

Lake Characteristic: Stratified



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Description

The development of discrete vertical layers of water with different water temperature resulting in two thermal habitats in the lake: (1) warm surface water that is always well oxygenated and (2) cold bottom waters that can have low to high oxygen concentrations. Lakes that are not stratified (unstratified) are generally shallow (< 2 m average depth), characterized by frequent complete mixing from top to bottom, and high oxygen levels throughout. Unstratified lakes generally can occur in one of two states. The first is characterized by high nutrients, high wind resuspension, no rooted plants, and turbid water; and the second is characterized by low to medium nutrients, low wind resuspension, rooted plants dominant, and clear water.

General Condition of Feature

This habitat is considered 65% in good to excellent condition, 20% in fair condition, and 15% in degraded to very degraded condition.

Associated Species of Greatest Conservation Need

FISH

- cisco or lake herring (*Coregonus artedii*)

Associated Threats

MODIFICATION OF NATURAL PROCESSES

- Altered hydrologic regimes: Water withdrawal & dewater
- Climate change: (low threat)

POLLUTION

- Altered nutrient inflows: Altered nutrient inflows to the point that there is insufficient oxygen below the thermocline
- Thermal changes: Hydro-water discharges from stratified impoundments can denigrate and diminish the cool water area without proper regulation (exp. Boney Falls on Escanaba River); Biggest threat would be thermal pollution from power plants (low threat)
- Urban, municipal, and industrial pollution: Industrial effluent

HABITAT CONVERSION

- Wetland modification

BIOLOGICAL INTERACTIONS

- Invasive plants and animals

Conservation Actions Needed (Threats addressed)

LAND, WATER & SPECIES MANAGEMENT

- Maintain or rehabilitate natural hydrology (altered hydrologic regimes)

LAW & POLICY

- Encourage sound water withdrawal practices that take into account species needs (altered hydrologic regimes)
- Encourage townships to separate combined sewer systems (altered nutrient inflows)
- Implement and continually improve storm water and non-point source best management practices (Urban, municipal, and industrial pollution)
- Protect and rehabilitate groundwater recharge by requiring that all development-related runoff be captured by infiltration basins (altered hydrologic regimes)
- Protect existing hydrologic conditions of lakes and remaining natural lake outlets by prohibiting construction of new lake-level control structures (altered hydrologic regimes)
- Reduce effluent flow (Urban, municipal, and industrial pollution)
- Strengthen water quality laws especially those that relate to water temperatures and discharges (variety of threats)
- Upgrade septic systems (altered nutrient inflows)

Research and Survey Needs

- Develop alternative methods for addressing urban runoff
- Establish effective methods of communicating with the public and their stewardship role (reduce pesticide use, proper oil disposal, etc)
- Develop ways of decreasing imperviousness in southern watersheds

Monitoring

- Dissolved oxygen
- Effluent discharges: waste water treatment plants, septic systems
- Riparian buffer modification
- Sediment loads

- Water temperatures
- Wetland modification