**Section 367.1020 Phase I Diagnostic Study**

The Phase I diagnostic study shall contain the following elements:

a) Identification of the lake to be restored or studied, including:

1) the name of the lake;

2) the location of the lake within the State;

3) the general hydrologic relationship of the lake to associated upstream and downstream waters; and

4) the water quality standards applicable to the lake under 35 Ill. Adm. Code 302.

b) A geological description of the drainage basin including soil types and soil loss to stream courses that are tributary to the lake.

c) A description of the public access to the lake including the amount and type of public transportation to the access points.

d) A description of the size and economic structure of the population residing near the lake that would use the improved lake for recreation and other purposes.

e) A summary of historical uses of the lake, including recreational uses up to the present time, and a discussion of how these uses may have changed because of water quality degradation.

f) An explanation, if a particular segment of the lake user population is or will be more adversely impacted by lake degradation.

g) A statement regarding the water use of the lake compared to other lakes within a 50-mile (80-kilometer) radius.

h) An itemized inventory of all known point source pollution discharges that affect or have affected lake water quality over the past five years, and a description of any abatement actions that have been completed or are in progress for these discharges, including the time frame for any contemplated future corrective action.

i) A description of the land uses in the lake watershed that lists each land use classification as a percentage of the whole and quantifies the nonpoint pollutant loading produced by each land use category.

j) A discussion and analysis of historical baseline limnological data and one year of current limnological data, including the following:

1) the present trophic condition of the lake;

2) the surface area of the lake (acres and hectares);

3) maximum depth of the lake (feet and meters);

4) average lake depth (feet and meters);

5) hydraulic residence time;

6) the area of the watershed draining to the lake (acres and hectares);

7) the physical, chemical, and biological quality of the lake and important lake tributary waters;

8) bathymetric maps;

9) if dredging is expected to be included in the restoration activities, an analysis of representative bottom sediment core samples for phosphorus, nitrogen, heavy metals and other chemicals appropriate to the State water quality standards contained in 35 Ill. Adm. Code: Subtitle C, Chapter I and for persistent synthetic organic chemicals where appropriate;

10) if dredging is expected to be included in the restoration activities, the results of elutriate testing pursuant to 35 Ill. Adm. Code 186;

11) an assessment of the phosphorus, nitrogen, and sediment inflows and outflows associated with the lake and a hydraulic budget including groundwater flow;

12) vertical temperature and dissolved oxygen data for the lake to determine if the hypolimnion becomes anaerobic and, if so, for how long and over what extent of the bottom;

13) total and dissolved phosphorus, nitrite, nitrate, ammonia and organic nitrogen concentrations for the lake;

14) measured chlorophyll values for the upper mixing zone;

15) representative alkalinities;

16) an assessment of the algal growth limiting nutrient, based on total nitrogen to total phosphorus ratios;

17) a discussion of the extent of algal blooms and the predominant algal genera;

18) algal biomass, determined through algal genera identification, cell density counts (numbers of cells per milliliter), and converted to cell volume based on factors derived from direct measurements, and reported in biomass of each major genus identified;

19) Secchi disc depth and suspended solids measurements;

20) an estimate (and map) of the portion of the shoreline and bottom that is impacted by vascular plants (submersed, floating, or immersed higher aquatic vegetation), specifically the lake surface area between 0 and the 30 foot (10 meter) depth contour or twice the Secchi disc transparency depth, whichever is less, including identification of the predominant species;

21) an estimate of the sediment load to the lake via shoreline erosion, and a map depicting the location and severity of shoreline erosion;

22) for lakes subject to significant public contact use or fished for consumption, standard bacteriological analyses and fish flesh analyses for organic and heavy metal contamination shall be included unless otherwise specified in the financial assistance agreement. All sample analyses shall be conducted by a laboratory certified by the Agency as capable of carrying out water quality analyses. Samples shall be sent to an Agency laboratory for quality assurance and quality control analysis as agreed to by the lake owner and the Agency in the financial assistance agreement.

k) An identification and discussion of the lake's biological resources, such as fish population, and a discussion of the major known ecological relationships.