

Glossary of Terms

Algae: Small aquatic plants containing chlorophyll and without roots that occur as single cells or multi-celled colonies. Algae form the base of the food chain in aquatic environments.

Algal bloom: A heavy growth of algae in and on a body of water as a result of high nutrient concentrations.

Aquatic Invasive Species (AIS): Refers to species of plants or animals that are not native to a particular region and cause harm to the ecosystem. They are problematic because they don't have predators so they reproduce quickly and out-compete native species, which can result in decreased diversity.

Best Management Practice (BMP): Practices or methods used to prevent or reduce amounts of nutrients, sediments, chemicals or other pollutants from entering water bodies from human activities. BMPs have been developed for agricultural, forestry, construction, and urban activities. Examples of BMPs include nutrient management planning, crop rotations, changes in tillage, cover crops, grassed waterways, terraces, manure storage, barnyard runoff controls, harvestable buffers, alternative manure treatment system, low disturbance manure injection, etc...

Clean Water Act: The federal environmental law governing water pollution. The CWA provides the basic structure for regulating discharges of pollutants into the waters of the United States and for regulating quality standards for surface waters. When passed in 1972, the CWA's primary emphasis was to reduce the amount of point sources pollution discharging into waterways from wastewater treatment plants and industrial facilities.-The CWA does not give EPA the express authority to control non-point sources pollution but it requires that each state calculate a Total Maximum Daily Load (TMDL) for each pollutant that causes any water body to be listed under the Act as impaired for one or more of its uses, such as fishing, swimming, or supplying drinking water.

Climate Change: A long-term alteration of weather patterns, such as average and extreme temperature and precipitation, affecting a particular location or the planet as a whole. Climate is different from weather because it is measured over a long period of time, whereas weather can change from day to day, or from year to year.

Drainage basin: The area drained by, or contributing to, a stream, lake, or other water body (see watershed).

Ecological rehabilitation: The reparation of ecosystem processes, services, and productivity but it does not mean to restore the ecosystem to its pre-existing condition.

Ecological restoration: The process of assisting by active human intervention and action, the recovery of an ecosystem that has been degraded, damaged, or destroyed to its preexisting condition.

Ecology: A scientific study of relationships between organisms and their surroundings (environment). Ecology is the study of ecosystems.

Ecosystems: A community of living organisms in conjunction with the nonliving components of their environment, interacting as a system. These biotic and abiotic components are linked together through nutrient cycles and energy flows.

Escherichia coli (E. coli): A member of the fecal coliform group of bacteria that is commonly found in the intestines of animals and humans. *E. coli* in water is a strong indicator of sewage or animal waste contamination that can contain pathogens and viruses harmful to public health.

Eutrophic: Waters extremely rich in nutrients, with high biological productivity. Eutrophic lakes have higher concentrations of phosphorus and chlorophyll and poorer clarity.

Flushing rate: Term describing rate of water volume replacement of a water body, usually expressed as basin volume per unit time needed to replace the water body volume with inflowing water. The inverse of the flushing rate is the (hydraulic) detention time. A lake with a flushing rate of 1 lake volume per year has a detention time of 1 year.

Green infrastructure: Use of vegetation, soils, and other elements and practices to restore some of the natural processes required to manage water and create healthier urban environments. At the city or county scale, green infrastructure is a patchwork of natural areas that provides habitat, flood protection, cleaner air, and cleaner water. At the neighborhood or site scale, they are stormwater management systems that mimic nature soak up and store water. Examples include rain gardens, green roofs, bioswales, rain barrels, permeable pavements, planter boxes, etc.

Hydraulic retention time: The period of detention of water in a basin. The inverse of detention time is flushing rate. A lake with a detention time of one year has a flushing rate of 1 lake volume per year.

Impaired Water List / 303(d) listed: The Impaired Waters List is also known as the 303(d) list. Every two years, DNR publishes a list of waters (rivers, streams, lakes and beaches) considered impaired, as required by Section 303(d) of the federal Clean Water Act (CWA). Impaired waters do not meet standards and may not support designated uses, like fishing, swimming, recreating or public health.

Limiting nutrient: Essential nutrient needed for growth of plant organism which is the scarcest in the environment. Oftentimes, in freshwater systems, either phosphorus or nitrogen may be the limiting nutrient for plant growth.

Limnology: The study of the biological, chemical, and physical features of lakes and other bodies of fresh water.

MAMSWaP: Madison Area Municipal Stormwater Partnership consists of 20 municipalities, Dane County and UW-Madison that work together to meet Wisconsin Pollutant Discharge Elimination System (WPDES) permitting requirements. The WPDES program allows the DNR to regulate the discharge of pollutants to waters of the state. Wastewater permits contain all the monitoring requirements, special reports and compliance schedules appropriate to the facility in question. Permits are issued for a five-year term.

Mesotrophic: Waters with an intermediate level of productivity. Mesotrophic lakes have medium-level nutrients and are usually clear water with submerged aquatic plants.

Mitigation: Actions taken to replace or restore animals or plants that may have been damaged or removed by certain prior activities.

Municipal Separate Storm Sewer System (MS4): A conveyance or system of conveyances (e.g., storm drains, pipes, and ditches) used to collect or convey stormwater to waters of the U.S. It is not a combined sewer and it is not part of a sewage treatment plant or publicly owned treatment works. To prevent harmful pollutants from being washed or dumped into MS4s, certain operators are required to obtain permits and describes the stormwater control practices that will minimize the discharge of pollutants from the sewer system.

Nitrogen: A chemical constituent (nutrient) essential for life. Nitrogen is a primary nutrient necessary for plant growth.

Non-point (pollutant) source: A diffuse source of water pollution that does not discharge through a pipe or other readily identifiable structure. Non-point pollution typically originates from activities on land and the water. Examples of non-point sources are agricultural, forest, and construction sites, marinas, urban streets and properties.

Nutrient: Any chemical element, ion, or compound required by an organism for the continuation of growth, reproduction, and other life processes.

Oligotrophic: Waters that are nutrient poor and have little organic production. Oligotrophic lakes have very clear waters.

Phosphorus: Phosphorus is a naturally occurring element and essential plant nutrient found in material such as fertilizer, leaves, soil, and animal waste. When it enters our lakes from agricultural and urban runoff, it is known to promote the growth of noxious cyanobacteria blooms that can produce toxins of human and animal health concern. It takes as little as one pound of phosphorus to grow of 500 pounds of algae.

Phosphorus loading: The mass of phosphorus delivered to a body of water, which can include both internal and external sources. Internal sources can include the release of phosphorus from nutrient-rich bottom sediments into the water column. External sources are from upland areas, such as phosphorus delivered through soil erosion and polluted stormwater runoff.

Phytoplankton: Free floating microscopic plants (algae).

Point (pollutant) source: A source of pollutants or contaminants that discharges through a pipe or culvert. Point sources, such as an industrial or sewage outfall, are usually readily identified.

Pollutant: A contaminant or a substance that is not naturally present in water or occurs in unnatural amounts that can degrade the physical, chemical, or biological properties of the water. Pollutants can be chemicals, disease-producing organisms, silt, toxic metals, oxygen-demanding materials, to name a few.

Primary production: The rate of formation of organic matter or sugars in plant cells from light, water and carbon dioxide. Algae are primary producers.

Public Trust Doctrine: A body of law Programs having roots in Roman law, English common law and the North West Ordinance of 1787. It grants authority to the state to regulate its waters, it establishes public rights of use and defines state property rights in navigable waters.

Residence time: The average length of time that water or a chemical constituent remains in a lake.

Secchi disk: A 20-cm (8-inch) diameter disk painted white and black in alternating quadrants that is lowered into the water column. It is used to measure water clarity or turbidity by measuring the depth at which the disk ceases to be visible from the surface.

Sediment: Solid material deposited in the bottom of a basin.

Thermal stratification: Horizontal layering of water in a lake caused by temperature-related differences in density. A thermally stratified lake is generally divided into the epilimnion (uppermost, warm, mixed layer), metalimnion (middle layer of rapid change in temperature and density) and hypolimnion (lowest, cool, least mixed layer).

Total Maximum Daily Load (TMDL): For each waterway on the Impaired Water List, DNR must develop and implement a plan to reduce pollutants so that the waterway is no longer impaired and can be delisted. One of the key tools to meet this goal is the development of a TMDL report. TMDL reports identify the amount of a pollutant(s) that a waterway can tolerate and still meet water quality standards. To generate the TMDL report, water quality data is analyzed using engineering models, and the calculated amount of pollutant is allocated between point and nonpoint sources of the pollutant. A TMDL report also includes an implementation plan to reduce the pollutants from each source.

Tributaries: Rivers, streams or other channels that flow into a water body.

Trophic state: Term used to describe the productivity of the lake ecosystem and classify it as oligotrophic (low productivity, "good" water quality), mesotrophic (moderate productivity), or eutrophic (high productivity; "poor" water quality).

Turbidity: A measure of how cloudy or murky a water body is. Turbidity can be measured relative to water clarity using a Secchi disk. High turbidity means low water clarity.

Watershed: The entire surface landscape that contributes water to a lake or river. See drainage area.

Watershed Adaptive Management: A voluntary compliance option for point source facilities to comply with phosphorus limits by funding management measures at other point or nonpoint sources. Point source facilities build on partnerships with other landowners, municipalities, and private and public entities which offer flexibility and cost-effective solutions to achieve the applicable water quality criteria in the receiving water. This is an adaptive process because monitoring is required over time which allows learning through the process of management and adjustment. A current initiative using this strategy in the Yahara watershed is led by Yahara WINS.

Wetland: A generalized term for a broad group of wet habitats. Wetlands are areas of vegetation that are transitional between land and water bodies and range from being permanently wet to intermittently water covered.

Yahara CLEAN (Capital Lakes Environmental Assessment and Needs): A lake cleanup partnership launched in 2008 with Dane County, City of Madison, Wisconsin Department of Natural Resources, and Wisconsin Department of Agriculture, Trade and Consumer Protection. The group released a report outlining 70 recommendations to improve water quality. In 2011, Clean Lakes Alliance reconvened the coalition of partners to turn the list of recommendations into a streamlined action plan with clear goals, costs, and metrics. With the help of an engineering firm, the Yahara CLEAN Strategic Action Plan for Phosphorus Reduction details 14 most cost-effective actions to achieve the goal to cut phosphorus runoff to our lakes in half.

Yahara CLEAN Compact: In 2019, Clean Lakes Alliance reconvened and expanded the Yahara CLEAN partnerships to update the 14 actions for phosphorus reduction with the Yahara CLEAN Compact. The goal is to account for accomplishments and progress to date, re-evaluate phosphorus reduction targets, and set forth revised strategies, costs and timelines to complete the needed work. The organizational structure is defined as:

- **Partner:** official signatories and voting members under the Compact, providing agreed upon staff and financial resources to facilitate the Yahara CLEAN updating process.
- **Collaborator:** supporting agencies or organizations that often play a significant cooperating role in watershed phosphorus reduction and/or achieving water quality improvements.
- **Supporter:** sign statement of support endorsing the goals of the Compact.
- **Steering team:** group of appointed designees representing partners and collaborators, that advice on planning processes and recommendations.
- **Executive Committee:** partner designees that serve as decision making body
- **Subgroups:** topic-specific advisory bodies formed at the discretion of the steering team

Yahara River: The river that traverses the Yahara Watershed, entering in Columbia County and exiting in Rock County, and passes through all of the four largest Madison-area lakes (Mendota, Monona, Waubesa, and Kegonsa). The Yahara River eventually joins the Rock River, which feeds into the Mississippi River in Illinois.

Yahara Watershed: The Yahara River Watershed is comprised of 536 square miles, is home to approximately 481,000 people, and is part of the larger Rock River Basin. It encompasses 6 cities, 11 villages, and 19 towns within the greater Madison area. This watershed can be divided into sub-watersheds. For example, the Yahara Lakes Watershed drains 386 square miles of land surface directly and exclusively to the five Yahara lakes, and has its outlet point right after Lake Kegonsa.

Yahara WINS (Watershed Improvement Network): A groundbreaking initiative to achieve clean water goals for the Yahara Watershed. In this effort, community partners led by Madison Metropolitan Sewerage District are collaborating on a strategy called watershed adaptive management in which all sources of phosphorus in the watershed work together to reduce phosphorus. The effort began in 2012 as a pilot project and in 2017 transitioned to a full-scale effort.

Zooplankton: Microscopic animal plankton in water. *Daphnia* sp. or water fleas are freshwater zooplankton.

