INVESTIGATION OF SEPTIC LEACHATE DISCHARGES INTO BIG PLATTE LAKE, BENZIE COUNTY, MICHIGAN

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FOR
THE MICHIGAN DEPARTMENT OF NATURAL RESOURCES
AND
THE PLATTE LAKE IMPROVEMENT ASSOCIATION

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INTRODUCTION

Swanson Environmental, Inc. (SEI) has been retained by the Michigan Department of Natural Resources (MDNR) to conduct a septic leachate detection survey on Big Platte Lake in Benzie County, Michigan. The location of Big Platte Lake and the study area are illustrated in Figure 1. The shoreline scanning for septic system discharge was conducted from August 18 through 20, 1981, in cooperation with the MDNR. Objectives of the study were to locate and sample septic leachate plumes entering Big Platte Lake, and to study groundwater flow patterns in the immediate vicinity of the lake.

PROCEDURES

One of the causes of accelerated lake eutrophication is domestic septic systems located on lake shores which malfunction and release nutrients and bacteria into lake water through the bottom sediments. Septic seepage into lakes can result from several conditions including; (1) shallow groundwater, encouraging soil water saturation and anaerobic conditions; (2) location too near the water's edge to allow complete bacterial degradation and soil absorption of potential contaminants; and (3) hydraulic overloading of good systems and poorly designed or poorly installed systems due to excessive use during peak recreation periods (Kerfoot and Brainard, 1979).

When any of the above conditions exist, septic leachate can be carried with the groundwater through porous soils, erupting as an active plume along the lake bottom. Figure 2 illustrates how a typical septic system might fail and discharge pollutants into a lake. The discharge tends to travel horizontally with the groundwater flow, entering the lake in shallow shoreline areas.

Septic leachate contains both UV fluorescent organics and conductive inorganics. Whiteners, surfactants, and natural degradation