

P

Packed Tower — (Air Quality) An air pollution control device in which contaminated air is passed through a tower containing substances (packing) possessing large surface area. Water is passed over the packing material in a countercurrent fashion, i.e., in a direction opposite to the passage of the air, and the air contaminants are then absorbed into the liquid. Also referred to as *Absorption Tower*, *Spray Tower*, or *Tray Tower*.

Packed Tower Aeration — (Water Quality) A process for the removal of organic contaminants from groundwater. The groundwater flows downward inside a tower filled with materials (the packing) over a large surface area. Air is introduced at the bottom of the tower and is forced upward past the falling water. Individual organic contaminants are transferred from the water to the air, according to the gas and water equilibrium concentration values of each contaminant. Also referred to as *Air Stripping*.

Packer — A device lowered into a well to produce a fluid-tight seal.

Pack Ice — Floating ice that has been driven together into a single mass.

PAHs — See *Polycyclic Aromatic Hydrocarbons*.

Pahranagat National Wildlife Refuge (NWR) [Nevada] — One of the nine National Wildlife Refuges (NWR) located in the State of Nevada, the Pahranagat NWR is located approximately 90 miles north of Las Vegas, Nevada, at the northern end of the *Desert National Wildlife Refuge* and consists of 5,380 acres (8.4 square miles) of marshes, open water, native grass meadows and cultivated croplands. Established in 1964, the Pahranagat NWR hosts numerous waterfowl and other migratory birds on the Pacific Flyway, which stretches from Alaska and Canada to Mexico. The name “Pahranagat” comes from the Paiute Indian word meaning “place of many waters.” Also see *National Wildlife Refuge (NWR) System* and *National Wildlife Refuges (NWR) [Nevada]*.

Palatable Water — Water, at a desirable temperature, that is free from objectionable tastes, odors, colors, and turbidity.

Paleobotany — The study of lake sediments, pollens, and microfossils to determine ancient climate and vegetation.

Paleontology — The study of fossils of animal and plant life that existed in remote geological times. The study of these remains enables scientists to trace the evolutionary history of extinct as well as contemporary organisms. Paleontologists also play a major role in unraveling the stratigraphic mysteries of the earth's crust and by using detailed information on how fossils are distributed in sedimentary strata, they help prepare accurate geologic maps, which are essential in the search for oil, water, and minerals.

Paleopedology — The study of fossil soils. Also see *Pedology*.

Palmer Drought Severity Index (PDSI) — The PDSI was the first comprehensive drought index developed in the United States. It is a meteorological drought index based on a balance between moisture supply and demand and responds to weather conditions that have been abnormally dry or abnormally wet. The index is calculated based on precipitation and temperature data, as well as the local *Available Water Content (AWC)* of the soil, i.e., soil moisture. From the index's inputs, all the basic terms of the water balance equation can be determined, including evapotranspiration, soil recharge, runoff, and moisture loss from the surface layer. The index, however, is less well suited for mountainous regions or areas of frequent climatic extremes. Human impacts on the water balance, such as irrigation or drainage, are not considered. The index roughly ranges from extremes of -6 to + 6, with negative values denoting dry spells and positive values indicating wet periods. There are also a few values in the magnitude of -7 or +7. Ideally, the PDSI is designed so that a -4.0 in South Carolina has the same meaning in terms of the moisture departure from a climatological normal as a -4.0 in Idaho. The following shows the more typical PDSI classifications:

- 4.00 or more – Extremely wet
- 3.00 to 3.99 – Very wet
- 2.00 to 2.99 – Moderately wet
- 1.00 to 1.99 – Slightly wet
- 0.50 to 0.99 – Incipient wet spell
- 0.49 to -0.49 – Near normal
- 0.50 to -0.99 – Incipient dry spell

- 1.00 to -1.99 – Mild drought
- 2.00 to -2.99 – Moderate drought
- 3.00 to -3.99 – Severe drought
- 4.00 or less – Extreme drought

Also see *Drought Indexes (Indices)*.

Palustrine — Pertaining to a *Marsh* or *Wetlands*; wet or marsh habitats.

Palustrine Wetlands — Used in the wetlands classification system by the *U.S. Fish and Wildlife Service (USFWS)* to refer to wetlands that are vegetated-dominated by trees, shrubs, herbaceous plants, mosses or lichens. See *Wetlands (General)*, *Wetlands (COE and EPA)*, *Wetlands (USFWS)*, *Wetlands (NRCS)*, *Wetlands, Palustrine*, and *Wetlands, Benefits*. [See Appendix D–2 for an explanation of the Wetland and Deepwater Habitat Classification System according to U.S. Fish and Wildlife Service (USFWS) criteria and more detailed information of these systems.

PAMs — See *Polyacrylamides (PAMs)*.

Pan — (1) A basin or depression in the earth, often containing mud or water. (2) A natural or artificial basin used to obtain salt by evaporating brine. Also referred to as *Hardpan*.

Pan Evaporation — Evaporation in inches from a standard Weather Bureau Class A pan. See *Evaporation Pan*.

Paralytic Shellfish Poisoning (PSP) — A pathological condition in humans caused by the consumption of certain marine mussels or clams that have fed on planktonic dinoflagellates belonging to the genus *Gonyaulax*. The mussels or clams become contaminated with a neurotoxin produced by the dinoflagellates, and subsequent consumption by humans results in respiratory or gastrointestinal distress. The condition occurs in conjunction with the phenomenon known as the *Red Tide*, a bloom of dinoflagellate population in marine waters.

Parameter — (1) A variable, measurable property whose value is a determinant of the characteristics of a system. (2) (Statistics) Fundamentally, the parameter represents the true value of the characteristic of a sample or population. The estimate of a parameter, called a statistic, is a measurement of a sample of the population. The parameters in an *Econometric Model (Regression Analysis)* describe the relationship between the variations in the *Dependent Variable*, or the variable to be explained, and the variations in the *Independent*, or *Explanatory Variable(s)*. For example, in the simple expression of cause and effect

$$Y_t = \hat{a} + \hat{a} X_t + \hat{a}_t$$

the constant term, \hat{a} (*alpha*), and the coefficient term, \hat{a} (*beta*), define the (fixed) parameters of this econometric model and will be tested, statistically, to determine if the relationship is valid, i.e., is there exists a causal (i.e., cause and effect) relationship, or if the variations in the dependent variable are based on chance (random).

Parapet Wall — A solid wall built along the top of a dam for ornament, for the safety of vehicles and pedestrians, or to prevent overtopping.

Parent Material — The unconsolidated and more or less chemically weathered mineral or organic matter from which the *Solum* of soils is developed by *Pedogenic* processes.

Parhelic Circle — A luminous halo visible at the height of the sun and parallel to the horizon, caused by the sun's rays reflecting off atmospheric ice crystals. Also referred to as a *Parhelic Ring*.

Parna Dune — An eolian dune built of sand size aggregates of clayey material that commonly occurs leeward of a playa.

Parshall Flume — A device used to measure the flow of water in an open channel.

Partial Ballena — A spur, with a fully rounded crest, that is connected to an erosional fan remnant large enough that some relict fan surface is preserved on the remnant summit.

Partial Duration Flood Series — A list of all flood peaks that exceed a chosen base stage or discharge, without regard for the number occurring in a year. Also referred to as *Basic-Stage Flood Series* or *Floods Above a Base*.

Partial Penetration — A well constructed in such a way that it draws water directly from a fractional part of the total thickness of the aquifer. The fractional part may be located at the top, the bottom, or anywhere else in the aquifer.

Partial Pressure — In a mixture of gases, the pressure exerted by each gas independently of the other gases.

Partial-Record Station — A gaging site where discrete measurements of one or more hydrologic parameters are obtained over a period of time without continuous data being recorded or computed. A common example is a crest-stage gage partial record station at which only peak stages and flows are recorded.

Particle Count — (Water Quality) Results of a microscopic examination of treated water with a special "particle counter" that classifies suspended particles by number and size.

Particle Size — The diameter (usually the intermediate diameter), in millimeters, of suspended sediment or bed material determined by either sieve or other sedimentation methods. The sedimentation-method utilizes the

principle of Stokes Law to calculate sediment particle sizes. Sedimentation methods (pipet, bottom-withdrawal tube, visual-accumulation tube, Sedigraph) determine fall diameter of particles in either distilled water (chemically dispersed) or in native water (the river water at the time and point of sampling).

Particle Size Classification — Agrees with recommendations made by the *American Geophysical Union Subcommittee on Sediment Terminology*. The particle size classification is as follows:

- [1] **Clay** – 0.00024–0.004 millimeters (mm);
- [2] **Silt** – 0.004–0.062 mm;
- [3] **Sand** – 0.062–2.0 mm; and
- [4] **Gravel** – 2.0–64.0 mm.

Particulate Loading — The mass of *Particulates* per unit volume of water.

Particulate Matter — (Water Quality) In water pollution, particulate matter describes solid material in either the solid or dissolved states. Insoluble particulate matter includes particulate substances that either settle from water that is allowed to stand or are removed by passing the water through a filter. Sand, clay, and some organic matter constitute insoluble particulate matter. Dissolved substances that will neither settle if water is allowed to stand nor be removed by passage through a filter, but which will be recovered if the water is allowed to evaporate, are called dissolved particulate matter. Salt is an example of this type of particulate matter. In air pollution, particulate matter is used to describe either solid particles or liquid droplets that are carried by a stream of air or other gases.

Particulate Organic Matter (POM) — Material of plant or animal origin that is suspended in water. The amount of this type of material suspended in water can be estimated by first removing the suspended material from the water by filtration, followed by either a direct measurement of the amount of carbon retained on the filter or by estimating the amount of carbon present from the weight lost upon heating the filter in excess of 500°C (932°F). Generally, the greater the amount of particulate matter present, the more severe the water pollution problem.

Particulate Phosphate — That portion of the total amount of phosphate (PO_4^{-3}) suspended in water that is attached to particles and will not pass through a filter. The aggregates can be either inorganic or organic. This form of phosphate must be solubilized before it can be used as a plant nutrient.

Particulates — Very small solids suspended in water. They can vary in size, shape, density, and electrical charge and can be gathered together by *Coagulation* and *Flocculation*. Also see *Particulate Matter*.

Particulate Transport — Movement of undissolved particles in subsurface water.

Parts Per Billion (PPB) — The number of “parts” by weight of a substance per billion parts of water. Used to measure extremely small concentrations.

Parts Per Million (PPM) — The number of “parts” by weight of a substance per million parts of water. This unit is commonly used to represent pollutant concentrations. Large concentrations are expressed in percentages.

Parts Per Thousands (PPT) — An expression of concentration which indicates one unit is contained in a total of a thousands units. It is normally used to specify the salinity of water and commonly indicated by the symbol “‰”.

Passive Solar Water Heater — A water heating system that does not require mechanical pumps or controls to create hot water for domestic use.

Pathogen — A disease-producing agent; usually applied to a living organism (i.e., biological). Generally, any viruses, bacteria, or fungi that cause disease.

Patchiness — A descriptive term referring to the size and variety of specific assemblages of vegetative communities residing within a particular area.

PCBs (Polychlorinated Biphenyls) — A group of synthetic, toxic industrial chemical compounds once used in making paint and electrical transformers which are chemically inert and not biodegradable. PCBs were frequently found in industrial wastes, and subsequently found their way into surface and ground waters. As a result of their persistence, they tend to accumulate in the environment. In terms of streams and rivers, PCBs are drawn to sediment, to which they attach and can remain virtually indefinitely. Although virtually banned in 1979, they continue to appear in the flesh of fish and other animals.

PCE — See *Perchloroethylene*. Also referred to as *Tetrachloroethylene* and *Perclene*.

Peak Flow — The maximum instantaneous discharge of a stream or river at a given location. It usually occurs at or near the time of maximum stage.

Peaking — Typically describes the peak water demand for a municipal water system and is expressed as a ratio of the base demand level, e.g., 2:1 peaking represents a peak demand that is twice the base demand.

Peak Load (Power) — The maximum load in a stated period of time. Usually it is the maximum integrated load over an interval of one hour which occurs during the year, month, week, or day. It is used interchangeably with *Peak Demand*.

Peak Use Rate — The maximum periodic rate of consumptive use (*Evapotranspiration*) of water by plants.

Peat — Any mass of semi-carbonized vegetable tissue formed by partial decomposition in water of various plants, especially mosses of the genus *Sphagnum*. Peat varies in consistency from turf to slime. As it decomposes its color deepens, old peat being dark brown or black, and keeping little of the plant texture. According to its formation, it is known as *Bog Peat* (mosses), *Heath Peat* or *Meadow Peat* (grasses and sedges), *Forest Peat* or *Wood Peat* (trees), and *Sea Peat* (seaweeds). Also see *Peatland*.

Peat Bog — See *Bog* and *Peatland*.

Peatland — A type of *Ecosystem*, also referred to as a *Mire*, in which organic matter is produced faster than it is decomposed, resulting in the accumulation of partially decomposed vegetative material called *Peat*. In some mires peat never accumulates to the point where plants lose contact with water moving through mineral soil. Such mires, dominated by grasslike sedges, are called *Fens*. In other mires peat becomes so thick that the surface vegetation is insulated from mineral soil. These plants depend on precipitation for both water and nutrients. Such mires, dominated by acid-forming sphagnum moss, are called *Bogs*. Peatlands are most extensive in northern regions. They develop where drainage of water is blocked, precipitation is retained, and decomposition of organic matter is slowed. Some peatlands form when accumulated organic matter and sediments fill in a pond or basin above the level of the water table. Called *Raised Bogs*, these sphagnum-dominated basins become so high in acidity and low in groundwater minerals that sedges and grasses retreat to the edges. Less commonly, sphagnum moss may form a floating mat over the water, then thicken and support associated vegetation, mostly *Heaths*, and eventually reach the bottom. Such mires are called *Quaking Bogs*. Under certain conditions, especially deforestation, sedge and sphagnum invade higher ground. The peat they form becomes compressed and blocks the drainage of water. These are called *Blanket Mires* or *Moors*. Also see *Marshland*.

Pebble — A small stone, especially one worn smooth by erosion. (Geology) A rock fragment between 4 and 64 millimeters (0.16 and 2.51 inches) in diameter, especially one that has been naturally rounded.

Peclet Number — Relationship between the advective and diffusive components of solute transport; expressed as the ratio of the product of the average interstitial velocity and the characteristic length, divided by the *Coefficient of Molecular Diffusion*. Small values indicate diffusion dominates; large values indicate advection dominates.

Pediment — (Geology) (1) A broad, gently sloping rock surface at the base of a steeper slope, often covered with *Alluvium*, formed primarily by erosion. (2) A broad, flat or gently sloping, rock-floored erosion surface or plain of low relief, typically developed by subaerial agents (including running water) in an arid or semiarid region at the base of an abrupt and receding mountain front or plateau escarpment, and underlain by bedrock (occasionally by older alluvial deposits) that may be bare but more often partly mantled with a thin and discontinuous veneer of alluvium derived from the upland masses and in transit across the surface. The longitudinal profile of a pediment is normally slightly concave upward, and its outward form may resemble a *bajada* (which continues the forward inclination of a pediment). Unlike a *bajada*, however, which it closely resembles, a pediment is a surface of erosion whereas a *bajada* is a surface of deposition. In fact, the top of a *bajada* often merges with trailing portions of a pediment.

Pedisediment — A layer of sediment, eroded from the shoulder and backslope of an erosional slope, that lies on and is, or was, being transported across a pediment (footslope).

Pedogenic (Pedogenesis) — The process of soil formation. Also see *Pedology*.

Pedology — The scientific study of soils, their origins, characteristics, and uses.

Pelagic — Referring to the open sea at all depths (pelagic animals live in the open sea and are not limited to the ocean bottom).

Pelite — (Geology) A sedimentary rock composed of fine fragments, as of clay or mud.

Penplain, also Peneplane — (Geology) A nearly flat land surface representing an advanced stage of erosion.

Peninsula — A piece of land that projects into a body of water and is connected with the mainland by an *Isthmus*.

Penstock — (1) A gate or sluice used in controlling the flow of water. (2) A tube or trough for carrying water to a water wheel, or a pipe carrying water to an electric turbine.

Per Capita Water Use — The water produced by or introduced into the system of a water supplier divided by the total residential population; normally expressed in terms of gallons per person per day (gpcd).

Per Worker Water Use — The water withdrawn or used by businesses and industry on a per worker basis. Normally calculated as total commercial and industrial water use divided by the average number of full-time equivalent (FTE) employees during the period, or gallons per worker per day (gpwd).

Percent Composition (Percent of Total) — A unit for expressing the ratio of a particular part of a sample or population to the total sample or population, in terms of types, numbers, weight, or volume.

Percent of Normal (Drought Index) — One of the simplest measurements of rainfall for a location, a percent of “normal” figure is calculated by dividing the actual period precipitation by the normal precipitation, which is

typically based on a historical average of a 30-year mean or average value. This figure is then multiplied by 100 percent to provide the drought index value. Normal precipitation for a specific location is always considered to be 100 percent; therefore, drought index numbers below 100 percent indicated various degrees of drought conditions. The percent of normal index, while easily understood and effective for assessing a single region or season, can be misunderstood as the concept of normal is a mathematical construct and does not necessarily correspond with what one should expect precipitation to be in any given year (i.e., the normal value may be merely an average of extreme conditions). Also see *Drought Indexes (Indices)*.

Percent Saturation — The amount of a substance that is dissolved in a solution compared to the amount that could be dissolved in it.

Percent Sodium — The percent of cationic equivalents in a water which is attributable to sodium.

Perched Ground Water — Ground water in a saturated zone of material underlain by a relatively impervious stratum which acts as a barrier to downward flow and which is separated from the main ground water body by a zone of unsaturated material above the main ground water body.

Perched Streams — Perched streams are either *Losing Streams* or *Insulated Streams* that are separated from the underlying ground water by a zone of aeration. Also see *Stream*.

Perched Water Table — The top of a *Zone of Saturation* that bottoms on an impermeable horizon above the level of the general water table in the area. Is generally near the surface, and frequently supplies a hillside spring.

Perchloroethylene (PCE) (Tetrachloroethylene) — A solvent often used for degreasing and in dry cleaning which sometimes makes its way into water wells and other ground water supplies. Studies have shown that high concentrations of the chemical can cause liver and kidney damage, including cancer, in animals. In humans, however, not enough information is available to say it is a definite carcinogen. The *U.S. Environmental Protection Agency's (EPA)* safe drinking water standard for tetrachloroethylene is 0.005 parts per million (ppm). Also referred to as *Tetrachloroethylene* and *Perclene*.

Perclene — See *Perchloroethylene (PCE)* or *Tetrachloroethylene*.

Percolating Waters — Underground waters whose course and boundaries are incapable of determination. Waters which pass through the ground beneath the earth's surface without a definite channel. May be rainwater slowly infiltrating through the soil or water seeping through the banks or the bed of a stream, but these waters have left the flow of the stream so that they no longer may be characterized as a part of the stream flow. It is presumed that ground waters percolate.

Percolation — (1) The movement, under hydrostatic pressure, of water through the interstices of a rock or soil. Also, the movement of water within a porous medium such as soil toward the water table without a definite channel. (2) The entrance of a portion of the streamflow into the channel materials to contribute to ground water replenishment. (3) Slow seepage of water through a filter.

Percolation, Deep — The amount of water that passes below the root zone of the crop or vegetation.

Percolation Path — The course followed by water moving or percolating through any permeable material or under a dam which rests on a permeable foundation.

Percolation Pond — Refers to a pond (usually man-made) designed to allow treated wastewater effluent to percolate slowly into the ground. The pond acts as a holding facility while gravity allows the water to percolate or seep through the soil or other unconsolidated medium into the local water table (usually the surficial aquifer).

Percolation Rate — The rate, usually expressed as a velocity, at which water moves through saturated granular material. Also applies to quantity per unit of time of such movement and has been used erroneously to designate *Infiltration Rate* or *Infiltration Capacity*.

Percolation Test — (1) A procedure to measure the drainage characteristics of the soil on a lot. Such tests are required in the proper design of septic tank drainfields. (2) A soil test to determine if soil will take sufficient water seepage for use of a septic tank.

Perennial Crops — Those plants that live and evapotranspire throughout the year (365 days).

Perennial Grass — A grass that lives for more than one growing season. All visible leaves die back each year, but the roots send out new growth in the spring. Perennial grass roots are typically deeper than those of annual grasses.

Perennial Stream — A stream that flows from source to mouth throughout the year. Also see *Stream*.

Perennial Yield (Ground Water) — The amount of usable water of a ground water reservoir that can be withdrawn and consumed economically each year for an indefinite period of time. It cannot exceed the sum of the *Natural Recharge*, the *Artificial (or Induced) Recharge*, and the *Incidental Recharge* without causing depletion of the groundwater reservoir. Also referred to as *Safe Yield*.

Perfected Water Right — (1) A completed or fully executed water right. A water right is said to have been perfected when all terms and conditions associated with it have been fully accomplished, e.g., the diversion has been effected

and the water applied to beneficial use. (2) A water right to which the owner has applied for and obtained a permit, has complied with the conditions of the permit, and has obtained a license or certification of appropriation. (3) A water right which indicates that the uses anticipated by an applicant, and made under permit, were made for *Beneficial Use*. Usually it is irrevocable unless voluntarily canceled or forfeited due to several consecutive years of nonuse. Also referred to as a *Certified Water Right*. Also see *Appropriation Doctrine*.

Perfected Water Permit — A permit issued after the permittee has initiated *Beneficial Use* of water in accordance with the terms and conditions of the conditional water permit. The perfected water permit is the instrument of conveyance of a water right.

Perfection — The process of meeting terms and conditions of a water right permitting process which results in a *Perfected Water Right*.

Perforation of Wells — Holes in the casing of wells which allow water to flow into the well.

Periodic Station — A site where stage, discharge, sediment, chemical, or other hydrologic measurements are made one or more times during a year, but at a frequency insufficient to develop a daily record.

Periphyton — An assemblage of microorganisms (plants and animals) firmly attached to and growing upon solid surfaces, such as the bottom of a stream, rocks, logs, pilings, and other structures. While primarily consisting of algae, they also include bacteria, fungi, protozoa, rotifers, and other small organisms. Periphyton are useful indicators of water quality.

Perlite, also Pearlite — A natural volcanic glass similar to obsidian but having distinctive concentric cracks and a relatively high water content. In a fluffy heat-expanded form perlite is used as a lightweight aggregated, in fire-resistant insulation, and in soil for potted plants.

Permafrost — The part of the earth's surface that is permanently frozen. Permanently frozen subsoil, occurring throughout the polar regions and locally in perennially frigid areas. Also see *Tundra*.

Permanent Control — A stream-gaging control which is substantially unchanging and is not appreciably affected by scour, fill, or backwater.

Permanent Hardness — Water hardness that cannot be reduced or removed by heating the water, a reflection of the presence of dissolved calcium, magnesium, iron and other divalent metal ions. These ions will react to form insoluble precipitates.

Permanent Monument — Fixed monuments or reference markers placed away from the dam which allow movements in the horizontal and vertical *Control Points* on the dam to be observed by using accurate survey procedures.

Permeability — (1) The capacity of soil, sediment, or porous rock to transmit water; the property of soil or rock that allows passage of water through it. (2) For a rock or an earth material, the ability to transmit fluids; the rate at which liquids pass through soil or other materials in a specified direction. It is measured by the rate at which a fluid of standard viscosity can move through a material in a given interval of time under a given *Hydraulic Gradient*. Permeability for underground water is sometimes expressed numerically as the number of gallons per day that will flow through a cross section of 1 square foot, at 60°F, under a hydraulic gradient of 100 percent. Permeability is equal to velocity of flow divided by hydraulic gradient. The following permeability terms apply:

- [1] **Very Slow** – less than 0.05 inch per hour;
- [2] **Slow** – 0.05 to 0.20 inch per hour;
- [3] **Moderately Slow** – 0.20 to 0.80 inch per hour;
- [4] **Moderate** – 0.80 to 2.50 inches per hour;
- [5] **Moderately Rapid** – 2.50 to 5.0 inches per hour;
- [6] **Rapid** – 5.0 to 10.0 inches per hour; and
- [7] **Very Rapid** – More than 10.0 inches per hour.

Permeability Coefficient — The rate of flow of water through a unit cross-sectional area under a *Unit Hydraulic Gradient* at the prevailing temperature (*Field Permeability Coefficient*), or adjusted to 15°C (59°F). See *Permeability*, above.

Permeability, Effective — Observed permeability of a porous medium to one fluid phase, under conditions of physical interaction between the phase and other fluid phases present.

Permeability, Intrinsic — (1) Relative ease with which porous medium can transmit a fluid under a potential gradient, as a property of the medium itself. (2) Property of a medium expressing the relative ease with which fluids can pass through.

Permeability Soil — The quality of a soil horizon that enables water or air to move through it. The permeability of a soil may be limited by the presence of one nearly impermeable horizon even though the others are permeable.

Permeable — Having pores or openings that permit liquids or gasses to pass through.

Permeable Soils — Soils that water can easily penetrate and spread through.

- Permissible Velocity** — (Hydraulics) The highest velocity at which water may be carried safely in a channel or other conduit. Also, the highest velocity that can exist through a substantial length of conduit and not cause scouring of the channel. Also referred to as *Safe Velocity* or *Noneroding Velocity*.
- Permit** — (1) (Water Right) A written document which grants authority to take unused water and put it to *Beneficial Use*. If all requirements of the permit are satisfied, then the permit for water appropriation can mature into a license or *Perfected Water Right*. (2) (Discharge) A legally binding document issued by a state or federal permit agency to the owner or manager of a point source discharge. The permit document contains a schedule of compliance requiring the permit holder to achieve a specified standard or limitation (by constructing treatment facilities or modifying plant processes) by a specified date. Permit documents typically specify monitoring and reporting requirements to be conducted by the applicant as well as the maximum time period over which the permit is valid. Also see *Application, Water Right*.
- Permit, Water [Nevada]** — The written permission from the state engineer to appropriate public waters for a beneficial use from a surface or underground source, at a specific point of diversion, under limited circumstances. If all requirements of the permit are satisfied, then the permit for water appropriation can mature into a license or *Perfected Water Right*. Also see *Permitted Water Right [Nevada]*, and *Application, Water Right*.
- Permit System** — (1) A general term referring to a system of acquiring water rights under state law whereby the state must issue a permit for a new use of water. (2) A system requiring all appropriators to obtain a permit from some administrative official or body before commencing the use of water. Although permit systems were at one time, generally associated with the eastern United States using the *Riparian Doctrine*, they are now found elsewhere as well. The permit system provides the centralized record keeping and control necessary for the efficient functioning of the appropriation system.
- Permitted Water Right [Nevada]** — The right to put surface or groundwater to beneficial use that is identified by a document issued by the Nevada State Engineer prior to the filing of satisfactory proof of “perfection of application” in accordance with Nevada Revised Statutes Chapter 533. If proof of beneficial use is accepted by the State Engineer, then the water right permit can be converted into a *Certificated Water Right*. If proof of beneficial use is not made to or accepted by the State Engineer, then the right to claim title to the water may cease. Also see *Application, Water Right*.
- Permitted Well** — A well from which water is used for other than a domestic use and which has received a permit for a *Beneficial Use* from the water regulatory body or other appropriate official.
- Persistence** — The relative ability of a chemical to remain chemically stable following its release into the environment. Persistent chemicals resist biodegradation and thus are of greater concern in the treatment of water and wastes.
- Persistent Emergent** — *Emergent Hydrophytes* that normally remain standing at least until the beginning of the next growing season; e.g., cattails (*Typha* spp.) or bulrushes (*Scirpus* spp.).
- Persistent Pesticides** — Pesticides remaining in the environment for more than one growing season or for more than one year after applications.
- Perspiration** — The fluid, consisting of water with small amounts of urea and salts, that is excreted through the pores of the skin by the sweat glands; sweat.
- Perspire** — To produce sweat or salty water from glands in the skin. A natural way of cooling the body by the evaporation of water.
- Pervious** — Allowing passage through, as a material to water.
- Pervious Paving** — Paving material that allows water to penetrate to the soil below.
- Pervious Zone** — A part of the cross section of an *Embankment Dam* comprising material of high permeability.
- Pesticide** — Any chemical agent used for the control of specific organisms, for example, *Insecticides, Herbicides, Fungicides, miticides, and rodenticides*.
- Peterson Dredge** — A device used to collect sediment samples for the identification of bottom-dwelling animals in lakes and streams. The device has the appearance of a closed metal cylinder sectioned in half through the long axis. Weights can be attached to the outside of the cylinder sections to provide a deeper bite into the sediment. The Peterson dredge is particularly useful in the sampling of sediments that have a high content of sand and gravel. Also referred to as the *Peterson Grab*.
- Petrify** — To convert (organic matter) into stone or a substance of stony hardness by the infiltration of water and the deposition of dissolved mineral matter .
- Petrochemicals** — Chemical substances produced from petroleum in refinery operations and as fuel oil residues. These include fluoranthene, chrysene, mineral spirits, and refined oils. Petrochemicals are the bases from which *Volatile Organic Compounds (VOCs)*, plastics, and many pesticides are made. These chemical substances are often toxic to humans and the environment.

Petroleum Derivatives — Chemicals formed when gasoline breaks down in contact with ground water.

pH (Hydrogen Ion Concentration, or Potential of Hydrogen) — (1) A convenient method of expressing the acidity or basicity of a solution in terms of the logarithm of the reciprocal (or negative logarithm) of the hydrogen ion concentration. The pH scale runs from 0 to 14; a pH value of 7.0 indicates a neutral solution. Values above 7.0 pH indicate basicity (basic or alkaline solutions); those below 7.0 pH indicate acidity (acidic solutions). Natural waters usually have a pH between 6.5 and 8.5. Because the units are derived from common logarithms, a difference of one pH unit indicates a tenfold (10^1) difference in acidity; similarly, a difference of two units indicates a hundredfold (10^2) difference in acidity. The term originally derived from “potential of hydrogen,” or hydrogen power. (2) A term indicating the hydrogen ion concentration of a solution, i.e., a measure of the solution’s acidity. The term (from French, *pouvoir hydrogène*, or literally, “hydrogen power”) is defined as the negative logarithm of the concentration of H^+ ions (protons): $pH = -\log_{10} [H^+]$, where $[H^+]$ is the concentration of H^+ ions in moles per liter (see *Mole*). Because H^+ ions associate with water molecules to form hydronium (H_3O^+) ions (see *Acid* and *Base*), pH also is often expressed in terms of the concentration of hydronium ions. In pure water at 22° C (72° F), H_3O^+ and hydroxyl (OH^-) ions exist in equal quantities; the concentration of each is 0.107 moles/liter. Consequently, the pH of pure water is $-\log(0.107)$, which equals $\log 107$, or 7. If an acid is added to water, however, an excess of H_3O^+ ions is formed; their concentration can range between 0.106 and 0.10 moles/liter, depending on the strength and amount of the acid. Therefore, acid solutions have a pH ranging from 6 (for a weak acid) to 1 (for a strong acid). Inversely, a basic solution has a low concentration of H_3O^+ ions and an excess of OH^- ions, and the pH ranges from 8 (for a weak base) to 14 (for a strong base). The presence and concentration of many dissolved chemical constituents found in water are, in part, influenced by the hydrogen-ion activity of water. Biological processes including growth, distribution of organisms, and toxicity of the water to organisms are also influenced, in part, by the hydrogen-ion activity of water.

Phagotroph — An organism that obtains nutrients through the ingestion of solid organic matter. This class of organism includes all animals from the simplest, single-celled animal (for example, the protozoa) to the higher life forms. Organisms have some type of device to ingest particles, a digestive system, and a system to discard waste products. Contrast with *Osmotroph*.

Phase — (Chemistry) Any of the forms or states, solid, liquid, gas, or *Plasma*, in which matter can exist, depending on temperature and pressure; a discrete homogeneous part of a material system that is mechanically separable from the rest, as is ice from water.

Phase Rule — (Physics) A rule stating that the number of degrees of freedom in a material system at equilibrium is equal to the number of *Components* minus the number of *Phases* plus the constant 2. For example, the system of water vapor, liquid water, and solid ice has zero degrees of freedom because the three phases of vapor, liquid, and solid coexist in one component, water. A solution of salt in water, for example, is a chemical system in which the components are salt and water. The chemical components of a system can exist as gas, liquid, or solid phases. The phase rule is applicable only to systems, called heterogeneous systems, in which two or more physically distinct phases are in equilibrium. A system cannot contain more than one gas phase but can contain any number of liquid and solid phases. A water solution of salt contains three phases: Salt comprises the solid phase, water comprises the liquid phase, and water vapor formed by evaporation of the water comprises the gas phase. Water is an example of a heterogeneous chemical system of one component. The liquid and gas phases, water and water vapor, coexist over a wide range of temperatures and pressures. At one temperature and pressure, called the *Triple Point*, all three phases of water (liquid), water vapor (gas), and ice (solid) coexist at equilibrium. The phase rule is expressed by the equation $F = C - P + 2$, where “F” is the number of variables (usually temperature, pressure, and concentration) that can be changed without causing the disappearance of a phase or the appearance of a new one. “C” represents the number of chemical components of the system and “P” the number of phases present.

Phenology — The science of appearances through and attempt to understand nature’s “clocks and calendars.” Today, it has taken on a meaning that links biological events and seasonal weather changes. These events include the hibernation of animals, the sprouting and flowering of plants, changing of leaf color, and the migration of birds.

Phenols — A group of organic compounds that in very low concentrations produce a taste and odor problem in water and which in higher concentrations are toxic to aquatic life. They are byproducts of petroleum refining, tanning, and textile, dye, and resin manufacturing processes.

Phenolphthalein Alkalinity — The alkalinity in a water sample measured by the amount of standard acid needed to lower the pH to a level of 8.3 as indicated by the change of color of the phenolphthalein from pink to clear.

Phosphates — General term used to describe phosphorus-containing derivatives of phosphoric acid (H_3PO_4). The chemical containing the phosphate group (PO_4^{-3}) can be either organic or inorganic and either particulate or dissolved. Phosphates constitute an important plant nutrient. Also see *Carlson’s Trophic State Index (TSI)*, *Total*

Inorganic Nitrogen (TIN), and Total Inorganic Phosphate (TIP).

- Phosphoric Acid** — A term applied to any of three oxygen acids of phosphorus known respectively as ordinary or orthophosphoric, pyrophosphoric, and metaphosphoric acids. The most common form, orthophosphoric acid, or simply phosphoric acid, H_3PO_4 , is a syrup-like compound and an important ingredient in fertilizers. However, to be available for use by plants, the phosphates must be soluble in water or plant juices. Insoluble normal phosphates, as mineral phosphates, are therefore often converted into soluble acid salts by treatment with sulfuric acid. Phosphoric acid, when used as a fertilizer ingredient, is often blamed for excessive algae growth and oxygen losses in rivers and is frequently a leading toxin to aquatic life.
- Phosphorus** — (1) An element that is essential to plant life but contributes to an increased trophic level (*Eutrophication*) of water bodies. (2) One of the three primary nutrients in a complete fertilizer and the second one listed in the formulation on a fertilizer label: 10-8-6 (nitrogen, phosphorus, potassium). Also see *Phosphates* and *Phosphoric Acid*.
- Photic** — (1) Penetrated by or receiving light. (2) Designating or relating to the layer of a body of water that is penetrated by sufficient sunlight for *Photosynthesis*. Also see *Photic Zone*.
- Photic Zone** — The upper water layer down to the depth of effective light penetration where *Photosynthesis* balances respiration. This level (the *Compensation Level*) usually occurs at the depth of 1 percent light penetration (i.e., 1 percent of surface light intensity) and forms the lower boundary of the *Zone of Net Metabolic Production*. Also see *Metabolism*.
- Photoautotroph** — An organism which utilizes carbon dioxide (CO_2) for cell growth and obtains its energy from the sun.
- Photolysis** — The breakdown of a material by sunlight. For example, nitrogen dioxide (NO_2) is split into nitric oxide (NO) and atomic oxygen (O) by the ultraviolet energy in sunlight. Photolysis is also an important degradation mechanism for contaminants in surface water and in the terrestrial environment.
- Photolysis (of Water)** — The lysis of water to give oxygen and hydrogen under the influence of light. This process is the source of the free oxygen formed in photosynthesis.
- Photosynthesis** — The process in green plants and certain other organisms by which carbohydrates are synthesized from carbon dioxide and water using light as an energy source. Most forms of photosynthesis release oxygen as a byproduct. Chlorophyll typically acts as the catalyst in this process.
- Phreatic** — Of or relating to ground water.
- Phreatic Line** — The line marking the upper surface of the *Zone of Saturation* in the soil.
- Phreatic Surface** — A term equivalent to the *Groundwater Surface* or the *Water Table*; the free surface of ground water at atmospheric pressure.
- Phreatic Water** — Synonymous with the *Zone of Saturation*.
- Phreato-Magmatic** — A magma being in contact with ground water which is converted to the vapor phase.
- Phreatophyte** — (1) Literally, a water-loving plant, one that thrives in wet sites and/or has the ability to tap deep saturation zones. (2) A deep rooted plant that obtains its water from the water table. (3) A plant that habitually obtains its water supply from the *Zone of Saturation*, either directly or through the *Capillary Fringe*.
- Phycology** — The study of algae.
- Physical-Chemical Treatment Processes** — A means of wastewater treatment using both physical and chemical processes.
- Physical Landscape** — Natural land forms and associated natural phenomena of a region.
- Physical Weathering** — The breaking down of parent rock into bits and pieces by exposure to temperature changes and the physical action of moving ice and water, growing roots, and human activities such as farming and construction. Compare to Chemical Weathering.
- Physiographic Divisions** — (Geography) Broad land groupings based on the physical features of the landscape.
- Physiographic Province** — (Geography) A region of similar structure and climate that has had a unified *Geomorphic* history.
- Physiography** — Description of nature or natural phenomenon in general; physical geography.
- Phytometer** — A device for controlling the input of water to a plant, usually simply a sealed pot, that can be weighed so as to evaluate water use and growth.
- Phytoplankton** — Microscopic floating plants, mainly algae, that live suspended in bodies of water and that drift about because they cannot move by themselves or because they are too small or too weak to swim effectively against a current.
- Phytoplankton Die-Off** — An abrupt, massive mortality of *Phytoplankton* resulting from natural or manmade causes.
- Phyto-Remediation (Phytoremediation)** — The use of plants to cleanse polluted and contaminated soils. Under this

process, certain plants (e.g., sunflowers and Indian mustard) are highly effective in removing heavy metals and other toxic wastes through their uptake of water in the soil, a process which may be enhanced by the addition of chemicals to facilitate the absorption process. The plants are then harvested and discarded in a specially designated site or sent to a smelter where the metals can be extracted and sold off. The process, of course, is limited to the depth of the plant's roots.

Phytotoxicant — A chemical that can damage or kill plants in aquatic environments.

Phytotoxicity — The ability of chemicals to damage or kill plants in aquatic environments.

Picocurie (PC, pCi) — One trillionth (1×10^{-12}) of the amount of radioactivity represented by a curie (Ci). A curie is the amount of radioactivity that yields 3.7×10^{10} radioactive disintegrations per second. A picocurie yields 2.22 dpm (disintegrations per minute).

Piedmont — (1) An area, plain, slope, glacier, or other feature at the base of a mountain, for example, a foothill or a *Bajada*. In the United States, the Piedmont (region) is a plateau extending from New Jersey to Alabama and lying east of the Appalachian Mountains. (2) Lying or formed at the base of a mountain or mountain range; for example, a piedmont terrace or a piedmont pediment.

Piedmont Slope — A major physiographic part of an *Intermontane Basin* that comprises all of the constructional and erosional, major and component landforms from the basin floor to the mountain front and on into alluvium-filled mountain valleys.

Pier — (1) A structure or platform which extends from the shore out into a body of water, supported by piles or pillars, and serves primarily for mooring and landing ships or boats. (2) A structure (as a breakwater) extending into navigable water for use as a landing place or promenade or to protect or form a harbor. Frequently used synonymously with *Jetty*.

Piezometer — (1) An instrument used to measure pressure head in a conduit, tank, soil, etc. It usually consists of a small pipe or tube tapped into the side of the container, so that the inside end is flush with, and normal to, the water face of the container and is connected with a manometer pressure gage, mercury or water column, or other device for indicating pressure head. (2) An instrument for measuring pore water pressure within soil, rock, or concrete. (3) Also, an instrument for measuring the compressibility of liquids.

Piezometer (Open Well) — A well structure or tube which allows the level of saturation within a dam to be measured.

Piezometric Head — Synonymous with *Hydraulic Head*, which is now commonly used.

Piezometric Surface — An imaginary surface that everywhere coincides with the static level of the water in the aquifer. This term is now generally considered to be obsolete, being replaced by the term *Potentiometric Surface*.

Piezometry — (Physics) The measurement of the compressibility of liquids.

Pingo — An Arctic mound or conical hill, consisting of an outer layer of soil covering a core of solid ice.

Pioneer Plants — *Herbaceous* annual and seedling perennial plants that colonize bare areas as a first stage in secondary succession.

Pipeline — A conduit of pipe, especially one used for the conveyance of water, gas, or petroleum products.

Piping — (1) The progressive development of erosion of a dam structure by seepage, appearing downstream of the dam as a hole or seam discharging water that contains soil particles. (2) The process by which water forces an opening around or through a supposedly sealed structure, such as a check dam or levee. As water flows through, the opening usually grows larger and the water carries away sediment or levee material. Also referred to as *Internal Erosion*.

Pirate Stream — One of two streams in adjacent valleys that has been able to deepen its valley more rapidly than the other, has extended its valley headward until it has breached the divide between them, and has captured the upper portion of the neighboring stream.

Pitot Tube — An instrument used to measure the velocity of flowing water, with the velocity head of the stream an index of velocity. It consists essentially of an orifice held to a point upstream in the water, connected with a tube in which the rise of water due to velocity head may be observed and measured. It also may be constructed with an upstream and downstream orifice, with two water columns, in which case the difference in height of the water columns in the tubes is the index of velocity.

Pitting — The construction of pits or basins of suitable capacity and distribution to retain water and increase infiltration on rangeland.

Place of Use — The specific location, typically documented in a water right permit, where water is applied or used. A water user cannot use water at another location without transferring the right or obtaining a new right.

Place of Use Limitation — In the context of water law, the act of defining a water right so that the owner of the right may not freely change the place of use without consideration of the effect of such change on other water users.

Placer — (Geology) (1) A glacial or alluvial deposit of heavy minerals such as gold or platinum concentrated in stream

or beach gravels. (2) A place where a placer deposit is washed to extract its mineral content.

Plain — (1) Level or gently rolling land, usually below 2,000 feet (610 meters) in elevation. (2) A flat, undulating, or even rolling area, larger or smaller, that includes few prominent hills or valleys, that usually is at low elevation in reference to surrounding areas, and that may have considerable overall slope and local relief.

Plan — A compilation of goals and objectives, policy statements, and implementation strategies for guiding the physical, social, and/or economic development of an area or region; may be comprehensive or may relate to a specific resource, i.e., a *Water Resource Plan* which assesses both sources and use of water and develops strategies for their most effective and efficient use.

Plane — To skim across the surface of the water.

Plankton — (1) Minute floating forms of microscopic plants and animals in water which cannot get about to any extent under their own power. (2) The community of suspended, floating, or weakly swimming organisms that live in the open water of lakes and rivers. They form the important beginnings of food chains for larger animals. Concentrations are expressed as a number of cells per milliliter (cells/mL of sample). Also see *Zooplankton*.

Plankton Bloom — A large quantity of plankton giving water a definite color. Pond water usually appears green because the majority of plankton organisms are greenish, but plankton blooms may also appear black, yellow, red, brown, or blue-green.

Planning — A comprehensive study of present trends and of probable future developments, together with recommendations of policies to be pursued. Planning embraces such subjects as population growth and distribution; social forces; availability of land, water, minerals, and other natural resources; technological progress; and probable future revenues, expenditures, and financial policies. Planning must be responsive to rapidly changing conditions.

Planning Horizon — The overall time period considered in the planning process that spans all activities covered in or associated with the analysis or plan and all future conditions and effects or proposed actions which would influence the planning decisions.

Plant Community — (Biology) An assemblage of plants characterized or dominated by certain species.

Plant Nutrients — The primary mineral ingredients of fertilizer: phosphate (PO_4^{-3}), nitrate (NO_3^-), and ammonium (NH_4^+), together with an extensive array of chemical elements (*Trace Elements*) used in lesser amounts to support the growth of plants.

Plash — (1) To cause a splashing or spattering effect. (2) To break the surface of the water; to splash.

Plasma — (Physics) An electrically neutral, highly ionized gas composed of ions, electrons, neutral particles. It is a *Phase* of matter distinct from solids, liquids, and normal gases.

Plasmolysis — Shrinkage or contraction of the protoplasm away from the wall of a living plant or bacterial cell, caused by loss of water through *Osmosis*.

Plastic Soil — A soil capable of being molded or deformed continuously and permanently, by relatively moderate pressure into various shapes.

Plate Boundaries — (Geology) According to the theory of *Plate Tectonics*, the locations where the rigid plates that comprise the crust of the earth meet. The plates move slowly on the molten material beneath in the process called *Continental Drift*. As the plates meet, the boundaries can be classified as divergent (places where the plates are moving apart, as at the mid-ocean ridges of the Atlantic Ocean), convergent (places where the plates are colliding, as at the Himalayas Mountains), and transform (places where the plates are sliding past each other, as the San Andreas fault in California).

Plate Tectonics — (Geology) The concept that both continents and ocean basins are only the emergent parts of large pieces or plates of the earth's surface. It is generally agreed that the global surface can be divided into at least twenty discrete plates (seven major and many minor) with each plate moving in a different direction from that of its neighbor. It is this motion that creates the variety of features of the earth as well as leads to instability along the plate edges. The motion of the plates is believed to be caused by tremendous heat and pressure built up beneath the relatively thin veneer of the overlying plates. The motion of the plates is characterized by spreading centers whereby molten rock is forced to the surface to form new crustal rocks, and collision zones where plates meet and the older, heavier plate is forced beneath the newer, lighter plate to be turned into a molten state once again deep beneath the earth's surface. This subduction process builds up the mountains along the collision line and results in considerable seismic activity. The seven major plates are named for the continents or oceans and include Pacific, Eurasian, African, Australian, North American, South American, and Antarctic. Also see *Plate Boundaries*.

Plateau — A level, elevated land area, usually between 2,000 and 6,000 feet (610–1,830 meters) in elevation.

Playa — (1) Generally, a dry or intermittently dry lakebed in the lowest spot of a closed valley. (2) An ephemerally flooded, barren area on a basin floor that is veneered with fine textured sediment and acts as a temporary or the final sink for drainage water (3) Also, a nearly level area at the bottom of an undrained desert basin, sometimes

temporarily covered with water. Salt contents are generally quite high. The term *Playa* is interchangeable with the term *Sink*.

Playa Lake — A temporary lake formed in a *Playa*. A shallow, intermittent lake in an arid region, occupying a *playa* in the wet season but drying up in the summer; an ephemeral lake that upon evaporation leaves or forms a *playa*.

Pleistocene — (Geology) Of, belonging to, or designating the geologic time, rock series, and sedimentary deposits of the earlier of the two epochs of the Quaternary Period. This epoch was characterized by the alternate appearance and recession of northern glaciation and the appearance of the progenitors of human beings. Also commonly referred to as the *Ice Age*, the Pleistocene covered a period of time from about 2 million years ago to 10,000 years ago and immediately preceded the Holocene Epoch, or the period from 10,000 years ago to the present. The late Pleistocene is generally considered to be the Wisconsinan Age (North America), which extended from about 300,000 years ago to 10,000 years ago and the beginning of the Holocene.

Plouston — (1) Plants that float on the surface of bodies of fresh water. (2) Organisms living in the thin surface layer existing at the air-water interface of a body of fresh water.

Plimsoll's Mark — (Nautical) The load-line mark conspicuously painted originally on the sides of all British merchant vessels and used to indicate the limit of submergence allowed by law. A similar mark has been required since 1930 on all ships registered in the United States.

Pliocene — (Geology) The epoch immediately preceding the *Pleistocene* which lasted for about 10 million years' duration from about 12 million years ago to about 2 millions years ago.

Plop — To fall with a sound like that of an object falling into water without splashing.

Plow, or Plough — To cleave the surface of or move through water.

Plug — (1) The procedure by which a well is sealed after it has been abandoned. (2) Cement, grout, or other material used to fill and seal a hole drilled for a water well.

Plug Flow — A type of flow that occurs in tanks, basins, or reactors when a slug of water moves through without ever dispersing or mixing with the rest of the water flowing through.

Plugging — The act or process of stopping the flow of water, oil, or gas into or out of a formation through a borehole or well penetrating that formation.

Plumb — A weight on the end of a line, used to determine water depth.

Plumber — One who installs, repairs, and maintains piping, fittings, and fixtures involved in the distribution and use of water in a building.

Plumbing — The pipes, fixtures, and other apparatus of a water, gas, or sewage system in a building.

Plume — (1) (Ecology) A space in air, water, or soil containing pollutants released from a point source. (2) (Water Pollution) A relatively concentrated mass of emitted chemical contaminants spreading in the environment. In surface water, the effluent added to a receiving stream near a point source. For example, when a heated-water discharge is added to a stream, the heated water does not mix immediately with the stream water. The mass of hot water remains detectable for some distance downstream. In groundwater, the *Leachate* leaking down-gradient from a site of buried waste material.

Plunge — To thrust or cast oneself into, or as if into, water.

Pluvial — (1) Of having to do with rain; rainy. (2) To flow, pour, or fill. (3) (Geology) Formed or caused by the action of rain, as a pluvial deposit. (4) (Geology) More specifically, the two or more Wisconsin stages, of the late *Pleistocene* age (epoch), when the western United States waterbasins were filled with lakes. The *Early Pluvial* period consisted of periods of high humidity so remote as to have left no clear-cut shore features; the *Postpluvial* period represented a period of desiccation following the last high lake stage.

Pluvial Lake — A lake formed during a pluvial (rainy) period.

Pluvial Period — A period of increased rainfall and decreased evaporation, which prevailed in nonglaciated areas during the time of ice advance elsewhere.

Pluviometer — A *Rain Gauge*.

Pluvius — Characterized by heavy rainfall; rainy.

Pocosin — An upland swamp of shallow water of the coastal plain of the Southeast United States; a "Dismal", as used in the southern United States.

Pogonip — A term used in the Western United States denoting a dense winter fog containing frozen particles, formed in the deep valleys of the Sierra Nevada.

Point Bar — A bank on the inside of a meander bend that has built up due to sediment deposition opposite a pool.

Point Discharge — The instantaneous rate of discharge, in contrast to the mean rate for an interval of time.

Point of Compliance (POC) — (Water Quality) For a hazardous waste treatment, storage, or disposal facility, the location, specified by the operations permit of the facility, for downgradient wells. The wells are placed to detect

the presence of any contaminants released from the facility into groundwater that will move into the uppermost aquifer in the area.

Point of Diversion — The point from which water is diverted from a source.

Point(s) of Diversion — Broadly, the point(s) specified in a water right permit from which water is diverted from a source. Also refers to a river, stream, canal, or reservoir where irrigation water is diverted into an irrigation project.

Point-of-Entry (POE) Treatment Device — (Water Quality) A treatment device applied to the drinking water entering a house or building to reduce the contaminants in the water distributed throughout the house or building.

Point-of-Use (POU) Treatment Device — (Water Quality) An approach to the management of the quality of drinking water that locates a water treatment device at the faucet in an individual household. Such devices are sometimes used in homes supplied by a private well that does not meet drinking water standards.

Point Pollution Source — See *Point Source (PS)*.

Point Precipitation — Precipitation at a particular site, in contrast to the mean precipitation over an area.

Point Source (PS) — (1) A stationary or clearly identifiable source of a large individual water or air pollution emission, generally of an industrial nature. (2) Any discernible, confined, or discrete conveyance from which pollutants are or may be discharged, including (but not limited to) pipes, ditches, channels, tunnels, conduits, wells, containers, rolling stock, concentrated animal feeding operations, or vessels. Point source is also legally and more precisely defined in federal regulations. Contrast with *Non-Point Source (NPS) Pollution*.

Point Source (PS) Pollution — (1) Pollution originating from any discrete source. (2) Pollutants discharged from any distinct, identifiable point or source, including pipes, ditches, channels, sewers, tunnels, wells, containers of various types, concentrated animal-feeding operations, or floating craft. Also referred to as *Point Source of Pollution*. Also see *Non-Point Source (NPS) Pollution*.

Point Waste Load Allocation — The amount of a particular pollutant a *Point Source*, e.g., a wastewater treatment facility, can discharge over a specified period of time into a receiving body of water. Allocations are a result of agreed upon water quality standards for a stream.

Polar (Ice) Cap — (1) Either of the regions around the poles of the earth that are permanently covered with ice. (2) A high-altitude icecap. (3) (Astronomy) Either of the regions around the poles of Mars that are covered with frozen carbon dioxide (CO₂) and water.

Polder — An area of low-lying land, especially in the Netherlands, that has been reclaimed from a body of water and is protected by dikes.

Policy — (Water Planning) A statement of governmental intent against which individual actions and decisions are evaluated. The wording of policies conveys the level of commitment to action, for example, policies which use the word “shall” are mandatory directives, while those using the word “should” are statements of direction to be followed unless there are compelling reasons to do otherwise. Also see *Water Planning* and *Water Policy*.

Polishing — (Water Quality) The removal of low concentrations of dissolved, recalcitrant organic compounds from either water intended for human consumption or wastewater that has been subjected to *Primary* and *Secondary Wastewater Treatment*. The passage of water through a charcoal filtering device is a frequently employed polishing technique.

Pollutant — (1) Something that pollutes, especially a waste material that contaminates air, soil, or water. (2) Any substance of such character and in such quantities that when it reaches a body of water, soil, or air, it is degrading in effect so as to impair their usefulness or render them offensive. (3) Any solute or cause of change in physical properties that renders water unfit for a given use.

Polluted — Something which contains foreign substances.

Pollution — (1) Any alteration in the character or quality of the environment which renders it unfit or less suited for certain uses. With respect to water, the alteration of the physical, chemical, or biological properties by the introduction of any substance that adversely affects any beneficial use. (2) Adverse and unreasonable impairment of the beneficial uses of water even though no actual health hazard is involved. Under the Clean Water Act (CWA), for example, the term is defined as the manmade or man-induced alteration of the physical, biological, chemical, and radiological integrity of water.

Pollution Indicator Organism — (Water Quality) A plant or animal species that is not normally present in an aquatic environment unless the body of water has been subjected to damage by pollution. For example, *Escherichia coli* is a bacterium that is not found in the aquatic environment unless the system has been contaminated by the addition of fecal material. The organism signals the presence of pollution.

Polyacrylamides (PAMs) — Synthetic polymers with extensive water-retention and water-saving capabilities used to halt erosion and promote dryland farming. The polymers used are long-lasting, gel-forming, water-absorbing

materials that can absorb more than 400 times their weight in distilled or pure water. While commercial florists have used PAMs for a number of years, the polymers are now available on a commercial scale to where farmers can incorporate them into the soil like powdered fertilizers and pesticides. In addition to direct application to both soil and irrigation water, the polymers may also be woven into a fabric to cover the surface for weed control and additional moisture conservation.

Polychlorinated Biphenyls (PCBs) — A group of synthetic, toxic industrial chemical compounds once used in making paint and electrical transformers which are chemically inert and not biodegradable. PCBs were frequently found in industrial wastes, and subsequently found their way into surface and ground waters. As a result of their persistence, they tend to accumulate in the environment. In terms of streams and rivers, PCBs are drawn to sediment, to which they attach and can remain virtually indefinitely. Although virtually banned in 1979 with the passage of the Toxic Substances Control Act, they continue to appear in the flesh of fish and other animals.

Polychlorinated Naphthalenes (PCNs) — Industrial chemicals that are mixtures of chlorinated naphthalene compounds. They have properties and applications similar to polychlorinated biphenyls (PCBs) and have been identified in commercial PCB preparations.

Polycyclic Aromatic Hydrocarbons/Polaromatic Hydrocarbons (PAHs) — Polycyclic aromatic hydrocarbons, or PAHs, are a class of very stable organic molecules made up of only carbon and hydrogen. These molecules are flat, with each carbon having three neighboring atoms much like graphite. An example is the PAH coronene, with chemical symbol $C_{24}H_{12}$. These molecules are highly carcinogenic, but they are also very common. PAHs are a group of over 100 different chemicals that are formed during the incomplete burning of coal, oil and gas, garbage, or other organic substances like tobacco or even charbroiled meat (such as benzo[a]pyrene). PAHs are usually found as a mixture containing two or more of these compounds, such as soot. Some PAHs are manufactured. These pure PAHs usually exist as colorless, white, or pale yellow-green solids. PAHs are found in coal tar, crude oil, creosote, and roofing tar, but a few are used in medicines or to make dyes, plastics, and pesticides. PAHs are also present in marine conditions where heavy motorboat traffic exists. Some characteristics of PAHs are shown below:

- [1] PAHs enter the air mostly as releases from volcanoes, forest fires, burning coal, and automobile exhaust.
- [2] PAHs can occur in air attached to dust particles.
- [3] Some PAH particles can readily evaporate into the air from soil or surface waters.
- [4] PAHs can break down by reacting with sunlight and other chemicals in the air, over a period of days or weeks.
- [5] PAHs enter water through discharges from industrial and wastewater treatment plants or through marine engine exhaust releases.
- [6] Most PAHs do not dissolve easily in water. They stick to solid particles and settle to the bottoms of lakes or rivers.
- [7] Microorganisms can break down PAHs in soil or water after a period of weeks or months.
- [8] In soils, PAHs are most likely to stick tightly to particles; certain PAHs move through soil to contaminate underground water.
- [9] PAH contents of plants and animals may be much higher than PAH contents of soil or water in which they live, indicating a tendency towards *Bioaccumulation*.

Polynuclear Aromatic Hydrocarbons (PNAs) — A group of highly reactive organic compounds, such as naphthalene and biphenyls, that are a common component of creosotes, which can be carcinogenic.

Polyelectrolyte — (Water Quality and Wastewater Treatment) A high molecular weight substance which results in charged ions upon dissolving in water. Organic polyelectrolytes, also referred to simply as polymers, such as starches and gums, are widely used in the flocculation process and as coagulant aids in water and wastewater treatment. The three basic types of polymers for water clarification are *cationic*, *anionic*, and *non-ionic*. Cationic polymers can be used in place of, or as a supplement to, inorganics in primary coagulation. Anionic and non-ionic polymers have greater size and weight and are most effective as flocculants or coagulant aids. Anionic polymers are preferred for wastes containing inorganic solids, while cationics are better for treatment of oily water and biologically active sludges.

Polyhaline — Term to characterize water with salinity of 18 to 30‰ (parts per thousand), due to ocean salts.

Polynya — (Russian) An area of open water surrounded by sea ice.

Polysaline — Term to characterize water with salinity of 18 to 30‰ (parts per thousand), due to land-derived salts.

Polymer — A substance which consists of giant molecules formed by the linkage of simple molecules (monomers). The linkage process is a chemical reaction called polymerization. In the water and wastewater treatment process, polymers are also referred to as *Polyelectrolytes*.

- Pond** — A body of water smaller than a lake, often artificially formed.
- Pond Scum** — A mass of filamentous algae forming a green scum on the surface of ponds and other such bodies of water.
- Pond, Wastewater Stabilization** — (Water Quality) An impoundment area for water, natural or artificial, into which untreated or partially treated wastewater is discharged and in which natural purification and stabilization processes take place under the influence of sunlight, air, and biological activity. Also see *Lagoon*.
- Pondage** — (1) The holding back of water for later release for power development above the dam of a hydroelectric plant to: (a) equalize daily or weekly fluctuations of streamflow, or (b) to permit irregular hourly use of water by the wheels to take care of fluctuations in the load demand. (2) The water so held back and later released. (3) The storage capacity available for the use of such water.
- Pool** — (1) A location in an active stream channel, usually located on the outside bends of meanders, where the water is deepest and has reduced current velocities. (2) A deep reach of a stream; a part of the stream with depth greater than the surrounding areas frequented by fish. The reach of a stream between two riffles; a small and relatively deep body of quiet water in a stream or river. Natural streams often consist of a succession of pools and riffles.
- Pool-Riffle Ratio** — The ratio of pool and riffle areas, or pool and riffle length in a given stream reach.
- Popple** — To move in a tossing, bubbling, or rippling manner, as choppy water.
- Population** — (Statistics) The total number of potential observations in a specific category, for example, the human population of a particular city, or the number of animals of a particular species within a defined area. Typically, measurements of the behavior and characteristics of the population are not possible and therefore a *Sample* is selected which, if an *Unbiased Sample*, will, even in its limited numbers, be representative of the characteristics of the total population.
- Population Density** — (1) The number per unit area of individuals of any given species at a given time. (2) (Water Planning) The number of people in a given area. The number may be obtained by multiplying the number of dwelling units per unit area (e.g., square mile, square kilometer, acre, etc.) by the number of residents per dwelling unit.
- Population Equivalent (PE)** — (Water Quality) A way to express the strength of industrial waste in terms of the comparable amount of *Biochemical Oxygen Demand (BOD)* in the household wastewater produced by one person. An industrial waste that has a PE of 1,000 is equivalent to the BOD of waste produced by 1,000 people.
- Pore** — Synonymous with *Interstice (Interstitial)*.
- Pore Pressure** — Pressure exerted by fluid in the void space of soil or rock; the interstitial (pore) movement of water that may take place through a dam, its foundation, or its abutments.
- Pore Space** — That portion of rock or soil not occupied by solid mineral matter and which may be occupied by ground water.
- Porosity** — Most generally, porosity is the property of containing openings or interstices. In rock or soil, it is the ratio (usually expressed as a percentage) of the volume of openings in the material to the bulk volume of the material. With respect to water, porosity is a measure of the water-bearing capacity of a formation. However, with respect to water extraction and movement, it is not just the total magnitude of porosity that is important, but the size of the voids and the extent to which they are interconnected, as the pores in a formation may be open, or interconnected, or closed and isolated. For example, clay may have a very high porosity with respect to potential water content, but it constitutes a poor medium as an aquifer. More important in this respect are a formation's *Effective Porosity* (defined below) and its *Specific Retention*.
- Porosity, Effective** — The amount of interconnected pore space in a material available for fluid transmission; expressed as a percentage of the total volume occupied by the interconnecting interstices. Porosity may be primary, formed during deposition or cementation of the material, or secondary, formed after deposition or cementation, such as fractures.
- Porous** — A condition which allows liquids to pass through.
- Port** — (1) A place on a waterway with facilities for loading and unloading ships; a city or town on a waterway with such facilities. Also, the waterfront district of a city. (2) A place along a coast that gives ships and boats protection from storms and rough water; a *Harbor*.
- Positive Association** — (Statistics) The direct relationship between two *Variables*, the values of which fluctuate together, in the same direction.
- Post-Closure Plan** — A document prepared by a hazardous waste treatment, storage, or disposal facility outlining the groundwater monitoring and reporting, waste containment provisions, and security arrangement for the 30-year period following closure.
- Postdiluvian, also Postdiluvial** — (Biblical) Existing or occurring after *The Flood*.

Postglacial — Relating to or occurring during the time following a glacial period.

Potable Water — Water that is drinkable. Specifically, freshwater that generally meets the standards in quality as established in the U.S. Environmental Protection Agency (EPA) *Drinking Water Standards* for drinking water throughout the United States. Potable water is considered safe for human consumption and is often referred to as *Drinking Water*. Freshwater that exceeds established chloride and dissolved solids limits is often referred to as slightly saline, brackish, or nonpotable water and is either diluted with fresher water or treated through a desalination process to meet potable-water standards for public supply. Also see *Drinking Water Standards* and *Drinking Water Standards [Nevada]*. [Appendix B-3 presents a listing of Nevada's current drinking water primary and secondary quality standards. Also see Appendix B-1 and B-2 for *Safe Drinking Water Act (SDWA)* regulated contaminants and proposed contaminants to be regulated. Also see Appendix B-6, Water Treatment — Disinfectants, Appendix B-7, Water Treatment — Processes, and Appendix B-8, Water Treatment — Technologies.]

Potamon Zone — Stream reach at lower elevations characterized by reduced flow, higher temperature, and lower dissolved oxygen levels. Also see *Rhithron Zone*.

Potential — (1) (Hydrology and Hydraulics) Any of several scalar variables, each involving energy as a function of position or condition; of relevance here is the fluid potential of ground water. (2) (Water Quality) A water quality issue or problem identified by a river authority as being a potential problem, or a problem without current supporting data.

Potential Drop — Difference in total head between two *Equipotential Lines*.

Potential Energy — The energy available in a substance because of position (e.g., water held behind a dam) or chemical composition (hydrocarbons). This form of energy can be converted to other, more useful forms (for example, hydroelectric energy from falling water).

Potential Evapotranspiration — (1) The maximum quantity of water capable of being evaporated from the soil and transpired from the vegetation of a specified region in a given time interval under existing climatic conditions, expressed as depth of water. (2) The water loss that will occur if at not time there is a deficiency of water in the soil for use by vegetation.

Potential Natural Water Loss — The water loss during years when the annual precipitation greatly exceeds the average water loss. It represents the approximate upper limit of water loss from the type and density of vegetation native to a basin, under conditions of actual moisture supply and other basin characteristics, in contrast to *Potential Evapotranspiration* which represents a hypothetical condition where there is no deficiency of water in the soil for use by the type and density of vegetation that would develop.

Potential Rate of Evaporation — The rate of evaporation under the existing atmospheric conditions from a surface of water that is chemically pure and has the temperature of the atmosphere. Also referred to as *Evaporativity*.

Potential Supply — That part of the resource base that has the potential for development or further expansion.

Potential Yield (or Well Capacity) — The maximum rate at which a well will yield water under a stipulated set of conditions, such as a given drawdown, pump, and motor or engine size. Well capacity may be expressed in terms of gallons per minute, cubic feet per second, or other similar units.

Potentiometric Surface — A surface which represents the static head of ground water in tightly cased wells that tap a water-bearing rock unit (i.e., aquifer). In relation to an aquifer, the potentiometric surface is defined by the levels to which water will rise in tightly cased wells. If the head varies significantly with depth in the aquifer, then there may be more than one potentiometric surface. The *Water Table* is a particular potentiometric surface for an *Unconfined Aquifer*. This term has generally replaced the term *Piezometric Surface*.

Pothole — (1) A deep hole or pit, especially a deep, round hole formed in the rock of a river bed by gravel whiling in water. (2) A rough hole formed in a road surface from a combination of weathering and the wear of vehicular traffic. Also referred to as *Chuckhole*.

Potometer — An apparatus for measuring the rate of transpiration in a plant by determining the amount of water absorbed.

Pour — (1) To make a liquid stream or flow, as from a container. (2) To rain hard or heavily.

Pour Point — The lowest temperature at which a liquid will pour under given conditions.

Practically Irrigable Acreage (PIA) — The standard (as established in *Arizona v. California*, 373 U.S. 546 [1963], decreed in final form, 376 U.S. 340 [1964], decree amended, 383 U.S. 268 [1966], second supplemental decree entered, 466 U.S. 144 [1984]) for quantifying reserved water rights on an Indian reservation set aside with the intent that its inhabitants pursue agriculture [or, assumed by extension, water-related economic pursuits, e.g., fish hatcheries]. Under this standard Indian tribes are legally entitled to the amount of water needed to irrigate all practically irrigable acreage within their reservation boundaries. Furthermore, these water rights have a priority

date equal to the date at which the reservation was established. Under the Winters Doctrine, which is the foundation of this policy, practicably irrigable acreage must meet two criteria: (1) the land must be able to reasonably sustain crops; and (2) the cost of supply water to the crops must not be unreasonable. Also see *Winters Rights (Decision)* and *Water Law [Federal]*.

Prairie — A tract of level to hilly land that has a dominance of grasses and forbs, has a scarcity of shrubs, and is treeless. The natural plant community consists of various mixtures of tall, mid, and short growing native species, known as *true prairie*, *mixed prairie*, and *short-grass prairie*, respectively. Also see *Grasslands*.

Prairie Pothole — A geologic and geographic formation prevalent in the Northern Great Plains region of the United States stretching into Canada and characterized by a depression in the land formed thousands of years ago as a result of retreating *Glaciers* during the last *Ice Age*. These areas form a vast region of *Seasonal Wetlands* accommodating extensive bird populations during their migration and breeding seasons.

Precautionary Drawdown — Release of water from a reservoir or other water impoundment facility initiated by projections that inflows will cause water in the structure to exceed desired levels.

Prechlorination — The addition of chlorine at the headworks of a water treatment plant prior to other treatment processes. Done mainly for disinfection and control of tastes, odors, and aquatic growths, and to aid in coagulation and settling.

Precipitable Water — The total water vapor contained in an atmospheric column of unit cross-sectional area; expressed in terms of water of the same cross-sectional area.

Precipitant — An agent added to a liquid mixture to encourage the formation of solid materials that will settle from the mixture. For example, alum (aluminum sulfate) is added to sewage to promote the formation of *Floc*, which facilitates the removal of organic materials from the wastewater.

Precipitate — A solid which forms from a liquid suspension as a result of a chemical reaction. The material (floc) is insoluble in water and will settle out over time.

Precipitation — (1) The downward movement of water in liquid or solid form from the atmosphere following condensation in the atmosphere due to cooling of the air below the dew point. Includes rain, snow, hail, and sleet. (2) As used in *Hydrology*, precipitation is the discharge of water, in liquid or solid state, from the atmosphere, generally onto a land or water surface. It is the common process by which atmospheric water becomes surface or subsurface water. The term “precipitation” is also commonly used to designate the quantity of water that is precipitated. Forms of precipitation include drizzle, rainfall, glaze, sleet, snow, graupel, small hail, and hail. Also, the process of separating mineral constituents from a solution by evaporation (halite, anhydrite) or from magma to form igneous rocks.

Precipitation, Effective — In agriculture, that portion of the rainfall that remains in the soil and contributes to crop growth.

Precipitation Gage — A device used to collect and measure precipitation.

Precipitation, Initial — Precipitation at the beginning of a storm before the depression storage is fully filled up.

Precipitation, Intensity — The amount or rate of precipitation collected in a unit time interval.

Precipitation, Probable Maximum — The amount of precipitation that is the physical upper limit for a given duration over a particular basin.

Precision — (Statistics) The repeatability of a series of test results; whether the testing method gives the same answer under the same set of circumstances or sampling criteria.

Preference System — State laws or constitutional provisions which establish preferred use for water over other types of uses. Such systems typically rank domestic or municipal use as the highest, then agricultural use second, and industrial and mining uses next. See *Preferred Use* and *Designated Ground Water Basin*.

Preferred Use — A use given some sort of preference not given other uses. Preference can take many forms, depending on state law. One type of use, such as domestic use, may be preferred over others when there are competing applications to appropriate the same water. Persons having water rights for preferred use may be entitled to take water before those having rights for other uses, regardless of their relative priorities. A person needing water for a preferred use may be authorized to condemn (i.e., to buy in a forced judicial sale) water being used for non-preferred purposes. Also see *Designated Ground Water Basin* and *Designated Ground Water Basin [Nevada]*.

Preferred Use [Nevada] — In the interest of public welfare, the state engineer is authorized and directed to designate preferred uses of water within the respective areas so designated by him and from which the ground water is being depleted. In acting on applications to appropriate ground water, he may designate such preferred uses in different categories with respect to the particular areas involved within the following limits: domestic, municipal, quasi-municipal, industrial, irrigation, mining and stock-watering uses and any uses for which a county, city, town, public

water district or public water company furnishes the water.

Preheating — Heating of feedwater prior to desalting in a membrane process in order to render desalting more efficient.

Preliminary Settlement Agreement (PSA) [Nevada] — An agreement reached between the Pyramid Lake Paiute Tribe of Indians and Sierra Pacific Power Company (SPPCo) on May 23, 1989. The PSA provides SPPCo the ability to store its water rights in federally operated reservoirs along the Truckee River in California at times when it is not needed for municipal and industrial (M&I) water supply in the Reno–Sparks Metropolitan Area. In exchange, excess water in storage is used for fishery purposes when drought conditions are not in effect. Also, SPPCo forgoes its right to single-use hydroelectric flows in the Truckee River under the *Orr Ditch Decree [Nevada and California]*, thereby enabling the United States and the Tribe to store water for fishery benefit at certain times of the year. The PSA is incorporated into *Public Law 101–618* (the *Negotiated Settlement*) by reference.

Prescribed Fire (or Burning) — The intentional burning of forest or grassland fuels under conditions specified in an approved plan to meet management objectives and confined to a predetermined area; ignition may be either the result of a scheduled management activity or from other sources (e.g., lightning).

Prescribed Water Rights — (1) Water rights to which legal title is acquired by long possession and use without protest of other parties. (2) Water use rights gained by trespass or unauthorized taking that ripen into a title; on a par with rights to land gained through adverse possession. To perfect the right, the use of water must be adverse, hostile, open and continuous for five continuous years against the recognized water rights holder. Contrast with *Appropriative Water Rights*, *Riparian Water Rights*, and *Littoral Water Rights*.

Prescription — A method of acquisition of title or the use of water by immemorial or long-continued enjoyment. The right of prescription may not exist where water rights laws and a strict permitting process is enforced.

Prescriptive Water Rights — Water rights which are acquired by diverting water and putting it to use in accordance with specified procedures, e.g., filing a request with a state agency to use unused water in a stream, river, or lake.

Presedimentation — (Water Quality) A pretreatment process used to remove gravel, sand, and other gritty material from raw water before it enters the main treatment plant. This is usually done without the use of coagulating chemicals.

Preservation — The natural resources policy that stresses the aesthetic aspects of forests, rivers, wetlands, and other areas and tends to favor leaving such areas in an undisturbed state. Compare with *Conservation*.

Preservative — A chemical added to a water sample to keep it stable and prevent compounds in it from changing to other forms or to prevent microorganism densities from changing prior to analysis.

Pressure (*p*) — Force per unit area. Enclosed fluids exert a force perpendicular to the surface of the containing vessel. The shape of the container does not affect the fluid pressure.

Pressure Filter — (Water Quality) A device used to remove fine particulate matter from water. The filter consists of a filter medium, such as sand or anthracite coal, packed in a watertight vessel.

Pressure Filtration — (Water Quality) A process by which liquid is removed from a sludge by using external pressure to force it through a filter.

Pressure Gage — An instrument, graduated in any units desired, for registering the pressure of solids, liquids, or gases.

Pressure Gradient — The change in pressure with distance, from lower to higher pressure, or vice versa.

Pressure Head — The relative pressure (excess over atmospheric pressure) divided by the unit weight of water; expressed in units of height.

Pressure Relief Pipes — Pipes used to relieve uplift or *Pore Pressure* in a dam foundation or in the dam structure.

Pressure Sewers — A system of pipes in which water, wastewater, or other liquid is pumped to a higher elevation.

Pressure, Static — Pressure exerted by a fluid at rest.

Pressurized Water Reactor (PWR) — A nuclear reactor in which water, heated by nuclear energy, is kept at high pressure to prevent the water from boiling. Steam is then generated in a secondary coolant loop and subsequently this steam is used to turn a turbine which generates electricity.

Presumptive Test — (Water Quality) The first of three steps in the analysis of water or wastewater for the presence of bacteria of fecal origin. Portions of a water sample are inoculated into lactose broth and incubated for 24 hours at 37°C (98.6°F). The presence of acid and gas after that time is a positive test, and the water is presumed to be contaminated. Also see *Confirmed Test* and *Completed Test*.

Pretreatment — (1) Under the *Clean Water Act (CWA)*, the required alteration and/or reduction of certain water pollutants in a waste stream before the wastewater is discharged into a *Publicly Owned Treatment Works (POTWs)*. The purpose of this requirement is to prevent discharges that will reduce the efficiency of the water treatment facility or to treat materials that are not treated or inadequately treated by the facility. (2) Treatment of feedwater

prior to desalting, for example, removal of iron and manganese prior to electro dialysis.

Price (or Pygmy) Current Meter — A (water) current meter with a series of conical cups fastened to a flat framework through which a pin extends. Flowing water rotates the cups around the pin in a horizontal plane, and acoustical or electrical devices register the number of revolutions, from which the velocity of the water can be computed.

Price Elasticity (of Water) — Defined as the ratio of the percent change in the quantity demanded of water (or any other economic good) and the percent change in price, or

$$n_{\text{water}} = \text{Percent Change in } Q_{\text{water}} / \text{Percent Change in } P_{\text{water}}$$

An elastic demand results when the ratio of n_{water} is greater than unity (>1), implying that a given change in price will result in a greater (percentage) change in the quantity demanded. Under such conditions of “elastic demand” for water, consumers tend to be responsive to changes in the price for water. Conversely, an inelastic demand results when the ratio of n_{water} is less than unity (<1), implying that a given change in price will result in a smaller (percentage) change in the quantity demanded. Under such conditions of “inelastic demand,” consumers are relatively unresponsive to changes in the price for water. Along any given (downward sloping) demand curve, the elasticity will vary from inelastic, to unity, to elastic as the price rises further.

Primacy — (1) Term used to denote that individual states have been delegated the authority to implement the requirements, as prescribed by the *U.S. Environmental Protection Agency (EPA)*, of the *Safe Drinking Water Act (SDWA)* and amendments thereto. (2) Primary enforcement responsibility for administration and enforcement of the primary drinking water regulations and related requirements applicable to public water systems within a state.

Primary Cost — (FEMA) The cost of providing the basic floodproofing feature – elevation, flood shield, floodwall or levee.

Primary Data — (Data Analysis) Typically, data acquired by direct interaction, such as direct observation through measurements, tabulation, or surveys. Contrast with *Secondary Data*.

Primary Drinking Water Regulation — Applies to public water systems and specifies a contaminant level, which, in the judgement of the *U.S. Environmental Protection Agency (EPA)* Administrator, will not adversely affect human health.

Primary Drinking Water Standards — Enforceable standards related directly to the safety of drinking water; set by the U.S. Environmental Protection Agency (EPA). Also see *Drinking Water Standards* and *Drinking Water Standards [Nevada]*. [Also see Appendix B-3, Nevada Drinking Water Standards, for a listing of Nevada’s current drinking water primary and secondary quality standards.]

Primary Frontal Dune — A continuous or nearly continuous mound or ridge of sand with relatively steep seaward and landward slopes immediately landward and adjacent to the beach and subject to erosion and overtopping from high tides and waves during major coastal storms. The inland limit of the primary frontal dune occurs at the point where there is a distinct change from a relatively mild slope.

Primary Productivity — A measure of algal productivity or rate of growth in a body of water, the primary productivity measures the mass of carbon used annually by algae per unit area of lake surface. This measure, also referred to as the *Algal Growth Rate*, is expressed as an index figure in grams of carbon per square meter per year, and indicates the state of *Eutrophication* of a body of water. Algal productivity is influenced by the quantities of nutrients that flow into, or fall onto, the lake each year and the number of days of sunshine. Another important factor is the mixing of the lake, which brings up to the surface where algae exist nutrients which have accumulated near the bottom of the lake.

Primary Settling Tank — (Water Quality) A holding tank where raw sewage or other wastewater is retained to allow the settling and removal of particulate material. The material that separates from the suspension is often termed *Sludge*.

Primary Sludge — The *Sludge* produced by primary treatment in a wastewater treatment plant.

Primary Standards — (Water Quality) Standards set by the *U.S. Environmental Protection Agency (EPA)* for the maximum amount of pollutants that can be present in air and water without adverse health effects on humans. The primary standards for drinking water are set for 20 materials, ranging from arsenic to fluoride and from pesticides to radionuclides. Compare to *Secondary Standards*.

Primary Succession — The development of plant and animal communities in a land area that does not contain topsoil, for example in an area covered by lava that has solidified. This type of succession depends on the slow weathering of rock through weathering or biological processes. Compare with *Secondary Succession*.

Primary Wastewater Treatment — (Water Quality) The removal of particulate materials from domestic wastewater, usually done by allowing the solid materials to settle as a result of gravity. Typically, the first major stage of treatment encountered by domestic wastewater as it enters a treatment facility. The wastewater is allowed to stand

in large tanks, termed *Clarifiers* or *Primary Settling Tanks*. Primary treatment plants generally remove 25 to 35 percent of the *Biological Oxygen Demand (BOD)* and 45 to 65 percent of the total suspended matter. Also, any process used for the decomposition, stabilization, or disposal of sludges produced by settling. The water from which solids have been removed is then subjected to *Secondary Wastewater Treatment* and possibly *Tertiary Wastewater Treatment*.

Prime Agricultural Lands — (NRCS) Lands that are in one of the following categories:

- [1] Lands rated as either Class I or Class II in the *Natural Resources Conservation Service (NRCS) Land Capability Classification* system;
- [2] Lands that support livestock used for the production of food and fiber and which have an annual carrying capacity equivalent to at least one animal unit per acre as defined by the U.S. Department of Agriculture; or
- [3] Lands planted with fruit of nut-bearing trees, vines, brush or crops which have a commercial-bearing period on an annual basis.

Farmland, Prime — As defined in the *Farmland Protection Policy Act of 1981*: Land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops, and is available for these uses (urban areas are not included). It has the soil quality, growing season, and moisture supply needed for the economic production of sustained high yields of crops when treated and managed (including water management) according to acceptable farming methods. Prime farmland includes land that is being used currently to produce livestock and timber, but it excludes land committed to urban development or water storage.

Prime Water — Generally, any water delivered via a canal to a headgate; irrigation water released from storage for deliver to a headgate.

Priming — (1) The first filling or first seasonal filling of a canal, reservoir, or other structure with water. (2) Starting the flow, as in a pump or siphon.

Principal Spillway — Allows discharge of water from a reservoir when the water level exceeds the top of the spillway. Principal spillways are used to allow small inflows to be released from the reservoir. Also see *Spillway*.

Prior Appropriation Doctrine — (1) A concept in water law under which a right to a given quantity of water is determined by such a procedure as having the earliest *Priority Date*. (2) The system for allocating water to private individuals used in most of the western United States. The doctrine of *Prior Appropriation* was in common use throughout the arid west as early settlers and miners began to develop the land. The prior appropriation doctrine is based on the concept of “*First in Time, First in Right*”. The first person to take a quantity of water and put it to *Beneficial Use* has a higher priority of right than a subsequent user. Under drought conditions, higher priority users are satisfied before junior users receive water. Appropriative rights can be lost through nonuse; they can also be sold or transferred apart from the land. Contrasts with *Riparian Doctrine* and *Riparian Water Rights*. Also see *Littoral Water Rights* and *Prescribed Water Rights*.

Priority — The concept that the person first using water has a better right to it than those commencing their use later. An appropriator is usually assigned a “priority date”. However, the date is not significant in and of itself, but only in relation to the dates assigned other water users from the same source of water. Priority is only important when the quantity of available water is insufficient to meet the needs of all those having a right to use water. See (*Prior Appropriation Doctrine* and *Appropriative Water Rights*).

Priority Date — The date of establishment of a water right; the officially recognized date associated with a water right. The rights established by application have the application date as the date of priority. Relative to other water rights, the priority date may make a water right senior (predating other rights) or junior (subordinate to other rights). See (*Prior Appropriation Doctrine* and *Appropriative Water Rights*).

Priority of Use and Statutory Preferences — Under appropriation water law systems, priority of use refers to the date a water right is acquired, with senior rights prevailing over junior rights. Priority of use must be distinguished from statutory preferences (designations), which refer to statutory statements of preference among types of beneficial use and would come into play, for example, in deciding which of two concurrent water rights should be satisfied first during a shortage of water or which of two competing applications for a water right should be granted.

Priority Pollutants — (Water Quality) A list of 129 chemicals in 65 classes of chemical materials defined as toxic pollutants by Section 307 of the 1977 *Clean Water Act (CWA)*, which also requires technology-based effluent standards for the control of these chemicals.

Pristine — (Ecology) No trace of human activities; landscape alterations from natural ecological processes only.

Probabilistic Process — The process in which the probability of occurrence of the variables is taken into consideration and their sequence of occurrence is ignored.

Probability — (1) The likelihood that a given event will occur. (2) (Statistics) A number expressing the likelihood

that a specific event will occur, expressed as the ratio of the number of actual occurrences to the number of possible occurrences.

Probability Distribution — The frequency distribution divided by the total number of occurrences (observations), provided that the latter tends to infinity.

Probability of Detection — The likelihood, expressed as a percentage, that a test method will correctly identify a leaking tank.

Probable Maximum Flood (PMF) — (1) The largest flood for which there is any reasonable expectancy in a particular climatic era. (2) The most severe flood that may be expected from a combination of the most critical meteorological and hydrological conditions that are reasonably possible in the drainage basin. It is used in designing high-risk flood protection works and siting or structures and facilities that must be subject to almost no risk of flooding. The probable maximum flood is usually much larger than the 100-year flood.

Probable Maximum Precipitation — The maximum amount of precipitation for a given period that can reasonably be expected to occur in a specific drainage basin.

Process Fluid Stabilization [Nevada] — The condition which results when contaminants in any fluid, including meteoric waters (i.e., precipitation), which are intentionally or unintentionally introduced into any heap leaching or tailings facility are bound or contained or otherwise treated so as to prevent them from degrading the waters of the state under the environmental conditions that may be reasonably expected at the site.

Process Geomorphology — See *Geomorphology, Process*.

Process Variable — A physical or chemical quantity which is usually measured and controlled in the operation of a water treatment plant or industrial plant.

Process Verification — Verifying that process raw materials, water usage, waste treatment processes, production rate and other facts relative to quantity and quality of pollutants contained in discharges are substantially described in the permit application and the issued permit.

Process Wastewater — Any water that comes into contact with any raw material, product, byproduct, or waste.

Process Water — Any water that comes in contact with a new material or product. The water is often released as wastewater following use.

Produced Water — As crude oil is extracted from a well, the water that comes to the surface with the oil. The produced water can constitute a large fraction of the total fluids extracted, and it is either pumped back into an underground formation via an *Injection Well* or discharged to surface water.

Product Water — Output water of a desalting or water treatment plant.

Profile — A graph showing variation of elevation with distance along a traverse or profile cross section. Also referred to as a flood profile if drawn for a specific flood or level of flooding.

Profundal Zone — The deep, bottom-water area beyond the depth of effective light penetration. Includes all the lake floor beneath the *Hypolimnion*.

Project Conveyance Efficiency — The project conveyance efficiency is an expression representing those “losses” (seepage, operation spills, evaporation, etc.) experienced by an irrigation project conveyance system while transporting water from the diversion point to the farm headgate(s). $Project\ Conveyance\ Efficiency = (Total\ Farm\ Headgate\ Delivery\ (in\ acre\text{-}feet\ per\ year) \div (Total\ Diversion\ for\ Irrigation\ at\ Dam\ (in\ acre\text{-}feet\ per\ year))$ expressed as a percentage.

Project Crop Water Requirement — The project crop water requirement is the annual amount of water required to meet the total project’s crop consumptive use plus leaching requirement, and adjusted for natural precipitation (expressed in acre-feet per year).

Project Dependable Capacity (PDC) — The power capacity that a hydropower system can reliably deliver at any time. Due to the uncertainties inherent in hydrologic forecasting, and hence reservoir system inflows, defining what is meant by a reliable power capacity is crucial is this determination and requires extensive computer modeling of historical inflows to the storage system.

Project Efficiency — The project efficiency is a general term referring to the efficiency relating to all aspects of a project’s use of water.

Project Evaluation Period — Expected useful life of a project beginning at the end of the installation of the project.

Project Installation Period — The time period required for construction and installation of a project.

Project Farm Headgate Requirement — The project farm headgate requirement is that amount of water (in acre-feet per year) required at all farm headgates of the project. Project crop water requirement is adjusted for average project farm irrigation efficiency to arrive at this figure: $Project\ Farm\ Headgate\ Requirement = Project\ Crop\ Water\ Requirement \div the\ Average\ Project\ Farm\ Irrigation\ Efficiency$ expressed in acre-feet per year.

Project WET (Water Education for Teachers) [Nevada] — A statewide supplementary, interdisciplinary water

education program with components for the education community (K–12) and the general public. The goal of *Nevada Project WET* is to facilitate and promote the awareness, appreciation, knowledge, and stewardship of Nevada's water resources through the development and dissemination of classroom-ready teaching aides, teacher training, learning materials, and demonstration models as well as the maintenance of a resource bureau. The program is designed to provide useful, unbiased information in a straight-forward, neutral fashion addressing a wide variety of water-related topics to include: atmospheric water, surface water, ground water, water conservation, water pollution, water laws, water users, and competition for limited water resources. *National Project WET* at Montana State University coordinates the individual state WET programs. The Nevada Division of Water Planning (Department of Conservation and Natural Resources), along with the Nevada Cooperative Extension, National Project WET, and the International Office for Water Education, sponsor the Nevada Project WET program. Other water education programs include International Office for Water Education (IOWE) established at Utah State University in 1983 to promote water/science education and the *U.S. Geological Survey's (USGS) National Water Information Clearinghouse (NWIC)* which was established to serve as a focus for the dissemination of water resource information to all levels of government, academia, the private sector, and the general public.

Project Yield — The water supply attributed to all features of a project, including integrated operation of units that could be operated individually. Usually, but not always, it is the same as the firm water yield. Also see *Dependable Supply* and *Firm Yield*.

Projection — (Mathematical) Calculations made into the future based on current events and trends. Also see *Extrapolate/Extrapolation*.

Promontory — A high ridge of land or rock jutting out into a body of water; a headland.

Proof of Beneficial Use — A part of the water right application and permitting process which documents that the water permitted for use has been applied to *Beneficial Use*. Generally, this process is followed by the issuance of the water right certificate (*Perfected Water Right*).

Proof of Appropriation — Part of the water right application and permitting process which attests to the fact that water has been withdrawn for the use specified in the original permit request.

Proper Functioning Condition — The functioning condition of riparian/wetlands is a result of interactions among geology, soil, water and vegetation. Riparian/wetland areas are functioning properly when adequate vegetation is present to dissipate stream energy associated with high water flows, thereby reducing erosion and improving water quality; filter sediment and aid floodplain development; improve floodwater retention and groundwater recharge; develop root masses that stabilize streambanks against cutting actions; develop diverse pond and channel characteristics to provide habitat and the water depth, duration and temperature necessary for fish production, waterfowl breeding and other uses; and support greater biodiversity.

Property Right — A generic term that refers to any type of right to specific property, whether it is personal or real property, tangible or intangible. As an example, a landowner has a property right to use water attached to his or her land.

Propylitic — (Geology) A type of *Hydrothermal* alteration characterized by the formation of calcite, chlorite, epidote, serpentine, quartz, pyrite, and iron oxides.

Protozoa — Small, one-celled animals including amoebae, ciliates, and flagellants.

Provenance — For sediment, the source area or source bedrock or source sediment.

Province — An ecological unit at the regional scale of assessment controlled mainly by continental weather patterns.

Pseudomorphs — (Geology) A mineral whose outward crystal form is that of another mineral species, typically as a result of *Hydrothermal* alteration.

Psychrometer — A *Hygrometer* used to determine relative humidity of the atmosphere. It usually consists of two thermometers, one wet and one dry bulb, with the wet bulb wrapped in a cloth wick saturated with water which, due to evaporation, causes the temperature to fall below that of the air. From this difference in temperature and the use of specially prepared tables, the relative humidity can be determined.

Public Domain (Lands) — Referring to all the lands of the United States which the federal government obtained by cession from:

- [1] 13 Original States (1789–1802);
- [2] Louisiana Purchase (1803);
- [3] Cession from Spain (1819);
- [4] Occupation of the Oregon Territory (1846);
- [5] Mexican Cession (1848);
- [6] Purchase from Texas (1850);
- [7] Gadsden Purchase (1853); and

[8] Purchase of Alaska (1867).

Public Interest, or Public Welfare — An interest or benefit accruing to society generally, rather than to any individuals or groups of individuals in the society. In many states, a permit to appropriate water must be denied if the appropriation would be contrary to the public interest or public welfare. These terms are sometimes vague and state engineers or others administering the water permit systems generally have viewed narrowly the authority granted under such provisions. In some cases they have restricted their consideration to matters of economic efficiency or the effects of the proposed appropriation on existing or future use for the water and have not considered such things as the environmental effects. However, recent developments, such as state environmental policy acts or legislation addressing specific public interest criteria, have placed new emphasis on this issue. Also see *Public Trust Doctrine*.

Public Involvement — The process of obtaining citizen input into each stage of the development of a planning document. Under the *National Environmental Policy Act (NEPA)*, such inputs are required as part of any *Environmental Impact Statement (EIS)* process.

Public Land Survey System (PLSS) — The description of the location of land using the survey system (public land survey system) of the United States Government and includes the 40-acre subdivision within a *quarter, section, township* and *range*. The public land survey system is based on the concept of a township as a square parcel of land six miles on each side. Its location is established as being so many six-mile units east of a north-south line (called the *meridian*) and so many six-mile units north or south of an east-west line (called the *baseline*). The township is described by township and range, e.g., T.4N, R.23E. Each township is further divided into 36 parts called sections one mile square (each section measuring 5,280 feet on each side). A typical section containing 640 acres may be further subdivided into quarters (measuring 2,640 feet on each side). The quarter of a section is equal to 160 acres and described as the NW $\frac{1}{4}$ or the NE $\frac{1}{4}$ or the SW $\frac{1}{4}$ or the SE $\frac{1}{4}$ of that particular section. The quarter section may be divided into four quarters, each being $\frac{1}{16}$ of a section, or 40 acres (measuring 1,320 feet on each side). Each sixteenth is described as the NW $\frac{1}{4}$ or the NE $\frac{1}{4}$ or the SW $\frac{1}{4}$ or the SE $\frac{1}{4}$ of that particular quarter section. A person must determine which is north on a map (usually at the top) in this case the easterly direction would be to the right, south to the bottom, and west to the left. The written location of a specific 40-acre parcel of land would be NW $\frac{1}{4}$ of the NW $\frac{1}{4}$ of Section 13, T.4N., R.23E. Some sections may contain more or less acreage than 640. Also see *Local (Test-Well) Site Designation [Nevada]* for the use of the PLSS in denoting test-well site locations.

Public Law 92-500 (PL 92-500) — The *Water Pollution Control Act* of 1972 which set goals and timetables for attaining water quality standards. See *Water Pollution Control Act*.

Public Law 93-523 (PL 93-523) — The *Safe Drinking Water Act (SDWA)* of 1974 which established primary and secondary quality standards for drinking water. See *Safe Drinking Water Act (SDWA)*.

Public Law 101-618 (PL 101-618) [Nevada and California] — Omnibus legislation passed by the 101st Congress at the end of its 1990 session intended to settle a number of outstanding disputes concerning the Truckee and Carson Rivers. The legislation authorized an ambitious environmental restoration program to benefit the *Lahontan Valley Wetland System [Nevada]* and Pyramid Lake and the lower Truckee River. It also established a framework for resolving separate but closely-related water-resource conflicts involving the Pyramid Lake Paiute and Fallon Paiute-Shoshone Tribes, the cities of Reno and Sparks (Nevada), the states of Nevada and California, and (pending the resolution of several as-yet unsatisfied controversies) the *Newlands (Irrigation) Project [Nevada]*. The legislation contains two primary titles: *TITLE I — The Fallon Paiute-Shoshone Indian Tribal Settlement Act*; and *TITLE II — The Truckee-Carson-Pyramid Lake Water Rights Settlement Act*. Collectively, the legislation can be referred to as the *Negotiated Settlement*. The seven (7) main elements covered by the legislation include:

- [1] **Promote the Enhancement and Recovery of Endangered and Threatened Fish Species** – A recovery program is to be developed for the Pyramid Lake endangered fish species cui-ui (*Chasmistes cujus*) and the threatened fish species Lahontan cutthroat trout (*Oncorhynchus clarki henshawi*) in compliance with the *Endangered Species Act (ESA)* and the *Truckee-Carson-Pyramid Lake Water Rights Settlement Act*. Water rights acquisitions are authorized for this purpose.
- [2] **Protect Wetlands from Further Degradation** – A water rights purchase program is authorized for *Lahontan Valley Wetlands*, with the intent of sustaining an average of 25,000 acres of wetlands (*Stillwater National Wildlife Refuge*: 14,000 acres; *Carson Lake and Pasture*: 10,200 acres; and *Fallon Reservation and Indian Lakes*: 800 acres) to both prevent further degradation and improve the habitat of the fish and wildlife which depend on those wetlands. The *U.S. Fish and Wildlife Service (USFWS)* has estimated that this will require up to 125,000 acre-feet (AF) of water per year.
- [3] **Encourage the Development of Solutions for Demands on Truckee River Waters** – An operating

agreement is to be negotiated for the Truckee River — *The Truckee River Operating Agreement (TROA)* — covering procedures for using storage capacity in upstream reservoirs in California consistent with recovery objectives for listed Pyramid Lake fishes. This includes the implementation of the terms and conditions of the *Primary Settlement Agreement (PSA)* between SPPCo and the Pyramid Lake Paiute Tribe.

- [4] ***Improve Management and Efficiency of the Newlands Project*** – The Secretary of the Interior is authorized to operate and maintain the *Newlands Project* to serve additional purposes, including recreation, improved water quality flowing to the wetlands, improved fish and wildlife habitat, and municipal water supply for Lyon and Churchill counties. A project efficiency study is required. The 1973 Gesell Decision is recognized and the 1988 *Operating Criteria and Procedures (OCAP)* is to remain in effect at least through 1997.
- [5] ***Fallon Paiute–Shoshone Water Issues Settlement*** – Establishment of a settlement fund for the Fallon Paiute–Shoshone Tribe totaling \$43 million. The Tribe is authorized to purchase land and water rights to consolidate tribal holdings within the reservation. Specific litigation filed by the Tribe is to be dismissed.
- [6] ***Pyramid Lake Paiute Tribe Issues Settlement*** – A tribal economic development fund of \$40 million was established for the Pyramid Lake Paiute Indian Tribe to provide for the settlement of water, fish, and other issues. Another fund of \$25 million was established for the Pyramid Lake fishery.
- [7] ***Interstate Water Apportionment Settlement*** – Facilitate an interstate allocation of the waters of the Truckee River, Carson River, and Lake Tahoe between the states of California and Nevada.

Also see *Truckee River Agreement [Nevada and California]*.

Publicly-Owned Treatment Works (POTW) — Facilities for the treatment of domestic sewage that are owned and operated by a public body, usually a municipal government, a state, or Indian tribe.

Public Scoping — The process of soliciting public comments on the issues to be examined in environmental documents such as an *Environmental Impact Statement (EIS)* or water planning documents. The process can be carried out by public meetings, soliciting written comments, or both. The identification of issues, alternatives, impacts, mitigation and/or monitoring all may be addressed during the scoping process.

Public Service — The business of supplying an essential commodity, such as water or electricity, or a service, such as communications or transportation, to the public.

Public-Service Corporation — A corporation providing essential services, such as water or electricity, to the public.

Public-Supply Water — (1) Water withdrawn for all users by public and private water suppliers and delivered to users that do not supply their own water. (2) Water withdrawn by and delivered to a public water system regardless of the use made of the water. Includes water supplied both by large municipal systems and by smaller quasi-municipal or privately-owned water companies. Water suppliers provide water for a variety of uses, such as *Domestic Water Use* (also referred to as *Residential Water Use*), *Commercial Water Use*, *Industrial Water Use*, *Thermoelectric Power Water Use* (domestic and cooling purposes), and *Public Water Use*.

Public Trust Doctrine — (1) A vaguely defined judicial doctrine under which the state holds its navigable waters and underlying beds in trust for the public and is required or authorized to protect the public interest in such waters. All water rights issued by the state are subject to the overriding interest of the public and the exercise of the public trust by state administrative agencies. (2) Based in Roman Law, the Public Trust Doctrine holds that certain resources belong to all the people and are therefore held in trust by the state for future generations. Since the 1970s, court rulings have expanded the concept of public trust to protect not only the traditional uses of navigation, commerce, and fishing, but also ecological preservation, open space maintenance, and scenic and wildlife habitat preservation. In a 1983 landmark ruling by the California Supreme Court (*National Audubon Society v. Superior Court of Alpine County*), the court held that water right licenses held by the City of Los Angeles and its Department of Water and Power to divert water from streams tributary to Mono Lake remain subject to ongoing State of California supervision under the public trust doctrine and could be curtailed or revoked, if necessary, to protect the public trust. The court held that public trust uses must be considered and balanced when the rights to divert water away from *Navigable* bodies of water are to be considered. Therefore, in issuing or reconsidering any rights to appropriate or divert water, the state must balance public trust needs with the needs for other beneficial uses of water. Also see *Equal Footing Doctrine (U.S. Constitution)* and *Public Interest, or Public Welfare*.

Public Utility — A private business organization, subject to government regulation, that provides an essential commodity or service, such as water, electricity, transportation, or communications, to the public.

Public Water System (PWS) — A system for provision to the public of piped water for human consumption, if such system has at least 15 service connections (such as households, businesses, or schools) or regularly serves at least

25 individuals daily for at least 60 days out of the year. Public water systems are divided into three categories:

- [1] **Community Water Systems** – serves the same population year round (e.g., homes, mobile homes, housing subdivisions);
- [2] **Nontransient-Noncommunity Water Systems** – regularly serves at least 25 of the same people for at least six months of the year (e.g., schools, factories, and hospitals); and
- [3] **Transient Noncommunity Water Systems** – caters to transitory customers in nonresidential areas (e.g., campgrounds, motels, and gas stations).

The terms include any collection, treatment, storage, and distribution facilities under control of the operator of such systems and used primarily in connection with the system, and any collection or pretreatment storage facilities not under such control that are used primarily in connection with the system. As of 1993 there were about 200,000 public water systems in the United States regulated under the *Safe Drinking Water Act (SDWA)*. These systems served approximately 243 million U.S. residents, or 94 percent of the total population of 258 million. The remainder of the population is served by private wells not subject to regulation under the SDWA. [Also see Appendix B-1, SDWA Regulated Contaminants and Appendix B-2, SDWA Proposed Contaminants to be Regulated, Appendix B-6, Water Treatment — Disinfectants, Appendix B-7, Water Treatment — Processes, Appendix B-8, Water Treatment — Technologies, and Appendix B-9, Threats to Water Quality.]

Public Water Use — Water supplied from a *Public Water Supply System (PWSS)* and used for such purposes as fire fighting, street washing, and municipal parks, golf courses, and swimming pools. Public water use also includes system water losses (water lost to leakage) and brine water discharged from desalination facilities. Also referred to as *Utility Water Use*.

Puddle — (1) A small pool of water usually a few inches deep and from several inches to several feet across. (2) An accumulation of meltwater on ice due to melting snow or ice. (3) The act of compacting earth, soil, clay, etc. by mixing them with water and rolling or tamping the mixture. (4) A compact mass of earth, soil, clay, or mixture of one or more, which has been compacted through the addition of water and rolling and tamping, and has been made more or less impervious.

Puddling — The compaction of wet material, such as clay, in order to make a watertight paste.

Pueblo Right — (Southwest United States) A water right possess by a municipality which, as a successor a a Spanish-law pueblo, is entitled to the beneficial use of all needed, naturally occurring surface and groundwater of the original pueblo watershed.

Pump — A device which moves, compresses, or alters the pressure of a fluid, such as water or air, being conveyed through a natural or artificial channel.

Pump (Head) Curve — The relationship between the head developed by a pump and the capacity (flow) for a constant rotative speed.

Pump Lift — The distance between the ground water table and the overlying land surface.

Pumped Hydroelectric Storage — Storing water for future use in generating electricity. Excess electrical energy produced during a period of low demand is used to pump water up to a reservoir. When demand is high, the water is released to operate a hydroelectric generator.

Pumped Storage — (1) A reservoir that has a pumping plant as the main source of water supply. (2) Water pumped upgrade into a reservoir or lake during periods of low electric power consumption. The water added to the reservoir is later released through the hydroelectric facility to generate electricity during times of high power demand.

Pumped Storage Plant — A hydroelectric power plant which generates electric energy for peak load use by utilizing water pumped into a storage reservoir during off-peak periods.

Pumped Storage Project — A hydroelectric power plant and reservoir system using an arrangement whereby water released for generating energy during peak load periods is stored and pumped back into the upper reservoir, usually during periods of reduced power demand.

Pumping-Generating Plant — A plant at which the turbine-driven generators can also be used as motor-driven pumps.

Pumping Head — Energy given to a fluid by a pump; usually expressed in feet of fluid (foot-pounds per pound).

Pumping Station — Mechanical devices installed in sewer or water systems or other liquid-carrying pipelines to move the liquids to a higher level.

Pumping Test — A test that is conducted to determine aquifer or well characteristics. More specifically, a test made by pumping a well for a period of time and observing the change in *Hydraulic Head* in the aquifer. A pump test may be used to determine the capacity of the well and the hydraulic characteristics of the aquifer. Also referred to as *Aquifer Test*.

Purge — To force a gas through a water sample to liberate volatile chemicals or other gases from the water so their

level can be measured.

Purgeable Organics — Volatile organic chemicals which can be forced out of the water sample with relative ease through purging.

Purification (Water) — Steps taken to eliminate impurities and pollution from water.

Purification Process (Water) — The sequence of steps taken, beginning with unpurified water, which results in purified water delivered through a water system to the ultimate consumer. This sequence would normally include most or all of the following:

- [1] Begin with unpurified water;
- [2] Screening – removal of leaves, sticks and large foreign material;
- [3] Pre-Chlorination – removal of disease organisms, bad taste, and odors;
- [4] Pre-Settling – settling out large dirt particles;
- [5] Flash Mix – a process in which chemicals are added to cause fine dirt to clump together;
- [6] Coagulation/Flocculation – a process in which flash mix particles are gathered and made even larger;
- [7] Sedimentation – a process in which gravity is used to settle out the large particles formed in coagulation/flocculation;
- [8] Filtration – removal of any remaining particles; water is at least 99 percent particle-free at this point in the process;
- [9] Final Chlorination – removal of any remaining disease organisms and adds necessary chlorine to prevent microbe regrowth in the distribution system;
- [10] Corrosion Control – a step in which chemicals are added to neutralize the corrosive effects of “soft” water systems, thereby preventing damage to plumbing and fixtures;
- [11] Finally, effluent pumps send the purified water to residential, commercial, and industrial establishments.

Purify (Water) — To rid water of impurities or pollution. See Purification Process (Water).

Purl — (1) To flow or ripple with a murmuring sound. (2) The sound made by rippling water.

Putrefaction — The biological decomposition of organic matter by bacteria, fungi, and oxidation, resulting in the formation of foul-smelling products, typically of swamps, bogs, and other areas of persistent moisture; a rotting. A biological process most closely associated with *Anaerobic* conditions.