4/17/2003

ANS Early Detection and Monitoring
Current Efforts, Online Resources, and Relevant Literature

Note: This is a preliminary list. If you are aware of documents, resources and/or programs that should be included please contact Kevin Walters, Great Lakes Commission, via phone (734-971-9135) or email (kwalters@glc.org).

Ongoing Invasive Species Research/Monitoring

- The Inland Seas Education Association has developed an invasive species field course and established an invasive species monitoring program through GLNPO support. /www.schoolship.org/invasivespecies/

- Dr. Rex Lowe, BGSU, and his graduate students are conducting several research projects on the effects of zebra mussels in the Great Lakes. During their survey work, they have identified a new invasive brown algae. They have also collected some baseline, pre-infestation data. These are small scale 'monitoring' projects, but could serve as examples for larger projects. *see *Lowe, R.L. and R.W. Pillsbury, 1995* AND *Pillsbury, R.W., R.L. Lowe, Y.D. Pan, and J.L. Greenwood, 2002*.

Online resources

- http://www.glerl.noaa.gov/seagrant/cercopagis/cercopagisreports.htm.
  Summary: Early detection website for reporting water flea.

- http://nas.er.usgs.gov
  Summary: Central repository for biogeographic accounts of ANS.

- http://www.ag.state.co.us/DPI/weeds/mapping/CWMProgram.html
  Summary: State of Colorado Dept. of Agriculture weed mapping program used to determine weed distributions and detect invasive, noxious weeds.

- http://www.aphis.usda.gov/ppq/ep/pestdetection/plthlthconf.pdf
  Summary: USDA APHIS contributions to the detection and monitoring of invasive plants and insects presented during the Plant Health Conference 2000.

- http://www.epa.gov/glnpo/monitor.html
  Summary: GLNPO Great Lakes monitoring programs.

- http://www.nccos.noaa.gov/documents/invasives_fact1.pdf
  Summary: National Centers for Coastal Ocean Science Alien Species Early Detection and Warning System.

Literature

- Kolar, C.S. and D.M. Lodge. 2002. Ecological predictions and risk assessment for alien fishes in North America. Science 298:1233-1236.

Summary: Using a generalizable risk assessment approach and statistical models of fish introductions into the Great Lakes, Kolar and Lodge developed a quantitative approach to target prevention efforts on species most likely to cause damage. Fish that pose a high risk to the Great Lakes if introduced are identified.

- Li, H.W. and P.B. Moyle. 1981. Ecological analysis of species introductions in aquatic systems. Transactions of the American Fisheries Society 110:772-782.
Summary: This article examines the likelihood that introduced species will produce cascading trophic effects related to ecosystem productivity. It also lays out an evaluation procedure for potential introductions. This may be useful if the prediction of future invaders becomes part of a detection and monitoring program.

- Ricciardi, A. 2001. Facilitative interactions among aquatic invaders: is an "invasional meltdown" occurring in the Great Lakes? Can. J. Fish. Aquat. Sci. 58:2513-2525.
Summary: In this article, Ricciardi argues that introduced species may facilitate, rather than compete with, one another. This goes against the "biotic resistance" that states species-rich communities are less vulnerable to invasion because of competition for limiting resources. The ideas presented in this article may be useful in developing a proactive, predictive approach.

- Pillsbury, R.W., R. L. Lowe, Y. D. Pan, and J. L. Greenwood. 2002. Changes in the benthic algal community and nutrient limitation in Saginaw Bay, Lake Huron, during the invasion of the zebra mussel (*Dreissena polymorpha*). J. N. Am. Benthol. Soc., 2002, 21(2):238-252.

- R. L. Lowe and R. W. Pillsbury. 1995. Shifts in benthic algal community structure and function following the appearance of zebra mussels (*Dreissena polymorpha*) in Saginaw Bay, Lake Huron. J. Great Lakes Res. 21(4):558-556.

- Buchan, L. A. and D. K. Padilla. 2000. Predicting the likelihood of Eurasian watermilfoil presence in lakes, a macrophyte monitoring tool. Ecological Applications. 10(5): 1442-1455.

- Eichler, L., E. A. Howe, and C. W. Boylen. The use of stream delta surveillance as a tool for early detection of Eurasian watermilfoil. J. Aquat. Plant Manage. 39:79-82.

- Ricciardi, A., W. M. Steiner, R. N. Mack, and D. Simberloff. Toward a global information system for invasive species. Bioscience. 50(3):239-244.

- Wittenberg, R. and M. W. Cock., Eds. Invasive Alien Species: A Toolkit of Best Prevention and Management Practices. CAB International. 2001.