

10 LAKE OF THE ISLES

HISTORY

Historically a wetland complex, Lake of the Isles was named for its four enclosed islands. The Minneapolis Park and Recreation Board (MPRB) acquired the lake and surrounding property in 1886 through purchase, donation and condemnation. The property originally consisted of 100 acres of water, 67 acres of wetland and 33 acres of land. In 1884, one of the four islands (closest to the south shore) was removed by the Chicago, Milwaukee and Saint Paul Railway and tracks were laid on fill between Calhoun and Isles. Dredging of approximately half a million cubic yards of material, between 1889 and 1911, drastically changed the look of the lake with the elimination of a second island and an increase in lake area to 120 acres. Fill was used to create parkland on the final 80 acres. Some of the other modifications included deepening of the north arm, to a uniform depth, and construction of shoreline along the once marshy, east side of the lake. The connection of Isles to Calhoun was completed in 1911 and was celebrated by citywide festivities. Figure 10A shows a picture of Lake of the Isles. Figure 10B shows the Lake of the Isles bathymetric map. Table 10A shows the Lake of the Isles morphometric data.

Lake of the Isles is a polymictic lake, occasionally stratifying and mixing throughout the summer months. Dense stands of macrophytes can provide stabilization for zones of thermal stratification in some areas however. The lake was part of the Clean Water Partnership project for the Chain of Lakes and was the focus of multiple restoration activities including grit chambers (1994, 1997, 1999) for stormwater sediment removal, constructed wetland detention ponds for further treatment of incoming stormwater and a whole lake alum treatment (1997) to limit the internal loading of phosphorus. Recent restoration efforts are described at the end of this section in Water Quality Projects.



Figure 10A. Lake of the Isles.

Lake of the Isles is part of the Chain of Lakes Regional Park which received over 5.78 million visitors in 2005 and was the most visited park in Minnesota (Metropolitan Council, 2006).

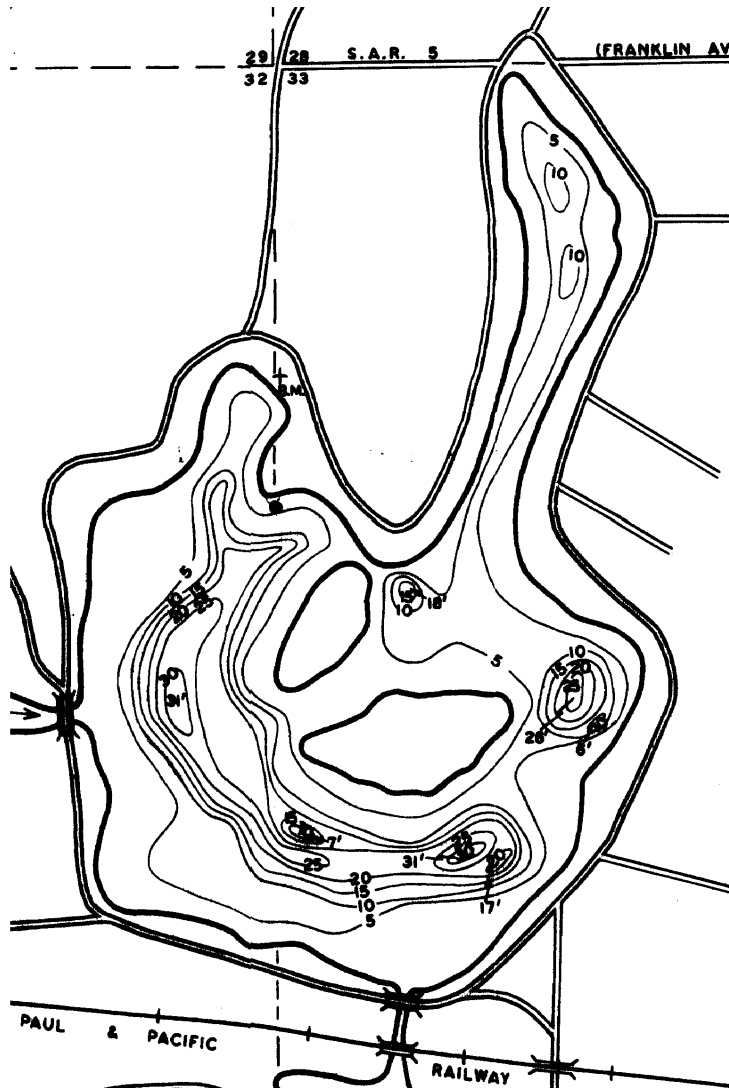


Figure 10B. Bathymetric map of Lake of the Isles. Map courtesy of the Minnesota Department of Natural Resources (MDNR).

Table 10A. Lake of the Isles morphometric data. * Littoral area defined as less than 15 feet deep

Surface Area (acres)	Mean Depth (m)	Maximum Depth (m)	% Littoral Area*	Volume (m ³)	Watershed Area (acres)	Watershed: Lake Area (ratio)	Residence Time (years)
103	2.7	9.4	89%	1.11x10 ⁶	735	7.1	0.6

LAKE LEVEL

See Lake Calhoun, Section 4.

PIEZOMETRIC WELLS

Data from piezometric wells surrounding Lake of the Isles are shown in Figure 10C. Section 1 contains more information about piezometric wells and their map locations.

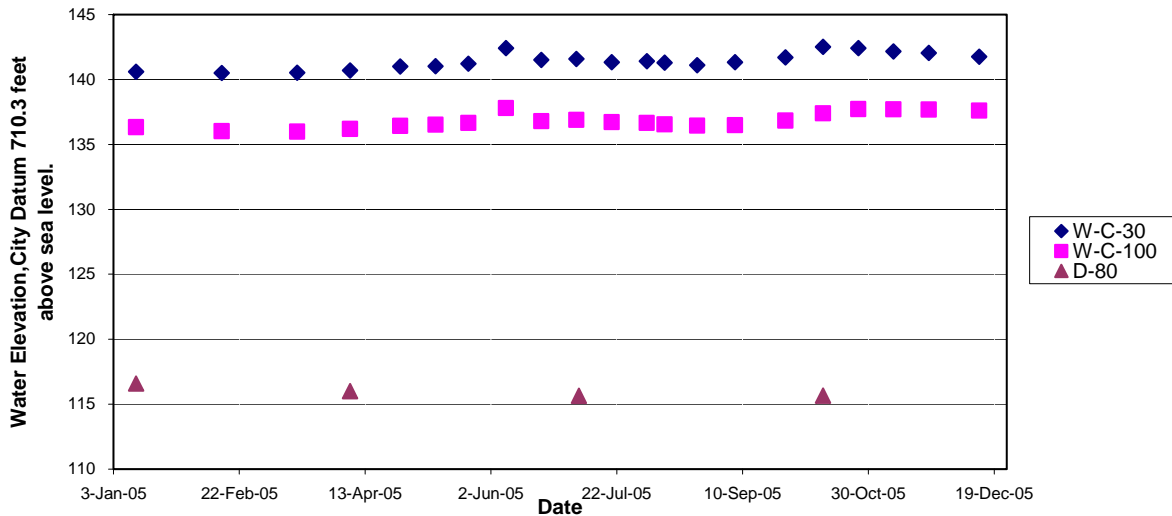


Figure 10C. 2005 piezometric well measurements surrounding Lake of the Isles.

WATER QUALITY TRENDS (TSI)

Figure 10D shows the Lake of the Isles linear regression to be relatively unchanged to slightly improving. A detailed explanation of TSI can be found in Section 1.

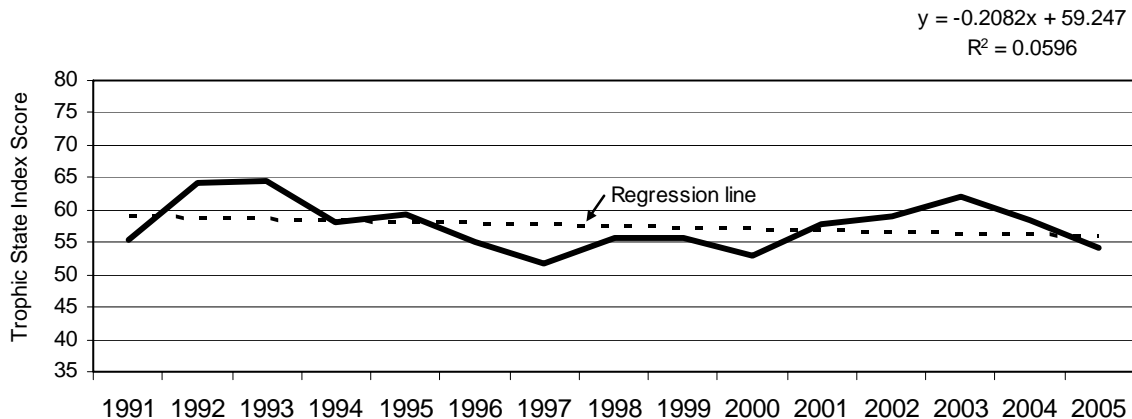


Figure 10D. Lake of the Isles TSI scores and regression analysis.

Lake of the Isles showed an improvement in water quality, but it was a weaker trend with some degradation from 2000 to 2003. The year 2005 improved over 2003 and 2004. The alum treatment in 1997 coincides with the lowest/best TSI score. Currently, Lake of the Isles has a TSI score that is average for this ecoregion. It falls near the 50th percentile category for lakes in this ecoregion (based on calculations from the Minnesota Pollution Control Agency, using the Minnesota Lake Water Quality Data Base Summary, 2004).

BOX AND WHISKER PLOTS

The box and whisker plots show the scatter within the years data set for the Secchi, chlorophyll-*a* and total phosphorus in more detail. Long-term lake monitoring is necessary to evaluate the seasonal and year-to-year variations seen in each lake and predict trends. A detailed

explanation of box and whisker plots can be found in Section 1. Figure 10E shows the box and whisker plots of Lake of the Isles TSI data.

Upstream improvements are noticeable in the total phosphorus box plot (Figure 10E). Water quality appears to have stabilized with total phosphorus in the range of ~50µg/L. These levels are consistent with the shallow nature of the lake.

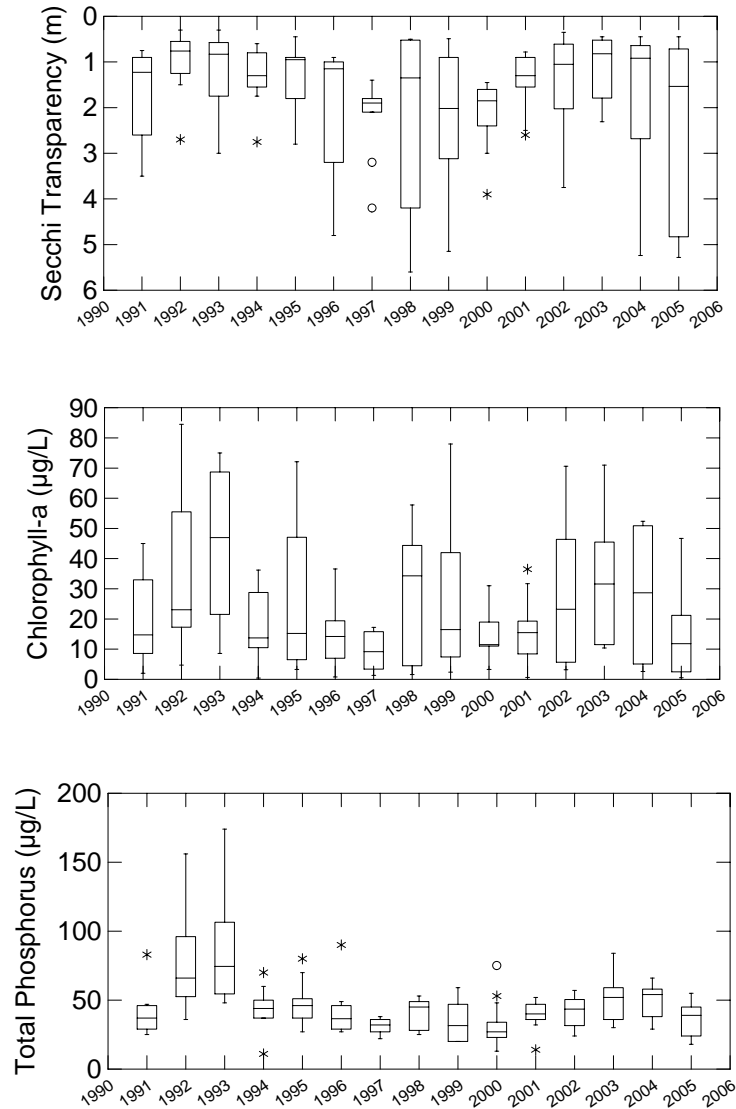


Figure 10E. Lake of the Isles box and whisker plots of TSI data.

LAKE AESTHETIC AND USER RECREATION INDEX (LAURI)

The LAURI for Lake of the Isles is shown in Figure 10F. Lake of the Isles scored “good” in aquatic plants and “excellent” in water clarity and aquatic plants. Since Lake of the Isles does not have a swimming beach, no score was calculated for public health. For more details on LAURI see Section 1.

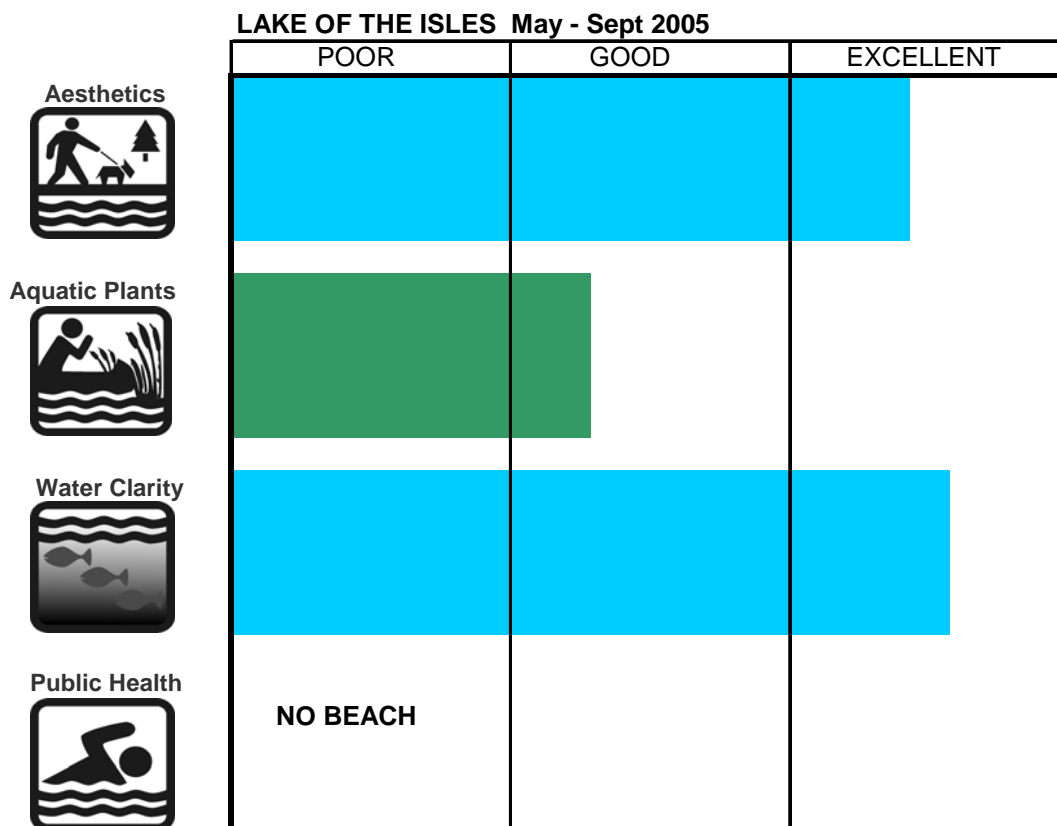


Figure 10F. The LAURI for Lake of the Isles in 2005.

WINTER ICE COVER

Ice came off Lake of the Isles on April 5, 2005, which was the mean and median day of ice off. Ice came on the lake December 2, 2005, which was a few days later than average. See Section 1 for details on winter ice cover records and Section 18 for a comparison with other lakes.

EXOTIC AQUATIC PLANT MANAGEMENT

The MDNR requires a permit to remove or control Eurasian watermilfoil. These permits limit the area from which milfoil can be harvested to protect fish habitat. The permits issued to the MPRB allowed for harvesting primarily in swimming areas, boat launches and in shallow areas where recreational access is necessary. The permitted area on Lake of the Isles was 48.5 acres, which is 47% of the total lake surface area. See Section 1 for details on aquatic plants.

PHYTOPLANKTON AND ZOOPLANKTON

Phytoplankton and zooplankton are the microscopic plant and animal life that form the basic food web of lake ecology. The greenness of a lake is measured by chlorophyll-*a* (chl-*a*) as an expression of the phytoplankton present. In 2005, due to laboratory problems, complete phytoplankton and zooplankton analysis were not available for the entire sampling season. Tables 10B and 10C show the phytoplankton and zooplankton data, respectively. Table 10B shows the 2005 dominant phytoplankton for the specific sampling trip. The percent (%)

dominant are in reference to the total (division) community. The dominant division appeared to be blue-green algae (Cyanophyta). Table 10C shows Arthropoda dominated for most of the period, but for a brief period in mid-August, Rotifera dominated. Figure 10G shows the chlorophyll-*a* distribution for the data available in 2005. The highest chl-*a* value was mid-August where it approached 50 µg/L, which is quite high.

Table 10B. Lake of the Isles 2005 sampling trips and the corresponding dominant phytoplankton division.

Lake	Date	Dominant Division	% Dominant
Isles	6/22/2005	Cyanophyta	40
Isles	7/6/2005	Cyanophyta	76
Isles	7/19/2005	Cyanophyta	87
Isles	8/11/2005	Cyanophyta	92
Isles	8/22/2005	Cyanophyta	94
Isles	9/9/2005	Cyanophyta	92
Isles	9/26/2005	Cyanophyta	93
Isles	10/17/2005	Cyanophyta	85

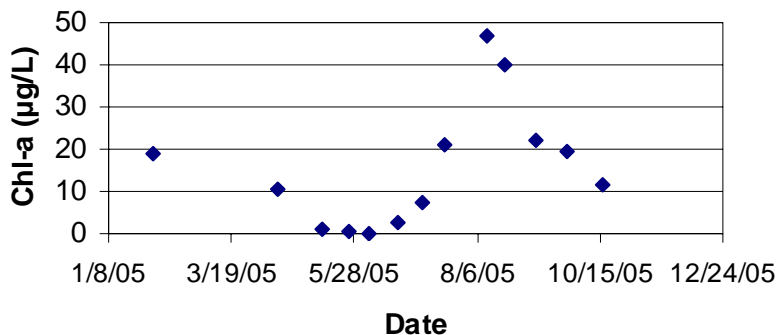


Figure 10G. Lake of the Isles 2005 chlorophyll-a data.

Table 10C. Lake of the Isles 2005 zooplankton tow data distribution.

Vertical Tow Depth (m)	Date	Lake	Arthropoda units/L	Protozoa units/L	Rotifera units/L	Total Zooplankton units/L	% Arthropoda	% Protozoa	% Rotifera
8	7/6/2005	Isles	198	2	206	406	49%	0.5%	51%
8	8/11/2005	Isles	47	3	119	169	28%	2%	70%
8	9/9/2005	Isles	137	1	22	160	86%	0.5%	14%
9	10/17/2005	Isles	374	2	72	448	83%	0.4%	16%

MACROPHYTE SURVEY

A point survey method was used on Lake of the Isles to survey the type and abundance of macrophytes in the lake. GPS coordinates, rake methodology and GIS mapping were used to conduct the survey. The findings are presented in Table 10D. The two most common species were Coontail (*Ceratophyllum demersum*) and Eurasian watermilfoil (*Myriophyllum spicatum*). Figure 10H shows the aquatic plant densities found on Lake of the Isles during the August 2005 point intercept survey. The maximum depth where plants were encountered was 11.5 feet. The frequency is the percentage of time the species was encountered at all of the sampling points. Eurasian watermilfoil, an invasive exotic species, was encountered more frequently than the

native Coontail. The frequency is the percentage of time the species was encountered at all of the sampling points.

Table 10D. Lake of the Isles 2005 macrophyte survey.

Species	Number of points w/ species present	Total points	Points <12ft	Frequency
<i>Ceratophyllum demersum</i>	7	60	51	0.12
<i>Myriophyllum spicatum</i>	40	60	51	0.78



Figure 10H. Lake of the Isles 2005 point intercept macrophyte survey.

FISH STOCKING

Additional information and a definition of fry, fingerling, yearling and adult fish can be found in Section 1.

Lake of the Isles was stocked by MDNR in:
2000 with 300 fingerling Tiger Muskellunge
2004 with 300 fingerling Tiger Muskellunge

WATER QUALITY PROJECTS

The Lake of the Isles Renovation Plan was developed to combat the deterioration of the shoreline and water quality. The emphasis was on shoreline stabilization, wetland enhancement and restoration, path reconstruction, upland plant restoration, and the raising of passive recreation areas.

The shoreline on the north side of Kenilworth Lagoon was stabilized, and a new wetland/flood storage area was created east of the Off-Leash Recreation Area on the south side of the lake. In 2002, work began to replace the WPA-era retaining wall at Evergreen Point and to stabilize the shoreline on the south side of Kenilworth Lagoon and the east shore, along with construction of new pedestrian and bike paths and the planting of trees. The retaining wall and shoreline work was completed in fall 2003.

The west bay and north arm of the lake have the highest concentrations of peat and are, therefore, the sites of the most significant settling. To restore the park's historic aesthetic, necessitated by the park's listing on the National Register of Historic Places, these sections have to be filled in. The cost of removing the original peat, however unsuitable as fill, and replacing it with a more desirable alternative is prohibitive. To minimize future settling in these areas, the fill will be compressed by a layer of heavier material. When the compression has been maximized, the excess material will be removed, and the paths can be constructed, and landscaping completed.

Finally, when all other project components have been completed, Lake of the Isles Parkway will be repaved. More information can be found at:

<http://www.minneapolisparcs.org/default.asp?PageID=658>