Water Quality Assessment

Applicability

The Water Quality Assessment section primarily applies to new or expanding marinas and coincides with the Marina Flushing section. Water quality assessment is typically addressed through the permitting process in Indiana. However, this section does provide marina designers and developers some guidance on marina siting and design impacts on water quality.

Background

As stated in the Marina Flushing section, water circulation and marina flushing play important roles in the distribution and concentration of potential pollutants in a marina basin. Improperly designed marinas and day-to-day marina operations can potentially lead to poor water quality. Poor water quality in turn can have a negative impact on fish and wildlife within the marina basin or channel. However, remember that poor water quality in a marina may not solely be a result of operations in the marina itself. Marinas can be impacted by other land use activities within the watershed. The watershed is the area of land where all of the water that is under it or drains off of it goes into the same place. Impacts such as storm water run-off from other areas, fertilizer use upstream or pollutants brought from marina flushing activities may all lead to decreased water quality.

A marina employee uses a Secchi disk to measure how deep she can see into the water.

Water quality monitoring and assessment can be used to determine ambient water quality, the extent and causes of a water quality problem, or to measure the effectiveness of best management practices being implemented in a marina. The concentration of dissolved oxygen in water is a good indicator of the health of the marina. This number indicates whether there is enough oxygen for fish and other aquatic life. A low dissolved oxygen concentration number may suggest that there is too much decaying matter, or possibly that oil or other substances on the water's surface is preventing an exchange of gases. The transparency of the water can also be a good indicator of water quality in the marina. Erosion, run-off, algal blooms, and resuspended bottom sediment can reduce transparency. Transparency can be measured with simple, inexpensive equipment such as a transparency tube (see photo on the next page) or Secchi disk.

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Pathogenic organisms can present a public health concern. Pathogens such as E. coli and enterococci are contained in human and animal fecal waste. Testing should be done to see if the water is safe to be used recreationally for swimming or skiing and to determine the condition of a proposed marina development site.

A transparency tube is used to assess water quality.

Existing Federal and State Laws

As part of the permitting process, the Indiana Department of Environmental Management reviews potential water quality impacts for newly proposed or expanding marinas through the 401 Water Quality Certification Program. The Indiana Department of Natural Resources (IDNR) also reviews the potential impacts of newly proposed or expanding marinas through the Navigable Waterways Act (IC 14-29-1), the Lake Preservation Act (IC 14-26-2), the Sand and Gravel Permits Act (IC 14-29-3), and the Construction of Channels Act (IC 14-29-4). The U.S. Army Corps of Engineers (USACE) utilizes Section 10 of the River and Harbor Act of 1899 and Section 404 (permit application process) of the Clean Water Act to make a water quality assessment. However, existing marinas may also wish to participate in some form of volunteer water quality monitoring.

Visual inspections are an easy way for marina operators to perform water quality monitoring. The clarity of the water, volume of aquatic plants, abundance of aquatic wildlife and fish, presence of sheens on the water or debris accumulation can be used to judge the health of the water. These types of inspections can be easily done by educating marina staff on what to look for. Staff can do visual inspections during the course of their daily activities at little or no cost to the marina.

Hoosier Riverwatch

Marinas can utilize their clients and local community groups or universities to assist in water quality assessment. College students may be interested in participating in projects involving marinas. The data they gather can be shared. Volunteers may help gather and analyze water samples, record ecosystem activities, catalog and collect beach debris and restore degraded habitat.

Hoosier Riverwatch is a state-sponsored water quality monitoring initiative. The purpose is to increase public awareness of

water quality issues and concerns by training volunteers to monitor stream water quality. More information can be found on the Web at www.IN.gov/dnr/nrec/3046.htm.

The U.S. Environmental Protection Agency's Office of Wetlands, Oceans, and Watersheds offers training and assistance in starting up monitoring programs. A volunteer program description can be found on the Web at www.epa.gov/owow/monitoring/volunteer.

Best Management Practices

U.S. EPA has provided several best management practices that can be applied successfully to monitor water quality. The following best management practices are described for illustrative purposes and to provide guidance for marinas that are in the planning stage or for those marinas that are looking to expand.

- Use a water quality monitoring methodology to measure water quality conditions. The first step in a marina water quality assessment should be the evaluation and the characterization of existing water quality conditions. Baseline data for the water body on which the marina is proposed might be available from IDNR, IDEM, or a federal agency such as the U.S. Geological Survey, U.S. EPA or USACE. The second step is to set design standards in terms of water quality. In most states, the water quality is graded based on dissolved oxygen content, and a standard exists for the 24-hour average concentration and an instantaneous minimum concentration. A state's water quality standard for dissolved oxygen during the critical season may be used to set limits of acceptability for good water quality.

- Use a water quality modeling methodology to predict post-construction water quality conditions. Numerical models can be a more economical alternative to collecting water quality data in the field. However, all models require some field data for proper calibration. (Check to see if baseline data already exists.) Numerical models can also be used to evaluate different alternative designs to maximize flushing of pollutants.

- Perform preconstruction inspection and assessment. A preconstruction inspection and assessment may be affordable in place of detailed water quality monitoring or modeling for marinas with 10 to 49 slips. An expert knowledgeable in water quality and hydrodynamics may assess potential impacts using available information and site inspection.

- Water quality sampling, monitoring, and modeling are not necessary in many cases to gather information about the health of a marina's waters. Visual inspections of aquatic plant abundance and appearance in and around the marina, use of the marina and surroundings by ducks and geese, the appearance of bottom sediments, the general clarity of the water near docks, and the abundance of fish can provide the information necessary to judge the health of the water. These types of inspections can be done during the course of daily operations by any member of the marina staff at minimal cost to the marina (see

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volunteer monitoring best management practice below). Done every year, these visual inspections can show what the "normal" conditions are within and adjacent to the marina. When changes are noted, limited water quality sampling can be done to determine what might account for them if a local or state environmental management authority hasn't already done this.

- Establish a volunteer monitoring program at the marina. Marinas can help involve their clientele and local community in water quality issues and environmental protection by beginning a volunteer monitoring program. Volunteer monitors build awareness of pollution problems, become trained in pollution prevention, help clean up problem sites, and increase the amount of water quality information available.