

MID-ATLANTIC EXOTIC PLANT MANAGEMENT TEAM

Exotic Vegetation Management Annual Report for Fiscal Year 2010



Host Park:
Shenandoah National Park
Luray, Virginia

James Åkerson and Craig Bentley
Supervisory Ecologist/Liaison and Field Crew Leader
Mid-Atlantic Exotic Plant Management Team
Natural Resources and Science
Northeast Regional Office – NPS
October 2010

Figure 1a. N. Wender applies basal herbicide to autumn olive on the steep Bluestone River canyon of BLUE, November 2009.



Figure 1b. C. Bentley and a COLO volunteer move Asian bamboo for disposal, March 2010.

Figure 1c. C. Bentley holds a Trimble GPS device to document treatment of mile-a-minute vine, Canada thistle, and toadflax, among others at EISE, June 2010.



**Exotic Vegetation Management
Mid-Atlantic Exotic Plant Management Team
Annual Report for Fiscal Year 2009**

Start and End Dates: 10/1/2009 – 9/30/2010 (on-going since FY 2003)

Lead Agency Staff: James Åkerson, Supervisory Ecologist and Team Liaison (NPS Northeast Region (NER)).

Field Personnel: Craig Bentley, Field Crew Team Leader (NER); Nathan Wender, Biological Science Technician (NER); Robert Jennings, Biological Science Technician (NER); Coleman Minney and Brandon White, seasonal Biological Science Technicians (NER); and Eugene Kobayashi and Dustin Baxter, SCA Interns, among others ad hoc.

Funding Source(s): Base funding for operations comes from the NPS Natural Resource Challenge for Exotic Plant Management Teams. Additional project funding came from Northeast Region, WASO-Biological Resources Management Division, and carry-over on a grant through the National Audubon Society of Virginia with Toyota Together-Green Foundation.

Funding Accounts and Spent/Remaining Amounts for the Year:

<u>Source Accounts</u>	<u>Spent (\$)</u>	<u>Remaining (\$)</u>
1. 2144-6205-NYP	\$307,400	\$ -0-
2. SNPA account (APPA)	\$-0-	\$300
3. NER (added)	\$3,250	\$-0-
4. BRMD (added)	\$4,990	\$-0-

Refer to the appendix for a breakdown of budget expenditures.

Other Sources – In-kind services and contributions to the program were received from partner park units in the form of vehicle fuel, office and storage space, temporary park housing, mapping products, environmental clearance process, and park staff time in the field, among others. In-kind contributions amounted to an estimated \$185,230 or 38 percent of budget and in-kind contributions (see the appendix).

Expanded Executive Summary

Fiscal year 2010 was the eighth year of operations for the Mid-Atlantic Exotic Plant Management Team and its overarching Mid-Atlantic Cooperative of 18 parks. Hosted at Shenandoah National Park, the Mid-Atlantic Team serves national park units in Virginia, West Virginia, Maryland, and Pennsylvania. A Steering Committee made up of representatives from each park unit provides overall management direction. The Team Liaison provides administrative leadership and coordinates activities with individual parks and other agencies. He oversees work by non-NPS work groups and volunteers and serves as Contracting Officer's Technical Representative. The Field Crew Leader provides direction for on-the-ground activity and oversees matters of safety, technical effectiveness, equipment maintenance, data management, and staff training. Fieldwork is accomplished through the broad cooperation of Team crewmembers, park staffs, student interns, public volunteers, special interest sponsors, and, when called upon, private contractors. Program support comes through a combination of federal and nonprofit organizations. Collaborative partnerships augment the organizational capacity to manage invasive plants and improve potential for sustainability.

The following achievements are notable for fiscal year 2010.

- The Mid-Atlantic Cooperative completed field inventories on **5,761** acres at 18 park units and exotic vegetation control treatments on **499** acres¹ at **18** parks upon **67** plant species.

The top ten species by order of treated acreage include *Microstegium vimineum*, *Lonicera japonica*, *Polygonum perfoliatum*, *Alliaria petiolata*, *Lespedeza cuneata*, *Rosa multiflora*, *Elaeagnus umbellata*, *Centaurea biebersteinii*, *Ailanthus altissima*, and *Ligustrum* spp.

- Hopewell Furnace NHS inaugurated its first volunteer event for controlling invasive plants with Team assistance. That is the third park to benefit from volunteer program development by the EPMT. The Appalachian Trail program is led by the Team. Colonial NHP and Valley Forge created and operate their own volunteer programs.

The Appalachian Trail and Hopewell Furnace programs combined (led by the EPMT) involved **573** volunteers who contributed **1,895** hours. Activities included hands-on plant control treatments and public awareness presentations.

- Implementation planning was completed at New River Gorge, Bluestone, and Thomas Stone units, all with appropriate environmental clearance. Valley Forge and Hampton have plans in review for approval.
- The Cooperative augmented its functional capacity by utilizing a variety of implementation methods. In addition to NPS staffing, the Cooperative utilized park volunteers, individual Student Conservation Association (SCA) interns, and nonprofit collaborations. All performed with excellence.
- The Team itself worked 459 person-days in the field, accomplishing 467 treatment acres. That represents excellent work efficiency, 1.02-acres per field day.

¹ Includes treatment and retreatment acres for the year.

- COLO PETE, and RICH utilized the Eastern indefinite deliverables, indefinite quantities (IDIQ) contract to control Phragmites, Japanese stiltgrass, Japanese honeysuckle, and Oriental bittersweet, among others.
- The Team Liaison increased public awareness of invasive species issues by the following actions:
 - Participated in **six** news media interviews (external)
 - Spoke at **four** professional or public meetings
 - Provided orientation and training to the public at **20** volunteer events (external)
 - Created **22** reports, articles, newsletter entries, and intranet releases (external & internal).
- The Team maintained state certification to apply herbicides within the Commonwealth of Virginia, Maryland, Pennsylvania, and West Virginia². Seasonal employees and SCA interns obtained state certifications for the Commonwealth of Virginia.
- The Team had no lost time due to incidents. Implementation of the Team's safety program with daily safety discussions³ helped set a high organizational standard for safe operations.

Management Recommendations

The Team and participating parks continue to lose ground budgetarily. The Consumer Price Index for expenditures in the Mid-Atlantic region indicates that the Team suffers an accumulated 18-percent decrease in purchasing power since 2003. In similar fashion, parks have tighter budgets and have fewer seasonal staff. As a result, many parks in the Cooperative now rely on the Team's assistance for their sole source of exotic plant management. Increased park base funding is essential to improve that situation and augment invasive plant control. Additional project funding is needed to shore up park funding losses.

There were exceptions to the decline in program funding support. Colonial, New River Gorge, Petersburg, and Richmond successfully competed for project funding to treat invasives. Volunteers are providing valuable partnering and public advocacy. With Team assistance, Hopewell Furnace initiated a volunteer program for the first time to augment its program potential. Also with assistance by the Team, the Appalachian Trail continued its volunteer program for invasive plant management for the third year.

Three parks increased invasive plant control without Team assistance by their own volunteer programs, including Colonial, Shenandoah, and Valley Forge.

² Certification is generally required only of the Team Liaison or Crew Leader. It is our organizational goal to have all crewmembers certified, emphasizing our high interest in personnel safety and environmental risk management.

³ Daily 6-minute tailgate safety sessions consist of crew-led discussions on various germane topics.

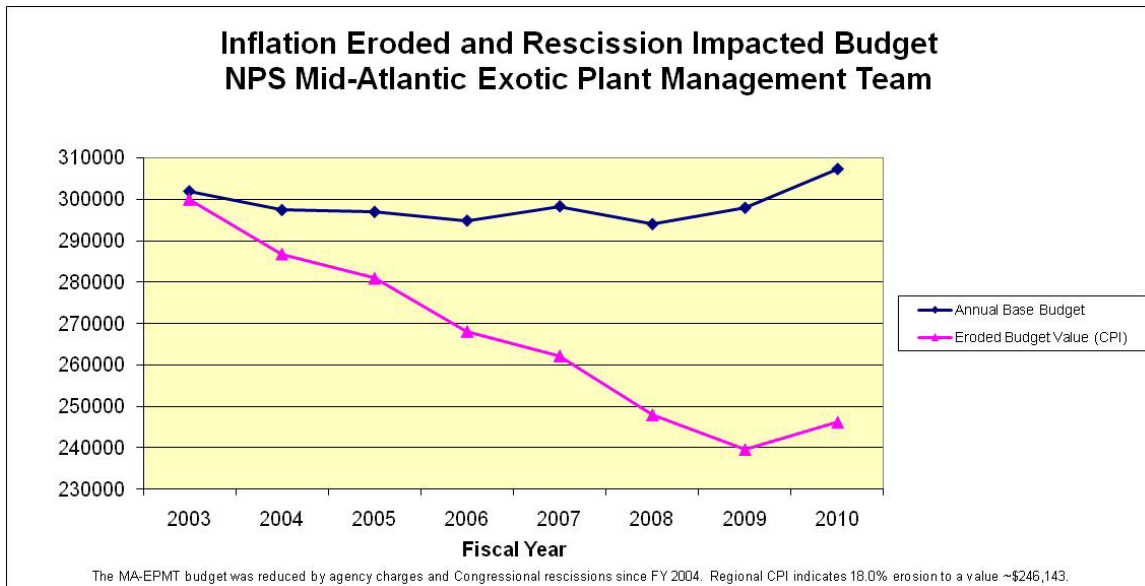


Figure 2. Program funding for the NPS Mid-Atlantic Exotic Plant Management Team has eroded 18% since 2003 as indicated by the regionally calculated Consumer Price Index.

Public outreach is essential to improve the general understanding of invasive species issues, gain public participation in reducing new species introductions, and garner their advocacy for improving long-term effectiveness of the Team. Individual parks should initiate interpretation-education campaigns to improve public understanding and cooperation in invasive plant management.

Introduction/Background

There is a long history of nonnative species introductions beginning with the first European settlers to North America. Accidental introductions came (and continue to come) with immigrants, their dunnage, and unrelated commerce in trade goods. Purposeful introductions came with settlers and later as the result of professional plans for supposed betterment of human health, agriculture, and land reclamation. Negative impacts are readily apparent. Farmers and ranchers in the West became early proponents of “noxious” weed control to fight the economic losses caused by displacement of desired grass crops in grazing and agricultural land by exotic weeds. Ecologists also warned of local native species losses and wholesale ecological change due to invasions of exotic species. Westbrooks (1998) believes that the homogenization of the world’s flora and fauna leads to decreased biological diversity and long-term harm. He states, “Unlike chemical pollutants that degrade over time [rendering them harmless] invasive organisms can become established and reproduce. Once established, they can spread from site to site, and region to region, often without further human assistance.” Elton (1958) believes many native species will decline or disappear altogether due to invasives.

Resisting biological invasions is an essential part of the NPS mission to *conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such a manner and by such means as will leave them unimpaired for the enjoyment of future generations* (U.S. Congress 1916). As part of the NPS Natural Resource Challenge funding program, begun in FY 1999, the NPS organized to create a concerted invasive vegetation control effort. Sixteen EPMTs were eventually established throughout the country to work with parks to accomplish survey, control, and monitoring of invasive plants.

In the mid-1990s, parks that are now within the Mid-Atlantic Cooperative began independently increasing their knowledge of local infestations and exotic plant control technologies. Colonial, Gettysburg, Shenandoah, and Valley Forge created small programs to inventory and control invasives. With a successful multi-year NPS-NRPP grant proposal in FY 2000, for the creation of an exotics control team for parks in Virginia, there began an effort to cooperate between eight parks, and collaborate with surrounding landowners to control the worst of known infestations. The system of reconnaissance, species prioritization, and strategic planning they developed helped them to create a viable program. Recognition of their efforts came through the successful FY 2003 competition for national program base funding. It allowed the formation of a larger Cooperative whose traveling team serves 18 national park units in Virginia, Maryland, Pennsylvania, and West Virginia.

Partners

The Mid-Atlantic Cooperative is made up of national park units in four states. The parks are both stakeholders and partners in resource protection through invasive plant management. A steering committee of park representatives and the Team Liaison set management priorities. Park staff and the Team cooperate in on-the-ground assessment and control activities.

Table 1. Table of partner park units within the Mid-Atlantic Cooperative.

Park Unit	State
Appalachian National Scenic Trail	MD
Appomattox Court House National Historic Park	VA
Bluestone National Scenic River	WV
Booker T. Washington National Monument	VA
Colonial National Historic Park	VA
Eisenhower National Historic Site	PA
Fredericksburg and Spotsylvania County Battlefields Memorial National Military Park	VA
Gauley River National Recreation Area	WV
George Washington Birthplace National Monument	VA
Gettysburg National Military Park	PA
Hampton National Historic Site	MD
Hopewell Furnace National Historic Site	PA
New River Gorge National River	WV
Petersburg National Battlefield	VA
Richmond National Battlefield Park	VA
Shenandoah National Park	VA
Thomas Stone National Historic Site	MD
Valley Forge National Historical Park	PA

Within the scope of managing exotic vegetation and site restoration, and as specifically approved by the Regional Solicitor, the Mid-Atlantic Cooperative works with its neighbors to control exotics along park boundary areas. Outreach with neighboring landowners improves the anticipated success and longevity of park treatment projects by creating extended management buffers and engendering active allies in monitoring for subsequent infestations. During FY 2010, collaboration consisted of property access for past treatment monitoring; there were no field treatments implemented.

Table 2. Table of collaborating neighbors of the Mid-Atlantic Cooperative, FY 2010.

Collaborating Neighbors within the Mid-Atlantic Cooperative			
Neighbor	Adjacent Park	General Location	Targeted Exotic
Colonial Williamsburg Foundation	Colonial NHP	Midway along the Colonial Parkway at the Colonial Williamsburg property	Kudzu, English ivy, tree of heaven
Henry Tobler III	Shenandoah NP	West side of the Park near US Highway 33	Bamboo
Douglas Workman	Shenandoah NP	West side of the Park near US Highway 33	Bamboo
Crow's Nest Natural Lands Trust	Hopewell Furnace NHS	Bethesda Church vicinity	Several species

Study Area Description

The Mid-Atlantic Cooperative is made up of national park lands within three geographic areas, including the Coastal Plateau, Piedmont, and Ridge & Valley zones. The Coastal and Piedmont zones contain many variants of warm-moist forest types generally described as the Loblolly-Shortleaf Pine forest type (SAF 1980). Hardwoods are very often a large part of the forest composite. Moister sites may contain yellow-poplar, American beech, white ash, sweetgum, red maple, water oak, and willow oak. Drier sites contain pines, sweetgum, blackgum, southern red oak, post oak, white oak, mockernut hickory, and pignut hickory. The Ridge & Valley zone contains the forest type variants contained within the Oak-Hickory and Oak-Pine forest types (SAF 1980) where the latter types are on drier sites due either to poorer soils or lesser annual precipitation. In either case, hardwoods remain a major factor in the forest composite and development. Moister sites contain sweetgum, Eastern hemlock, Eastern white pine, basswood, birches, American beech, flowering dogwood, and northern red oak, among others. Drier sites contain chestnut oak, white oak, Table Mountain pine, and Virginia pine, among others.

The Cooperative is within one of the most vigorous and biologically diverse ecological zones in North America. As an example, over 1,100 native vascular plant species have been documented within Shenandoah National Park alone. Protecting the natural legacy of participating parks is essential to ensure that future generations of the public enjoy their expanse and native beauty. Invasive exotic vegetation, on the other hand, threatens to destroy native diversity and ecosystem health, replacing thousands of species with a relatively few aggressive invasives. Within the Mid-Atlantic Cooperative, 15-to-25 percent of the vegetative species are nonnative. Generally, the subset of *invasive* plants amounts to 2-to-8% of the nonnatives.

Methods

Recognizing that the scope of invasive plant infestation is too large for complete eradication, the Mid-Atlantic Cooperative strategically targets invasive vegetation that threatens high-value resources within park lands. Decision-making criteria are described below. The Cooperative controlled and monitored exotic infestations in a safe and efficient manner using state-of-the-art approaches while protecting the environment during operations. Increasing the expertise and involvement of participating park staffs was emphasized so there was increased likelihood for programmatic sustainability. The ultimate goal of site restoration was made an integral part of planning, control, monitoring, and follow-up activities. Public education and outreach was a focus during all phases of work. Outreach was conducted through news media, park interpretation,

volunteer program, school programs, and professional meetings. Actions that addressed specific goals follow.

Goal 1 – Assess and prioritize invasive exotic vegetation threats, prescribe control methods within a framework of integrated pest management, and compile necessary control protocols. Adaptively update strategic plans at all parks as new information develops. The intent is to conduct extensive operational reconnaissance to locate invasive epicenters, gain acreage estimates of infestation, and note special concerns sufficient for species prioritization, strategic planning, and post-treatment monitoring. Strategic planning and prioritization is a team effort. Each park adaptively amends strategic plans and protocols with the assistance of the Team Liaison. Prioritizing invasive species for treatment is to be accomplished with a four-phase approach as described in respective park strategic plans, and more generally in the Cooperative’s Work Plan, 2010-2014 (NPS 2009).

Implementation planning took place at Valley Forge, New River Gorge, Bluestone, Hampton, and Thomas Stone. Plans were finalized and approved for New River/Bluestone and Thomas Stone units. References and SharePoint links are provided in the References section.

Goal 2 – Control targeted exotic populations at all parks.

The Cooperative had a target of 225 treatment/retreatment acres for the year. In FY 2010, the Cooperative exceeded that, totaling 499 acres. The Team attained greater efficiencies, while park programs, volunteers, and contract labor contributed to the whole.

Table 3. Table of the top ten invasive species treated in FY 2010 at park units within the Mid-Atlantic Cooperative. (The first ten species by order of appearance for each park unit.)

Treated Exotic Species, FY 2010	
Park	Species (Common Names)
APCO	Spotted knapweed, Japanese stiltgrass, multiflora rose, mullein, garlic mustard, privet, thistles, lespedeza, tree of heaven, and Japanese honeysuckle, plus eight others
APPA	Autumn olive, wineberry, Japanese stiltgrass, multiflora rose, garlic mustard, tree of heaven, Japanese honeysuckle, spotted knapweed, mile-a-minute, and sulfur cinquefoil, plus 12 others
BLUE	Multiflora rose, autumn olive, Japanese honeysuckle, and privets
BOWA	Japanese stiltgrass, Johnsongrass, lespedeza, and crown vetch
COLO	Golden bamboo, privets, Japanese honeysuckle, English ivy, tree of heaven, princess tree, autumn olive, black jetbead, and periwinkle
EISE	Thistles, yellow toadflax, crown vetch, mile-a-minute, Japanese honeysuckle, multiflora rose, bush honeysuckle, garlic mustard, autumn olive, and tree of heaven, plus eight others
FRSP	Japanese stiltgrass, Oriental lady’s thumb, tree of heaven, Japanese honeysuckle, lespedeza, multiflora rose, spotted knapweed, autumn olive, Oriental bittersweet, and mimosa, plus 12 others
GARI	Coltsfoot, wineberry, Japanese knotweed, mullein, tree of heaven, yellow sweetclover, multiflora rose, chrysanthemum, thistles, and autumn olive, plus two others
GETT	Japanese stiltgrass, Japanese honeysuckle, garlic mustard, multiflora rose, mile-a-minute, Japanese barberry, autumn olive, mullein, wisteria, and wineberry, plus five others
GEWA	Japanese honeysuckle, lespedeza, sweetgum, autumn olive, wisteria, Japanese stiltgrass, black locust, thistles, Phragmites, and multiflora rose, plus 12 others

-- (continued) --

Park	Species (Common Names)
HAMP	Periwinkle, Japanese stiltgrass, ground ivy, garlic mustard, Japanese honeysuckle, Oriental bittersweet, English ivy, wineberry, multiflora rose, and privets, plus seven others
HOFU	Japanese barberry, wineberry, Japanese stiltgrass, mile-a-minute, Oriental bittersweet, Euonymus, autumn olive, multiflora rose, Japanese honeysuckle, and privets, plus nine others
NERI	Japanese knotweed, stiltgrass, Japanese honeysuckle, multiflora rose, tree of heaven, bush honeysuckle, princess tree, privets, and autumn olive
PETE	Japanese stiltgrass, privets, Japanese honeysuckle, beefsteak plant, Russian olive, wisteria vine, English ivy, tree of heaven, paper mulberry, and lespedeza, plus four others
RICH	Japanese honeysuckle, privets, tree of heaven, Japanese stiltgrass, multiflora rose, mullein, Oriental bittersweet, euonymus, bush honeysuckle, and Japanese knotweed, plus five others
SHEN	Mile-a-minute, Japanese stiltgrass, garlic mustard, kudzu, lady's thumb, multiflora rose, mullein, tree of heaven, wavyleaf basketgrass, and wineberry, plus six others
THST	Japanese stiltgrass, lespedeza, sweetgum, beefsteak plant, lady's thumb, wineberry, mullein, thistles, tree of heaven, and princess tree
VAFO	Autumn olive, Phragmites, zebra grass, Oriental bittersweet, wisteria, crown vetch, Japanese stiltgrass, Japanese barberry, mullein, and multiflora rose, plus nine others
Aggregate Summary	Japanese stiltgrass, Japanese honeysuckle, mile-a-minute, garlic mustard, lespedeza, multiflora rose, autumn olive, spotted knapweed, tree of heaven, and privets, plus 57 others

Through the years, there has been a shift in the species treated. Early in the program, parks and the Team focused on dominant invasive overstory trees and shrubs such as tree of heaven, princess tree, Oriental bittersweet, Japanese barberry, and autumn olive. In many of the treated areas no other invasives were noted. Subsequent to initial canopy treatments, however, waves of other invasives appeared. In many cases dominance of invasive forbs and grass species occurred. Some of the species came from seed spread by wind, birds and wildlife, while others had been present but eked along in a subdominant state under the previous canopies. Representatives of these newer invaders include Japanese stiltgrass, mile-a-minute vine, Oriental lady's thumb, multiflora rose, dame's rocket, and seedlings of tree of heaven. A conceptual illustration of the transition is shown in the following chart.

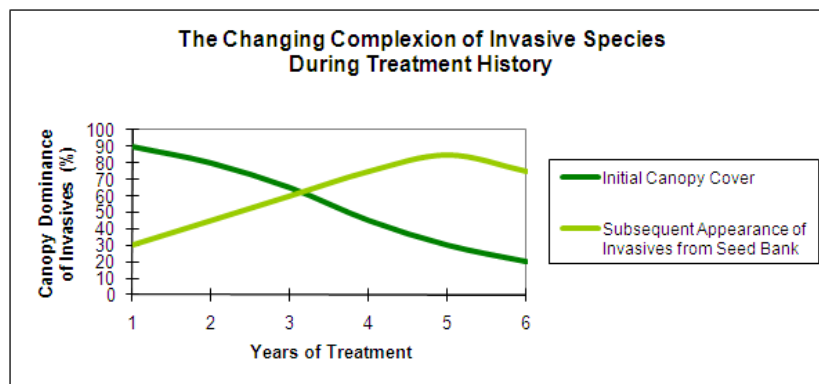


Figure 3. Conceptual illustration of the transition of treated species through time.

Best management practices were followed for treatments and follow-up. Those practices were gathered from field staff, local experience, the counsel of professional experts, and appropriate species-specific documentation in print and on the worldwide web. The Team

cooperated with parks in the field whenever possible. That cooperation increased on-the-ground outputs and enhanced transfer of knowledge. All procedures were compatible with NPS directives and federal & state laws.

The guide for planning proportionate field assistance is the approved *Mid-Atlantic Invasive Plant Management Cooperative of National Parks Work Plan 2010 – 2014* (NPS 2009). Actual field time varies from that guide due to weather events, training requirements, budget constraints, and personnel absences. The Team worked at each park in varied amounts, between 1-to-17 percent of total. A table breaking down the field activity, including volunteer time, is included in the appendix.

The Team conducts treatment site monitoring at least annually to evaluate treatment effectiveness, refine and adjust treatment strategies, and determine exotic species' status and trends.

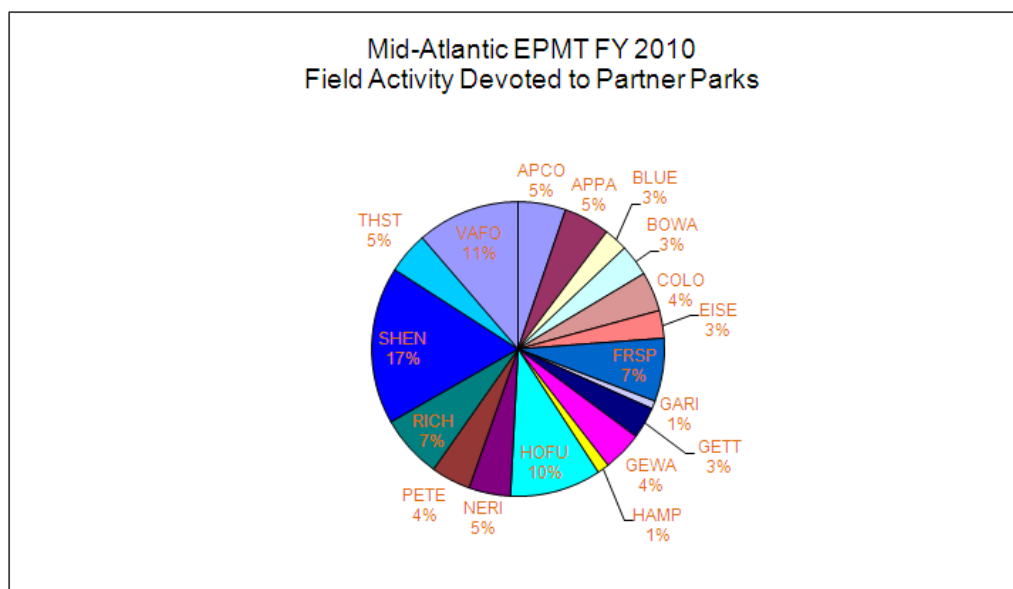


Figure 4. Chart depicting the breakout of field time of the Mid-Atlantic Exotic Plant Management Team devoted to each partner park unit, FY 2010.

Risk management and safety are incorporated throughout. Daily tailgate safety sessions and periodical Safety Plan reviews encouraged safe operations and provided a stage to identify and resolve other risk management issues (i.e., hazardous materials management, sustainability, being environmentally “green,” etc.). The Field Crew Leader had the prime responsibility for making safety a daily discussion item.

The permanent field team has pesticide applicator certification for each state in the Cooperative. That exceeds state requirements which typically require that only the field leader be certified. This further indicates the Team’s commitment to personal safety and environmental protection. Seasonal employees and SCA interns studied for and passed Commonwealth of Virginia certification.

Goal 3 – Assess treated sites for further restoration needs. Implement prescribed fire and other management methods in an integrated fashion where needed and appropriate. Monitor exotics control and restoration actions.

A treatment monitoring protocol was used that is functionally simple and adaptable to fit various shaped and sized units (NPS 2003). Results of monitoring provided information regarding invasives' presence, native species regeneration and forest development. The goal of exotic plant management is not solely to control nonnatives. It is to create conditions that allow for healthy functioning native ecosystems. Much of the eastern forest type is well suited to regenerate itself following natural disturbance such as wildfire, windstorm and the like. The removal of invasive vegetation mimics such an occurrence. In general, native plantings are not needed where affected areas are (1) free of subsequent invasive reinfestation, (2) smaller than ¼-acre, (3) not broadly exposed to potentially damaging weather/climatic elements, and (4) not containing soil compaction or environmental poisoning (i.e., mine spoils, and oil, fuel and other chemical spills). Resident or adjacent natives are well able to recolonize such sites without intervention. The need for site restoration subsequent to invasive controls was evaluated on a case-by-case basis to determine appropriate follow-up treatments. FY 2010 saw no need for restoration measures beyond invasive plant treatments.

Goal 4 – Maintain a cohesive and cooperative effort within the Cooperative that trains and benefits from individual park expertise. Develop collaborative ventures with outside agencies and landowners to control exotics and restore ecosystems on a broad scale.

The programmatic intent is to create a program that is bigger than its parts. The following Team actions in FY 2010 assured that support and momentum were present to promote programmatic success.

- Worked closely with park management staffs in all phases as appropriate (i.e., park priority setting & review, species identification, site survey and documentation, treatment implementation, monitoring & evaluation, site restoration planning, and annual work planning and program evaluation).
- Created and measured real on-the-ground accomplishments.
- Focused on effective transfer of knowledge and procedures to park staffs.
- Created optimal infrastructure and functionality, within funding constraints, needed to efficiently assess and control invasive exotics.
- Reached out to the public at park units regarding the story of invasive vegetation issues and control accomplishments with inexpensive media tools, media contacts, and public contact in the field.

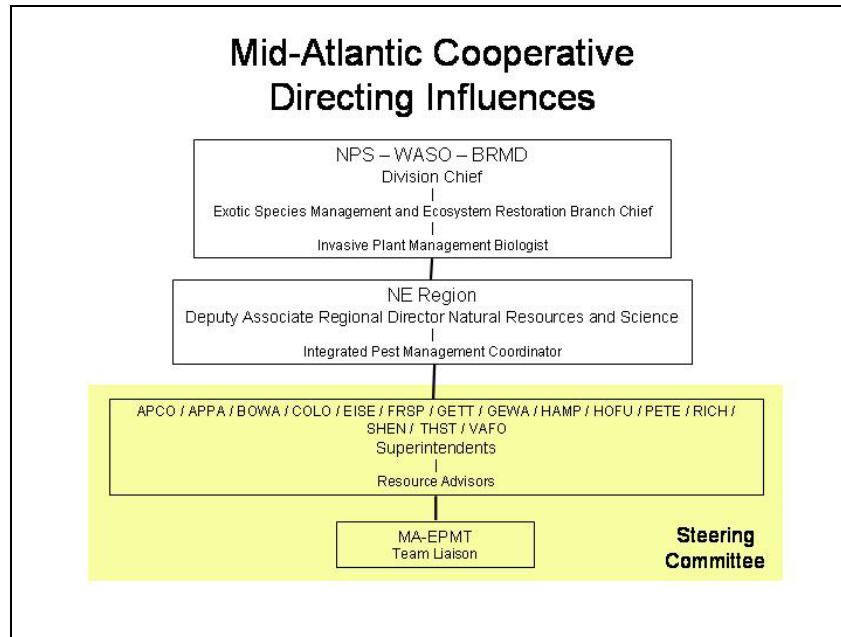


Figure 5. Chart illustrating the directing influences for operations of the Mid-Atlantic Exotic Plant Management Team and Cooperative.

Results

This was the eighth year of ONPS base-funded operations (FY 2003-2010) continuing from an earlier three-year NPS NRPP project effort (FY 2000-2002) which focused on park units in Virginia. A summary of achievements for the year follows.

Notable Achievements

(1) The Mid-Atlantic Cooperative completed field inventories on **5,761** acres at all **18** parks. They also conducted monitoring on 1,030 acres at 13 parks. The Cooperative's treatment/retreatment goal of 225 acres was achieved and surpassed at **499** treated and retreated acres. There were **67** exotic species treated during the year. The amount of declared species-acres of control increased modestly at ten parks.

Table 4. Table of Mid-Atlantic Exotic Plant Management Team accomplishments for Fiscal Year 2010 – summarizing management activity.

Mid-Atlantic EPMT Fiscal Year 2010 Accomplishments		
Work Category	Parks	Acres
Inventoried	18 of 18	5,761
Treated	18 of 18	383
Monitored	13 of 18	1,030
Retreated	12 of 18	117
Controlled species	1 of 18	37
GPRA goal: 225	Achieved: ~499 acres	

Partners	Mid-Atlantic Cooperative Treatment Acres by Partners							
	2003	2004	2005	2006	2007	2008	2009	2010
Mid-Atlantic Team	67.0	175.4	225.9	164.2	230.2	315.7	496.3	467.1
Partner Park Units	0.0	0.0	1.3	30.9	0.3	19.5	49.6	27.7
SCA Teams	0.0	0.0	50.2	56.1	84.0	4.3	0.0	0.0
Contractors	0.0	220.5	171.7	60.2	26.5	160.4	5.8	0.0
Volunteers	0.0	0.0	0.0	4.3	15.8	6.1	8.8	4.7
Totals	67.0	395.9	449.1	315.6	356.7	506.0	560.5	499.49

Table 5. Table of treatment contributions by partners within the Mid-Atlantic Cooperative, FY 2003 - 2010.

(2) The field crew worked 459 person-days in the field, accomplishing 467 treatment acres (of the Cooperative's 499 acres total). That represents a Team efficiency of 1.02 acres per person field day, a notable achievement. The amount of park-based contribution to the annual total dropped off from previous years. The amount of Team time devoted to training increased from 2009 due to required refreshers for administrative and safety issues. Time devoted to data entry, analysis, and other activities held steady.

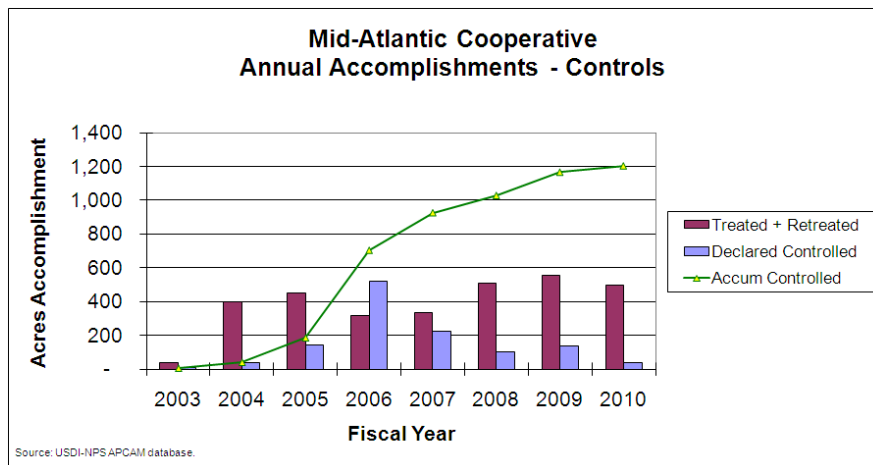


Figure 6. Chart of annual treatment accomplishment and acres of control, 2003 - 2010.

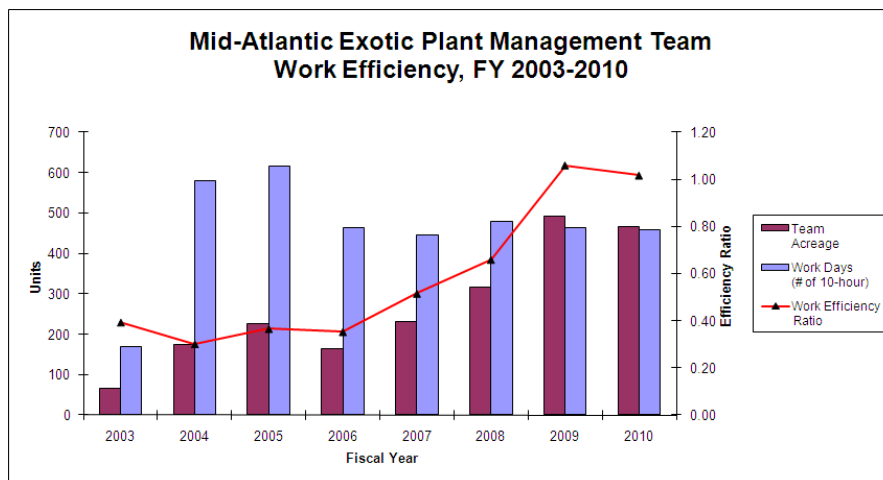


Figure 7. Field work time, acres treated, and an index of Team field work efficiency, 2003 – 2010.

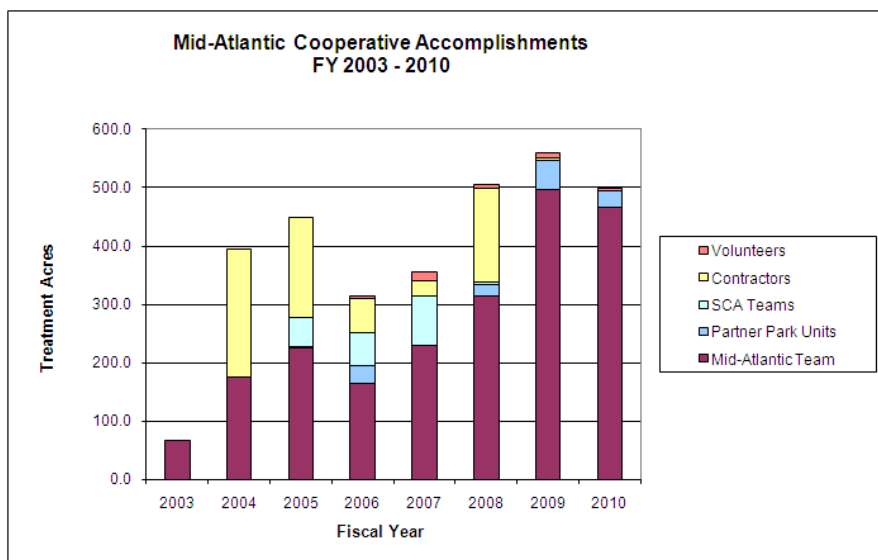


Figure 8. Indicating combined treatment and retreatment accomplishment from all collaborators for the eight-year period, FY 2003 – 2010.

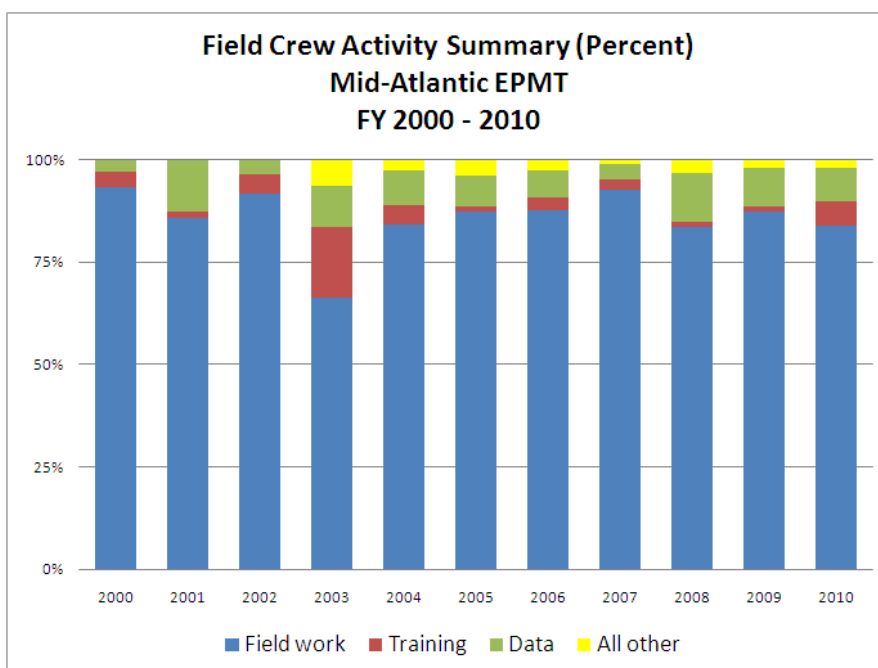


Figure 9. Description of field crew work tasks, including field work, training, data, and all other (but not including personal leave and holidays), 2003 – 2010.

(3) The Mid-Atlantic EPMT has now helped three parks organize volunteer programs for controlling invasive plants. Those include Shenandoah NP, Appalachian NST, and Hopewell Furnace NHS. The Shenandoah program became independent in 2008 and will not be specifically reported here. The intent of these programs is to expand exotic plant control accomplishment and develop public advocacy.

(a) This was the third year of directing the Appalachian Trail program (Northern Virginia section). The volunteer database was expanded from 395 records to 430 records. Database listings

include individuals, schools, universities, churches, clubs, and professional organizations. There were 19 volunteer events where 485 volunteers contributed 1,521 volunteer hours. Their labor added 24.3 gross infested acres to the treated total. They treated *Alliaria petiolata*, *Microstegium vimineum*, *Elaeagnus umbellata*, *Rosa multiflora*, *Rubus phoenicolasius*, *Polygonum caespitosum*, *Verbascum thapsus*, and *Celastrus orbiculatus*.



Figure 10. (A) Sherando High School students pull stiltgrass, fall 2009. (B) Friends of the National Zoo nature campers pose after field work, summer 2010.

(b) The Team was invited to organize and lead a pilot volunteer event at Hopewell Furnace, August 20, 2010. It was the first volunteer event conducted at Hopewell for the purpose of invasive plant management. Of great assistance were the Crow's Nest Natural Lands Trust and Valley Forge NHP who provided staff for the event. In all, 88 volunteers contributed 374 hours to control *Microstegium vimineum*, *Elaeagnus umbellata*, *Rosa multiflora*, *Rubus phoenicolasius*, and *Celastrus orbiculatus*. Media coverage of the event generated several requests for information and future collaboration. As a result, Hopewell hopes to work with a high school in the future.



Figure 11. (A) Alvernia University volunteers receive an orientation from the HOFU Superintendent, Edie Shean-Hammond. (B) Volunteers tackle invasives at the HOFU historical village.

(c) In addition to the three volunteer programs the Team helped organize, Colonial NHP and Valley Forge NHP also have volunteer programs. All five programs testify to the value of volunteer field work and public advocacy for addressing resource management needs at parks. For the year, 1,009 volunteers donated 5,087 volunteer hours in ~64 events to benefit 138 gross infested acres. Those efforts created impressive progress toward natural area recoveries, native species protection, and cultural landscape preservation.

(4) Three parks utilized the NPS (Eastern) national indefinite deliverables, indefinite quantities contract to control invasives on their lands. COLO treated Phragmites, PETE treated Japanese stiltgrass, and RICH treated Japanese honeysuckle, Oriental bittersweet, and others.

(5) The Team completed implementation planning for three parks, including Bluestone NSR, New River Gorge NR, and Thomas Stone NHS. A near-final plan for VAFO is being reviewed for approval. Planning continues for Hampton NHS. The intent in FY 2011 is to finalize planning at both parks.

(6) Permanent team members obtained state certifications to apply herbicides within Virginia, West Virginia, Maryland, and Pennsylvania. Seasonal employees and student interns obtained state certification for the Commonwealth of Virginia. Also, a volunteer leader active in APPA events obtained Commonwealth of Virginia certification. The Team Liaison conducted pesticide user safety training on four occasions, in October, March, and June (x2) for incoming staff and a volunteer leader. The appendix lists all pesticide certifications.

(7) The Team had no lost time due to injuries by implementing a well-executed and documented safety program with daily safety discussions (NPS 2009).

The Team completed all analyses and documentation requirements to resume operations of their ATV subsequent to the national safety stand-down (NPS 2010).

(8) The Cooperative augmented its functional capacity by utilizing individual SCA interns, park volunteers, sponsoring nonprofits, and private sector contractors – all with excellent success.

(9) The Team Liaison participated on the Wavyleaf Basketgrass Taskforce and the Commonwealth of Virginia Invasive Species Advisory Committee.

(10) The Team created the *Simplified Work Plan – 2010* which was reviewed by the Mid-Atlantic Cooperative Steering Committee (NPS 2009).

(11) In-kind contributions from partner parks increased over previous years. The value of input into the program in the form of equipment, housing, fuel, staff and volunteer participation, and such amounted to \$185,230 or about 38% of the total program.

(12) The Team Liaison increased public awareness of invasive species issues by the following actions. (Refer to the appendix for detail.)

- Participated in **six** news media interviews (external)
- Spoke at **four** professional or public meetings
- Provided orientation and training to the public at **20** volunteer events (external)
- Created **22** reports, articles, newsletter entries, and intranet releases (external/internal).

Discussion

The Mid-Atlantic Cooperative is within an unglaciated, biologically diverse and highly productive region spanning the coastal plains of Chesapeake Bay, Piedmont, and Ridge & Valley zone of the Blue Ridge Mountains. Few areas have greater biological diversity. Protecting the natural and cultural legacy of the region is essential to assure that future generations enjoy its expanse and beauty. The Mid-Atlantic Team is an excellent organizational foundation for preserving and protecting natural and cultural resources. Most parks lost ground financially and increasingly relied solely on the Team for their exotics control program instead of being able to conduct their own on-the-ground activities. This will decrease future annual progress in treating high priority invasive species. It will also tend to decrease corporate knowledge of the program due to lack of on-the-ground participation.

Parks are making progress toward achieving a maintenance level of exotic plant management needs. That status is achieved and noted when monitoring and treatment needs are less than one percent on an annual basis. Organizationally, increased volunteer participation in exotic plant management and improved public awareness of the issues helps slow down the programmatic losses due to budgetary short-falls.

The nationally funded Mid-Atlantic Exotic Plant Management Team is a continuation of efforts begun in FY 2000 when, through NPS Natural Resource Protection Program project funding, a smaller Virginia Invasive Vegetation Management Team and its cooperative of eight parks was begun. The momentum and expertise garnered during the 2000-2002 period became an essential part in helping the Mid-Atlantic Cooperative thrive in its first years of expanded operations.

In spite of budget problems, on-the-ground participation of park staffs and volunteers has increased for the most part since the Cooperative's beginning. Transfer of knowledge continues for all involved, helping expand the corporate knowledge of program intent and activity. Invasive exotic plants are being controlled in a strategic fashion that helps reduce the likelihood of resource impairment for future generations.

References:

Elton, C. 1958. *The ecology of invasions by plants and animals*. London: Methuen and Co., Ltd.

Hiebert, Ronald D. and James Stubbendieck. 1993. *Handbook for ranking exotic plants for management and control*. United States Department of the Interior, National Park Service, Midwest Regional Office, Omaha, NE. Natural Resources Report NPS/NRMWRO/NRR-93/08. 31 pp.

NPS. 2010. *Implementation plan for managing invasive exotic vegetation: Thomas Stone National Historic Site*. Thomas Stone NHS, Port Tobacco, MD. April 2010. 24 pp plus appendices. SharePoint access:
http://nrpcsharepoint/brmd/Invasive_Plant_Mgt/MAEPMT/Shared%20Documents/Forms/AllItems.aspx?RootFolder=%2fbrmd%2fInvasive%5fPlant%5fMgt%2fMAEPMT%2fShared%20Documents%2fManagement%20Plans%20%2d%20Draft%20and%20Final&FolderCTID=%2639F7EDDF2%2d8E1B%2d4619%2d8A37%2dB8739F1D020D%7d

NPS. 2010. *Implementation plan for managing invasive exotic vegetation: New River Gorge National River and Bluestone National Scenic River*. New River Gorge NR, Glen Jean, WV. February 2010. 34 pp plus appendices. SharePoint access:
http://nrpcsharepoint/brmd/Invasive_Plant_Mgt/MAEPMT/Shared%20Documents/Forms/AllItems.aspx?RootFolder=%2fbrmd%2fInvasive%5fPlant%5fMgt%2fMAEPMT%2fShared%20Documents%2fManagement%20Plans%20%2d%20Draft%20and%20Final&FolderCTID=%2639F7EDDF2%2d8E1B%2d4619%2d8A37%2dB8739F1D020D%7d

NPS. 2010. *Job hazard analysis: Field use of all-terrain vehicles (ATV) for exotic plant management*. NPS-Biological Resources Management Division, Mid-Atlantic Exotic Plant Management Team, Luray, VA. July 2010. 7 pp. SharePoint access:
http://nrpcsharepoint/brmd/Invasive_Plant_Mgt/MAEPMT/Shared%20Documents/Safety%20and%20Risk%20Management/JH-A-ATV-use_MA-EPMT_2010-07-08.pdf

NPS. 2009. *Tailgate safety topics – FY 2010: Daily six-minute safety sessions*. NPS-Biological Resources Management Division, Mid-Atlantic Exotic Plant Management Team, Luray, VA. October 2009. 7 pp. SharePoint access:
http://nrpcsharepoint/brmd/Invasive_Plant_Mgt/MAEPMT/Shared%20Documents/Safety%20and%20Risk%20Management/Tailgate-safety-topics_MA-EPMT-FY2010.pdf

- NPS. 2009. *Mid-Atlantic Invasive Plant Management Cooperative of National Parks; work plan 2010 – 2014*. NPS-Biological Resources Management Division, Mid-Atlantic Exotic Plant Management Team, Luray, VA. October 2009. 51 pp. SharePoint access: http://nrpcsharepoint/brmd/Invasive_Plant_Mgt/MAEPMT/Shared%20Documents/Work%20Plans%20and%20Initial%20Work%20Schedules/MA-EPMT_Workplan-FY2010-2014.pdf
- NPS. 2009. *Simplified EPMT work plan – 2010*. NPS-Biological Resources Management Division, Mid-Atlantic Exotic Plant Management Team, Luray, VA. 5 pp. SharePoint access: http://nrpcsharepoint/brmd/Invasive_Plant_Mgt/MAEPMT/Shared%20Documents/Work%20Plans%20and%20Initial%20Work%20Schedules/MA-EPMT_Workplan-FY2010-forms.pdf
- NPS. 2009. *Safety plan for field operations: 2009-2014*. NPS-Biological Resources Management Division, Mid-Atlantic Exotic Plant Management Team, Luray, VA. 42 pp. SharePoint: http://nrpcsharepoint/brmd/Invasive_Plant_Mgt/MAEPMT/Shared%20Documents/Safety%20and%20Risk%20Management/Safety-Plan_MAEPMT_2009-2014.pdf
- NPS. 2003. *Mid-Atlantic Exotic Plant Management Team exotic invasive vegetation survey/monitoring protocols*. NPS-Biological Resources Management Division, Mid-Atlantic Exotic Plant Management Team, Luray, VA. 15 pp.
- Society of American Foresters. 1980. *Forest cover types of the United States and Canada*, F.H. Eyre, Editor. Society of American Forester, Bethesda, MD. 148 pp plus map.
- U.S. Congress. 1916. *National Park Service Organic Act*. August 25, 1916, 16 USC 1-4, chapter 408; 39 Stat. 535.
- Westbrooks, R. 1998. *Invasive plants, changing the landscape of America: Fact book*. Federal Interagency Committee for the Management of Noxious and Exotic Weeds (FICMNEW), Washington, D.C. 109 pp.

Appendices

Outreach: Reports, Presentations, and Outreach of FY 2010

Reports, Publications, and Articles

National Park Service. 2010. *Rapid response to insect, disease & abiotic impacts: Procedures to protect forest integrity in units of the National Park System within Eastern forests*. James Åkerson and Wayne Millington, eds. U.S. Department of the Interior, National Park Service, Northeast Region, Philadelphia, PA. 211 pp. Web access: http://www.nps.gov/nero/ipm./Forest-Insect-n-Disease-Rapid-Response-Plan_final-2010-08-05.pdf

Shenandoah NP. 2010. "Shenandoah is part of an 18-park cooperative to fight invasive plants" IN *Resource Management 2010*. USDI National Park Service, Shenandoah National Park, Luray, VA. P. 11-12. Web access: <http://www.nps.gov/shen/parkmgmt/loader.cfm?csModule=security/getfile&PageID=272605>

NPS. 2010. *Alvernia University & Hopewell Furnace NHS: A collaborative effort to provide service-learning and freshman class esprit de corps opportunities while preserving an American legacy through invasive plant control*. [Slide show] NPS-Biological Resources Management Division, Mid-Atlantic Exotic Plant Management Team, Luray, VA. Summer 2010. SharePoint access: http://nrpcsharepoint/brmd/Invasive_Plant_Mgt/MAEPMT/Shared%20Documents/Public%20Relations%20and%20Outreach/HOFU-event-results.pdf

NPS. 2010. *Invasive alert: Black and pale swallow-worts – bad news boys for old fields and meadows*. NPS-Biological Resources Management Division, Mid-Atlantic Exotic Plant Management Team, Luray, VA. Spring 2010. 2 pp. SharePoint access: http://nrpcsharepoint/brmd/Invasive_Plant_Mgt/MAEPMT/Invasive%20Alerts/Factsheet_MA-EPMT-Alert_black-n-pale-swallow-wort.pdf

NPS. 2009. *Invasive alert: Wavyleaf basketgrass – Reverted cultivar loves shade*. NPS-Biological Resources Management Division, Mid-Atlantic Exotic Plant Management Team, Luray, VA. Fall 2009. 2 pp. SharePoint access: http://nrpcsharepoint/brmd/Invasive_Plant_Mgt/MAEPMT/Invasive%20Alerts/Factsheet_MA-EPMT-Alert_wavyleaf-basketgrass.pdf

NPS. 2009. *Mid-Atlantic Exotic Plant Management Team: Exotic Vegetation Management Annual Report for Fiscal Year 2009*. NPS- Biological Resources Management Division, Mid-Atlantic Exotic Plant Management Team, Luray, VA. October 2009. 27 pp. SharePoint access: http://nrpcsharepoint/brmd/Invasive_Plant_Mgt/MAEPMT/Shared%20Documents/Reports/FY2009_AnnualReport-full_MA-EPMT.pdf

NPS. 2009. *Mid-Atlantic Exotic Plant Management Team: Accomplishments 2009*. NPS-Biological Resources Management Division, Mid-Atlantic Exotic Plant Management Team, Luray, VA. October 2010. 2 pp. SharePoint access: http://nrpcsharepoint/brmd/Invasive_Plant_Mgt/MAEPMT/Shared%20Documents/Reports/FY2009_AnnualReport-flier_MAEPMT.pdf

Presentations

1. Åkerson spoke to 3rd & 4th-graders at the Keister Elementary School Careers Day on NPS careers; Harrisonburg, VA, 10/20/09 (Outreach: 45 children + three teachers).

2. Åkerson spoke to 11th & 12th-graders at Virginia Governor's School on invasive species challenges; Mt. Jackson, VA, 10/27/09 (Outreach: 22 students + 2 teachers).
3. Åkerson spoke at Harrisonburg Mennonite Church (open to the general public) on his experience at the BP oil spill response of June 2010; Harrisonburg, VA, 8/4/2010 (Outreach: 40).
4. Åkerson spoke to 11th-graders at Virginia Governor's School on two topics including BP oil spill impacts to the Gulf of Mexico and invasive species challenges; Mt. Jackson, VA, 9/20/10 (Outreach: 35 students + 2 teachers).
5. Volunteer leaders and Åkerson gave 20 introductory talks (5-10 minutes) at volunteer events on the environmental problems posed by invasive vegetation. These drew publics from the Front Royal and Northern VA areas and Reading, PA (Outreach: 554).

Media and Other Public Outreach

1. Åkerson responded to R. Keilor, *Northern Virginia Daily* newspaper for an article on the APPA invasive plant control volunteer event with the Montessori school; the article appeared 11/19/09 (Outreach: potentially 100,000).
2. Åkerson was interviewed by T. Mitchell, *Daily-News Record* (Harrisonburg, VA) re: the BP oil spill, 7/28/2010 (Outreach: potentially 100,000).
3. Åkerson was interviewed for WVPT-TV (Harrisonburg, VA) re: his work at the BP oil spill, 8/4/2010 (Outreach: potentially 100,000).
4. Åkerson was interviewed by Eileen Faust, *The Mercury Press* (Reading, PA) re: the HOFU volunteer event with Alvernia University, 8/4/2010 (Outreach: potentially 90,000).
5. Åkerson was interviewed by Heather Tassmer, *The Southern Berks News* (Reading, PA) re: the HOFU volunteer event with Alvernia University, 8/4/2010 (Outreach: potentially 22,500).
6. Åkerson was interviewed by L. Amstutz, Eastern Mennonite University re: the BP oil spill for their on-line magazine, 8/10/2010 (Outreach potential: 20,000). It was picked up by *Connections* magazine fall issue (Outreach potential: 20,000).
7. Åkerson submitted monthly accomplishment updates to the Northeast Region *Highlights Newsletter* (Outreach: @200 people; internal).

Internet / Intranet outreach

1. Åkerson and Millington posted their document titled, *Rapid response to insect, disease & abiotic impacts: Procedures to protect forest integrity in units of the National Park System within Eastern forests* on the internet. Internet access: http://www.nps.gov/nero/ipm./Forest-Insect-n-Disease-Rapid-Response-Plan_final-2010-08-05.pdf.
2. Essential and helpful documents were made available to NPS employees on the Team SharePoint site. Access: http://nrpcsharepoint/brmd/Invasive_Plant_Mgt/MAEPMT/default.aspx.
3. Åkerson maintained the NER intranet site for regional exotic plant management teams. Access: <http://inside.nps.gov/regions/region.cfm?rgn=1534&lv=3>.

Safety Management

1. The Mid-Atlantic EPMT safety plan was updated summer 2010.
2. Specific to the national NPS safety stand-down regarding field use of ATVs, the Team was approved to resumed ATV use on July 29, 2010, after successfully completing all documentation, analyses, and revision of the job hazard analysis form.
3. The field team conducted almost daily 6-minute tailgate safety sessions to emphasize safety during the workday (143 occasions during the year).

4. Volunteer leaders conducted safety briefings at volunteer events (19 occasions at APPA and one occasion at HOFU during the year).
5. Conducted herbicide inventories quarterly and made sure required MSDS sheets were available for all products.
6. Appropriately disposed of triple-rinsed herbicide containers to the Rockingham County landfill for special recycling.
7. Provided pesticide use reports to all park units for CY 2009 Team activity.
8. Pesticide certifications:
 - a. Åkerson: VA-Forest and R/W; WV-Forest; MD-Forest and R/W; and PA-Forest
 - b. Bentley: VA-Forest and R/W; WV--Forest and R/W; MD--Forest and R/W; and PA--Forest and R/W
 - c. Jennings: WV-R/W; and PA-R/W
 - d. Wender: VA-Forest; WV-Forest; MD-Forest; and PA-Forest
 - e. Kobayashi, SCA intern: VA-Registered Technician
 - f. Baxter, SCA intern: VA-Registered Technician
 - g. White, seasonal: VA-Registered Technician
 - h. Minney, seasonal: VA-Registered Technician
 - i. Pryor, VIP leader: VA-Registered Technician.

Training

Administrative

1. Federal information systems security awareness plus privacy and records management training completed: Åkerson, 4/10; Bentley, 6/10; Wender, 5/10; Baxter, 6/10; White, 6/10; Minney, 6/10 (1 hour @ person)
2. EEO for supervisors and managers: Åkerson, 1/10 (2 hours)

Safety / Risk Management

1. Wilderness First Responder training: Bentley and Wender, 6/10 (80 hours @person)
2. VA pesticide core training completed: Pryor, 3/10; Baxter, 6/10; White, 6/10; and Minney, 6/10 (20 hours @person)
3. NSC Defensive driving II (online): Åkerson, 12/09 (15 hours)
4. MSDS: Åkerson, 12/09 (2 hours)
5. Operational leadership: Åkerson, 1/10; and Wender, 7/10 (16 hours @person)
6. Safety for supervisors: Åkerson, 4/10 (3 hours)
7. MD pesticide recertification training completed: Åkerson, 7/10 (10 hours)
8. VA pesticide recertification training completed: Wender, 9/10 (10 hours)
9. ICS-200 training: Åkerson, 6/10 (2 hours)
10. ICS-700 training: Åkerson, 7/10 (5 hours)
11. Training for minimal exposure for MS Canyon 252 oil spill: Åkerson, 7/10 (2 hours)
12. NPS Fire Safety Refresher completed: Bentley and Wender, Spring 2010 (8 hours)

Biology

1. Wilderness minimum requirements decision process: Åkerson, 1/10 (10 hours)

Programmatic Time Breakdown: Activities and Parks

Appendix Table 1. Table of combined fieldwork and shared administrative tasks conducted for member park units within the Mid-Atlantic Cooperative, FY 2010.

Mid-Atlantic EPMT Breakdown of Work Time, FY 2010						
Park Unit	MA-EPMT Work at Parks & Shared Admin.		Contractor Work at Parks (EPMT-directed)	Volunteer Work at Parks (EPMT-directed)	Total of All MA-EPMT Work at Parks	
	(Days)	(%)	(Days)	(Days)	(Days)	(%)
APCO	37	5%			37	4%
APPA	36	5%		144	180	21%
BLUE	25	4%			25	3%
BOWA	29	4%			29	3%
COLO	33	5%			33	4%
EISE	27	4%			27	3%
FRSP	45	7%			45	5%
GARI	17	2%			17	2%
GETT	29	4%			29	3%
GEWA	33	5%			33	4%
HAMP	19	3%			19	2%
HOFU	59	9%		37	96	11%
NERI	34	5%			34	4%
PETE	33	5%			33	4%
RICH	45	7%			45	5%
SHEN	92	13%		0.6	93	11%
THST	34	5%			34	4%
VAFO	65	9%			65	7%
	684	100%	-0-	~182	~866	100%



Appendix Figure 1a. Group photograph of the Mid-Atlantic EPMT, FY-2010 fall season. Left-to-right is Craig Bentley, Robert Jennings, Eugene Kobayashi (SCA intern), Nathan Wender, and James Åkerson.



Appendix Figure 1b. Group photograph of the Mid-Atlantic EPMT, FY-2010 later in the season. Left-to-right is Craig Bentley, Nathan Wender, Coleman Minney (seasonal), Brandon White (seasonal), Dustin Baxter, not pictured (SCA intern), and James Åkerson.



Appendix Figure 2. Volunteer Leaders: Ted Pryor, Robin Williams, and Wendy Ebersberger; three of the six leaders for the Appalachian National Scenic Trail. (Not pictured are Susan Schafer, Paul Dennison, and Suzy Mayes.)

Mid-Atlantic Cooperative In-kind Contributions (FY 2010)

Location/Item	Value (\$)										
All parks (except APPA/FRSP/GARI/HOFU):											
Fuel (20 gallons/week * 32 weeks * \$2.75/gal)	\$ 1,760										
Minor non-budget tools & repairs	\$ 500										
SHEN (as host):											
Office space (12'x15' + 10'x12' = 300 sqft) @\$4-6/ft/mo	\$ 14,400	3240									
Office supplies	\$ 500										
Equipment storage & shop (25'x50' = 1,250 sqft) @\$2/ft/mo	\$ 30,000										
Fuel (20 gallons/week * 45 weeks * \$2.75/gal)	\$ 2,475										
Utilities (phone + electric + water/sewer/garbage)	\$ 3,600										
Network & IT support	\$ 5,000										
Administration	\$ 4,095										
Human Resources	\$ 2,500										
\$ 62,570											
Park specific:	Subtotals	Staff	Equipment	GIS/maps	Photography	Johnboat	Storage	Loader	Housing	NEPA	
APCO: field equipment (Gator), field GPS	\$ 2,300	\$ 500.00	500	300			1000		\$ -		
APPA: 1 field staff, NEPA clearance	\$ 1,763	\$ 1,262.56							\$ -	500	
BOVA: 0 field staff, field equipment (Roto-Wipe)	\$ 1,000	\$ -	1000						\$ -		
COLO: 1 field staff	\$ 4,540	\$ 4,539.98					0		\$ -		
FRSP: 3 field staff, GIS mapping, field equipment, storage	\$ 8,575	\$ 7,575.38		500			500		\$ -		
GETT/EISE: 6 field staff, GIS mapping	\$ 12,696	\$ 12,396.49		300					\$ -		
GEWA/THST: 0 field staff, housing 2 seasons, field equipment (tractor) canoe/Johnboat (phragmites work), storage	\$ 3,830	\$ -	750			100	1000		\$ 1,980.00		
HAMP: field equipment, Bobcat loader	\$ 700	\$ -	200					500	\$ -		
HOFU: 0 field staff (VIPs), housing 4 seasons, storage & office space	\$ 1,820	\$ -					500		\$ 1,320.00		
NER/BLUE/GARI: housing 3 seasons	\$ 2,640	\$ -							\$ 2,640.00		
PETE: 0 field staff, housing 2 seasons, GIS mapping, field equipment	\$ 4,356	\$ -	200	500			2000		\$ 1,656.00		
RICH: 2 field staff, GIS mapping, field equipment	\$ 4,255	\$ 2,754.78	200	300			1000		\$ -		
SHEN: 6 field staff, GIS mapping, field equipment, NEPA clearance	\$ 18,929	\$ 16,528.66	200	1500	200				\$ -	500	
VAFO: 0 field staff, field GPS, GIS mapping, storage, loader, NEPA clearance	\$ 4,316	\$ 2,066.08		1000			250	500	\$ -	500	
		\$ 47,623.93	\$ 3,050	\$ 4,400	\$ 200	\$ 100	\$ 6,250	\$ 1,000	\$ 7,596	\$ 1,500	
Volunteer contribution @\$20.85 (APPA, COLO, and HOFU)	\$ 48,380										
Outside grants	\$ 300										
Total In-kind	\$ 185,230	\$ 185,230	16,935								
	2010										
In-kind percent of total budget (\$307,400 + in-kind)	38%										
	2010										
In-kind percent of funded budget (\$307,400)	60%										

Appendix Table 2. Table of in-kind support from participating parks within the Mid-Atlantic Cooperative, FY 2010.

Appendix Table 3. Table of funding expenditures of the Mid-Atlantic Exotic Plant Management Team, FY 2010.⁴

FY 2010 Funding Expenditures of the Mid-Atlantic EPMT					
	→ Source	NR Challenge Base Funding	NER Base Funding	BRMD Base Funding	Toyota Together-Green Project Grant (APPA)
Expense Type	→ Account	2144-6205-NYP	4531-6000-NYY 4531-6200-NYY	2146-2200-NYP 2146-2301-NYP	Funds held by the Shenandoah National Park Association for APPA vol. prog.
Personnel		\$241,708	\$ -0-	\$ -0-	\$ -0-
Supplies & Materials		12,926	1,250	2,360	
Training		2,411			
Travel		25,826			
Equipment		14,374	2,000	2,630	
Vehicles		1,000			
Rent/Utilities		2,266			
Services		2,489			
Other		4,399			
Totals		\$ 307,400	\$ 3,250	\$ 4,990	\$ -0-
Funds held into FY-2011		-0-	-0-	-0-	\$ 300

⁴ These figures include all activities relative to exotic plant management.