Eastern Invasives Management Network
Workshop # 3, March 2003

Milford Neck, Delaware

Threat Reduction, Strategies and Measuring Success

Threat ranking for invasive weeds are given in Table 1. The table is excerpted from the Site Conservation Plan and does not show the full extent of all threats. Priority ranking for control of these species has been determined through the use of TNC Weed Management Template.

Table 1: Invasive Weed Threat Ranking

Conservation target	Stress	Rank	Priority
Beach-Dune community	*Phragmites australis*	Medium	Low
Tidal Marsh	*Phragmites australis*	Very High	Very High
Contiguous forest blocks	Upland invasive suite*	Low	Low
Reforestation sites	Upland invasive suite	High	High
	Phragmites australis	Medium	High

*The upland invasive suite is characterized by multiflora rose, Autumn Olive, Japanese honeysuckle. In most areas adjacent to farm fields honeysuckle is considered uncontrollable.

Conservation target, Beach Dune community: The beach dune community at Milford Neck lies along the Delaware Bay, a globally important site for shorebird migration. The habitat is characterized by a shrub community of beach plum, and myrtle species. The herbaceous layer is dominated by seaside goldenrod and is interspersed with an array of grass species. The tidal wash portions of the beach are typical of most bay front beaches: sandy in nature with mudflats exposed at low tides. *Phragmites australis* has advanced from spoils left by a nearby canal dug during the late 1920. This population presently covers approximately 8 acres at the southern end of the TNC preserve. Density is estimated at 30%. The population is currently relatively static in nature, but is expected to advance if water levels on the dunes and lower elevations were altered to favor the spread of the invasive. Due to a breach in the dune from advancing water, this seems a real possibility. Human activity, notably birdwatching, presents the possibility that apical buds of phragmites rhizomes may become trampled, resulting in increased shoot growth. The herbaceous and grass layers are most affected.

Threat rank is assigned in recognition of the possibility of these factors. Priority is listed as low primarily because of the static nature of this population and difficult access. Methods of control currently feasible are limited to backpack spray applications combined with hand wiping of herbicide in areas of mixed vegetation. Threat ranking could be reduced to low if the population can be managed at 15% coverage in areas most adjacent to the canal. Total eradication is not thought possible due to the continual transport of seed and rhizomes along the canal from upstream locations.

Strategies currently being considered include establishing a temporary storage site for equipment in the area of the infestation. Personnel could then be moved on and off site by boat along the canal. Because of the tidal nature of the canal and fast water conditions it is not thought safe to continually move herbicide along the canal. One additional staff would have to be added to the chapter to help with control efforts. It is unlikely that volunteers could be utilized because of unpredictable weather conditions, particularly wind. USFWS or DE F&W equipment and staff might be utilized to control the main infestation along the

canal. Either agency is currently equipped to handle chemical applications from the water. Aerial applications are not feasible to the abundance of desirable vegetation.

Baseline monitoring of this population is expected to begin this growing season. Monitoring will include coverage estimates and mapping utilizing GPS location and ArcView if feasible. Sketch drawings will most certainly be part of this effort. Monitoring is expected to be accomplished by trained volunteers. Volunteer monitors will then be able to monitor in successive years once a control program is established.

Conservation target, tidal marsh: Tidal salt mash within the site comprises approximately 3,000 acres. TNC owns roughly 1,400 of these acres. The remainder is owned by DE F&W and DE Wildlands, a non-profit dedicated to conservation of open space. The habitat within the marsh is typical of Mid-Atlantic saltmarshes dominated by *Spartina* species on a matrix of hummocks supporting salt tolerant shrub species and upland tree and shrub species on larger dryer raised hummocks and islands. Extensive grid ditching was done in the late 1920's and early 1930's. Several areas were re-ditched in the 1950's through the 1960's. The initial infestation of phragmites likely coincides with the re-ditching period. All populations of the aggressive genotype of phragmites are currently expanding. DE F&W has been controlling phragmites through aerial application (helicopter delivery of glyphosate) for several years. The program is having success in abating and reducing the spread of phragmites. DE Wildlands (DW) is currently focusing their phragmites control efforts at another property far off site to the north. The population of phragmites within their lands at Milford Neck (directly adjacent to TNC lands) is seen as a continual source for new propagules migrating onto previously controlled or currently clean areas. Phragmites on TNC lands was initially sprayed in 1997 under the DE cost share program for phragmites control, but participation in the program was abandoned before lasting results could be gained. All areas formerly treated are now re-infested.

Threat ranking of High has been assigned because of the scale of the population (500 acres +/-) and the rapidly advancing nature of the population into otherwise weed free localities. Coastal Plain Salt Mash Sparrow, Sharp-tailed Sparrow, several Rail species, Northern Harrier, Black Duck, and other marsh dependent species are threatened by the advance of this aggressive weed. Aerial photography and land-sat. imagery collected over the last 3 – 5 years provides support to our suppositions. The action priority of Very High is in support of threat ranking. Over the next 3 years we seek to reduce coverage by 50%. At this point threat ranking will be lowered to High.

Strategies: A number of strategies are currently being employed on and off TNC land.

1. 2003: 145 TNC acres enrolled in DE cost share program. Funding :USFW Partners in Conservation.
2. 2003: Requested 3 year funding for phragmites control on 500 TNC acres under Private Stewardship Grant Program.
3. 2003: MOU with DE Wildlands permitting TNC to control on DW property. Outside funding assumed.
4. 2003: Meetings with DW planned to identify critical control areas on DW lands. Funding to be sought.
5. 2004: Continued TNC enrollment in DE cost share for second year treatment on 145 acres.
6. USFWS support to be sought to initiate a phragmites burn program for herbicide treated areas.
7. 2005: Continued TNC enrollment in DE cost share and expansion under PSGP if funding granted.
8. 2005: Enroll DW lands in DE cost share program.
9. 2006: Continued enrollment of TNC and DW. Note that as control continues, costs are reduced due to decreasing area of infestation and lower rates of herbicide required to treat areas previously sprayed. Priority ranking is expected to remain at Very High. Action will continue for several years as necessary.

Monitoring: A number of strategies are planned as control efforts proceed. All efforts are targeted at measuring the extent of infestation over time both in terms of area covered and population density.

1. Current aerial photography and land-sat. used to establish baseline conditions
2. Aerial application sites to be tracked using on-board GPS mapping equipment.
3. DE F&W over-flight photography for waterfowl surveys to be utilized to monitor phragmites.
4. Chapter hopes to locate funding for additional photographic surveys to be done by herbicide applicator.
5. Ground truthing to be done during winter months. Access provided by DE F&W equipment and staff.

Conservation target, reforestation sites: Current reforestation sites (total 80 acres +/-) are situated to close small agricultural gaps in contiguous forest or expand forested lands outward into agricultural lands bordering existing roads. All reforestation sites are bounded by a suite of invasive weeds which include multiflora rose, Japanese honeysuckle, and Autumn olive. Proportions of these invaders vary locally, but all wooded edges are infested to some degree. In reforestation sites adjacent to marsh or wet woods, phragmites is problematic as it quickly creeps out into fields within the year following the end of tillage. In areas that have been planted in trees to hasten succession, treatment of phragmites is difficult at best. Agricultural noxious weeds are also present in most reforestation sites. State law mandates control of these pest plants. Compliance is not entire, instead limited to highly visible areas or those where succession is being obviously impeded. The chapter is currently developing a reforestation plan that will eventually remove all agricultural lands from production over the next 8 years.

Threat rankings are divided into two groupings, upland invasive suite and phragmites. While both invaders have the potential to disrupt reforestation efforts to high degrees, phragmites has been given lower rank of Medium primarily because the scale of the infestation is more limited. Priority ranking for both invaders is High because the chapter believes control of these weeds is within our scope. In order to assign reduced ranks to both it will become necessary to limit the scale of the infestations by close to 80%. Note that within the upland suite, Japanese honeysuckle is thought to be generally unmanageable, but will be controlled in all areas where active control of rose and olive is ongoing. That is, when spraying for rose, there is no reason to avoid honeysuckle. In areas monotypically honeysuckle, the weed is being intentionally ignored. We realize that 80% reduction is ambitious, but most infestations are currently confined to edges of reforestation sites and thus thought manageable. The reduction goal recognizes the severe disruption to reforestation that invasives pose.

Strategies: Weed populations surrounding current reforestation sites have been mapped using a combination of GPS location and sketch mapping. Weed populations surrounding future sites either have been mapped to some degree or planning for mapping is in the works. Beyond mapping several other strategies are currently or will be employed.

1. Volunteers are used to clear the fields for small rose and olive plants. Hand digging is successfully employed as evidenced by the continual reduction of woody invaders in each successive year.
2. Edge control of woody invaders (herbicide combined with mechanical destruction) is done by staff and a very limited number of specially trained volunteers. The control program is highly aggressive.
3. Control of large woody invaders in the interior of the field follows the methods of edge control.
4. Mapping of control efforts is done at every work day. Re-visits to control sites is done monthly.
5. Phragmites control in adjacent marsh accessible by air is done as part of the marsh strategy.
6. Phragmites control of populations expanding into the reforestation sites from the edges was implemented in 2002. Herbicide application are done on a contract basis utilizing a highly modified tractor and modified wiper bar system. The program will be continued in 2003.
7. Mapping of sites selected for reforestation in 2003 and 2004 will commence this spring. A small team of trained volunteer is expected to be used. Current technology is limited to GPS location and field sketching. We are, however hoping to advance to PDA – ArcView. Funding for ArcView is secure.

8. A detailed reforestation plan that prioritizes site choices and provides cost estimates is currently being completed.
9. DE F&W and USFWS are currently being targeted for funding. We expect good cooperation.

Monitoring:
1. Base line monitoring of current reforestation sites was done in 1999 by DE Invasive Species Council. The monitoring also included much of the easily accessible portions of the preserve.
2. Monitoring around and in current reforestation sites was updated by TNC staff in each subsequent year.
3. The results of each monitoring effort are compared to past results. So far it appears evident that we are reducing the scale of the infestation on current reforestation sites.
4. As part of any good herbicide program, revisits to control areas are often.
5. A volunteer team is being assembled to map invasives at prospective reforestation sites. This will guide site selection.

Conservation target, contiguous forest blocks: The threat from invasives to the intact portions of the forest appears to be so low that the chapter has intentionally ignored developing any control strategy. While there some small patches of weeds within the woods most of these appear to be weak and not reproducing (no seed found). Most of the problem in doing any real assessment of the forest is in having the resources of staff and volunteers to dedicate to the job. To date casual observation by TNC staff (me) taking personal time for birdwatching or generic wandering has been the method of survey. Overall it seems that most of the interior of the forest is relatively weed free. The impact by invasives from field edges appears to be shallow. I will say that if I had some cadre of good volunteers willing to explore further with good technology, I would welcome their effort.

Invasives beyond the borders:

We are waiting for many new invaders to the conservation site. The list is long and includes some well known troubles such as purple loosestrife, giant hogweed, Japanese barberry, burningbush and nutria. Additionally we recognize that those currently found within the site are also located just outside the site and beyond. Almost without exception, the primary vector is human. It would seem wise to include the entire state of DE as a potential source for problems. Milford Neck is facing ever increasing public visitation as an ecotourism site. Development pressures are high. Birds fly, nutria swim, wind blows.

To imagine that we will have control over all these factors is unrealistic. However, we look to the immediate area beyond the site boundary as the first source of new invasion or re-infestation. We look further into the state as secondary. To that end we follow the rivers at the northern and southern ends of the site, and the tributaries of these that flow into the site as likely pathways for invasion. Road edges within the site and just outside the site are also of particular interest.

The Delaware Invasive Species Council (DISC) in partnership with USGS has just released an on line version of the state mapping system for invasive weeds. The scope of the project is state wide. Reporting of invasive populations is done by biologists, land managers, and other conservationists within the state. TNC staff are authorized for data input. Access to the data base is open to the public, although public can not at this time make reports. TNC will utilize this tool to keep updated regarding the status of invaders throughout the state.

While this method is not guaranteed to prevent a new invader from becoming established, it will give us some ability to target our monitoring efforts within the site. Additionally, as more and more volunteers become trained in invasive weed identification, it is hoped that they will become more adept at observing potential threats beyond the site. Milford Neck is accessed through a limited network of small secondary and tertiary roads. While we have no formal plan for surveys along these roads, good observation skills may lead towards the speedy elimination of a new invader within those areas of the site we can control.