

LAKE ERIE



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# Lake Erie Lakewide Management Plan (LaMP) Technical Report Series

Added Costs to Agriculture and Industry Impairment  
Assessment

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April 2000

Lake Erie LaMP Technical Report No. 14

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## NOTE TO THE READER:

This technical report was prepared as one component of Stage 1, or "Problem Definition," for the Lake Erie LaMP. This report provides detailed technical and background information that provides the basis for the impairment conclusions recorded in the LaMP 2000.

This document has been extensively reviewed by the government agencies that are partnering to produce the LaMP, outside experts, and the Lake Erie LaMP Public Forum, a group of citizen volunteers. This review was designed to answer two questions:

- Is the document technically sound and defensible?
- Do the reviewers agree with the document conclusions regarding impairment?

In its present form, this report has been revised to address the comments received during that review process, and there is majority agreement with the impairment conclusions presented.

## 14.1 Listing Criteria

According to the International Joint Commission (IJC), impairment to the beneficial use of Lake Erie water for agriculture or industry occurs when there are additional costs required to **treat the water prior to use** for agricultural purposes (i.e. including but not limited to, livestock watering, irrigation and crop-spraying) or industrial purposes (i.e. intended for commercial or industrial applications and noncontact food processing) (IJC, 1989).

## 14.2 Geographic Scope of the Assessment

The geographic scope of the Lake Erie LaMP beneficial use impairment assessment (BUA) was established in the 1995 Lake Erie LaMP Concept Paper and includes open lake waters, nearshore areas, river mouths and embayments, and the lake effect zone of Lake Erie tributaries. The lake effect zone is defined as that zone where the waters of the lake and the tributary river are mixed.

## 14.3 Informational Scope of the Assessment

The title of this assessment has led to much confusion about the scope of “added costs” that are intended to be addressed. **The focus of this assessment is the evaluation of Lake Erie water quality, not the economics of Lake Erie basin agriculture and industry.** Therefore, the main issue is whether raw Lake Erie water can be used, if desired, without prior treatment for agricultural and industrial applications where a non-potable source of water is needed.

As a result of the above-mentioned confusion, the following categories of potential added costs were presented to the Beneficial Use Impairment Assessment Subcommittee (BUIASC) for consideration in this assessment:

- The added cost of building and maintaining confined disposal facilities.
- The added cost to the shipping industry and/or commodity producers due to the need for dredging.
- The added costs to humans due to human use of the Lake Erie basin, such as sewage treatment, erosion control, controls on pesticide applications, etc.
- Certain zebra mussel related costs, including: a) cleaning, repairing, or replacing lower units, cooling systems or hulls of boats; b) impacts to the Lake Erie fishery (including the charter boat industry); and c) research, government management, and public education efforts.
- Industrial or drinking water plant costs incurred to monitor and/or treat to control zebra mussels.

Each proposed cost category was screened against the listing criteria referenced in section 14.1. With the exception of zebra mussel monitoring and/or control, none of these costs are specifically related to treatment of Lake Erie water prior to use by agriculture or industry, so they were not included in this assessment.

## 14.4 Application of Listing Criteria

### *Agricultural Use of Lake Erie Water*

There was no published documentation available to evaluate potential impairment to use of Lake Erie water for agricultural purposes in the 19 counties bordering Lake Erie. Therefore, in October, 1995 and February, 1996 an agricultural questionnaire was sent to government agricultural representatives in the Lake Erie basin by the US Natural Resources Conservation Service (NRCS) and the Ontario Ministry of Food, Agriculture, and Rural Affairs (OMAFRA). The questionnaire was designed to identify the current agricultural uses of Lake Erie water and whether treatment prior to use was necessary.

Nine questionnaire responses were received from NRCS representatives in the U.S. and 10 questionnaire responses were received from OMAFRA representatives in Canada. Because the questionnaire targeted individuals within OMAFRA or NRCS who had contact with large numbers of agricultural producers in the applicable Lake Erie counties, each response was representative of hundreds of agricultural producers. For example, the OMAFRA questionnaire was sent to agricultural representatives, crop and horticultural advisors, and agricultural engineers. OMAFRA responses were representative of approximately 12,500 farms in the counties bordering Lake Erie in Canada (Essex-2200; Kent-2800; Elgin-1700; Haldimand-Norfolk-3000; Niagara-2700).

Lake Erie water is being used for agricultural purposes in 6 counties. In situations where Lake Erie water is currently use for agricultural purposes, no instances where water is treated prior to use were documented through the questionnaire. Questionnaire responses also did not identify any situations where Lake Erie water would be used, but is not, due to the need for treatment prior to use.

### *Industrial Use of Lake Erie Water*

As noted above in section 14.3, added costs due to zebra mussel monitoring and control were considered as a potential cause of impairment in this assessment. Therefore, industrial use of Lake Erie was defined based on the three sectors most affected by these costs---- industries, utilities, and drinking water treatment plants.

Results from a 1994 Ohio Sea Grant survey of 1500 U.S. facilities that use Great Lakes surface water were used to assess added costs due to zebra mussel monitoring and control. The purpose of the survey was to: a) systematically collect information to identify zebra mussel infested facilities, b) determine the costs of monitoring, cleaning, and controlling zebra mussel infestations, and c) determine whether the best methods are being used to minimize these costs.

Of the nearly 400 useable responses received, 107 responses were from users of Lake Erie or Lake Erie tributary waters. Responses to the Sea Grant survey indicate that between 1989-1994, U.S. Lake Erie basin electric power plants, industries, and municipal water suppliers spent \$12.5 million (out of a total of \$60.2 million spent by all U.S. Great Lakes respondents) to monitor and control zebra mussels. Of this \$12.5 million, \$9.1

million was spent by U.S. Lake Erie basin power plants and industry (Hushak, et. al., 1995).

Annual monitoring cost decreases of at least 50% were reported between 1989 and 1994 for US Lake Erie water user respondents. In contrast, steadily increasing control costs were reported by US utilities using Lake Erie water (\$222,000 in 1989 versus \$1,906,600 in 1994). Industrial control costs have remained fairly constant from 1989 to 1994. Control costs at water plants peaked in 1991 (\$1,514,500) and have been dropping since. The most common type of control measure reported by utilities and water plants using Lake Erie water was chemical (chlorine, potassium, or molluscicides). The most common type of control method reported by industrial users of Lake Erie water was retrofitting and design.

## **14.5 Impairment Conclusions**

There are no “added costs” impairments to use of Lake Erie water for agricultural purposes. Although this assessment evaluated added costs for zebra mussel monitoring and control, ultimately this was determined not to be an added cost impairment for the reasons listed below.

- The intent of the listing criteria for this assessment is to address water quality. Zebra mussel monitoring and control is not a water quality issue, but rather an issue of keeping the industrial facility intake pipes open, so that water can be used.
- The costs, both economic (see section 14.3) and biological, of zebra mussels to the Lake Erie environment are not limited to their impacts on industrial users of Lake Erie water. Consequently, it is inappropriate to address zebra mussel monitoring and control costs in isolation from all other zebra mussel impacts.
- The zebra mussel is not the only Lake Erie exotic that is causing “added costs” due to the need for control or abatement (i.e.- sea lamprey, purple loosestrife, etc.)

The 1995 Lake Erie LaMP Concept Paper recommended that the impacts of exotics be dealt with as a "key stressor" to the biology of the Lake Erie system. The LaMP will use the results of the beneficial use impairment assessment process, including the above information, to address zebra mussel impacts from an ecosystem perspective. As a starting point, the impacts of exotics, including zebra mussels, have already been summarized in Section 11, Significant and Ongoing Issues, of the LaMP 2000.

## **14.6 References**

Hushak, Leroy, Deng, Y. & Beilen M. 1995. The Cost of Zebra Mussel Monitoring & Control. Aquatic Nuisance Species Digest. Volume 1, No.1.

IJC. 1989. Proposed Listing/Delisting Criteria for Great Lakes Areas of Concern. Focus on International Joint Commission Activities. Volume 14, Issue 1, insert.