INVASIVE SPECIES MANAGEMENT PLAN
FOR WUHALA WOODS

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INVASIVE SPECIES MANAGEMENT PLAN FOR WUHALA WOODS

1. Establish conservation targets and goals

2. Identify and prioritize species/infestations that threaten targets and goals

3. Assess control techniques

4. Develop and implement weed management plan

5. Monitor and assess impact of management actions

6. Review and modify

- part of an overall restoration program
- keep in mind that the ultimate purpose of the effort is to preserve native species, communities and/or functioning ecosystems.
<table>
<thead>
<tr>
<th>Vines</th>
<th>Sparse(&lt;20), Moderate(20-100), Dense(&gt;100)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oriental Bittersweet (Celastrus orbiculatus)</td>
<td>Sparse (Negligible)</td>
</tr>
<tr>
<td>Japanese Honeysuckle (Lonicera japonica)</td>
<td>Sparse (Negligible)</td>
</tr>
<tr>
<td>Poison Ivy (Rhus radicans) NUISANCE</td>
<td>Dense</td>
</tr>
<tr>
<td>Shrubs</td>
<td>Sparse(&lt;20), Moderate(20-100), Dense(&gt;100)</td>
</tr>
<tr>
<td>Bush Honeysuckle (Lonicera spp.)</td>
<td>Moderate(20-100)</td>
</tr>
<tr>
<td>Autumn Olive (Eleagnus umbellata)</td>
<td>Sparse (Negligible)</td>
</tr>
<tr>
<td>Multiflora Rose (Rosa multiflora)</td>
<td>Dense</td>
</tr>
<tr>
<td>Japanese barberry (Berberis thunbergii)</td>
<td>Dense</td>
</tr>
<tr>
<td>Privets (Ligustrum spp)</td>
<td>Sparse (Negligible)</td>
</tr>
<tr>
<td>Japanese Knotweed (Polygonum cuspidatum)</td>
<td>Sparse (Negligible)</td>
</tr>
<tr>
<td>Siebold viburnum (Viburnum sieboldii)</td>
<td>Sparse (Negligible)</td>
</tr>
<tr>
<td>Trees</td>
<td>Sparse(&lt;5), Moderate(5-10), Abundant(&gt;10)</td>
</tr>
<tr>
<td>Tree-of-Heaven (Allanthus altissima)</td>
<td>Moderate</td>
</tr>
<tr>
<td>Norway Maple (Acer platanoides)</td>
<td>Sparse (Negligible)</td>
</tr>
<tr>
<td>Herbaceous</td>
<td>Sparse (individuals found but not common), Moderate(&gt;1 patch of plants), Abundant(several large patches, wide distribution)</td>
</tr>
<tr>
<td>Wineberry (Rubus phoenicolasius)</td>
<td>Sparse</td>
</tr>
<tr>
<td>Purple Loosestrife (Lythrum salicaria)</td>
<td>Sparse</td>
</tr>
<tr>
<td>Phragmites (Phragmites australis)</td>
<td>Sparse (Negligible)</td>
</tr>
<tr>
<td>Garlic Mustard (Allaria petiolata)</td>
<td>Abundant(several large patches, wide distribution)</td>
</tr>
<tr>
<td>Japanese Stil Grass (Microstegium vimineum)</td>
<td>Abundant(several large patches, wide distribution)</td>
</tr>
<tr>
<td>Blackberry (Rubus allegheniensis) NUISANCE</td>
<td>Moderate</td>
</tr>
</tbody>
</table>
**INVASIVE SPECIES MANAGEMENT PLAN FOR WUHALA WOODS**

**Multiflora Rose** *(Rosa multiflora)*

Identify and locate Multiflora Rose shrubs
Cut shrubs to ground with machete, loppers or brush cutting mower
Apply Pathfinder II undiluted with spray wanddauber to the stumps and bark within 5 to 10 minutes following cutting
Chip or mow with attention to not disperse berries

Monitor each season, cut and re-apply herbicide as necessary

As tree canopy closes, Multiflora rose will be shaded out

In Wuhala Woods much of the Multiflora rose is sparse in the understory increasing treatment success

Stands are larger and more prolific in gaps where full sun is present

Repeated mowing 2 to 3 times alone may deter spindly stands of multiflora rose in areas of tree canopy closure

Herbicide applications are best in summer, fall & winter
INVASIVE SPECIES MANAGEMENT PLAN FOR WUHALA WOODS

Ailanthus (*Ailanthus altissima*)
- Identify and locate Ailanthus trees
- Tree of less than 2 inch diameter girdle completely in 16 inch vertical cuts at waist level.
- Apply Pathfinder II with quality paint brush generously within 5 to 10 minutes following girdling
- Herbicide treatment requires 3 to 4 hours to dry before precipitation.
- Use the Peel and Paint Treatment Method for trees above 2 inches in diameter.
- Apply at 3 to 4 feet aboveground level
- Peel back bark in 2 inch wide strips to expose moist cambium layer with machete, hatchet or chain saw
- Leave alternating intact bark strips 2 to 3 inches wide between the 20 inch vertical cuts.
- Alternating cuts and intact bark inhibits vigorous stump sprouting.
- Peel and Paint Method can be applied in summer, fall and winter.

Eradication of the Ailanthus tree takes repeated treatments to effectively kill the leaves, trunks and roots.

Tree of Heaven (*Ailanthus altissima*) Wuhala Woods
East near Blue Trail entrance
Poison Ivy (*Toxicodendron radicans*)

Poison Ivy Management

- Identify Poison Ivy vines
- Take precaution from getting poison ivy - gloves, hats, long sleeves, Tecnu, or employ someone not allergic to poison ivy.
- Cut the poison ivy vine at the 5 foot level. Cut the vine 1 foot from the base of the tree trunk with machete, loppers or hatchet.
- Multiple, small vines could be cut carefully with a sharp, curved pruning saw, machete, or bow saw without damaging the tree's bark (This may be very time consuming).
- Pry off and remove poison ivy vine with spade, machete or shovel; discard vines in small piles

Poison Ivy vines on mature trees
Wuhala Woods-East
Apply Pathfinder II with paintbrush directly to the cut vine immediately. Work in herbicide thoroughly without runoff.

- Allow the vine to stay on the tree. It will die and eventually decompose and fall from the tree.
- There are thousands of poison ivy vine growing up trees. A team of 2 persons would need approximately 80 to 100 hours to accomplish a total treatment.
- One could prioritize by first treating specimen trees, trees closest to the trails, or devise some comprehensive coverage strategy.
- Total removal will greatly improve the overall health of Wuhala Woods and utilization of the Woods by the citizens of Chatham.
INVASIVE SPECIES MANAGEMENT PLAN FOR WUHALA WOODS

Japanese Knotweed (*Polygonum cuspidatum*)
- One small patch near Cornell Street entrance
- one of the Invasives that is hardest to remove.
- Injecting the stems helps in getting the herbicide into the root/rhizome system but it still may take many years and several applications to finally eradicate this troublesome invasive.
- It can spread quickly from seed production and rhizomes and will take over large areas within a forest.

- Japanese Barberry (*Berberis thunbergii*)
- Privet (*Ligustrum lucidum*), Asiatic
- Honeysuckle (*Lonicera maackii*), Siebold viburnum (*Viburnum sieboldi*)
- Cut shrubs to 5 to 10 inch stumps with machete, chain saw, or loppers
- Apply herbicide treatment of Pathfinder II, Rodeo or commercial grade Roundup directly to stump with quality paint brush

① Chip or mow brush without the berries to disperse on forest floor
② Monitor treated plants seasonally for stump sprouting or other signs of life
③ Cut and reapply herbicide to sprouts until plant is totally eradicated
INVASIVE SPECIES MANAGEMENT PLAN FOR WUHALA WOODS

- Japanese Stiltgrass and garlic mustard both grow lushly and tend to take over the whole forest floor.

- The stiltgrass in both sections of the Wuhala Woods is growing mostly in disturbed areas and in gaps in the forest canopy.

- Manually pulling and bagging is an effective management method although it can be very labor intensive

- Planting native trees and shrubs into the stiltgrass can help to restore these areas

- A combination of deer-resistant native shrubs and understory trees; and tube protected trees help restore the true forest character and ecology.
"The engineers estimate is based on the results of the survey in respect to
the invasive species, the amount and extent of the individual stands
of invasive plants and our experience with the materials and level of
effort to perform the activities outlined in the Management Plan."

**Essential Elements of Invasive Plant Management Strategy Level of Effort Required**

- **Time Estimate** (per species) for each treatment or phase
  \[= \text{# of 8 hr days} \times \text{# of people required.} \]

**EXAMPLE:**

**Multiflora Rose (Rosa multiflora)** Management - **Time Estimate**

- **First Treatment**
  
  **4 Days @ 8 Hours per day x 2 Persons = 64 Hours**
Engineers Estimate of Costs for Implementation

Invasive Plant Management Strategy Level of Effort Required

**Multiflora Rose Management**
- Time Estimate - Total = 120 Hours

**Ailanthus Management**
- Time Estimate - Total = 136 Hours

**Poison Ivy Management**
- Time Estimate - Total = 336 Hours

**Invasive Plant Management**
- Time Estimate - Total = 56 Hours

**Monitoring** - Time Estimate = 150 hrs

**Wuhala Woods Eastern Sector, Long-Term Maintenance - 7 Years**
- Time Estimate = 336 Hours

**Wuhala Woods Western Sector, Long-Term Maintenance - 7 Years**
- Time Estimate = 252 Hours

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**Wuhala Woods Western Sector, Gaps in Forest Canopy**
- Management Time Estimate = 96 hrs

**Wuhala Woods Eastern Sector, Gaps in Forest Canopy**
- Management Time Estimate = 160 hrs
Engineers Estimate of Costs for Implementation

Multiflora Rose (*Rosa multiflora*) Management – Time Estimate = 120 hrs

Ailanthus (*Ailanthus altissima*) Management - Time Estimate = 136 hrs

Poison Ivy (*Toxicodendron radicans*) Management - Time Estimate = 336 hrs

Management Time Estimate = 56 hrs


Wuhala Woods Western Sector, Gaps in Forest Canopy Time Estimate = 96 hours

Wuhala Woods Eastern Sector, Gaps in Forest Canopy Time Estimate = 160 hours
Engineers Estimate of Costs for Implementation

Estimate of Costs for Restoring the Affected Areas

Ecological Restorations Planning and Implementation Steps
- Site Assessment
- Data Interpretation
- Plant Number Calculation
- Native Plant Ranking by Characteristics
- Design Restoration Plantings
- Brainstorm Design Innovations
- Select Native Plant Nurseries
- Fax for Plant Availability
- Fax Plant Orders to Multiple Nurseries
- Pick Up or Receive Delivered Plants
- Transport Plants to Restoration Sites
- Edit and Expand Native Plant Restoration Design
- Layout Plants Using Color-Coded Flags
- Install Plants into the Ground
- Work in Leaves and Sticks as Mulch
- Install Deer Protection as Necessary
- Devise Long-Term Maintenance Plan
- Adhere with Commitment to Maintenance Plan

Ecological Restoration Materials
- Native Trees, Overstory - Containerized 5 to 7 feet
- Native Trees, Overstory - Balled and Burlapped 10 to 15 feet
- Native Trees, Understory - Containerized 5 to 7 feet
- Native Shrubs - Containerized 4 to 6 feet
- Herbaceous Plants - Gallon size and plugs
- Deer Protection - Tree protector tubes, Oak stakes, Plastic fencing

Ecological Restoration with Native Plants - Time Estimate
- Western Sector and Eastern Sector
  Total - 285 Person Hours

Ecological Restoration with Native Plants - Cost Estimates, Western Sector
  Total - $8, 815.00

Ecological Restoration with Native Plants - Cost Estimates, Eastern Sector
  Total - $18, 835.00

Ecological Restoration with Native Plant - Cost Estimates, Mortality Replacement Plants
  Total - $ 2, 500
Ecological Restoration with Native Plants - Time Estimate

- **Western Sector and Eastern Sector**  Total - 285 Person Hours
- **Ecological Restoration Materials**
  - Native Trees, Overstory - Containerized 5 to 7 feet
  - Native Trees, Overstory - Balled and Burlapped 10 to 15 feet
  - Native Trees, Understory - Containerized 5 to 7 feet
  - Native Shrubs - Containerized 4 to 6 feet
  - Herbaceous Plants - Gallon size and plugs
  - Deer Protection - Tree protector tubes, Oak stakes, Plastic fencing

**Cost Estimates**

- **Western Sector**  =  $8,815.00
- **Eastern Sector**  =  $18,835.00

**Mortality Replacement Plants Costs**  =  $2,500
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List of suggested Native Plants for Gaps in both Sectors of Wuhala Woods

Trees - Overstory
- Acer saccharum - Sugar maple
- Betula nigra - River birch
- Carya Species
- Celtis occidentalis - Hackberry
- Fraxinus americana - White ash
- Fraxinus pennsylvanica - Green ash
- Platunus occidentalis - Sycamore
- Quercus bicolor - Swamp white oak
- Quercus palustis - Pin oak
- Quercus rubra - Red oak
- Quercus velutina - Black oak
- Tilia americana – Linden

Trees - Understory
- Carpinus caroliniana - Ironwood
- Cornus florida - Flowering dogwood
- Nyssa sylvatica - Black gum
- Viburnum lentago - Nannyberry viburnum
- Viburnum prunifolium - Blackhaw viburnum

Shrubs
- Cornus racemosa - Gray dogwood
- Viburnum dentatum - Arrowwood viburnum

Herbaceous Plants
- Osmunda regalis – Royal fern
- Osmunda cinnamomea – Cinnamon fern
- Eupatorium maculatum – Spotted joe-pye
- Panicum clandestinum – Deer tongue
- Elymus virginicus – Virginia Wild Rye
- Verbena hastate – Blue Vervain
- Monada fistulosa – Wild Bergamot
- Eupatorium fistulosum- Boneset
- Desmodium canadense – Showy Tick Trefoil
Monitoring - Time Estimate

The New Jersey Department of Environmental Protection has a protocol which states that ecological management and restoration projects be monitored for a 5 year period.

We recommend that Wuhala Woods be monitored 3 times per year, Spring, Summer and Fall.

Monitoring consists of making observations and recording data that is used to plan and execute the regular, periodic management and maintenance requirements essential for the long-term success of the projects. Monitoring Time Estimate - Total = 150 Hours
Engineers Estimate of Costs for Implementation

Wuhala Woods Eastern Sector, Long-Term Maintenance (7 Years)
- Mowing, select weeding, pruning, control invasives and vines, remove tubes, replace mortality - 3 Times per year for 7 years
  Time Estimate = 336 Hours

Wuhala Woods Western Sector, Long-Term Maintenance (7 Years)
  Time Estimate = 252 Hours

NOTE: The levels of effort estimates are based on the probability of using private landscape contractors to perform the work. Naturally, using volunteers to perform tasks not requiring herbicides would lower the overall estimates due to the likelihood of a crew of several versus 2 people per task.
The Issue of Parking Areas for Wuhala Woods

Map of possible parking sites for the Western Sector of Wuhala Woods
The Issue of Parking Areas for Wuhala Woods

Map of possible parking site for the Eastern Sector of Wuhala Woods

End of Rutgers Street Parking Site
The Issue of Parking Areas for Wuhala Woods
The Issue of Parking Areas for Wuhala Woods

ANALYSIS AND RECOMMENDATIONS

Both tracts of the Wuhala Woods are listed in the NJDEP’s Landscape Project as being Forested Wetlands meaning that the NJDEP considers these areas to have value as critical habitat.

FEMA indicate that these areas lie within the regulated areas addressed in the Flood Hazard Area Control Act Rules (N.J.A.C. 7:13-10.4). Construction of Parking Areas within these designated areas or within 300 ft of these areas will require applying for a permit from the NJDEP.

The restrictions and constraints likely to be imposed by the NJDEP (the first of which will be to prove the absolute necessity of having such a structure within the regulated area) by the Wetlands Act and the Flood Hazard Area Control Rules are such that we feel that using the existing options of on-the-street parking until usage of the Wuhala Woods requires constructing on-site parking facilities is the most sensible course of action.

Wuhala Woods shown as Forested Wetlands on NJDEP iMAP web site
Trash and Debris Management Plan for Wuhala Woods

EXTENT OF THE PROBLEM

Western Sector

Construction debris in Western Sector of Wuhala Woods
Trash and Debris Management Plan for Wuhala Woods

Eastern Sector

RECOMMENDATIONS

Western Section

• Stewards of Wuhala Woods
• Management plan
  • Volunteers (safety issues)
  • Dept of Public Works

Eastern Sector (Flood Zone Area)

• Stewards of Wuhala Woods
• Management plan
  • Volunteers (safety issues)
  • Dept of Public Works

Receptacles must be secured and not be floatable*
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FOR WUHALA WOODS

Thank You very much !!

Royal, Antonio and Bob