

2008

**ICC Non-Native Invasive Species
Task Force Report**

November 2008

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I. INTRODUCTION

A. Inter-Agency Non-Native Invasive Task Force

1) Task Force Background

The inter-agency Non-Native Invasive (NNI) Task Force was created in April 2008 to evaluate potential impacts of the Intercounty Connector (ICC) on adjacent forest resources and recommend mitigation measures. The ICC is a multi-modal east-west highway proposed to link existing and planned development areas between the I-270 and the I-95/US 1 corridors within Montgomery and Prince George's counties (SHA et al., 2004). The highway is being built by the Maryland State Highway Administration (SHA) and the Maryland Transportation Authority (MdTA), with support from the Federal Highway Administration (FHWA).

The ICC will be a state-of-the-art highway that is being designed with the goal to minimize impacts to the environment. However, environmental impacts are unavoidable and the selected roadway design bisects forested areas including four major stream valley parks (SVPs) in Montgomery County. This includes clearing and grubbing interior forests within the ICC Right-of-Way (ROW) to allow for construction of the roadway and other supporting facilities. During this process, new forest edges will be created in areas adjacent to mature forested parkland. This newly created edge habitat will be susceptible to invasion of NNIs.

The SHA and MdTA are required by Maryland State law to manage these newly created edges within the ROW for NNIs on the state noxious plant list. However, the species included on the noxious plant list are mainly agricultural pests that generally do not pose a significant threat to forest ecology; climbing vines pose the biggest threat to forest ecology and none are included in the list.

In response to these concerns, the Maryland-National Capital Park and Planning Commission (M-NCPPC) partnered with the SHA, MdTA, Maryland Department of Agriculture (MDA), Montgomery County Department of Environmental Protection (MD DEP), and the University of Maryland (UM) to create the NNI Task Force to evaluate the benefits of additional management of NNIs along the ROW-parkland interface. It is noted that this task force was created early in the ICC construction process, presenting the unique opportunity to implement preventative measures and develop rapid response protocols to detect and address NNIs before a viable seed bank becomes established and NNIs become a major problem in parkland adjacent to the ICC corridor.

2) *About the Task Force*

The NNI Task Force held its inaugural meeting on April 15, 2008, and an additional two meetings were held in the summer of 2008. The agenda and meeting minutes for all meetings are included as Attachment A of this report. In order to represent a broad range of expertise and interests, the task force included members from local and state agencies as well as respected experts in the field of NNI control. The table below presents the agencies that were represented on the NNI Task Force.

Table 1. Agencies Represented on the NNI Task Force

Agency	Nature of Involvement
Maryland-National Capital Park and Planning Commission	Landowner of adjacent parkland potentially impacted by NNIs due to the construction of the ICC
Maryland State Highway Administration	Landowner of the ICC ROW, managing the construction of the ICC
Maryland Transportation Authority	Future owner-operator of the ICC after construction is complete
Maryland Department of Agriculture	Experts in NNIs and implementing the MD State noxious weed law
Montgomery County Department of Environmental Protection	Experts in forest resources
University of Maryland	Unaffiliated expert

B. Goal of the NNI Task Force

The goal of the inter-agency NNI task force was to evaluate the potential for deleterious effects of creating new forest edges on existing resources associated with construction of the Intercounty Connector. Based on this evaluation, management strategies will be recommended in order to preserve existing forest ecology to the extent possible.

C. Report Purpose and Outline

The purpose of this report is to document the findings and recommendations of the NNI Task Force that can reduce the potential for NNIs to impact adjacent parkland. An outline for the rest of this report is shown below.

Chapter 2: Discusses the ecological significance of NNIs, the specific NNIs that present the biggest threat to forest ecology, existing programs that address NNIs in Montgomery County, and the locations within Montgomery County where new forest edges will be created adjacent to parkland.

Chapter 3: Presents the Task Force recommendations to control NNIs during the ICC construction phase and ICC operation phase.

Chapter 4: Conclusions

II. NNI BACKGROUND AND ECOLOGICAL SIGNIFICANCE

A. General Overview of Non-Native Invasive Species

In the following sections, NNIs are more formally defined and their ecological significance is discussed.

1) *Definition of Non-Native Invasive Species*

Non-native species, also called alien or exotic species, are species that are introduced into an ecosystem in which they did not evolve. Alien or exotic species can come from other continents, other countries and even other parts of the United States, and they can be introduced accidentally or purposefully (Maryland Invasive Species Council, 2008). For example, kudzu was introduced from Japan into the United States in the late 1800's as a forage crop and ornamental plant, and was later promoted as an erosion control measure by the Soil Conservation Service (Swearingen et al., 2002). Conversely, mile-a-minute was unintentionally introduced in the 1930s to a nursery site in York County, Pennsylvania after unsuccessful experimental introductions in Maryland and Oregon (Swearingen et al., 2002).

However, not all non-native species are considered to be invasive. In fact, many of our food crops and domesticated animals are exotic. The National Invasive Species Council (NISC, 2006) defines an invasive species as a "species that is non-native to the ecosystem under consideration and whose introduction causes or is likely to cause economic or environmental harm or harm to human health." It is estimated that invasive species cost the United States approximately \$35 billion a year in control efforts and agricultural losses (Swearingen et al., 2002). The ecological harm associated with NNIs will be discussed in more detail below.

The following presents the characteristics of invasive species that allow them to reproduce rapidly and spread over large areas (Bergmann, 2008; Swearingen et al., 2002):

- Invasive species have few, if any, natural controls such as diseases, pest, and predators.
- They are able to produce large numbers of viable seeds that germinate and survive.
- Seeds have long lives in soil, and some can lay dormant in the soil until conditions become favorable for germination.
- Seeds are dispersed away from the parent plant through various means such as wind, water, wildlife, and people.
- Seeds and plants can tolerate a wide range of climatic conditions and habitats.

- Many reproduce clonally through rhizomal growth; one “mother plant” can produce hundreds to thousands of clones.

2) *Ecological Significance of Non-Native Invasive Species*

The famous Harvard biologist E.O. Wilson has claimed that the introduction of invasive alien species is second only to habitat destruction as the leading cause of biodiversity loss worldwide.

As discussed above, environmental harm is one of the criteria for non-native species to be considered invasive. In the context of forest ecology, NNIs often display the following qualities that can result in a decrease in biological diversity and ultimately in environmental harm (Bergmann, 2008; Swearingen et al., 2002):

- NNIs rapidly invade new areas and out-compete native plants for light, water, and nutrients.
- NNIs are aggressive and persistent, and change the composition, structure, and function of the existing ecological community.
- NNIs alter ecosystem processes by reducing the amount of available resources (e.g., light and water). For example, NNIs can alter natural forest succession by preventing seedling establishment of native plants.
- NNIs that grow as tree-climbing vines can significantly reduce tree vigor and affect the health of trees, possibly resulting in killing the tree. As NNIs grow and proliferate, the amount of sunlight available for the trees is reduced. In addition, the weight of the NNI biomass can topple smaller or weakened trees.
- NNIs disrupt insect-native plant associations (e.g., seed dispersal, pollinator relationships).
- NNIs replace the native food sources depended upon by wildlife, and reduce or eliminate host plants for native insects and other wildlife.

In addition, NNIs can reduce recreational opportunities associated with forest resources. As plant and wildlife communities change in response to NNIs, unique outdoor experiences such as bird watching, hiking, wild flower viewing, and fishing become scarcer.

B. Potential Impacts of Creating New Edges on Forest Ecology

The effect of creating new edges and construction of new roads on forest ecology has been studied and significant impacts have been documented. New edges along road corridors facilitate the establishment of NNIs by altering the physical habitat to conditions, stressing native vegetation, and providing transportation corridors for seed dispersal (Trombulak and Frissell, 2000). Habitat alterations include changes in soil conditions (e.g., bulk density, temperature, and moisture), light availability, and patterns of runoff—all of which favor species well adaptable to constantly changing and disturbed conditions. Further, NNIs that establish in road corridors create seed banks which can be viable for many years—in some cases over 80 years (USDA, 2003).

The richness (i.e., number of species) and density of NNIs tend to be significantly higher along road corridors compared to interior forest stands. For example, Parendes and Jones (2000) found that exotic plants, while widely distributed in the study area, were almost completely restricted to roadsides, streams, and recent clearcuts. They also note that exotic species were almost absent in the soil seedbank under mature forest stands. Gelbard and Belnap (2002) found that the richness and density of NNIs along paved roads was 50 percent greater, and the richness of native species was 30 less, compared to unimproved areas. Similar results were observed by Ramey (2002), who surveyed NNIs at road edges, forest edges, and interior forests. NNIs were three to four times more likely to occur in roadside and forest edge plots compared to interior plots.

While NNIs tend to be less prevalent in interior forest stands, once established along road corridors they do have the potential to spread into interior reaches. Several studies found that the most susceptible areas are 30 to 50 meters from the forest edge, but that NNIs may expand further than 100 m into the forest interior (Fraver, 1994; Gelbard and Belnap, 2002; Hansen and Clevenger, 2005). NNI expansion into interior forests may be aided by seed dispersal by birds (McNab and Meeker, 1987).

C. NNIs, the ICC, and Montgomery County Parkland

The ICC bisects several large areas of forest located on Montgomery County parkland including the following four major stream valley parks (SVPs): Rock Creek SVP, North Branch SVP, Northwest SVP, and Upper Paint Branch SVP (Figure 1).

All four of these parks have special designations in the areas where the ICC bisects the parkland. For example, these parks were designated as Biodiversity Areas by the Maryland Department of Natural Resources -Wildlife and Heritage Division in the early 1990s due to the presence of rare, threatened, or endangered (RTE) species, or as examples of unique or high quality natural

communities. The following table shows the additional special designations have been assigned to these parks due to their pristine and sensitive nature.

Table 2. Major Stream Valley Parks Impacted by the ICC

Stream Valley Park	Special Designation
Rock Creek Stream Valley Park	Special Protection Area ¹ , Biodiversity Area ²
North Branch Stream Valley Park	Special Protection Area, Biodiversity Area, Best Natural Area ³
Northwest Branch Stream Valley Park	Special Protection Area, Biodiversity Area, Best Natural Area
Upper Paint Branch Stream Valley Park	Special Protection Area, Biodiversity Area, Best Natural Area

¹Special Protection Areas: Area with high quality natural resources in which additional laws and regulations apply in order to maintain the high quality conditions.

²Biodiversity Areas: High quality area contains species of plants on the Maryland RTE watchlist, or having species of high local importance.

³Best Natural Areas: High quality natural areas with large acres of high quality, contiguous forest, RTE or watchlist plant species, and/or unique plant and wildlife habitat.

As discussed above, NNIs are one of the biggest threat to forest ecology and biodiversity. While forest surveys have identified several species of NNIs on Montgomery County parkland, they tend to be less prevalent in the interior sections of the SVPs listed above. However, after the ICC is built, these once interior forests will be susceptible to NNI infestation due to favorable conditions created for NNI seed establishment. The following table shows the area of high quality forests that will be vulnerable to invasion of NNIs due to the construction of the ICC.

Table 3. Estimate of Potential Parkland Vulnerable to NNI Invasion

Stream Valley Park	Linear Feet of ROW that Bisects Major Stream Valley Parks	New Parkland Vulnerable to NNI Invasion (acres)*
Rock Creek SVP	1500	6.9
North Branch SVP	4000	18.4

Northwest Branch SVP	7500	34.4
Upper Paint Branch SVP	8500	39
Total (ac)	21,500 ft (4 miles)	98.7

*Assumes 100 ft of forest on either side of the ICC are the most vulnerable to invasion of new NNIs.

D. Montgomery County Department of Parks NNI Control Programs

In order to protect forests and biodiversity in the County, Montgomery County Department of Parks has developed and implemented a comprehensive plan to address and control NNIs on parkland including the components listed below:

- Identifying areas of concern and prioritizing work action programs in these locations.
- Coordinating NNI removal efforts made by Regional Park staff system-wide.
- Incorporating NNI plant management responsibilities in all permits, contracts, leases and other agreements for non-park use of parkland (implemented August 2007).
- Secured funding for hiring contract professionals to remove NNIs in select prioritized park locations.
- Monitoring NNI infestation levels and control efforts in parkland and tracking results in a GIS database.
- Providing citizen volunteer training classes on NNI identification and control methods. (There are currently over 650 citizen “Weed Warriors”).
- Providing training programs for Department of Parks’ employees on NNI identification and removal techniques.
- Providing regularly scheduled M-NCPPC-staffed opportunities for large group volunteer efforts to restore NNI infested park sites.
- Coordinating the efforts of over 35 volunteer groups to remove NNIs in parkland.

E. Cost of Not Taking Action

Taking no action to control NNIs along the newly created woodland edges created by the ICC will most likely lead to an infestation of NNIs. If no preventative action is taken, the likely long-term outcome will be the loss of forest land, as well as individual trees as vines grow up and overtake the forest canopy. A loss of biodiversity and wildlife habitat will also result as native species of shrubs, tree seedlings, and herbaceous plants in the understory are displaced by NNIs.

In addition to the aesthetic and biodiversity losses, the reduction of vegetation impairs the natural processes that add significantly to the quality of life in the county. Trees provide a plethora of benefits that include, but not limited to: reductions in air and water pollution, greenhouse gases, stormwater runoff, and erosion, replenishing of groundwater, and moderating of stream temperatures to name just a few.

Once established, the cost of treating NNIs on parkland can vary significantly depending on the level of infestation, the species involved, removal methods selected, ability to access the area, etc. M-NCPPC contracts with MDA herbicide applicators to treat many park areas. MDA also has extensive experience treating noxious weeds along SHA ROWs and therefore has good knowledge of the effort that would be required for this program. MDA’s estimate for this work is \$1,000 per acre. The potential impact is approximately 98 acres of parkland (8 linear miles extending 100 ft into forest edges).

At \$1,000 per acre, the potential cost would be \$98,000 per year. Assuming a program will be put in place to regularly monitor and treat NNIs, this cost should drop after several years once the disturbed area along the LOD has stabilized. With so many variables it is difficult to estimate an annual cost; however, the table below presents a reasonable estimate for control efforts. These costs will be evaluated and adjusted accordingly at the end of the fifth year.

Years after completion	Amount per year
1 to 3	\$98,000
4 - forward	\$49,000

III. NNI TASK FORCE RECOMMENDATIONS

The following sections present the recommendations of the inter-agency NNI Task Force. It is noted that task force members focused on providing cost-effective and practical measures for limiting the establishment of and managing NNIs in parkland adjacent to the ICC. Another factor that task force members recognized when making recommendations was the different phases of how the ICC will be built and managed. The construction phase is being administered by the SHA, which is using five design-build (D-B) contracts to build the ICC. However, after completion of the ICC, authority will be transferred to MdTA for long-term operation and maintenance. Some of the challenges of the D-B process as it relates to NNI control are discussed below.

Task Force members suggested that the two keys to reducing the long-term threat of NNIs at the parkland-ROW interface are to prevent the establishment of a viable seedbank during the construction phase, and to implement an early detection and rapid response program to treat NNIs as they are identified. While long-term programs are recommended, the first two years after initial clearing was identified as the critical timeframe for preventing the establishment of a viable seedbank and thus a significant effort should be made during this time period. Once a seed bank is established, it is almost impossible to eradicate NNIs.

The NNI task force made separate recommendations for the construction phase and operational phase of the ICC. As stated above, the critical time period for preventing the establishment of a viable seedbank is during the first two years after initial clearing. This time period generally coincides with the duration of construction of each of the five contracts of the ICC. In addition, the construction and operational phases of the ICC are being managed by different agencies—SHA and MdTA, respectively—and as such there are different logistic, financial, and organizational factors.

As previously mentioned, SHA is utilizing five D-B contracts to build the ICC. Each of the D-B contracts has very detailed design and construction requirements, and the design-builder is bound by these terms. The Task Force recognizes that the design-builder has no obligation to do items not specified in the contract but hope that there is a willingness to expand on some efforts that are required. The result can be a greatly enhanced effort to control NNIs that requires very little extra effort by the D-B. For example, building an early detection process into an existing process would be useful. Some NNI work is required by State Law—NNIs that are on the State Noxious Weed list must be controlled. The ROW will be inspected for noxious weeds by MDA and Montgomery Weed Control, Inc. When a target species is identified in the ROW, the information will be forwarded to the D-B through a standardized report and the D-B will be responsible for eradication. Many of the species of NNIs that are of concern to M-NCPPC are not on the noxious weed list so their management is not required. However, the program

described above for noxious weed monitoring and control could easily be expanded to include other NNI species at minimum cost. Environmental inspectors from M-NCPPC, SHA and others could be trained to identify NNIs and report infestations to SHA and/or M-NCPPC. This will cost nothing since the inspectors are in the field inspecting fencing, SWM, etc. An early detection program like this could be developed relatively quickly and should ensure that when infestations are detected they are small and easily treated using staff and materials that are already on-site for treating noxious weeds.

A. Recommendations During Construction Phase

1) Determine Baseline Conditions

It is important to determine baseline conditions so that changes in the plant community after the ICC is built can be detected and the appropriate response can be taken. In addition, comparing future monitoring results to baseline conditions will allow agencies to measure the success of NNI program(s) that may be implemented.

Task Force members discussed several aspects of how baseline conditions should be determined. It was widely agreed that conducting extensive field test plots throughout the 8-mile parkland-ROW interface (4 miles on each side of the ICC) would be too costly and time-consuming. However, Task Force members felt that existing conditions could be reasonably determined by conducting a scaled-back baseline inventory in which photographs are taken and field forms are filled out documenting NNI conditions at some prescribed distance (e.g., every quarter of a mile) along the 8-mile parkland-ROW interface. The following guidelines were recommended for the baseline study:

- The baseline study should be conducted during the peak growing seasons for the NNIs of concern.
- The study should be conducted after initial clearing of the Limits of Disturbance (LOD). The following reasons were given for this recommendation:
 - The location of the parkland-ROW forest edge will be known rather than approximated.
 - It will be much easier to access the areas of interest through the ROW.
 - There will be better lighting to take photographs and document conditions.
 - Points of reference will be easier to identify for comparison in future years.

- The initial clearing should not have a significant impact on NNIs and should not skew/impact the baseline study.

In addition, the task force recommended reviewing existing documentation for information on current conditions. Information related to current NNI conditions may be found in the Natural Environmental Technical Report, the FEIS, and the ROD. M-NCPPC forest managers can provide additional information on historic conditions.

The results of the baseline study will be documented in a report and shared with the NNI Task Force.

2) *Enforce a Good Housekeeping Program and Good Construction Practices*

Good housekeeping programs include keeping work areas neat and orderly, regular trash and waste removal, proper signs and notification of hazards, etc. These programs can reduce the number of work-related injuries, ensure compliance with permit conditions, and improve the public opinion of the project. Good housekeeping, combined with the use of good construction practices, can also help prevent the establishment of a viable seedbank and reduce the possibility of seeds being transported from an infested area to an area with few NNIs.

Task force members felt that the most important tool in preventing seedbank establishment was stabilizing exposed soils as soon as possible after initial clearing and throughout construction. Quickly establishing good vegetative cover will reduce the potential for colonization of NNI species in disturbed areas. The erosion and sediment control (E&SC) permit requires that exposed areas be stabilized with vegetation after initial clearing and during construction, and therefore proper implementation and enforcement of the E&SC program will reduce the opportunities for NNIs to become established. Approved seed mixes should be used and measure should be taken to ensure vegetative cover is quickly established. To this end, regulating agencies (i.e., Maryland Department of the Environment) play an important role in NNI control. They should be informed of the importance of establishing ground cover as quickly as possible not only for E&SC purposes, but also for NNI control purposes.

Good housekeeping measures like ensuring that equipment is clean and free of debris can also play a role in reducing the potential for NNI seed dispersal. Prior to transporting construction equipment to a different location, reasonable measures should be taken to remove loose soil from tires, tracks, and undercarriages. These soils could contain NNIs seeds that can become dislodged and introduced to a new environment if relocated without removing.

3) *Develop Training Programs*

Training programs should be developed to educate field personnel on how to identify NNIs. Field personnel are considered to be a first line of defense in NNI control as they are in the ROW almost every day and may have to opportunity to recognize NNIs before major growth occurs. While field personnel would not be expected to conduct routine monitoring activities (see below), field personnel may encounter NNIs during their day-to-day responsibilities and therefore they can provide valuable information on the location of new NNI outbreaks.

Training programs can be developed for construction workers, environmental monitors and inspectors, and other field personnel. Training may be in the form of short and informal “tool box” discussions, or in more formal programs such as the environmental compliance and awareness training (ECAT) program. M-NCPPC has developed NNI identification training programs for a variety of users and applications and can help develop a program for these purposes. In addition, M-NCPPC can provide training services and field identification pamphlets.

It is noted that an important component to the training program should be developing a reporting mechanism that field personnel can use to report the occurrence of NNIs in the parkland-ROW corridor. The reporting mechanism will need to be developed by M-NCPPC in conjunction with SHA and might follow the protocols used by MDA to report noxious weeds as described above.

4) *Develop Monitoring Programs*

The training program should be complimented by the implementation of a more formal monitoring program. When combined, these two programs will form the basis of an early detection and rapid response program.

Monitoring for NNIs in the parkland-ROW interface should be conducted on a routine basis by trained field personnel. The program will be overseen and periodically field verified by experienced professionals. Results should be tracked in a database. M-NCPPC can assist with developing a monitoring program and in monitoring activities. As suggested above, such a program could model the one used by MDA and the D-B to monitor and treat for noxious weeds.

5) *Review Landscaping Plans and Work with Design-Builder*

As previously discussed, quickly establishing vegetation and stabilizing soils after clearing is critical to reducing the opportunities that NNIs have to germinate. Task Force members recommended that M-NCPPC work with the D-B and review the E&SC plans for the clearing

and grubbing phase and the final landscaping plans. The focus of these reviews should be on methods used to quickly stabilize soil after initial clearing and during construction, and the selection of vegetation used in the landscaping plans.

It should be noted that M-NCPPC is already coordinating with the D-B and is reviewing these plans.

B. Recommendations During the Operational Phase

1) Develop Partnerships

Long-term partnerships should be developed between M-NCPPC, MdTA, and local stakeholder and citizen groups, as well as other local and state agencies. Developing partnerships will allow M-NCPPC and MdTA to leverage limited resources and possibly lower the cost of NNI removal, if the removal activities can be combined with other activities conducted by other agencies/organizations. In addition, these partnerships can be used to plan volunteer events and share information related to local NNI outbreaks and control efforts.

The following list presents some agencies/organizations that should be considered for developing partnerships:

- Maryland Department of Agriculture
- Maryland Native Plant Society
- Maryland Non-Native Invasive Species Council
- Maryland Department of Natural Resources
- U.S. Fish and Wildlife Service
- Prince George's County Department of Parks and Recreation
- Mid-Atlantic Exotic Pest Plant Council

2) Develop Training Programs

Similar to the construction-phase training recommendation, a training program should be developed for the personnel that will be performing the long-term routine maintenance of the ICC. After completion of the ICC, MdTA will assume all operational and maintenance responsibilities within the ROW—thus, M-NCPPC should work with MdTA to develop this

program. This program should include the following aspects: importance of controlling NNIs, basic NNI identification, methods for controlling NNIs, and a system for reporting NNIs identified at the ROW ecotone, so that they can be tracked and eradicated during future NNI control activities.

MdTA personnel should also have an understanding of the importance of stabilizing exposed soils and E&SC measures in controlling NNIs. To this end, it was recommended that MdTA maintenance managers attend the E&SC certification courses offered by MDE and SHA—referred to as the “green card” and “yellow card” certification courses, respectively.

3) *Develop Long-term Monitoring Programs*

Again, the training program should be complimented with a monitoring program. Monitoring for NNIs in the parkland-ROW corridor should be conducted on a routine basis by experienced professionals, and results should be tracked in a database. M-NCPPC can assist with developing a monitoring program and in monitoring activities.

C. Other Recommendations

Several other recommendations were briefly discussed during various task force meetings. For example, there was a recommendation to apply for federal and/or research grants to conduct innovative NNI control experiments. Alternatively, researchers conducting experiments on NNIs and forest edges may be interested in using the ICC corridor in experiments.

D. Recommendations for Controlling NNIs

Task force members discussed several alternatives for managing and controlling NNIs along the parkland-ICC interface. Members favored an integrated approach in which site-specific conditions and non-chemical controls are considered prior to pesticide applications. The following methods of controlling NNIs were recommended:

- Mechanical control methods including physical removal of NNIs using procedures like hand-picking and vegetation management such as mowing.
- Biological control methods including using natural biological processes to control NNIs like beneficial insects and biological pesticides.
- Chemical control methods including applying synthetic pesticides to eradicate NNIs.

Using this multi-disciplinary approach could prove to be both cost-effective and environmentally-friendly. Mechanical controls are most effective prior to establishment of NNIs when numbers of plants are small. It was acknowledged that mechanical controls may be difficult to implement depending on the size of the infested area. Mechanical controls may also be limited due to safety concerns to volunteers and maintenance workers depending on the proximity of the ICC to the infested area, and difficulties accessing the infested area depending on barriers (e.g., sound walls), waterways, wetlands, marsh, and dense forests. Task force members were also interested in the use of biological controls; however, this type of NNI control is currently considered to be an emerging science and the use of biological agents to control NNIs would be experimental. To this end, the task force agreed the only proven method to controlling and eradicating NNIs at the parkland-ICC interface was the use of chemicals.

The task force stressed the importance of developing partnerships during the construction and operational phases of the ICC, and leveraging the relationships when determining the best course of action for controlling NNIs. For example, if pesticide applications become necessary to control weeds in the ROW, it may be possible to coordinate with the D-B so that the same applicator can treat NNI problem areas along the parkland-ICC interface in the vicinity of the required treatment at the same time. The approach will likely be more cost-effective than applying pesticides on two separate occasions.

The course of action selected for controlling NNIs should be made by and agreeable to the interested parties—i.e., M-NCPPC, SHA, and/or MdTA. Both M-NCPPC (2008) and SHA (2003) have developed recommendations for controlling vegetation. These manuals should also be considered when determining the course of action.

Because the road intersects large park woodlands, there will be long stretches where the only access to the newly created wood-edges is via the ICC. M-NCPPC and MdTA will need to work out an agreement to allow access to parkland through the ICC in order to facilitate treatment of NNIs on parkland.

E. Implementation of NNI Task Force Recommendations

The recommendations presented in this section have the potential to reduce the likelihood that the newly created forest edge will become dominated by NNIs. However, task force members acknowledged that it may be difficult or impossible to implement all the above recommendations. That said, the benefit of these recommendations can only be realized by proper implementation of as many of them as possible. The responsible parties for each phase of the ICC (construction and operational) should discuss each of these recommendations and determine which can be reasonably implemented. Specific programs should be developed, and agreements outlining agency responsibilities should be created.

For the construction phase, M-NCPPC and SHA should discuss training and monitoring programs. In addition, the D-B for the contracts with area(s) adjacent to the impacted parklands should be involved to discuss construction practices and opportunities to jointly treat NNIs in the ROW and along the parkland-ICC interface. Similarly, M-NCPPC and MdTA should discuss potential partnerships with other agencies and non-profit groups, and develop training and monitoring programs for the operational phase of the ICC.

The goal of many of these recommendations is to maximize the use of existing resources and programs to reduce the capital costs of implementing an NNI control program. A few examples include implementing an M-NPCCP-developed training program, and using personnel that are already on-site for basic monitoring activities. However, there will obviously be some costs associated with the implementation of some of these recommendations and control efforts of NNIs along the parkland-ICC interface. To ensure that funds are available for necessary NNI control operations, M-NCPPC proposes creating a jointly-funded account to cover costs associated with implementing the NNI control program. Administration of this account and the amount deposited into the amount will be determined by M-NCPPC and SHA and/or MdTA.

IV. CONCLUSIONS

A. About the Inter-Agency NNI Task Force

M-NCPPC partnered with SHA to create the inter-agency NNI Task Force in April 2008. The goal of the NNI task force was to evaluate the potential for deleterious effects of creating new forest edges on existing resources associated with construction of the ICC, and to recommend strategies to preserve existing forest ecology to the extent possible.

Members of the NNI task force were selected to represent a broad range of expertise and interests, and included personnel from local and state agencies as well as respected experts in the field of NNI control. A total of three NNI task force meetings were held in the summer of 2008.

The ICC bisects several large areas of forest located on Montgomery County parkland including the following four major stream valley parks (SVPs): Rock Creek SVP, North Branch SVP, Northwest SVP, and Upper Paint Branch SVP. These four parks have been identified as unique county resources and have special designations to help preserve and protect these resources. The ICC bisects approximately four miles of these SVPs, creating approximately eight miles of new forest edge habitat.

B. NNI Task Force Recommendations

Task force members focused on providing cost-effective and practical measures for controlling NNIs in parkland adjacent to the ICC. In addition, the task force recognized that SHA is responsible for building the ICC while MdTA will be responsible for the long-term management; thus, separate construction phase and operational phase recommendations were made. In addition, recommendations for controlling NNIs along the forest-ROW interfaces were made.

Briefly, task force members suggested that the two keys to reducing the long-term threat of NNIs at the parkland-ROW interface are to prevent the establishment of a viable seedbank during the construction phase, and to implement an early detection and rapid response program to treat NNIs as they are identified. The first two years after initial clearing was identified as the critical timeframe for preventing the establishment of a viable seedbank and thus a significant effort should be made during this time period.

The NNI task force recommendations are presented below.

1) *Construction Phase Recommendations*

- Determine baseline conditions after initial clearing of the LOD.

- Enforce a good housekeeping program and good construction practices.
- Develop training programs for on-site personnel.
- Develop monitoring and reporting programs.
- Review landscaping plans and work with design-builder.

2) *Operational Phase Recommendations*

- Develop partnerships with local and state agencies and organizations.
- Develop training programs long-term maintenance personnel.
- Develop long-term monitoring and reporting programs.

3) *Recommendations for Controlling NNIs*

Task force members discussed several alternatives for managing and controlling NNIs along the parkland-ICC interface. Members favored an integrated approach consisting of mechanical, biological, and chemical control techniques. The task force stressed the importance of developing partnerships during the construction and operational phases of the ICC. By leveraging these partnerships, it may be possible to reduce the cost of treating NNIs.

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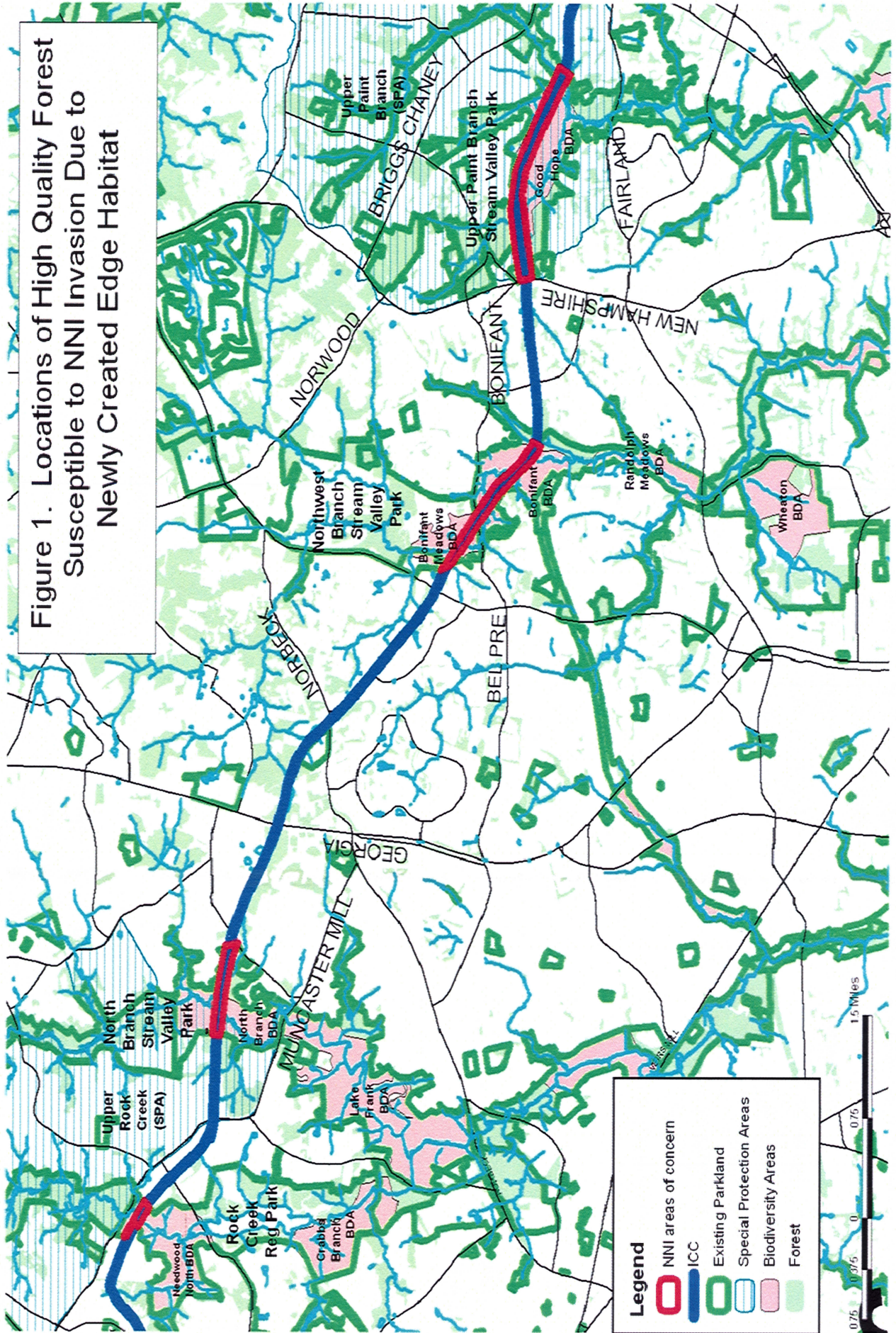
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Figure 1. Locations of High Quality Forest Susceptible to NNI Invasion Due to Newly Created Edge Habitat



Legend

- NNI areas of concern
- ICC
- Existing Parkland
- Special Protection Areas
- Biodiversity Areas
- Forest



Appendix A
Task Force Meeting Agendas and Minutes

NNI Task Force Outline/Agenda

April 15, 2008

Overall Objectives and Goals

Discuss existing NNI management strategies

- State
- County
- Parks
- ROW

Evaluate existing conditions along the ROW

- Potential for further degradation with newly created edges

Determine effectiveness of current strategies

- Success and failures/lessons learned

Discuss effects of NNIs on native and plant communities and ecological benefits of managing NNIs along the ROW

Explore management options—cost/benefit analysis

- Mechanical
- Chemical
- Biological
- Integrated Pest Management (IPM)

Establish time schedule

- Additional meetings, if required
- Formulate recommendations and best management practices
- Prepare final report with documentation of recommendation

NNI Right-of-Way Task Force

Minutes from the 4/15/2008 Inaugural Meeting

Attendees

Name	Affiliation	Email Address
Joe Vervier	SHA/Landscape Operations Division	jvervier@sha.state.md.us
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David Myers	University of Maryland	dnmgevs@umd.edu

NEXT MEETING: Wednesday, May 14th at 10 am at Parkside Headquarters (9500 Brunett Ave., Silver Spring, MD).

Overall Goals and Objectives

The goal of the NNI interagency task force is to evaluate the potential for deleterious effects of creating new forest edges on existing resources associated with construction of the Intercounty Connector. Based on this evaluation, management strategies will be recommended in order to preserve existing forest ecology to the extent possible.

Summary of Discussion

- SHA usually manages NNIs as defined by the State noxious weed list—these are usually grasses/weeds that pose a greater threat to agriculture than to forest ecology
 - MNCPPC is mainly concerned with climbing vines, among other invasives, that threaten forest ecology
- It is important to have a plan in effect to manage NNIs. If no plan is in effect, eliminating one invasive may only create new opportunities for other invasives.
 - Carole B. provided copies of M-NCPPC’s planting requirements which discuss maintenance and NNI control.
 - SHA will provide a copy of the vegetation management manual, which discusses SHA’s approach.
- It is important to establish existing forest conditions in order to determine if the ROW is impacting parklands, and to focus limited resources on highest-value forests.
 - Baseline inventories are time- consuming and expensive
 - A standard monitoring protocol does not exist for collecting baseline data
 - A scaled-back baseline inventory will be conducted in which photographs will be taken along the 8-mile ROW interface (4 miles on each side of the ICC) and field forms will be created to document existing conditions.
- Potential Management Strategies
 - Management strategies should include recommendations related to road construction activities that can reduce the potential for NNI dispersal (e.g., ensure tires are clean when moving construction equipment between different sites; soil stocking operations).
 - Train ICC environmental monitors to identify NNIs and investigate the potential for the environmental monitors to be the initial line of defense.
 - SHA can manage only NNI within the ROW. However, the D-B has responsibility for the ROW during construction and they only need to comply with state law. Work with D-B to provide reasonable cost-effective controls.
 - Stabilizing exposed soil is an important element of NNI control.
 - Partnering with local stakeholders will be critical to success. Perhaps partner with Maryland Department of Agriculture to do NNI control along the ROW and into parkland.

- Most of the noxious weeds M-NCPPC is concerned about will require mechanical and/or chemical controls.
 - Use of chemical controls in SPA will need to be coordinated with M-NCPPC Environmental Planning.

Action Items

- Kyle Spendiff to expand list of invitees for next meeting to include SHA representatives on the policy end, Maryland Department of Agriculture, Maryland Department of the Environment, and Montgomery County DEP
- Bill Klingelhofer to provide cost estimates for NNI control (e.g., field crew-day).
- Don Cober to provide a copy of relevant sections of the Vegetation Management Plan.
- Kyle Spendiff to meet with Carole Bergmann and Rob Gibbs to develop a baseline monitoring protocol.
 - Intend to begin baseline monitoring the week of April 21st.

NNI Task Force Outline/Agenda

May 14, 2008

Review Minutes From Last Meeting

- Questions or comments

Evaluate existing conditions along the ROW

- Potential for further degradation with newly created edges
- Conducting a baseline study
 - Photographs before or after clearing begins?
 - Schedule for conducting baseline study

Review relevant sections of the SHA Vegetation Management Plan

- Compare to M-NCPPC approach

Cost estimates/required resources

- SHA cost estimate from MDA

Conditions at Route 32

Establish time schedule

- Additional meetings
- Formulate recommendations and best management practices
- Prepare final report with documentation of recommendations

NNI Right-of-Way Task Force

Minutes from the 5/14/2008 Meeting

Attendees

Name	Affiliation	Email Address	Phone
Laura Miller	MCDEP	Laura.miller@montgomerycountymd.gov	(240) 777-7704
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NEXT MEETING: Wednesday, June 18th at 1:30 pm at Parkside Headquarters (9500 Brunett Ave., Silver Spring, MD).

Summary of Discussion

- MDA is only responsible for monitoring noxious weeds within the LOD/ROW. They will not be monitoring the forest stream valleys.
 - They do not do any removal activities/treatment. It will be the D-Bs responsibility to treat the noxious weeds within the ROW.
 - They do not, and cannot, monitor for climbing vines.
- The noxious weed law is part of the issue:
 - It is a criminal law and people who do not follow this law can be taken to court.
 - Adding climbing vines to the law would essentially make everyone guilty of not following the law and/or it would require a very large budget to treat the climbing vines.
- MDA will be starting noxious weed inspections at the ICC the week of 5/12/08. The inspections will not be continuous, but rather coincide with the growing season of the noxious weeds of concern.
- Due to the above issues, it is unlikely that MDA can monitor climbing vines and other non-state listed NNIs during their routine inspections.
 - It was suggested that the environmental inspectors be trained to identify the NNIs of major concern (e.g., climbing vines), and assist in monitoring the ROW and stream valley forests.
 - M-NCPPC may also assist in monitoring efforts.
 - Results can be reporting using MDA's format and given to SHA and/or the DB. If treatment for noxious weeds becomes necessary, it may be possible for the contractor to also treat adjacent climbing vines.
- It should be noted that MdTA does not use MDA for noxious weed control; they do their own work. Therefore it is important to have a representative from MdTA at future task force meetings.

- Documentation of existing conditions: scaled-back baseline study.
 - While it is important to document existing conditions, there should be significant focus on ensuring that a viable seed bank is not created by construction of the ICC.
 - There should be a fair amount of information on existing conditions in various documents that were required as part of the approval process (e.g., Forest Stand Delineation). M-NCPPC will attempt to obtain as much information from existing documents and report back to the task force.
 - It is important to conduct the baseline study during the peak growing season for the NNIs of concern.
 - Lane H. suggested conducting the baseline study after the initial clearing has occurred.
 - The boundary/forest edge will be known rather than approximate.
 - There will be better access to the interior forests through the LOD.
 - There will be better lighting for photographs.

- Points of reference will be easier to identify for comparisons in future years.
 - The initial clearing should not have a significant impact on NNIs and should not skew/impact the baseline study.
 - Those in attendance agreed with this approach.

- Commitments/Enforcement
 - Look for commitments to battle NNIs in ROD and other legal documents. Several ICC documents indicate that SHA has agreed to control NNIs (as well as noxious weeds) within the ROW, but this should be confirmed.
 - Inform regulating agencies (e.g., MDE) of importance of establishing ground cover/turf as quickly as possible to prevent establishment of NNIs. Thus, E&SC measures play an important role in NNI control.

- Potential Management Strategies
 - It was stressed that the best way to combat NNIs is to quickly establish vegetation after clearing.
 - The seed bank will not necessarily affect the forests this year, but it will affect them in the years to come.
 - Once a seed bank is established, it is almost impossible to eradicate the NNIs.
 - The critical timing is right after initial clearing occurs.
 - Reduce the likelihood of seeds being transferred from one construction site to another (e.g., clean tires/tracks when leaving a construction site).
 - Train ICC environmental monitors to identify NNIs.
 - While there is no law requiring NNI seed bank treatment, the D-B is required to quickly stabilize the LOD. It is important to enforce this requirement.
 - Kyle S. asked if anyone knew of effective biological controls for NNIs.
 - Lane H. responded that Bob Trumble is experimenting with insects to control mile-a-minute. There are also other projects that may be of interest.
 - He will be going to look at these experimental sites and will report back to the NNI task force.
 - The use of pre-emergents for mile-a-minute would likely be cost prohibitive and may “burn” established vegetation. Secondary treatment for mile-a-minute is recommended.
 - Bill K. suggested looking in biofumigation and establishing a native mustard plant.
 - There may be research grants to investigate this option.
 - Partner with local societies like the Maryland Native Plant Society and the Maryland Native Invasive Species Council.

Action Items

- M-NCPPC to invite a representative from MdTA.
- M-NCPPC will attempt to obtain as much information related to existing conditions from existing reports (e.g., Forest Stand Delineation).
- Lane H. will provide a summary of his visit to the biological control experimental sites.
- M-NCPPC to research ROD and other legal documents to identify any commitments in which SHA agrees to assist in developing a NNI program.
- M-NCPPC will prioritize the ecologically sensitive areas where preservation and NNI control are most critical.

NNI Task Force Outline/Agenda

June 18, 2008

Review Minutes from Last Meeting

- Questions or comments?

Discuss Action Items from Last Meeting

- M-NCPPC to invite a representative from MdTA.
- M-NCPPC will attempt to obtain as much information related to existing conditions from existing reports (e.g., Forest Stand Delineation).
- Lane H. will provide a summary of his visit to the biological control experimental sites.
- M-NCPPC to research ROD and other legal documents to identify any commitments in which SHA agrees to assist in developing a NNI program.
- M-NCPPC will prioritize the ecologically sensitive areas where preservation and NNI control are most critical.

Revisit Objectives and Goals of Task Force

- Overall Goals and Objectives:
 - The goal of the NNI interagency task force is to evaluate the potential for deleterious effects of creating new forest edges on existing resources associated with construction of the Intercounty Connector. Based on this evaluation, management strategies will be recommended in order to preserve existing forest ecology to the extent possible.
- Is this still appropriate or should this be revised?
- The outcome of this task force will be a report to the Planning Board with several recommendations.

Establish time schedule

- Additional meetings?
 1. Prior to scheduling additional meetings, it may be worthwhile to document all the recommendations that have been made in all the previous meetings to determine if future meetings are needed.
- Formulate recommendations and best management practices.
- Prepare final report with documentation of recommendations.

NNI Right-of-Way Task Force
Minutes from the 6/18/2008 Meeting

Attendees

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NEXT MEETING: To Be Determined

Summary of Discussion

- The ICC will be managed by MdTA after it is operational.
 - There are currently no agreements between SHA and MdTA in place discussing how plantings and other vegetation will be managed after the ICC is operational.
 - The SHA has warranties on plantings by the D-B which are specified in the RFP. However, after the road is operational, MdTA will be responsible for maintenance.
 - MdTA has not managed roads in Montgomery County.
 - Much of the NNI work will be performed by contractors.
 - They will be deferring to SHA and local agencies for recommendations on contractors and other resources.
 - There is potential for MNCPPC and MdTA to use the same NNI contractor which opens the possibility of having NNIs on both sides of the ROW monitored and treated at the same time.
 - MdTA indicated that it may be possible for MNCPPC personnel to access adjacent parkland for management purposes via the access gates along the ICC. An agreement will be needed.
- Documentation of existing conditions
 - The ICC is not covered under the forest law, and therefore a complete Forest Stand Delineation (FSD) was not conducted. There is probably not a significant amount of information on existing conditions in various documents that were required as part of the approval process.
 - Rob G presented a map with the high priority areas for NNI control.
 - Carole B recommended not spending a lot of time conducting a baseline study. As discussed in previous meetings, documentation of existing conditions is important; however, it can also be very time and resource intensive. A scaled-back baseline of the entire edge should be conducted as previously outlined and agreed to by the task force. This can be combined with institutional knowledge on existing conditions.
- Commitments/Enforcement
 - Steve Reid presented the group with the results of a document search looking for previous commitments to control NNIs. While the issue is briefly discussed in several documents, no firm commitments were made.
- Potential Management Strategies
 - Conduct basic soil sampling (e.g., OM, pH, etc.) in the parkland areas adjacent to the ICC prior to and post clearing. Look for changes in soil chemistry, and how this may affect vegetation and growth of NNIs.
 - Have all the MdTA ICC maintenance supervisors go through the SHA yellow card certification course.
 - Management of NNIs should also focus on safety. Some of the climbing vines can cause trees to become unstable, which can present a safety concern. These

- trees will eventually need to be taken down before they fall. This should be considered when evaluating costs and determining a NNI management strategy.
- Work with the landscape architect and review landscape plans, with a focus on landscaping as it pertains to NNI control and prevention.

Next Steps and Action Items

- M-NCPPC will prepare a draft document of all the recommendations made throughout the past three task force meetings and send it out for comment.