

Final Report for Grant Agreement ME#381159

**Field Surveys of Aquatic and Terrestrial Plant Species of
Special concern in Eastern Pennsylvania**

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Abstract

Aquatic Plant Surveys

Aquatic Plant Surveys were carried out at 30 sites and resulted in documentation of 38 occurrences of PNDI-listed vascular plants of which 31 were new and 7 were updates of EOs that had been described previously. Field reports have been submitted to DCNR Bureau of Forestry and PNDI-East.

One hundred fifty herbarium specimens were collected and deposited in the herbarium of the Morris Arboretum of the University of Pennsylvania (see complete list attached). Ten of the lakes we surveyed were included in the DEP/EPA water quality sampling program for 2002. We are coordinating with this program in order to be able to compare water quality data with plant inventory data at some future date.

We presented two aquatic plant identification workshops to foster an appreciation of the diversity and ecological importance of aquatic plants. We also met with lake residents at many of the lakes we surveyed.

We conducted additional field surveys in Montgomery County. Four field visits and numerous telephone and/or email consultations were held regarding PNDI reviews.

Objectives

1. Continue the survey of aquatic plants of glacial lakes in northeastern Pennsylvania initiated in 2000.
2. Provide recommendations for appropriate PNDI status of the plants involved.
3. Provide information to lake community residents and lake managers regarding the diversity and ecological role of aquatic plants.
4. Evaluate Penn DOT project impacts on occurrences of PNDI-listed plants as needed.

Justification

Many glacial lakes in northeastern Pennsylvania have not been surveyed for vascular plants recently or at all (Pennsylvania Flora Database, PNDI database). Furthermore, many publicly owned lakes were not included in earlier surveys because it was thought that they did not need protection and therefore were a lower priority for inventorying. Consequently data are not available to accurately assess the true status of many aquatic vascular plants. In addition, several invasive, non-native aquatic plants have been spreading throughout the region and their impact on native lake flora has not been fully evaluated.

Adding to the problem, lake residents and lake managers have little appreciation for the role of aquatic plants in lake ecosystems and little knowledge of the diversity of aquatic vegetation, which is frequently referred to as "seaweed". Demands are frequently made to control aquatic vegetation in privately and publicly owned water bodies to facilitate various recreational and aesthetic uses. The assumption has often been made, in the

absence of any inventory data, that the offending vegetation is non-native invasive species such as Eurasian water milfoil.

Materials and Methods

Lake surveys were carried out during July and August 2002. A rowboat was used to make a circuit of the each lake for the purpose of observing and sampling the aquatic flora. A viewing tube, constructed from a section of PVC pipe was employed to see below the surface. A grappling tool constructed from 2 garden rakes bolted together back to back was dragged across the lake bottom at regular intervals to obtain samples from water too deep to reach otherwise. Samples were identified immediately or later in the laboratory, and herbarium specimens prepared for each site. GPS data points were recorded at each site where PNDI-listed plants were found.

Products Delivered

1. A progress report and a final report have been submitted to the Wild Resources Conservation Fund.
2. Field reports were submitted to PNDI-East and the Bureau of Forestry for all PNDI-listed species found.
3. One hundred and fifty (150) herbarium specimens were deposited in the Morris Arboretum Herbarium (MOAR) permanently documenting findings.
4. Recommendations for changes in the status of 6 species are being evaluated for submission to the Rare Plant Forum and the Vascular Plants Technical Committee.

Results and Conclusions

Aquatic Plant Surveys

Appendix A contains a complete list of species observed and specimens collected at each site. As a direct result of these surveys, we recommended that several species, including

Another interesting finding was three new populations of *Elatine americana* (synonym: *E. triandra* var. *americana*). Until very recently this species was considered extirpated in Pennsylvania. It is now appearing with increasing frequency in glacial lakes in northeastern Pennsylvania, often forming mixed populations with *Elatine minima*. It is unclear whether Pennsylvania botanists are just noticing it, or is rapidly expanding its range. All historical occurrences were in the southeastern corner of the state (Rhoads and Klein 1993).

Invasive Species

We found non-native invasive species in 7 of the lakes we surveyed. One lake contained a large population of fanwort (*Cabomba caroliniana*); curly pondweed (*Potamogeton crispus*) was present in six of the lakes, but in no case was it a dominant plant in the lake. This species is easy to miss late in the season as it senesces earlier than most other aquatic species.

Additional Field Surveys

Additional field surveys were carried out in Montgomery County. Field reports have been sent to DCNR Bureau of Forestry and PNDI-East.

Aquatic Plant Workshops

We conducted 2 hands-on workshops in conjunction with the Pike County Conservation District and the Delaware Highlands Conservancy. The purpose of the workshops was to acquaint residents and managers of lakes with the diversity and ecological role of native aquatic vegetation and enlist them in monitoring for non-native invasive species. These meetings enabled us to make numerous contacts, which have resulted in opportunities to survey additional privately owned lakes. We also met with lake community residents at many of the lakes where we conducted surveys.

Environmental Reviews

At the request of Jeanne Harris, Autumn Sabo, and Chris Firestone we have consulted on numerous projects that have come up for environmental review because of potential impacts on PNDI-listed plants. We made field visits to two PennDOT project sites (both in the Route 309 improvement corridor), a riverbank stabilization project site on the Neshaminy Creek in Bucks County, and a proposed construction site in Nockamixon State Park. In addition we consulted via telephone and email regarding numerous others.

We also participated in a planning meeting for a Pennsylvania Cleanways trash removal project scheduled for Little Tinicum Island in May 2003.

Recommendations

An outcome of this year's surveys will be a recommendation that *Xyris montana* be dropped from the PNDI list; we will also recommend a change in the status of *Najas gracillima*. We are also evaluating the current classification of *Glyceria borealis*, *Potamogeton bicupulatus*, *Gentiana linearis*, and *Lygodium palmatum*.

Our finding of additional large populations of *Utricularia purpurea*, *Potamogeton robbinsii*, and *Eleocharis olivacea* is further evidence that our recommendations in the last two years to drop these species from the PNDI list were correct.

Discussion of Management Recommendations

Management recommendations resulting from this work relate most directly to the status of species classified as endangered, threatened, rare or undetermined by the Pennsylvania Natural Diversity Inventory. It is very important to the credibility of the PNDI program overall, that the classifications accurately reflect each species true status in the state. Although progress is made every year, continuing studies and inventories are needed to provide a strong scientific basis for status determinations and effective conservation programs.

Literature/Sources Cited

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