



Oasis — A fertile or green spot in a desert or wasteland, made so by the presence of water.

Obligate Hydrophytes — Species that are found only in *Wetlands*, e.g., cattail (*Typha latifolia*) as opposed to *Ubiquitous Hydrophytes*, species that grow either in wetland or on upland areas — e.g., red maple (*Acer rubrum*).

Observation Well — A well used to monitor changes in water levels of an aquifer and to obtain samples for water quality analyses. Also see *Wellhead Protection Program*.

Obsidian Hydration Studies — A method of determining the approximate age of an obsidian artifact by the measurement of the thickness of a microscopically visible “rind” on a flaked edge, resulting from the absorption of water.

Obstruction — Includes, but is not limited to, any dam, wall, wharf, embankment, levee, dike, pile, abutment, protection, excavation, channelization, bridge, conduit, culvert, building, wire, fence, rock, gravel refuse, fill, structure, vegetation or other material in, along, across or projecting into any watercourse which may alter, impede, retard or change the direction and/or velocity of the flow of water, or due to its location, its propensity to snare or collect debris carried by the flow of water, or its likelihood of being carried downstream.

OCAP (Operating Criteria and Procedures) [Nevada] — Operating criteria originally instituted in 1967 for water diversions and irrigation of the *Newlands (Irrigation) Project [Nevada]* in the Carson River Basin and designed to maximize use of Carson River flows to satisfy project requirements and minimize diversions from the Truckee River. Current OCAP requirements for this project were set in 1988 and according to *Public Law 101-618 (the Negotiated Settlement)* are to remain in effect at least through December 31, 1997 at which time a new *Truckee River Operating Agreement (TROA) [Nevada and California]* will be implemented.

Occluded Front — The widespread (cloudiness and precipitation) that results when the faster-moving cold front overtakes the warm front and lifts it aloft, often stalling in the process.

Ocean — Generally, the whole body of salt water which covers nearly three fourths of the surface of the globe. The average depth of the ocean is estimated to be about 13,000 feet (3,960 meters); the greatest reported depth is 34,218 feet (10,430 meters), north of Mindanao in the Western Pacific Ocean. The ocean bottom is a generally level or gently undulating plain, covered with a fine red or gray clay, or, in certain regions, with ooze of organic origin. The water, whose composition is fairly constant, contains on the average 3½ percent of dissolved salts; of this solid portion, common salt forms about 78 percent, magnesium salts 15–16 percent, calcium salts 4 percent, with smaller amounts of various other substances. The density of ocean water is about 1.026 (relative to distilled water, or pure H₂O). The oceans are divided into the Atlantic, Pacific, Indian, Arctic, and Antarctic Oceans. See *Oceans (World)*.

Oceanaut — A person trained to live in underwater installations and conduct, assist in, or be a subject of scientific research. Also called *Aquanaut*.

Ocean Discharge Waiver — A variance from *Clean Water Act (CWA)* requirements for discharges into marine waters.

Ocean Dumping Permit — Under the *Ocean Dumping Ban Act* of 1988, which amended the *1972 Marine Protection, Research, and Sanctuaries Act (MPRSA)*, no new permits for the dumping of sewage sludge or industrial waste are allowed, and all holders of existing permits were forced to cease ocean dumping of these materials on December 31, 1991.

Ocean Floor Sediment — Unconsolidated materials that settle and accumulate on the floor of the deep ocean. These materials can be fine muds and clays, quartz grains, dust, glacial debris comprised of microscopic shells of plants or animals, and substances precipitated directly from seawater.

Oceans (World) — The oceans of the world include the North and South Atlantic Oceans, the North and South Pacific Oceans, the Arctic Ocean, the Antarctic Ocean, and the Indian Ocean. Figuratively, these are referred to as the *Seven Seas*.

Ocean Thermal Energy Conversion (OTEC) — Electricity generation by making use of the temperature difference (as much as 20°C, or 68°F, in the tropics) between the top and bottom layers of the ocean to convert a fluid to vapor, which in turn powers a turbine generator. Low efficiency and saltwater corrosion are two current technical problems with the implementation of OTEC.

- Ocean Thermal Gradients** — The temperature difference between deep and surface water in the oceans.
- Oceanography** — The science relating to the study of the ocean.
- Odor Threshold** — The minimum odor of a water sample that can just be detected after successive dilutions with odorless water. Also referred to as *Threshold Odor*.
- Off-Channel Use** — See *Offstream Use*.
- Off-Line Reservoir** — A reservoir constructed to the side of the main canal, usually in a natural drainage channel used to store surplus water runoff during the winter season for use during the irrigation season.
- Off-Piste** — (Sports) Existing or taking place on snow that has not been compacted into tracks.
- Off-Site Use** — A use of water away from the point of diversion or withdrawal.
- Offset** — (Irrigation) The difference between the controlled variable and the referenced input, for example, in a canal system, the difference between the actual water level in the canal and the water level at design flow.
- Offshore** — Situated off the shore but within waters under a country's control, as offshore fisheries.
- Offstream (Off-Stream) Use** — (1) Water withdrawn from a surface water source for uses such as irrigation, municipal and industrial (*M&I*) water supply, steam electric power generation, etc. (2) Water withdrawn or diverted from a ground or surface-water source for use at another place. Examples of offstream use include public-water supply, industry, irrigation, livestock, thermoelectric power generation, and other uses. Also referred to as *Off-Channel Use*.
- Ogee** — A reverse curve shaped like an elongated letter *S*. The downstream faces of overflow dams are often made in this shape.
- Oil Skimmer** — A device that collects and removes oil from a water surface. Ropes, belts, rotating drums, and similar devices are used as adhering surfaces for the oil, and the oil is pressed out or scraped off into a holding tank.
- Oil Slick** — A layer of oil floating on the surface of water.
- Oil Spill** — An accidental or intentional discharge of oil which reaches bodies of water. Can be controlled by chemical dispersion, combustion, mechanical containment, and/or adsorption. Spills from tanks and pipelines can also occur away from water bodies, contaminating the soil, getting into sewer systems and threatening underground water sources.
- Old** — (1) (Geology) Having become slower in flow and less vigorous in action. Used of a river. (2) (Geography/Topography) Having become simpler in form and of lower relief; well advanced toward reduction by running water to the lowest level possible. Used of topographic features or a landform.
- Old Field** — Cropland that is no longer used to produce an agricultural crop and that has been allowed to revert to natural plant cover.
- Old Growth** — (1) Forests that either have never been cut or have not been cut for many decades. (2) Forests characterized by a large percentage of mature trees. (3) A late stage of forest succession. Although the specific characteristics of old-growth stands vary with species composition and history, some commonly expected attributes in mesic forests on productive sites include: an abundance of large trees at least 180 to 200 years old; a multi-layered, multi-species canopy dominated by large overstory trees with moderate to high closure; numerous trees with broken tops, snags, and large logs.
- Oligohaline** — Term to characterize water with salinity of 0.5 to 5.0‰ (parts per thousand), due to ocean-derived salts.
- Oligosaline** — Term to characterize water with salinity of 0.5 to 5.0‰ (parts per thousand), due to land-derived salts.
- Oligotrophic (Water)** — Pertaining to a lake or other body of water characterized by extremely low nutrient concentrations such as nitrogen and phosphorous and resulting very moderate productivity. Oligotrophic lakes are those low in nutrient materials and consequently poor areas for the development of extensive aquatic floras and faunas. Such lakes are often deep, with sandy bottoms and very limited plant growth, but with high dissolved-oxygen levels. This represents the early stages in the life cycle of a lake. Degrees of *Eutrophication* typically range from *Oligotrophic* water (maximum transparency, minimum chlorophyll-*a*, minimum phosphorus) through *Mesotrophic*, *Eutrophic*, to *Hypereutrophic* water (minimum transparency, maximum chlorophyll-*a*, maximum phosphorus). Also see *Carlson's Trophic State Index (TSI)* and (*Mean Trophic State Index (TSI)*).
- On-Fan Drainageway** — A drainageway or dendritic drainage system that rises on an alluvial fan, fan piedmont, or fan remnant and that may debouch on the fan piedmont or cross it.
- Once-Through Cooling Water** — Water (fresh or saline) that is withdrawn from a river, stream or other water body (man-made or natural), or a well, that is passed through a steam condenser one time, and then returned to the stream or water body some distance from the intake. Once-through cooling water is used to exchange the heat from the steam condensers commonly used in power production plants to the cooler water. Typically, such waters are required to be cooled in cooling ponds before returning to a stream or other body of water. Also referred to as

Open-Cycle Cooling.

- One Hundred-Year Flood** — A flood having a one-percent chance of being equalled or exceeded in any given year. Having the same meaning as *Base Flood*, *1 percent Flood*, *One-Percent Chance Flood* or *Hundred-Year Flood*. Also see *X-Year Flood*, and *X-Year Flood, Y-Duration Rain*.
- One-Percent Chance Flood** — See *One Hundred-Year Flood* or *Base Flood*.
- Onfarm** — Activities (especially growing crops and applying irrigation water) that occur within the legal boundaries of private property.
- Onshore** — Coming or moving from the water toward or onto the shore, as a breeze or prevailing wind.
- Oocyst** — An encysted oospore, either before or after division of its cell contents. See *Cryptosporidial (Crypto) Oocyst*.
- Ooze** — (1) To flow or leak out slowly, as through small openings. (2) To disappear or ebb slowly. (3) To exude moisture. (4) Soft mud or slime. (5) A layer of mud-like sediment on the floor of oceans and lakes, composed chiefly of the remains of microscopic sea animals. (5) Muddy ground.
- Opalized** — A rock whose original constituents have been replaced by opaline silica, a form of *Silica* (SiO_2) containing varying percentages of water.
- Open** — An unobstructed area of land or water.
- Open Canopy** — (Botany) Forest trees which are so scattered that there are frequent openings between tree crowns in the canopy.
- Open Channel System** — A system of conveyance channels where the top flow boundary is a free surface (e.g., canal systems).
- Open-Cycle Cooling** — The practice of withdrawing surface or well water to cool the condensers of an electric power plant or other industrial equipment, followed by release of the heated water to the ocean, a river, or a lake.
- Open Drains** — Open channels or large ditches spaced throughout an irrigation project to collect surface and subsurface drainage from adjacent farm land.
- Open or Screened Interval** — The length of the unscreened opening or of a well screen through which water enters a well, in feet below land surface.
- Open-Pit Mining** — The process of removing mineral deposits that are found close enough to the surface so that the construction of tunnels (underground mining) is not necessary. The soil and strata that cover the deposit are removed to gain access to the mineral deposit. The primary environmental concerns related to this technique are the disposition of spoils removed to gain access to the deposit and the scoring of the landscape that remains following the complete removal of the mineral deposit. Erosion and water pollution are also concerns because runoff from the mining area is frequently rich in sediments and minerals which may pollute receiving streams. Furthermore, when the resulting pit extends below the water table, it may necessitate the removal of groundwater that infiltrates the mining pit, potentially altering the groundwater flow with possible implications on the water table and groundwater characteristics. Also referred to as *Strip Mining* or *Surface Mining*. Also see *Acid Mine Drainage*, *Dewater* and *Dewatering*, and *Yellowboy*.
- Open River Channel** — A navigation channel in a natural river with improvements limited to removal of obstructions and dredging to obtain adequate depths.
- Open Space/Open Space Use** — Refers to the current employment of land, the preservation of which conserves and enhances natural or scenic resources, protects streams and water supplies or preserves sites designated as historic pursuant to law.
- Open Water Loop** — Any process in which water is routed through a facility and then not reused, but discharged into a surface body of water after any appropriate treatment. Contrast with *Closed Water Loop*.
- Operating Criteria** — Design and institutional criteria that determine the operating limits of a water system.
- Operating Criteria and Procedures (OCAP) [Nevada]** — See *OCAP [Nevada]*, above.
- Operation and Maintenance Costs (O&M)** — Average annual costs of project operation and normal maintenance.
- Operation, Maintenance, and Replacement Costs (O M & R)** — The value of goods and services needed to operate a constructed project and make repairs and replacements necessary to maintain the project in a sound operating condition during its economic life.
- Operational Concept** — Mode of operating a canal with respect to location of priorities; usually supply oriented (upstream concept) or demand oriented (downstream concept).
- Operational Losses** — Losses of water resulting from evaporation and seepage.
- Operational Spill** — (1) A loss or waste of water in an irrigation system caused by operation of the system. (2) (Terminal Spill) Refers to those releases made at the terminal ends of the project conveyance or reservoir system. These canal or reservoir releases are not reused on the project's improved irrigated acreage.

- Orbital Wave** — (Hydraulics) A wave, such as an ocean wave, where the water particles move in a closed transverse and do not translate.
- Ordinary Least Squares (OLS)** — (Statistics) Mathematical procedures for attributing the variability of one quantity to changes in one or more other quantities. Often called “line fitting” or “curve fitting” since it produces an equation that can be used to predict the quantity of interest under many conditions. The concept is to attempt to fit a mathematical function to a series of data whereby the square of the error terms measuring the differences between the model estimates and actual observations is minimized, hence the term Ordinary Least Squares (OLS) is also used to describe this process. The standard of regression model is generally termed the *Classical Linear Regression (CLR) Model*. Also see *Regression Analysis*.
- Ordinate (Symbol Y)** — (Mathematics) The plane Cartesian coordinate representing the distance from a specified point to the x-axis (*Abscissa*), measured parallel to the y-axis.
- Organic** — Of or related to a substance that contains carbon atoms linked together by carbon-carbon bonds. All living matter is organic.
- Organic Carbon (OC)** — A measure of organic matter present in aqueous solution, suspension, or bottom sediments. May be reported as dissolved organic carbon (DOC), suspended organic carbon (SOC), or total organic carbon (TOC).
- Organic Load** — (Water Quality) The amount of organic material added to a body of water. The amount of material, usually added by human activities, that must be mineralized or degraded within a particular environment.
- Organic Mass** — Volatile mass of the living substance is the difference between the *Dry Mass* and *Ash Mass* and represents the actual mass of the living matter. Organic mass is expressed in the same units as for ash mass and dry mass.
- Organic Matter** — (1) Plant and animal residues, or substances made by living organisms. All are based upon carbon compounds. (2) Any material of organic origin such as peat moss, ground bark, compost, and manure to be dug into the soil to improve its condition.
- Organic Nitrogen** — Nitrogen that is bound to carbon-containing compounds. This form of nitrogen must be subjected to mineralization or decomposition before it can be used by the plant communities in aquatic and terrestrial environments. This is in contrast with inorganic nitrogen, which is in the mineral state and more readily utilized by plant communities.
- Organic Soil** — Soil composed of predominantly organic rather than mineral material. Equivalent to *Histosol*.
- Organic Waste** — Carbon-containing materials that are discarded into the environment and particularly into bodies of water. The term is often used as a euphemism for domestic sewage.
- Organism** — Any living entity.
- (Total) Organism Count** — The total number of organisms collected and enumerated in any particular sample.
- Organism Count/Area** — The number of organisms collected and enumerated in a sample and adjusted to the number per area of habitat, usually square meter (m²), acre, or hectare. Periphyton, benthic organisms, and macrophytes are typically expressed in these terms.
- Organism Count/Volume** — The number of organisms collected and enumerated in a sample and adjusted to the number per sample volume, usually milliliter (mL) or liter (L). Numbers of planktonic organisms can be expressed in these terms.
- Organochlorine Compounds** — Any chemicals that contain carbon and chlorine. Organochlorine compounds that are important in investigations of water, sediment, and biological quality include certain pesticides and industrial compounds.
- Organotins** — Chemical compounds used in anti-foulant paints to protect the hulls of boats and ships, buoys, and pilings from marine organisms such as barnacles.
- Orifice** — As used in water studies, an opening with a closed perimeter; is usually sharp edged, and of regular form in a plate, wall, or partition through which water may flow. An orifice is used for the measurement or control of water.
- Orogenic** — (Geology) Pertaining to the process of mountain-building, especially by the folding of the earth’s crust. Also see *Diastrophic* and *Tectonic*.
- Orographic Cloud** — A cloud whose form and extent is determined by the disturbing effects of orography and mountains upon the passing flow of air. Because these clouds are linked with the form of the terrestrial relief, they generally move very slowly, if at all, although the winds at the same level may be very strong.
- Orographic Precipitation** — Precipitation which results from the lifting of moist air over a topographic barrier such as a mountain range. The precipitation may occur some distance upwind and a short distance downwind, as well as on the barrier feature.

- Orographic Storm** — A rain or snow event that results from lifting (and consequent cooling) of an air mass over a mountain barrier, usually restricted to the windward (up wind) side of the mountains, and often producing hot, dry winds on the lee (down wind) side.
- Orr Ditch Decree [Nevada and California]** — A tabulation or adjudication of Nevada (only) water rights for the Truckee River and its tributaries regulated through a series of reservoirs and irrigation canals, administered by the U.S. District Court Federal Water Master in Reno, Nevada. In combination with the *Truckee River Agreement [Nevada and California]* and the *Floriston Rates [California and Nevada]*, the Orr Ditch Decree currently represents the basis for operation of the Truckee River between its source (Lake Tahoe) and its terminus (Pyramid Lake). The Orr Ditch Decree (1944) incorporates the provisions of the Truckee River Agreement (1935), which provides for operation of storage facilities, especially Lake Tahoe, to satisfy Truckee River water rights. The Floriston rates constitute the chief operation objective on the Truckee River today and originated as a turn-of-the-century flow requirement for run-of-the-river users — hydropower and a pulp and paper mill. While the Orr Ditch Decree establishes water rights for entities within Nevada using the Truckee River's waters, the Truckee River Agreement, as part of that Decree, determines the operational mechanisms to satisfy those rights. Also see *Truckee River General Electric Decree [California]*.
- OS3** — A narrow ridge of gravelly or sandy glacial outwash material deposited by a stream in an ice tunnel within a glacier. Also referred to as *Esker*.
- Osmoregulation** — The adjustment in the osmotic concentration of solutes in body fluids to environmental conditions, for example, when salmon migrate from salt to freshwater.
- Osmosis** — The selective passage of liquids through a semipermeable membrane in a direction which tends to make concentrations of all substances on one side of the membrane equal to those on the other side. The semipermeable membrane allows the passage of water but prevents the passage of substances dissolved in the water. The water movement is from the more dilute solution toward the more concentrated solution, and will continue until the two solutions are equal in concentration. If pressure is applied to the more concentrated side, the flow of water will reverse, from the concentrated side to the more dilute side, a condition termed *Reverse Osmosis*.
- Osmotic Lysis** — The rupture of a cell placed in a dilute solution. For example, when a red blood cell is placed in distilled water, water tends to move into the cell because of the osmotic pressure generated as a result of the concentration of the materials inside the cell. As the amount of water increases within the cell, the cell membrane can no longer withstand the pressure, and ruptures.
- Osmotic Potential** — The work per unit quantity of pure water that has to be done to overcome the effect of ions in the soil solutions. Unlike the *Matric Potential*, it has little effect on movement of water in soils; its major effect is on uptake of water by plant roots.
- Osmotic Pressure** — The pressure exerted by the flow of water through a semipermeable membrane separating two solutions with different concentrations of solute.
- Osmotroph** — An organism that obtains nutrients through the active uptake of soluble materials across the cell membrane. This class of organism, which includes the bacteria and fungi, cannot directly utilize particulate material as nutrients. Contrast with *Phagotroph*.
- Other Water Use** — Water used for such purposes as heating, cooling, irrigation (public-supplied only), lake augmentation, and other nonspecific uses. The water can be obtained from a *Public Water Supply System*, or may be self supplied. Also see *Self-Supplied Water*.
- Outcrop** — Subsurface formations which become exposed at the surface.
- Outfall** — The place where a sewer, drain, or stream discharges; the outlet or structure through which reclaimed water or treated effluent is finally discharged to a receiving water body.
- Outflow, also Outflows** — (1) To issue or stream out, in or as if in a flow from a body of water. (2) Process of flowing out; includes all water that leaves a *Hydrologic System*.
- Outflow Channel** — A natural stream channel that transports reservoir releases.
- Outlet** — Point where water exits from a stream, river, lake, reservoir, tidewater, or artificial drain. The mouth of a river where it flows into a larger body of water.
- Outlet Channel** — A waterway constructed or altered primarily to carry water from man-made structures, such as terraces, tile lines, and diversions.
- Outlet Discharge Structure** — A structure built to protect the downstream end of a dam's outlet pipe from erosion and is often designed to slow the velocity of released water to prevent erosion of the stream channel.
- Outliers** — (Data Analysis) Data values in a time series which are significantly different from the series trend and/or other data values such that their inclusion may jeopardize the model's ability to fit the data. If such sample data values cannot be explained by other, external factors, then they should probably be omitted from the model

estimation process altogether.

Outwash — A deposit of sand and gravel formed by streams of meltwater flowing from a glacier and laid down in stratified deposits.

Ouzel, also Ousel — A water ouzel or water dipper.

Overall Project Efficiency — A term reflecting all of the losses experienced by the irrigation project. By definition: $Overall\ Project\ Efficiency = Project\ Conveyance\ Efficiency \times Farm\ Irrigation\ Efficiency$, or Total Project Crop Water Requirement *divided by* Diversions Into Project for Irrigation (expressed as a percentage).

Overbank Flow — Water flow over the top of the *Bankfull Channel* onto the floodplain.

Overbank Storage — Water stored in the flood plain during flood flows.

Overburden — The earth, rock, and other materials that lie above a desired ore or mineral deposit.

Overchute — A *Flume* (or bridge with sideboards) for passing flood water across an irrigation ditch or canal.

Overdraft — (1) A condition that occurs in a ground water basin when pumping exceeds recharge over an extended period of time. (2) That quantity of water pumped in excess of the safe yield; the act of overdrawing a water supply or aquifer in amounts greater than replenishment. Also, the sustained extraction of ground water from an aquifer at a rate greater than the recharge rate of the aquifer, resulting in a drop in the level of the water table. Also see *Ground Water Overdraft* and *Ground Water Mining*.

Overfall — An abrupt change in stream channel elevations. Also, the part of a dam or weir over which the water flows.

Overfall Dam — A dam constructed to allow water to overflow the dam's crest.

Overfish — (1) To fish (a body of water) to such a degree as to upset the ecological balance or cause depletion of living creatures. (2) To fish a body of water so extensively as to exhaust the supply of fish or shellfish.

Overfishing — The removal of a sufficiently large number of certain fish from a body of water such that breeding stocks are reduced to levels that will not support the continued presence of the fish in desirable quantities for sport or commercial harvest.

Overflow — (1) To flow or run over the top, brim, or banks. (2) To be filled beyond capacity, as a container or a waterway.

Overflow Rate — (1) The flow into a basin divided by its total surface area, often expressed in units of gallons per day per square foot. It is used as a design parameter for settling basins. (2) (Water Quality) One of the guidelines for the design of the settling tanks and clarifiers in a water treatment plant; used by plant operators to determine if tanks and clarifiers are over or under used.

Overflow Standpipe — A standpipe located in a dam or other structure at an elevation that allows removal of excess water, preventing overflow.

Overhead Irrigation — A pressurized irrigation system where water is distributed through pipes to the field and applied through a variety of sprinkler heads or nozzles. Pressure is used to spread water droplets above the crop canopy to simulate rainfall. These systems include portable and traveling guns, solid or permanent fixtures (overhead or pop ups), center pivots, and periodic moving systems. The efficiencies of these sprinkler systems range from 15 to 85 percent; however, the average of 70 percent is commonly used. Also referred to as *Sprinkler Irrigation*.

Overland Flow — (1) Surface runoff. (2) The flow of rainwater or snowmelt over the land surface toward stream channels. (3) (Water Quality) The discharge of wastewater in such a way that it flows over a defined land area prior to entering a receiving stream. The movement over vegetated land fosters the removal of plant nutrients from the wastewater and constitutes a form of *Tertiary Wastewater Treatment*. After it enters a stream, it becomes *Runoff*.

Overstory — (Botany) The uppermost, or tree, part of a forest, formed by tree crowns; canopy. Also, the highest plant community within a given area, which in a sagebrush-grassland setting, would be the sagebrush.

Overtum — (1) The sinking of surface water and rise of bottom water in a lake or sea that results from changes in temperature that commonly occur in spring and fall. (2) One complete cycle of top to bottom mixing of previously stratified water masses. This phenomenon may occur in the spring or fall, or after storms, and results in uniformity of chemical and physical properties of water at all depths. Also referred to as *Turnover*, e.g., *Fall Turnover* and *Spring Turnover*.

Ownership Entitlements (USBR) — The maximum acreage a landholder may directly or indirectly own and irrigate with Reclamation irrigation water.

Oxbow — An abandoned meander in a river or stream, caused by neck cutoff. Used to describe the U-shaped bend in the river or the land within such a bend of a river.

Oxbow Lake — An abandoned meander isolated from the main stream channel by deposition, and filled with water.

- Oxidant** — An oxidizing agent.
- Oxidase** — Any of a group of enzymes which catalyze oxidation reactions by using molecules of oxygen as the electron acceptor.
- Oxidation (Oxidizing)** — (1) A chemical reaction that involves combination with oxygen or the loss of electrons. (2) The process of increasing the positive valence or of decreasing the negative valence of an element or ion. (3) The process by which electrons are removed from atoms or ions, also, reduction. (4) (Water Quality) The addition of oxygen that breaks down organic waste or chemicals such as cyanides, phenols, and organic sulfur compounds in sewage by bacterial and chemical means.
- Oxidation Ditch** — (Water Quality) A shaped ditch, usually oval, with a revolving drum-like aerator which circulates the liquid within it and supplies air to it, to reduce the organic material by aerobic action.
- Oxidation Pond** — A man-made body of water in which organic wastes are stabilized by the action of bacteria, used most frequently with other waste-treatment processes; a sewage lagoon.
- Oxidation-Reduction Potential** — The electric potential required to transfer electrons from one compound or element (the *Oxidant*) to another compound (the *Reductant*); used as a qualitative measure of the state of oxidation in water treatment systems.
- Oxidized Rhizosphere** — A zone around a plant root system in *Hydric Soils* that shows staining from oxidation (“rust” stains).
- Oxygen** — (Chemical symbol O) An element occurring free as a colorless, tasteless, odorless diatomic gas, O₂ (ordinary oxygen), in the *Atmosphere*, of which it forms about 23 per cent by weight and about 21 per cent by volume, being slightly heavier than nitrogen. Oxygen combines with most elements, is essential for plant and animal respiration, and is required for nearly all combustion. Oxygen is the most abundant of all the elements on the earth’s surface, for, in addition to its occurrence free in air, it forms, in combination with *Hydrogen*, 88.812 per cent by weight of *Water* (H₂O) and nearly one-half by weight of the rocks composing the earth’s crust, being a constituent of silica, the silicates, the carbonates, the sulphates, etc. It is a constituent of all but a very few acids and, in general, the greater the proportion of oxygen with which an element combines, the more acidic does it become. It is also a constituent of a large proportion of organic compounds. Oxygen is also known in an allotropic, more active form, *Ozone*, O₃.
- Oxygen Deficit** — (Water Quality) The difference between observed oxygen concentration and the amount that would theoretically be present at 100 percent saturation for existing conditions of temperature and pressure.
- Oxygen Demand** — The need for molecular oxygen (O₂) to meet the needs of biological and chemical processes in water. The amount of molecular oxygen that will dissolve in water is extremely limited; however, the involvement of oxygen in biological and chemical processes is extensive. Consequently, the amount of oxygen dissolved in water becomes a critical environmental constraint on the biota living in the water. The metabolism of large organisms like submerged plants and fish, the microorganisms engaged in decomposition, and spontaneous chemical reactions all require (demand) a portion of a limited resource, molecular oxygen. Also see *Biochemical Oxygen Demand (BOD)*.
- Oxygen-Demanding Waste** — Any organic material that will stimulate the metabolism of bacteria with a corresponding use of *Dissolved Oxygen (DO)* when discharged into a natural waterway. Frequently used as a euphemism for domestic sewage. Also see *Oxygen Demand*.
- Oxygen Depletion** — The removal of *Dissolved Oxygen* from a body of water as a result of bacterial metabolism of degradable organic compounds added to the water, typically caused by human activities.
- Oxygen Sag Curve** — A graph of the measured concentrations of *Dissolved Oxygen* in water samples collected (1) upstream from a significant *Point Source (PS)* of readily degradable organic material (pollution), (2) from the area of the discharge, and (3) from some distance downstream from the discharge, plotted by sample location. The amount of dissolved oxygen is typically high upstream, diminishes at and just downstream from the discharge location (causing a sag in the line graph) and returns to the upstream levels at some distance downstream from the source of pollution or discharge.
- Oxygen Saturation Capacity** — The maximum quantity of dissolved oxygen that a liquid exposed to the atmosphere can contain at a given temperature and pressure.
- Oxygenate** — To treat, combine, or infuse with oxygen.
- Ozonation** — (Water Quality) The use of *Ozone* gas (O₃) as a disinfectant to reduce the microbial load and to kill dangerous pathogenic bacteria in water. The treatment can be applied to a public drinking water supply before it enters the distribution system or to wastewater prior to its discharge into a receiving stream.
- Ozonator** — A device that applies *Ozone* to water for disinfection or for taste and odor control.
- Ozone** — (1) A chemical compound composed of three oxygen atoms used in water disinfection. (2) A blue gaseous

allotrope of oxygen (triatomic oxygen), O₃, formed naturally from diatomic oxygen by electric discharge or exposure to ultraviolet radiation. It is an unstable, powerfully bleaching, poisonous oxidizing agent with a pungent, irritating odor, used to deodorize air, purify water, treat industrial wastes, and as a bleach. Increasingly, public utilities are converting from chlorine to ozone as a primary disinfectant. More potent than chlorine, ozone is the only known water supply disinfectant that is effective against the water-borne pathogen *Cryptosporidium*. In addition, ozone does not create health-threatening byproducts such as trihalomethanes (THMs) and haloacetic acids that are created in chlorination.

Ozone Hole — A large area over Antarctica recently discovered to have a seasonal drop in stratospheric ozone concentration of as much as 50 percent. It is linked to the formation of stratospheric ice clouds that release chlorine atoms from chlorofluorocarbons during the Antarctic winter. The chlorine is present in quantities that cause the extensive ozone depletion when the spring sunshine returns. Also see *Ozone Layer Depletion*.

Ozone Layer — A region of the upper atmosphere, between about 15 and 30 kilometers (10 and 20 miles) in altitude, containing a relatively high concentration of ozone that absorbs solar ultraviolet radiation in a wavelength range not screened by other atmospheric components. Also called *Ozonosphere*.

Ozone Layer Depletion — The destruction of *Ozone* molecules in the *Ozone Layer* of the *Stratosphere* by chemical reactions with materials released by human activities. The main ozone-consuming chemicals are the chlorofluorocarbons (CFCs) and the halons, both of which are groups of chemicals that are extremely stable in the *Troposphere*, with typical atmospheric lifetimes of 60 to 100 years. If the CFC's or halons migrate to the stratospheric ozone layer, the ultraviolet radiation there is strong enough to break the molecules apart, releasing chlorine atoms (CFC's) or bromine atoms (halons) which react with and destroy ozone. Also referred to as *Ozone Depletion*.