

MID-ATLANTIC EXOTIC PLANT MANAGEMENT TEAM

Exotic Vegetation Management Annual Report for Fiscal Year 2006

Host Park:
Shenandoah National Park
Luray, Virginia

James Åkerson

Supervisory Forest Ecologist and Team Liaison
Mid-Atlantic Exotic Plant Management Team
Natural Resources and Science
Northeast Regional Office – NPS
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Figure 1-a. The Mid-Atlantic EPMT crew cuts *Celastrus orbiculatus* and *Ailanthus altissima* at the East Chapel site of Valley Forge NHP.



Figure 1-b. A cooperative effort – the Valley Forge crew disposes of debris caused by exotic plant control.



Figure 2. Volunteers near Big Meadows campground of Shenandoah National Park pull *Alliaria petiolata* (garlic mustard) that is invading Big Meadows swamp, a National Heritage site for flora.

**Exotic Vegetation Management
Mid-Atlantic Exotic Plant Management Team
Annual Report for Fiscal Year 2006**

Start and End Dates: 10/1/2005 – 9/30/2006 (on-going since FY 2003)

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

Field Personnel: Norman Forder, Crew Team Leader (NER); Dale Meyerhoeffer, Biological Science Technician (NER); M. Kate Jensen, Biological Science Technician (NER); and Andrea Norris, SCA Intern, among others ad hoc.

Funding Source(s): Base funding from NPS Biological Resource Management Division – Exotic Plant Management Team Projects (Natural Resources Challenge)

Funding Amount for Year (by source): \$300,000 original (BRMD – EPMT Projects). The available amount was decreased to \$294,875 due to a 1.17% rescission for Hurricane Katrina Disaster Relief and 0.65% NPS Northeast Regional assessment.

NRC Base
\$294,875

Other Sources – In-kind services and contributions to the program were received from 13 partner parks in the form of vehicle fuel, office and storage space, mapping products, geographic positioning of field sites, and park staff time in the field. In-kind contributions amounted to an estimated \$74,560.

Account Number (by source):

2144-6205-NYP - program operations, minor equipment, supplies, and support of an indefinite quantities contract for exotic plant control.

- Personal Services - \$241,561
- Supplies - \$15,943 (\$500 went directly to partner park (SHEN) for herbicides)
- Training - \$193
- Travel - \$24,843
- Equipment - \$364
- Vehicle - \$-0-
- Services - \$10,187 (including \$5,263 for SCA stipend, housing, and travel, \$4,400 to the indefinite quantities contract, \$50 for pesticide training, and \$475 for Trimble GPS unit maintenance)
- Other - \$1,784

Additionally, \$124,083 was expended from prior year's contract obligations to perform plant control.

Expanded Executive Summary

Fiscal year 2006 was the fourth year of operations for the Mid-Atlantic Exotic Plant Management Team and its overarching Mid-Atlantic Cooperative of parks. Housed at Shenandoah National Park, the Mid-Atlantic Team serves national parks in Virginia, Maryland and Pennsylvania. Fourteen (14) park units participated in the Cooperative. A Steering Committee made up of representatives from each park provides overarching management leadership as well as individual park direction. The Team Liaison provides daily operations leadership and coordinates activities with individual parks. He also oversees work by non-NPS work groups and volunteers and serves as Contracting Officer's Technical Representative for contract work. The Crew Leader provides direction for on-the-ground activity and oversees matters of safety, equipment maintenance, data management, and staff training. Field work was accomplished with Team crewmembers, park staffs, student interns, volunteers, and private contractors. Partnerships are increasing the effectiveness of treatments while broadening the organizational capacity to successfully manage invasive plants into the future.

Significant Accomplishments

The following achievements are notable for Fiscal Year 2006.

- The Mid-Atlantic Cooperative completed field inventories on **10,961** acres and exotic vegetation control on **316** acres¹ at **14** parks upon **45** plant species.
- The Cooperative's private sector contractor, Invasive Plant Control, Inc., completed 697 acres of inventories and 60 acres of exotic plant control (part of the total).
- The Cooperative's Student Conservation Association exotic plant team completed 236 acres of inventories and 56 acres of exotic plant control (part of the total).
- A new Short-term Volunteer Program increased public participation in invasive plant control by involving 402 volunteers totaling 1,640 hours in the field.
- *A Strategic Plan for Managing Invasive Exotic Vegetation at Hopewell Furnace NHS* and accompanying environmental clearance were approved by the site's Superintendent. A complete initial inventory preceded the planning effort to determine threats and facilitate priority analysis.
- Permanent team members maintained their state certification to apply herbicides² within the Commonwealth of Virginia, Maryland, and Pennsylvania. Temporary employees and student interns obtained state certification for the Commonwealth of Virginia.
- The Team minimized lost time due to accidents (-0- hours) by implementing a well executed and documented safety program with daily safety discussions.
- The Cooperative expanded its functional capacity by utilizing individual Student Conservation Association (SCA) interns, a SCA Exotic Plant Team, park volunteers, and a for-profit private contract – all with excellent success.
- The Team increased public awareness of invasive species issues by:
 - Participating in **ten** news media interviews
 - Publishing **ten** articles in professional newsletters
 - Speaking at **12** professional or public meetings
 - Creating **seven** reports that are available to the public, and
 - Responding to **seven** public queries for information.

¹ Includes treatment and retreatment acres for the year.

² Certification is generally required only of the Team Liaison or Crew Leader. Having all crew members become certified indicates the organization's high degree of interest in risk management and personnel safety.

Management Recommendations

Invasive exotic plants pose a very real threat to biological diversity and native species health. The Mid-Atlantic Exotic Plant Management Team is an excellent foundation to preserve and protect the natural and cultural resources at participating parks. Unfortunately, there are both positive and negative currents impacting the program. With assistance from the Team, Booker T. Washington N.M. successfully achieved a park wide maintenance level of need for treatments in 2004³. Three other park units are nearing such status; they have received first-round suppression of all top-tier invasives⁴. As a result, the Cooperative expanded its span of assistance in 2006 to an additional park unit, Hopewell Furnace NHS. Unhappily, most cooperating parks continue to lose ground budgetarily; many increasingly rely on the Team's assistance for their sole source of exotic plant management. This means less progress is made toward treating high priority species. All parks should be encouraged to aggressively seek specific project-based funding from NPS and nonprofit grant sources to shore up their base-funding losses.

Utilizing a nonprofit grant, Shenandoah National Park augmented exotic plant management by operating a short-term volunteer program. In this tight budget time, the program increased the level of exotic plant management activity. A modicum of funding is required to furnish volunteers with equipment and supplies and to support a part-time volunteer leader. Other parks should consider pursuing a similar avenue for increasing on-the-ground activity.

Finally, public outreach and education is a means to improve the public's understanding of issues and potentially benefit the long-term effectiveness of exotic plant management. Individual parks should initiate public awareness campaigns to improve public understanding of exotic plant issues and, among other potential benefits, encourage them to refrain from the purchasing invasive exotics for their own properties, as well as to encourage assistance in invasive plant control on public lands.

Introduction/Background

Throughout the history of post-1492 settlement of the Americas, exotic species have either been accidentally introduced with new immigrants, dunnage, and trade goods, or purposefully introduced for supposed betterment of human health, agriculture, and land reclamation efforts. 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 warn 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.

³ GPRA defines the "maintenance level" as the point when control work is needed less than annually and outside funding and labor is no longer needed to keep up with the need.

⁴ Those parks include: Fredericksburg and Spotsylvania County Battlefields, George Washington Birthplace, and Petersburg National Battlefield. They still face second-tier invasives that either pose more difficult control potential or have less environmental harm potential.

The National Park Service organized to create a concerted effort to control invasive vegetation. Sixteen EPMTs were established throughout the country to survey, control, and monitor invasive plants. Resisting biological invasion is an essential part of the agency 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).

In the mid-1990s, parks that are now within the Mid-Atlantic Cooperative began increasing their knowledge of local infestations and exotic plant control technologies. Colonial National Historic Park, Gettysburg National Military Park, and Shenandoah National Park created small programs to inventory and control invasives. With a successful NPS multi-year grant proposal in FY 2000 for the creation of a traveling 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 that they developed helped them to quickly 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 now serves 14 national park units in Virginia, Maryland and Pennsylvania.

Partners

The Mid-Atlantic Team functions within the Mid-Atlantic Cooperative of national parks in Virginia, Maryland, and Pennsylvania. A steering committee of park specialists and Team Liaison sets management priorities. The parks and Team cooperate in on-the-ground control and assessment activities. A listing of partner parks and their primary representatives follows.

Figure 3. Table of partner parks within the NPS Mid-Atlantic Cooperative – describing the parks and contact persons on the Steering Committee in FY 2006. (* = Became the park contact mid-year.)

Partner Parks and Primary Contacts within the Mid-Atlantic Cooperative			
Park	State	Contact Person	Contact Title
APCO	VA	Brian Eick	Natural Resource Specialist
BOWA	VA	Timothy Sims	Park Ranger
COLO	VA	Charles Rafkind / *Dorothy Geyer	Natural Resources Manager / Landscape Architect
FRSP	VA	Gregg Kneipp	Resource Management Specialist
GETT and EISE	PA / PA	Zachary Bolitho Randy Krichten	Natural Resource Specialist Forestry Technician
GEWA and THST	VA / MD	Rijk Moräwe	Integrated Resources Program Manager
HAMP	MD	Paul Bitzel	Horticulturist
HOFU	PA	Steven Ambrose	Chief Ranger
PETE	VA	Dave Shockley Tim Blumenschine	Resource Management Chief Biologist
RICH	VA	Kristen Allen	Resource Management Specialist
SHEN	VA	Gordon Olson	Natural Resources Branch Chief
VAFO	PA	Meghan Carfioli / *Kristina Heister	Acting Natural Resources Spec. / Natural Resources Manager

Within the scope of managing exotic vegetation and site restoration, the Mid-Atlantic Cooperative works with its neighbors to control exotics along park boundary areas. This outreach improves the anticipated success and longevity of treatment projects by creating extended management buffers and engendering active allies in monitoring for subsequent infestations. To date, three landowners participate as follows. (Additionally, George Washington Birthplace NM pursued an additional neighboring partnership that was approved in October 2006 to address a common problem with Phragmites reed.)

Figure 4. Table of partnering neighbors of the Mid-Atlantic Cooperative for FY 2006 – organizations and individuals participating in exotic plant management along park borders.

Partner Neighbors within the Mid-Atlantic Cooperative			
Partner Neighbor	Adjacent Park	General Location	Targeted Exotic
Colonial Williamsburg Foundation	Colonial National Historic Park	Midway along the Colonial Parkway at the Colonial Williamsburg property	Kudzu, English ivy, tree of heaven
Henry Tobler III	Shenandoah National Park	West side of the Park near US Highway 33	Bamboo
Douglas Workman	Shenandoah National Park	West side of the Park near US Highway 33	Bamboo

Finally, as will be described later, a volunteer program is operational which attracts the public to assist park crews and the Mid-Atlantic Team in controlling invasive plants. Volunteers are providing valuable partnering.

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.

Protecting the natural legacy of the region is essential to ensure that future generations of the public enjoy its expanse and native beauty. The Cooperative is within one of the most vigorous and biologically diverse ecological zones in North America. To date, 1,100 native vascular plant species have been documented within one park alone, Shenandoah National Park. 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-23 percent of the vegetative species are nonnative.

Methods

The Mid-Atlantic Cooperative strategically targets invasive vegetation threatening resources within park lands. The Cooperative controls and monitors exotic infestations in a safe and efficient manner using state-of-the-art approaches, while protecting the environment during operations. Increasing the corporate expertise and involvement of participating park staffs is emphasized so that there is increased likelihood for programmatic sustainability. The goal of site restoration is made an integral part of planning, control, monitoring, and follow-up activities. Public education and outreach is addressed during all phases of work. Outreach through media contacts, park interpretation, school programs, and professional meetings are conducted. Actions that address 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 their strategic plans and protocols with the assistance of the Team Liaison. Targeting and prioritizing invasive species for treatment is accomplished with a four-phase approach.

Phase 1. Field data of species presence and dominance is coupled with state invasive advisory lists to provide initial winnowing. Though Virginia, Pennsylvania, and Maryland have hundreds of nonnative species, some have been identified as highly invasive and of particular threat to natural settings. Lesser threats are not initially targeted in this phase. (See Phase 4 to note how lesser threats may also be treated.)

Phase 2. The NPS *Handbook for Ranking Exotic Plants for Management and Control* (Hiebert & Stubbendieck 1993) is used to correlate potential environmental harm with potential for treatment success. Localized conditions and species presence information is incorporated into the system. A ranked list is created where species with the greatest potential for negative environmental impacts and greatest likelihood for control receive highest priority for treatment.

Phase 3. Specific natural and historical/archeological resource protection concerns are incorporated into the priority listing and epicenter information. It is essential to strategically target invasive species that threaten federally listed species or significant landscapes, structures and ethnographic resources⁵. On the other hand, it is also essential to note areas that could be damaged by specific vegetation control techniques. Both issues are factored into consideration.

Phase 4. Lastly, priorities are adjusted for operational practicality. For example, though one particular species may be targeted in a particular area, other lesser or unranked exotics will also be treated there to assure that the area is left clean for native restoration.

⁵ Significance is designated by inclusion in the National Register or archeological documentation.

The process composite creates a targeted and prioritized operations list. The following figure summarizes the targeted and prioritized species for participating parks in the Mid-Atlantic Cooperative.

Figure 5. Table of targeted exotic vegetation for parks within the Mid-Atlantic Cooperative – listing targeted species and their relative priority for each park.

Targeted Exotic Species and Relative Priorities ⁶	
Park	Species (Common Names)
APCO ⁷	Princess tree, tree of heaven, multiflora rose, Japanese barberry, Chinese wisteria, Johnson grass, Japanese honeysuckle, Japanese stiltgrass, bull & Canada thistles, crowned vetch, privet, mimosa tree, mulleins, periwinkle, spotted knapweed, chicory
BOWA ⁷	Kudzu, Johnson grass, tree of heaven, multiflora rose, gorse, Japanese honeysuckle, and Japanese stiltgrass
COLO ⁷	Princess tree, tree of heaven, Asian bamboo, privet, Phragmites, Japanese knotweed, Oriental bittersweet, nonnative wisteria, kudzu, English ivy, Japanese honeysuckle, Johnson grass, periwinkle, Japanese stiltgrass, multiflora rose, mimosa, wineberry, barberry, gill-over-the-ground, and nonnative thistles
EISE ⁷	Mile-a-minute weed, multiflora rose, tree of heaven, Japanese barberry, privet spp., nonnative thistles, Japanese honeysuckle, garlic mustard, autumn olive, teasel, Japanese stiltgrass, crowned vetch, and mulleins
FRSP ⁷	Multiflora rose, tree of heaven, English ivy, periwinkle, Japanese knotweed, nonnative thistles, Japanese honeysuckle, mimosa, privet, autumn olive, and Japanese stiltgrass
GETT ⁷	Mile-a-minute, Japanese barberry, multiflora rose, Tartarian bush honeysuckle, tree of heaven, autumn olive, Japanese honeysuckle, garlic mustard, teasel, nonnative thistles, Japanese stiltgrass, privet spp. and mulleins
GEWA ⁷	Autumn olive, Phragmites, English ivy, periwinkle, nonnative grasses, multiflora rose, Japanese honeysuckle, giant mullein, princess tree, tree of heaven, mimosa, Oriental bittersweet, privets, Chinese lespedeza, garlic mustard, nonnative thistle, Japanese stiltgrass, barberry, spotted knapweed, gorse, and wisteria
HAMP ⁸	Mile-a-minute, porcelain berry, bush honeysuckle, multiflora rose, wineberry, English ivy, Japanese honeysuckle, garlic mustard, periwinkle, gill-over-the-ground, and Norway maple
HOFU ⁷	Bamboo, Norway maple, winged euonymus, Chinese wisteria, bush honeysuckle, autumn olive, mile-a-minute, Japanese barberry, Oriental bittersweet, multiflora rose, wineberry, tree of heaven, privets, Japanese honeysuckle, English ivy, garlic mustard, Japanese stiltgrass, ground ivy, lespedezas, mullein, nonnative thistles
PETE ⁷	Tree of heaven, Johnson grass, privet, autumn olive, multiflora rose, Japanese stiltgrass, Japanese honeysuckle, mimosa, Chinese lespedeza, Chinese wisteria, and periwinkle. Treatment also include English Ivy, Oriental Bittersweet, Mulleins, and crowned vetch
RICH ⁷	Tree of heaven, privet, mimosa, Oriental bittersweet, princess tree, English ivy, Johnson grass, Japanese honeysuckle, Japanese stiltgrass, multiflora rose, periwinkle, gill-over-the-ground, Chinese lespedeza, Japanese knotweed, and autumn olive
SHEN ⁸	Mile-a-minute vine, kudzu, Oriental bittersweet, Japanese knotweed, Johnsongrass, tree of heaven, bamboo, autumn olive, princess tree, mulleins, and Oriental lady's thumb
THST	Mile-a-minute vine, tree of heaven, multiflora rose, wineberry, Japanese honeysuckle, Japanese stiltgrass, and mulleins
VAFO ⁸	Oriental bittersweet, bush honeysuckles, privets, barberry, multiflora rose, tree of heaven, princess tree, mile-a-minute, Chinese wisteria, Japanese honeysuckle, stiltgrass, and mulleins

Programmatic and project-specific plans meet National Environmental Policy Act and National Historic Preservation Act standards. Park personnel conduct the compliance process with the assistance of the Team Liaison and Northeast Region staff.

⁶ Relative priority for each park is indicated by the order of listing.

⁷ Contained within approved park strategic plans for managing invasive vegetation.

⁸ Contained within approved park project clearance documentation.

Goal 2 – Control targeted exotic populations at all parks.

The Cooperative has an annual target of 225 treatment/retreatment acres. Best management practices are followed for treatments and follow-up. Those practices were garnered from local experience, the counsel of professional experts, and appropriate species-specific documentation in print and on the worldwide web. The Team and parks cooperate in control work to increase on-the-ground outputs and ensure the transfer of knowledge and techniques takes place. All procedures are compatible with NPS directives and federal & state laws.

Collaboration with park neighbors to jointly control common exotic problems continues. This greatly improves the success potential of our efforts by increasing the area of influence and management.

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

Park staffs are trained on-the-ground in aspects of monitoring protocols, species identification, and vegetation control technologies. Risk management and safety are incorporated throughout.

Daily tailgate safety sessions and periodical Safety Plan reviews encourage safe operations and identify and resolve other risk management issues (i.e., hazardous materials management, sustainability, being environmentally "green," etc.). Risk avoidance is everyone's concern. To ensure that "everyone's concern" does not mean "no one's," the Crew Leader has the prime responsibility.

Permanent Team crew members possess pesticide applicator certifications at each of the states in the Cooperative. Seasonal and individual SCA team members possess applicator certification for the Commonwealth of Virginia only. Periodical updates of knowledge is provided through formal state sanctioned training and on-the-job instruction.

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.

The goal of exotic vegetation 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 weather/climatic elements, and (4) not involving 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. On the other hand, it is necessary, in some cases, to plant fast growing native vegetation to ensure that invasives do not recapture the site. The need for site restoration subsequent to invasive controls is evaluated on a case-by-case basis to determine appropriate follow-up treatments. Virginia, Pennsylvania and Maryland native planting guides are used for appropriate species applications. *Regionally* native seed stock has been used initially, but use of seed stock that is native to the *parks* in question will be the goal

of the Cooperative within a five-year period. Obtaining such seed stock will be done through volunteer and/or contracted programs of seed procurement and nursery operations. The Team works along side park staff members to plan and initiate the process of restoration. It is estimated that 10%-to-30% of treated areas will need restoration treatments through a 5-year period.

A treatment monitoring protocol (NPS 2003a) is used that is functionally simple and adaptable to fit various shaped and sized units. Results of monitoring provide information regarding invasives' presence, native species regeneration and forest development.

Associated members of the Mid-Atlantic EPMT are the Fire Management Officer and Fire Ecologist stationed at Shenandoah National Park. They serve parks in a sub-regional organization called the "Mountains to the Sea." Two-way communications between the Mid-Atlantic EPMT Liaison and the fire organization are needed for effective planning and coordination. Note the following figure that illustrates the organization and lines of communications. There are many situations where prescribed fire use is advantageous to (1) kill certain invasives outright or weaken them for better effectiveness of other measures; (2) expend the seed bank of prolific invasive seeders; (3) clear sites of vegetative mass and make it possible for subsequent mechanical or herbicide applications and site restoration activities; or (4) improve soil nutrition for subsequent vegetative growth. National fire funding may be available to plan and conduct such site restoration burns.

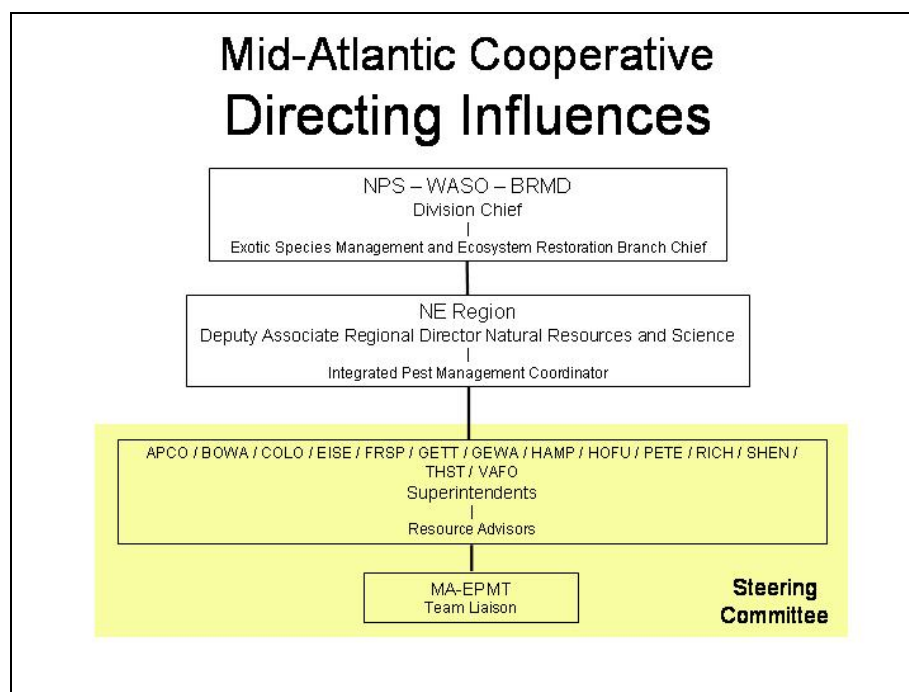


Figure 6. Chart illustrating the directing influences for operations of the Mid-Atlantic Exotic Plant Management Team and Cooperative through FY 2006.

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 actions assure that support and momentum are present to promote success.

- Working integrally with park and Fire 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 implementation, and annual program evaluations).
- Assuring on-going and effective transfer of knowledge and procedures.
- Creating optimal infrastructure and functionality, within funding constraints, needed to efficiently assess and control invasive exotics.
- Demonstrating real on-the-ground accomplishments.
- Interpreting the story of invasive vegetation issues and control accomplishments at each park unit with inexpensive media tools, media contacts, and public outreach.

Results

This was the fourth year of ONPS base-funded operations (FY 2003-2006) continuing from an earlier NPS NRPP project effort (FY 2000-2002). A summary of achievements for the year follows.

Notable Achievements

The Mid-Atlantic EPMT organized and led the first field season of Shenandoah National Park's **Short-term Volunteer Program**. The intent of the program is to expand exotic plant control program accomplishment. Grant funding from the National Parks Foundation and Tauck Foundation paid for retaining a student intern to expand the contacts database, set up group appointments, and lead field events. The database of available volunteers and organizations was expanded to 234 records by fiscal year end (up from 156). Included are schools, universities, churches, clubs, and professional organizations. From it, 21 events were arranged, totaling 392 volunteers and 772 volunteer hours in the field. Volunteers controlled *Alliaria petiolata* (garlic mustard), *Celastrus orbiculatus* (Oriental bittersweet), *Rosa multiflora*, *Rubus phoenicolasius* (wineberry), and *Berberis thunbergii* (Japanese barberry).

Team and Park staffs assisted by helping lead several larger groups and by providing talks at public events. The short-term volunteer program has three kinds of field events – special events, events by appointment, and weekend events. By far, the most successful approach was the event by appointment. During the year, nine groups and 271 volunteers devoted 494 hours controlling invasive plants. The special and weekend events, on the other hand, though providing fewer hours for the time invested, helped the overall program by increasing public understanding of the issues involved. Media publicity was used with special events to promote the message and intent of the program. Weekend events also offered an activity for tourists who wanted to “help the parks” during their visits. The two special events and ten weekend events produced 121 volunteers who devoted 278 hours of field work. It was apparent, regardless of the type of event, that though volunteers left tired, they were energized by seeing the results of their labor. Many will return. Meaningful work attracts eager workers. **When combining student interns with the short-term volunteer activities, a total of 402 volunteers devoted 1,640 hours of their time controlling invasive plants.** That is an excellent boon to the program.

The Mid-Atlantic Cooperative completed field inventories on **10,961** acres at **14** parks. There were **45** species treated during the year. The treatment/retreatment goal of 225 acres was surpassed, where 204.7 treated acres plus 110.9 retreated acres totaled **315.6** acres. (See Figure

7.) Contributing to the achievements were funds carried over from the previous year into the indefinite quantities contract. Even without those funds, the Team achieved the annual goal with 255.4 acres control.

Figure 7. Table of Mid-Atlantic Exotic Plant Management Team accomplishments for Fiscal Year 2006 – summarizing exotic vegetation management activity.

Mid-Atlantic EPMT Fiscal Year 2006 Accomplishments		
Work Category	Parks	Acres
Inventoried	14 of 14	10,961
Treated	11 of 14	205
Monitored	13 of 14	3,207
Retreated	9 of 14	111
Controlled species	7 of 14	1368
Restored area	1 of 14	1.4
GPRA goal: 225 acres		Achieved: 316 acres

The Cooperative's private sector contractor (Invasive Plant Control, Inc.) completed 696.5 acres of inventories and 60.2 acres of exotic controls (part of the total). The Cooperative's Student Conservation Association Exotic Plant Team completed 236.4 acres of inventories and 56.1 acres of exotic controls (part of the total). Volunteer efforts contributed another 4.2 acres control (part of the total).

The team completed initial survey and analysis of invasive threats at HOFU during the spring/summer. A preliminary scoping session was conducted in May with the park Superintendent, park staff, several adjacent land managers, and the Team to discuss invasive plant management challenges in the area. As a result of that input, and in cooperation with the park staff, the Team drafted a strategic plan which was reviewed during the summer and was approved with accompanying environmental clearance by the Superintendent, September 26, 2006. It sets out the policy standards, treatment priorities, and appropriate treatment methods, among other things.

The team members and Liaison helped parks update their species and site priorities for exotic plant treatment. A common threat among parks is the group of highly invasive vines such as mile-a-minute, kudzu, Oriental bittersweet, and Japanese honeysuckle. Other common targeted exotics include tree of heaven, autumn olive, Japanese barberry, multiflora rose, privets, Phragmites, and Japanese stiltgrass. See the earlier figure for targeted invasives for each park unit.

Permanent team members maintained state certification to apply herbicides⁹ within the Commonwealth of Virginia, Maryland, and Pennsylvania. Temporary employees and student interns obtained state certification for the Commonwealth of Virginia. The Team Liaison maintained state certification in all three states plus West Virginia. Refer to the appendix for a full listing of certification.

The Team Liaison developed a pesticide user safety training curriculum that was approved for continuing education credit by the states of VA, PA, MD, and WV. The class was offered June 9,

⁹ Certification is generally required only of the Team Liaison or Crew Leader. Having all crew members become certified indicates the organization's high degree of interest in risk management and personnel safety.

2006, at FRSP where 23 people attended. Class members were made up of employees from two NPS parks, a SCA exotic plant management team, volunteers, and the private sector.

The Team Liaison participated on the Commonwealth of Virginia Invasive Species Advisory Committee. The group completed their task to draft a statewide strategic exotic species plan. After review of the initial draft of August 2005, the plan was approved by the Commonwealth in December 2006.

The Team minimized lost time due to accidents (-0- hours) by implementing a well executed and documented safety program with daily safety discussions (NPS 2004b).

The Cooperative augmented its functional capacity by utilizing (1) individual SCA interns, (2) a SCA Exotic Plant Team, (3) park volunteers, and (4) a private sector contract – all with excellent success.

The Team submitted a draft FY 2007 Work Plan for review and finalization in August 2006 to the Mid-Atlantic Cooperative Steering Committee (NPS 2006).

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

- Participating in **ten** news media interviews
- Publishing **ten** articles in professional newsletters
- Speaking at **12** professional or public meetings
- Creating **seven** reports available to the public, and
- Responding to **seven** public queries for information.

(Refer to the appendix for detail on these items.)

Discussion

The Mid-Atlantic Cooperative is within a 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. Unfortunately, most parks have lost ground financially and increasingly rely solely on the Team for their exotics control program instead of being able to conduct their own on-the-ground activity. This will eventually decrease the 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.

On the brighter side, parks are making progress toward achieving a maintenance level of exotic plant management needs. That status is achieved when monitoring and treatments are needed on a less than annual basis without outside funding assistance. Organizationally, building supportive programs to increase short-term volunteer participation in exotic plant management and improve public awareness of surrounding issues will help 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 period 2000-2002 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 early beginnings. 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 provides for long-lasting protection that will leave park resources unimpaired for future generations.

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- NPS. 2002. *The Mid-Atlantic Network – Exotic Plant Management Team: Detailed Implementation Plan, FY 2003 NPS-BRMD competitive funding, August 2002*. NPS-Biological Resources Management Division, Mid-Atlantic Exotic Plant Management Team, Luray, VA. 15 pp.
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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, Professional Meetings, Presentations, Interviews of FY 2006

Reports, Publications, and Articles

- Åkerson, James. 2006. "The Mid-Atlantic Exotic Plant Management Team: A Friend Indeed" IN Shenandoah National Park Resource Management Newsletter. Spring 2006. Shenandoah National Park, Natural & Cultural Resources Division, Luray, VA. P. 14.
- Kashin, Kirill. 2006. "Message from Russian Volunteer Kirill Kashin" IN Shenandoah National Park Resource Management Newsletter. Spring 2006. Shenandoah National Park, Natural & Cultural Resources Division, Luray, VA. P. 35.
- NPS. 2006. *The Mid-Atlantic Exotic Plant Management Team (MA-EPMT): Work Plan for FY 2007, August 2006* (in draft). NPS-Biological Resources Management Division, Mid-Atlantic Exotic Plant Management Team, Luray, VA. 31 pp.
- Shenandoah National Park. 2006a. *Expanded Use of Short-term Volunteers with Invasive Exotic Plant Control*; activity notice, 3/2/06. Shenandoah National Park, Luray, VA. 2 pp.
- Shenandoah National Park. 2006b. *Eradication Efforts -- Invasive Mile-a-minute Vine*; activity notice, 7/6/06. Shenandoah National Park, Luray, VA. 2 pp.
- Shenandoah National Park. 2006c. *Continue Limberlost Exotic Plant Control*; activity notice, 7/6/06. Shenandoah National Park, Luray, VA. 2 pp.
- Shenandoah National Park. 2006d. *National Public Lands Day Event, September 30, 2006*; activity notice, 9/11/06. Shenandoah National Park, Luray, VA. 2 pp.

Presentations:

1. Åkerson delivered a talk on "Contract Reporting Requirements" at the annual interagency Invasive Species Management Workshop at Fort Detrick, MD, 1/19/06. (40 people)
2. Åkerson delivered a talk on "Earth Keeping" at Eastern Mennonite University, 1/12/06. (15 people)
3. Åkerson delivered talks on the topic of ecology and invasive plants to three individual 9th grade classes at Eastern Mennonite High School in Harrisonburg, VA, 5/4/06. (60 people)
4. Åkerson, Hughes, and Fisichelli delivered talks to the general public on natural resource values of and invasive plant threats to Big Meadows, Shenandoah National Park at the "Save the Meadow – Invasive Plants!" 5/20 and 5/21/06. (30 people)
5. Åkerson delivered a talk on "Ecological Dysfunction Caused by Invasive Species" to students participating in the Virginia Governor's School, 6/20/06. (25 people)
6. Åkerson delivered a talk on "Ecological Players, Processes, and Interactions" to students from Wetsel Middle School, Madison, VA, 9/20/06. (10 people)
7. Åkerson and Hughes delivered talks on natural resource values of and invasive plant threats to Big Meadows, Shenandoah National Park at the *National Public Lands Day* event, 9/30/06. (79 people).

Public Outreach

1. Emma Marris, *Nature* journal writer, interviewed Åkerson on the topic of exotic species impacts to native forest lands, 10/18/05. Marris conducted follow-up on-site interviews of Meyerhoeffler, Jensen, and Overstreet, MA-EPMT field crew, and Rafkind, COLO

- Resources Manager, 10/25/05. The resulting article, “Invasive Species: Shoot to Kill,” is included in the *Nature* journal dated 11/17/05.
2. Åkerson submitted accomplishments statements to the NPS Northeast Region *Highlights Newsletter* for the following issues: October, November, and December 2005; and January, March, April, May, August, and September 2006.
 3. Åkerson updated the Mid-Atlantic EPMT internet website slideshow via Ft. Collins Branch of Resource Management Division for inclusion in that office’s website update, 1/26/06.
 4. Åkerson attended the National Weed Awareness Week in Washington, DC, 2/27/06 and 3/1/06.
 5. R. McMann, *Sierra Magazine* writer interviewed Åkerson on invasive plant threats, 4/17/06.
 6. B. Flook, *Northern Virginia Daily* newspaper reporter interviewed Åkerson on invasive threats, 4/24/06.
 7. B. Knarr, reporter, WSVB radio of Harrisonburg, VA interviewed Åkerson regarding “Save the Meadow Weekend” and invasive plants, 5/18/06.
 8. D. Kipperman, *Daily News-Record* newspaper (Harrisonburg, VA) reporter interviewed Åkerson regarding “Save the Meadow Weekend” and invasive plants, 5/19/06.
 9. C. O’Connor, *Northern Virginia Daily Magazine* reporter interviewed Åkerson regarding fall color and invasives, 5/24/06.
 10. Åkerson delivered three presentations on the threats of invasive plants to the natural and cultural resource values of the Big Meadows area at the “Save the Meadow Weekend” special volunteer event, 5/20/06 and 5/21/06.
 11. Ashley Womble, *This Old House Magazine* writer interviewed Åkerson regarding invasive species impacts and public involvement in landscaping, 7/11/06; resulting article was in the October 2006 issue, p.26.
 12. R. King, *Northern Virginia Daily* newspaper reporter interviewed Åkerson regarding National Public Lands Day, 8/23/06.
 13. B. Knarr, WSVB radio of Harrisonburg, VA, reporter interviewed Åkerson regarding National Public Lands Day, 8/23/06.
 14. J. Peterson, WINA radio of Charlottesville, VA, reporter interviewed Åkerson regarding National Public Lands Day, 8/24/06.
 15. Åkerson submitted an article sketch on the short-term volunteer program at Shenandoah National Park to the NPS *Park Tips*, 8/28/06.

Safety Management

1. Updated the Mid-Atlantic EPMT Safety Plan, 10/28/05.
2. Conducted regular 6-minute tailgate safety sessions at the beginning of field work (38 occasions).
3. Conducted herbicide inventories (1/24/06 and 8/10/06) and made sure required MSDS sheets were available for all products (2/28/06 and 7/13/06).
4. Åkerson passed the WV pesticide safety certification exam, 1/31/06.
5. All permanent staff (4 people) and seasonal (1 person) maintained state certification to safely apply herbicides in Virginia, Maryland, and Pennsylvania.
6. Åkerson developed a pesticide user safety training curriculum that was approved by the states of VA, PA, MD, and WV for continuing education credit; the class was offered on 6/9/06 at FRSP where 23 people attended from NPS, the private sector, and volunteers.
7. Åkerson proctored the Commonwealth of Virginia pesticide user safety exam for local staff on three occasions, 7/17/06, 8/10/06, and 8/14/06.

Training

Administration

1. Web-based required training completed:
 - o Information Technology security training: Åkerson, Forder, Meyerhoeffer, and Jensen, May-June 2006.
 - o Records Management: Åkerson, Meyerhoeffer, and Jensen, September 2006.
 - o Privacy Act: Åkerson, Meyerhoeffer, and Jensen, September 2006.

Safety / Risk Management

1. Pesticide user safety refresher class for N. Forder and D. Meyerhoeffer (8 hours), 1/25/06.
2. Annual wildfire safety refresher class for N. Forder, D. Meyerhoeffer, and K. Jensen on February 2006.
3. Seasonal staffing (8 people) received initial pesticide user safety training; offered on four occasions, 4/13/06, 5/22/06, 5/30/06, and 6/19/06.
4. N. Forder received First Aid/CPR/AED training, 5/06.
5. Åkerson attended “All Hazards Emergency Response” training for resource specialists in Savannah, GA, 6/13-15/06.
6. Pesticide user safety refresher class for K. Jensen (8 hours), 6/15/06.

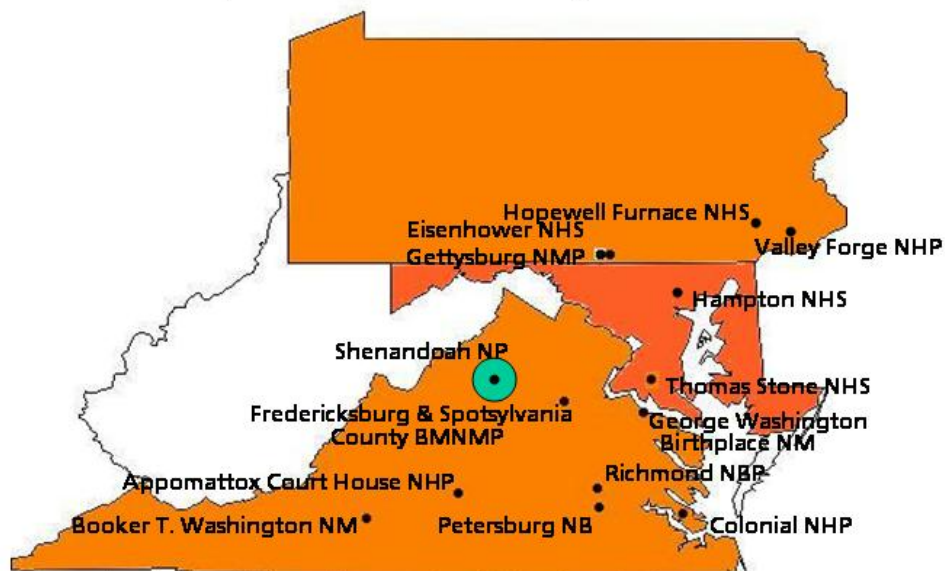
Biology

1. Åkerson attended the Invasive Species Management Conference at Ft. Detrick, MD, 1/19/06.

General Competency

1. Fundamentals-II was attended by:
 - o K. Jensen (4/2-4/15/06) and
 - o D. Meyerhoeffer (7/16-7/29/06), both at HOAL.

Mid-Atlantic Exotic Plant Management Cooperative Working Circle



Designating park units receiving on-the-ground control and monitoring assistance, FY 2006.
Figure 8. Map indicating the participating parks of the Mid-Atlantic Cooperative, FY 2006.



Figure 9. Group photograph of the FY 2006 Mid-Atlantic EPMT. From left-to-right are Norman Forder, Kate Jensen, Dale Meyerhoeffer, Andrea Norris (SCA Intern), and James Åkerson.

Mid-Atlantic Cooperative In-kind Contributions

Location/Item	Value (\$)								
· Provided by previous NRPP (VA-EPMT) funding									
5-passenger 4x4 pick-up (GSA equivalence for \$260/mo rent + 1100x21.5¢ mileage)	\$	5,958							
· All parks:									
Fuel (while in park)	\$	3,000							
Minor non-budget tools & repairs	\$	500							
· SHEN (as host):									
Office space (source: Bill Dudley Realty)	\$	3,600							
Office supplies	\$	200							
Equipment storage & shop (source: Bill Dudley Realty)	\$	5,000							
Fuel (20 gallons/week * 40 weeks)	\$	2,400							
Utilities	\$	6,000							
Network & IT support	\$	7,378							
· Park specific:									
	Subtotals		Staff	Equipment	GPS/GIS	Photography	Johnboat	Storage	Loader
APCO: 2 field staff, field equipment, GPS/GIS services	\$ 4,045	\$	3,045.35	250	750				
BOWA: 1 field staff, field equipment	\$ 1,773	\$	1,522.68	250					
COLO: GIS, photography, field equipment, storage	\$ 1,650	\$	-	200	750	200		500	
FRSP: 2 field staff, housing 3 seasons, field GPS, GIS, field equipment	\$ 4,745	\$	3,045.35	200	1500				
GETT/EISE: 3 field staff, housing 3 seasons, GIS, radios, field equipment	\$ 5,518	\$	4,568.03	200	750				
GEWA/THST: 2 field staff, housing 3 seasons, field GPS, field equipment, canoe/Johnboat (phragmites work), storage	\$ 4,115	\$	3,045.35	200	750		70	50	
HAMP: 2 field staff, field equipment, Bobcat loader	\$ 3,745	\$	3,045.35	200					500
HOFU: storage & office space	\$ 100							100	
PETE: 2 field staff, housing 3 seasons, field GPS, GIS, field equipment	\$ 5,745	\$	3,045.35	200	1500			1000	
RICH: 1 field staff, housing 2 seasons, field GPS, field equipment	\$ 2,473	\$	1,522.68	200	750				
SHEN: 3 field staff, field GPS, GIS, field equipment	\$ 6,468	\$	4,568.03	200	1500	200			
VAFO: 1 field staff, GIS, photography, storage	\$ 3,273	\$	1,522.68		1500	200		50	
		\$	28,931	\$	2,100	\$	9,750	\$	600
		\$		\$		\$		\$	
		\$		\$		\$		\$	
Total In-kind	\$	77,687	\$	77,687					
	2006								
In-kind percent of total budget (\$294,525 + in-kind)		21%							
	2006								
In-kind percent of funded budget (\$294,525)		26%							

Figure 11. Table of annual Mid-Atlantic EPMT programmatic accomplishments and expenditures for GPRA reporting, FY 2006.

GRPA Results -- FY 2006

Accomplished by Mid-Atlantic EPMT & Cooperators

ACRES				----- EPMT --			----- IPC, Inc. -			----- SCA Team -		
----- TOTAL -				----			----			----		
PARK	TREATED	RETREATED	TOTAL	TREATED	RETREATED	TOTAL	TREATED	RETREATED	TOTAL	TREATED	RETREATED	TOTAL
APCO*	18.0	1.6	19.6	18.0	1.6	19.6			0.0			0.0
BOWA*	1.2	0.2	1.3	1.2	0.2	1.3			0.0			0.0
COLO	5.9	1.1	7.0	5.9	1.1	7.0			0.0			0.0
EISE*	0.0	0.0	0.0			0.0			0.0			0.0
FRSP*	7.3	47.5	54.8	6.2	7.6	13.8			0.0	1.1	39.8	41.0
GETT*	30.9	0.0	30.9	27.2	0.0	27.2	3.7	0.0	3.7			0.0
GEWA*	8.1	2.9	11.0	4.7	1.4	6.0			0.0	3.4	1.5	4.9
HAMP	0.0	0.0	0.0			0.0			0.0			0.0
HOFU	1.4	0.0	1.4	1.4	0.0	1.4			0.0			0.0
PETE*	13.9	4.0	17.9	11.4	4.0	15.3			0.0	2.6	0.0	2.6
RICH*	5.3	9.2	14.5	5.1	1.8	6.9			0.0	0.2	7.4	7.6
SHEN*	83.2	35.8	119.0	47.6	30.6	78.1	35.6	5.3	40.9			0.0
THST	0.0	0.0	0.0			0.0			0.0			0.0
VAFO*	29.6	8.6	38.2	22.5	0.1	22.6	7.0	8.5	15.5			0.0
TOTAL	204.7	110.9	315.5	151.0	48.3	199.3	46.4	13.8	60.2	7.3	48.8	56.1

VALUE

Park	EPMT Person Days*	Percent Total	EPMT Value	IPC, Inc. Cost	SCA Team Value	Total Expended
APCO	41	4.8%	\$ 14,025	\$ -	\$ -	\$ 14,025
BOWA	15	1.7%	\$ 5,119	\$ -	\$ -	\$ 5,119
COLO	52	6.0%	\$ 17,793	\$ -	\$ -	\$ 17,793
EISE	23	2.7%	\$ 7,859	\$ -	\$ -	\$ 7,859
FRSP	53	6.2%	\$ 18,273	\$ -	\$ 6,427	\$ 24,700
GETT	33	3.8%	\$ 11,285	\$ -	\$ -	\$ 11,285
GEWA	33	3.8%	\$ 11,285	\$ -	\$ 5,723	\$ 17,007
HAMP	13	1.5%	\$ 4,434	\$ -	\$ -	\$ 4,434
HOFU	29	3.4%	\$ 9,914	\$ -	\$ -	\$ 9,914
PETE	54	6.3%	\$ 18,649	\$ -	\$ -	\$ 18,649
RICH	51	5.9%	\$ 17,451	\$ -	\$ -	\$ 17,451
SHEN	153	17.8%	\$ 52,288	\$ 19,363	\$ -	\$ 71,651
THST	13	1.5%	\$ 4,434	\$ -	\$ -	\$ 4,434

FTE

EPMT FTE**	IPC FTE***	SCA FTE***	Total FTE
0.20	0	0	0.20
0.07	0	0	0.07
0.25	0	0	0.25
0.11	0	0	0.11
0.26	0	0.24	0.50
0.16	0.01	0	0.17
0.16	0	0.19	0.35
0.06	0	0	0.06
0.14	0	0	0.14
0.26	0	0	0.26
0.24	0	0	0.24
0.73	0.13	0	0.87
0.06	0	0	0.06

VAFO	49	5.7%	\$ 16,765	\$ 63,737	\$ -	\$ 80,502
TOTALS	612	71.2%	\$ 209,572	\$ 83,100	\$ 12,150	\$ 304,822
						\$ 304,822
SCA supplies	0	0.0%	\$ -	\$ -	\$ -	\$ -
Data/equip	68.4	8.0%	\$ 23,430	\$ -	\$ -	\$ 23,430
Training/Fire duty	33	3.8%	\$ 11,304	\$ -	\$ 1,350	\$ 12,654
Holidays/Leave	146.6	17.1%	\$ 50,218	\$ -	\$ -	\$ 50,218
TOTALS	248	28.8%	\$ 84,953	\$ -	\$ 1,350	\$ 86,303
						\$ 86,303
GRAND TOTALS	859.8	100.0%	\$ 294,525	\$ 83,100	\$ 13,500	\$ 391,125

52 weeks x 4
days

208 days/person 100 11.6% \$ 34,255
4.13 FTE

860 total days MA-EPMT IPC, Inc. SCA Team Total

Total budget \$ 294,525 \$ 83,100 \$ 13,500 \$ 391,125

0.24	0.13	0	0.36
2.94	0.27	0.43	3.65
0.00	0	0	0.00
0.33	0	0	0.33
0.16	0	0	0.16
0.70	0	0	0.70
1.19	0	0	1.19
4.13	0.27	0.43	4.84

* EPMT person days is actual field time plus proportion of shared time

** EPMT staff total FTE is 4.1 times percent total

*** Actual work sheets

Breakdown of budget by type of expenditure

Figure 12. Table of funding support for the Mid-Atlantic Exotic Plant Management Team, FY 2006.¹⁰

FY 2006 Funding Support for the Mid-Atlantic EPMT		
→ Source	MA-EPMT Base Funds	
Expense Type → Account	2144-6205- NYP	
Personnel	\$241,561	
Supplies & Materials	15,943	
Training	193	
Travel	24,843	
Equipment	364	
Vehicles	0	
Services	10,187	
Other	1,784	
Totals	\$294,875	

¹⁰ These figures include all activities relative to exotic plant management.