

INVASIVE SPECIES MANAGEMENT PLAN FOR WUHALA WOODS

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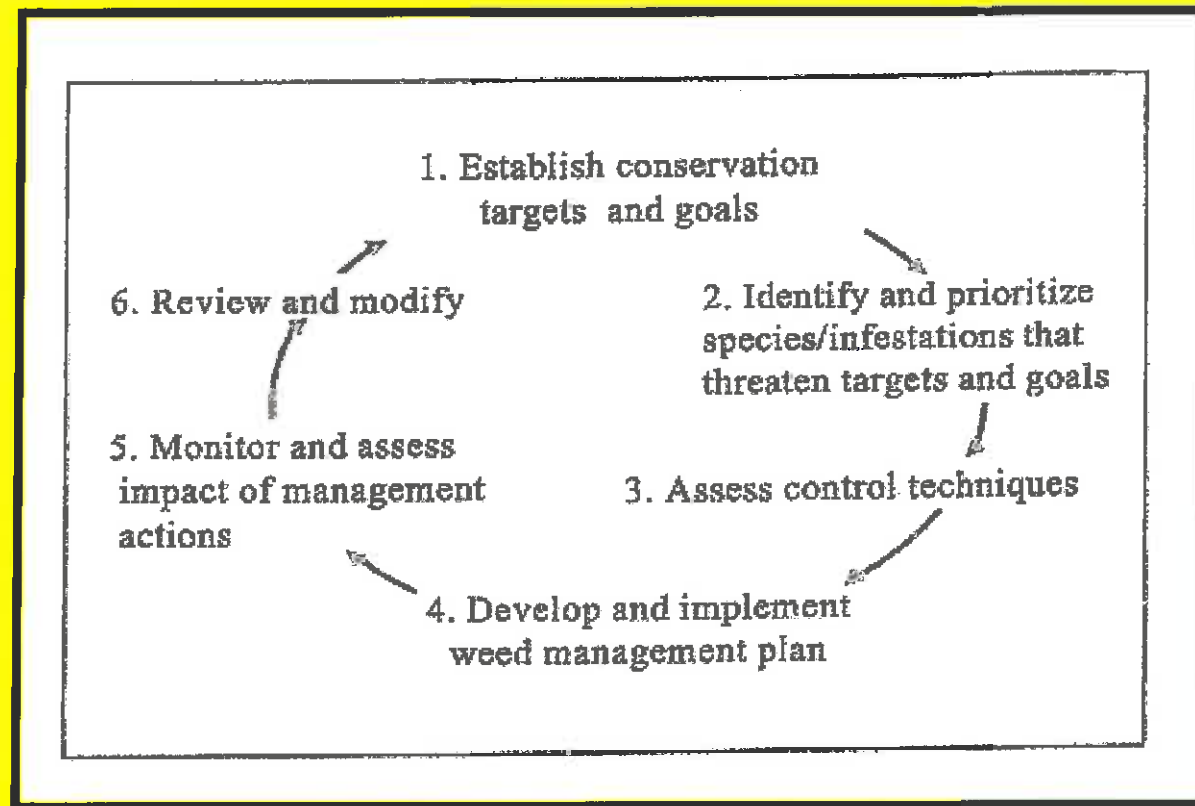
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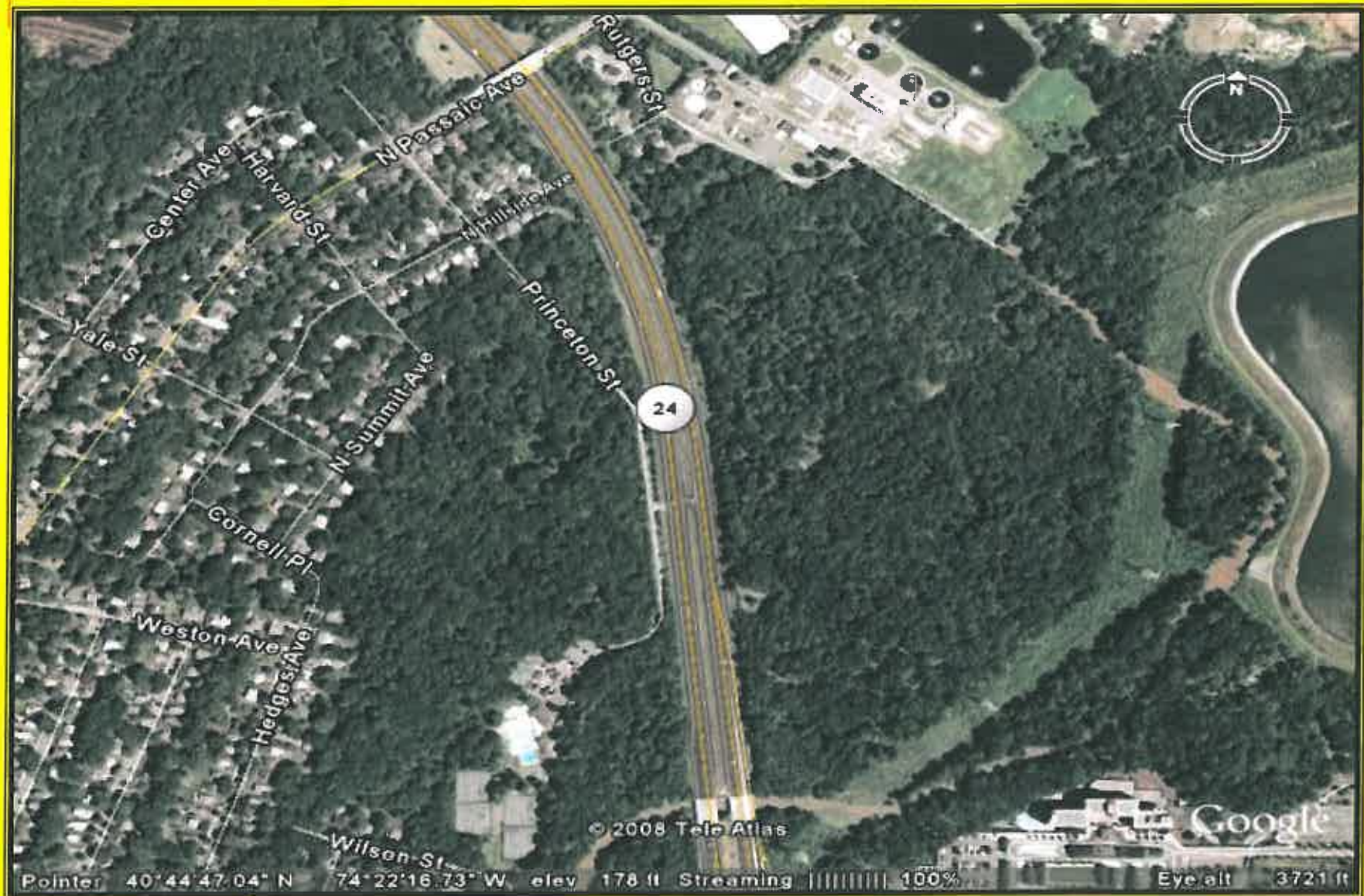


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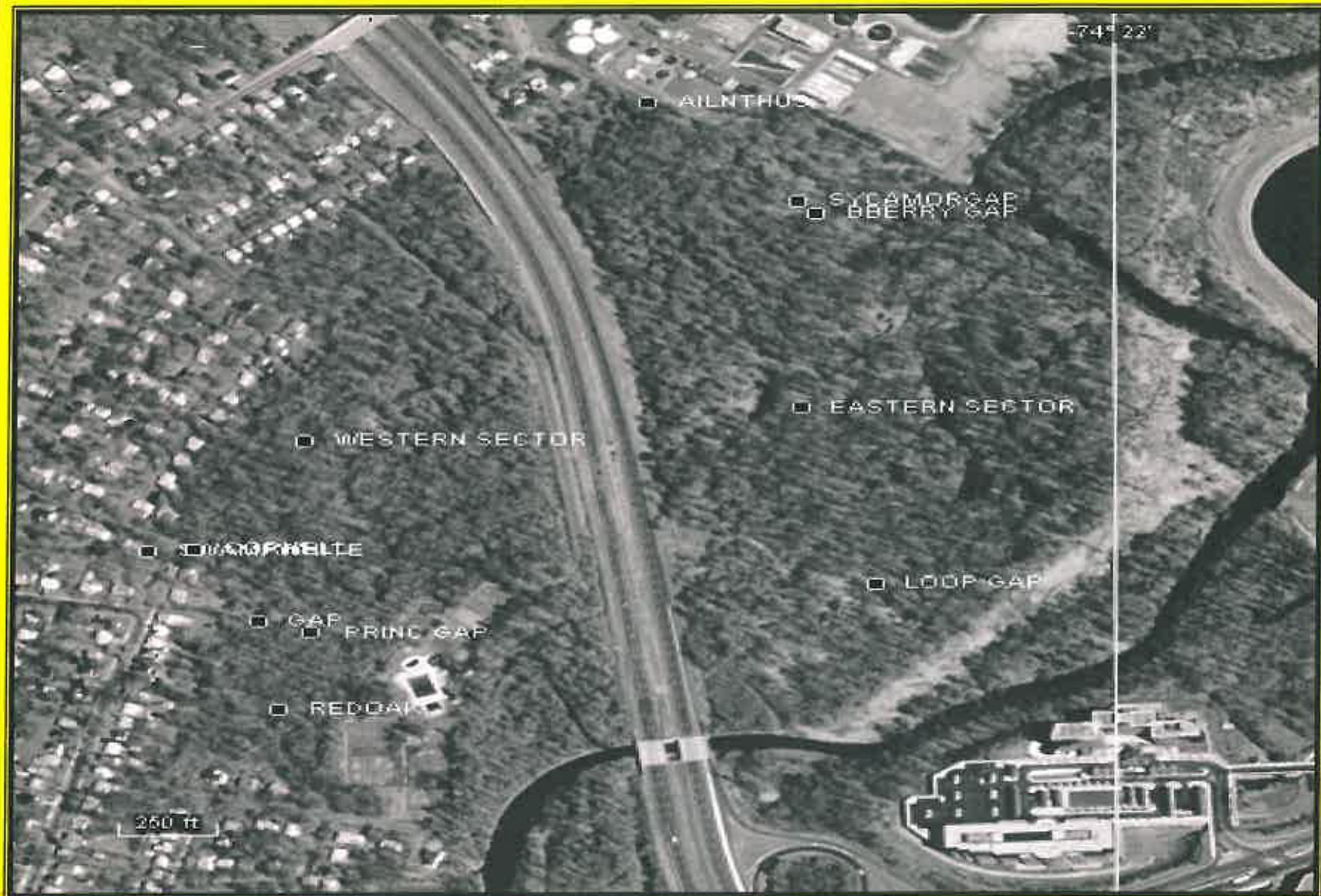


- *part of an overall restoration program*
- *keep in mind that the ultimate purpose of the effort is to preserve native species, communities and/or functioning ecosystems.*

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Generalized Occurrence of Invasive and Nuisance Plants for Wuhala Woods

Vines

Vines: Sparse(<20), Moderate(20-100), Dense(>100)

**Oriental Bittersweet (*Celastrus orbiculatus*)
Japanese Honeysuckle (*Lonicera japonica*)
Poison Ivy (*Rhus radicans*) NUISANCE**

**Sparse (Negligible)
Sparse (Negligible)
Dense**

Shrubs

Shrubs: Sparse(<20), Moderate(20-100), Dense(>100)

**Bush Honeysuckle (*Lonicera* spp.)
Autumn Olive (*Eleagnus umbellata*)
Multiflora Rose (*Rosa multiflora*)
Japanese barberry (*Berberis thunbergii*)
Privets (*Ligustrum* spp)
Japanese Knotweed (*Polygonum cuspidatum*)
Siebold viburnum (*Viburnum sieboldii*)**

**Moderate(20-100)
Sparse (Negligible)
Dense
Dense
Sparse (Negligible)
Sparse (Negligible)
Sparse (Negligible)**

Trees

Trees: Sparse(<5), Moderate(5-10), Abundant(>10)

**Tree-of-Heaven (*Ailanthus altissima*)
Norway Maple (*Acer platanoides*)**

**Moderate
Sparse (Negligible)**

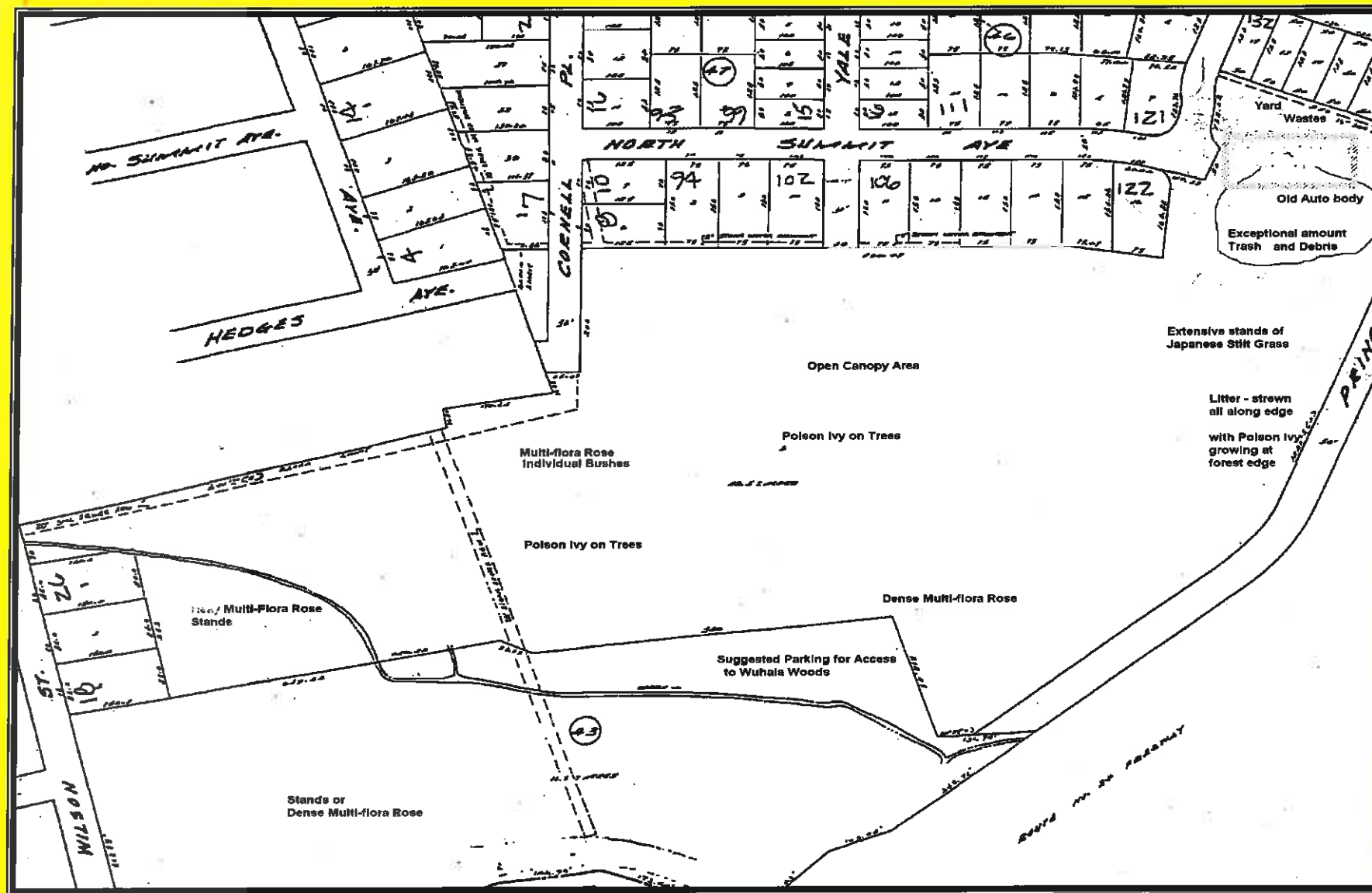
Herbaceous

**Herbs: Sparse(individuals found but not common),
Moderate(>1 patch of plants), Abundant(several
large patches, wide distribution)**

**Wineberry (*Rubus phoenicolasius*)
Purple Loosestrife (*Lythrum salicaria*)
Phragmites (*Phragmites australis*)
Garlic Mustard (*Alliaria petiolata*)
Japanese Stilt Grass (*Microstegium vimineum*)
Blackberry (*Rubus allegheniensis*) NUISANCE**

**Sparse
Sparse
Sparse (Negligible)
Abundant(several large patches, wide distribution)
Abundant(several large patches, wide distribution)
Moderate**

INVASIVE SPECIES MANAGEMENT PLAN FOR WUHALA WOODS



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 wand/dauber 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



Multiflora Rose - Wuhala Woods along Princeton Road



Multiflora Rose - Wuhala Woods -EAST near wastewater treatment plant

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 widestrips to expose moist cambium layer with machete, hatchet or chain saw
- ☐ Leave alternating intact barkstrips 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**

INVASIVE SPECIES MANAGEMENT PLAN FOR WUHALA WOODS

- **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 wines on mature trees
Wuhala Woods-East**

INVASIVE SPECIES MANAGEMENT PLAN FOR WUHALA WOODS



?

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 mackii*), Siebold
- viburnum (*Viburnum seiboldi*)
- ?
- 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

③ Chip or mow brush without the berries to disperse on forest floor

③ Monitor treated plants seasonally for stump sprouting of other signs of life

③ Cut and reapply herbicide to sprouts until plant is totally eradicated



INVASIVE SPECIES MANAGEMENT PLAN FOR WUHALA WOODS

- Treatment of ***Microstegium vimineum*** – Japanese Stiltgrass, ***Alliaria petiolata*** Garlic Mustard
- 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.



Engineers Estimate of Costs for Implementation

“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
= # of 8 hr days X # of people required.***

EXAMPLE:

Multiflora Rose (Rosa mulitflora) 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

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**

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

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

Management Time Estimate = 56 hrs

- **Japanese Knotweed (*Polygonum cuspidatum*), Japanese Barberry (*Berberis thunbergii*), Privet (*Ligustrum lucidum*), Asiatic honeysuckle (*Lonicera mackii*), Siebold viburnum (*Viburnum sieboldi*), Norway maple (*Acer platanoides*), White mulberry (*Morus alba*)**

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

Engineers Estimate of Costs for Implementation

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

INVASIVE SPECIES MANAGEMENT PLAN FOR WUHALA WOODS

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
- Quercu 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 racemasa - Gray dogwood
- Viburnum dentatum - Arrowwood virburnum

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)

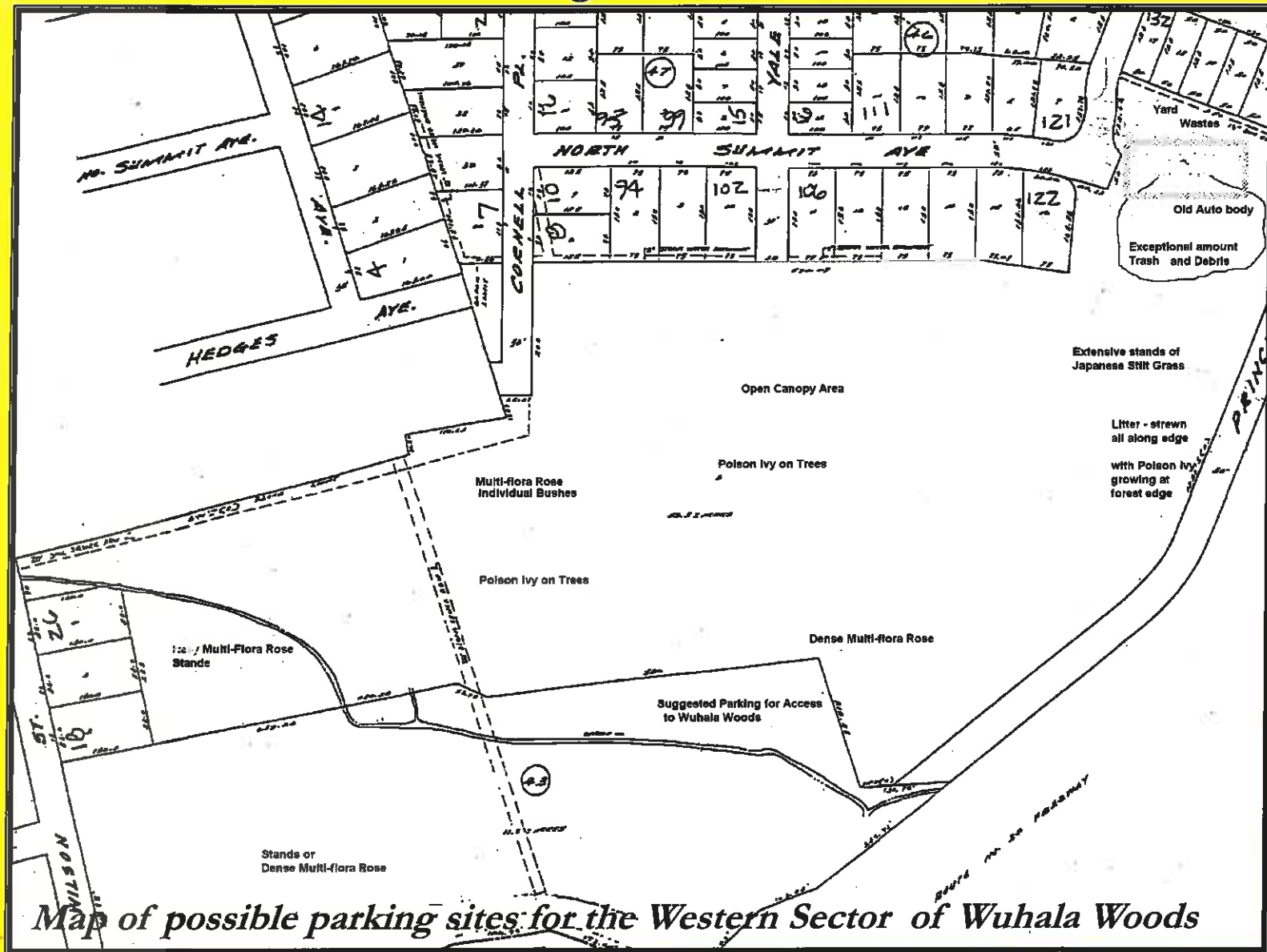
- ***Mowing, select weeding, pruning, control invasives and vines, remove tubes, replace mortality - 3 Times per year for 7 years*** **Time Estimate = 336 Hours**

Wuhala Woods Western Sector, Long- Term Maintenance (7 Years)

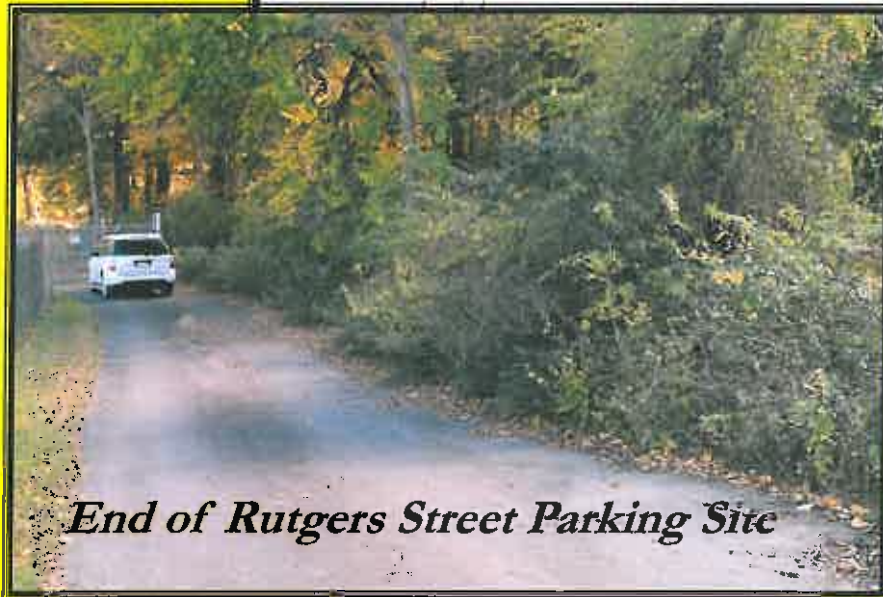
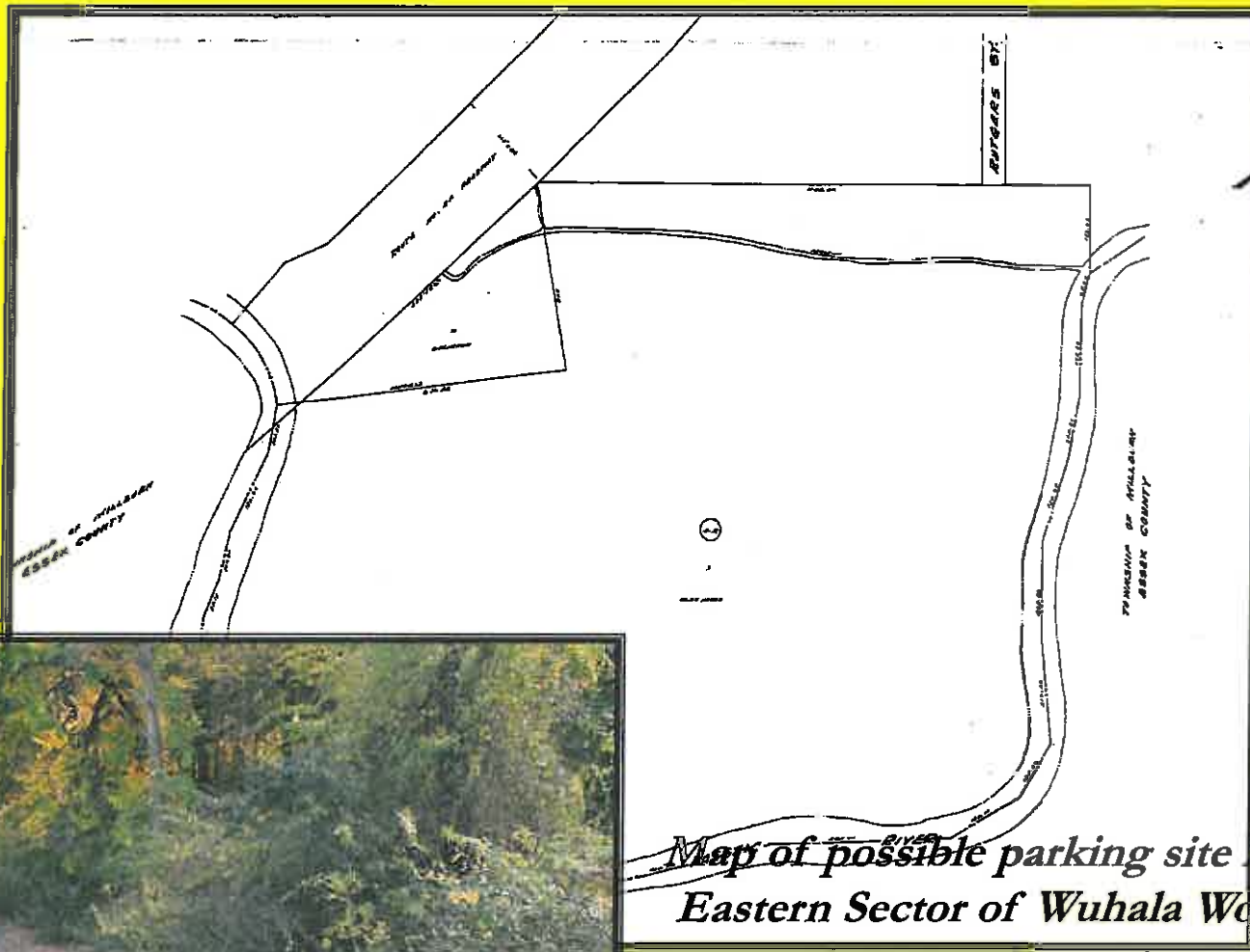
Time Estimate = 252 Hours

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



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The Issue of Parking Areas for Wuhala Woods



The Issue of Parking Areas for Wuhala Woods

ANALYSIS AND RECOMMENDATIONS

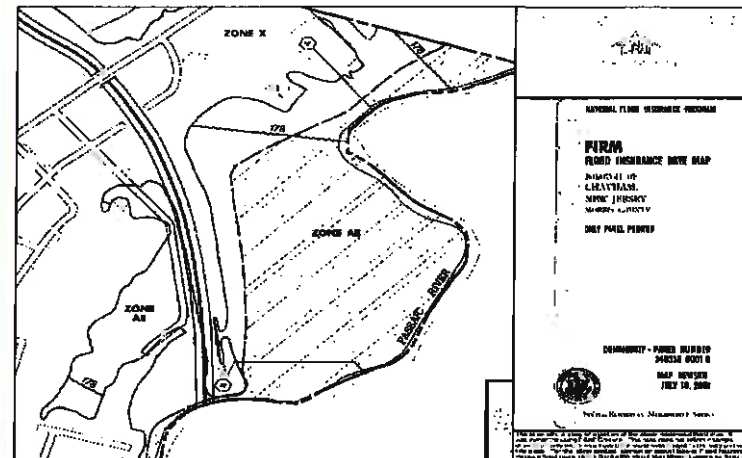
Both tracts of the Wuhala Woods are listed in the NJDEP's Landscape Project as being Forested Wetlands meaning that the NJDEP considers these area to have value as critical habitat.

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***

***INVASIVE SPECIES MANAGEMENT PLAN
FOR WUHALA WOODS***

Thank You very much !!

Royal, Antonio and Bob

