

A Quantitative Approach to Predict Potential Nonindigenous Aquatic Plant Species Problems

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Historically, water resource managers have responded reactively to invasions of nonnative aquatic plants. Advance warning of the potential of new species to invade could provide agencies with a window of opportunity to implement regulatory and educational programs to help prevent the species' introduction. This proactive approach to management could also help expedite preparation and planning in the event of an infestation of these new species.

Researchers from the U.S. Army Corps of Engineers evaluated the potential for some aquatic plant species to pose a realistic nuisance threat to ecosystems in the state of Minnesota. These species include cabomba (*Cabomba caroliniana*), egeria or Brazilian elodea (*Egeria densa*), hydrilla (*Hydrilla verticillata*) (dioecious and monoecious biotypes), European frogbit (*Hydrocharis morus-ranae*), water primrose (*Ludwigia uruguayensis*), European water clover (*Marsilea quadrifolia*), variable-leaf watermilfoil (*Myriophyllum heterophyllum*), spiny naiad (*Najas marina*), brittle naiad (*Najas minor*), yellow floating heart (*Nymphoides peltata*), and waterchestnut (*Trapa natans*).

The evaluation of these species involved two major phases. The first phase consisted of a thorough literature review of these species, including life history and ecological characteristics controlling species' distribution. Information on home range and climatological barriers was also collected. The second phase focused on determining the likelihood of establishment in Minnesota and subsequent nuisance development.

The CLIMEX model simulation, developed for analyzing species ranges, was useful in identifying locations around the world with climates similar to the climate in

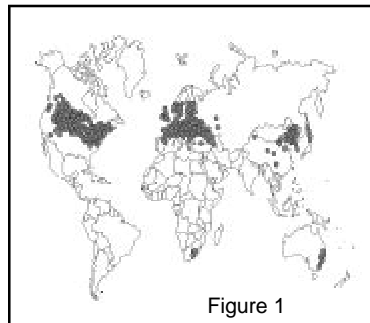


Figure 1

Minnesota. (Figure 1: Locations around the world with climates similar to Minnesota based on a CLIMEX Match Index of 75 or greater.) This information, coupled with data on each species' native distribution, allowed assessment of cases warranting concern based on compatibility of Minnesotan

conditions to those in a species' place of origin and current distribution. While insufficient data were found to perform CLIMEX simulations for most species,

those simulations that were performed provided excellent insight into potential distribution. For instance, CLIMEX predicted likely egeria expansion into the Great Lakes region. (Figure 2:

Present and potential distribution of egeria (*Egeria densa*) in the U.S. is based on a calculated CLIMEX Environmental Index [EI]. States with a number of 25 or greater indicate present or potential distribution of egeria.) Six of the species surveyed (cabomba, hydrilla (monoecious biotype), yellow floating heart, variable-leaf watermilfoil, European frogbit, and waterchestnut) had a high probability of success in Minnesota. Although the growth of any of these species could potentially become problematic, the growth of four species, waterchestnut, variable-leaf

watermilfoil, hydrilla (monoecious biotype) and cabomba, was expected to be most severe. Only two of the selected species were of moderate concern for Minnesota, spiny naiad and European water clover.

Consideration of species growth potential and proximity to the state could provide useful information in establishing priorities regarding prevention, regulation, management and research. The CLIMEX model provides a quantitative mechanism to evaluate potential range extensions. Performing such simulations to use as a basis for management decisions, however, will require additional data on each species under evaluation. Also, little is known of the environmental requirements and tolerance ranges of many of these species. Greenhouse studies are needed to obtain additional data to improve our ability to predict growth potential of species of concern (e.g., cabomba, waterchestnut, yellow floating heart, variable-leaf watermilfoil, hydrilla (monoecious) and European frogbit) in Minnesota and elsewhere using the CLIMEX model.

The CLIMEX model is a promising tool to identify potentially problematic plant species for prevention efforts and regulatory exclusion. Full implementation of probabilistic models for species introduction for use by resource managers will require further research and development. The potential currently exists for rapid development of these models as prevention tools.

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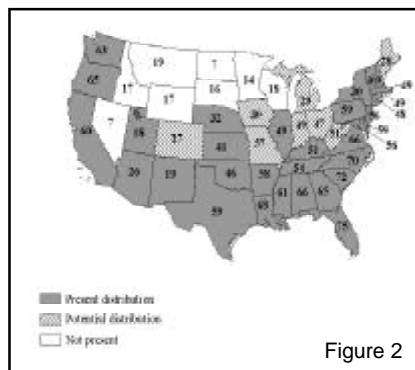


Figure 2

Great Lakes Panel Update

On Oct. 19-20 the Panel met in Chicago, Ill., with discussion focused on the Great Lakes Action Plan and recommendations from the *Ballast Water Management and Aquatic Nuisance Species* symposium. The Action Plan preamble, vision statement, goals and principles were approved by the Panel at the meeting. The Action Plan addendum, comprised of objectives and strategic actions associated with the plan's goals and principles, is being refined and will be finalized and approved in the next few months. Discussion on the ballast water recommendations will support a consensus-based document to help guide the work of U.S. EPA and other agencies as they approach this critical issue. The Panel meeting also covered an update from the national ANS Task Force and review and approval of the Panel's FY 2000 workplan, among other topics.

On Oct. 21, following the Panel meeting, the U.S. EPA's Great Lakes National Program Office, with assistance from the Great Lakes Commission, sponsored the *Great Lakes Nonindigenous Invasive Species Workshop*. This informative workshop, one in a series that U.S. EPA is holding around the nation, helped raise awareness and understanding within U.S. EPA of the problems and potential solutions associated with aquatic and terrestrial nonindigenous invasive species in the Great Lakes Basin. Recommendations from this workshop will be presented in a final report to U.S. EPA headquarters to help guide the agency's efforts in areas of prevention, control, detection and monitoring, and outreach/education. The Panel will hold its next meeting in the spring of 2000. **Contact:** Kathe Glassner-Shwayder, Great Lakes Commission, 734-665-9135, shwayder@glc.org.

Washington Watch

Two committees of the national ANS Task Force are working on projects central to the control, prevention and monitoring of ship-borne aquatic nuisance species. The Criteria Committee has focused on developing criteria for reviewing the adequacy of compliance with unenforced (or voluntary) guidelines for ballast water management. It is also developing criteria for the U.S. Coast Guard to use in reviewing the effectiveness of the overall program and making revisions. It is likely that the Coast Guard will ultimately determine that unenforced guidelines are not adequate to achieve a high level of compliance, and that they should be made mandatory. Recognizing this reality, many shipping industry representatives are beginning to focus on how the Department of Transportation could accurately monitor compliance and usher in use of treatment technologies instead of how to determine if the program should be mandatory.

The Ballast Water and Shipping Committee is developing guidance for the

Coast Guard to help the organization judge the efficacy and environmental soundness of alternatives to ballast water exchange (a responsibility given to the Coast Guard in the reauthorization of the 1996 National Invasive Species Act [NISA]). It is also charged with coordinating research and development activities for ballast treatment technologies. Interested Panel members are encouraged to participate in this process. For more information, please see: www.anstaskforce.gov for Task Force contacts and committees or the Coast Guard Ballast Water Management Program at www.uscg.mil/hq/g-m/mso4/Contents.htm for contacts and program information.

Finally, although the reauthorization of the NISA will not begin until the legislative session of 2001-2002, it is not too soon for interested parties to begin determining the substantive changes needed for continued performance of the legislation. Due to the Executive Order on Invasive Species, funding sources for agencies involved in the control of invasive species are likely to remain secure. Coordination with other regional panels to determine consensus items for action could be helpful during the reauthorization process to show a united front to Congress. **Contact:** Allegra Cangelosi, 202-544-5200, acangelo@nemw.org.

News from Around the Basin

ILLINOIS: In October, DNR and USFWS biologists found round goby specimens in the Chicago Sanitary and Ship Canal near Romeoville, eleven miles downstream of the site of the proposed electrical barrier, due to be completed in May 2000. (*Editors Note: The last issue of the ANS Update [Volume 5, No. 3] incorrectly reported that the ruffe was found eleven miles downstream from the electrical barrier.*) Work on the barrier continues on schedule. Illinois Gov. George Ryan signed a transmittal letter on Oct. 27, 1999, submitting the State Comprehensive Management Plan to the ANS Task Force for review. This culminated a two year developmental effort. **Contact:** Rod Horner, IL-DNR, RHORNER@dnrmail.state.il.us.

OHIO: The DNR is working on revising its current ANS related administrative rules. Sections of the Great Lakes Panel's model guidance on legislation, regulation and policy are being considered for modification based on recommendations from constituent groups. Other efforts include the development of a zebra mussel alert card for lake monitoring and signage for boat ramps at lakes with zebra mussels. A grant proposal for the Ohio Coastal Management Program is also being prepared for a non-chemical sea lamprey control program for the Grand River. **Contact:** Randy Sanders, OH DNR, 614-265-6344, randy.sanders@dnr.state.oh.us.

MICHIGAN: In November, Gov. John Engler announced the release of the *Aquatic Nuisance Species Handbook for Government Officials*. The purpose of the handbook is to educate local, county and

state government officials about the problems and solutions relating to the on-going invasion and spread of aquatic nuisance species. The handbook was developed pursuant to Michigan's Comprehensive State Management Plan targeting nonindigenous species. **Contact:** Mark Coscarelli, MI DEQ, 517-335-4227, cosarem@state.mi.us.

MINNESOTA: Sea Grant and the DNR are cooperating with other states on a National Invasive Aquatic Plant Outreach/Research Initiative. It will include a risk assessment of aquatic plant shipments from mail order and Internet sales. In a related project, the DNR is funding a winter hardiness study at the University of Minnesota to develop a protocol to be used in future risk assessment of exotic aquatic plants. **Contact:** Jay Rendall, MnDNR, 651-297-1464, jay.rendall@dnr.state.mn.us.

National ANS Task Force

The ANS Task Force met Dec. 1-2 in Arlington, Va. The Task Force heard presentations on several Chesapeake Bay invasive species issues (e.g., nutria, rapa whelk) and on a bait analysis pathway study. Issues discussed included state ANS management plans, establishment of additional regional panels, the U.S. Coast Guard's ballast water program and updates from the regional panels (Great Lakes, Western and Gulf of Mexico). An update was also given on the implementation of the Executive Order on Invasive Species. The selection process is underway for membership on the Invasive Species Advisory Committee, established to provide advice to the Invasive Species Council, comprised of federal agencies and cabinet level representatives. The first meeting of the Advisory Committee and Council is expected to be in late January.

The next meeting of the ANS Task Force will be held in Florida in the spring. Details of the meeting will be available soon. **Contact:** Sharon Gross, Executive Secretary, ANS Task Force, 703-358-2308, Sharon_Gross@fws.gov.

Upcoming Events

- ◆ *10th International Aquatic Nuisance Species and Zebra Mussel Conference*. Feb. 14-18, 2000. Westin Harbour Castle, Toronto, Ontario, Canada. **Contact:** Elizabeth Muckle-Jeffs, 800-868-8776, profedge@renc.igs.net; or the conference web site, www.zebraconf.org.

On the Bookshelf

- ◆ *9th International Zebra Mussel and Aquatic Nuisance Species Conference Abstracts*. Soft cover book, 175 pp. plus a 20 page addendum. 1999. \$10 each. **Contact:** Doug Jensen, djensen1@d.umn.edu.
- ◆ *Aquatic Nuisance Species Handbook for Government Officials*. Pamphlet, 23 pp. 1999. **Contact:** Mark Coscarelli, MI DEQ, 517-335-4227, cosarem@state.mi.us. Pamphlet's Internet address: www.deq.state.mi.us/ogl.