Population Monitoring and Contaminants Affecting the American Otter

Indicator #8147

This indicator report was last updated in 2002.

Overall Assessment

Status:	**Mixed**
Trend:	**Not Assessed**

Lake-by-Lake Assessment

Separate lake assessments were not included in the last update of this report.

Purpose

- To directly measure the contaminant concentrations found in American otter populations within the Great Lakes basin
- To indirectly measure the health of Great Lakes habitat, progress in Great Lakes ecosystem management, and/or concentrations of contaminants present in the Great Lakes

Ecosystem Objective

As a society we have a moral responsibility to sustain healthy populations of American otter in the Great Lakes/St. Lawrence basin. American otter populations in the upper Great Lakes should be maintained, and restored as sustainable populations in all Great Lakes coastal zones, lower Lake Michigan, western Lake Ontario, and Lake Erie watersheds and shorelines. Great Lakes shoreline and watershed populations of American otter should have an annual mean production of >2 young/adult female; and concentrations of heavy metal and organic contaminants in otter tissue samples should be less than the No Observable Adverse Effect Level found in tissue sample from mink. The importance of the American otter as a biosentinel is related to International Joint Commission Desired Outcomes 6: Biological Community Integrity and Diversity, and 7: Virtual Elimination of Inputs of Persistent Toxic Chemicals.

State of the Ecosystem

A review of State and Provincial otter population data indicates that primary areas of population suppression still exist in southern Lake Huron watersheds, lower Lake Michigan and most Lake Erie watersheds. Data provided from New York Department of Environmental Conservation (NYDEC) and Ontario Ministry of Natural Resources (OMNR) suggest that otter are almost absent in western Lake Ontario (Figure 1). Most coastal shoreline areas have more suppressed populations than interior zones.

Areas of otter population suppression are directly related to human population centers and subsequent habitat loss, and also to elevated contaminant concentrations associated with human activity. Little statistically-viable population data exist for the Great Lakes populations, and all suggested population levels illustrated were determined from coarse population assessment methods.

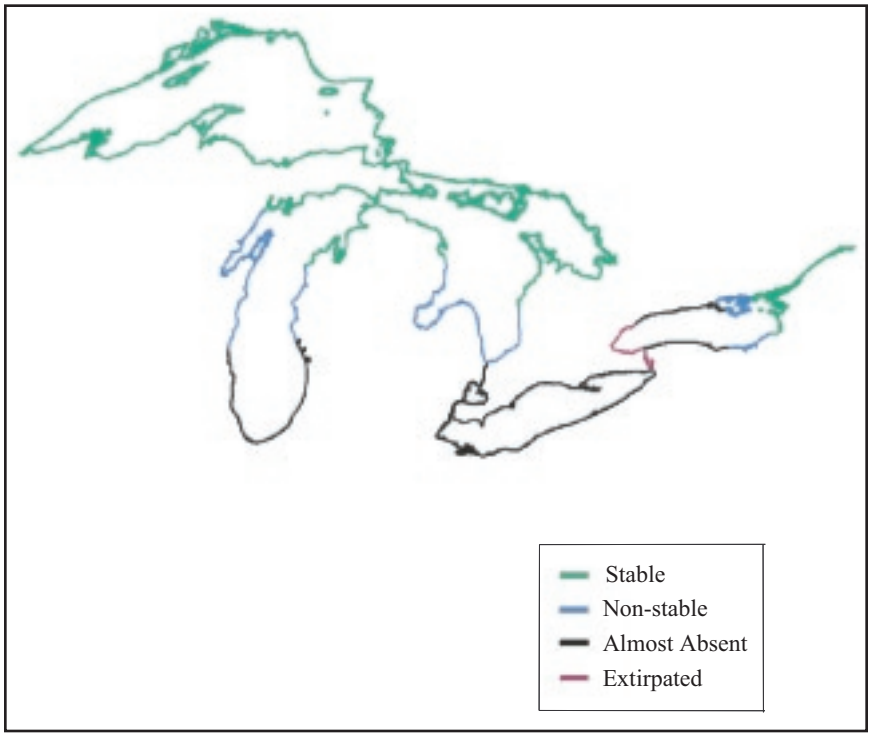

Figure 1. Great Lakes shoreline population stability estimates for the American otter.

Source: Thomas C.J. Doolittle, Bad River Band of Lake Superior Tribe of Chippewa Indians

Pressures
American otters are a direct link to organic and heavy metal concentrations in the food chain. It is a relatively sedentary species and subsequently synthesizes contaminants from smaller areas than wider-ranging organisms, e.g. bald eagle. Contaminants are a potential and existing problem for many otter populations throughout the Great Lakes. Globally, indications of contaminant problems in otter have been noted by decreased population levels, morphological abnormalities (i.e. decreased baculum length) and decline in fecundity. Changes in the species population and range are also representative of anthropogenic riverine and lacustrine habitat alterations.

Management Implications
Michigan and Wisconsin have indicated a need for an independent survey using aerial survey methods to index otter populations in their respective jurisdictions. Minnesota has already started aerial population surveys for otter. Subsequently, some presence-absence data may be available for Great Lakes watersheds and coastal populations in the near future. In addition, if the surveys are conducted frequently, the trend data may become useful. There was agreement among resource managers on the merits of aerial survey methods to index otter populations, although these methods are only appropriate in areas with adequate snow cover. NYDEC, OMNR, federal jurisdictions and Tribes on Great Lakes coasts indicated strong needs for future assessments of contaminants in American otter. Funding, other than from sportsmen, is needed by all jurisdictions to assess habitats and contaminant levels, and to conduct aerial surveys.

Comments from the author(s)
All state and provincial jurisdictions use different population assessment methods, making comparisons difficult. Most jurisdictions use survey methods to determine populations on state or provincial-wide scales. Most coarse population assessment methods were developed to assure that trapping was not limiting populations and that otter were simply surviving and reproducing in their jurisdiction. There was little work done on finer spatial scales using otter as an indicator of ecosystem heath.

In summary, all state and provincial jurisdictions only marginally index Great Lakes watershed populations by presence-absence surveys, track surveys, observations, trapper surveys, population models, aerial surveys, and trapper registration data.

Michigan has the most useful spatial data that could index the largest extent of Great Lakes coastal populations due to their registration requirements. Michigan registers trapped otter to an accuracy of 1 square mile. However, other population measures of otter health, such as reproductive rates, age and morphological measures, are not tied to spatial data in any jurisdiction, but are pooled together for entire jurisdictions. If carcasses are collected for necropsy, the samples are usually too small to accurately define health of Great Lakes coastal otter verses interior populations. Subsequently, there is a large need to encourage and fund resource management agencies to streamline data for targeted population and contaminant research on Great Lakes otter populations, especially in coastal zones.

Acknowledgments
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Sources
Bishop, P., Gotie, R., Penrod, B., and Wedge, L. 1999. *Current status of river otter management in New York*. New York State Department of Environmental Conservation, Otter management team, Delmar, New York.

Bluett, R.D. 2000. Personal Communication. Illinois Department of Natural Resources, Springfield, IL.

Bluett, R.D., Anderson, E.A., Hubert, G.F., Kruse, G.W., and Lauzon, S.E. 1999. Reintroduction and status of the river otter (*Lutra canadensis*) in Illinois. *Transactions of the Illinois State Academy of Science* 92(1 and 2):69-78.

Brunström, B., Lund, B., Bergman, A., Asplund, L., Athanassiadis, I., Athanasiadou, M., Jensen, S., and Örberg, J. 2001. Reproductive toxicity in mink *(Mustela vison)* chronically exposed to environmentally relevant polychlorinated biphenyl concentrations. *Environ. Toxicol. Chem*. 20:2318-2327.

Chapman, J.A., and Pursley, D. (eds.). *Worldwide furbearers conference proceedings.* Worldwide Furbearer Conference, Inc. Frostburg, MD, pp.1752-1780.

Dawson, N. 2000. Personal Communication. Ontario Ministry of Natural Resources, Northwest Region. Thunder Bay, ON.

Dwyer, C.P. 2000a. Personal Communication. Ohio Division of Wildlife, Oak Harbor, OH.

Dwyer, C.P. 2000b. *Population assessment and distribution of river otters following their reintroduction into Ohio.* Crane Creek Wildlife Experiment Station, Ohio Division of Wildlife, Oak Harbor, OH.

Foley, F.E., Jackling, S.J., Sloan, R.J., and Brown, M.K. 1988. Organochlorine and mercury residues in wild mink and otter: comparison with fish. *Environ. Toxicol. Chem.* 7:363-374.

Friedrich, P.D. 2000. Personal Communication. Michigan Department of Natural Resources. East Lansing, MI.

Halbrook, R.S., Jenkins, J.H., Bush, P.B., and Seabolt, N.D. 1981. Selected environmental contaminants in river otters (*Lutra canadensis*) of Georgia and their relationship to the possible decline of otters in North America. In *Proc. Worldwide Furbearer Cong.*, pp. 1752- 1762, Worldwide Furbearer Conference, Inc.

Hammill, J. 2000. Personal Communication. Michigan Department of Natural Resources. Crystal Falls, MI.

Henny, C.J., Blus, L.J., Gregory, S.V., and Stafford, C.J. 1981. PCBs and organochorine pesticides in wild mink and river otters from Oregon. In *Proc. Worldwide Furbearer Cong.*, pp. 1763-1780.

Hochstein, J., Bursian, S., and Aulerich, R. 1998. Effects of dietary exposure to 2,3,7,8-tetrachlorodibenzo-p-dioxin in adult female mink *(Mustela vison). Arch. Environ. Contam. Toxicol.* 35:348-353.

Johnson, S. 2000. Personal Communication. Indiana Department of Natural Resources. Bloomington, IN.

Johnson, S.A., and Berkley, K.A. 1999. Restoring river otters in Indiana. *Wildlife Society Bull.* 27(2):419-427.

Johnson, S.A., and Madej, R.F. 1994. *Reintroduction of the river otter in Indiana – a feasibility study.* Indiana Department of Natural Resources, Bloomington, IN.

Kannan, K., Blankenship, A., Jones, P., and Giesy, J. 2000. Toxicity reference values for the toxic effects of polychlorinated biphenyls to aquatic mammals. *Human Ecological Risk Assessment* 6:181-201.

Kautz, M. 2000. Personal Communication. New York Department of Environmental Conservation, Delmar, NY.

Leonards, P., de Vries, T., Minnaard, W., Stuijfzand, S., de Voogt, P., Cofino, W., van Straalen, N., and van Hattum, B. 1995. Assessment of experimental data on PCB induced reproduction inhibition in mink, based on an isomer- and congenerspecific approach using 2,3,7,8-tetrachlorodibenzo-p-dioxin toxic equivalency. *Environ. Toxicol. Chem.* 14:639-652.

Mason, C. 1989. Water pollution and otter distribution: a review. *Lutra* 32:97-131.

Mason, C., and Macdonald, S. 1993. Impact of organochlorine pesticide residues and PCBs on otters *(Lutra lutra)*: a study from western Britain. *Sci. Total Environ.* 138:127-145.

Mayack, D.T. 2000. Personal Communication. New York Department of Environmental Conservation, Gloversville, NY.

Michigan Department of Natural Resources. 2000a. *Distribution of otter harvest by section 1998-99.* East Lansing, MI.

Michigan Department of Natural Resources. 2000b. *River otter reproductive and harvest data 1995-1999.* East Lansing, MI.

New York State Department of Environmental Conservation. 1998-99. *Furbearer harvest by county and region.* Albany, NY.

Ohio Division of Wildlife. 1999-2000. *Watersheds with river otter observations.* Oak harbor, OH.

Olson, J. 2000. Personal Communication. Furbearer Specialist, Wisconsin Department of Natural Resources, Park Falls, WI.

Ontario Ministry of Natural Resources. 2000. *Ontario furbearer population ranks through trapper questionnaires by Wildlife Assessment Unit*. Thunder Bay, ON.

Roos, A., Greyerz, E., Olsson, M., and Sandegren, F. 2001. The otter *(Lutra lutra)* in Sweden? Population trends in relation to 3DDT and total PCB concentrations during 1968-99. *Environ. Pollut.* 111:457-469.

Route, W.T., and Peterson, R.O.1988. *Distribution and abundance of river otter in Voyageurs National Park, Minnesota*. Resource Management Report MWR-10. National Park Service, Omaha, NE.

Sheffy, T.B., and St. Amant, J.R. 1982. Mercury burdens in furbearers in Wisconsin. *J. Wildlife Manage*. 46:1117-1120.

Wisconsin Department of Natural Resources. 2000a. *Distribution of otter harvest by management unit 1998-99*. Madison, WI.

Wisconsin Department of Natural Resources. 2000b. *Otter population model statewide 1982-2005.* Madison, WI.

Wisconsin Department of Natural Resources. 1979-1998. *Summary of otter reproductive information*. Madison, WI.

Wren, C. 1991. Cause-effect linkages between chemicals and populations of mink (*Mustela vison*) and otter (*Lutra canadensis*) in the Great Lakes basin. *J. Toxicol Environ. Health* 33:549-585.

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