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GLOSSARY
OF SOME
ENVIRONMENTAL and RELATED TERMS

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ENVIRONMENTAL PROTECTION DEPARTMENT
IMPERIAL OIL LIMITED

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PREFACE

This glossary contains environmental and related technical terms frequently used in describing biological effects of pollution, air and water studies, bioassays, and other quality control procedures.

It does not attempt to include 'all' biologically oriented terminology, as the volume is enormous, and would defeat the purpose of a glossary of this kind. Similarly, in order to keep the glossary from becoming too large, the amount of information under each heading has been limited.

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A

ABIOTIC - pertaining to or characterized by the absence of life or living organisms.

ABYSSAL - inhabiting deep water (roughly below 1,000 metres).

ACCLIMATION - the process of becoming accustomed to a new climate or environment.

ACETYLCHOLINE - body chemical involved in the transmission of impulses across nerve junctions.

ACID, STEARIC - most common fatty acid occurring in natural animal and vegetable fats.

ACTIVATED SLUDGE - biological treatment procedure in which waste water is aerated in presence of micro-organisms, which utilize as food certain components in the waste water.

ACUTE TOXICITY - fast acting and lethal; 2 to 4 day exposure in a bioassay test accepted as covering period of acute lethal action.

ADAPTATION - a change in the structure, form or habitat of an organism resulting from a change in its environment.

ADDITIVE EFFECT - see Synergism

ADENOCARCINOMA - a malignant tumor in which the cells are arranged in the form of glands or gland-like structures.

AEROBIC ORGANISM - an organism that thrives in the presence of oxygen.

AEROSOL - a cloud of solid particles and/or liquid droplets smaller than 100 microns in diameter, suspended in a gas.

AIR, RESIDUAL - air that stays in the lungs after forceful expiration.

AIR, TIDAL - air that is carried to and from the lungs during a respiratory cycle.

ALGAE (pl. alga) - simple plants, often microscopic, containing chlorophyll. Most alga are aquatic and may produce a nuisance when conditions are suitable for prolific growth.

- ALLOPATRIC - refers to two species having different areas of distribution
- ALVEOLUS (pl. alveoli) - an air sac of the lungs formed by the terminal dilation of tiny air passageways.
- AMNIOTE - any reptile, bird or mammal.
- ANADROMOUS FISH - fish that spend a large part of their life at sea or in lakes, but ascend rivers or streams to spawn. Examples are shad, salmon, trout and striped bass.
- ANAEROBIC ORGANISM - an organism that thrives in the absence of oxygen.
- ANEMIA - a condition in which the number of red blood cells in the circulatory system is below normal.
- ANNELIDS (Annelida) - segmented worms. Most are marine, but many live in soil, or fresh water. Examples are earthworms, sludgeworms and leeches.
- ANOXIA - an abnormally low amount of oxygen in body tissues.
- ANTAGONISM - the phenomenon whereby the total effect of individual agents is less than the sum of the separate effects when taken independently.
- APHOTIC ZONE - area in a large body of water in which there is no light penetration from the surface.
- APPLICATION FACTOR - the degree of dilution applied to the LC50 (TLM) value of a bioassay test to ensure a safe discharge rate of effluent water into a receiving water.
- ARTHROPODA - largest phylum in animal kingdom; including crabs, insects, spiders, centipedes, etc.
- ASPHYXIA - the extreme condition caused by lack of oxygen and excess carbon dioxide in the blood.
- ASSIMILATION - the transformation of absorbed nutrients into body substances.
- ATELECTASIS - the collapse of all or part of a lung with resultant loss of functioning tissue.

ATP (adenosine triphosphate) - a coenzyme common to all organisms that provides a source of energy for a range of different cellular activities.

ATROPHY - a wasting away of the body from defective nutrition or other causes.

AUTOTROPHIC ORGANISM - an organism capable of constructing organic matter from inorganic substances.

AVES - the class of birds.

B

- BACILLARIOPHYCEAE - diatoms; class of algae; microscopic unicellular plants occurring singly or grouped into colonies. Abundant in marine and fresh water plankton and, along with various other algae types, provides basis for all life at sea. Past deposition of the cell walls has formed deposits known as diatomaceous earth.
- BACTERIA (Schizomycophyta) - group of unicellular or multicellular microscopic organisms lacking chlorophyll. Usually classified with plants rather than animals, but are distinct from both.
- BENTHOS - the aggregate of organisms living on or at the bottom of a body of water.
- BENTHIC REGION - the bottom of a body of water.
- BIOASSAY - a method of determining the concentration of a substance necessary to affect a test animal under stated laboratory conditions.
- BIOCHEMICAL OXYGEN DEMAND (BOD) - the amount of oxygen utilized by organisms in the biochemical oxidation of organic matter at a specified temperature.
- BIODEGRADATION - the metabolic utilization of a waste substance by micro-organisms.
- BIOLOGICAL TIME - an expression of time on a logarithmic scale when used in biological studies.
- BIOLYSIS - dissolution of a living organism; death.
- BIOMASS - that part of a given habitat consisting of living matter expressed either as weight of organisms per unit area, or as the volume of organisms per unit volume of habitat.
- BIOME - a complex of communities characterized by a distinctive type of vegetation and maintained under the climatic conditions of the region.
- BIOTA - all living organisms (plant and animal) of a region.
- BIOTIC POTENTIAL - the capacity of a population of animals or plants to increase in numbers under optimum environmental conditions.

BIOTYPE - group of organisms having the same hereditary characteristics.

BIVALVE - an animal with a hinged two-valve shell. Examples are the clam and oyster.

BLOOM - a readily visible concentrated growth or aggregation of plankton.

BLUE-GREEN ALGAE - see Cyanophyta.

C

CARCINOGEN - a substance capable of causing living tissue to become cancerous.

CARINATES - living birds capable of flight.

CATADROMOUS FISH - fish that feed and grow in fresh water, but return to the sea to spawn. Best known example is the American eel.

CHEMICAL OXYGEN DEMAND (COD) - a measure of the oxygen equivalent required for oxidation by chemical means of organic and inorganic matter in a waste-water, corrected for the influence of chloride present.

CHLOROPHYLL - green pigment found in all algae and higher plants; located in chloroplasts except in blue-green algae, where it is scattered in cytoplasm of cell. Several chlorophylls exist; chlorophyll 'a' is the only one common to all green plants.

CHLOROPHYTA - green algae; largest group of algae; very diverse distribution in marine and fresh water.

CHLOROPLAST - a specialized body containing chlorophyll in green plants; the site of photosynthesis.

CHLOROSIS - a disease condition in green plants marked by a yellowing or blanching of the leaves.

CHOLINESTERASE - a body enzyme which is essential for proper operation of the nervous system by hydrolyzing excess acetylcholine.

CHONDRICHTHYES - cartilaginous fishes; absence of true bone; almost exclusively marine. Examples are sharks, skates & rays.

CHRONIC TOXICITY - a slow acting or lingering lethal action; generally taken as longer than 4 days.

CILIARY FEEDING - feeding by filtering minute organisms from a current of water down through or towards the animal by cilia.

CILIUM (pl. cilia) - a fine cytoplasmic thread projecting from the surface of cells; capable of rhythmic movement.

CIRCADIAN RHYTHM - diurnal rhythm; a rhythmic change that occurs in an organism with a periodicity of approximately twenty-four hours.

CLEAN WATER ASSOCIATION - an association of organisms, usually characterized by many different species that are able to live only in a natural unpolluted environment, ie. a group of species highly susceptible to minute toxicant concentrations.

COARSE or ROUGH FISH - those species of fish considered to be of poor fighting quality when taken on tackle, and/or poor food quality. Examples include carp, goldfish, gar, sucker, bowfin, gizzard shad, and certain kinds of catfish.

COCCINA - small lumps of hardened oil often mixed with sand; found on or near the shore or floating on the water.

COELENTERATA - phylum of animals containing hydroids, jelly fish, sea-anemones, and corals. All aquatic, most marine. Body of simple plan and radially symmetrical.

COLD-BLOODED ANIMALS - see Poikilothermic animals.

COLIFORM GROUP - bacteria commonly found in fecal sewage waste and used as indicators of sanitary quality of water. Most common is Coliform bacillus.

COMMUNITY - an ecological term for any naturally occurring group of different organisms inhabiting a common environment and interacting with each other through a food chain.

CONSUMERS - organisms that consume solid particles of organic food material.

COPEPODA - minute marine animals occurring in the plankton in such numbers as to be important food for fish.

CRUSTACEA - animals with rigid outer covering, jointed appendages, and gills; most are aquatic. Examples are crayfish, crabs, and barnacles.

CUMULATIVE - used in pollution work to mean an increase in toxic strength by successive additions of a pollutant.

CUTICLE - a protective layer covering the surface of a leaf.

CYANOPHYTA (Myxophyta) - blue-green algae; primitive, microscopic, unicellular or multicellular colonies. Present in marine and fresh-water, often planktonic and often found in cold arctic water. Some blue-green algae produce animal toxins.

CYTOLYSIS - dissolution of cells by destruction of their surface membranes.

CYTOPLASM - the protoplasm of a cell, excluding the nucleus; usually a transparent, slightly viscous fluid.

DENSITY - DEPENDENT FACTORS - features of the environment which are directly related to the abundance of plants or animals. Examples are food, oxygen, breeding sites, etc.

DENSITY - INDEPENDENT FACTORS - features of the environment which are largely or entirely unaffected by changes in the density of the population. Examples include temperature, salinity, etc.

DESORPTION - release of a substance which has been taken into another substance by a physical process or held in concentrated form upon the surface of another substance.

DETENTION TIME - theoretical time required to displace the contents of a basin or settling facility at a given rate of flow.

DEVIATION, STANDARD - a measure of dispersion of values about a mean value.

DIAPYCNIS - period of suspended development or growth, accompanied by greatly decreased metabolism; common to some animals.

DIPLODIA - see Bacillariophyceae.

EUPHOTIC ZONE - an area in a large body of water that has sufficient light for photosynthesis, but sufficient light for animal respiration.

FLOCCULATION - a water purification process in which suspended air bubbles in the water are released by pressure reduction, carrying with them all minute particles which attach to the suspended particles and float to the surface of the water.

D

DAPHNIA - waterfleas; microscopic swimming crustaceans; form a major portion of the zooplankton population.

DEHYDROGENASE - an enzyme which accelerates the removal of hydrogen from metabolites and its transfer to other substances; plays important roles in biological oxidation-reduction processes.

DELIQUESCE - to dissolve gradually and become liquid by absorbing moisture from the air.

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DETENTION TIME - theoretical time required to displace the contents of a basin or settling facility at a given rate of flow.

DEVIATION, STANDARD NORMAL - a measure of dispersion of values about a mean value.

DIAPAUSE - period of suspended development or growth, accompanied by greatly decreased metabolism; common to some animals.

DIATOM - see Bacillariophyceae.

DISPHOTIC ZONE - an area in a large body of water that has insufficient light for photosynthesis, but sufficient light for animal responses.

DISSOLVED AIR FLOATATION (DAF) - a waste water clarification procedure in which pressurized air dissolved in the water is released by pressure reduction, causing formation of minute bubbles which attach to the suspended particles and float them upward to the water surface.

DISSOLVED SOLIDS - substances either organic or inorganic that are dissolved in a waste stream and which constitute the residue when a sample is evaporated to dryness.

DOSE - used in toxicology to mean the amount of toxicant injected or ingested into the organism.

DYSPHEA - difficult or laboured breathing.

DYSTROPHIC LAKES - brown-water lakes with a high humus content and low lime content; often lacking in nutrients.

E

- EARTH, DIATOMACEOUS - a chalky, siliceous material formed from past deposition of countless numbers of diatoms.
- ECHINODERMATA - marine animals having a radiating arrangement of parts. Examples include starfish, sea urchins, sea cucumbers, etc.
- ECOLOGY - study of the relation of animals and plants to their surroundings.
- ECOSYSTEM - a community of organisms interacting with one another, plus the environment in which they live and with which they also interact; a system consisting of producers, autotrophic organisms (mainly green plants); consumers, heterotrophic organisms (animals); and decomposers, (chiefly bacteria and fungi); all of these activities being influenced by physical conditions of the environment.
- ECOTYPE - a subspecies or race of organism that is especially adapted to a particular set of environmental conditions.
- EDEMA - a condition caused by abnormally large amounts of fluid in the intercellular tissue spaces of the body.
- EFFUSION - escape of a fluid into a tissue or part, usually caused by rupture of a vessel.
- EMPHYSEMA - a swelling due to the presence of air, usually excess or additional air.
- ENDEMIC - confined to a given region.
- ENDOCYTOSIS - a condition or disease arising from the inclusion within a cell of a material which does not properly belong there.
- ENTOMOLOGY - the study of insects.
- ENVIRONMENT - the sum of all external influences and conditions affecting the life and development of an organism.
- ENZYME - a protein which is a catalyst. ie. a substance which promotes chemical change to a substrate without itself being used up in the reaction.

- EPIDEMIOLOGY - science dealing with the factors involved in the distribution and frequency of a disease process in a population.
- EPILIMNION - that region of a body of water that extends from surface to the thermocline (area of large temperature change), and does not have a permanent temperature stratification, (see Stratification).
- EPIPHYTE - plant attached to another plant not growing parasitically upon it, but merely using it for support.
- EPITHELIUM - a layer of cells that covers an external or internal surface.
- ESTUARY - commonly an arm of the sea at the lower end of a river.'
- ETHOLOGY - study of behaviour of an animal in its natural environment.
- EULITTORAL ZONE - the shore zone of a body of water between the limits of water-level fluctuation.
- EUPHOTIC ZONE - the lighted region that extends vertically from the water surface to the level at which photosynthesis fails to occur because of ineffective light penetration.
- EURYHALINE - able to tolerate wide variation of osmotic pressure in the environment.
- EURYTHERMOUS - able to tolerate wide variations of temperature in the environment.
- EURYTOPIC ORGANISMS - organisms with a wide range of tolerance to a particular environmental factor.
- EUTROPHICATION - the enrichment of a body of water by increased input of nutrients; process may occur naturally or through inflow of effluent waste.
- EUTROPHIC WATER - water with a rich supply of nutrients; may support large organic production such as algae blooms which can suffocate the natural populations.

F

FACULTATIVE AEROBE - an organism that although fundamentally an anaerobe can grow in the presence of free oxygen.

FACULTATIVE ANAEROBE - an organism that although fundamentally an aerobe, can grow in the absence of free oxygen.

FALL OVERTURN - a physical phenomenon that may take place in a body of water during the early autumn. The sequence of events leading to fall overturn include: cooling of surface waters; density change in surface waters producing convection currents from top to bottom; circulation of the total water volume by wind action and vertical temperature equality 4°C . The overturn results in a uniformity of the physical and chemical properties of the water.

FAUNA - the entire animal life of a region.

FINGERLING - a young fish. Commonly used for young salmon and trout.

FLATWORMS (Platyhelminthes) - non-segmented worms; flattened top to bottom and commonly found in water or as parasites in plants and animals.

FLOC - the insoluble particles formed in a waste flow by the addition of a flocculant which entrains suspended solids and removes them by sedimentation from the waste flow.

FLORA - the entire plant life of a region.

FOOD CHAIN - chain of organisms existing in any natural community through which energy is transferred. Each link in the chain feeds on and obtains energy from the one preceding it, and in turn is eaten by and provides energy for the one following it. The number of links is usually three or four. At the beginning of the chain are the green plants - the producer level. All other levels are consumer levels. At each trophic or energy level much of the energy obtained is lost in respiration and thus fewer organisms can be supported at the succeeding one. All the food chains in a community make up the food web.

FORAMINIFERANS - a group of Protozoa, mostly marine, which form multi-chambered shells of lime. Foraminiferan shells form large parts of chalk and deep sea oozes.

FRY - the stage in the life of a fish between the hatching of the egg and the absorption of the yolk sac. From this stage until they attain a length of one inch, the young fish are considered 'advanced fry'.

FUNGI (Mycophyta) - group of plants lacking chlorophyll; unicellular or possessing tubular filaments. Examples are moulds, yeasts, mushrooms, rusts, etc.

G

GAME FISH - those species of fish considered to possess sporting qualities on fishing tackle. Examples of fresh-water game fish include salmon, trout, muskellunge, walleye, pike, and bass.

GILLS - respiratory organ of aquatic animals through which the interchange of oxygen and carbon dioxide by diffusion occurs between water and blood.

GILL FILAMENTS - threadlike structures constituting the gills of a fish.

GILL LAMELLAE - subdivision of tissue on gill filaments. Respiratory exchange takes place in lamellae.

GILL SUFFOCATION - clogging of the gill filaments in a fish.

GRAVIMETRIC - relating to measurement by weight.

GREEN ALGAE - see Chlorophyta.

GRILSE - a mature, undersized, male salmon returning to fresh water, usually after one year of sea life, to spawn for the first time.

H

HABITAT - a region with a particular kind of environment inhabited by organisms. eg. sea shore.

HAEMOGLOBIN - a protein found in red blood cells of vertebrates responsible for oxygen transport to all parts of the body.

HALOPHYTE - plant that tolerates very salty soil, a condition typical on shores of river estuaries.

HAZARDOUS SUBSTANCE - an element or compound which, when discharged in any quantity into the environment, presents an imminent and substantial danger to the public health and welfare.

HERBICIDE - a substance intended to control or destroy vegetation; often selective for particular plant types.

HERBIVORE - an organism that feeds on vegetation.

HETEROTROPHIC ORGANISM - an organism that is dependent on organic matter for food.

HISTOLOGY - the study of the anatomy of tissues and their microscopic cellular structure.

HISTOLYSIS - dissolution of tissue.

HOLOMICTIC LAKES - lakes that are completely circulated to the deepest parts at time of winter cooling.

HOLOPHYTIC - synthesizing of organic compounds from inorganic components, using the energy of sunlight by means of chlorophyll.

HOLOZOIC - feeding in an animal-like manner.

HOMEOSTASIS - the tendency of an animal's physiological system to maintain internal stability.

HOMEOTHERMIC - 'warm-blooded'; maintaining a constant body temperature, raised above that of usual surroundings. Characteristic of birds and mammals.

HYDROPHILIC - characteristic of a substance denoting strong affinity for water.

HYDROPHOBIC - characteristic of a substance denoting a lack of affinity for water. Such a substance usually has a strong affinity for oil.

HYGROSCOPIC - readily absorbing and retaining moisture from the atmosphere.

HYPERPLASIA - increase in amount of tissue by increase in number of cells which individually keep their usual size.

HYPERTROPHY - increase in size of tissue by increase in size of individual cells without increase of their numbers.

HYPOLIMNION - the region of a body of water that extends from the thermocline to the bottom of the lake, and is removed from surface influence. (see Stratification, Thermocline).

I

ICHTHOLOGY - the study of fishes.

INCIPIENT LETHAL LEVEL - that level of the environmental parameter beyond which 50% of the population cannot live for an indefinite period.

INDICATOR ORGANISMS - species of aquatic organisms which can serve as indices of pollution. Examples include stonefly nymph, mayfly naiad, caddisfly larvae, damselfly nymph, dragonfly nymph, etc.

INDIGENOUS (of organisms) - native to a particular area, not introduced.

INSECTICIDE - a substance intended to check or destroy insects; may be selective for a particular species or group of species.

INTERCEPTOR BASIN - a basin used as a receiver to collect the waste stream to permit flow and composition equilization into a treatment facility.

INTERCOSTAL - situated between ribs.

INTERNAL ENVIRONMENT - medium in which body cells are bathed, ie. the inter-cellular fluid. In equilibrium with blood stream in vertebrates, it is normally kept highly constant in composition (homeostasis).

INTERSTITIAL - pertaining to or situated in the space between cells.

INTERTIDAL ZONE - pertaining to the littoral region that is between the low and high water mark.

INVERTEBRATES - animals without backbones.

IN VITRO - by derivation, means 'in glass'. In general, applied to any biological study done under controlled laboratory conditions.

IN VIVO - any biological process occurring in its natural environment.

IRRITABILITY - responsiveness to change in environment by complex, adaptive activity; a universal property of living things. An example would be the nervous activity of animals.

K

KELP - a large, brown seaweed.

KINAESTHETIC - detecting movement.

KINESIS - locomotory movement of an organism or cell in response to a stimulus such that the speed depends on the strength of stimulus, but stimulus does not control direction of movement.

KREBS CYCLE - complex cycle of enzyme-controlled reactions in which ATP, a source of energy is synthesized. The cycle is the final step in oxidation of glucose and takes place in the cell.

L

- LARVA - pre-adult form in which some animals hatch from eggs; capable of survival on its own, usually incapable of sexual reproduction and distinctly different in form from sexually mature adult.
- LATERAL LINE SYSTEM - system of sense organs present in aquatic vertebrates, in pores arranged in a line down each side of the body and in patterns on the head; detects pressure changes and vibrations in water.
- LC50 - see Median Lethal Concentration.
- LD50 - see Median Lethal dose.
- LEACH - to dissolve out by the action of a percolating liquid.
- LENTIC ENVIRONMENT - standing water, and its various inter-grades. Examples are lakes, ponds, and swamps.
- LESION - damage or a change in function or structure of an organ.
- LETHAL - causing death, or sufficient to cause death by direct action.
- LETHARGIC STATE - an abnormal state or a disorder, characterized by having the faculties and energies suspended in an organism.
- LIFE CYCLE - progressive series of changes undergone by an organism or lineal succession of organisms, from fertilization to death.
- LIMNETIC ZONE - the open water region of a lake. This region supports plankton and fish as the principal plants and animals.
- LIMNOLOGY - the study of fresh waters and their inhabitants.
- LITTORAL - inhabiting bottom of sea or lake near shore, roughly within a depth to which light and wave action reach. For sea, usually taken as between high tide mark and 200 metres; for lakes, approximately down to 10 metres.
- LOTIC ENVIRONMENT - running waters, such as a stream or river.

M

MACRO-ORGANISM - any organism visible to the naked eye.

MALIGNANT - tending to become progressively worse, and if unchecked could result in death.

MEDIAN EFFECTIVE CONCENTRATION (EC50) - the concentration of a substance in a suitable diluent that evokes a 50% response (may be lethal or sublethal) in a sample of test animals within a prescribed exposure interval.

MEDIAN EFFECTIVE DOSE (ED50) - a term corresponding to EC50, universally used in pharmacology and toxicology, where 'D' represents dose, the amount of substance taken inside the animal by injection or ingestion, that evokes a 50% response.

MEDIAN LETHAL CONCENTRATION (LC50 or TLm) - the concentration of a substance in a suitable diluent that evokes a 50% mortality in a sample of test animals within a prescribed exposure interval (usually 48 or 96 hours).

MEDIAN LETHAL DOSE (LD50) - a term corresponding to LC50, universally used in pharmacology and toxicology, where 'D' represents dose, the amount of substance taken inside the animal by injection or ingestion, that evokes a 50% mortality.

MEDIAN LETHAL TIME (LT50) - the time to death of 50% of the individuals in a sample of test animals within a prescribed exposure interval.

MEDIAN TOLERANCE LIMIT (TLm) - see Median Lethal Concentration. TLm corresponds to LC50 and is used primarily in U.S.A.

MEDUSA - free-swimming form of Coelenterate; bell or umbrella shaped, swimming by pulsations of body. Example is a jelly-fish.

MEROMICTIC LAKE - a lake in which dissolved substances create a gradient of density difference in depth, preventing complete mixing or circulation of the water.

MESOPHILIC - a characteristic denoting an organism that thrives at medium temperatures (80°F to 100°F).

METAPLASIA - a change in the cells of a tissue to form which is not normal for that tissue.

METASTABLE - marked only by a slight margin of stability.

MICROFAUNA - all the animal life in a region that are of a microscopic size.

MICRO-ORGANISM - any minute organism invisible or barely visible to the naked eye.

MICRON - one millionth (10^{-6}) of a metre.

MIXOHALINE WATER - brackish water.

MOLLUSCA - a large phylum of animals commonly called shellfish. All have a soft unsegmented body protected in most cases by a calcareous shell. Examples are snails, mussels, clams, and oysters.

MORBIDITY - the occurrence of a disease state.

MORPHOLOGY - the study of form and structure of living organisms.

MORTALITY (percent) - ratio of number of deaths over total number in population, times 100.

MOTILE - exhibiting, or capable of spontaneous movement.

MOTION, BROWNIAN - the rapid random motion of small particles due to bombardment by surrounding molecules which are in thermal motion.

MOUSSE - a water-in-oil emulsion.

MYCOLOGY - the study of fungi.

N

NEBULIZE - to reduce to a fine spray.

NECROSIS - death of tissue.

NEKTON - swimming animals of pelagic zone in sea or lake.

NEMATODA - unsegmented roundworms; some are free living in soil, fresh water and salt water; some are parasitic in plant and animal tissue.

NEOPLASM - any abnormal growth, such as a tumor.

NEOTENY - persistence of the form of an early stage of development, either temporary, eg. climatically delayed development, or permanent.

NERITIC - inhabiting the sea over the Continental Shelf; arbitrarily taken to be sea where it is shallower than 200 metres.

NEURAL - concerned with the nervous system.

NEUROHUMORAL - acting by transmission of a nerve impulse across a synapse by secretion of minute amount of chemical substance from the nerve fibre.

NEUSTON - organism resting or swimming on the surface film of water.

NICHE - the role of an organism (plant or animal) in the community; term stresses the function of each organism rather than its physical place in the habitat.

NIDICOLOUS BIRDS - those which hatch in relatively undeveloped state and stay in the nest some time after hatching.

NIDIFUGOUS BIRDS - those which hatch well-developed and leave the nest immediately.

NUNATAK - see Refugium.

NYMPH - young stage of insect; resembling adult in some features but sexually immature and with underdeveloped wings.

OCEANIC - inhabiting the sea where it is deeper than 200 metres.

OCEANOGRAPHY - the study of the physical, chemical, geological, and biological aspects of the sea.

OLFACTORY - pertaining to the sense of smell.

OLIGOTROPHIC (of lakes) - poorly productive in terms of organic matter formed; nutrient supply low.

OMNIVOROUS - eating a diet of both plants and animals.

ONTOGENY - the whole course of development during an individual's life history.

OPERCULAR CAVITY - space inside gill cover.

ORGANIC DETRITUS - the particulate remains of disintegrated plants and animals.

OSTEICHTHYES - bony fish.

OVERTURN - see Fall Overturn, and Spring Overturn.

OXYGEN-DEBT - a phenomenon that occurs in an organism when available oxygen is inadequate to supply respiratory needs, resulting in the accumulation of metabolic by-products in the organism's body.

OXYHAEMOGLOBIN - oxygenated haemoglobin.

P

- PAEDOGENESIS - reproduction in larval or other pre-adult form.
- PARASITE - an organism that lives on or in a host organism from which it obtains nourishment at the expense of the latter during all or part of its existence.
- PARASITOLOGY - the study of plants and animals which live on others.
- PARR - a young salmon having dark crossbars on its sides; may also refer to young of certain other fish, as the codfish.
- PARTS PER MILLION (ppm) - unit commonly used to designate the concentration of a substance in a waste water in terms of weight. Ppm is almost synonymous with milligrams per litre (mg/l), which is replacing the term ppm.
- PASSERINES - a major group of birds; perching with one toe backwards and three forward. Contains about half the known species of birds, including most common inland ones.
- PATHOGEN - any disease-producing organism or material.
- PATHOGENESIS - the production or the mode of origin and development of a disease condition.
- PATHOLOGY - the study of cells exhibiting deranged functions.
- PELAGIC - inhabiting, or living in close association with (as in the case of sea birds) the large mass of water in a sea or lake.
- PELAGIC ZONE - the mass of water in a sea or lake, in contrast to the sea or lake bottom; commonly called the free-water region. Pelagic animals and plants are divided into plankton and nekton (fish, aquatic mammals, etc.)
- PERIPHYTON - the association of aquatic organisms attached to various surfaces projecting above the bottom.
- PHAEOPHYTA - brown algae (seaweed); marine, usually abundant in cold water; benthic, common inhabitants of intertidal zone.
- PHAGE (Bacteriophage) - a virus that parasites bacteria.
- PHEROMONE - a chemical substance which is released by an animal and influences the behaviour of another individual of the same species, eg. sex odours.

- PHOSPHORYLATION - combination of organic acceptor molecule (eg. sugar) with phosphate, resulting in formation of high energy bonds. Process is carried out in cell. Most important high energy compound is A.T.P., universally present in living organisms.
- PHOTOSYNTHESIS - the formation of carbohydrate from carbon dioxide and water in the presence of chlorophyll and light, in plant tissues.
- PHOTOTROPISM - movement in response to a light gradient.
- PHYLUM - one of the major groups used to classify animals.
- PHYSIOLOGY - study of the processes which go on in living organisms.
- PHYTOPLANKTON - the plant section of plankton, that live unattached in water. Found near or on surface of water. Contains chlorophyll, and through photosynthesis, produce major part of earths organic matter.
- PHYTOTOXIC - harmful to plants.
- PINNIPEDIA - seals, walruses, sea lions; specialized aquatic mammals.
- PISCES - fish.
- PLAGIOCLIMAX - type of plant community in equilibrium under existing environmental conditions, but which has not achieved the natural climax state.
- PLANKTON - animals and plants of sea or lakes which float or drift almost passively. They are mostly very small, the smallest being diatoms. Plankton is found mainly near the surface where the plants get suitable illumination. Plankton is of great ecological and economic importance as it is the primary food level from which all other aquatic animals derive their energy.
- PLASMOLYSIS - the shrinking of the cytoplasm away from the wall of a living cell due to water loss by osmotic action.
- PLATYHELMENTHES - see Flatworms.
- PLECOPTERA - stoneflies. Small order of insects with aquatic nymphs; very sensitive to trace amounts of pollution in a fast moving stream and therefore used as indicator organisms.

PNEUMOCONIOSIS - a fibrous reaction in the lungs caused by the reaction of certain inhaled dusts.

POIKILOTHERMIC - 'cold blooded', but actually with varying body temperature, which approximately follows that of the surroundings. Characteristic of all animals except birds and mammals.

POLLUTION - an event or a continuing circumstance whereby there are introduced into the environment of air, land, and water, substances that may adversely affect the balance of nature and human well being.

POLYP - sedentary form of coelenterate. eg. hydra.

POPULATION - a community of potentially breeding individuals at a given locality.

POPULATION CYCLE - rise and fall of population numbers under natural conditions with regular periodicity.

PORIFERA - sessile animals that fasten to piers, pilings, rocks, etc. Commonly called sponges.

POTENTIATION - see Synergism.

POTOMOLOGY - the study of the physical, chemical, geological, and biological aspects of rivers.

PRODUCERS - organisms that synthesize their own organic substances from inorganic substances.

PRODUCTIVITY (of an ecosystem) - primary productivity is the rate at which energy from light is absorbed and utilized with carbon dioxide in the production of organic matter in photosynthesis. Net production is given by the amount of organic matter formed in excess of that used in respiration. It represents food potentially available to the consumers of the ecosystem.

PRODUCTIVITY (of an organism) - a time-rate unit of the total amount of biomass produced by the organism.

PROFUNDAL ZONE - the deep area beyond the depth of effective light penetration in a body of water.

PROTISTA - all organisms of simple biological organization. Examples are algae, bacteria, fungi and protozoa.

PROTOZOA - animals consisting either of a single cell or of aggregates of cells, each of which performs all the essential functions of life. They are mostly microscopic and largely aquatic.

PUPA - stage between larva and adult of some insects, in which locomotion and feeding cease, but great developmental change occurs.

R

RADIOLARIA - group of marine planktonic Protozoa.

RATITES - flightless birds.

REDD - a type of fish-spawning area associated with running water and clean gravel. Fishes that utilize this type of spawning area include some trout, salmon and minnows.

REDUCERS - organisms that digest food outside the cell wall by means of enzymes secreted for this purpose. Examples are fungi, bacteria, protozoa, and non-pigmented algae.

REFUGIUM - a locality which has escaped drastic alteration following climatic change, in contrast to the region as a whole.

REGRESSION - a trend or shift toward a mean. A regression line or curve is one that best fits a particular set of data according to some principle.

ROTIFERS (Rotatoria) - microscopic aquatic animals, primarily free living, fresh-water forms that occur in a variety of habitats.

S

SAPROPHYTE - an organism which obtains organic matter in solution from dead and decaying tissues of plants and animals.

SCAVENGER - an organism that feeds upon decomposing organic matter.

SCUDS (Amphipods) - macroscopic aquatic crustaceans that are laterally compressed. Great numbers are consumed by fish.

SCYPHOZOA - jelly-fish.

SEDIMENTATION - the process of deposition of suspended matter from a waste water, by gravity.

SEEDING - introduction of micro-organisms into a biological oxidation unit, to minimize the time required to build a biological sludge.

SESSILE - fixed to the substratum; sedentary.

SHELLFISH - common name for shelled molluscs and crustaceans.

SHELLFISH POISON - a poison present in shellfish that have fed upon certain marine phytoplankters in which the toxic principles exist. The shellfish concentrates the poison without harmful effects to itself, but man is poisoned through consumption of the toxic flesh.

SMOLT - a young, silvery salmon migrating to the sea; between the stages of parr and grilse.

SPASM - an involuntary and abnormal muscular contraction, usually sudden and forceful.

SPAWNING - depositing of eggs in water by female, and fertilizing of these by the male.

SPECIALIZED - having specialized adaptations to a particular habitat or mode of life, which tend to restrict the range of habitat which can be occupied, and the mode of life which can be followed.

SPECIATION - origin of species.

SPECIES - a natural population, or group of populations that are reproductively isolated from other populations with which they might breed.

SPILL, MINOR OIL - less than 100 gallons in internal waters, or less than 1,000 gallons in offshore waters.

SPILL, MODERATE OIL - 100 gallons to 10,000 gallons in the internal waters and 1,000 to 100,000 gallons in offshore waters.

SPILL, MAJOR OIL - more than 10,000 gallons in internal waters, or more than 100,000 gallons in offshore waters.

SPONGES - see Porifera.

SPORE - a reproductive element of many lower organisms.

SPRING OVERTURN - a physical phenomenon that may take place in a body of water during the early spring; caused by melting of ice cover, warming of surface waters, density change in surface waters producing convection currents from top to bottom, circulation of the total water volume by wind action, and vertical temperature equality of 4°C. The overturn results in a uniformity of the physical and chemical properties of the water.

STANDING CROP - the biota present in an environment on a selected date.

STENOHALINE - unable to tolerate wide variation of osmotic pressure of environment.

STENOTHERMOUS - unable to tolerate wide variation of temperature of environment.

STENOTOPIC ORGANISMS - organisms with a narrow range of tolerance for a particular environmental factor.

STRATIFICATION (of a lake) - a phenomenon in which a distinct density gradient is produced in a body of water by the warming of the surface layers. Stratification sets in during the summer months and consists of three layers: the epilimnion - the wind-stirred and largely homogenous water layer near the surface; the thermocline - the layer of rapid vertical temperature change (a thermal gradient of at least 1°C per metre); and below the thermocline, the hypolimnion - the relatively stagnant water mass near the bottom. Stratification results in considerable tem-

perature changes in the water, stagnation, and lack of circulation, all of which have a profound effect upon the biota of the lake.

SUBLETHAL - below the level which directly cause death within a prescribed exposure interval.

SUBLITTORAL ZONE - the part of the shore from the lowest water level to the lower boundary of plant growth.

SWIMBLADDER - an internal, membraneous, gas-filled organ of many fishes. It may function as a hydrostatic or sense organ, or as part of the respiratory system.

SYMBIOSIS - two organisms of different species living together, one or both of which may benefit and neither is harmed.

SYNAPSE - the physiological junction between nerve-cells.

SYNERGISM - a situation in which the combined action of two or more agents acting together is greater than the sum of the action of these agents separately.

SYSTEMATICS - the science of organism classification.

SYSTEMIC - relating to the body as a whole, rather than to its individual parts.

T

TAXIS - Locomotory movement of an organism or cell in response to a directional stimulus, eg. chemotaxis, geotaxis, phototaxis.

TELEOSTEI - a subclass containing the great majority of existing fish (20,000 species).

THERMOCLINE - a layer in a body of stratified water characterized by a rapid vertical temperature change (ie. a thermal gradient of at least 1°C per metre).

THERMOPHILIC - characteristic denoting an organism that thrives at higher temperatures (120°F to 130°F).

THRESHOLD - that intensity of stimulus below which there is no response by a given irritable tissue.

THRESHOLD ODOUR CONCENTRATION - the least amount of a substance in water that is detectable by smell.

TL_m - see Median Tolerance Limit.

TOLERANT ASSOCIATION - an association of organisms capable of withstanding adverse conditions within the habitat. It is characterized by a reduction in susceptible species (from a clean water association) and an increase in individuals from tolerant species.

TOXICOLOGY - the study of poisons, their preparation, identification, physiologic action and antidotes.

TRICHOPTERA - caddis flies (insects); the aquatic larvae live in cases in fast-flowing waters and are used as indicators.

TRICKLING FILTER - a biological oxidation unit consisting of a bed or rack over which waste water is distributed for contact with the biological growths which develop on the filter medium.

TROPHIC LEVEL - each successive level of nourishment represented by the links of the food chain is known as a trophic level. The plant producers within an ecosystem constitute the first trophic level, the herbivores form the second trophic level, and the primary carnivores represent the third level. Additional links in the food chain constitute further trophic levels.

W

WARM and COLD WATER FISH - examples of warm water fish include black bass, sunfish, catfish, gar, etc. Cold water fish include salmon, trout, whitefish, etc. The temperature factor determining distribution is set by adaptation of the eggs to warm or cold water.

WARNING (Aposematic) COLOURATION - conspicuous markings on an animal which is poisonous, distasteful, etc. that keep predators from attacking.

Z

ZOOGLEA - bacteria embedded in a jelly-like matrix formed as the result of metabolic activities.

ZOOID - member of a colony of animals which are joined together.

ZOOLOGY - the study of animals.

ZOOPLANKTON - protozoa and other animal micro-organisms living unattached in water, and, along with phytoplankton, make up the planktonic populations of the lakes and seas.

