

LAKEKEEPERS GLOSSARY OF TERMS

Abiotic Components

Non-living components of our natural environment, such as sunlight, water, oxygen, minerals, and temperature.

Acid

Corrosive substances with a pH of less than 7.0; acidity is caused by high concentrations of hydrogen ions.

Aerobic

In the presence of, or requiring, oxygen.

Algae

A plant or plantlike organism of any of several classes of chiefly aquatic, usually chlorophyll-containing, nonvascular organisms that usually include the green, yellow-green, brown, and red algae and the blue-green algae (also known as cyanobacteria).

Algal Bloom

Population explosion of algae in surface waters due to an increase in plant nutrients such as nitrates and phosphates. Usually due to excessive blue green algae growth.

Alkalinity

(aka Basic) The ability of water, or other substances, to absorb high concentrations of hydrogen ions. Substances with a pH greater than 7.0 are considered alkaline. A measure of the amount of carbonates, bicarbonates, and hydroxide present in water. Low alkalinity is the main indicator of susceptibility to acid rain. Increasing alkalinity is often related to increased algae productivity. Expressed as milligrams per litre (mg/L) of calcium carbonate (CaCO_3), or as micro equivalents per litre ($\mu\text{eq/L}$). $20 \mu\text{eq/L} = 1 \text{ mg/L}$ of CaCO_3 .

Amictic Lake

Lake with the absence of circulation periods, as in permanently ice-covered lakes.

Ammonia

A form of nitrogen found in organic materials and many fertilizers. It is the first form of nitrogen released when organic matter decays. It can be used by most aquatic plants and is therefore an important nutrient. It converts rapidly to nitrate (NO_3) if oxygen is present. The conversion rate is related to water temperature. Ammonia is toxic to fish at relatively low concentrations in pH-neutral or alkaline water.

Under acid conditions, non-toxic ammonium ions (NH_4^+) form, but at high pH values the toxic ammonium hydroxide (NH_4OH) occurs. The water quality standard for fish and aquatic life is 0.02 mg/L of NH_4OH .

Ammonification

Production of ammonia (NH_3) from organic nitrogenous compounds by decay of dead material and metabolism in living organisms.

Anaerobic

Relating to a process that occurs with little or no oxygen present.

Anoxia

Water conditions where dissolved oxygen is depleted (insufficient available oxygen is present).

Bacteria

Tiny, unicellular organisms that reproduce by cell division and usually have cell walls; can be shaped like spheres, rods or spirals and can be found in virtually any environment.

Benthic

Referring to bottom zones or bottom-dwelling forms.

Benthos

Animals and plants living on or within the substrate of a water body (freshwater, estuarine or marine).

Biodiversity

The existence of a wide range of different types of organisms in a given place at a given time.

Biological Productivity

The total amount of organic matter or equivalent in energy accumulated in an ecosystem.

Biotic Components

Living components of our natural environment, such as people, plants, animals, fungi, and microorganisms.

Blue Listed

Includes any indigenous species or subspecies (taxa) considered to be vulnerable in British Columbia. Vulnerable taxa are of special concern because of characteristics that make them particularly sensitive to human activities or natural events. Blue-listed taxa are at risk, but are not extirpated, endangered, or threatened.

Board of Directors

Individuals within a stewardship group who are key decision-makers and coordinate the activities and operations of a group.

Carnivore

An animal that obtains its energy from consuming other animals.

Charitable Status

A status obtained by legally registering a stewardship or volunteer group as a charity with Canada Revenue Agency (Government of Canada, 2021).

Chlorophyll

A green, light-absorbing pigment found in plants and other photosynthetic organisms. A magnesium-porphyrin complex, it is an essential electron donor in photosynthesis. The amount of chlorophyll present in lake water depends on the amount of algae and is therefore used as a common indicator of water quality.

Clarity

A Secchi disk is a 20 cm (8 inch) diameter plate with alternating quadrants painted black and white that is used to measure water clarity (light penetration). The disk is lowered into water until it disappears from view. It is then raised until just visible. An average of the two depths, taken from the shaded side of the boat, is recorded as the Secchi disk reading. For best results, the readings should be taken on sunny, calm days, without wearing sunglasses.

Cold Monomictic Lake

Cold monomictic lakes have a water temperature that never exceeds 4°C and a period of circulation in the summer. These lakes are mainly found in the Arctic mountains and usually have some contact with glaciers or permafrost.

Condensation

The change in state of water from a vapour to a liquid.

Conductivity

Measures a water's ability to conduct an electric current.

Conductivity is reported in micromhos per centimeter ($\mu\text{mhos/cm}$) and is directly related to the total dissolved inorganic chemicals in the water. Values are commonly two times the water hardness unless the water is receiving high concentrations of contaminants introduced by humans.

Consumers

A nutritional grouping in the food chain of an ecosystem, composed of heterotrophic organisms, chiefly animals, which ingest other organisms or particulate organic matter.

Cyanobacteria

Known as blue-green algae that are bacteria with a simple cell structure. They are distinguished from other bacteria by the presence of chlorophyll-a and their ability to photosynthesize like plants in the aquatic system.

Decomposers

Heterotrophic organisms (including bacteria and fungi) which break down the complex compounds of dead organisms, absorbs some decomposition products, and releases substances usable by consumers.

Decomposition

The breakdown of dead organic materials.

Detritus

Material that consists of decaying, decomposing organic matter (often dead plants or animals).

Dimictic Lakes

Lakes that experience two mixing events per year, one typically following the summer stratification period and the other following the inversely stratified winter period.

Dissolved Oxygen

The amount of free oxygen absorbed by the water and available to aquatic organisms for respiration; amount of oxygen dissolved in a certain amount of water at a particular temperature and pressure, often expressed as a concentration in parts of oxygen per million parts of water (ppm).

Environmental Stewardship

Stewardship concerned with the biotic and abiotic components of our natural environment in pursuit of enhancing, restoring, and conserving natural resources, ecosystems, and the species associated with them.

Epilimnion

The upper, well-mixed, well-illuminated, nearly isothermal region of a typical stratified lake.

Erosion

Movement of soil by water or wind.

Eutrophic

Lakes that have high levels of biological productivity. An abundance of plants is supported by having high levels phosphorus and nitrogen.

Eutrophication

The process by which lakes and streams are enriched by nutrients, and the resulting increase in plant and algae growth. This process includes physical, chemical, and biological changes that take place after a lake receives inputs for plant nutrients--mostly nitrates and phosphates--from natural erosion and runoff from the surrounding land basin. The extent to which this process has occurred is reflected in a lake's trophic classification: oligotrophic (nutrient poor), mesotrophic (moderately productive), and eutrophic (very productive and fertile).

Evapotranspiration

The change in state of water from a liquid to a vapour back to the atmosphere.

Exotic Species

Plant or animal species introduced into an area where they do not occur naturally; non-native species. Examples area Eurasian Milfoil and Purple Loosestrife.

Extirpated

Taxa that no longer exist in the wild in British Columbia, but do occur elsewhere.

Fetch

The maximum distance across a lake where wind can travel without stopping.

Water Exchange Rate

Water exchange rate is the rate of water replacement in a lake. It's unit of measure is times/year. Conversely, retention time is the average length of time water resides in a lake, ranging from several days in small impoundments to many years in large seepage lakes. Retention time is important in determining the impact of nutrient inputs. Long retention times result in recycling and greater nutrient retention in most lakes. Calculate retention time by dividing the lake volume by the volume of water passing through the lake in on year.

Food Chain

The transfer of food energy from plants through herbivores to carnivores. An example: insect-fish-bear or the sequence of algae being eaten by small aquatic animals (zooplankton) which in turn are eaten by small fish which are eaten by larger fish and eventually by people or predators.

Herbivore

An animal that obtains its energy from consuming plants.

Herbaceous

Refers to a plant that has a non-woody stem and which dies back at the end of the growing season.

Hydrological Cycle

The natural movement of water on earth between condensation, precipitation, infiltration, runoff, and evapotranspiration.

Hypolimnion

Lowermost, noncirculating layer of cold water in a typical, thermally stratified lake, usually deficient in oxygen.

Infiltration

The movement of water below the earth's surface.

Isothermic

Lake conditions that present consistent or similar water temperatures at varying depths.

Kjeldahl Nitrogen

The most common analysis run to determine the amount of organic nitrogen in water. The test includes ammonium and organic nitrogen.

Liability Insurance

Covers the legal costs that an organization is responsible for if liabilities have occurred.

Limnetic

Of, pertaining to, or inhabiting the pelagic region of a body of fresh water.

Limnology

The scientific study of inland freshwater systems including lakes & reservoirs, rivers, creeks & streams, groundwater, and wetlands.

Littoral Zone

The lake zone between the shoreline and maximum depth aquatic plants can grow.

Macrophytes

Rooted aquatic plants found in the littoral zone of a lake.

Marginal Lakes

Lakes that historically transition between two mixing classes and often experience unusual mixing behaviour relative to their dominant mixing classification.

Meromictic Lakes

Lakes that are persistently stratified, often owing to their great depths or to the presence of a chemical gradient.

Mesomictic Lakes

Lakes with partial circulation, the lower denser layers never mixing with the upper.

Metalimnion

The central stratum between the epilimnion and hypolimnion in a stratified lake; the region occupied by the thermocline.

Mission Statement

A clear and concise description of your organization's reason for being.

Monomictic Lakes

One vertical mixing event per year.

Morphometry

Referring to the size and shape of a lake. Lake morphometry includes maximum and average depth, surface area, volume, shoreline length, etc.

Nekton

Animals capable of swimming independently of turbulence.

Neuston

Microscopic organisms adapted to living on the upper surface and underside of the surface film on the air-water interface.

Nitrate

An inorganic form of nitrogen important for plant growth. Nitrogen is in this stable form when oxygen is present. Nitrate often contaminates groundwater when water originates from manure pits, fertilized fields, lawns, or septic systems. High levels of nitrate- nitrogen (over 10 mg/L) are dangerous to infants and expectant mothers. A concentration of nitrate-nitrogen ($\text{NO}_3\text{-N}$) plus ammonium-nitrogen ($\text{NH}_4\text{-N}$) of 0.3 mg/L in spring will support summer algae blooms if enough phosphorus is present.

Nitrification

The conversion of ammonia (NH_3) to nitrate (NO_3^-).

Nitrite

A form of nitrogen that rapidly converts to nitrate (NO_3^-) and is usually included in the NO_3^- analysis.

Nitrogen Fixation

The conversion of atmospheric nitrogen (N_2) into an organic form usable by plants and other organisms; nitrogen is typically fixed by bacteria that live in nodules on the roots of legumes and similar plants.

Nutrients

Elements or substances such as nitrogen and phosphorus that are necessary for plant growth. Large amounts of these substances can become a nuisance by promoting excessive aquatic plant growth.

Nutrient Cycling

The movement of inorganic compounds from nutrient reservoirs through trophic levels and abiotic components.

Nutrient Pollution

The negative effects in lakes brought on by an excess of nitrogen and/or phosphorus, resulting in exponential algae growth.

Oligomictic Lake

Lakes that are persistently stratified in most years yet mix fully in others.

Oligotrophic

Relatively low productivity lakes due to low nitrogen and phosphorus levels. Waters of these lakes are usually quite clear due to limited algae and plant growth.

Orthophosphorus

Dissolved inorganic phosphorus.³ The dissolved inorganic form of phosphorus that is immediately bio-available for absorption by algae. Also, can be referred to as soluble reactive phosphorus (SRP).

Pathogen

A disease-producing agent; usually applied to a living organism. Generally, any viruses, bacteria, protozoans, or fungi that cause disease.

Pelagic

The main open water portion of a lake, beyond the extent of rooted vegetation and above the lake's profundal zone.

Periphyton

Algae and associated microorganisms growing attached to any submerged surface, such as rocks or plants.

Phosphorus

Key nutrient influencing plant growth. Soluble reactive phosphorus (orthophosphorus) is the amount of phosphorus in solution that is available to plants. Total phosphorus includes the amount of phosphorus in solution (reactive) and in particulate form.

Photosynthesis

The chemical process by which plants convert sunlight, carbon dioxide, and water to energy (sugars) to live and grow.

Phytoplankton

Microscopic plants found in the water. Algae or one-celled (phytoplankton) or multicellular plants either suspended in water (plankton) or attached to rocks and other substrates (periphyton). Their abundance, as measured by the amount of chlorophyll *a* (green pigment) in an open water sample, is commonly used to classify the trophic status of a lake. Numerous species occur. Algae are an essential part of the lake ecosystem and provides the food base for most lake organisms, including fish. Phytoplankton populations vary widely from day to day, as life cycles are short.

Plankton

Small plant organisms (phytoplankton and nanoplankton) and animal organisms (zooplankton) that float or swim weakly through the water.

Polymictic Lakes

Permanently or frequently mixed lakes

ppm

parts per million; units per equivalent million units; equal to milligrams per litre (mg/L).

Precipitate

A solid material which forms and settles out of water as a result of certain negative ions (anions) combining with positive ions (cations).⁸ Metals tend to precipitate in the presence of oxygen.

Precipitation

The movement of water from the atmosphere to the earth's surface.

Producer

An organism that uses light to synthesize new organic material from carbon dioxide.

Profundal (Benthic) Zone

The region occurring below the limnetic (pelagic) zone. The main sediment zone of a lake, the non-vegetated lake bottom sediment.

Quality Assurance

A variety of strategic, careful actions taken to ensure to the highest reasonable degree that methods are sound and followed correctly.

Quality Control

A specific system of maintaining conditions such that results are reliable.

Red Listed

Includes any indigenous species or subspecies (taxa) considered to be extirpated, endangered, or threatened in British Columbia. Extirpated taxa no longer exist in the wild in British Columbia, but do occur elsewhere. Endangered taxa are facing imminent extirpation or extinction. Threatened taxa are likely to become endangered if limiting factors are not reversed. Red-listed taxa include those that have been, or are being, evaluated for these designations.

Respiration

Complex process that occurs in the cells of plants and animals in which nutrient organic molecules such as glucose combine with oxygen and produce carbon dioxide, water, and energy. It is the reverse reaction of photosynthesis. Respiration consumes oxygen (O₂) and releases carbon dioxide (CO₂). It also takes place as organic matter decays.

Restoration

Measures undertaken to return a degraded ecosystem's functions and values, including its hydrology, plant, and animal communities, and/or portions thereof, to a less degraded ecological condition.

Retention Time

The number of years that a lake-volume equivalent of water remains in a lake.

Riparian Zone

The area of land bordering streams, lakes, and rivers containing moist soils and moisture-loving plants that is seasonally inundated with water.

Runoff

The movement of water across the earth's surface.

Secchi Disk

A 20 cm (8 inch) diameter plate with alternating quadrants painted black and white that is used to measure water clarity (light penetration). The disc is lowered into water until it disappears from view. It is then raised until just visible. An average of the two depths, taken from the shaded side of the boat, is recorded as the Secchi disk reading.

Sedimentation

The removal, transport, and deposition of detached soil particles by flowing water or wind. Accumulated organic and inorganic matter on the lake bottom. Sediment includes decaying algae and weeds, marl, and soil and organic matter eroded from the lake's watershed.

Seiche

Standing or oscillating wave in an enclosed or partially enclosed body of water.

Shoreline Development Ratio (or Index)

A number that relates the measured shoreline length of a given lake to the shoreline length of a perfectly circular lake of equal area.

SMART Goal

A specific, measurable, achievable, relevant, and time-delineated goal.

Society

An independent, democratic organization that is governed by the Societies Act and the society's own constitution and bylaws.

Spring Overturn

Seasonal springtime mixing of lake layers separated by density due to temperature.

Steward

A person entrusted with the care of something that requires support and attention in order to thrive.

Stewardship

The act of caring for something through dutiful planning and conscientious management.

Thermocline/Metalimnion

The zone in which the largest relative temperature change occurs with depth during lake thermal stratification.

Stratification

The layering of water due to differences in density. Water's greatest density occurs at 4°C (39°F). As water warms during the summer, it remains near the surface while colder water remains near the bottom. Wind mixing determines the thickness of the warm surface water layer (epilimnion), which usually extends to a depth of about 6.5 m (20 feet). The narrow transition zone between the epilimnion and cold bottom water (hypolimnion) is called the metalimnion or thermocline.

Summer Stratification

Seasonal summertime separation of lake water into layers based on density due to temperature.

Suspended Solids

A measure of the particulate matter in a water sample, expressed in milligrams per liter. When measured on inflowing streams, it can be used to estimate the sedimentation rate of lakes or impoundments.

SWOT Analysis

An exploration undertaken by an organization to identify its strengths, weaknesses, opportunities, and threats.

Thermocline/Metalimnion

The zone in which the largest relative temperature change occurs with depth during lake thermal stratification

Transpiration

The passage of water in plants from the roots through the vascular system to the stoma of the leaves and into the atmosphere.

Trophic Levels

Positions in a food web occupied by a group of organisms with similar feeding modes.

Trophic Status

the relative biological (algal) productivity of a water body usually assessed by measurement of specific quality parameters including chlorophyll a concentration, water clarity and rate of loss of oxygen from profundal waters.

Trophogenic Zone

The zone of a lake where sunlight reaches so photosynthesis/algae growth can occur. In this zone, the rate of photosynthesis is greater than the rate of respiration by phytoplankton. Also referred to as the photic zone.

Turbidity

Degree to which light is blocked because water is muddy or cloudy.

Turnover

(Or Overturn) Fall cooling and spring warming of surface water changes its density, and gradually makes temperature and density uniform from top to bottom. This allows wind and wave action to mix the entire lake. Mixing allows bottom waters to contact the atmosphere, raising the water's oxygen content. However, warming may occur too rapidly in the spring for mixing to be effective, especially in small, sheltered kettle lakes.

Vision

A simple inspirational statement that outlines an ideal that your organization aspires to.

Volunteer Burnout

A situation that arises when a volunteer group has too few members, resulting in the overworking of a small pool of volunteers who may become fatigued or disinterested in the group over time.

Volunteer Saturation

A situation that arises when a volunteer group has too many members, resulting in stress for group managers to coordinate, and insufficient opportunities for a large group of volunteers such that they may become disinterested in the group over time.

Warm Monomictic Lake

Ice-free lake with one period of complete circulation during the cold time of year; temperature stratification occurs in summer.

Water Quality

A term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose.

Watershed

The total area above a given point on a watercourse that contributes water to its flow; the entire region drained by a waterway or watercourse that drains into a lake or reservoir.

Zooplankton

Microscopic animals that live in the water column and feed on phytoplankton.