Developing a management plan for a college nature preserve

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Historical, Physical and Ecological Features

- 5.3 ha forested preserve at Marist College, Dutchess County, NY (**Fig. 1**)
- Held as private estates during 17th-20th centuries, purchased by Marist College, 1997, later named ***Fern Tor*** (Casey, 1998)
- Structures include century-old brick mansion converted for academic use stone foundations, sheds, and unpaved carriage roads (**Fig. 1**)
- Ecosystems: forest, creek, pond and wetland
- Forest types: oak-hickory ridges, hemlock-northern hardwood cove

Purposes

Education

- Natural history observation & field journals
- Introductory biology field experiments
- Forest community measurement & analysis
- Class-related or independent research

Recreation

- Walking/running
- Photography
- Wildlife viewing

Conservation

- Species conservation via forest and freshwater ecosystem protection
- Southern-most extension of ~15 mi. of forested land from Rhinecliff to Poughkeepsie, on east shore of Hudson River
- Part of *Hudson River Valley Greenway* (HRVG,2009)
  - 13 counties bordering the Hudson River
  - promotes preservation of cultural & recreational resources

Problems

1. **ROTC activities** – foxholes (**Fig. 2**), off-trail maneuvers, paintball
2. **Tree cutting** –one of college's oldest trees; no consultation with faculty
3. **Litter & trash** – from adjoining rental property and visitors
4. **Invasive & nuisance plant species** – poison ivy, brambles, duckweed and rapidly expanding Japanese knotweed (**Fig. 3**)
5. **Erosion** – surface and banks of trails & roads
6. **Campfires** – occasionally at overlook
7. **Landscaping debris** – unmanaged piles along North Ridge Trail

Fig. 2. Foxhole near scenic overlook

Fig. 3. Japanese knotweed & duckweed

Prohibited Activities

1. Campfires or barbecues
2. Motorized vehicles, except by grounds crew and security
3. Digging, except for sampling and conservation activities
4. Paintball
5. Bicycling
6. Dog walking
7. Unlawful activities - graffiti, littering, alcohol & illicit drug use

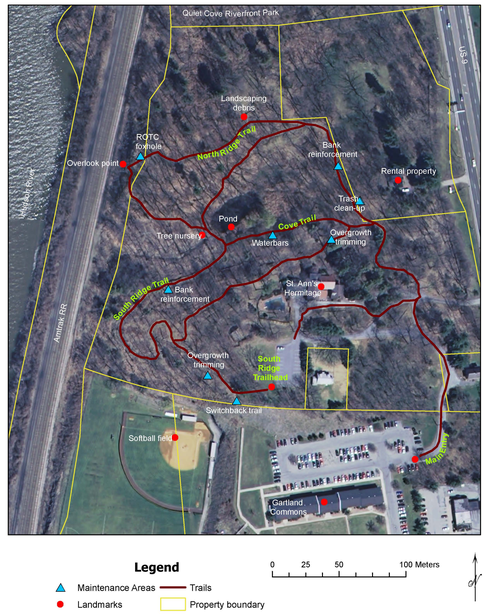

Fig. 1. Fern Tor trails & landmarks

Fig. 5. Japanese knotweed colonies in Fern Tor

Preserve Management

Ecosystems

- All ecosystems – recreational activities should be limited to trails, to avoid damage to flora, fauna, soils and stream bed
- Pond and wetland
  - **Japanese knotweed** (*Polygonum cuspidatum)* on shoreline and in wetland. Partially suppressed with black sheeting & tarps **(Fig. 4)**

(a) April 1 **(b)** July 21

Fig. 4. Suppression of Japanese knotweed by black polyethylene & tarps is highly effective nearly 4 months after laying them down.

- Forests
  - Standing & fallen dead & diseased trees should remain (unless hazardous or have crossed roads and paths)
  - Native tree & shrub saplings to be planted to reduce erosion, replace dead trees, enhance wildlife habitat &/or increase plant biodiversity

Trails (Fig. 1)

- Erosion control
  - Bank reinforcement at areas indicated in **Fig. 1.** Also plant native shrubs to stabilize soil, improve habitat & aesthetics of road edges
  - Switchbacks for access trail from Gartland Commons
  - Waterbars to intercept water traveling down trails
- Overgrowth control (managed by college grounds crew)
  - Poison ivy & bramble trimming in spring & summer

Debris (Fig. 1)

- Leaves & landscaping debris from main campus & residential areas should be actively composted at north edge of the preserve

Signage

- To educate about natural history, ecology & regional conservation
- To indicate prohibited activities

Invasive Species Control - Japanese knotweed

Harmful effects

- Colonies out-compete native species & greatly alter habitats

Population in Fern Tor (Fig. 5)

- Dominates wetland and most of pond shoreline
- Largest colony behind landscaping debris area, bordering a county park to north, that is also part of Hudson River Valley Greenway
- 9-fold area increase in past two years, 650 m² to 5760 m²

Proposed control options (Table 1)

- Manual - Pond shoreline
  - Continued trimming & pulling, followed by mulching with black polyethylene sheeting & tarps (**Fig. 4)**
- Manual plus herbicide – Wetland
  - More difficult to lay and secure mulch than along pond
- Herbicide only - Upland colonies
  - Glyphosate - systemic, kills roots & rhizomes (Tu et al., 2001)
    - Low toxicity to vertebrates; registered & approved for aquatic use by US EPA (EPA, 2009)
    - Surfactants in some formulations (e.g., *Roundup*®) are highly toxic to aquatic organisms (N. Kraus, pers. comm.)
      - *Rodeo*® does not contain surfactants

Table 1. Schedule of Japanese knotweed control

Month	Task	Materials to Purchase
January		
February		
March	Clear & dispose of stalks at pond	Leaf bags
April	Continue to clear stalks & lay tarps Apply *Rodeo*® in uplands	Leaf bags, tarps, cinder blocks, *Rodeo*®
May	Cut new growth & re-lay tarps	
June	Apply *Rodeo*® in uplands	
July	Cut new growth & re-lay tarps	
August		
September	Cut new growth & re-lay tarps Apply *Rodeo*® in uplands	
October		
November	Clear & dispose of stalks from wetland	Leaf bags
December		

Japanese knotweed growth phases
Winter die-back period:
Appearance of shoots:
Summer growth period:
Onset of flowering:
Seed set:

Long-term management

- Use of the above control options as needed
- Possible use of goats to graze large, dense colonies
- Planting & seeding of native plants to create shade, exclude & compete with knotweed

Managing Council

Purpose – coordinated, informed implementation of the management plan

Structure

- Parties with vested interest in integrity and maintenance of the preserve
  - Faculty from Departments of Environmental Science & Policy (ES&P) and Biology
  - Managers from Department of Physical Plant
  - Students from ES&P and Biology, campus environmental club and X-C teams
- Report to Vice President for Academic Affairs (VPAA)
- Funding through VPAA and Department of Physical Plant

Activity

- Meet once each semester to asses status of implementation of management plan, and to develop priorities for each semester
- Coordinate student work crews for priority activities
- Develop student leadership & commitment for stewardship of Fern Tor

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ACKNOWLEDGEMENTS

Tim Nightingale &Ralph Short, Dept. of Physical Plant, provided extensive logistical & material support. Members of the Marist Women's Crew Team & Adam Feldman removed knotweed stalks and laid mulch. Tim Coalla and Naja Kraus, NYS Dept. of Environmental Conservation, Reg. 3, provided GIS support.