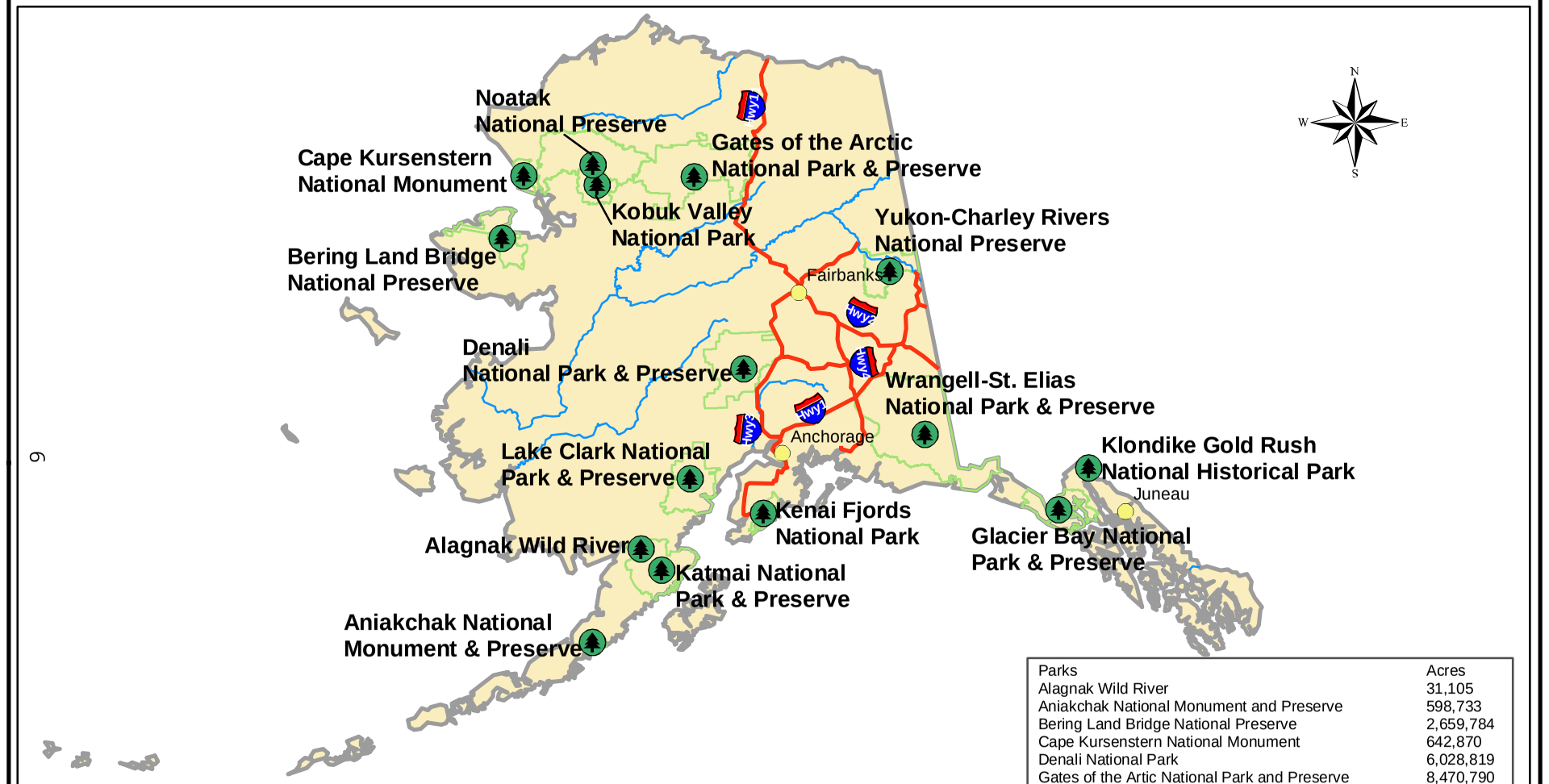
Raising awareness about exotic plants in Alaska is critical to management, particularly among those involved in soil-disturbing activities. Through participation in the interagency Committee for Noxious and Invasive Plant Management and media outreach, Alaska is bringing the issue to the attention of the public and working with other researchers and managers to identify key species and habitats for control. On this basis, the summer of FY 2004 will see a flurry of activity as projects are implemented in more than half of the region's parks. Alaska is unique in many ways, not the least of which is the widespread persistence of intact native ecosystems. The Alaska EPMT aims to see it remain that way.

Target Weed Species

bigleaf lupine
bird (tufted) vetch
butter-and-eggs (toadflax)
common dandelion
European mountain ash
European stickseed
Japanese knotweed
narrowleaf hawksbeard
oxeye-daisy
white/yellow sweetclover

Alaska Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior



Parks	Acres
Alagnak Wild River	31,105
Aniakchak National Monument and Preserve	598,733
Bering Land Bridge National Preserve	2,659,784
Cape Kursenstern National Monument	642,870
Denali National Park	6,028,819
Gates of the Artic National Park and Preserve	8,470,790
Glacier Bay National Park and Preserve	2,635,625
Katmai National Park and Preserve	4,040,936
Kenai Fjords National Park	625,919
Klondike Gold Rush National Historic Park	11,861
Kobuk Valley National Park	1,751,646
Lake Clark National Park and Preserve	4,001,151
Noatak National Preserve	6,568,645
Wrangell-St. Elias National Park and Preserve	13,133,197
Yukon-Charley Rivers National Preserve	2,519,662
Total Acreage	53,720,743

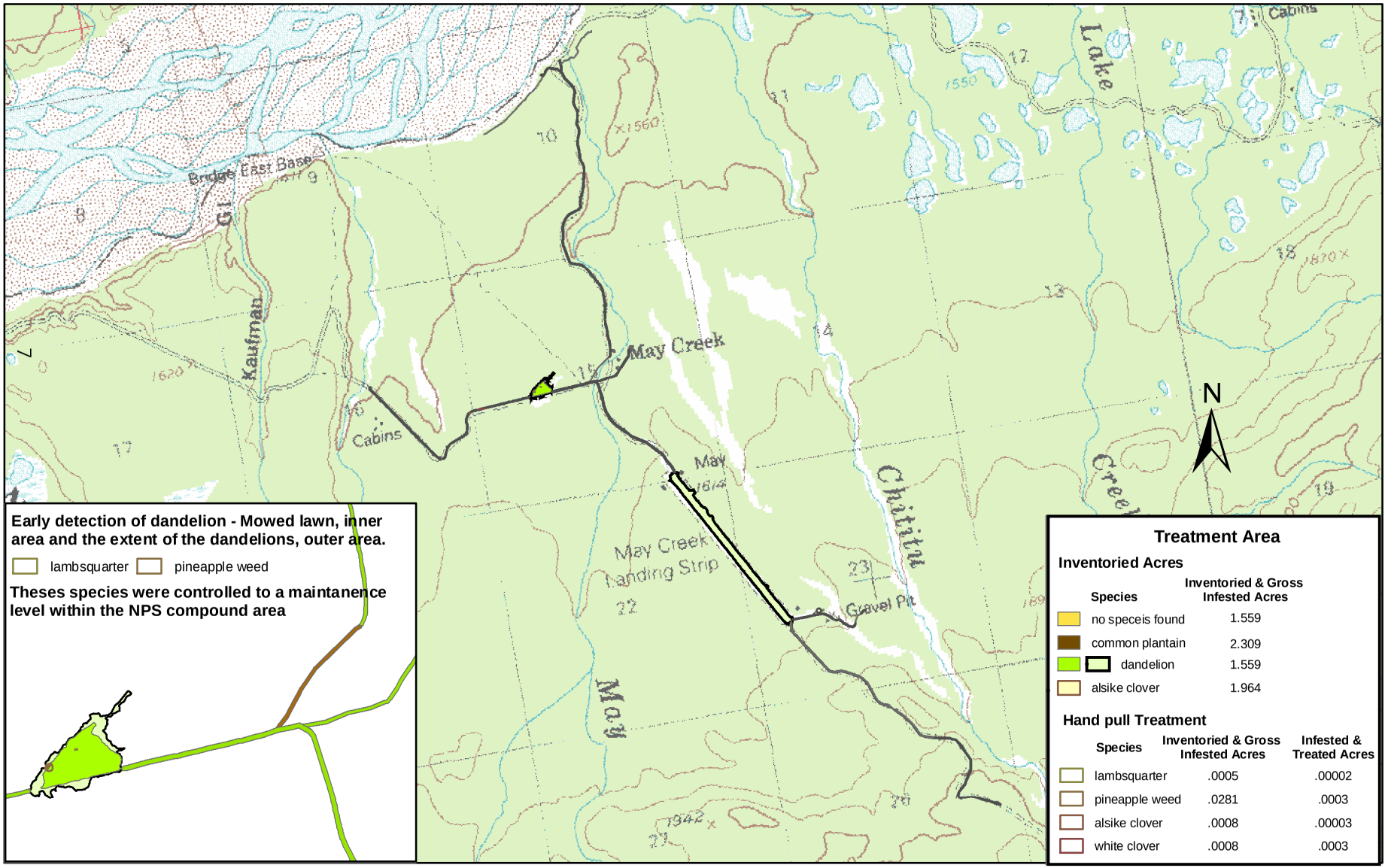
Source: ESRI and NRID
Date: 24 Nov 03

0 285,000 570,000 1,140,000 Meters

Calculations based on Alber Conical Equal Area projection

May Creek - Wrangles St. Elias NP
Alaska EPMT

National Park Service
U.S. Department of the Interior



Early detection of dandelion - Mowed lawn, inner area and the extent of the dandelions, outer area.

lambsquarter pineapple weed

Theses species were controlled to a maintanence level within the NPS compound area

Treatment Area

Inventoried Acres

Species	Inventoried & Gross Infested Acres
no speceis found	1.559
common plantain	2.309
dandelion	1.559
alsike clover	1.964

Hand pull Treatment

Species	Inventoried & Gross Infested Acres	Infested & Treated Acres
lambsquarter	.0005	.00002
pineapple weed	.0281	.0003
alsike clover	.0008	.00003
white clover	.0008	.0003

Meters
0 650 1,300 2,600

Scale - 1:36,500

Source: USGS DOQ McCarthy B5,
AK coverages collected with a Trimble GPS receiver
Date: 21 Nov 03

Coordinate System - Albers Conical Equal Area

California

Exotic Plant Management Team

Partner parks (all in the state of California): Point Reyes NS, Yosemite NP, Sequoia NP, Kings Canyon NP, Cabrillo NM, Channel Islands NP, Devils Postpile NM, Golden Gate NRA, John Muir NHS, Lassen Volcanic NP, Redwood NP, Santa Monica Mountains NRA, Whiskeytown-Shasta-Trinity NRA, Pinnacles NM

Accomplishments

Inventoried Acres	16,153
Gross Infested Acres	4,955
Infested Acres	59
Treated Acres	53
Monitored Acres	5
Retreated Acres	.1
Restored Acres	5
Time Lost due to Injury	0

Pampas grass removal at Wildcat Cliffs, Point Reyes National Seashore

The California Exotic Plant Management Team had a successful FY 2003 season serving 12 partner and one additional park. During this second year of operation, the EPMT focused on refining and expanding their ability to serve park needs. Carefully allocating personnel and equipment costs as well partnering with the Student Conservation Association, the team was able to increase in size by the equivalent of 2.5 team members.

The EPMT made a concerted effort to integrate with other groups also concerned with invasive plants thus enhancing their ability to prioritize projects, tackle complex invasive populations, and stay abreast of the most effective techniques. Accomplishing this included providing EPMT presentations to NPS at the Pacific West Regional Inventory and Monitoring Network Coordinators meeting as well as to California's Department of Food and Agriculture and Department of Fish and Game. As a result of these efforts, the NPS now has a presence on the California Invasive Plant Council board of directors and the California Interagency Noxious Weed Coordinating Council. The EPMT has made positive inroads into the highly diverse community of groups that are focusing on invasive plant reduction in California.

The team philosophy has been to concentrate on smaller, outlying infestations–selecting projects that tend to protect relatively rare or pristine areas. To do this, they developed a project request protocol that facilitates smart prioritization and enhanced partner park commitments.

One of the more rewarding projects this year was treatment of a pampas grass invasion on the 600-foot rocky cliffs overhanging the Pacific Ocean at Point Reyes National Seashore. EPMT members were lowered on rappel lines onto Wildcat Cliffs to remove this last untreated pampas grass site within the Seashore. The heat from the cliffs and the instability of the crumbling sandstone made for challenging work; yet the team managed to manually remove a total of 1,391 plants from these nearly vertical slopes. The work at this project site represents the culmination of a four-year effort by the park to remove pampas grass from the ecosystem and has made the team a model on how to join forces with a park to remove an "A-rated" invasive on an extremely difficult to access coastal-scrub site. This project has boosted hopes that other seemingly uncontrollable invasive plants may be controlled. With the strides and networking established in FY 2003, the EPMT is looking forward to a creative and productive FY 2004.

Target Weed Species

bluegum eucalyptus
bull thistle
cape Ivy
French broom
Himalayan blackberry
pampas and jabata grass
Scotch broom
silverwattle acacia
wooly mullein
yellow starthistle

California Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior

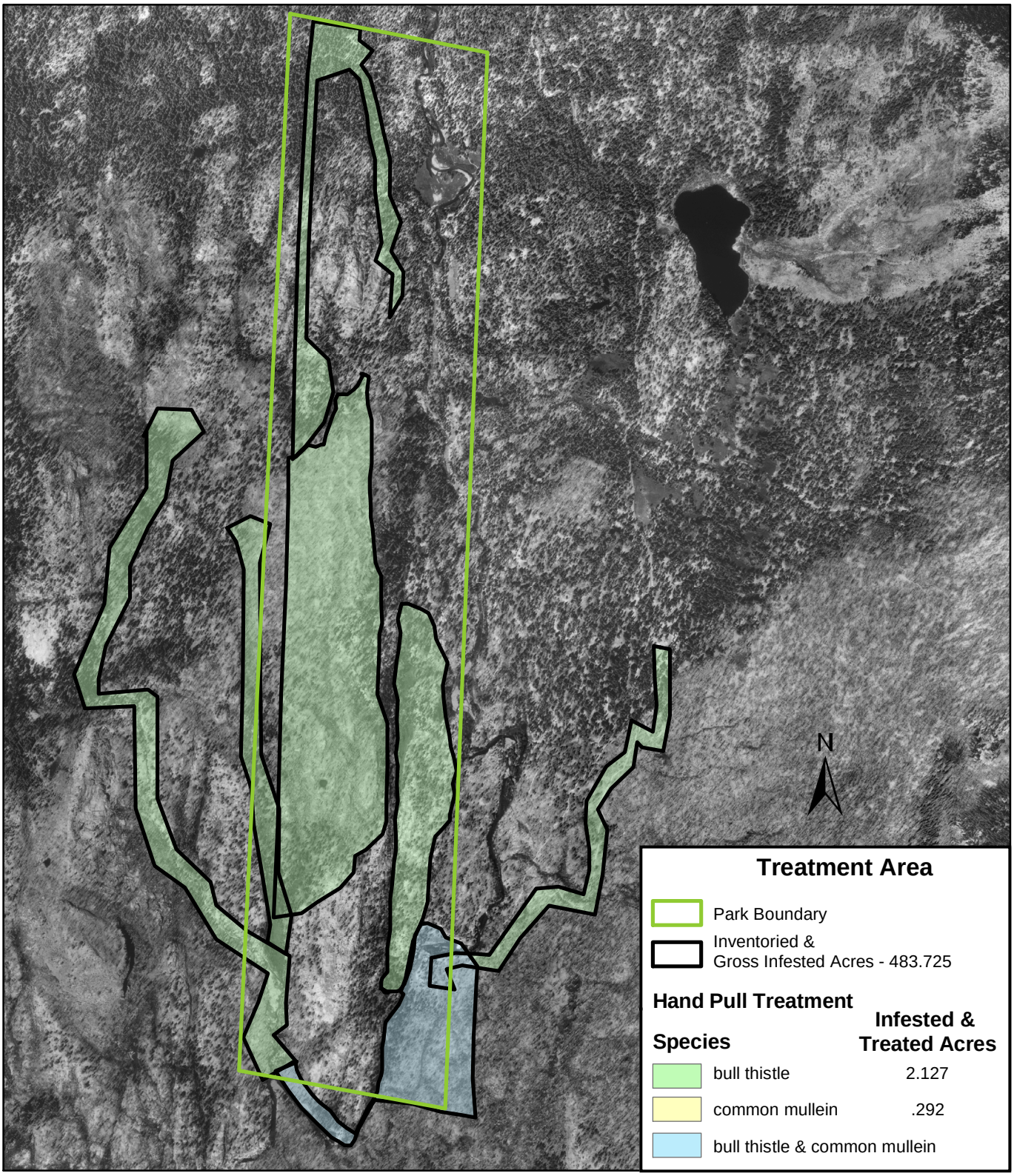
Parks	Acres
Cabrillo National Monument	158
Channel Islands National Park	242,286
Devils Postpile National Monument	786
Golden Gate National Recreation Area	75,873
John Muir National Historic Site	341
Lassen Volcanic National Park	106,169
Point Reyes National Seashore	66,200
Redwood National Park	114,565
Santa Monica Mountains National Recreation Area	152,361
Sequoia and Kings Canyon National Park	856,023
Whiskeytown-Shasta-Trinity National Recreation Area	41,785
Yosemite National Park	740,984
Total Acreage	2,397,531

Calculations based on Lambert Conformal Conic (Conterminous US) projection

Source: ESRI and NRID
Date: 24 Nov 03

Devils Postpile NM
California EPMT

National Park Service
U.S. Department of the Interior



Source: USGS DOQQ Crystal Crag NW,
Mammoth Mountain SW, NRID Park Boundary,
CA coverages collected with a Trimble GPS receiver
Date: 24 Nov 03

Scale - 1:20,300

Coordinate System - UTM_Zone 11N_NAD 83

Chihuahuan Desert/Southern Shortgrass Prairie

Exotic Plant Management Team

Partner parks and states: Bent's Old Fort NHS, CO; White Sands NM, NM; Carlsbad Caverns NP,NM; Washita Battlefield NHS, OK; Big Bend NP, TX; Amistad NRA, TX; Alibates Flint Quarries NM, TX; Capulin Volcano NM, NM; Fort Davis NHS, TX; Lake Meredith NRA, TX; Guadalupe Mountains NP, TX

Accomplishments

Inventoried Acres	2,903
Gross Infested Acres	392
Infested Acres	73
Treated Acres	38
Monitored Acres	19
Retreated Acres	8
Restored Acres	36
Time Lost Due to Injury	0

Chain saw removal of saltcedar at White Sands National Monument

The Chihuahuan Desert/Southern Shortgrass Prairie Exotic Plant Management Team (CDSP-EPMT) serves 11 partner parks spread across 500 miles of the desert southwest. Since its inception in FY 2000, the team has treated hundreds of acres of exotic plants and helped restore native wildland habitats.

The EPMT's outreach and partnership actions continue to enhance its accomplishment record. Volunteers and interagency partners contributed over 200 hours and several hundred dollars of funding for weed control efforts. The New Mexico State Highway Department, the Bureau of Land Management (BLM), the Natural Resources Conservation Service (NRCS), the CDSP-EPMT and the White Sands National Monument joined forces to conduct treatments on saltcedar, African rue and malta star thistle in southwestern New Mexico.

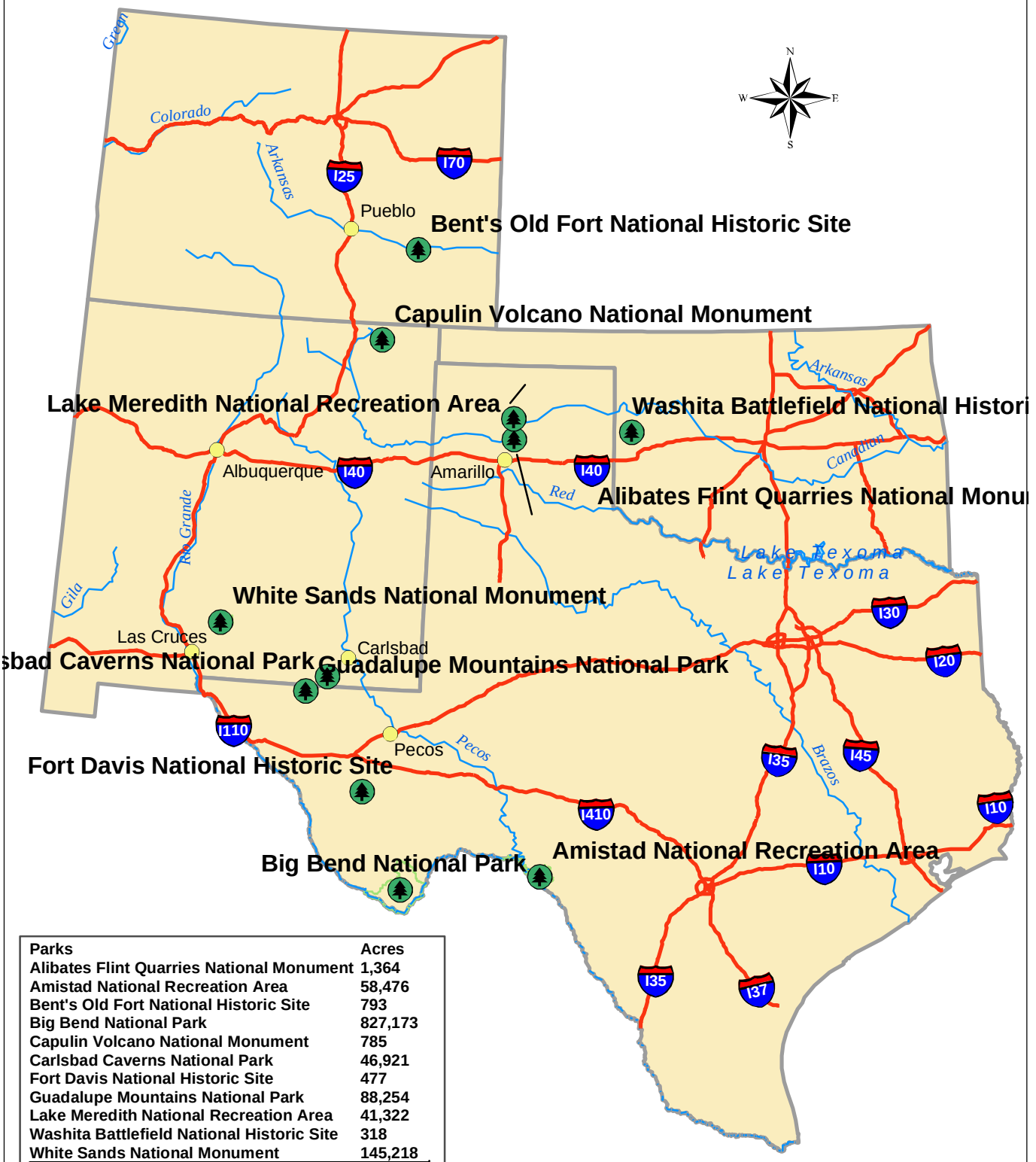
Other strong partners include: the Bureau of Reclamation (funding of potential biological control treatments, other saltcedar removal projects and restoration); the Canadian River Water Authority (in-kind funding for water sampling); Texas Parks and Wildlife (in-kind funding for habitat restoration), the Wild Turkey Federation (funding for project work); the National Interagency Fire Management Program (funding for prescribed burns and hazard reduction on saltcedar); Texas Tech University Cooperative Agreements (monitoring and contractor treatments); the World Wildlife Fund and Friends of Big Bend National Park; Texas State Parks; the Trull Foundation (funding for international saltcedar work which includes areas in Mexico); the US Forest Service (provides native plant seeds for restoration work); Colorado State Forestry (coordinates with private landowner efforts to remove saltcedar); Colorado Division of Wildlife (in-kind support to remove saltcedar); the Colorado Community Correctional crews (provide labor to conduct saltcedar removal); U.S. Air Force at Holloman Air Force Base (conducts exotic plants removal on neighboring lands, provides in-kind support of GIS and map development); BLM (provides training in chainsaw use, NEPA coordination); U.S. Forest Service (provides research and informational bulletins on specific treatments); the New Mexico State University Cooperative Extension Service (provides pesticide application training, conducts tours of treatment areas, and provides research information on chemicals and treatments);and Sul Ross State University (signed agreement to provide native plant propagation services).

Target Weed Species

African rue
Canadian thistle
horehound
Malta starthistle
Russian olive
Russian knapweed
saltcedar
Scotch thistle
yellow sweetclover

Chihuahuan Desert/Southern Shortgrass Prairie Exotic Plant Management Team Host and Partner Parks

National Park Service
U.S. Department of the Interior



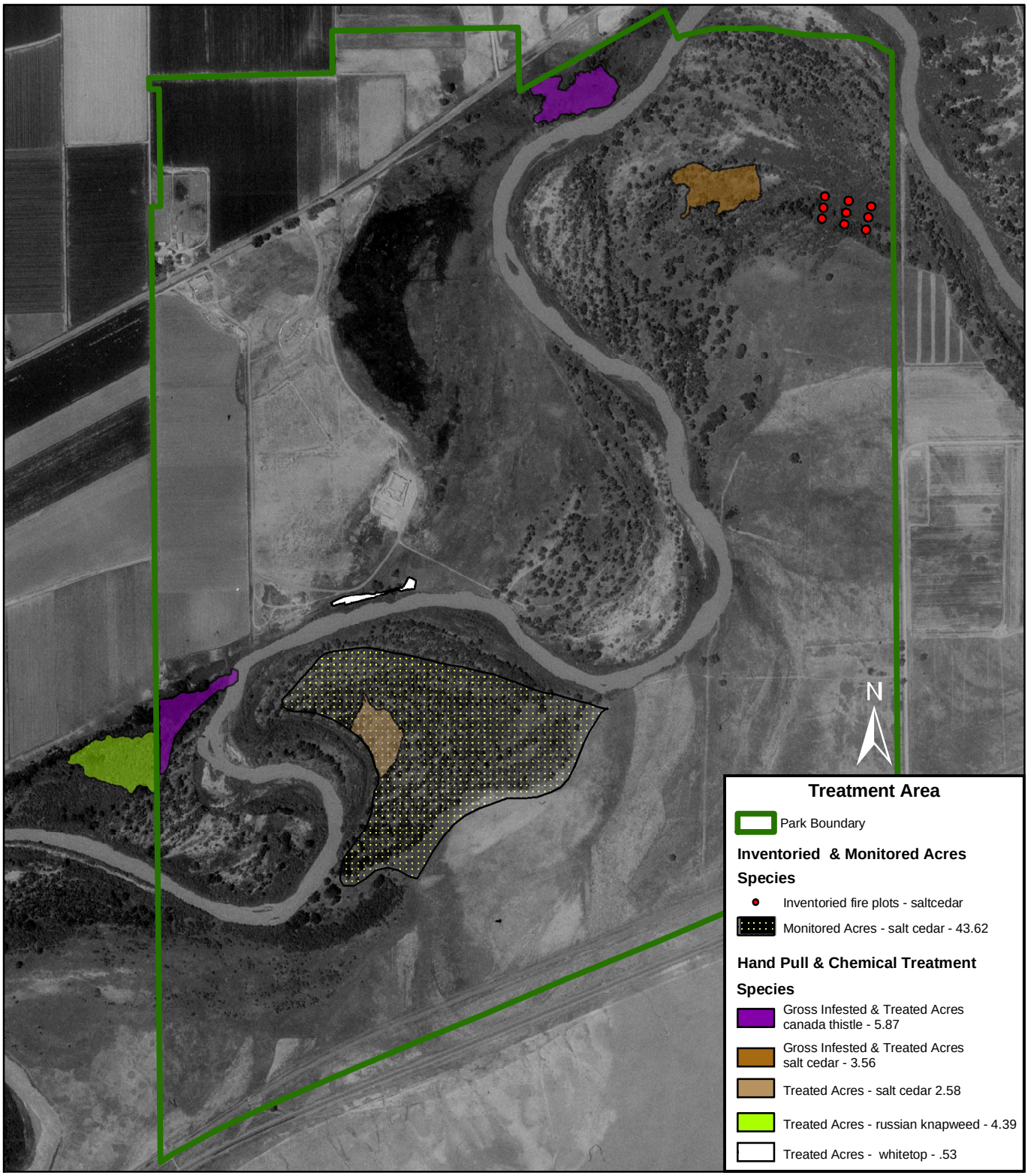
Parks	Acres
Alibates Flint Quarries National Monument	1,364
Amistad National Recreation Area	58,476
Bent's Old Fort National Historic Site	793
Big Bend National Park	827,173
Capulin Volcano National Monument	785
Carlsbad Caverns National Park	46,921
Fort Davis National Historic Site	477
Guadalupe Mountains National Park	88,254
Lake Meredith National Recreation Area	41,322
Washita Battlefield National Historic Site	318
White Sands National Monument	145,218
Total Acreage	1,211,101

Calculations based on Lambert Conformal Conic (Conterminous US) projection

Source: ESRI and NRID
Date: 24 Nov 03

Bent's Old Fort NHS
Chihuahuan Desert/Southern Shortgrass Prairie EPMT

National Park Service
U.S. Department of the Interior



Source: USGS DOQQ Hadley SE, NRID Park Boundary, CDSP coverages collected with Trimble GPS Receiver
Date: 24 Nov 03

Scale - 1:11,400

Coordinate System - UTM_Zone 13N_NAD 83

Colorado Plateau

Exotic Plant Management Team

Partner Parks and states: Utah: Bryce Canyon NP, Rainbow Bridge NM, Timpanogos Cave NM. Colorado: Black Canyon of the Gunnison NP, Colorado NM, Curecanti NRA, Hovenweep NM, Mesa Verde NP, Yucca House NM. New Mexico: Aztec Ruins NM, Bandelier NM, Chaco Culture NHP, El Malpais NM, El Morro NM. Arizona: Canyon de Chelly NM, Glen Canyon NRA, CO, Hubbell Trading Post NHS, Petrified Forest NP, Pipe Spring NM, Sunset Crater Volcano NM, Walnut Canyon NM, Wupatki NM. Wyoming: Fossil Butte NM.

Accomplishments

Inventoried Acres	35,654
Gross Infested Acres	35,654
Infested Acres	403
Treated Acres	225
Monitored Acres	0
Retreated Acres	22
Restored Acres	0
Time Lost Due to Injury	0

Tamarisk and Russian olive treated at Courthouse Wash, Arches National Park

The Colorado Plateau EPMT (COPL-EPMT) was in its first year with Karen Beppler-Dorn acting in the Liaison position. Parks within the Colorado Plateau filed requests for proposals and received grants. All grants were managed directly by the receiving parks.

The parks used the grants to hire Student Conservation Association (SCA) crews, Public Land Corps, Utah State University, and other teams to inventory, map, and control invasive species. A portion of the funds was put into cooperative agreements, with both the SCA and Utah Conservation Corps, that will flow over into FY 2004.

COPL-EPMT hired a Team Liaison, Diane M. Dobos-Bubno, who will start at the host park of Petrified Forest in FY 2004.

The team surveyed 35 miles of shoreline beaches on Blue Mesa Reservoir at Curecanti National Recreation Area for tamarisk. Both mechanical (hand pulling, cutting) and chemical methods were used to treat tamarisk.

Field bindweed, yellow and white sweet clover, cheat grass, Russian knapweed, tamarisk, and Russian olive occurring within 83 acres at three sites were treated in Colorado National Monument.

The Utah State University cooperated with NPS crews to perform inventory surveys for invasive non-natives at six parks in Utah: Arches National Park, Canyonlands National Park, Capitol Reef National Park, Hovenweep National Monument, Natural Bridges National Monument, and Zion National Park. The University will also compile and report on the data; the report is due in February 2004.

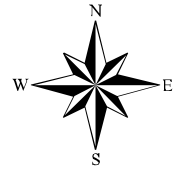
Glen Canyon National Recreation Area coordinated with the Navajo Nation and the Coconino Rural Environmental Corps to treat ravennagrass and Russian olive in the riparian zone along the San Juan River. Boats and river float support was provided by Arizona Raft Adventures, Flagstaff, AZ.

Target Weed Species

Canada thistle
cheatgrass
Himalayan blackberry
leafy spurge
ravennagrass
Russian olive
Russian thistle
tamarisk (saltcedar)

Colorado Plateau Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior



Parks	Acres
Aztec Ruins National Monument	317
Bandelier National Monument	32,661
Black Canyon of the Gunnison National Monument	21,098
Bryce Canyon National Park	35,763
Canyon de Chelly National Monument	91,789
Chaco Culture National Historic Park	34,505
Colorado National Monument	20,194
Curecanti National Recreation Area	40,572
El Malpais National Monument	116,221
El Morro National Monument	1,030
Glen Canyon national Recreation Area	1,238,290
Hovenweep National Monument	797
Petrified Forest national Park	94,430
Rainbow Bridge National Monument	161
Sunset Crater Volcano National Monument	3,021
Timpanogos Cave National Monument	246
Walnut Canyon National Monument	3,631
Total Acreage	1,734,726

Source: ESRI and NRID
Date: 24 Nov 03

0 130,000 260,000 520,000 Meters

Calculations based on Lambert Conformal Conic (Conterminous US) projection

Florida Caribbean Partnership

Exotic Plant Management Team

Partner Parks and states: Gulf Islands NS, FL; Timucuan EHP, FL; Canaveral NS, FL; Biscayne NP, FL; Everglades NPr., FL; Big Cypress NP, FL; Dry Tortugas NP, FL; De Soto N Mem, FL.

Accomplishments

Inventoried Acres	256,973
Gross Infested Acres	256,969
Infested Acres	7,519
Treated Acres	6,834
Monitored Acres	1
Retreated Acres	717
Restored Acres	0
Time Lost Due to Injury	0

Private contractors treating melaleuca and latherleaf in Florida parks

Florida and the Caribbean are unique in that they encompass areas in the tropical climate zone. Many invasive exotics take advantage of this no-freeze zone and have few environmental constraints. Species such as melaleuca and Brazilian pepper shut out all native species and out-compete them completely. Areas of coastal mangrove habitat, cypress domes, and marl prairies are threatened by these exotics. Unique island species are threatened in the Caribbean.

The Florida/Caribbean Partnership EPMT (FLC-EPMT) partners with the Florida Department of Environmental Protection (DEP) Upland Invasive Plant Management Program. This program, established in 1997, is an effort to curb the spread of exotic plants on public conservation lands. Through the program, state partners and over 400 public land managers work to control exotic plants. Regional working groups select projects while private contractors provide on-the-ground control.

In FY 2000, DEP and NPS partnered to establish the Florida EPMT. Under this partnership, NPS selects and submits projects to DEP. The control costs for the projects are divided and control is accomplished using private contractors. In FY 2003, the Florida EPMT expanded to include the US Virgin islands. This expansion was the result of a cooperative agreement with the University of Florida under a grant from the USDA Subtropical Agricultural Research Program Grant.

In FY 2003 the FLC-EPMT entered into a cooperative agreement with the South Florida Water Management District for mapping exotic plants on 8 million acres of natural areas in south Florida. They applied for and received $542,704 in DOI Cooperative Cost Share funding for exotic plant control in addition to $423,000 from Florida DEP and $411,112 from EPMT. In addition, they began initiating international partnerships to share technical information and conduct joint control projects in Caribbean.

Overall, the FLC-EPMT has increased productivity and expanded geographically. However, the invasive species list grows as well. Fighting invasives in this region requires constant monitoring and continued treatment. In this manner, much of the mature melaleuca has been eradicated from Big Cypress National Preserve—a 729,000-acre park. However, a rapidly spreading species, the old world climbing fern poses a serious threat to tree islands in parts of Everglades National Park and surrounding areas. With gains in some areas and threats in others, the FLC-EPMT is continually adapting to meet new challenges.

Target Weed Species

Australian pine
Brazilian pepper
Chinese tallow
guineagrass
latherleaf
limeberry
mahoe
melaleuca
Old World climbing fern
wild tamarind

Florida Caribbean Partnership Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior

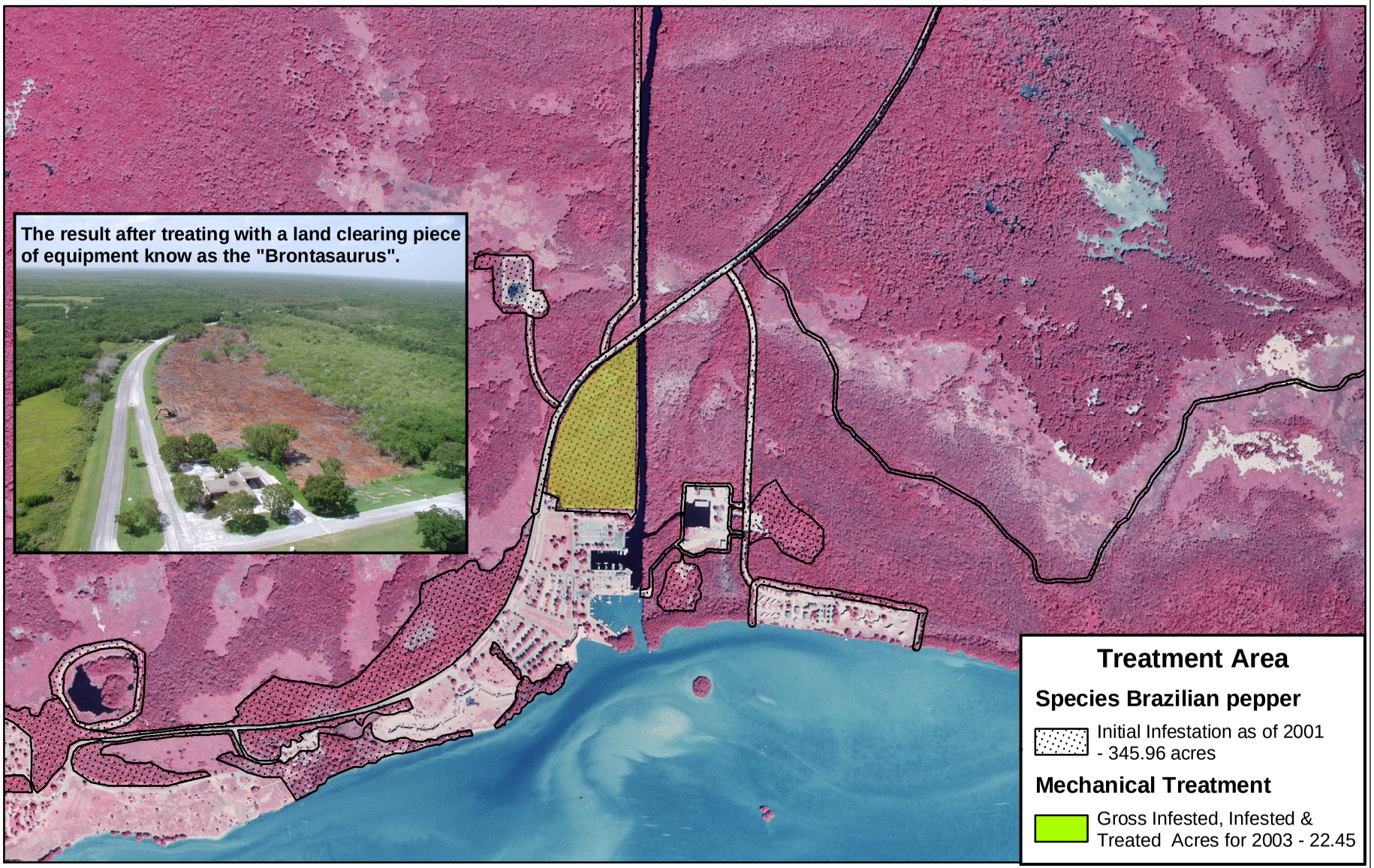
Parks	Acres
Big Cypress National Preserve	904,257
Biscayne National Park	215,938
Canaveral National Seashore	75,559
Castillo de San Marcos National Monument	30
DeSoto National Memorial	32
Dry Tortugas National Park	83593
Everglades National Park	1,888,554
Fort Caroline National Memorial	190
Fort Matanzas National Monument	396
Gulf Islands National Seashore (FL)	120,416
Timucuan Ecological and Historic Preserve	61,577
Virgin Islands National Park	16,195
Total Acreage	3,366,737

Calculations based on Lambert Conformal Conic (Conterminous US) projection

Source: ESRI and NRID
Date: 24 Nov 03

Everglades NP
Florida Caribbean Partnership EPMT

National Park Service
U.S. Department of the Interior



Source: Raster Image RGB Composite DOQQ Flaminog SE,
FLC coverages collected with a GPS receiver
Date: 24 Nov 03

Scale - 1:15,400

Coordinate System - UTM_Zone 17N_NAD 83

Great Lakes

Exotic Plant Management Team

Partner parks and states: Apostle Islands NL, WI; Indiana Dunes NL, IN; Isle Royale NP, MI; Mississippi NRRA, MN; Pictured Rocks NL, MI; Saint Croix NSR, WI; Sleeping Bear Dunes NL, MI; Voyageurs NP, MN

Accomplishments

Inventoried Acres	488
Gross Infested Acres	488
Infested Acres	141
Treated Acres	29
Monitored Acres	.023
Retreated Acres	1.78
Restored Acres	0
Time Lost Due to Injury	0

Spotted knapweed control at Pictured Rocks National Lakeshore

The Great Lakes Exotic Plant Management Team (GL-EPMT) serves eight partner parks located in four states throughout the upper Midwest Great Lakes region. These parks, extending from the boreal forest of northern Minnesota to the sand dunes of southern Lake Michigan, also work in association as the Great Lakes Network for the Inventory and Monitoring (I&M) program. Co-location of the GL-EPMT with the Great Lakes Network I&M staff in Ashland, Wisconsin provides the opportunity for the two programs to work together closely, taking advantage of shared positions and functions

This first year, as strategies are defined, the EPMT funding supported a technician in each of the partner parks. This allowed the park to accomplish specific exotic plant management projects. Data collection (including inventory and mapping) and the collation of existing information were a major component of this first year's work. Although emphasis was placed on locating and mapping exotic plants, activities also included treatment and control work in each park.

Treatment and control activities over the course of this first field season included release and monitoring of leaf eating beetles for biological control of purple loosestrife at Apostle Islands National Lakeshore; manual control of garlic mustard, with volunteer support, in priority areas at Indiana Dunes National Lakeshore; manual removal of spotted knapweed from backcountry locations at Isle Royale National Park; buckthorn removal, with assistance from volunteer groups, on islands at Mississippi National River and Recreation Area; removal of spotted knapweed, with the help of Nature Conservancy volunteers, from the Grand Sable Dunes at Pictured Rocks National Lakeshore; treatment of buckthorn and honeysuckle along river habitat at Saint Croix National Scenic Riverway; removal of baby's breath, with volunteer assistance, from dune habitat within Sleeping Bear Dunes National Lakeshore; and removal of purple loosestrife from key wetland areas within Voyageurs National Park.

Highly invasive and persistent, non-native species significantly threaten the unique ecological communities for which the Great Lakes parks were established. Some of the last remaining undeveloped dune ecosystems along the shores of the Great Lakes, as well as unique plant assemblages, are endangered. Future efforts will involve continued control of invasive species, increased participation in partnership and outreach programs, and the development of long-term strategies for control, monitoring, and ecological restoration.

Target Weed Species

baby's breath
common buckthorn
common reed
garlic mustard
Japanese honeysuckle
leafy spurge
multiflora rose
purple loosestrife
spotted knapweed
reed canary grass

Great Lakes Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior

Parks	Acres
Apostle Islands National Lakeshore	69,327
Indiana Dunes National Lakeshore	17,266
Isle Royale National Park	557,742
Mississippi National River and Recreation Area	53,804
Picture Rocks National Lakeshore	68,650
Saint Croix National Scenic River	98,007
Sleeping Bear Dunes National Lakeshore	70,101
Voyageurs National Park	204,426
Total Acreage	1,139,323

Calculations based on Lambert Conformal Conic (Conterminous US) projection

Source: ESRI and NRID
Date: 24 Nov 03

Gulf Coast

Exotic Plant Management Team

Partner parks and states: Cane River Creole NHP, LA; San Antonio Missions NHP, TX; Jean Lafitte NHP and Pr, LA; Vicksburg NMP, MS; Natchez Trace Parkway, MS, Gulf Islands NS, MS.

Accomplishments

Inventoried Acres	44,522
Gross Infested Acres	42,313
Infested Acres	437
Treated Acres	71
Monitored Acres	0
Retreated Acres	.27
Restored Acres	0
Time Lost Due to Injury	0

Gulf Coast Exotic Plant Management Team working on a buffel grass control project at Padre Island National Seashore

This was the Gulf Coast Exotic Plant Management (GC-EPMT) Team's first full season. The Team Liaison was hired in October, the Crew Chief in November, and the team came on board in May. Fieldwork began after two weeks of team training and continued uninterrupted through the end of the fiscal year.

The team's approach and strategy varied depending on the prevailing conditions at each of the ten partner parks. Growing season of each of the target species was the major controlling factor followed by the degree of infestation at each park. Small isolated populations of target species were given priority, followed by difficult to control species which will require multi-year control efforts. This strategy was employed to both stop new infestations before they became a major problem and ensure that the existing difficult infestations received an initial treatment.

The team loves a challenge and invested a considerable percentage of this year's energy developing control efforts for kudzu which is prevalent at three of the partner parks. Kudzu is a particularly persistent and difficult to control species in the area.

Targeted species for future control efforts in the gulf coast region include: 1) Chinese tallow which has become a major problem in the Big Thicket National Preserve and Jean Lafitte National Historic Park because it poses a similar threat to the Gulf Island National Seashore, 2) Chinese privet and Japanese honeysuckle which are of greatest concern in the Big Thicket National Preserve and Gulf Island National Seashore, 3) Chinaberry which is of greatest concern in the San Antonio Missions National Historical Park, 4) cogon grass which is becoming an increasing problem at most of the GC-EPMT partner parks, and 5) kudzu which is the most prevalent exotic plant pest of the Natchez Trace Parkway and Vicksburg National Military Park.

The GC-EPMT has been involved in several outreach programs this year including presentations to students from Saint Michaels University and the Big Thicket Association on the ecology and control of Chinese tallow.

Target Weed Species

Brazilian pepper
chinaberry
Chinese privet
Chinese tallow
cogon grass
giant reed
glossy privet
Japanese climbing fern
kudzu
saltcedar

Gulf Coast Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior

Parks	Acres
Big Thicket National Preserve	89,795
Gulf Islands National Seashore (MS)	55,261
Jean Lafitte National Historic Park and Preserve	18,856
Lyndon B. Johnson National Historic Site	1,694
Natchez Trace Parkway (MS)	31,420
Padre Island National Seashore	133,569
San Antonio Missions National Historic Park	837
Vicksburg National Military Park	1,604
Total Acreage	333,036

Source: ESRI and NRID
Date: 24 Nov 03

0 90,000 180,000 360,000 540,000 Meters

Calculations based on Lambert Conformal Conic (Conterminous US) projection

Lake Mead

Exotic Plant Management Team

Partner parks and states: Arches NP, UT; Cedar Breaks NM, UT; Canyonlands NP, UT; Capitol Reef NP, UT; Death Valley NP, CA; Dinosaur NM, CO/UT; Grand Canyon NP, AZ; Great Basin NP, NV; Lake Mead NRA; Joshua Tree NP, CA; Manzanar NHS, CA; Mojave Nr, CA; Natural Bridges NM, UT; Parashant NM, AZ; Zion NP, UT

Accomplishments

Inventoried Acres	2,613
Gross Infested Acres	1,832
Infested Acres	200
Treated Acres	61
Monitored Acres	125
Retreated Acres	19
Restored Acres	150
Time Lost Due to Injury	0

Removal of tamarisk at Arches National Park in Utah

The Lake Mead EPMT has primarily focused it's weed control activities within riparian and wetland habitats. Riparian areas, springs and wetlands are the most unique and valuable habitats in the arid West. They provide rare water sources for wildlife and support diverse plant communities. These water dependent communities also act as evolutionary islands that support many rare and endemic species. Unfortunately, these areas are also the most threatened habitats in the West as exotic species invasion has made a significant impact.

Tamarisk or saltcedar is a widespread invader of riparian areas throughout the West. It consumes vast amounts of water and displaces native plant and animal communities that depend on the limited water for survival. Tamarisk and other exotic plants commonly form dense impenetrable thickets that exclude wildlife and add salts to the soil surface inhibiting native plant recruitment. Fortunately, EPMT control of tamarisk and other riparian exotic species has proven to be an effective habitat restoration method.

The Lake Mead EPMT uses low impact, selective weed control methods that do not harm adjacent desirable vegetation. Native plants usually recover quickly following the removal of the weed plants without any active revegetation. When necessary, the team has successfully transplanted hundreds of native trees after exotic plant control. Site recovery is facilitated by a reduction in competition and an increase in soil moisture from the removal of weed trees.

The Lake Mead EPMT has become an interagency team that receives supplemental funding from local entities. It is responsible for implementing exotic plant control throughout southern Nevada for the Bureau of Land Management, the US Forest Service, the US Fish and Wildlife Service and Clark County, NV. The team obtained hazard fuel fire funds to assist with an all EPMT mobilization tamarisk and Russian olive control project at Arches National Park .The team was also awarded a Cooperative Conservation I grant by matching local county funds. These partnerships and additional funding have enabled the Lake Mead EPMT to hire more crewmembers and work on a watershed basis surrounding Lake Mead National Recreation Area. All of the partners benefit by having a larger crew implement projects within a limited time frame.

A 16-person team was fielded during FY 2003 which included 3 new squad leader term positions to provide continuous year round project support.

Target Weed Species

arundo
camelthorn
dandelion
fountain grass
Himalayan blackberry
houndstongue
perennial pepperweed
Russian knapweed
Russian olive
tamarisk (saltcedar)

Lake Mead Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior

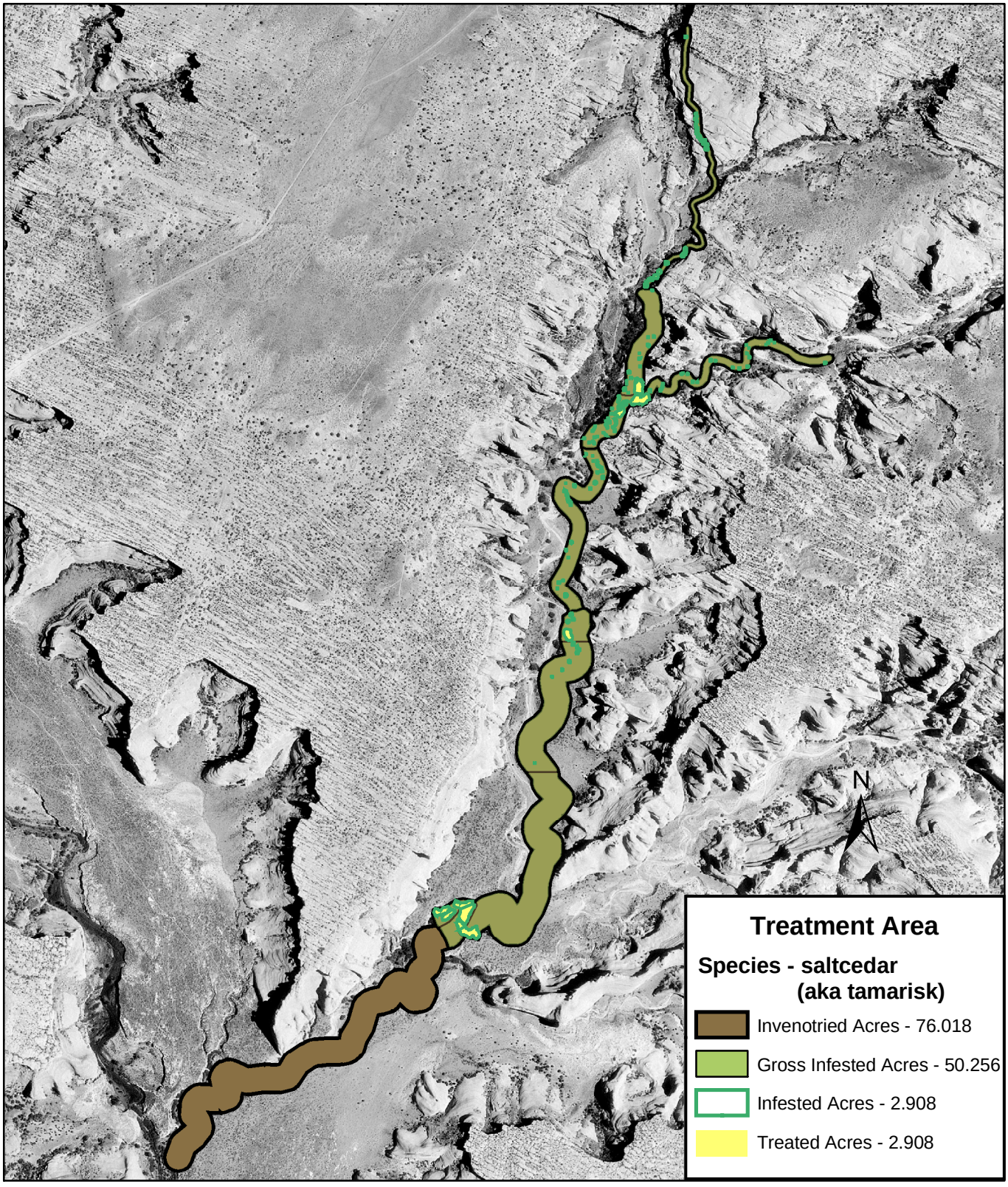
Parks	Acres
Arches National Park	75,738
Canyonlands National Park	331,348
Capitol Reef National Park	241,510
Cedar Breaks National Monument	6,038
Death Valley National Park	3,371,001
Dinosaur National Monument	208,656
Grand Canyon National Park	76,351
Great Basin National Park	1,197,517
Hovenweep National Monument	797
Hubbell Trading Post National Historic Site	161
Joshua Tree National Park	790,689
Lake Mead National Recreation Area	1,255,905
Manzanar National Historic Site	806
Mesa Verde National Park	52,694
Mojave National Park	1,529,963
Natural Bridges National Monument	7,324
Parashant National Monument	97,387
Pipe Spring National Monument	40
Yucca House National Monument	31
Zion National Park	146,403
Total Acreage	9,390,359

Source: ESRI and NRID
Date: 24 Nov 03

Calculations based on Lambert Conformal Conic (Conterminous US) projection

Lost Springs Canyon - Arches NP
Lake Mead EPMT

National Park Service
U.S. Department of the Interior



Meters
0 310 620 1,240

Source: USGS DOQQ Mollie Hogan SE, LAME
GIS collected with a Trimble GPS receiver
Date: 24 Nov 03

Scale - 1:15,100

Coordinate System - UTM_Zone 11N_NAD 83

Mid-Atlantic Cooperative

Exotic Plant Management Team

Partner parks and states: Appomattox Court House NHP, VA; Booker T. Washington NM, VA; Colonial NHP, VA; Eisenhower NHS, PA; Fredericksburg and Spotsylvania County Battlefields Memorial NMP, VA; George Washington Birthplace NM, VA; Gettysburg NM Park, PA; Petersburg NB, VA; Richmond NBP, VA; Shenandoah NP, VA.

Accomplishments

Inventoried Acres	1,073
Gross Infested Acres	927
Infested Acres	162
Treated Acres	36
Monitored Acres	18
Retreated Acres	3
Restored Acres	0
Time Lost due to Injury	0

Herbicide application to a 4-foot diameter tree of felled heaven stump

The Mid-Atlantic Cooperative EPMT (Cooperative) formally began operations in March 2003 serving eleven national parks in Virginia, Maryland, and Pennsylvania. Cooperation between parks and collaboration with outside agencies and neighbors are hallmarks of the Cooperative. Neighboring landowners at two parks joined in attacking mutual threats, including Colonial National Historic Park and Shenandoah National Park. This year, NPS staff completed all fieldwork. Next year, both NPS staff and a private sector contractor will participate in the effort.

The Cooperative is within a diverse and highly productive region spanning the coastal plains of the Chesapeake Bay and Potomac River, the vigorous Piedmont, and the hills and valleys of the Blue Ridge Mountains. The biological diversity of the region is one of the greatest in North America. Exotic vegetation, on the other hand, threatens to destroy native diversity and ecosystem health, by replacing thousands of species with a relative few. Protecting the natural legacy of the region is essential to ensure that future generations enjoy its expanse and native beauty.

The Cooperative targets exotic species and areas of infestation that are highly invasive yet can be controlled with minimal efforts. This initial approach allows rapid protection of areas that, with minimal effort, return to vigorous natural development. Each park has a different set of exotic plant threats. Common problems include fast growing vines, such as kudzu and mile-a-minute. They also include plants with either fruits that fauna eat and pass to other locations or light wind-blown seed, such as Japanese barberry and tree of heaven.

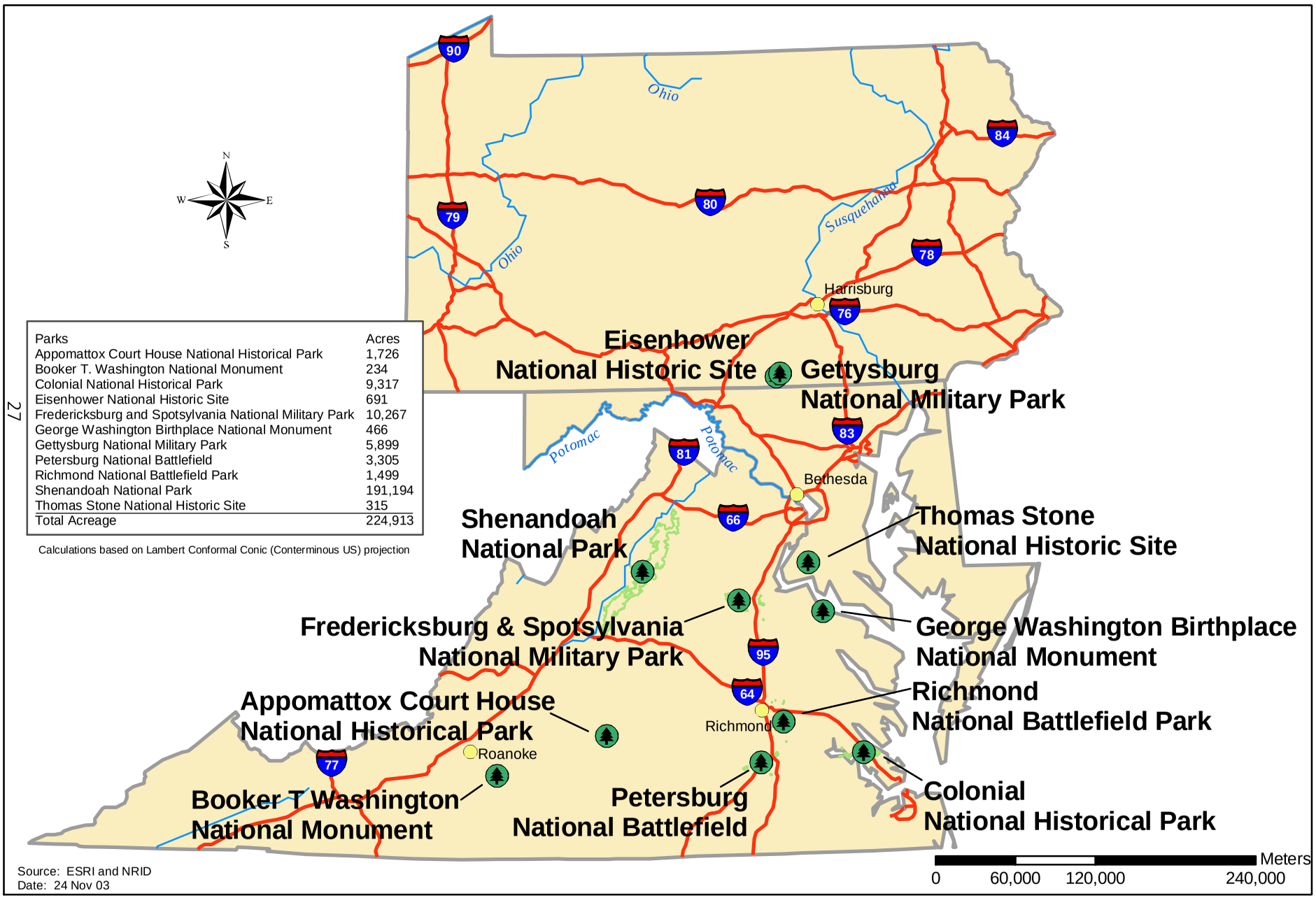
The Cooperative uses an integrated pest management approach where prevention and early detection are emphasized and controls include hand pulling, manual and power assisted cutting, prescribed fire, and application of herbicides. The team works closely with park maintenance staffs, construction contractors, and permitted farmers to ensure that new exotics are not introduced into parklands. In an effort to increase public awareness and encourage appreciation of native species, members of the Cooperative reached the public through newspaper interviews, professional journals, interpretive talks in the parks, and participation in regional exotic pest plant councils.

Target Weed Species

ailanthus / tree of heaven
common reed / phragmites
Japanese barberry
Japanese stiltgrass
Johnson grass
kudzu vine
mile-a-minute vine
multiflora rose
oriental bittersweet vine
privet bush

Mid-Atlantic Cooperative Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior



Parks	Acres
Appomattox Court House National Historical Park	1,726
Booker T. Washington National Monument	234
Colonial National Historical Park	9,317
Eisenhower National Historic Site	691
Fredericksburg and Spotsylvania National Military Park	10,267
George Washington Birthplace National Monument	466
Gettysburg National Military Park	5,899
Petersburg National Battlefield	3,305
Richmond National Battlefield Park	1,499
Shenandoah National Park	191,194
Thomas Stone National Historic Site	315
Total Acreage	224,913

Calculations based on Lambert Conformal Conic (Conterminous US) projection

27

Source: ESRI and NRID
Date: 24 Nov 03

National Capital Region

Exotic Plant Management Team

Partner parks and states: Antietam NB, MD; Appalachian NST, VA, WV, PA; Catoctin Mountain Park, MD; Chesapeake and Ohio Canal NHP, MD, WV, DC; George Washington MPkwy, VA; Harpers Ferry NHP, VA, WV; Manassas NBP, VA; Monocacy NB, MD, National Capital Parks- Central, DC; National Capital Parks- East, DC; Prince William Forest Park, VA; Rock Creek Park, DC; Wolf Trap Farm Park for the Performing Arts, VA

Accomplishments

Inventoried Acres	163,677
Gross Infested Acres	134,029
Infested Acres	60,360
Treated Acres	1,093
Monitored Acres	77
Retreated Acres	246
Restored Acres	0
Time Lost Due to Injury	0

Foliar spraying of Common Reed near Dyke Marsh in George Washington Memorial Parkway

Despite a late start to the spring/summer treatment season—high rainfall and a hurricane—the National Capital Region Exotic Plant Management Team (NCR-EPMT) doubled their treatment acreage and increased acres inventoried by 3500%.

In addition to work in this region, the team was detailed for cooperative projects with the Florida EPMT at Everglades National Park and Biscayne National Park to control melaleuca, Australian pine, Asian snakewood, and portia tree. The team also worked on a project with the Mid-Atlantic Cooperative EPMT at Colonial National Historic Park to control Common reed and reduce fuels by removing exotic plants. The NCR-EPMT assisted the servicewide EPMT program establish new teams by aiding in the hiring of the Liaison and Crew Leader for the Northeast EPMT.

The NCR-EPMT increased public awareness and promoted the EPMT program concept by presenting numerous outreach programs, developing a NCR-EPMT web page and creating demonstration sites for congressional and teaching field tours. This year's 33 outreach programs included participation in: Rapid Response Workshops, Public Lands Day, Earth Day, Mission 66 and Park Service Anniversary, DC Garden Club Work Day, Interpretation Leadership and Integrated Pest Management Courses, and program recruitment at a Job Fair.

Partnerships for rare plant re-introduction, teaching demonstration plots, and fuel reduction were conducted with the following organizations: Nature Conservancy/Potomac Gorge Conservancy; Greater DC Garden Club; the FWS National Conservation Training Center; West Virginia Citizen Conservation Corps; George Washington University; and the National Park Service – STEP, YCC, SCA internship programs.

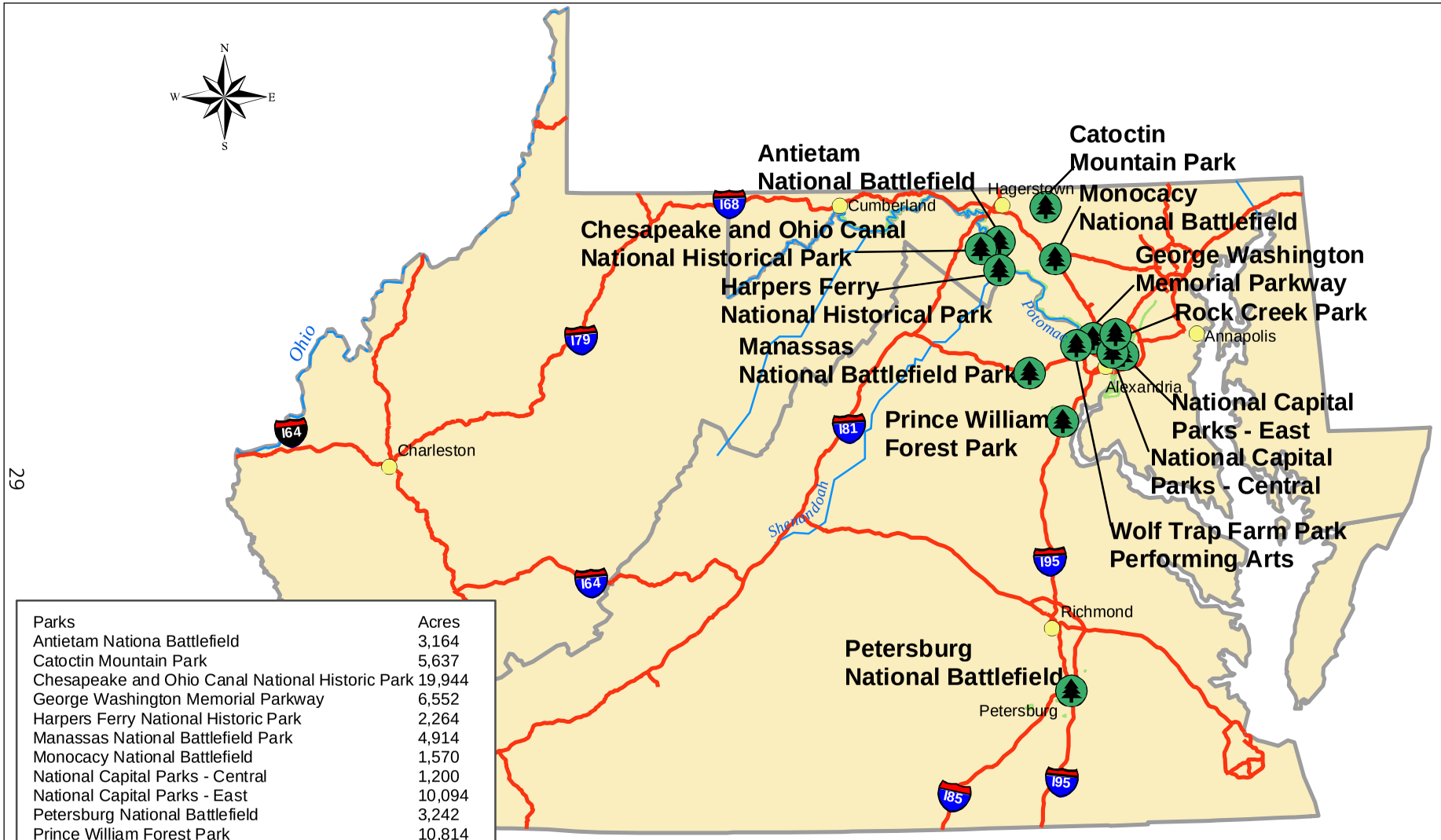
Work continued on removing exotic vegetation from selected sites along the Potomac River for the re-introduction of harperella, the only federally listed rare plant in the National Capital Region. The team assisted the US Fish and Wildlife Service in developing an Exotic Plant Management Plan for its Training Center in Shepherdstown, WV, and turned the entire campus into educational demonstration plots of different treatment techniques for a variety of species. Throughout all these activities, safety has remained of the utmost importance resulting in no lost work time.

Target Weed Species

bush honeysuckle
common reed
English ivy
Japanese barberry
Japanese honeysuckle
lesser celandine
mile-a-minute vine
multiflora rose
wineberry
wisteria

National Capital Region Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior



Parks	Acres
Antietam Nationa Battlefield	3,164
Catoctin Mountain Park	5,637
Chesapeake and Ohio Canal National Historic Park	19,944
George Washington Memorial Parkway	6,552
Harpers Ferry National Historic Park	2,264
Manassas National Battlefield Park	4,914
Monocacy National Battlefield	1,570
National Capital Parks - Central	1,200
National Capital Parks - East	10,094
Petersburg National Battlefield	3,242
Prince William Forest Park	10,814
Rock Creek Park	2,858
Wold Trap Farm Park	130
Total Acerage	72,383

Calculations based on Lambert Conformal Conic (Conterminous US) projection

Source: ESRI and NRID
Date: 24 Nov 03

0 49,500 99,000 198,000 Meters

Wolf Trap Farm Park NHP
National Capital Region EPMT

National Park Service
U.S. Department of the Interior

Source: USGS DOQQ Vienna NE & SE, NRID Park Boundary, NCR coverages collected with Trimble ProXR GPS Receiver
Date: 21 Nov 03

Scale - 1:4,800

Coordinate System - UTM_Zone 18N_NAD 83

North Coast / Cascades Network

Exotic Plant Management Team

Partner parks and states: North Cascades NP Complex, WA; Olympic NP, WA; Ebey's Landing NHR, WA; Fort Clatsop NM, OR; Fort Vancouver NHS, WA; Mount Rainier NP, WA; San Juan Island NHP, WA; Lake Roosevelt NRA, WA, John Day Fossil Beds, NM, OR; Lake Chelan NRA, WA; Ross Lake NP, WA; Nez Perce NHP, ID; Whitman Mission NHS, WA

Accomplishments

Inventoried Acres	15,295
Gross Infested Acres	2,527
Infested Acres	898
Treated Acres	336
Monitored Acres	86
Retreated Acres	18
Restored Acres	0
Time Lost due to Injury	0

Volunteers with the North Coast/Cascades Network EPMT pull Scotch broom in North Cascades National Park

The North Coast/Cascades Network EPMT has primarily focused on: 1) aggressively inventorying and treating Japanese knotweed in riparian areas and 2) containing Herb Robert to prevent it from invading undisturbed habitat. Japanese knotweed has the ability to form dense monocultures in riparian areas and may affect the quality of fish spawning habitat through increased sedimentation and habitat invasion. Herb Robert, a relatively recent invader, has demonstrated the ability to invade undisturbed areas beneath the forest canopy forming dense monocultures and excluding other under-story species.

During the summer of 2003, the team received a Cooperative Conservation Initiative grant to experiment with alternative methods for roadside and rights-of-way weed management. The team worked with NPS re-vegetation staff and the Washington Department of Transportation to develop a native plant mix for use in treatment areas and used both hot foam weed control and an agricultural steaming system in areas of regular disturbance. The team has additionally worked on cooperative projects with variety of partners, including: The Nature Conservancy of Washington; Washington State Parks; Washington State Department of Corrections; Clallum, Ferry, Island, Lincoln, Skagit and Whatcom counties; the US Forest Service; Seattle City Light; and the Elwha tribe.

The team has also focused on researching best management practices for a variety of other species. This has included experimentation at Ebey's Landing National Historic Reserve for the removal/replacement of poison hemlock in areas of high visitor use, as well as the removal of Canada thistle at San Juan Island National Historic Park to facilitate restoration of native prairie. It is anticipated that the results of this research will be reported on in FY 2004.

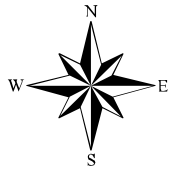
Plans for the future include expanding the team's service area to cover park units in a portion of the Northern Semi-Arid Network and treating additional troublesome riparian species such as reed canarygrass.

Target Weed Species

Canada thistle
English Ivy
everlasting peavine
hawkweed
herb Robert (*Geranium robertianum*)
Japanese, giant, and Himalayan knotweed
knapweed
poison hemlock
reed canary grass
Scotch broom

North Coast/Cascade Network Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior



Parks	Acres
Edeby's landing National Historic Reserve	18,140
Fort Clatsop National Memorial	133
Fort Vancouver National Historic Site	220
John Day Fossil Beds National Monument	13,950
Lake Roosevelt national Recreational Area	106,343
Mount Rainier National Park	237,166
North Cascades Network	
Lake Chelan National Park Complex	64,153
North Cascades National Park	510,539
Ross Lake National Park	119,175
Nez Perce National Historic Park	3,268
Olympic National Park	926,353
San Juan Islands National Historic Park	1,754
Whitman Mission National Historic Site	97
Total Acreage	2,001,291

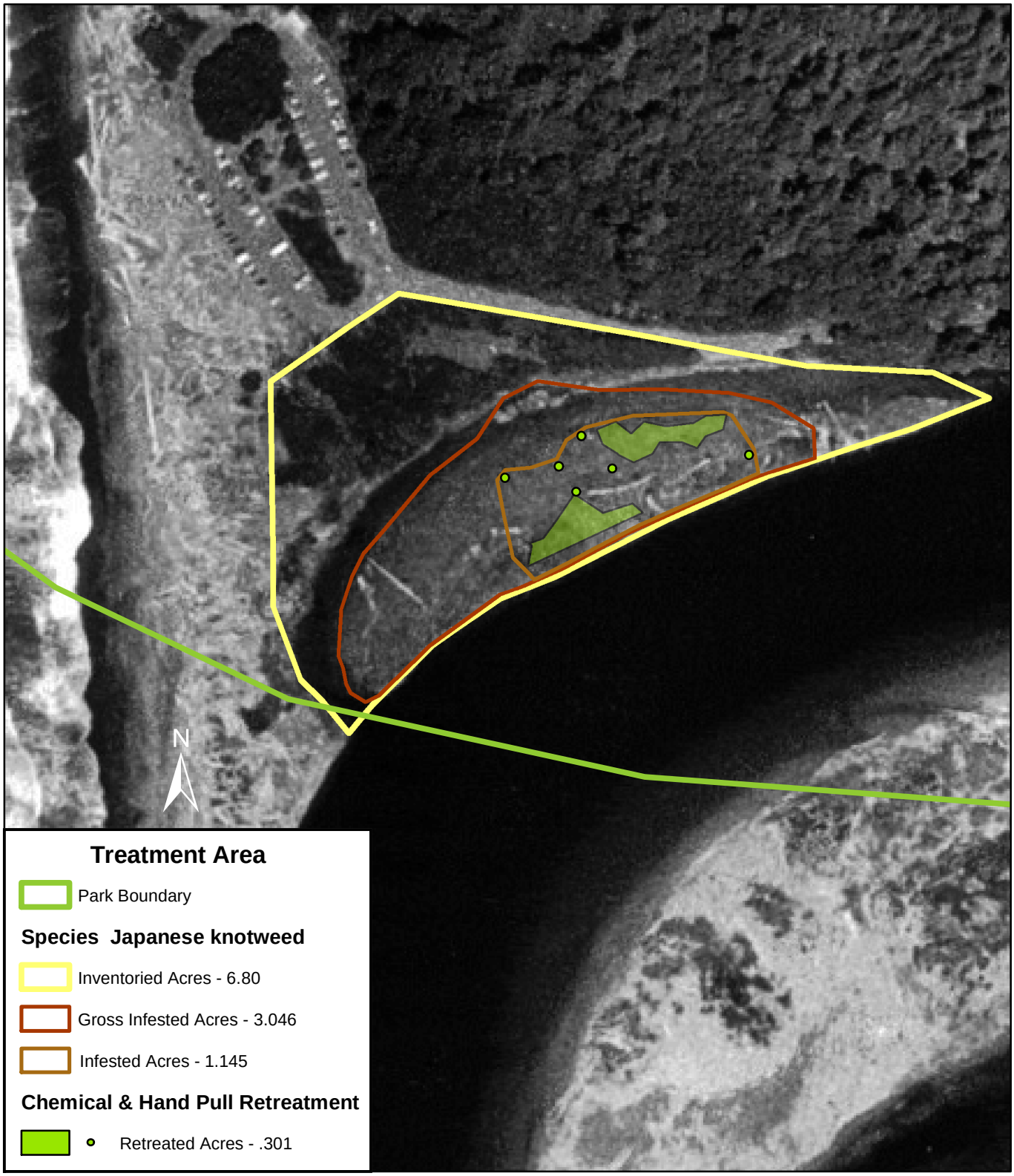
Source: ESRI and NRID
Date: 24 Nov 03

0 125,000 250,000 500,000 Meters

Calculations based on Lambert Conformal Conic (Conterminous US) projection

Quilyute River - Olympic NP
North Coast / Cascade Network EPMT

National Park Service
U.S. Department of the Interior



Source: USGS DOQQ La Push SE, NRID Park Boundary, NCCN coverages collected with Trimble GPS Receiver
Date: 24 Nov 03

Scale - 1:2,300

Coordinate System - UTM_Zone 10N_NAD 83

Northeast

Exotic Plant Management Team

Partner parks and states: Allegheny Portage Railroad NHS, PA; Boston Harbor Islands NRA, MA; Delaware Water Gap NRA, PA, NJ; Fort Necessity NB, PA; Friendship Hill NHS, PA; Hopewell Furnace NHS, PA; Johnstown Flood NM, PA; Morristown NHP, NJ; Roosevelt-Vanderbilt NHS, NY; Saratoga NHP, NY; Upper Delaware S&R, PA, NY; Valley Forge NHP, PA; Weir Farm NHS, CT

Accomplishments

Inventoried Acres	105
Gross Infested Acres	105
Infested Acres	32
Treated Acres	32
Monitored Acres	0
Retreated Acres	0
Restored Acres	0
Time Lost Due to Injury	0

Burning bush, invading forest under story at Delaware Water Gap National Recreation Area

The Northeast Exotic Plant Management Team (NE-EPMT) was created in FY 2003 to assist parks in the Northeast Region, from Pennsylvania north to Maine, in identifying and controlling invasive exotic plant populations threatening park resources.

The team reports to the Northeast Regional Office, Natural Resources and Science, but is stationed at Delaware Water Gap National Recreation Area. The Northeast Region has two EPMTs. The second, the Mid-Atlantic EPMT, is stationed at Shenandoah National Park and covers some south-central Pennsylvania parks in the northern part of its range.

Because of funding issues, EPMT staff were hired late in FY 2003. The Team Liaison was hired at the end of July and began work on August 24th. The Team Crew Leader was hired in September and will start on November 2nd. These two staff members will decide how to configure the actual team and begin advertising for Crew Member positions in late FY 2003.

In FY 2003, most of the Team's budget went toward buying vehicles, equipment and supplies. As a result, the Northeast EPMT is well equipped to deal with the challenges ahead.

Some on-the-ground work was done in June at Delaware Water Gap National Recreation Area. A contractor treated weeds on a 35-acre farm field being restored to a native warm-season grass meadow. This parcel is part of a network of open fields and comprises over 200 acres. It is the single largest contiguous set of meadows and open fields in the park and is considered crucial habitat for grassland bird species, such as the grasshopper sparrow, as well as other wildlife requiring open habitat.

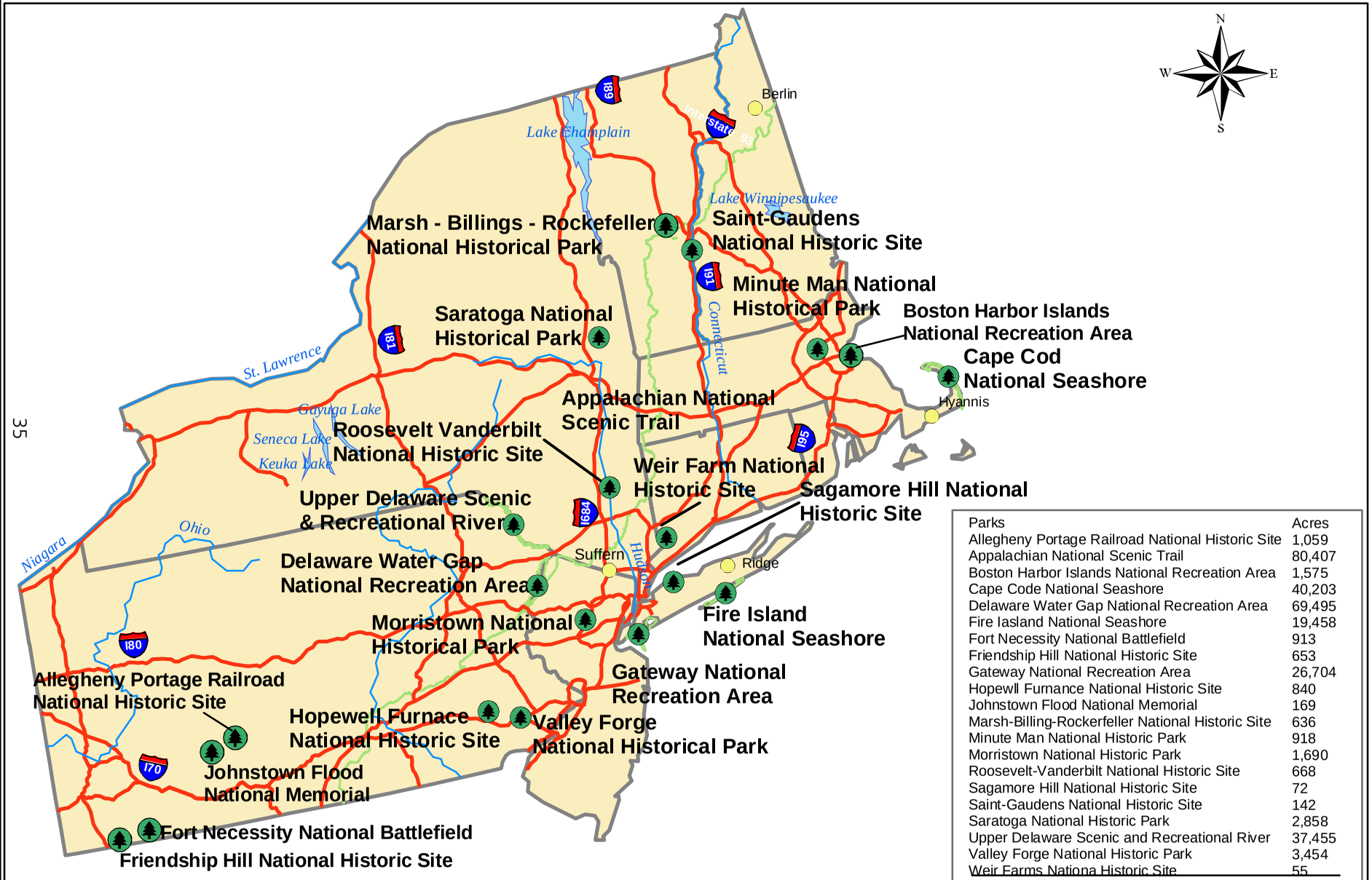
The target weed species listed below are those expected to be among the top most problematic species for Northeast parks. As the team progresses, this list will probably change as new challenges are encountered.

Target Weed Species

autumn olive
black swallow-wort
bush honeysuckles (several species)
garlic mustard
Japanese barberry
Japanese knotweed
Japanese stiltgrass
oriental bittersweet
common reed
purple loosestrife
tree-of-heaven

Northeast Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior



Parks	Acres
Allegheny Portage Railroad National Historic Site	1,059
Appalachian National Scenic Trail	80,407
Boston Harbor Islands National Recreation Area	1,575
Cape Code National Seashore	40,203
Delaware Water Gap National Recreation Area	69,495
Fire Iasland National Seashore	19,458
Fort Necessity National Battlefield	913
Friendship Hill National Historic Site	653
Gateway National Recreation Area	26,704
Hopewll Furnance National Historic Site	840
Johnstown Flood National Memorial	169
Marsh-Billing-Rockerfeller National Historic Site	636
Minute Man National Historic Park	918
Morristown National Historic Park	1,690
Roosevelt-Vanderbilt National Historic Site	668
Sagamore Hill National Historic Site	72
Saint-Gaudens National Historic Site	142
Saratoga National Historic Park	2,858
Upper Delaware Scenic and Recreational River	37,455
Valley Forge National Historic Park	3,454
Weir Farms Nationa Historic Site	55
Total Acreage	289,424

Source: ESRI and NRID
Date: 24 Nov 03

Meters
0 70,000 140,000 280,000

Calculations based on Lambert Conformal Conic (Conterminous US) projection

Northern Great Plains

Exotic Plant Management Team

Partner parks and states: Agate Fossil Beds NM, NE; Badlands NP, SD; Devils Tower NM, WY; Fort Laramie NHS, WY; Fort Union Trading Post NHS, ND; Jewel Cave NM, SD; Knife River Indian Villages NHS, ND; Missouri National RR, NE, SD; Mount Rushmore NM, SD; Niobrara NSR, NE; Scott's Bluff NM, NE; Theodore Roosevelt NP, ND; Wind Cave NP, SD

Accomplishments

Inventoried Acres	30,450
Gross Infested Acres	5,118
Infested Acres	2,879
Treated Acres	1,736
Monitored Acres	0
Retreated Acres	.02
Restored Acres	0
Time Lost Due to Injury	16

Control of leafy spurge at Theodore Roosevelt National Park

Non-native plants pose a serious threat to native plant communities and their natural processes in the Northern Great Plains Parks. In Badlands National Park, Canada thistle has invaded approximately 11,000 acres of native habitat. At Theodore Roosevelt National Park, more than 20,000 acres (~30%) of native habitat have been altered by the invasion of 68 exotic vegetation species. To date, the Northern Great Plains EPMT (NGP-EPMT) has located 123 large infestations (~595 acres) and 547 small infestations (~2.33 acres) of purple loosestrife along the Niobrara National Scenic River. In FY 2003, over 1,677 acres of purple loosestrife have been mapped at Missouri National Recreational River. These large monotypic stands of purple loosestrife are replacing native plant communities, eliminating waterfowl habitat, and reducing the biotic diversity of the riparian systems. At Wind Cave National Park, the team concentrated its efforts on two of the 28 management units and mapped 379 infestations of Canada thistle comprising 61.86 acres.

Exotic plant invasions not only displace native plant communities, but lead to the loss of habitat for federally listed threatened and endangered species. This includes the loss of nesting and foraging habitat for the endangered interior least tern and the piping plover. Both the Missouri National Recreational River and the Niobrara National Scenic River have federally designated sections of critical habitat for the piping plover.

The NGP-EPMT has been involved in several outreach programs this year. To promote public awareness of the NGP-EPMT, Devils Tower National Monument staff issued a press release about the collection and distribution of biological control agents for leafy spurge. The NGP-EPMT itself was on television, (KQCD-channel 7 and KXMB-channel 12) discussing control efforts. The team did a live broadcast on KFYR radio regarding the nearly 10 million biological control agents collected and released. The Associated Press picked up several press releases regarding aerial herbicide application and closure of campgrounds for treatment of leafy spurge.

The team presented two posters at the George Wright Society meeting, two posters at the 56th Annual Society Range Management Meeting and one poster at the Western Society of Weed Science Annual Meeting. Four peer reviewed journal articles were accepted and published: one in *Pest Management Science*, two in *Journal of Range Management,* and one in *Integrated Pest Management Reviews*. The team participated as a judge for North Dakota's Southwest Regional Science and Engineering Fair in Dickinson, ND.

The NGP-EPMT was successful in obtaining Cooperative Conservation Initiative, Fire Program, and Rocky Mountain Elk Foundation grants.

Target Weed Species

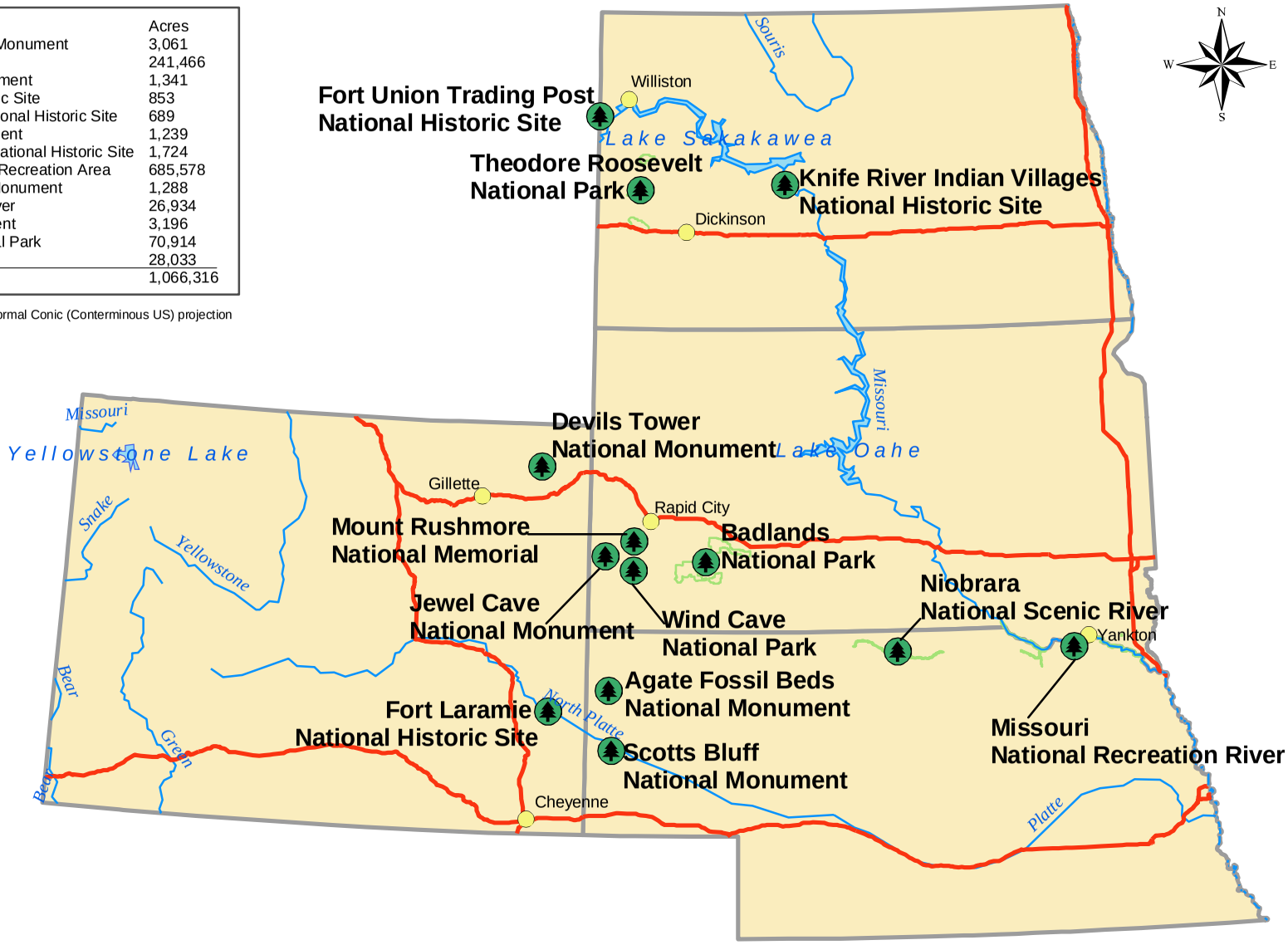
arundo
camelthorn
dandelion
fountain grass
Himalayan blackberry
houndstongue
perennial pepperweed
Russian knapweed

Northern Great Plains Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior

Parks	Acres
Agate Fossil Beds National Monument	3,061
Badlands National Park	241,466
Devils Tower National Monument	1,341
Fort Laramie National Historic Site	853
Fort Union Trading Post National Historic Site	689
Jewel Cave National Monument	1,239
Knife River Indian Villages National Historic Site	1,724
Missouri National River and Recreation Area	685,578
Mount Rushmore National Monument	1,288
Niobrara National Scenic River	26,934
Scottsbluff National Monument	3,196
Theodore Roosevelt National Park	70,914
Wind Cave National Park	28,033
Total Acreage	1,066,316

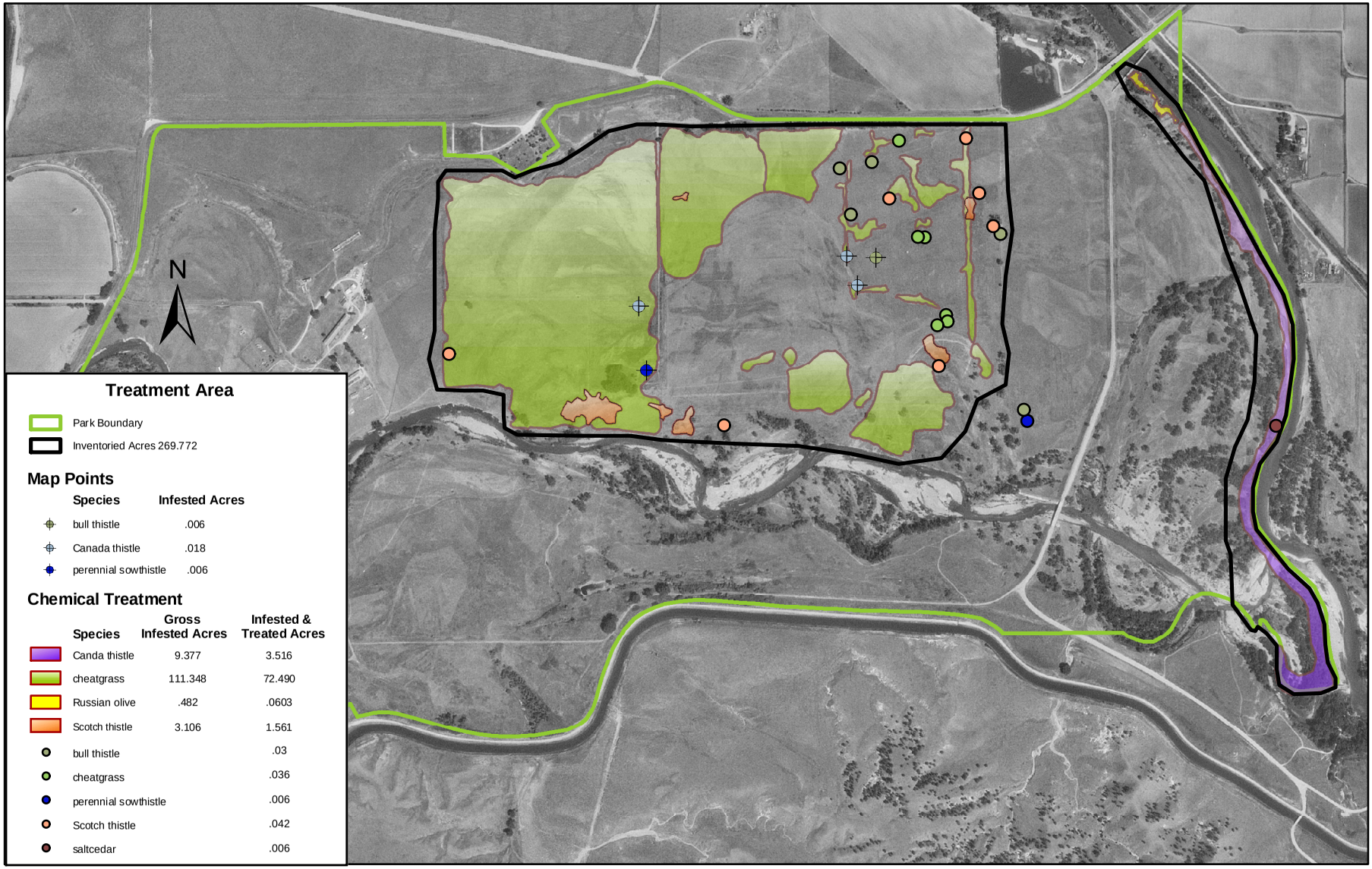
Calculations based on Lambert Conformal Conic (Conterminous US) projection



Source: ESRI and NRID
Date: 24 Nov 03

Fort Laramie NHS
Northern Great Plains EPMT

National Park Service
U.S. Department of the Interior



Treatment Area

Park Boundary

Inventoried Acres 269.772

Map Points

Species	Infested Acres
bull thistle	.006
Canada thistle	.018
perennial sowthistle	.006

Chemical Treatment

Species	Gross Infested Acres	Infested & Treated Acres
Canda thistle	9.377	3.516
cheatgrass	111.348	72.490
Russian olive	.482	.0603
Scotch thistle	3.106	1.561
bull thistle		.03
cheatgrass		.036
perennial sowthistle		.006
Scotch thistle		.042
saltcedar		.006

Source: USGS DOQQ Fort Laramie NE, NRID Park Boundary,
NGP coverages collected with a Trimble GPS receiver
Date: 21 Nov 03

0 225 450 900 Meters

Scale - 1:12,500

Coordinate System - UTM_Zone 13N_NAD 83

Northern Rocky Mountain

Exotic Plant Management Team

Partner parks and states: Bear Paw BG (Nez Perce NHP), MT; Big Hole NB, MT; Bighorn Canyon NRA, MT, WY; City of Rocks NPr, ID; Craters of the Moon NM, ID; Fossil Butte NM, WY; Glacier NP, MT; Golden Spike NHS, UT; Grand Teton NP, WY; Grant-Kohrs Ranch NHS, MT; Hagerman Fossil Beds NM, ID; John D. Rockefeller MP, WY; Little Bighorn Battlefield NM, MT; Yellowstone NP, WY, MT, ID

Accomplishments

Inventoried Acres	9,169
Gross Infested Acres	2,664
Infested Acres	78
Treated Acres	67
Monitored Acres	0
Retreated Acres	2
Restored Acres	.1
Time Lost Due to Injury	0

Control of cheat grass by the Northern Rocky Mountain EPMT

The Northern Rocky Mountain EPMT had a busy and exciting first year. Team infrastructure was developed using resource management program staff support from Yellowstone National Park, Glacier National Park, and Craters of the Moon National Monument. The 15 partner parks, totaling about 4 million acres, were divided into three satellite units. Each satellite consisted of a crew of three staff members, with seasonal employees at Yellowstone and Glacier National Park, and Student Conservation Association volunteers at Craters of the Moon National Monument.

The Yellowstone satellite EPMT crew, in addition to assisting within Yellowstone, focused on Grand Teton National Park; John D Rockefeller, JR Memorial Parkway; and the south unit of Bighorn Canyon National Recreation Area. The Glacier National Park satellite EPMT crew worked in Glacier National Park and assisted Grant-Kohrs Ranch National Historic Site, Big Hole National Battlefield, Little Bighorn Battlefield National Monument, the north unit of Bighorn Canyon National Recreation Area, and Bear Paw Battlefield. The Craters of the Moon satellite EPMT crew worked in Craters of the Moon National Monument, Hagerman Fossil Beds National Monument, Minidoka Internment National Historic Site, City of Rocks Natural Reserve, Fossil Butte National Monument, and Golden Spike National Historic Site. Yellowstone National Park, in addition to being the host park, provided an acting liaison for the first field season.

Much of the effort this year went into program development. Two permanent crew leaders were hired: one is stationed at Craters of the Moon National Monument and one is at Glacier National Park. Additionally, needed equipment and supplies were purchased including vehicles, four-wheelers, trailers, sprayers, computers, GPS units, etc.

Along with addressing infrastructure needs and two weeks of initial crew training at Yellowstone, the three satellite EPMT crews visited all partner parks at least once for a total of 45 crew weeks in the field. Crews treated over a dozen different species in the 15 parks with high priority placed on treatment of new invading species.

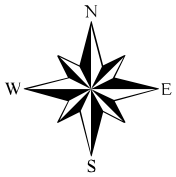
In addition to assisting parks with exotic plant treatment and inventories, EPMT staff assisted with the NPS Inventory and Monitoring efforts, fostered development and participation by partner parks in cooperative weed management areas, trained park staff in various phases of exotic plant operations, and assisted parks in several emergency operations including wild land fire fighting.

Target Weed Species

Canada thistle
cheatgrass
Dyer's woad
Dalmatian toadflax
field bindweed
leafy spurge
ox-eye daisy
Russian knapweed
yellow star thistle

Northern Rocky Mountain Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior



Parks	Acres
Bear Paw Battle Ground	197
Big Hole National Battlefield	673
Big Horn Canyon National Recreation Area	119,605
City of Rocks National Reserve	14,464
Craters of the Moon National Monument	467,063
Fossil Butte National Monument	8,213
Glacier National Park	1,026,689
Golden Spike National Historic Site	2,644
Grand Teton National Park	308,654
Grant-Kohrs Ranch National Historic Site	1,617
Hagerman Fossil Beds National Monument	4,288
John D. Rockerfeller Memorial Parkway	23,634
Little Bighorn Battlefield	761
Yellowstone National Park	2197338
Total Acreage	4,175,840

Meters
0 125,000 250,000 500,000

Calculations based on Lambert Conformal Conic (Conterminous US) projection

Source: ESRI and NRID
Date: 24 Nov 03

Pacific Islands

Exotic Plant Management Team

Partner parks and states (All located in Hawaii proper): Haleakala NP; Hawai'i Volcanoes NP; Kalaupapa NHP; Kaloko-Honokohau NHP; Pu'uhonua o Honaunau NHP; Pu'ukohola Heiau NHS

Accomplishments

Inventoried Acres	40,710
Gross Infested Acres	30,299
Infested Acres	33
Treated Acres	21
Monitored Acres	10
Retreated Acres	2
Restored Acres	0
Time Lost Due to Injury	0

Surgically targeting individual mature miconia with a "spot sprayer" on a helicopter to minimize impact to surrounding vegetation

The Pacific Islands EPMT (PI-EPMT) recently focused the majority of its efforts on the implementation of a coordinated interagency program to contain the rapidly expanding invasion of miconia (the "purple plague") on Maui. Although control programs have been in place for a decade, these efforts have historically suffered from inadequate resources acting on a poorly defined problem. Until recently, control efforts were chasing an invasion that was expanding at a rate that far exceeded available containment capacity.

Miconia has been described as the weed with the capability to completely destroy the Hawaiian rainforest from sea level to an elevation of 6,500 feet. Native to Central and South America, miconia has decimated over 70% of the Tahitian rainforest since its introduction in 1937. The conditions and climate available in Hawaii are comparable to those in Tahiti.

The recent miconia containment strategy has focused on four key areas: 1) increasingly specific problem definition using field crews and aerial surveys to identify hotspots, outlier populations, and periphery areas, 2) target elimination across the entire known area of infestation focusing specifically on mature and near mature (fruiting) plants using helicopters as platforms for spot application of herbicides, 3) ground crew sweeps beginning on the periphery of infestations and focusing on areas that most critically threaten Kipahulu Science Reserve in Haleakala National Park, and 4) development of new methods and technologies to improve control effectiveness and efficiency.

In addition to taking a lead role in the control of miconia on Maui, the team has assisted in other invasive weed control projects. For example, significant effort has been invested implementing an island-wide mapping and eradication effort for pampas grass on Maui. Originally brought in as an ornamental, pampas grass threatens to crowd out native vegetation and alter wildfire regimes on Maui. The invasion of pampas grass is considered to be in an incipient stage and on the verge of explosive expansion.

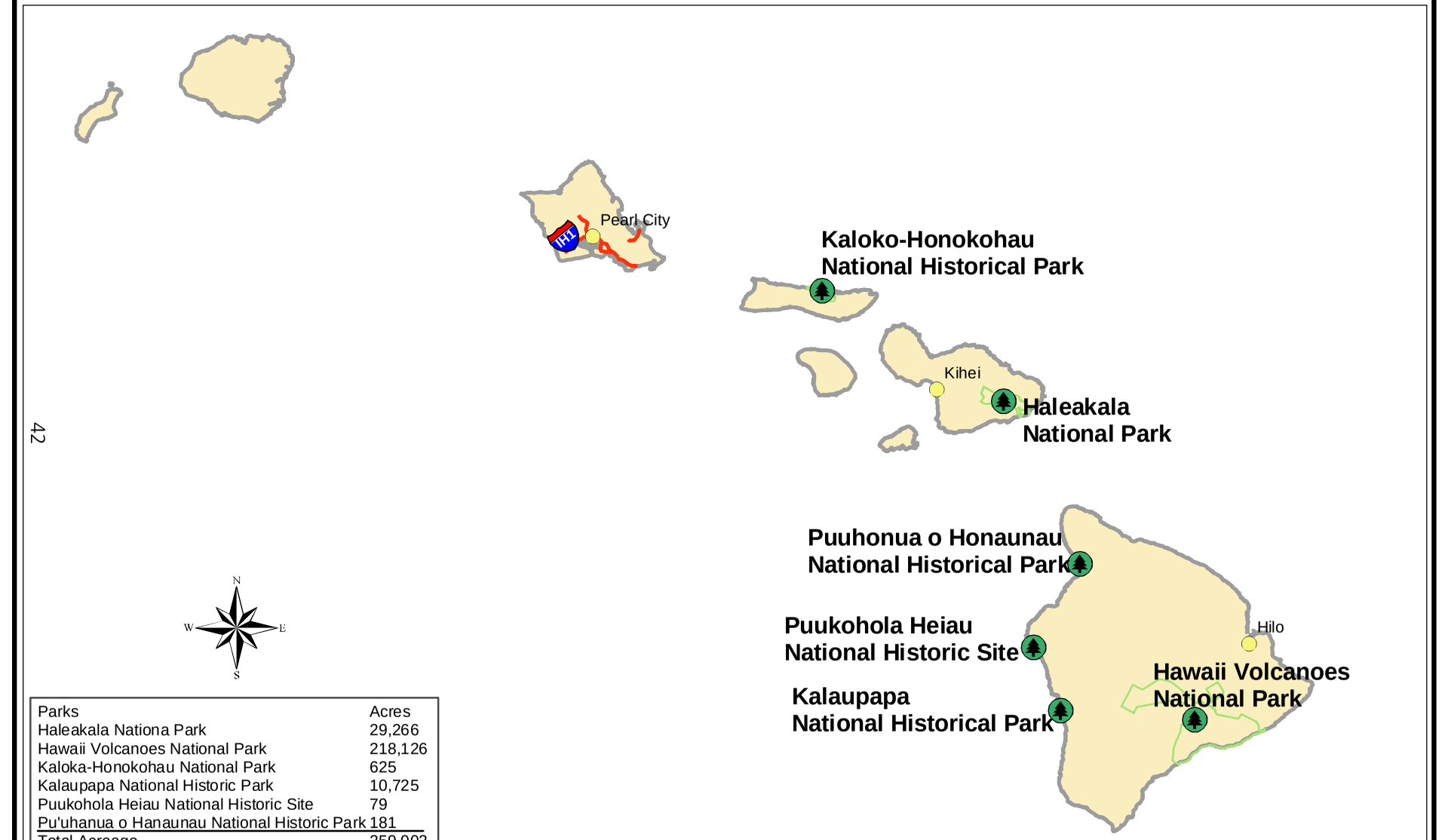
The team has benefited from a close cooperative relationship with the Maui Invasive Species Committee (MISC) leveraging effort and funding from a wide variety of sources including: state and county agencies, private entities and assorted watershed partnerships, federal agencies, and several National Park Service sources.

Target Weed Species

blue gum
fountain grass
giant reed
gorse
guava
Mexican weeping pine
miconia
mullein
pampas grass
silk oak

Pacific Islands Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior



42

Parks	Acres
Haleakala Nationa Park	29,266
Hawaii Volcanoes National Park	218,126
Kaloka-Honokohau National Park	625
Kalaupapa National Historic Park	10,725
Puukohola Heiau National Historic Site	79
Pu'uhanua o Hanaunau National Historic Park	181
Total Acreage	259,002

Calculations based on Albers Equal Area Conic (Hawaii) projection

Source: ESRI and NRID
Date: 24 Nov 03

Meters
0 40,000 80,000 160,000

Southeast

Exotic Plant Management Team

Partner parks and states: Blue Ridge Pkwy, NC, Big South Fork NRRA, TN; Cumberland Gap NHP, TN; Mammoth Cave NP, TN; Abraham Lincoln Birthplace NHS, TN; Carl Sandburg Home NHS, NC, Chattahoochee River NRA, GA; Chickamauga and Chattanooga NMP, GA, Cowpens NB, SC; Fort Donelson NB, TN; Guilford Courthouse NMP, NC; Kings Mountain NMP, SC; Little River Canyon NPr, AL, Ninety Six NHS, SC; Obed WSR, TN; Natchez Trace Parkway, TN; Russell Cave NMP, AL ; Stones River NB, TN

Accomplishments

Inventoried Acres	1,226
Gross Infested Acres	122
Infested Acres	122
Treated Acres	27
Monitored Acres	0
Retreated Acres	0
Restored Acres	0
Time Lost Due to Injury	0

Honeysuckle causes damage to red oak trees by out competing them for light.

The Southeast EPMT was established in July 2003 and serves 16 parks in the Appalachian Highlands and Cumberland-Piedmont Inventory and Monitoring Networks. It is responsible for implementing exotic plant management programs on National Park Service lands in Kentucky, Tennessee, North Carolina, South Carolina, Georgia and Alabama.

The Southeast EPMT focuses weed control activities in riparian and upland mesic habitats. Many of these sites are unique habitats and support state and federally listed threatened and endangered species. Exotic plants in this region were primarily introduced through intentional introductions, escapees from ornamental agricultural (e.g. tall fescue), and right-of-way plantings on sites that adjoin parklands.

Some of the most common invasions into natural areas are from plant populations that have become established along road right-of-ways. Often seen species include kudzu, wisteria, Oriental bittersweet, and multiflora rose. Ailanthus, paulownia, and mimosa are tree species that constitute the primary problem along roadsides and disturbed areas. The most troublesome exotics in river flood plains are privet and Nepalese browntop.

Exotic plants are constantly establishing in southeast parks because of the relatively mild and long growing seasons and elevation ranges. Therefore, the Southeast EPMT will work year- round using an integrated pest management approach to address this continual establishment.

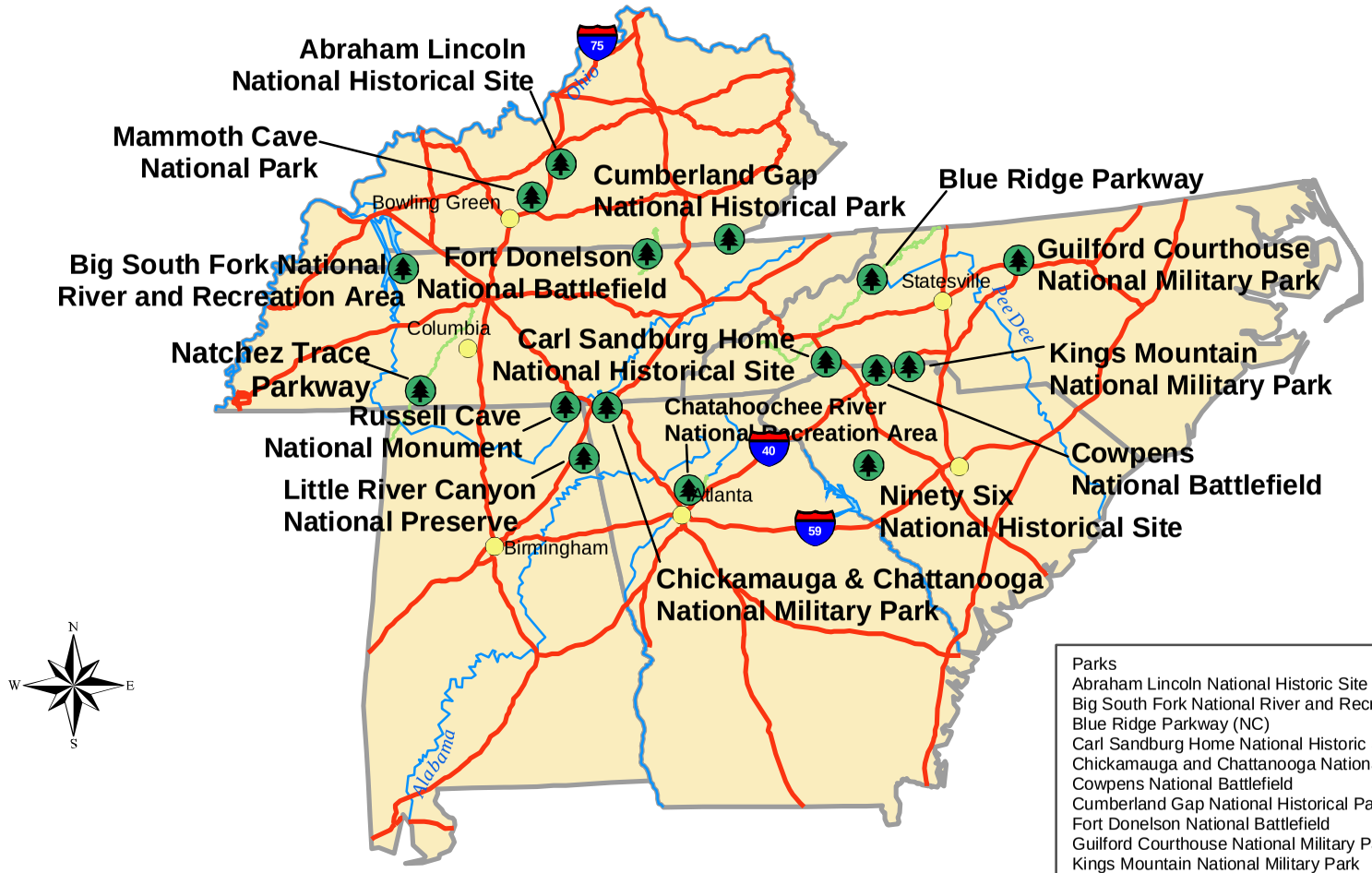
The Southeast EPMT is initially focusing its attention on the work taking place in the Great Smokey Mountains National Park to control invasive plants in 12 small parks in the region. The project was funded through a NRPP-Resource Management grant for FY 2000, FY 2001 and FY 2002 and served as a model for creating future EPMTs. The Southeast EPMT will become an interagency team that will work with federal, state and NGO partners such at the US Forest Service, the US Fish and Wildlife Service, Southern Appalachian Man and the Biosphe re, Tennessee Valley Authority, the Southeast Exotic Pest Plant Council, and other park friends to expand the awareness on the threat invasive plants pose to the region.

Target Weed Species

ailanthus
kudzu
Japanese honeysuckle
mimosa
multiflora rose
oriental bittersweet
paulownia
periwinkle
privet
wisteria

Southeast Exotic Plant Management Team
Host and Partner Parks

National Park Service
U.S. Department of the Interior



Parks	Acres
Abraham Lincoln National Historic Site	104
Big South Fork National River and Recreation Area	121,406
Blue Ridge Parkway (NC)	49,774
Carl Sandburg Home National Historic Site	270
Chickamauga and Chattanooga National Military Park	8,181
Cowpens National Battlefield	847
Cumberland Gap National Historical Park	20,223
Fort Donelson National Battlefield	527
Guilford Courthouse National Military Park	213
Kings Mountain National Military Park	3,934
Little River Canyon National Preserve	13,614
Mammoth Cave National Park	50,356
Natchez Trace Parkway (AL and TN)	14,219
Ninety Six National Historic Site	944
Russell Cave National Monument	318
Total Acreage	284,930

Source: ESRI and NRID
Date: 24 Nov 03

Meters
0 120,000 240,000 480,000

Calculations based on Lambert Conformal Conic (Conterminous US) projection

Appendix 1

The Alien Plant Control and Monitoring (APCAM) Database Overview

Purpose

The Alien Plant Control and Monitoring Database (APCAM) adheres to the institutional standards developed by Exotic Plant Management Teams for collecting inventory, control, and monitoring data on invasive vascular taxa.

Specifics

Exotic Plant Management Team members designed APCAM using the NPS Natural Resources Information Division's Database Template. The fields governed by North American Weed Management Association (NAWMA), in conjunction with the Weed Mapping and Database Development Guidelines for the National Park Service are abridged in the data dictionary. The Federal Geographic Data Committee's (FGDC) minimums for physical and geo spatial metadata are satisfied and standard taxonomic naming conventions are invoked from NPSpecies and the Plant Taxonomic Database. In addition, APCAM enlists the pesticide/herbicide naming conventions and reporting protocols established by NPS's Pesticide Use Proposals (PUPs) database. Ancillary data regarding weather, biological controls, collected plant material, digital photographs, and spatial relationships are included in APCAM. Current regulated status reports consist of six acreage categories by species, person hours and herbicide totals.

Contents

Data Entry Modules
- Abiotic
- APCAM
- Associated Species
- Biological Control Collection
- Biotic
- Disturbances
- Controlled Species
- Location ID/Event ID
- Photos
- Plants Collected
- Restoration
- Trip Reports
- Values At Risk
- Weather

Reports

Acres
- Inventoried Acres/Species
- Gross Infested Acres Treated
- Treated Acres per Species
- Inventoried Acres per Species
- Monitored Acres per Species
- Retreated Acres per Species
- Restored Acres per Species
- Controlled Acres per Species

Person Hours
- Person Hours per Team
- Person Hours for Preparation and Travel
- Person Hours by Activity

Summary
- Trip Report Summary
- Location ID Summary

Herbicides
- Herbicide Totals
- IPM Herbicide

Appendix 2

Acreage Definitions for APCAM Data Collection

Inventoried Area

Any area covered during the course of weed management / control activities. An area may be considered "inventoried" regardless of the presence / absence of target week species. Inventoried area is obtained by GPSing the perimeter, GPSing perimeter points or digitized on screen using landform references.

Gross Infested Area

The gross infested area is defined as the general perimeter of the infestation. Gross infested areas contain the target species and the spaces between populations or individuals. A gross infested area is described by a polygon, or a line feature (i.e. riparian course, roadway) which is buffered to account for the maximum distribution of individuals within the inventoried area.

Infested Area

Actual area occupied by weed species within the gross infested area, which does not contain the spaces between individuals and populations. The total infest area (with the gross infested area) may be comprised of multiple infested areas, described by polygons, buffered points, buffered lines, or be calculated as the result of a stem count in which each individual is assigned a coverage multiplier.

Treated Area

Treated area is either the infested area or subset of an infested area which has received treatment action. Treatment area is calculated using the same standards as infested area.

Monitored Area

Any area revisited for the purposes inventory or to assess treatment efficacy: gross infested, infested, or treated area. Area may be done by sweep (as in inventoried) or permanent monitoring points set in "infested" areas. Monitored areas (acreages) may reflect more than one monitoring visit/ year due to the potential for multiple generations in a season, and the need to monitor for re-treatment.

Retreated Area

Actual area of re-treatment (of original treated area) is comprised of a subset of, or the entire original treatment area.

*** All of these terms apply to single species measurements. When there is more than one weed species in an area, the above measurements need to be applied to each species (population) individually.**