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C-Horizon — A layer of unconsolidated material, relatively little affected by the influence of organisms and presumed to be similar in chemical, physical, and mineralogical composition to the material from which at least a portion of the overlying *Solum* has developed.

Cabotage — (1) (From the Spanish) A nautical term denoting navigation from cape to cape along the coast without having to go out into the open sea. (2) (International Law) Navigating and trading along the coast and between coastal ports; trade or transport in coastal waters or airspace or between two points within a country.

Caisson — (1) A watertight structure within which construction work is carried on under water. (2) A large box open at the top and one side, designed to fit against the side of a ship and used to repair damaged hulls under water. (3) A floating structure used to close off the entrance to a dock or canal lock. Also referred to as a *Camel*.

Calcareous — Formed of calcium carbonate or magnesium carbonate by biological deposition or inorganic precipitation in sufficient quantities to effervesce carbon dioxide visibly when treated with cold 0.1 normal hydrochloric acid. Calcareous sands are usually formed of a mixture of fragments of mollusk shell, echinoderm spines and skeletal material, coral, foraminifera, and algal platelets.

Calcareous Fens — *Peatlands* formed in areas of groundwater discharge, where cold, anoxic, mineral-rich water provides a specialized habitat for disproportionately large numbers of rare and endangered plants. Many of the plants found in calcareous fens are species which would be typical of more northern habitats. The health of such fens is inextricably linked to the presence of the upwelling groundwater. Also see *Peat (Peatlands)*.

Calcic Horizon — A secondary *Calcium Carbonate* accumulation in the lower *B-Horizon* that occurs as coatings on *Clasts* and as lenses in fine-grained sediment matrices; it is at least 15 centimeters (5.9 inches) thick and contains 15 percent or more calcium carbonate.

Calcine — Heated to temperature of dissociation; for example, heat gypsum to the temperature where the water of crystallization is driven off.

Calcite — (Geology) Calcium carbonate (CaCO_3), with hexagonal crystallization, a mineral found in the form of limestone, chalk, and marble.

Calcium Carbonate — Chemical symbol: CaCO_3 . The principal hardness and scale-causing compound in water. A white precipitate that forms in water lines, water heaters, and boilers in hard water areas; also known as scale. Also the principal chemical composition of *Tufa*, a calcareous and siliceous rock deposit of springs, lakes, or ground water.

Calcium Chloride — A white deliquescent compound, CaCl_2 , used chiefly as a drying agent, refrigerant, and preservative and for controlling dust and ice on roads.

Calcium Hydroxide — A white crystalline strong alkali $\text{Ca}(\text{OH})_2$ that is used especially to make mortar and plaster and to soften water.

Calf — A large floating chunk of ice split off from a glacier, an iceberg, or a floe.

Calgon — Trademark product used for a water softener.

Caliche — (1) A soil layer near the surface, more or less cemented by secondary carbonates of calcium or magnesium precipitated from the soil solution. It may occur as a soft, thin soil horizon, as a hard, thick bed just beneath the *Solum*, or as a surface layer exposed by erosion. (2) *Alluvium* cemented with sodium nitrate, chloride, and/or other soluble salts in the nitrate deposits of Chile and Peru. Also referred to as *Hardpan*.

California Doctrine — A system of allocating water, first announced in California, which combines *Riparian Rights* and *Appropriative Rights*. A number of states have applied this doctrine at one time or another. However, most states have essentially abandoned the doctrine in favor of the *Appropriation Doctrine*, and it is primarily of historical significance. Also see *Alpine Decree [California and Nevada]*.

California Environmental Quality Act (CEQA) — The California equivalent of the federal *National Environmental Policy Act (NEPA)*.

California-Nevada Interstate Compact [California and Nevada] — After thirteen years of negotiations between the two states (begun in 1955), the joint California-Nevada Interstate Compact Commission approved a provisional Interstate Compact in July 1968 for the division of the waters of Lake Tahoe, and the Truckee, Carson, and Walker

rivers. This provisional compact, with some modification, was eventually ratified by both states (California in September 1970 and Nevada in March 1971). The compact created the Tahoe Regional Planning Agency (TRPA) to oversee land-use planning and environmental issues within the Lake Tahoe Basin. However, the compact was never ratified by Congress which would have made it law. A major issue of contention was a phrase in the compact which stated that the use of waters by the federal government, its agencies, instrumentalities, or wards was to be against the use by the state in which it is made. This limitation, combined with new court interpretations of the federal *reserved water rights (Winters Doctrine)*, waters required for Pyramid Lake fish species under the *Endangered Species Act (ESA)*, and *public trust doctrine* issues combined to derail Congressional approval. Even so, both states chose to implement its terms under individual state legislation. With respect to the Lake Tahoe Basin, the compact provided for a maximum annual gross diversion from all sources of 34,000 acre-feet, of which California was allocated 23,000 acre-feet per year and Nevada 11,000 acre-feet per year.

California Species of Special Concern — Species which are not federal or state-listed as endangered, threatened, or rare, but are declining or are so few in number in California that extirpation is a possibility.

California State Water Resources Control Board (SWRCB) — See *State Water Resources Control Board (SWRCB) [California]*.

California Water Commission — See *Department of Water Resources (DWR) [California]*.

Call the River — To make a request or demand that water rights holders on a watercourse appropriate water only in accordance with the ranking of their *Priority Date*.

Calm — A period or condition of freedom from storms, high winds, or rough activity of water.

Calorie — (Abbreviation cal) (1) Basically, A unit of heat energy equal to the amount of heat needed to raise the temperature of one gram of water one degree *Celsius* ($^{\circ}\text{C}$). More precisely, any of several approximately equal units of heat, each measured as the quantity of heat required to raise the temperature of 1 gram of water by 1°C from a standard initial temperature, especially from 3.98°C (corresponding to the maximum density of water), 14.5°C , or 19.5°C , at 1 atmosphere pressure. Also referred to as the *Gram Calorie* and the *Small Calorie*. (2) The unit of heat equal to 1/100 the quantity of heat required to raise the temperature of 1 gram of water from 0°C (its freezing point) to 100°C (its boiling point) at 1 atmosphere pressure. Also referred to as the *Mean Calorie*. (3) The unit of heat equal to the amount of heat required to raise the temperature of 1 kilogram of water by 1°C at 1 atmosphere pressure. Also referred to as the *Kilocalorie*, *Kilogram Calorie*, and *Large Calorie*. (4) A unit of energy-producing potential equal to this amount of heat that is contained in food and released upon oxidation by the body. Also referred to as the *Nutritionist's Calorie*. The calorie is used when temperature is measured in degrees *Celsius* ($^{\circ}\text{C}$) on the *Centigrade Scale*. The *British Thermal Unit (BTU)* is used when the measurement is in degrees *Fahrenheit* ($^{\circ}\text{F}$) on the *Fahrenheit Scale*.

Calve — To break at an edge, so that a portion separates. Used of a glacier or an iceberg.

Camel — A device used to raise sunken objects, consisting of a hollow structure that is submerged, attached tightly to the object, and pumped free of water. Also referred to as a *Caisson*.

Canal — A constructed open channel for transporting water from the source of supply to the point of distribution.

Canal Automation — The implementation of a control system that upgrades the conventional method of canal system operation.

Canal Check Gate Structure — A structure designed to control the water surface level and flow in a canal, maintaining a specified water depth or head on outlets or turnout structures. Most canal check structures have movable gates.

Canal Freeboard — The amount of canal lining available above maximum design water depth.

Canal Losses — Seepage, evaporation, and operation spills from main-line canals and regulatory reservoirs.

Canal Pool — Canal section between check structures.

Canal Prism — The cross-sectional shape of a typical canal.

Canal Reach — The segment of the main canal system consisting of a series of canal pools between major flow control structures.

Canal System Operation — Water transfer from its source to points of diversion for irrigation, municipal and industrial, fish and wildlife, and drainage purposes.

Canceled Water Right — A water right that is invalidated due to the failure of the water right holder to comply with the terms and conditions of the permit. Also see *Forfeited Water Right* and *Withdrawn Water Right*.

Candidate Species — Plant or animal species designated by the Department of the Interior, *U.S. Fish and Wildlife Service (USFWS)* as candidates for potential future listing as an *Endangered Species* or *Threatened Species* pursuant to the *Endangered Species Act (ESA)* of 1973; plant or animal species that are candidates for designation as endangered (in danger of becoming extinct) or threatened (likely to become endangered).

- Canopy** — (1) The overhanging cover formed by leaves, needles, and branches of vegetation. (2) The more or less continuous cover of branches and foliage formed collectively by the crowns of adjacent trees and shrubs.
- Canopy Resistance** — The resistance to transport of water and vapor away from the soil and canopy.
- Canyon, also Cañon** — A narrow chasm with steep cliff walls, cut into the earth by running water; a gorge.
- Cap** — A layer of clay, or other impermeable material installed over the top of a closed landfill to prevent entry of rainwater and minimize *Leachate*.
- Capa (Critical Aquifer Protection Area)** — As defined in the *Safe Drinking Water Act (SDWA)*, is all or part of an area located within an area for which an application of designation as a sole or principal source aquifer (pursuant to Section 1424[e]) has been submitted and approved by the Administrator not later than 24 months after the date of enactment and which satisfies the criteria established by the Administrator; and all or part of an area that is within an aquifer designated as a *Sole Source Aquifer (SSA)*, as of the date of the enactment of the *Safe Drinking Water Act (SDWA)* amendments of 1986, and for which an area wide ground-water protection plan has been approved under Section 208 of the *Clean Water Act (CWA)* prior to such enactment.
- Capacitive Deionization (CDI)** — A relatively simple and straight forward electrochemical reaction process made unique and highly efficient through the development of a highly-porous material called carbon aerogel that absorbs huge volumes of ions. A single cube of carbon aerogel, one inch on a side, has an effective surface area of more than 20 million square inches. This unusually high surface area makes it possible to adsorb large numbers of ions. Water containing salt, heavy metals, or even radioactive isotopes is pumped through a series of electrochemical cells made from the aerogel, a material sometimes called “frozen smoke.” Effluent water from the series of stacked cells is subsequently purified. The trapped ions can be released into a relatively small stream of “rinse” water typically comprising less than one percent of the total volume of produce water. Also see *Deionization*.
- Capacity, Field or Soil** — The amount of water held in a soil sample after the excess gravitation water has drained away.
- Capacity, Gross Reservoir** — The total amount of storage capacity available in a reservoir for all purposes from the streambed to the normal maximum operating level. It does not include surcharge, but does include dead storage.
- Cape** — A point or head of land projecting into a body of water.
- Capillarity** — (1) The property of tubes or earth-like particles with hairlike openings which, when immersed in fluid, raise (or depress) the fluid in the tubes above (or below) the surface of the fluid in which they are immersed. (2) The interaction between contacting surfaces of a liquid and a solid that distorts the liquid surface from a planar shape. Also referred to as *Capillary Action* or *Capillary Attraction*.
- Capillary Action** — (1) The action by which water is drawn around soil particles because there is a stronger attraction between the soil particles and the water molecules themselves. (2) The movement of water within the interstices of a porous medium due to the forces of adhesion, cohesion, and surface tension acting in a liquid that is in contact with a solid. Synonymous with the terms *Capillarity*, *Capillary Flow*, and *Capillary Migration*.
- Capillary Attraction** — The force that results from greater adhesion of a liquid to a solid surface than internal cohesion of the liquid itself and that causes the liquid to be raised against a vertical surface, as water is in a clean glass tube. It is the force that allows a porous material like soil to soak up water from lower levels.
- Capillary Fringe** — (1) The zone at the bottom of the *Zone of Aeration (Vadose Zone)* where ground water is drawn upward by capillary force. (2) The zone immediately above the *Zone of Saturation* (or *Groundwater Table*) in which underground water is lifted against gravity by surface tension (*Capillary Action*) in passages of capillary size.
- Capillary Phenomena** — A phenomenon of water movement caused by *Capillarity*.
- Capillary Potential** — The work required to move a unit mass of water from the reference plane to any point in the soil column.
- Capillary Rise** — The height above a free water surface to which water will rise by *Capillary Action*.
- Capillary Water** — (1) Water held in the soil above the *Phreatic Surface* by capillary forces; or soil water above hygroscopic moisture and below the field capacity. (2) A continuous film of water found around soil particles.
- Capillary Zone** — The soil area above the water table where water can rise up slightly through the cohesive force of *Capillary Action*.
- Capture** — (1) Water withdrawn artificially from an aquifer is derived from a decrease in storage in the aquifer, a reduction in the previous discharge from the aquifer, an increase in the recharge, or a combination of these changes. The decrease in discharge from an aquifer plus the increase in recharge. Capture may occur in the form of decreases in the ground-water discharge into streams, lakes, and the ocean, or from decreases in that component of *Evapotranspiration* derived from the *Zone of Saturation*. (2) Diversion of the flow of water in the upper part of a stream by the headward growth of another stream.
- Capture Zone** — The zone around a well contributing water to the well; the area on the ground surface from which

a well captures water.

Carbamates — A class of new-age pesticides that attack the nervous system of organisms.

Carbon Adsorption — (Water Quality) A treatment system that removes contaminants from ground water or surface water by forcing it through tanks containing activated carbon treated to attract the contaminants.

Carbon-Chloroform Extract (CCE) — A measurement of the organic content of a water. It consists of adsorbing the organic matter onto activated carbon, then extracting it with chloroform.

Carbon Filtration — (Water Quality) The passage of treated wastewater or domestic water supplies through activated charcoal in an effort to remove low concentrations of dissolved chemicals.

Carbon Dioxide — A colorless, odorless, nonpoisonous gas, CO_2 , that forms *Carbonic Acid* when dissolved in water. Carbon dioxide is typically produced during combustion and microbial decomposition. Because carbon dioxide absorbs infrared radiation, rising levels of carbon dioxide in the global atmosphere over the past century have prompted concerns about climatic change and more specifically the *Greenhouse Effect*.

Carbon Polishing — (Water Quality) The removal of residual dissolved organic substances from wastewater by *Adsorption* on activated charcoal (granular activated carbon). A form of *Tertiary Wastewater Treatment*.

Carbon Treatment — (Water Quality) In a drinking water purification process, the removal of *Colloids* by *Adsorption* on *Activated Charcoal*. This step often improves the color, taste, and odor of drinking water. Also see *Secondary Drinking Water Standards*.

Carbonaceous Biochemical Oxygen Demand — The incubation of a sample of water or wastewater for a relatively short period of time in order to determine the *Biochemical Oxygen Demand (BOD)*. The short incubation, usually 5 days, is sufficient to detect only the microbial utilization of carbon compounds. A longer incubation (15 to 20 days) would also detect the oxidation of inorganic nitrogenous compounds (ammonia and nitrite) and the subsequent demand for molecular oxygen by chemoautotrophic bacteria.

Carbonate — (1) The collective term for the natural inorganic chemical compounds related to carbon dioxide that exist in natural waterways. (2) A sediment formed by the organic or inorganic precipitation from aqueous solution of carbonates of calcium, magnesium, or iron. The CO_3^{-2} ion in the *Carbonate Buffer System*. Combined with one proton, it becomes *Bicarbonate*, HCO_3^- and with two protons, *Carbonic Acid*. The carbonate ion forms a solid precipitant when combined with dissolved ions of calcium or magnesium.

Carbonate Aquifer — An aquifer found in limestone and dolomite rocks. Carbonate aquifers typically produced hard water, that is, water containing relatively high levels of calcium and magnesium.

Carbonate Buffer System — The most important buffer system in natural surface waters and wastewater treatment, consisting of a carbon dioxide, water, carbonic acid, *Bicarbonate*, and *Carbonate* ion equilibrium that resists changes in the water's pH. For example, if acid materials (hydrogen ions) are added to this buffer solution, the equilibrium is shifted and carbonate ions combine with the hydrogen ions to form bicarbonate. Subsequently, the bicarbonate then combines with hydrogen ions to form carbonic acid, which can dissociate into carbon dioxide and water. Thus the system pH is unaltered even though acid was introduced.

Carbonate Hardness — Water hardness caused by the presence of *Carbonate* and *Bicarbonate* of calcium and magnesium. Also see *Temporary Hardness*.

Carbonate Rock — (Geology) A rock consisting chiefly of carbonate minerals, such as limestone and dolomite.

Carbonated Water — (1) Effervescent water, usually containing salts, charged under pressure with purified carbon dioxide gas, used as a beverage or mixer. Also referred to as soda water, club soda, or seltzer. (2) A solution of water, sodium bicarbonate, and acid.

Carbonation, Groundwater — The dissolving of carbon dioxide in surface water as it percolates through the ground. The carbon dioxide reacts with water to form carbonic acid, a weak acid that causes the water to have a slightly acidic pH.

Carbonic Acid — A weak, unstable acid, H_2CO_3 , present in solutions of carbon dioxide and water. The carbonic acid content of natural, unpolluted rainfall lowers its pH to about 5.6.

Carcinogen — A cancer-causing substance or agent.

Carcinogenic — Cancer causing.

Carlson's Trophic State Index (TSI) — A measure of *Eutrophication* of a body of water using a combination of measures of water transparency or turbidity (using *Secchi Disk* depth recordings), *Chlorophyll-a* concentrations, and total phosphorus levels. TSI measures range from a scale 20–80 and from *Oligotrophic* waters (maximum transparency, minimum chlorophyll-a, minimum phosphorus) through *Mesotrophic*, *Eutrophic*, to *Hypereutrophic* waters (minimum transparency, maximum chlorophyll-a, maximum phosphorus). Also referred to as the (*Mean Trophic State Index (TSI)*). Also see *Total Inorganic Nitrogen (TIN)* and *Total Inorganic Phosphate (TIP)*.

Carr, also Car — (1) A pool; also, a *Fen* or a *Bog*. (2) The yellow or brown sediment of humate of iron in water

flowing from a peaty bog.

Carriage Losses (Water) — A term used to describe the operational losses associated with conveying water from its point of diversion to its point of use. These losses typically include spillage, seepage, evaporation, and phreatophyte usage along the water course, as applicable. Water rights applicants are entitled to water for transporting their entitlement to their proposed place(s) of use. Carriage losses are generally considered unavoidable, and are legally bearable so long as that extra water is used reasonably and economically in transporting the water to its destination.

Carriage Water (California–Central Valley Project) — The amount of extra water required for *Sacramento-San Joaquin Delta* outflow to maintain water quality standards in the Delta as the result of an increase in exports. Also see *Bay-Delta [California]*.

Carrying Capacity — (Ecology) The maximum number and type of species which a particular habitat or environment can support without detrimental effects.

Carson Division [Newlands Project, Nevada] — The Carson Division of the Newlands Project is located entirely within Churchill County, Nevada. It contains about 67,840 acres of water-righted land and is supplied by a combination of Carson River and Truckee River water from Lahontan Reservoir.

Carville Decree [Nevada] — The Carville Decree was issued on January 24, 1935 by Judge E.P. Carville and adjudicated water rights for the Little Humboldt River. As with the 1931 *Bartlett Decree* (and the 1935 *Edwards Decree* modifying the Bartlette Decree), the Carville Decree determined water rights for three classes of lands: (1) Class A – harvest crops; (2) Class B – meadow pasture; and (3) Class C – diversified pasture. In general, the decree provided for a flow of 1.0 cfs per 100 acres of decreed land, or at rates proportional to this. When water was available, Class A water rights are for the delivery of water at this rate of flow for a period of 180 days from March 15 to September 15, or a total water diversion during the season of 3.6 acre-feet per acre. Class B rights are for 90 days from March 15 to June 13, for a total of 1.8 acre-feet per acre. Class C rights are for 45 days from March 15 to April 28, for a total of 0.9 acre-feet per acre.

Cascade — A short, steep drop in stream bed elevation often marked by boulders and agitated white water.

Cascade Flow — Regulated flow through a series of flow control structures.

Casing — The steel conduit required to prevent waste and contamination of the ground water and to hold the formation open during the construction or use of the well. A tubular structure intended to be water tight installed in the excavated or drilled hole to maintain the well opening and, along with cementing, to confine the ground waters to their zones of origin and prevent the entrance of surface pollutants.

Casual Water — A temporary accumulation of water not forming a regular hazard of a golf course.

Catabolism — The biological breakdown of materials into their simpler components, i.e., decomposition. Performed by decomposer organisms, mainly bacteria and fungi.

Catadromous — Used to describe fish that live in fresh water but migrate to marine waters to breed. Contrast with *Anadromous*.

Catalase — A red crystalline enzyme that consists of a protein complex with heme groups and catalyzes the decomposition of *Hydrogen Peroxide* into water and oxygen.

Catalysis — The action of a *Catalyst*, especially an increase in the rate of a chemical reaction.

Catalyst — A substance that alters the speed of a reaction, but does not change the form or amount of product. For example, *Enzymes* are biological catalysts, enhancing reactions within living organisms.

Catalytic Converter — A reaction chamber typically containing a finely divided platinum-iridium *Catalyst* into which exhaust gases from an automotive engine are passed together with excess air so that carbon monoxide and hydrocarbon pollutants are oxidized to carbon dioxide and water.

Catalyze — To modify, especially to increase, the rate of a chemical reaction by *Catalysis* or the action of a *Catalyst*.

Cataphoresis — The migration of charged colloidal particles (*Colloids*) or *Molecules* through a solution under the influence of an applied electric field usually provided by immersed electrodes. Also call *Electrophoresis*.

Catastrophic — A property of non-linear dynamic systems (such as *Biotic Communities*) in which what appears to be a small disturbance (introduction of an exotic species) initiates large changes and establishes a new set of stable conditions.

Catch Basin — A sieve-like device at the entrance to a sewer to stop matter that could possibly block up the sewer.

Catchment — (1) The catching or collecting of water, especially rainfall. (2) A reservoir or other basin for catching water. (3) The water thus caught.

Catchment Area — (1) The intake area of an aquifer and all areas that contribute surface water to the intake area. (2) The areas tributary to a lake, stream, sewer, or drain. (3) A reservoir or basin developed for flood control or water management for livestock and/or wildlife. See also *Drainage Area; Watershed*.

Catchment Area (Basin) — The area draining into a river, reservoir, or other body of water.

- Categorical Exclusion** — A class of actions which either individually or cumulatively would not have a significant effect on the human environment and therefore would not require preparation of an *Environmental Assessment (EA)* or an *Environmental Impact Statement (EIS)* under the *National Environmental Policy Act (NEPA)*.
- Categorical Pretreatment Standard** — A technology-based effluent limitation for an industrial facility discharging into a municipal sewer system. Analogous in stringency to *Best Available Technology (BAT)* for direct dischargers.
- Categorical Variable** — (Statistics) A qualitative variable created by classifying observations into categories. For example, a series of household incomes could be classified into the categorical variables low, medium, and high describing certain specific ranges of income levels. Many statistical techniques are inappropriate for the use of categorical variables. Also referred to as a *Qualitative Variable*. Contrast with *Quantitative Variable*.
- Cation** — The positively charged particle or ion in an electrolyzed solution which travels to the cathode and is there discharged, evolved, or deposited. Also, by extension, any positive ion.
- Cation Exchange** — A chemical process in which *Cations* of like charge are exchanged equally between a solid, such as zeolite, and a solution, such as water. The process is often used to soften water.
- Cation Exchange Capacity (CEC)** — The total of exchangeable cations that a soil can adsorb; expressed in milliequivalents per 100 grams (g) of soil.
- Cat's-Paw, also Catspaw** — A light breeze that ruffles small areas of a water surface.
- Cattail** — A tall, reedy marsh plant with brown furry fruiting spikes; an *Emergent Plant*.
- Causeway** — A raised roadway, as across water or marshland.
- Caustic** — Alkaline or basic.
- Cavendish, Henry (1731–1810)** — A British chemist and physicist who discovered the properties of hydrogen and established that water was a compound of hydrogen and oxygen.
- Cavern** — A large underground opening in rock (usually limestone) which occurred when some of the rock was dissolved by water. In some igneous (formed by volcanic action) rocks, caverns can be formed by large gas bubbles.
- Caving** — The collapse of a stream bank by undercutting due to wearing away of the toe or an erodible soil layer above the toe.
- Cavitation** — (1) A process of erosion in a stream channel caused by sudden collapse of vapor bubbles against the channel wall. (2) The formation of cavities filled with air and water vapor due to internal pressure reduced below atmosphere. (3) The formation and collapse of gas pockets or bubbles on the blade of an impeller or the gate of a valve; collapse of these pockets or bubbles drives water with such force that it can cause pitting of the gate or valve surface.
- Cell** — (Biology) The basic building block of all living matter. The cell of a living organism contains a high percentage of water.
- Cells/Volume** — The number of plankton cells or natural units counted using a microscope and grid or counting cell. Results are generally reported as cells or units per milliliter.
- Cells Volume (Biovolume)** — One of several common methods used to estimate biomass of algae in aquatic systems. Cell members of algae are frequently used in aquatic surveys as an indicator of algal production. However, cell numbers alone cannot represent true biomass because of considerable cell-size variation among the algal species. Cell volume (μm^3) is determined by obtaining critical cell measurements on cell dimensions (for example, length, width, height, or radius) for 20 to 50 cells of each important species to obtain an average biovolume per cell. Cells are categorized according to the correspondence of their cellular shape to the nearest geometric solid or combination of simple solids (for example, spheres, cones, or cylinders). Representative formulae used to compute biovolume are as follows: (1) sphere: $\frac{4}{3} \bar{d}r^2$; (2) cone: $\frac{1}{3} \bar{d}r^3h$; (3) cylinder: $\bar{d}r^3h$. From cell volume, total algal biomass expressed as biovolume ($\mu\text{m}^3/\text{mL}$) is thus determined by multiplying the number of cells of a given species by its average cell volume and then summing these volumes overall all species.
- Cellulose** — The fibrous part of plants used in making paper and textiles, which in turn may be made into building products.
- Celsius [Temperature Scale] (C)** — (1) Relating to, conforming to, or having the international thermometric scale on which the interval between the triple point of water and the boiling point of water is divided into 99.99 degrees with 0.01° representing the *Triple Point* and 100° the boiling point at one atmosphere of pressure; Abbreviation C; Compare to *Centigrade [Temperature Scale]*. The Celsius scale, which is identical to the centigrade scale, is named for the 18th-century Swedish astronomer Anders Celsius, who first proposed the use of a scale in which the interval between the freezing and boiling points of water is divided into 100 degrees. By international agreement, the term Celsius has officially replaced Centigrade. (2) Unit of measure for the *Centigrade Temperature Scale* of measuring temperature, as contrasted with the *Fahrenheit* unit of measure. The formula for converting a Celsius temperature to Fahrenheit temperature is $F^\circ = [9/5C^\circ + 32]$. Also see *Temperature Scale*.

- Cenozoic Era** — Of, belonging to, or designating the latest era of geologic time, extending from 65 million years before present (B.P.) to the present, and including the *Tertiary Period* (from 65 million years B.P. to about 2 million years B.P.), encompassing the Paleocene, Eocene, Oligocene, Miocene and Pliocene Epochs, and the *Quaternary Period* (from about 2 million years B.P. to the present), encompassing the Pleistocene and Holocene Epochs, and is characterized by the formation of modern continents, glaciation, and the diversification of mammals, birds, and plants.
- Census** — A complete counting, with classification, of a population or group at a particular point in time, as regards to some well-defined characteristic(s). Usually has governmental and economic and social connotations, e.g., the decennial census of the population; however, also used in a biological and environmental sense for plants, animals, and habitat.
- Census of Agriculture** — A *Census* taken by the U.S. Department of Commerce, Bureau of the Census, every 5 years to include the number of farms, land in farms, crop acreage and production, irrigated acreage, farm spending, farm facilities and equipment, farm tenure, value of farm products sold, farm size, and other farm-related data.
- Census X-11 (Seasonal Adjustment) Process** — (Statistics) A seasonal adjustment process for decomposing time series data into its trend-level, seasonal index, trading day, and irregular components. It is primarily used to *De-Seasonalize* official government statistics for publication, but is arguably the most widely used and accepted seasonal adjusted process.
- Center-Pivot Irrigation** — Automated sprinkler irrigation achieved by automatically rotating the sprinkler pipe or boom, supplying water to the sprinkler heads or nozzles, at a radius from the center of the field to be irrigated. Water is delivered to the center or pivot point of the system. The pipe is supported above the crop by towers at fixed spacings and propelled by pneumatic, mechanical, hydraulic, or electric power on wheels or skids in fixed circular paths at uniform angular speeds. Water is applied at a uniform rate by progressive increase of nozzle size from the pivot to the end of the line. The depth of water applied is determined by the rate of travel of the system. Single units are ordinarily about 1,250 to 1,300 feet long (381–397 meters) and irrigate approximately a 130-acre (52.7 hectare) circular area. Also see *Irrigation Systems*.
- Centigrade [Temperature Scale] (C)** — Relating to, conforming to, or having a thermometric scale on which the interval between the freezing point of water and the boiling point of water is divided into 100 degrees with 0° representing the freezing point and 100° the boiling point at one atmosphere of pressure; Abbreviation C; Compare to *Celsius [Temperature Scale]*. The Centigrade scale is identical to the Celsius scale; however, by international agreement, the term Celsius has officially replaced Centigrade. Contrast with the *Fahrenheit Temperature Scale*, using degrees *Fahrenheit* (°F), in which 32°F above the 0°(F) mark indicates the freezing point of water and 212°F indicates the boiling point of water (at sea level). Also see *Temperature Scale*.
- Central Valley Project (CVP) [California]** — A multipurpose water project developed mainly by the *U.S. Bureau of Reclamation (USBR)*, extending from the Cascade Range on the north to the semiarid but fertile plains of California's Kern River on the south. The state and federal portions of the Central Valley Project (CVP) encompass twenty dams and reservoirs, pumping facilities, 500 miles of canals, and aqueducts providing protection from saltwater intrusion into the *Bay-Delta* region (also referred to as the *Sacramento-San Joaquin Delta*), irrigation water for San Joaquin Valley farms, and municipal and industrial water for some of California's most populated urban areas. Each year some seven million acre-feet of water are transported through the system and delivered primarily to Central Valley farmers. The construction of the CVP was approved by California voters in a 1933 referendum of the California Central Valley Project Act. Due to the effects of the Great Depression, the state was unable to construct the project at that time. Subsequently, portions of the CVP were authorized and constructed by the federal government. Other portions were later constructed by California after the Depression as part of the *State Water Project (SWP)*, as authorized under the 1960 Burns-Porter Act. Principal facilities of the SWP include Oroville Dam, Delta Facilities, the California Aqueduct, and North and South Bay Aqueducts. Principle facilities of the federal CVP include Shasta, Trinity, Folsom, Friant, Clair Engle, Whiskeytown, and New Melones dams, Delta facilities, and the Delta Mendota Canal. Joint CVP/SWP facilities include San Luis Reservoir and Canal and various Delta facilities. Also see *Bay-Delta [California]*.
- Centralized Control (Canal)** — Control of a canal project from a central location by the watermaster.
- Centralized Headquarters (Canal)** — Control of a canal project from a central location generally by a master station, communications network, and one or more remote terminal units (RTUs).
- Centrifugal Pump** — A device that converts mechanical energy to pressure or kinetic energy in a fluid by imparting centrifugal force on the fluid through a rapidly rotating impeller.
- Centrifugation** — (Water Quality) In water and wastewater treatment, a method used to remove liquid from sludges through use of centrifugal forces.

- CEQA** — See *California Environmental Quality Act (CEQA)*.
- CERCLA** — See *Comprehensive Environmental Response, Compensation, and Liability Act*.
- Certificate of Water Right** — An official document which serves as evidence of a *Perfected Water Right*. Also see *Application, Water Right*.
- Certificated Water Right** — The right granted by a state water agency to use either surface or ground water. Also see *Application, Water Right* and *Vested Water Right*.
- Certificated Water Right [Nevada]** — The right to put surface or ground water to beneficial use that is identified by a recorded document issued by the Nevada State Engineer after satisfactory proof of “perfection of application” for a permitted water right has been filed in accordance with Nevada Revised Statutes Chapter 533.
- Certified Water Right** — A state-issued document that serves as legal evidence that an approved application has been physically developed and the water put to beneficial use. The certificate establishes priority date, type of beneficial use, and the maximum amount of water that can be used. Before a water right can be certified, verification of the physical development must be provided to the state through a survey conducted by an approved water rights examiner. Even certified water rights are subject to occasional review to ensure continued beneficial use.
- Cesspool** — An underground catch basin for combined liquid and solid waste, such as household sewage, so designed as to retain the organic matter and solids but permitting the liquids to seep through the bottom and sides. Also see *Septic Tanks*.
- CFS (Cubic Foot per Second)** — A unit of discharge for measurement of flowing liquid equal to a flow of one cubic foot per second past a given section. A rate of flow equivalent to 448.83 gallons per minute. Also called *Second-Foot*. Also written as C.F.S. and cfs.
- CFS-Day** — The volume of water represented by a flow of 1 cubic foot per second for 24 hours. It equals 86,400 cubic feet, 1.983471 acre-feet, or 646,317 gallons.
- CFSM (Cubic Feet per Second per Square Mile)** — The average number of cubic feet of water per second flowing from each square mile of area drained by a stream, assuming that the runoff is distributed uniformly in time and area.
- Chalk** — A mineral composed mainly of the calcareous shells of various marine microorganisms, but whose matrix consists of fine particles of calcium carbonate, some of which may have been chemically precipitated.
- Chalybeate** — Tasting like iron, as water from a mineral spring.
- Channel** — (1) (Watercourse) A natural stream that conveys water; a natural or artificial watercourse with definite bed and banks to confine and conduct flowing water; a ditch or channel excavated for the flow of water. River, creek, run, branch, anabranch, and tributary are some of the terms used to describe natural channels, which may be single or *Braided*. Canal, aqueduct, and floodway are some of the terms used to describe artificial (man-made) channels. (2) (Landform) The bed of a single or braided watercourse that commonly is barren of vegetation and is formed of modern alluvium. Channels may be enclosed by banks or splayed across and slightly mounded above a fan surface and include bars and dumps of cobbles and stones. Channels, excepting floodplain playas, are landform elements.
- Channel Bank** — The sloping land bordering a channel. The bank has steeper slope than the bottom of the channel and is usually steeper than the land surrounding the channel.
- Channel Capacity** — The maximum rate of flow that may occur in a stream without causing overbank flooding; the maximum flow which can pass through a channel without overflowing the banks.
- Channel Control** — The condition under which the stage-discharge relation of a gaging station is governed by the slope, size, geometry, and roughness of the channel.
- Channel Density** — The ratio of the length of stream channels in a given basin to the area of the basin, expressed in feet per acre (meters per hectare).
- Channel-Forming Discharge** — See *Dominant Discharge*.
- Channel Inflow** — Water which at any instant is flowing into the channel system from surface flow, subsurface flow, base flow, and rainfall directly on the channel.
- Channel Lining** — Protection of the channel bottom and banks with concrete or *Riprap*.
- Channel Modification** — The modification of the flow characteristics of a channel by clearing, excavation, realignment, lining, or other means to increase its capacity. Sometimes the term is used to connote *Channel Stabilization*.
- Channel Realignment** — The construction of a new channel or a new alignment which may include the clearing, snagging, widening, and/or deepening of the existing channel.
- Channel Stabilization** — Erosion prevention and stabilization of velocity distribution in a channel using jetties, drops, revetments, vegetation, and other measures.

Channel Storage — The volume of water at a given time in the channel or over the flood plain of the streams in a drainage basin or river reach. Channel storage is sometimes significant during the progress of a flood event.

Channelization — (1) The artificial enlargement or realignment of a stream channel. (2) Straightening a stream or river to allow water to travel through the area more quickly. (3) The process of changing an straightening the natural path of a waterway. Channelization is often used as a means of flood control, but its negative effects often outweigh its advantages. For example, channelization often damages wetlands associated with rivers and streams.

Chaos Theory — A modern development in mathematics and science that provides a framework for understanding irregular or erratic fluctuations in nature. Chaotic systems are found in many fields of science and engineering. Evidence of chaos occurs in models and experiments describing convection and mixing in fluids, in wave motion, in oscillating chemical reactions, and in electrical currents in semiconductors. It is also found in the dynamics of animal populations and attempts are being made to apply chaotic dynamics in the social sciences, such as the study of business cycles. A chaotic system is defined as one that shows “sensitivity to initial conditions.” That is, any uncertainty in the initial state of the given system, no matter how small, will lead to rapidly growing errors in any effort to predict its future behavior. This “sensitivity to initial conditions” will make any long-term prediction of such phenomenon virtually impossible in reality. In other words, the system is chaotic and as such its behavior can be predicted only if the initial conditions are known to an infinite degree of accuracy, which is impossible. The possibility of chaos in a natural, or deterministic, system was first envisaged by the French mathematician Henri Poincare in the late 19th century. More recently, predictions have been made that the transition to chaotic turbulence in a moving fluid would take place at a well-defined critical value of the fluid’s velocity (or some other important factor controlling the fluid’s behavior). The term chaotic dynamics refers only to the evolution of a system in time. Chaotic systems, however, also often display spatial disorder — for example, in complicated fluid flows.

Chaparral — A type of *Biome* with hot, dry summers and rainfall mainly in the winter months. Vegetation consists of shrubs, small evergreen trees, and *sclerophyllous* species. Chaparral communities are found around the Mediterranean Sea, in central and southern California, along coastal Chile, in southern Australia, and in southern Africa.

Chatter Mark, also Chattermark — (Geology) One of a series of short scars made by glacial drift on a surface of bedrock.

Check Dam — (1) A structure placed bank to bank downhill from a headcut on a hillslope to help revegetate a gully. (2) A small dam constructed in a gully or other small watercourse to decrease the streamflow velocity, minimize channel erosion, promote deposition of sediment, and to divert water from a channel.

Check Gate — A gate located at a check structure used to control flow.

Check Irrigation — A method of irrigation in which an area is practically or entirely surrounded by earth ridges.

Check Structure — A device or structure placed in a canal such that water must pass through, over or under it. The check structure opening or position is typically a function of the flow rate, and is adjusted to maintain a certain flow rate or water level. Check structures are necessary to dam the water up during low flows so that all turnouts upstream can receive water. Also referred to as a *Cross Regulator* or *Gate*.

Check Valve — See *Backflow Preventer*.

Chemical Feeder — (Water Quality) A mechanical device for measuring quantities of chemical and applying them to a water at a preset rate.

Chemical Oxygen Demand (COD) — (Water Quality) (1) A measure of the chemically oxidizable material in the water which provides an approximation of the amount of organic and reducing material present. The determined value may correlate with *Biochemical Oxygen Demand (BOD)* or with carbonaceous organic pollution from sewage or industrial wastes. (2) A chemical measure of the amount of organic substances in water or wastewater. A strong oxidizing agent together with acid and heat are used to oxidize all carbon compounds in a water sample. Non-biodegradable and recalcitrant (slowly degrading) compounds, which are not detected by the test for BOD, are included in the analysis. The actual measurement involves a determination of the amount of oxidizing agent (typically, potassium dichromate) that is reduced during the reaction. Also see *Total Carbon (TC)* and *Total Organic Carbon (TOC)*.

Chemical Weathering — The gradual decomposition of rock by exposure to rainwater, surface water, atmospheric oxygen, carbon dioxide and other gases in the atmosphere, as well as compounds secreted by organisms. Compare to *Physical Weathering*.

Chemigation — Application of pesticides or fertilizers to farmlands through irrigation systems.

Chemoautotroph — An organism that utilizes oxidation of inorganic chemicals for its energy and carbon dioxide for cell growth. Also called a *Chemosynthetic Autroph*.

- Chemocline** — The transition zone between layers in a *Meromictic Lake*.
- Chemodynamics** — The study of the transport, conversion, and fate of chemical substances in air, water, or soil, including their movement from one medium to another.
- Chemosphere** — The region of the upper *Atmosphere* including the *Mesosphere* and upper *Stratosphere* in which various sunlight-driven chemical reactions occur.
- Chemosynthesis** — The synthesis of carbohydrate from carbon dioxide and water using energy obtained from the chemical oxidation of simple inorganic compounds. This form of synthesis is limited to certain bacteria and fungi.
- Chimney** — A tall column of rock on the ocean floor that is formed by the precipitation of minerals from superheated water issuing from a vent in the earth's crust and rising through the column of rock. Also see *Black Smoker*.
- Chinook** — A downslope wind in which the air is warmed by adiabatic (gradual) heating. Such conditions describe a warm, dry southwest wind blowing from the sea onto the coast of Oregon and Washington in the winter and spring, as well as a warm, dry wind blowing down the eastern slope of the Rocky Mountains.
- Chloramines** — Compounds containing nitrogen, hydrogen, and chlorine, formed by the reaction between hypochlorous acid (HOCl) and ammonia (NH₃) and/or organic amines in water. The formation of chloramines in drinking water treatment extends the disinfecting power of chlorine. Also referred to as *Combined Available Chlorine*.
- Chlorides** — Negative chlorine ions, Cl⁻, found naturally in some surface waters and groundwaters and in high concentrations in seawater. Higher-than-normal chloride concentrations in fresh water, due to sodium chloride (table salt) that is used on foods and present in body wastes, can indicate sewage pollution. The use of highway deicing salts can also introduce chlorides to surface water or groundwater. Elevated groundwater chlorides in drinking water wells near coastlines may indicate *Saltwater Intrusion*.
- Chlorinated** — (Water Quality) Describes water or wastewater that has been treated with either chlorine gas or a chlorine-containing compound.
- Chlorinated Hydrocarbons** — (Water Quality) Includes a class of persistent, broad-spectrum insecticides that linger in the environment and accumulate in the food chain. Among them are DDT, aldrin, dieldrin, heptachlor, chlordane, lindane, endrin, mirex, hexachloride, and toxaphene.
- Chlorination** — The application of chlorine or one of its compounds to water or wastewater, often for disinfection or oxidation purposes.
- Chlorinator** — A device for adding a chlorine-containing gas or liquid to drinking water or wastewater.
- Chlorine** — One of a group of elements classified as the halogens. Chlorine, Cl₂, the most common halogen, is a greenish yellow gas with an irritating odor. Chlorine is very reactive; it forms salts with metals, forms acids when dissolved in water, and combines readily with hydrocarbons. Various forms of chlorine are used to disinfect water. Chlorine is produced by the electrolysis of brine (a concentrated salt solution). Atomic number 17; atomic weight 35.45; freezing point -100.98°C; boiling point -34.6°C; specific gravity 1.56 (-33.6°C).
- Chlorine Breakpoint** — (Water Treatment) The point at which the chlorine dosage in a water treatment process has satisfied the *Chlorine Demand*. To eliminate the taste and odor associated with processed water, sufficient chlorine must be added to reach the breakpoint. Increasing the chlorine dose beyond the breakpoint produces a free chlorine residual, which is free to kill microorganisms. When chlorine is added to water, it first combines with constituents in the water such as iron, manganese, and nitrites. It is important to add enough chlorine to the water initially to ensure that these constituents are oxidized and to ensure that a residual is formed to react with the ammonia and organic matter in the water. Taste and odor problems result when chlorine dosages are either below the breakpoint, or well beyond the breakpoint.
- Chlorine-Contact Chamber** — (Water Quality) In a wastewater treatment plant, a chamber in which effluent is disinfected by chlorine before it is discharged to the receiving waters.
- Chlorine Demand** — (Water Quality) The amount of chlorine that must be added to purify drinking water; the amount of chlorine required to react with all dissolved and particulate materials and inorganic ammonia in the water.
- Chlorine Residual** — The concentration of chlorine remaining in water or wastewater at the end of a specified contact period which will react chemically and biologically. May be present as either combined or free chlorine, or both.
- Chlorophyll** — The green pigments of plants. There are seven known types of chlorophyll, *Chlorophyll a* and *Chlorophyll b* are the two most common forms. A green photosynthetic coloring matter of plants found in chloroplasts and made up chiefly of a blue-black ester.
- Cholera** — An infectious waterborne disease that is characterized by severe diarrhea and its resultant dehydration and electrolyte imbalance. The disease is caused by bacteria belonging to the genus *Vibrio*. Outbreaks are associated with contamination of surface waters with human fecal material.
- Chop** — A short, irregular motion of waves. Also, an area of choppy water, as on an ocean.

Chott, also Shott — (1) The depression surrounding a salt marsh or lake, especially in North Africa. (2) The bed of a dried salt marsh.

Chresard — Water present in the soil and available for plant absorption.

Chronic — Showing effects only over a long period of time, as in chronic toxicity.

Chuckhole — A rough hole in pavement, made by wear and weathering, more commonly referred to as *Pothole*.

Chute, or Chute Cutoff — As applied to stream flow, the term “chute” refers to a new route taken by a stream when its main flow is diverted to the inside of a bend, along a trough between low ridges formed by deposition on the inside of the bend where water velocities were reduced. Compare with *Neck Cutoff*.

Chute Spillway — The overfall structure which allows water to drop rapidly through an open channel without causing erosion. Usually constructed near the edge of dams.

Cienega — A Southwestern United States, non-forested wetland. Cienegas are dominated by *Graminoids* and may be seasonally dry.

Circulate, or Circulation — Movement or passage through a system of vessels, as water through pipes.

Circumneutral — Term applied to water with a pH of 5.5 (acidic) to 7.4 (alkaline).

Cirque — A smallish, rounded depression with steeply sloping sides carved into the rock at the top of a ridge where a glacier has its head. After the period of glaciation ends, the cirque may contain a small remnant of the former glacier, or it may fill with water and become a lake. The term *Tarn* is also used to describe lakes that have formed in cirques.

Cirque Basin — A half-amphitheater formed by alpine *Glaciation* with three steep sides. Usually found at upper ends of valleys and along ridges.

Cirrocumulus Clouds — A high-altitude cloud composed of a series of small, regularly arranged cloudlets in the form of ripples or grains. Also see *Cloud*.

Cirrostratus Clouds — A high-altitude, thin hazy cloud, usually covering the sky and often producing a halo effect. Also see *Cloud*.

Cirrus Clouds — A principal cloud type found at high altitudes and composed of ice crystals collected into delicate wisps or patches. Also see *Cloud*.

Cistern — An artificial reservoir or tank used for holding or storing water or other liquids. Typically a tank, often underground, used for storing rain water collected from a roof.

Clam-Flat — (New England) A level stretch of soft tidal mud where clams burrow.

Clammy — (1) Disagreeably moist, sticky, and cold to the touch. (2) Damp and unpleasant.

Clarification — A process or combination of processes where the primary purpose is to reduce the concentration of suspended matter in a liquid.

Clarifier — A device or tank in which wastewater is held to allow the settling of particulate matter.

Class A Pan — The U.S. Weather Bureau evaporation pan is a cylindrical container fabricated of galvanized iron or monel metal with a depth of 10 inches and a diameter of 48 inches. The pan is placed on an open 2- X 4-inch wooden platform with the top of the pan about 41 cm (16 inches) above the soil surface. It is accurately leveled at a site that is nearly flat, well sodded, and free from obstructions. The pan is filled with water to a depth of eight inches, and periodic measurements are made of the changes of the water level with the aid of a hook gage set in the still well. When the water level drops to seven inches, the pan is refilled. Its average pan coefficient is about 0.7 for lake evaporation.

(Injection Well) Classes — Classifications of the U.S. Environmental Protection Agency (EPA) that determine the permit requirements of an *Injection Well*. The following classes apply:

- [1] **Class I** – A well into which liquid hazardous wastes or other fluids are pumped down, with the fluids being injected into an underground formation below the lowest underground source of drinking water that is within a one-quarter mile radius of the well;
- [2] **Class II** – A well used to dispose of fluids produced by oil and gas wells, to introduce fluids for enhanced oil recovery, or for liquid hydrocarbon storage;
- [3] **Class III** – A well used to pump fluids underground for mineral extraction;
- [4] **Class IV** – A well used to re-inject treated fluid from a superfund cleanup site into or above an underground formation within a one-quarter mile radius of the well;
- [5] **Class V** – Wells not included in Classes I–IV, mainly shallow industrial disposal wells or *Recharge Wells*.

Classical Inference — (Statistics) Statistical inference is based on two basic premises: (1) The sample data constitute the only relevant information; and (2) The construction and assessment of the different procedures for inference are based on long-run behavior under essentially similar circumstances. Also see *Statistical Inference* and *Bayesian*

Inference.

Classical Linear Regression (CLR) Model — (Statistics) The standard for the *Ordinary Least Squares (OLS)*, or *Regression Analysis* model. The CLR Model has five basic assumptions:

- [1] **Linearity** – The dependent variable, or the variable to be explained or forecasted, can be calculated as a linear function of a specific set of independent, or explanatory variables;
- [2] **Randomness of Disturbance Terms** – The expected value of the disturbance term, that is the term showing the differences between the model’s estimated values and the actual observed values, is zero;
- [3] **Uncorrelated Disturbance Terms** – The disturbance terms all have the same variance and are not correlated with each other (see *Serial Correlation*);
- [4] **Data Conformity** – The observations on the independent variable can be considered fixed in repeated samples, i.e., it is possible to repeat the sample with the same independent variables;
- [5] **Sample Size and Selection** – The number of observations is greater than the number of independent variables and that there are no linear relationships, i.e., no significant correlations, between the independent variables (see *Multicollinearity*).

Classification (Soils) — The systematic arrangement of soils into groups or categories on the basis of their characteristics. Broad groupings are made on the basis of general characteristics and subdivisions on the basis of more detailed differences in specific properties. *Soil Taxonomy* is the study of soil classification systems. For a description of soil classifications, see *Land Capability Classes*.

Clast (Clastic) — (1) Pertaining to a rock or sediment composed principally of broken fragments that are derived from pre-existing rocks or minerals and that have been transported some distance from their places of origin. (2) An individual constituent, grain, or fragment of a sediment or rock, produced by the mechanical weathering (disintegration) of a larger rock mass.

Clay — (1a) A fine-grained, firm earth material that is plastic when wet and hardens when heated, consisting primarily of hydrated silicates of aluminum and widely used in making bricks, tiles, and pottery; (1b) A hardening or non-hardening material having a consistency similar to clay and used for modeling. (2) (Geology) A sedimentary material with grains smaller than 0.2 millimeters in diameter. (3) Moist, sticky earth; mud.

Clay Liner — A layer of clay soil that is added to the bottom and sides of a pit designed for use as a disposal site for potentially dangerous wastes. The clay prevents or reduces the migration of liquids from the disposal site.

Claypan — (1) A dense, compact layer in the subsoil having a much higher clay content than the overlying material from which it is separated by a sharply defined boundary. Such layers are formed by the downward movement of clay or by synthesis of clay in place during soil formation. Claypans are usually hard when dry, and plastic and sticky when wet. They usually impede movement of water and air, and the growth of plant roots. (2) (Australian) A shallow depression in which water collects after rain. Also see *Hardpan*.

Clayseal — A barrier constructed of impermeable clay that stops the flow of water or gas.

Clay Soil — A soil composed of microscopically small mineral particles that are flattened and fit closely together; spaces between particles for air and water are also small. When clay soil gets wet it dries out slowly because the downward movement of water, i.e., drainage, is slow.

Clean (Water) — Water that is free from foreign matter or pollution; not infected; unadulterated.

Clean Water Act (CWA) [Public Law 92–500] — More formally referred to as the *Federal Water Pollution Control Act*, the Clean Water Act constitutes the basic federal water pollution control statute for the United States. Originally based on the *Water Quality Act* of 1965 which began setting water quality standards. The 1966 amendments to this act increased federal government funding for sewage treatment plants. Additional 1972 amendments established a goal of zero toxic discharges and “fishable” and “swimmable” surface waters. Enforceable provisions of the CWA include technology-based effluent standards for point sources of pollution, a state-run control program for nonpoint pollution sources, a construction grants program to build or upgrade municipal sewage treatment plants, a regulatory system for spills of oil and other hazardous wastes, and a *Wetlands* preservation program (Section 404).

Clean Water Act (CWA), Section 319 — A federal grant program added by Congress to the CWA in 1987 and managed by the *U.S. Environmental Protection Agency (EPA)*, Section 319 is specifically designed to develop and implement state *Nonpoint Source (NPS) Pollution* management programs, and to maximize the focus of such programs on a watershed or waterbasin basis with each state. Today, all 50 states and U.S. territories receive Section 319 grant funds and are encouraged to use the funding to conduct nonpoint source assessments and revise and strengthen their nonpoint source management programs. Before a grant is provided under Section 319, states are required to: (1) complete a Nonpoint Source (NPS) Assessment Report identifying state waters that require nonpoint source control and their pollution sources; and (2) develop Nonpoint Source Management Programs that

outline four-year strategies to address these identified sources.

Clean Water Standards (EPA) — Generally refers to any enforceable limitation, control, condition, prohibition, standard, or other requirement which is promulgated pursuant to the *Federal Water Pollution Control Act (Clean Water Act)* [Public Law 92–500] or contained in a permit issued to a discharger by the U.S. Environmental Protection Agency (EPA) or by a state under an approved program, as authorized by Section 402 of the Clean Water Act, or by local governments to ensure compliance with pretreatment regulations as required by Section 307 of the Clean Water Act.

Clear Well — A reservoir containing potable water which has been previously treated before entering the distribution lines.

Clepsydra — An ancient device that measured time by marking the regulated flow of water through a small opening. Also referred to as a *Water Clock* or *Water Glass*.

Climate — The sum total of the meteorological elements that characterize the average and extreme conditions of the atmosphere over a long period of time at any one place or region of the earth's surface. The collective state of the atmosphere at a given place or over a given area within a specified period of time. Compare to *Weather*. Basic types of climates include:

[1] **Continental** — The climate characteristic of land areas separated from the moderating influences of oceans by distance, direction, or mountain barriers and marked by relatively large daily and seasonal fluctuations in temperature;

[2] **Oceanic** — The climate characteristic of land areas near oceans which contribute to the humidity and at the same time have a moderating influence on temperature and the range of temperature variation.

Climatic Cycle — The periodic changes of climate, including a series of dry years following a series of years with heavy rainfall.

Climatic Year — A period used in meteorological measurements. A continuous 12-month period during which a complete annual cycle occurs, arbitrarily selected for the presentation of data relative to hydrologic or meteorologic phenomena. The climatic year in the United States begins on October 1st and runs through September 30th. Similar to a *Water Year*.

Climatology, also Climatological — The science and study dealing with climate and climatic phenomena as exhibited by temperature, winds, and precipitation.

Climax — (1) The final stage of vegetation succession; a climax community reproduces itself and is in equilibrium with the existing environment. (2) The state of a *Biotic Community* attained when constituent species populations fluctuate rather than exhibit successional replacement and thereby self-perpetuate as long as climatic, edaphic (soil), and biotic conditions continue.

Clod — A compact, coherent mass of soil ranging in size from 5 to 10 millimeters (0.20 to 0.39 inch) to as much as 200 to 250 millimeters (7.87 to 9.84 inches) produced artificially, usually by the activity of man by plowing, digging, etc., especially when these operations are performed on soils that are either too wet or too dry for normal tillage operations.

Closed Basin — A hydrographic basin (basin, area or sub-area) is considered closed with respect to surface water flow if its topography prevents the occurrence of visible surface water outflow. It is closed hydrologically if neither surface nor underground water outflow can occur.

Closed-Basin Lake — A lake which has no outlet, from which water escapes only by evaporation.

Closed Canopy — Forest trees dense enough that tree crowns fill or nearly fill the canopy layer.

Closed Conduit System — A conveyance system where the flow of water is confined on all boundaries (i.e., pipe systems).

Closed-Cycle Cooling — A process in which cooling water used in industrial processes or in the generation of electrical energy is not discharged into receiving streams, where direct discharge can have adverse effects, but is circulated through cooling towers, evaporators, ponds, or canals to allow the dissipation of the heat, and the water to be reused.

Closed Drain — Subsurface drain, tile, or perforated pipe that receives surface water through surface inlets.

Closed-Loop Recycling — Recycling or reusing wastewater for non-potable purposes in an enclosed process.

Closed Water Loop — A process in which decontaminated wastewater is not discharged into a receiving stream but is reused. Any water lost during the process through evaporation or binding with some material is replaced by makeup water. Contrast with *Open Water Loop*.

Closet — A water closet; a toilet.

Cloud — A cloud is any concentration of gas, liquid droplets, or solid particles suspended as a distinct body in a gas or liquid. Generally, however, the term cloud is used to refer to the suspension of small ice or water particles in

the *Atmosphere*. **Cloud Formation** – Clouds in the atmosphere form whenever the relative *Humidity* of an air mass, or parcel, reaches slightly more than 100 percent. This can occur for a number of reasons: the upward motion of air, which causes expansion and cooling; input of water from outside the parcel; or loss of heat by radiation. Among the major producers of the upward motion that results in clouds are the *Low-Pressure* systems with their cold, warm, and occluded *Fronts*; tropical disturbances such as *Hurricanes*, *Cyclones*, or *Typhoons*; and the lifting of air as it flows over hilly and mountainous terrain. The size of cloud droplets and ice crystals ranges from about 1 to 100 micrometers (4/100,000 to 4/1,000 in). Particles this small fall to the ground so slowly that they appear suspended in air, tending to move with the wind. The fall of larger particles, at much greater speeds, is called *Precipitation*. About 1 million cloud droplets, with an average radius of 10 micrometers (4/10,000 inch), are required to make a typical raindrop of 1 mm (4/100 inch). Cloud droplets can exist at temperatures below 0°C (32°F) and are then referred to as supercooled. When supercooled water and ice crystals occur at the same location, the ice grows at the expense of the water, and an ice cloud forms. This occurs because at a given temperature ice has a greater affinity than liquid water for water vapor. Cloud droplets and ice crystals first form on certain types of small particles of dust or other airborne materials. They are called condensation nuclei when water droplets are formed and ice nuclei when ice crystals result. The nuclei generally range in size from as small as 0.01 micrometer to about 1 micrometer (4/10,000,000 to 4/100,000 inch). The number of nuclei vary widely, depending on the source of the air mass in which the parcel is imbedded. The atmosphere over the ocean generally has the lowest number of nuclei, whereas polluted air has the highest. The more nuclei, and therefore the more water droplets or ice crystals, the slower the process of formation of precipitation-sized particles, because the competition for the available water is greater. Thus, although *Rain* often falls shortly after a cloud forms over the ocean, a much longer time is required over continental areas. **Cloud Classification** – Clouds are classed as warm if their temperature throughout is above 0°C (32°F) and cold if they extend to heights where temperatures are less than 0° C. Cold clouds containing both supercooled water and ice are defined as mixed clouds; clouds composed entirely of ice are said to be glaciated. Some cold clouds contain only supercooled water. These clouds are hazardous to aviation because the water, freezing on impact with an airplane, can cause ice to build up on the fuselage and wings. Clouds, defined in terms of their gross physical characteristics, can be classified as *Stratiform* or *Cumuliform*. Stratiform, or layered, clouds form when the upward motion is relatively uniform over an area, and cumuliform, or cottony, billowing clouds develop when upward and downward air currents are separated by fairly short distances. When clouds form at ground surface they are called *Fog*. Clouds that form in the middle *Troposphere* are called *Altostratus* and *Alto cumulus*, and those in the upper troposphere are referred to as *Cirrocumulus*, *Cirrostratus*, or *Cirrus*. For those with bases in the lower troposphere, the terms *Stratus* and *Cumulus* are used. When precipitation is falling from these clouds, they are referred to with such terms as *Nimbostratus* or *Cumulonimbus*. *Nimbostratus* are the gray, leaden-sky clouds often produced by large-scale winter *Cyclones* in which precipitation is fairly steady and long-lasting. *Cumulonimbus* clouds, on the other hand, are associated with typical summertime *Thunderstorms*, in which rainfall is generally brief but heavy. A system of classifying clouds according to their physical characteristics has been devised by the *World Meteorological Organization*. Some of the more common cloud types are listed below:

- [1] **Cirrus** – A high-altitude cloud composed of narrow bands or patches of thin, generally white, fleecy parts, typically at an average height of 7 miles (11.3 kilometers);
- [2] **Cirrocumulus** – A high-altitude cloud composed of a series of small, regularly arranged cloudlets in the form of ripples or grains, typically at an average height of 5 miles (8 kilometers);
- [3] **Cirrostratus** – A high-altitude, thin hazy cloud, usually covering the sky and often producing a halo effect, typically at an average height of 6 miles (9.7 kilometers);
- [4] **Altostratus** – A somewhat high level, blue to grayish blue cloud that forms a sheet or layer, typically at an average height of 3.5 miles (5.6 kilometers);
- [5] **Alto cumulus** – A fleecy cloud, usually a rounded mass, but which can change radically and unexpectedly, producing intermediate forms, typically at an average height of 2.5 miles (4 kilometers);
- [6] **Cumulonimbus** – An extremely dense, vertically developed cumulus with a relatively hazy outline and a glaciated top extending to great heights, usually producing heavy rains, thunderstorms, or hailstorms, typically at an average height of 4 miles (6.4 kilometers);
- [7] **Cumulus** – A dense, white, fluffy, flat-based cloud with a multiple rounded top and a well-defined outline, usually formed by the ascent of thermally unstable air masses, typically at an average height of 2 miles (3.2 kilometers);
- [8] **Nimbus/Nimbostratus** – A rain cloud, especially a low dark layer of clouds precipitating continuous rain or snow, typically at an average height of .25 mile (.4 kilometer);

- [9] **Stratus** – A low-altitude cloud formation consisting of a horizontal layer of gray clouds, typically at an average height of .25 mile (.4 kilometer);
- [10] **Stratocumulus** – A low-lying cloud formation occurring in extensive horizontal layers with rounded summits, typically at an average height of 1 mile (1.6 kilometers).
- Cloudburst** — A sudden and extremely heavy downpour of rain that is small in areal extent, of short duration, and may be accompanied by lightning, thunder, and strong gusts of winds. Also, a torrential (hard) downpour of rain, which by its spottiness and relatively high intensity suggests the bursting and discharge of water from a cloud all at once.
- Cloud Chamber** — A vessel containing air saturated with water vapor whose sudden expansion reveals the passage of an ionizing particle by a trail of visible droplets.
- Cloud Modification** — Any process by which the natural course of development of a cloud is altered by artificial means. Also referred to as *Weather Modification*.
- Cloud Seeding** — A *Weather Modification* technique involving the injection of a substance into a cloud for the purpose of influencing the cloud's subsequent development. Ordinarily, this refers to the injection of a nucleating agent, which creates a nucleus around which precipitation will form. In common practice, cloud seeding involves the aerial release of silver iodide particles into convective clouds to create thunderstorms.
- Coagulant** — (1) An agent that causes a liquid or sol to coagulate. (2) (Wastewater Treatment) A chemical compound, such as *Alum* (aluminum sulfate), used to produce coagulation.
- Coagulant Aid** — (Wastewater Treatment) Fine particles with high surface area and high specific gravity providing for increased particle collisions during the neutralization process in wastewater treatment plants. They also improve settling and strengthen flocs in the coagulation process. They are generally used in much smaller doses than the coagulant itself. For example, *Sodium Bicarbonate* increases the efficiency of coagulation and extends the pH range to a level at which *Alum* (aluminum sulfate), is effective.
- Coagulate** — To cause the transformation of a liquid or sol, for example, into or as if into a soft, semisolid, or solid mass.
- Coagulation** — The clumping of particles which results in the settling of impurities. It may be induced by coagulants such as lime, alum, and iron salts.
- Coal Slurry Pipeline** — A pipeline which transports pulverized coal suspended in liquid, usually water.
- Coastal Barrier** — A naturally occurring island, sandbar, or other strip of land, including coastal mainland, that protects the coast from severe wave wash.
- Coastal Barrier Resources System (CBRS)** — Undeveloped communities, coastal barriers, and other protected areas designated as subject to certain flood insurance coverage restrictions. These areas were identified by the Coastal Barrier Resources Act of 1982 (CBRA) and the Coastal Barrier Improvement Act of 1990 and are shown on appropriate *Flood Insurance Rate Map (FIRM)* panels.
- Coastal High Hazard Area** — (FEMA) Area of special flood hazard – designated Zone V, VE, or V1-V30 on a *Flood Insurance Rate Map (FIRM)* – that extends from offshore to the inland limit of a primary frontal dune along an open coast, and any other area subject to high-velocity wave action from storms or seismic sources.
- Coastal Zone** — Coastal waters and adjacent lands that exert a measurable influence on the uses of the seas and their resources and biota.
- Coastal Zone Management Act (CZMA)** — A 1972 federal law, amended in 1980, that provides guidance and financial assistance to voluntary state and local coastal management programs. Goals of the program include the protection of natural resources and the management of land development in coastal areas, along shorelines, and on shorelands (extending inland as far as a strong influence on the shore is expected). The state programs established under the CZMA vary widely in their approach and application.
- Cobble** — Rock fragments 7.6 cm (3 inches) to 25.4 cm (10 inches) in diameter.
- COD** — See *Chemical Oxygen Demand* and *Cone of Depression*.
- Code of Federal Regulations (CFR)** — (1) The annual compilation of all current regulations that have been issued in final form by any federal regulatory agency. (2) The codification of the general and permanent rules initially published in the Federal Register by the executive departments and agencies of the federal government. The publication is organized by subject titles. Environmental regulations are covered under Title 40, Protection of the Environment.
- Co-Dominant** — Two or more plant species providing about equal areal cover which in combination control the environment.
- Coefficient Term** — (Statistics) The weight applied to one of the *Independent (or Exogenous) Variables* in the best prediction of the *Dependent (or Endogenous) Variable*. It is interpreted as the slope of the relation between the

independent variable and the dependent variable, or the change in the dependent variable for a unit change in the independent variable.

Coefficient of Determination (R^2) — (Statistics) A common measure of the “*Goodness of Fit*” in *Regression Analysis* used to assess the degree of causation between two variables or between one or more independent variables and a single dependent variable. The coefficient of determination is equivalent to the square of the *Correlation Coefficient* (R) and reflects the percent of variation in the dependent (explained) variable that is explained by the variations in the independent (explanatory) variable(s). Unlike the correlation coefficient, the coefficient of determination does not make an inference of causation, i.e., the changes in one variable do not affect changes in another. The value of the coefficient of determination varies between 0 (0 percent) and 1 (100 percent) with higher numbers representing better explanatory powers of a model in explaining the trends in historical data.

Coefficient of Discharge — The ratio of the observed to theoretical discharge.

Coefficient of Linear Extensibility — The ratio of the difference between the moist and dry lengths of a *Clod* to its dry length. The measurement correlates with the volume change of a soil upon wetting and drying.

Coefficient of Mechanical Diffusion — The rate at which solutes are mechanically mixed during *Advective Transport*, caused by the velocity variations at the microscopic level.

Coefficient of Molecular Diffusion — (1) The rate at which solutes are transported at the microscopic level due to variations in the solute concentrations within the fluid phases. (2) The rate of dispersion of a chemical caused by the kinetic activity of the ionic or molecular constituents. Also referred to as the *Diffusion Coefficient*. See *Molecular Diffusion*.

Coefficient of Roughness — Factor in fluid flow determination expressing the character of a surface and its fractional resistance to flow. Also referred to as *Roughness Coefficient*.

Coefficient of Runoff — Factor in the rational runoff formula expressing the ratio of peak runoff rate to rainfall intensity.

Coefficient of Storage — The volume of water an aquifer releases from or takes into storage per unit surface area of the aquifer per unit change in head.

Coefficient of Transmissivity (t) — The rate at which water of the prevailing kinematic viscosity is transmitted through a unit width of the aquifer under a unit *Hydraulic Gradient*. It is equal to an integration of the hydraulic conductivities across the saturated part of the aquifer perpendicular to the flow paths. Also, the rate at which water is transmitted through a unit width of an aquifer under a unit hydraulic gradient. Transmissivity values are given in gallons per minute through a vertical section of an aquifer 1 foot wide and extending the full saturated height of an aquifer under a hydraulic gradient of one in the *English Engineering System*; in the *Standard International System*, transmissivity is given in cubic meters per day through a vertical section of an aquifer 1 meter wide and extending the full saturated height of an aquifer under hydraulic gradient of one. It is a function of properties of the liquid, the porous media, and the thickness of the porous media. Also see *Transmissivity*.

Coefficient of Variation, or Variability — The *Standard Deviation* of a statistic expressed as a fraction of the mean or a percentage.

Coefficient of Viscosity — The degree to which a fluid resists flow under an applied force, measured by the tangential friction force per unit area divided by the velocity gradient under conditions of streamline flow.

Cofferdam — A temporary watertight enclosure that is pumped dry to expose the bottom of a body of water so that construction, as of piers, a dam, and bridge footings, may be undertaken. Also, a watertight chamber attached to the side of a ship to facilitate repairs below the water line. A *Diversion Cofferdam* prevents all downstream flow by diverting the flow of a river into a pipe, channel, or tunnel. Also see *Dam*, *Caisson* and *Camel*.

Cogeneration — The process by which energy is extracted from the waste head of an industrial process, such as from a steam boiler or food processing system.

Cohesion — A molecular attraction by which the particles of a body are united throughout the mass whether like or unlike. Compare to *Adhesion*.

Cold Front — The interface between an advancing mass of air that is colder than the one it is replacing, usually at the point of contact with the ground surface.

Cold Vapor — A method to test water for the presence of mercury.

Cold-Water — Lacking modern plumbing or heating facilities, as a cold-water residence.

Coldwater Fish — A fish that requires relatively cool water for survival. While the optimum temperature varies by species, most are found in water where temperatures are 20°C (68°F) or less.

Coliform (Bacteria) — (1) A group of bacteria predominantly inhabiting the intestines of man or animals but also found in soil. While typically harmless themselves, coliform bacteria are commonly used as indicators of the possible presence of pathogenic organisms. (2) A group of organisms (*Colon bacilli*) usually found in the colons

of animals and humans; non-pathogenic microorganisms used in testing water to indicate the presence of pathogenic bacteria. The presence of coliform bacteria in water is an indicator of possible pollution by fecal material. Generally reported as colonies per 100 milliliters (ml) of sample.

Coliform Index — An index of the bacteriological quality of water, based on a count of the numbers of coliform bacteria.

Collection Site — A stream, lake, reservoir, or other body of water fed by water drained from a watershed.

Collector Sewers — Pipes used to collect and carry wastewater from individual sources to an interceptor sewer that will carry it to a treatment facility.

Collector System — Conveys water from several individual sources such as groundwater wells and drains and surface inlet drains for rainstorm and snowmelt runoff to a single point of diversion. The collector system is associated with projects that increase water supply and decrease flood damage.

Collector Well — A well located near a surface water supply used to lower the water table and thereby induce infiltration of surface water through the bed of the water body to the well.

Colloidal Suspension — Suspension in water of particles so finely divided that they will not settle under the action of gravity, but will diffuse, even in quiet water, under the random impulses of *Brownian Movement*. Particles typically range in size from about one micron (0.000001 millimeter) to about one millimicron; however, there is no distinct differentiation by particle size between true *Suspension* and colloidal suspension or between colloidal suspension and *Solution*.

Colloids — (1) Any substance with particles in such a fine state of subdivision dispersed in a medium (for example, water) that they do not settle out, but not in so fine a state of subdivision that they can be said to be truly dissolved. (2) Quantities of extremely small particles, typically 0.0001 to 1 micron in size, and small enough to remain suspended in a fluid medium without settling to the bottom. Substances that, when apparently dissolved in water or other liquid, diffuse not at all or very slowly through a membrane and show other special properties, as lack of pronounced effect on the freezing point or vapor pressure of the solvent. Colloids represent intermediate substances between a true dissolved particle and a suspended solid, which will settle out of solution.

Colluvial Hollow — A bow-shaped concavity in bedrock that collects sediment between debris flows.

Colluvial Material — (Geology) Material consisting of *Alluvium* in part and also containing angular fragments of the original rocks. Typically found at the bottom or on the lower slopes of a hill.

Colluvium — (1) A general term used to describe loose and incoherent deposits of rock moved downslope by gravitational force in the form of soil *Creep*, slides, and local wash. (2) A general term applied to any loose, heterogeneous, and incoherent mass of soil material or rock fragments deposited chiefly by gravity-driven mass-wasting usually at the base of a steep slope or cliff, for example, talus, cliff debris, and avalanche material. (3) *Alluvium* deposited by unconcentrated surface run-off or sheet erosion, usually at the base of a slope. Also see *Colluvial Material*.

Colon Bacillus — (Microbiology) A rod-shaped bacterium, especially *Escherichia coli* (*E. coli*), a normal, generally nonpathogenic commensal found in all vertebrate intestinal tracts, but which can be virulent, causing diarrhea and other dysenteric symptoms. Its presence in water is an indicator of fecal contamination.

Colonization — (Biology) As applied to vegetation, the invasion of a disturbed area; annual plants are often colonizing species.

Color (Water) — See *Water Color*.

Colorado River Commission [Nevada] — An agency of the State of Nevada consisting of seven members, to include four members appointed by the Governor and three members from the *Southern Nevada Water Authority* Board of Directors. The Colorado River Commission has broad statutory authority to establish policies for the management of Nevada's allocation of power and water resources from the Colorado River and for the development of designated land in Southern Nevada.

Colorado River Compact — An agreement entered into on November 24, 1922 and ratified by the legislatures of the seven states within the Colorado River Basin — Arizona, California, Colorado, Nevada, New Mexico, Utah, and Wyoming — agreeing to the general allocation of the waters of the Colorado River. The compact divided the Colorado River Basin into an *Upper Basin* and a *Lower Basin*, with the division point established at Lees Ferry, a point in the mainstream of the Colorado River approximately 30 river miles south of the Utah-Arizona boundary. The Upper Basin was defined to include those parts of the states of Arizona, Colorado, New Mexico, Utah, and Wyoming within and from which waters naturally drain into the Colorado River system above Lees Ferry, and all parts of these states that are not part of the river's drainage system but may benefit from water diverted from the system above Lees Ferry. The Lower Basin was defined to include those parts of the states of Arizona, California, Nevada, New Mexico, and Utah within and from which waters naturally drain into the Colorado River system

below Lees Ferry, and all parts of these states that are not part of the river's drainage system but may benefit from water diverted from the system below Lees Ferry. The compact did not apportion water to any state; however, it did apportion to each upper and lower basin the exclusive, beneficial consumptive use of 7,500,000 acre-feet of water per year from the Colorado River system in perpetuity. Further, the compact gave to the Lower Basin the right to increase its annual beneficial consumptive use of such water by 1,000,000 acre-feet. This compact cleared the way for federal legislation for the construction of Hoover Dam. Subsequently, the Upper Basin states entered into the *Upper Colorado River Basin Compact* on October 11, 1948 which provided Arizona to use 50,000 acre-feet of water per year from the upper Colorado River system and apportioned the remaining water to the Upper Basin states according to the following percentages: Colorado, 51.75 percent; New Mexico, 11.25 percent; Utah, 23 percent; and Wyoming, 14 percent. The Lower Basin states could not come to an agreement on apportionment on their own, and in October 1962, the U.S. Supreme Court ruled that of the first 7,500,000 acre-feet of mainstream water in the Lower Basin, California is entitled to 4,400,000 acre-feet (58.67 percent), Arizona to 2,800,000 acre-feet (37.33 percent), and Nevada to 300,000 acre-feet (4.00 percent).

Colvin Algorithm — A canal flow control structure technique that operates the gates based on the rate of deviation of the water surface level from the setpoint.

Combined Available Chlorine — Concentration of chlorine which is combined with ammonia as chloramine or as other chloro-derivatives yet is still available to oxidize organic matter.

Combined Residual Chlorination — (Water Quality) The drinking water treatment method that involves the addition of chlorine to water at levels sufficient to produce, in combination with ammonia and/or organic amines, a *Combine Available Chlorine* residual. This chlorine residual maintains the treatment's disinfecting power throughout the water distribution system. Another approach to water chlorination is *Breakpoint Chlorination*.

Combined Sewer Overflow (CSO) — (Water Quality) The condition that occurs when a *Combined Sewer System (CSS)* that is already loaded with wastewater experiences an influx of stormwater runoff from a heavy rain or melting snows. This causes the sewers to overload and excess stormwater and wastewater to discharge directly into receiving streams through overflow ports without treatment.

Combined Sewer System (CSS) — A sewage system that carries both sanitary sewage and storm water runoff. During dry weather, combined sewers carry all wastewater for treatment. During storm events, part of the load may be intercepted to prevent overloading of the processing facility. In this case, the untreated portion is frequently allowed to enter the receiving stream. Also see *Combined Sewer Overflow*.

Comet — A celestial body, observed only in that part of its orbit that is relatively close to the sun, having a head consisting of a solid nucleus surrounded by a nebulous coma up to 2.4 million kilometers (1.5 million miles) in diameter and an elongated, curved vapor tail arising from the coma when sufficiently close to the sun. Comets are thought to consist primarily of ammonia, methane, carbon dioxide, and water.

Commercial Water Use (Withdrawals) — Water for motels, hotels, restaurants, office buildings, and other commercial facilities and institutions, both civilian and military. The water may be obtained from a public supply or may be self supplied. The terms "water use" and "water withdrawals" are equivalent, but not the same as *Consumptive Use* as they do not account for return flows. Also see *Industrial Water Use (Withdrawals)*, *Public Water Supply System* and *Self-Supplied Water*.

Common Law — A body of court decisions based on custom, traditional usage and precedent, as that of England, rather than codified written laws. *Riparian water rights* is a common practice under the common law doctrine.

Community — (1) A naturally occurring, distinctive group of different organisms which inhabit a common environment, interact with each other, and are relatively independent of other groups. (2) A group of people who participate in a social and economic network of statistically significant frequency and within the cultural and geographic boundaries of the network.

Community Assistance Program (CAP) — A grant program funded by the *Federal Emergency Management Agency (FEMA)* with the objective of providing technical assistance for flood mitigation activities and coordinating floodplain management activities in counties and communities participating in the *National Flood Insurance Program (NFIP)*.

Community of Interest — A social group that shares common perspectives, vulnerabilities, and preferences with respect to resource management issues (e.g., hunters, anglers, permittees, and environmentalists).

Community of Place — A social group bounded by geographic locality.

Community Water System — A public water system with 15 or more connections and serving 25 or more year-round residents and thus is subject to the *U.S. Environmental Protection Agency (EPA)* regulations enforcing the *Safe Drinking Water Act (SDWA)*.

Compact, Water — An agreement between states, ratified by Congress, providing for the division and apportionment

of waters of an interstate river or other body of water.

Compaction — A physical change in soil properties that result in an increase in soil bulk density and a decrease in *Porosity*. The packing together of soil particles by forces exerted at the soil surface, resulting in increased soil density.

Compensation Level — The level in a body of water, usually occurring at the depth of 1 percent light penetration, which forms the lower boundary of the *Zone of Net Metabolic Production*. Also see *Metabolism*.

Compensation Point — The point under water at which plant photosynthesis just equals plant respiration. The water depth defines the lower boundary, where photosynthesis takes place, of the *Euphotic Zone*. Also referred to as the *Compensation Level*.

Complete Fertilizer — Any plant food that contains all three of the primary nutrient elements of nitrogen, phosphorus, and potassium.

Complete Treatment — A method of treating water that consists of the addition of coagulant chemicals, flash mixing, coagulation-flocculation, sedimentation, and filtration. Also referred to as *Conventional Filtration*.

Completed Test — (Water Quality) The third, and last, part of the examination of water for the presence of bacteria of fecal origin. Cultures that are scored as positive in the earlier steps of the analysis (*Presumptive Test* and *Confirmed Test*) are subjected to a verification by inoculating appropriate media (eosin methylene blue agar plates) and performing a gram-positive/gram-negative stain on isolated colonies.

Completion — Sealing off access of undesirable water to the well bore by proper casing and/or cementing procedures.

Compliance Cycle — (Water Quality) The 9-year calendar year cycle, beginning January 1, 1993, during which public water systems must monitor. Each cycle consists of three 3-year compliance periods.

Compliance Monitoring — (Water Quality) Collection and evaluation of data, including self-monitoring reports, and verification to show whether pollutant concentrations and loads contained in permitted discharges are in compliance with the limits and conditions specified in the permit.

Compliance Schedule — (Water Quality) A negotiated agreement between a pollution source and a government agency that specifies dates and procedures by which a source will reduce emissions and, thereby, comply with a regulation.

Comply (EPA) — A term used to indicate compliance or adherence with *Clean Water Standards*, specifically with respect to a schedule or plan ordered or approved by a court of competent jurisdiction, the *U.S. Environmental Protection Agency (EPA)*, or a water pollution control agency in accordance with the requirements of the *Federal Water Pollution Control Act (Clean Water Act) [Public Law 92-500]* and regulations issued pursuant thereto.

Component Landforms — Commonly small landforms that compose part of the areas of a major landform and were created by partial dissection of, or by alluvial or eolian accretion on that larger, major landform. Component landforms are about the smallest landforms that can be usefully conceived of as single unit. Their morphological parts are landform elements, and the sideslope element may be subdivided into slope components.

Composite Sample — (Water Quality) A representative water or wastewater sample made up of individual smaller samples taken at periodic intervals.

Compost — (1) A mixture that consists largely of decayed organic matter, used for fertilizing and conditioning land. (2) An organic soil amendment or mulch made by gardeners from organic waste materials (dead leaves, some kitchen scraps, etc.). The materials are assembled in a pile where moisture and heat partially decompose them in a matter of months.

Compound — A substance composed of separate elements, ingredients, or parts. Water is a compound consisting of hydrogen and oxygen, chemical symbol H_2O .

Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) — Also referred to as the *Superfund Law*, this statute, originally enacted in 1980 and substantially modified in 1986, establishes the *U.S. Environmental Protection Agency's (EPA)* authority for emergency response and cleanup of hazardous substances that have been spilled, improperly disposed of, or released into the environment. The primary responsibility for response and cleanup is on the generators or disposers of the hazardous substances, with a backup federal response using a trust fund provision.

Comprehensive Plan — (Natural Resource) A plan for water and related land resources development, that does consider all economic and social factors and provides the greatest overall benefits to the region as a whole.

Concentrate — To make a solution or mixture less dilute, as by removing water from a solution.

Concentration — (1) The density or amount of a substance in a solution. (2) The amount of *Solute* present in proportion to the total *Solution*. More specifically, a measure of the average density of pollutants or other constituents, usually specified in terms of mass per unit volume of water or other *Solvent* (e.g., milligrams per liter) or in terms of relative volume of solute per unit volume of water (e.g., parts per million).

- Concentration Time** — The period of time required for storm runoff to flow from the most remote point of a catchment or drainage area to the outlet or point under consideration. Concentration time varies with depth of flow and channel condition.
- Concordant Flows** — Flows at different points in a river system that have the same *Recurrence Interval*, or the same frequency of occurrence. It is most often applied to flood-flows.
- Concrete-Gravity Structure** — A type of concrete structure in which resistance to overturning is provided only by its own weight.
- Condemnation** — Taking private property for public use, with compensation to the owner, under the right of *Eminent Domain*.
- Condensate** — A product of *Condensation*.
- Condensation** — (1) (Physics) The process by which a gas or vapor changes to a liquid or solid; also the liquid or solid so formed. (2) (Chemistry) A chemical reaction in which water or another simple substance is released by the combination of two or more molecules. The opposite of *Evaporation*. In meteorological usage, this term is applied only to the transformation from vapor to liquid.
- Condense** — (1) To cause a gas or vapor to change to a liquid. (2) To remove water from a substance, as from milk, for example.
- Conditional Water Permit** — (1) A water use permit that is conditional upon or granted subject to certain conditions, e.g., specific use, specific quantity, specific place, and specific period of time. (2) An authorization for the permittee to construct any facilities (such as a well and irrigation system) and to begin utilization of the water. A water right and a water permit are not the same thing. Also see *Water Right*.
- Conductance** — A rapid method of estimating the dissolved solids content of a water supply by determining the capacity of a water sample to carry an electrical current.
- Conductivity** — A measure of the ability of a solution to carry an electrical current.
- Conductor Casing** — The temporary or permanent steel casing used in the upper portion of the borehole to prevent collapse of the formation during the construction of the well or to conduct the gravel pack to the perforated or screened areas of the casing.
- Conduit** — (1) A natural or artificial channel through which fluids may be conveyed. (2) (Dam) A closed channel for conveying discharge through, under, or around a dam.
- Cone of Depression (COD)/Cone of Influence (COI)** — A cone-like depression of the water table or other piezometric surface that has the shape of an inverted cone and is formed in the vicinity of a well by withdrawal of water. The surface area included in the cone is known as the area of influence of the well. Also referred to as the *Pumping Cone* and the *Cone of Drawdown*.
- Confidence Limits** — (Statistics) Bounds of statistical probability, e.g., 95 percent, 98 percent, 99 percent, etc., established as part of the testing criteria. The confidence limits express the statistical probability associated with the acceptance of an econometric model's results.
- Confined Aquifer** — (1) An aquifer containing water between two relatively impermeable boundaries. The water level in a well tapping a confined aquifer stands above the top of the confined aquifer and can be higher or lower than the water table that may be present in the material above it. In some cases the water level can rise above the ground surface, yielding a flowing well. (2) An aquifer or water-bearing subsurface stratum which is bounded above and below by formations of impermeable or relatively impermeable material; a water-bearing formation whose upper boundary is a layer which does not transmit water readily. (3) An aquifer in which ground water is under pressure significantly greater than atmospheric and its upper limit is the bottom of a bed of distinctly lower hydraulic conductivity than that of the aquifer itself. See *Artesian Aquifer*.
- Confined Ground Water** — A body of ground water covered by material so impervious as to sever the hydraulic connection with overlying ground water except at the intake or recharge area. Confined water moves in pressure conduits due to the difference in head between intake and discharge areas of the confined water body.
- Confined Water (Artesian)** — Water under artesian pressure. Water that is not confined is said to be under water table conditions.
- Confining Bed** — A body of "impermeable" material stratigraphically adjacent to one or more aquifers. It may lie above or below the aquifer. In nature its hydraulic conductivity may actually range from nearly zero to some value distinctly lower than that of the aquifer. In some literature, the term confining bed has now supplanted the terms *Aquiclude*, *Aquitard*, and *Aquifuge*. Also referred to as *Confining Layer*.
- Confining Unit** — A hydrogeologic unit of relatively impermeable material, bounding one or more aquifers. This is a general term that has replaced *Aquitard*, *Aquifuge*, and *Aquiclude* and is synonymous with *Confining Bed*.
- Confirmed Test** — (Water Quality) The second stage in the examination of water for the presence of bacteria of fecal

- origin. Cultures that are positive on the first portion of the testing procedure (the *Presumptive Test*) are inoculated into tubes of brilliant green lactose bile broth and examined for fermentation when incubated at 35°C (95°F) for 48 hours. If fermentation is present, a third stage, the *Completed Test*, is performed.
- Confluence** — (1) The act of flowing together; the meeting or junction of two or more streams; also, the place where these streams meet. (2) The stream or body of water formed by the junction of two or more streams; a combined flood.
- Confluent Growth** — (Water Quality) A continuous bacterial growth covering all or part of the filtration area of a membrane filter in which the bacteria colonies are not discrete. In coliform testing, abundant or overflowing bacterial growth which makes accurate measurement difficult or impossible.
- Confounding Variable** — (Statistics) A variable which is associated with two or more observed variables and which directly affects the relationship between the observed variables. Often causal relationships are attributed to the observed variables when, in fact, it is the confounding variable that is the true causal factor. By holding the behavior of the confounding variable constant, the relationship between the two observed variables is no longer evident. Also see *Secondary (Indirect) Association*.
- Conifer** — A tree belonging to the order *Coniferae* with cones and leaves of needle shape or “scalelike.”
- Coniferous** — Pertaining to *Conifers*, which bear woody cones containing naked seeds.
- Conjunctive Management** — The integrated management and use of two or more water resources, such as a (groundwater) aquifer and a surface water body.
- Conjunctive Operation** — The operation of a ground water basin in combination with a surface water storage and conveyance system. Water is stored in the groundwater basin for later use by intentionally recharging the basin during years of above-normal water supply.
- Conjunctive (Water) Use** — (1) The operation of a groundwater basin in combination with a surface water storage and conveyance system. Water is stored in the groundwater basin for later use by intentionally recharging the basin during years of above-average water supply. (2) The combined use of surface and groundwater systems and sources to optimize resource use and prevent or minimize adverse effects of using a single source; the joining together of two sources of water, such as groundwater and surface water, to serve a particular use. (3) The integrated use and management of hydrologically connected groundwater and surface water.
- Connate Water** — Water that was trapped in the interstices of a sedimentary or extrusive igneous rock at the time of its deposition. It is usually highly mineralized and frequently saline.
- Connector System** — Conveys water from a single source to a different location typically without intermediate collection of diversions. The connector system is associated with regulation reservoirs and intakes to pumping plants or powerplants.
- Consent Decree** — (Environmental) A legal document approved by a judge, that formalizes an agreement reached between the *U.S. Environmental Protection Agency (EPA)* and a *Potentially Responsible Party (PRP)* or parties through which the PRP will conduct all or part of a cleanup action at a *Superfund Site*, cease or correct actions or processes that are polluting the environment, or otherwise comply with EPA initiated regulatory enforcement actions to resolve the contamination at the Superfund site involved. The consent decree describes the actions the PRP will take and may be subject to a public comment period.
- Consequent Stream** — A stream following a course that is a direct consequence of the original slope of the surface on which it developed.
- Conservation** — (1) Increasing the efficiency of energy use, water use, production, or distribution. (2) The careful and organized management and use of natural resource, for example, the controlled use and systematic protection of natural resources, such as forests, soil, and water systems in accordance with principles that assure their optimum long-term economic and social benefits. Also, preservation of such resources from loss, damage, or neglect.
- Conservation District** — A public organization created under state-enabling law as a special purpose district to develop and carry out a program of soil, water, and related resource conservation, use, and development within its boundaries. In the United States, such districts are usually a subdivision of state government with a local governing body and are frequently called a soil conservation district or a soil and water conservation district.
- Conservation Easement** — An agreement negotiated on privately owned lands to preserve open space or protect certain natural resources.
- Conservation Education** — A comprehensive concept that spans curricula from kindergarten through adult, post-graduate programs and links the subject to natural resource conservation, stressing the characteristics and interrelationships in management and use of our natural resources that will result in knowledgeable citizenry with attitudes of responsibility toward the conservation of those natural resources.
- Conservation Plan** — A collection of material containing land user information requested for making decisions

regarding the conservation of soil, water, and related plant and animal resources, along with necessary habitat, for all or part of an operating unit.

Conservation Pool — A residual pool maintained in a reservoir to support fish and other aquatic life.

Conservation Practice — A technique or measure used to meet a specific need in planning and carrying out soil and water conservation programs for which standards and specifications have been developed.

Conservation Standards — Standards for various types of soils and land uses, including criteria, techniques, and methods for the control of erosion and sediment and impacts on plant and animal species and necessary habitat resulting from land disturbing activities.

Conservation Storage — The portion of water stored in a reservoir that can be later released for useful purposes such as municipal water supply, power, or irrigation. Conservation storage is the volume of water stored between dead reservoir storage and flood control storage.

Conservation Tillage — A level of reduced tillage combined with one or more soil and water conservation practices designed to reduce loss of soil or water relative to conventional tillage. Such activities often take the form of non-inversion tillage that retains productive amounts of residue mulch on the surface.

Consolidated Aquifer — An aquifer made up of consolidated rock that has undergone solidification or lithification.

Consolidated Formation — Geological formations which occur naturally and have been turned to stone. The term is sometimes used interchangeably with the word *Bedrock*. It includes rock such as basalt, rhyolite, sandstone, limestone and shale. Typically, these formations will stand at the edges of a bore hole without caving.

Consolidation — (Soil Mechanics) Adjustment of a soil in response to increased load; involves squeezing of water from the pores and a decrease in void ratio (pore space). Frequently the geologic term *Compaction* is used instead.

Consolidation Grouting (of a Dam) — The injection of grout to consolidate a layer of the foundation, resulting in greater impermeability and/or strength. Also referred to as *Blanket Grouting*. Also see *Blanket (of a Dam)*.

Consolute — Of or relating to liquid substances that are capable of being mixed in all proportions.

Constant Head Orifice Turnout (Canal) — A calibrated structure containing an adjustable orifice gate and a gate downstream to control a constant head differential across the orifice gate to divert and measure water from a main irrigation canal to a distributing canal.

Constant Volume Operation Method (Canal) — A canal operation that maintains a relatively constant water volume in each canal pool.

Constituents — Any of the chemical substances found in water. Typically, measurements of such constituents in sampled drinking water may consist of *Total Dissolved Solids (TDS)*, Hardness (concentrations of Calcium and Magnesium, specifically), Sodium, Potassium, Sulfate, Chloride, Nitrate, Alkalinity, Bicarbonate, Carbonate, Fluoride, Arsenic, Iron, Manganese, Copper, Zinc, Barium, Boron, Silica, as well as other physical characteristics and properties such as water color, turbidity, pH, and electro-conductivity (EC). [As an example of constituents and their acceptable levels for drinking water, see Appendix B-3, Nevada Drinking Water Standards.]

Constructed Wetlands — (1) Wetlands constructed by man either as part of a *Wetland Banking*, *Wetland Clumping (Aggregation)*, or *Wetland Mitigation* program, or to achieve some other environmental preservation or restoration program. (2) (Water Quality) Wetlands constructed specifically for the purpose of treating waste water effluent before re-entering a stream or other body of water or being allowed to percolate into the groundwater. Also see *Lagoon*.

Construction Joint (of a Dam) — The interface between two successive placings or pours of concrete in a dam's structure where a bond, and not a permanent separation, is intended.

Consumable Water Supply — That amount of river water available for consumption at a given point on the river after existing prior water rights have been met.

Consumption, Domestic — The quantity or quantity per capita (person) of water consumed in a municipality or district for domestic uses during a given period, usually one day. Domestic consumption is generally considered to include all uses included in "municipal use of water," in addition to the quantity of water wasted, lost, or otherwise unaccounted for. Also see *Consumption, Municipal; Municipal Use of Water*.

Consumption, Industrial — The quantity of water consumed in a municipality or district for mechanical, trade, and manufacturing uses during a given period, usually one day.

Consumption, Municipal — The quantity of water consumed through use in developed urban areas. Also see *Consumption, Domestic; Consumptive Use*.

Consumptive Irrigation Requirement (CIR) — The quantity of irrigation water, exclusive of precipitation, stored soil moisture, or ground water, that is required consumptively for crop production.

Consumptive (Water) Use — (1) A use which lessens the amount of water available for another use (e.g., water that is used for development and growth of plant tissue or consumed by humans or animals). (2) A use of water that

renders it no longer available because it has been evaporated, transpired by plants, incorporated into products or crops, consumed by people or livestock, or otherwise removed from water supplies. (3) The portion of water withdrawn from a surface or groundwater source that is consumed for a particular use (e.g., irrigation, domestic needs, and industry), and does not return to its original source or another body of water. The terms *Consumptive Use* and *Nonconsumptive Use* are traditionally associated with water rights and water use studies, but they are not completely definitive. No typical consumptive use is 100 percent efficient; there is always some return flow associated with such use either in the form of a return to surface flows or as a ground water recharge. Nor are typically nonconsumptive uses of water entirely nonconsumptive. There are evaporation losses, for instance, associated with maintaining a reservoir at a specified elevation to support fish, recreation, or hydropower, and there are conveyance losses associated with maintaining a minimum streamflow in a river, diversion canal, or irrigation ditch.

Consumptive Water Use, Irrigation — The quantity of water that is absorbed by the crop and transpired or used directly in the building of plant tissue, together with that evaporated from the cropped area. Does not include runoff or deep percolation in support of the *Crop Leaching Requirement*.

Consumptive Water Use, Net — The consumptive use decreased by the estimated contribution by rainfall toward the production of irrigated crops. Net consumptive use is sometimes referred to as the *Crop Irrigation Requirement*.

Consumptive Water Use Requirement (Crop) — The annual irrigation consumptive use expressed in feet or acre-feet per acre.

Consumptive Water Waste — The water that returns to the atmosphere without benefiting man.

Contact Recreation (Water) — Recreational activities involving a significant risk of ingestion of water, including wading by children, swimming, water skiing, diving and surfing.

Contact Stabilization — A modification of the *Activated Sludge Process* wherein a contact basin provides for the rapid adsorption of the waste. A separate tank is provided for stabilization of the solids before they are reintroduced into the raw wastewater flow.

Contaminant — (1) In a broad sense any physical, chemical, biological, or radiological substance or matter in the environment. (2) (Water Quality) In more restricted usage, a substance in water of public health or welfare concern. Also, an undesirable substance not normally present, or an usually high concentration of a naturally-occurring substance, in water, soil, or other environmental medium.

Contaminate — To make impure or unclean by contact or mixture.

Contamination (Water) — Impairment of the quality of water sources by sewage, industrial waste, or other matters to a degree which creates a hazard to public health. Also, the degradation of the natural quality of water as a result of man's activities. There is no implication of any specific limits, since the degree of permissible contamination depends upon the intended end use, or uses, of the water.

Contents (Storage) — The volume of water in a reservoir. Unless otherwise indicated, reservoir content is computed on the basis of a level pool and does not include bank storage.

Continental Divide — A drainage divide separating the rivers which flow toward opposite sides of a continent.

Continental Divide [United States] — A ridge of the Rocky Mountains forming the North American watershed that separates rivers flowing in an easterly direction from those flowing in a westerly direction.

Continental Drift — The theory that continents slowly shift their positions as a result of currents in the molten rocks of the earth's mantle.

Continental Shelf — The submerged shelf of land that slopes gradually from the exposed edge of a continent for a variable distance to the point where the steeper descent (the *Continental Slope*) to the ocean bottom begins, commonly at a depth of about 600 feet (183 meters).

Continuity Equation — The relation, based on the conservation of mass, that equates the *Volumetric Flow Rate*, Q , of an incompressible fluid in a duct or pipe to the product of the fluid velocity, V , and the cross-sectional area, A , of the duct or pipe, by

$$Q = VA$$

If the area, A , increases, then the velocity, V , must decrease, and conversely. The equation is also applied to liquid flow through a system, stating that the flow in, Q_{in} , flow out, Q_{out} , and the change in the storage volume for a given time must be in balance, or

$$Q_{in} - Q_{out} = \dot{A}\text{Storage Volume}$$

Continuous Delivery — A method of delivering water to the farm headgate from an irrigation conveyance system on a continuous basis, as opposed to a demand delivery where flows are delivered on a rotational time schedule and/or

upon demand.

Continuous Discharge — A routine release to the environment that occurs without interruption, except for infrequent shutdowns for maintenance, process changes, etc.

Continuous-Record Station (USGS) — A gaging station site that meets either of the following conditions: (1) Stage or streamflow are recorded at some interval on a continuous basis; the recording interval is usually 15 minutes, but may be less or more frequent; (2) water quality, sediment, or other hydrologic measurements are recorded at least daily.

Continuous Recorder (Gage) — A device which measures stream flow levels on a continual basis.

Continuous Sample — A flow of water from a particular place in a plant to the location where samples are collected for testing. May be used to obtain *Grab Samples* or *Composite Samples*.

Contour Ditch — An irrigation ditch laid out approximately on the contour, or elevation of the land.

Contour Flooding — Irrigation method resulting in flooding fields from *Contour Ditches*.

Contour-Furrow Irrigation — The application of irrigation water in furrows that run across the slope with a forward grade in the furrows.

Contour Furrows — Furrows plowed approximately on the contour on pasture and rangeland to prevent runoff and increase infiltration; also, furrows laid out approximately on the contour for irrigation purposes.

Contour Plowing — A soil tilling technique that follows the shape of the land to minimize erosion.

Contour Strip Farming — A kind of contour farming in which row crops are planted in strips, between alternating strips of close-growing, erosion-resistant forage crops.

Contour Trenching — Development of water storage *Detention* or *Retention Facilities* along the contour by excavation and placement of soils as an embankment along the downstream side. Intervals vary with precipitation, slope, and soil.

Contract (USBR) — Any repayment or water service contract between the United States and a district providing for the payment of construction charges to the federal government, including normal operation, maintenance, and replacement costs pursuant to federal reclamation law. All water service and repayment contracts are considered contracts even if the contract does not specifically identify that portion of the payment which is to be attributed to operation and maintenance and that which is to be attributed to construction.

Contract Rate (USBR) — The repayment or water service rate set forth in a contract to be paid by a district to the federal government.

Contrail — A visible trail of streaks of condensed water vapor or ice crystals sometimes forming in the wake of an aircraft. Also referred to as *Vapor Trail*.

Contributing Area — That portion of a watershed which contributes to measured runoff under normal conditions.

Control — A natural constriction of the channel, a long reach of the channel, a stretch of rapids, or an artificial structure downstream from a *Gaging Station* that determines the *Stage-Discharge Relation* at the gage. A control may be complete or partial. A complete control exists where the stage-discharge relation at a gaging station is entirely independent of fluctuations in stage downstream from the control. A partial control exists where downstream fluctuations have some effect upon the stage-discharge relation at a gaging station. A control, either partial or complete, may also be shifting. Most natural controls are shifting to a degree, but a shifting control exists where the stage-discharge relation experiences frequent changes owing to impermanent bed or banks.

Control Dam — A dam or structure with gates to control the discharge from the upstream reservoir or lake.

Control Points (Horizontal and Vertical) — Small monuments that are securely embedded in the surface of a dam and used to detect any movement with respect to *Permanent Monuments* placed away from the dam itself.

Control Scheme (Canal) — The collection of methods and algorithms brought together to accomplish control of a canal system.

Control Structure (USGS) — A structure on a stream or canal that is used to regulate the flow or stage of the stream or to prevent the intrusion of saltwater.

Control System (Canal) — An arrangement of electronic, electrical, and mechanical components that commands or directs the regulation of a canal system.

Controlled Drainage — (Irrigation) Regulation of the water table to maintain the water level at a depth favorable for optimum crop growth.

Controlled Volume Operation Method (Canal) — An operation in which the volume of water within a canal reach between two check structures is controlled in a prescribed manner for time variable inflows and outflows such as off-peak pumping or canal-side deliveries.

Convection — (1) (Physics) Heat transfer in a gas or liquid by the circulation of currents from one region to another; also fluid motion caused by an external force such as gravity. (2) (Meteorology) The phenomenon occurring where

large masses of warm air, heated by contact with a warm land surface and usually containing appreciable amounts of moisture, rise upward from the surface of the earth.

Convective Storm — A rain event that results from unequal heating of the land surface such that a rising column of air cools beyond the dew point and becomes unstable, producing a *Cumulonimbus Cloud*, typically exhibiting violent local winds, high intensity rainfall over a small area and for a short duration, hail, thunder and lightning.

Convective Clouds — Clouds generated by the rising of air over a relatively warm land mass.

Convective Precipitation — Precipitation resulting from vertical movement of moisture-laden air, which upon rising, cools and precipitates its moisture.

Convective Transport — The component of movement of heat or mass induced by thermal gradients in ground water. Also see *Advection*.

Conventional Activated Sludge — A process in which influent and recycled sludge enter at the head of the aeration tank.

Conventional Method (Canal) — Where operations personnel (ditchrider and watermaster) control the canal system onsite. Labor-saving devices and machinery may be used to assist in the control of the canal facilities.

Conventional Systems — (Water Quality) Systems that have been traditionally used to collect municipal wastewater in gravity sewers and convey it to a central primary or secondary treatment plant prior to discharge to surface waters.

Conventional Tilling — Tillage operations considered standard for a specific location and crop and that tend to bury the crop residues; usually considered as a base for determining the cost effectiveness of control practices.

Conventional Water — A natural freshwater supply as opposed to desalted or brackish water.

Conveyance Loss — Water that is lost in transit from delivery systems such as pipes, canals, conduits, or ditches by leakage, seepage, spillage, evaporation, or evapotranspiration by plants growing in or near the channel. Generally, these conveyance losses are not available for further use; however, leakage from an irrigation ditch, for example, may percolate to a ground-water source and be available for further use.

Coolant — An agent, such as water, that produces cooling as by drawing off heat by circulating through an engine or by bathing a mechanical part.

Cooling Pond — Usually a man-made water body used by power plants or large industrial plants that enables the facility to recirculate once-through cooling water. The water levels in the pond are usually maintained by rainfall or augmented by pumping (withdrawal) water from another source. Also see *Cooling Water* and *Once-Through Cooling Water*.

Cooling Tower — A large tower or stack that is used for heat exchange of once-through cooling water generated by steam condensers. Hot water from the plant is sprayed in the tower and exchanges heat with the passing air. The water is then collected at the bottom of the tower and used again. A small amount of water is lost (consumed) through evaporation in this process. Also see *Cooling Water* and *Once-Through Cooling Water*.

Cooling Water — Water used for cooling purposes by electric generators, steam condensers, large machinery or products at industrial plants, and nuclear reactors. Water used for cooling purposes can be either fresh or saline and may be used only once or recirculated multiple times. Also see *Cooling Pond* and *Once-Through Cooling Water*.

Cooling Water Consumption (Power) — The cooling water which is lost to the atmosphere, caused primarily by evaporation due to the temperature rise in the cooling water as it passes through the condenser. The amount of consumption (loss) is dependent on the type of cooling employed — *Once-Through Cooling Water*, *Cooling Pond*, or *Cooling Tower*.

Cooling Water Load — The waste heat energy dissipated in the cooling water.

Cooling Water Required (Power) — The amount of water needed to pass through the condensing unit in order to condense the steam to water.

Coordinated Resource Management and Planning — A planning process used by the U.S. Department of the Interior, *Bureau of Land Management (BLM)* that includes public users, interest groups, agencies and affected individuals in the decision-making process before on-the-ground implementation of an activity plan.

Coordinated Resource Plan — A conservation plan including privately-owned land and public land.

Core — (Geology) The central portion of the earth below the *Mantle*, beginning at a depth of about 2,900 kilometers (1,800 miles) and probably consisting of iron and nickel. It is made up of a liquid outer core and a solid inner core.

Core Wall (of a Dam) — A wall built of impervious material, usually concrete or asphaltic concrete, in the body of an *Embankment Dam* to prevent leakage.

Coriolis Effect — (Climatology and Oceanography) The Coriolis effect, named for French physicist Gaspard Coriolis (1792–1843), is an imaginary force that appears to be exerted on an object moving within a rotation system. The

apparent force is simply the acceleration of the object caused by the rotation. This effect may be seen on a large scale in the movement of winds and ocean currents on the rotating earth. It dominates weather patterns, producing the counterclockwise flow observed around low-pressure zones in the Northern Hemisphere and the clockwise flow around such zones in the Southern Hemisphere. This effect is also responsible for the rotation of water funnels in the drains of tubs and water basins; the funnels will rotate counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere. Along the equator, there will be no such rotation.

Corn Snow — Snow that has melted and refrozen into a rough, granular surface.

Corona — (Astronomy) A faintly colored luminous ring appearing to surround a celestial body visible through a haze or thin cloud of water vapor, especially such a ring around the moon or sun, caused by the diffraction of light from suspended matter in the intervening medium. Also referred to as *Aureole*.

(U.S. Army) Corps of Engineers (COE) — See (*United States Army Corps of Engineers (COE)*). [See Appendix E-2 for the U.S. Army Corps of Engineers' organizational structure and primary missions and objectives.]

Corrasion — The wearing away of earth materials through the cutting, scraping, scratching, and scouring effects of solid material carried by water or air.

Correlation — (Statistics) A statistical means to measure the degree of "coincidence of change" between two variables, producing a value of variance termed the *Correlation Coefficient*. In strict correlation analysis, no inference of causation, i.e., one variable being "explained" by the variations of another, is made. Therefore, high correlations do not provide for an inference of causality; one must use previous information that the two sampled variables are indeed related to one another. The concept of the *Coefficient of Determination*, on the other hand, used as a common measure of "Goodness of Fit" in *Regression Analysis*, is used to assess the degree of causation between two variables or between one or more independent variables and a single dependent variable. The coefficient of determination is equivalent to the square of the correlation coefficient and reflects the percent of change in the dependent (explained) variable that is explained by the variations in the independent (explanatory) variable.

Correlation Coefficient (R) — (Statistics) A measure of the coincidence of change between two variables. The use of the correlation coefficient makes no inference as to causation, i.e., one variable causing changes to occur in another; it only represents a measure of the simultaneous behavior between two variables which either are related or are being affected similarly by a third variable. The value of the correlation coefficient will vary between -1.00 (-100 percent) and +1.00 (+100 percent) with higher numbers representing stronger levels of coincidence of changes. Positive correlation coefficients denote that the two series or variables evidence changes in the same direction while negative correlation coefficients reflect an inverse relationship between changes in one series and the changes in the other. Compare to the *Coefficient of Determination (R²)*.

Correlative — Having a mutual or reciprocal relation, that is, that the existence of one necessarily implies the existence of the other.

Correlative Estimate — A discharge or stream flow estimate determined by *Correlation*, or comparisons to other, possibly influencing factors, e.g., rainfall, snowpack, levels of upstream lakes and reservoirs, etc. A correlative estimate represents a likely value of the discharge or flow for any particular period — commonly a month — according to a specified method of analysis and the explanatory variables chosen.

Correlative (Water) Rights — (1) Certain rights of land owners over a common ground water basin are coequal, or correlative, so that any one owner cannot take more than his share even if the rights of others are impaired. (2) Another term for the reasonable use doctrine relating to percolating and riparian waters. In the groundwater context, the doctrine of correlative rights will generally limit the appropriation of groundwater to the landowner's proportionate share of the water available.

Corrosive — A substance that deteriorates material, such as pipe, through electrochemical processes.

Corrugation Irrigation — Spreading water by directing it into small channels across the field. Also referred to as *Furrow Irrigation*.

Coulee — (1) (Western U.S.) A deep gulch or ravine with sloping sides, often dry in summer. (2) (Louisiana and Southern Mississippi) A streambed, often dry according to the season; a small stream, bayou, or canal. (3) (Upper Midwest) A valley with hills on either side. (4) (Geology) A stream of molten lava; a sheet of solidified lava.

Couloir — A deep mountain gorge or gully.

Coupon — A piece of material, usually metal, used to test the rate of corrosion or scale buildup due to exposure to specific water conditions. See *Coupon Test*.

Coupon Test — A method of determining the rate of corrosion or scale formation by placing metal strips (or coupons) of a known weight in the pipe.

Course (Water) — The route or path taken by flowing water, such as a stream or river.

Covariance — (Statistics) A measure of the linear association between two variables. If both variables are always

above and below their means at the same time, the covariance is said to be positive. If one variable is above its mean when the other variable is below its mean and vice versa, the covariance is said to be negative. The value of the covariance is dependent upon the units in which each variable is measured whereas the *Correlation Coefficient* is a measure of this association which has been normalized and is therefore “unit free.”

Cove — A small sheltered inlet, creek, or bay; a recess in the shore.

Cover — (1) Vegetation or other material providing protection to a surface. (2) The area covered by live above-ground parts of plants. (3) Anything that provides visual or physical protection for an animal. Cover for fish includes vegetation that overhangs the water, undercut banks, rocks, logs and other woody debris, turbulent water surfaces, and deep water.

Cover Crop — A close-growing crop grown primarily for the purpose of protecting and improving soil between periods of regular crop production or between trees and vines in orchards and vineyards.

Cradle — A supporting structure shaped to fit the conduit it supports.

Cranberry Bog — A bog dominated by this mat-forming evergreen shrub; common in eastern North America.

Creek — A small stream of water which serves as the natural drainage course for a drainage basin; a flowing rivulet or stream of water normally smaller than a river and larger than a brook. The term is often relative according to size and locality. Some creeks in a humid region would be called rivers if they occurred in an arid area.

Creep — Slow mass movement of soil and soil material down relatively steep slopes, primarily under the influence of gravity but facilitated by saturation with water and by alternate freezing and thawing.

Creeper — A grappling device for dragging bodies of water, such as lakes or rivers.

Crenulation — Small-scale folding that is superimposed on larger-scale folding. Crenulations may occur along the cleavage planes of a deformed rock.

Creosotes — Chemicals used in wood preserving operations and produced by distillation of tar, including *Polycyclic Aromatic Hydrocarbons* and *Polynuclear Aromatic Hydrocarbons* (PAHs and PNAs). Contaminating sediments, soils, and surface water, creosotes may cause skin ulcerations and cancer with prolonged exposure.

Crest — (1) The top of a dam, dike, or spillway, which water must reach before passing over the structure; in international usage it refers to the crown of an overflow section of a dam. (2) The summit or highest point of a wave. (3) The highest elevation reached by flood waters flowing in a channel as in *Crest Stage* or *Flood Stage*.

Crest Gage — An instrument used to obtain a record of flood crests at sites where recording gages are not installed.

Crest Gate — A temporary or movable gate installed on top of a spillway crest to provide additional storage or prevent flow over the crest.

Crest Length — The length of the top or crest of a dam, including the length of the spillway, powerhouse, navigation lock, fish pass, etc., where these structures form part of the length of a dam. If detached from a dam, these structures would not be included in the crest length.

Crest Stage — The highest value of river *Stage* (or streamflow) attained in a flood.

Crest Width (or Top Thickness) — The thickness or width of a dam at the level of the top (crest) of the dam. In general, the term “thickness” is used for *Gravity* and *Arch Dams* and the term “width” is used for other dams.

Crevasse — (1) A deep crack or fissure, especially in a glacier. (2) A break in the levee of a river, dike, or similar structure. Also see *Levee*.

Crib Dam — A barrier or form of *Gravity Dam* constructed of timber forming bays, boxes, cribs, crossed timbers, gabions or cells that are filled with earth, stone or heavy material. Also see *Dam*.

Crick — (Inland Northern U.S. and Western U.S.) Variant of *Creek*.

Criteria — Water quality conditions which are to be met in order to support and protect desired uses.

Criteria, Testing (R^2 , t -Statistic, and F -Statistic) — (Statistics) In criteria testing of the appropriateness of an econometric forecast model’s structure (*Specification*), certain testing criteria are used most frequently. Specifically, the *Coefficient of Determination*, R^2 , is used as an overall measure of the “goodness of fit,” the t -Statistic, is used as a measure of the appropriateness of individual explanatory variables, and the F -Statistic, is used as a measure of the appropriateness of the inclusion or exclusion of a set of explanatory variables simultaneously. Also see *Model* and *Regression Analysis*.

Criteria, WHPA — Conceptual standards that form the basis for *Wellhead Protection Area (WHPA)* delineation. WHPA criteria can include distance, drawdown, time of travel, assimilative capacity, and flow boundaries. See *Wellhead Protection Area (WHPA)* and *Wellhead Protection (Program)*.

Critical — (Chemistry and Physics) Of or relating to the value of a measurement, such as temperature, at which an abrupt change in a quality, property, or state occurs. For example, a critical temperature of water is 100°C (212°F), its boiling point at standard atmospheric pressure.

Critical Aquifer Protection Area (CAPA) — As defined in the *Safe Drinking Water Act (SDWA)*, is all or part of

an area located within an area for which an application of designation as a sole or principal source aquifer (pursuant to Section 1424[e]) has been submitted and approved by the Administrator not later than 24 months after the date of enactment and which satisfies the criteria established by the Administrator; and all or part of an area that is within an aquifer designated as a sole source aquifer (SSA), as of the date of the enactment of the Safe Drinking Water Act Amendments of 1986, and for which an areawide ground-water protection plan has been approved under Section 208 of the *Clean Water Act (CWA)* prior to such enactment.

Critical Area — An area that, because of its size, location, condition, or importance, must be treated with special consideration because of inherent site factors and difficulty of management. Also, a severely eroded, sediment-producing area that requires special management to establish and maintain vegetation to stabilize the soil.

Critical (Ground Water) Area — An area that has certain ground water problems, such as declining water levels due, for example, to the use of underground water that approaches or exceeds the current recharge rate. These designated areas are usually limited in their development and use.

Critical Depth — The depth of water flowing in an open channel or conduit under conditions of critical flow at which specific energy is a minimum for a given discharge.

Critical Dry Period — As a general definition, describes a series of water-deficient years, usually a historical period, in which a full reservoir storage system at the beginning is drawn down to minimum storage at the end without any spill.

Critical Dry Year — A dry year in which the full commitments for a dependable water supply cannot be met and deficiencies are imposed on water deliveries.

Critical Flow — (1) The flow conditions at which the discharge is a maximum for a given specific energy, or at which the specific energy is a minimum for a given discharge. (2) In reference to Reynolds' critical velocities, the point at which the flow changes from streamline or non-turbulent to turbulent.

Critical Habitat — The area of land, water, and airspace required for normal needs and survival (e.g., forage, reproduction, or cover) of a plant or animal species.

Critical Low-Flow — Low flow conditions below which some standards (*Criteria*) do not apply. The impacts of permitted discharges are typically analyzed at critical low-flow.

Critical Point — (1) (Physics) The temperature and pressure at which the liquid and gaseous phases of a pure stable substance become identical. Also referred to as the *Critical State*. (2) (Water Quality) The location downstream from a waste discharge at which the dissolved oxygen of the water is at its lowest. Also referred to as the *Critical Reach*.

Critical Reach — The point in the receiving stream below a discharge point at which the lowest dissolved oxygen level is reached and recovery begins. Also referred to as the *Critical Point*.

Critical Slope — That slope that will sustain a given discharge at uniform, *Critical Depth* in a given channel.

Critical Velocity — Velocity at which a given discharge changes from tranquil to rapid flow; that velocity in open channels for which the specific energy (the sum of the depth and velocity head) is a minimum for a given discharge.

Crop Coefficient — The ratio of evapotranspiration occurring with a specific crop at a specific stage of growth to potential evapotranspiration at that time.

Crop Consumptive Use (Crop Requirement) — Often called *Evapotranspiration*. The amount of water used by vegetative growth of a given area by transpiration and that evaporated from adjacent soil or intercepted precipitation on the plant foliage in any specified time (acre-feet/acre).

Crop Irrigation Requirement — The amount of irrigation water in acre-feet per acre required by the crop; it is the difference between *Crop Consumptive Use*, or *Crop Requirement*, and the effective precipitation for plant growth. To this amount the following items, as applicable, are added: (1) irrigation applied prior to crop growth; (2) water required for leaching; (3) miscellaneous requirements of germination, frost protection, plant cooling, etc.; and (4) the decrease in soil moisture should be subtracted.

Crop Moisture Index (CMI) (Drought Index) — The CMI, as a derivative of the *Palmer Drought Severity Index (PDSI)*, uses a meteorological method to monitor week-to-week crop conditions. Differing from the PDSI, the CMI was designed to evaluate short-term moisture conditions across major crop-producing regions. It is based on the mean temperature and total precipitation for each week within a "climate division", as well as the CMI value from the previous week. The CMI is specifically designed to monitor short-term moisture conditions affecting a developing crop and is not a good long-term drought monitoring tool. The CMI was designed for areas in which mountain snowpack is a key element of water supply conditions. The index is based on snowpack, streamflow, precipitation and reservoir storage and is calculated uniquely for each water basin, which tends to limit interbasin and inter-regional index comparisons. Also see *Drought Indexes (Indices)*.

Crop Requirement — See *Crop Consumptive Use*.

- Crop Rotation** — A pattern of changing the crops grown in a specific field from year to year in order to control pests and maintain soil fertility.
- Crop Subsidy** — A price support paid to farmers by the government.
- Cropland** — Land currently tilled, including cropland harvested, land on which crops have failed, summer fallowed land, idle cropland, cropland planted in cover crops or soil improvement crops not harvested or pastured, rotation pasture, and cropland being prepared for crops, or newly seeded cropland. Cropland also includes land planted in vegetables and fruits, including those grown on farms for home use. All cultivated (tame) hay is included as cropland. Wild hay is excluded from cropland and included in pasture and range.
- Cross Connection** — A physical connection through which a supply of potable water could become contaminated. May include any actual or potential connection between a drinking water system and an unapproved water supply or other source of contamination.
- Cross Section** — A graph or plot of ground elevation across a stream valley or a portion of it, usually along a line perpendicular to the stream or direction of flow.
- Cross-Sectional Analysis** — (Statistics) Observations or characteristics of a variable analyzed without respect to variations due to time. Cross-sectional econometric models provide information on the behavior of a variable due to external factors. Contrast with *Time-Series Analysis*.
- Crown Cover** — The amount of *Canopy* provided by ranches and foliage of trees, shrubs, and herbs in a plant community.
- Crud** — (Sports) Heavy, sticky snow that is unsuitable for skiing.
- Cryology** — The science of the physical aspects of snow, ice, hail, sleet, and other forms of water produced by temperatures below 0°C (32°F).
- Cryoscope** — An instrument used to measure the freezing point of a liquid.
- Cryptosporidial (Crypto) Oocyst** — The hard shell in which the parasite, *Cryptosporidium parvum*, resides. This hard shell protects the parasite in the environment and remains viable for up to six months. This shell also protects the protozoa from chlorine disinfection treatment.
- Cryptosporidiosis** — A disease of the intestinal tract caused by the parasite *Cryptosporidium parvum*. Common symptoms include stomach cramps and diarrhea.
- Cryptosporidium Parvum** — A parasite often found in the intestines of livestock which contaminates water when the animal feces interact with a water source. Literally, cryptosporidium means “mystery spore,” and the parasite was not recognized as a human pathogen until 1976. In healthy individuals, infection may result in an acute diarrheal illness lasting for 2–3 weeks. In immuno-suppressed individuals (e.g., AIDS patients, children, elderly), *Cryptosporidiosis*, the disease from infection by the parasite, may be life-threatening. While much needs to be learned about the infectious level of crypto, studies have indicated that it takes five to ten cysts to make someone sick. Of particular concern to health officials and public drinking water supplies is that the most widely used agent to disinfect tap water — chlorine — does not kill the parasite. Also, the laboratory tests used to detect crypto are time-consuming, laborious, and expensive. As an additional complication in the detection process, there are several varieties of crypto, but only one — *Cryptosporidium parvum* — is infectious to humans. Also, laboratory tests cannot determine whether a *Crypto Oocyst*, the hard shell that protects the protozoa, is alive or dead. Currently, the only effective treatment for water supplies is through filtration (crypto oocysts are only 3 to 7 microns in size) and the use of ozone gas rather than chlorine. As of January 1997, the *U.S. Environmental Protection Agency (EPA)*, through the *Information Collection Rule (ICR)*, has required that all public water supply systems serving more than 100,000 connections to monitor for cryptosporidium.
- CSO** — See *Combined Sewer Overflow*.
- Cubic Feet Per Second (CFS)** — A unit expressing rate of discharge, typically used in measuring streamflow. One cubic foot per second is equal to the discharge of a stream having a cross section of 1 square foot and flowing at an average velocity of 1 foot per second. It also equals a rate of approximately 7.48 gallons per second, 448.83 gallons per minute, 1.9835 acre-feet per day, or 723.97 acre-feet per year.
- Cubic Feet Per Second Day (CFS-Day)** — The volume of water represented by a flow of one cubic foot per second for 24 hours. It equals 86,400 cubic feet, 1.983471 acre-feet, or 646,317 gallons.
- Cubic Feet per Second per Square Mile (CFSM, (ft³/s)mi²)** — The average number of cubic feet of water flowing per second from each square mile of area drained, assuming the runoff is distributed uniformly in time and area.
- Cucking Stool** — A chair formerly used for punishing offenders (as dishonest tradesmen) by public exposure or ducking in water.
- Cultivate** — To break up the soil surface, often removing weeds at the same time.
- Cultural Eutrophication** — The increasing rate at which water bodies “die” by pollution from human activities.

- Cultural Landscape** — Man-made features of a region reflecting land-use patterns, population distribution, and other activities of man that have altered the natural landscape.
- Culvert** — A transverse drain or waterway under a road, railroad, canal, or other obstruction.
- Cumulative Impact** — The environmental impacts of a proposed action in combination with the impacts of other past, existing and proposed actions. Each increment from each action may not be noticeable but cumulative impacts may be noticeable when all increments are considered together.
- Cumulative Infiltration** — The summation of the depth of water absorbed by a soil in a specified elapsed time in reference to the time of initial water application.
- Cumulonimbus Clouds** — A principal cloud type; the ultimate stage of development of *Cumulus* clouds. Cumulonimbus clouds are very dense and very tall, commonly 5 to 10 miles in diameter, and sometimes reaching heights of 12 miles or more. The upper portion is at least partly composed of ice crystals, and it often takes the form of an anvil or vast plume. The base of the cloud is invariably dark and is often accompanied by low, ragged clouds. Also commonly called *Thundercloud*, *Thunderhead*, *Thunderstorm*. Also see *Cloud*.
- Cumulus Clouds** — A principal cloud type characterized by vertical development; usually isolated with a dark, nearly horizontal base and upper parts resembling domes or towers and usually formed by the ascent of thermally unstable air masses. Also see *Cloud*.
- Cunette** — A longitudinal channel constructed along the center and lowest part of a channel or through a detention or retention facility and intended to carry low flows. Also referred to as a *Trickle Channel*.
- Curb Stop** — A water service shutoff valve located in a water service pipe near the curb and between the water main and the building.
- Curl** — A hollow arch of water formed when the crest of a breaking wave spills forward.
- Current** — (1) The portion of a stream or body of water which is moving with a velocity much greater than the average of the rest of the water. The progress of the water is principally concentrated in the current. (2) The swiftest part of a stream; (3) A tidal or nontidal movement of lake or ocean water; (4) Flow marked by force or strength.
- Current Meter** — An instrument for measuring the velocity of water flowing in a stream, open channel, or conduit by ascertaining the speed at which elements of the flowing water rotate a vane or series of cups.
- Cutback Irrigation** — Water applied at a faster rate at the beginning of the irrigation period and then reduced or cutback to a lesser rate, usually one-half the initial rate or that amount to balance with the intake rate.
- Cut Bank** — The outside bank of a bend, often eroding opposite a point bar.
- Cutoff, also Cut Off** — (1) (Hydraulics) The new and shorter channel formed either naturally or artificially when a stream cuts through the neck of a bank or oxbow; a channel cut across the neck of a bend. (2) (Dam) An impervious construction or material which reduces seepage or prevents it from passing through the foundation material of a dam structure.
- Cutoff Trench (of a Dam)** — An excavation later to be filled with impervious material to form a *Cutoff*. Sometimes used incorrectly to describe the cutoff itself.
- Cutoff Wall (of a Dam)** — A wall of impervious material (e.g., concrete, asphaltic concrete, steel sheet piling) built into the foundation of a dam to reduce or prevent seepage under the dam.
- Cutwater** — (1) (Nautical) The forward part of a ship's prow. (2) The wedge-shaped end of a bridge pier, designed to divide the current and break up ice floes.
- Cyanazine** — A herbicide listed by the *U.S. Environmental Protection Agency (EPA)* as a "possible human carcinogen" and found frequently in streams and rivers, particularly following floods and periods of heavy rain and runoff from agricultural lands. Cyanazine is used extensively for weed control for corn, sorghum, and sugarcane. Along with another common farm herbicide, *Atrazine*, Cyanazine concentrations can soar to levels much higher than federal standards during the peak growing season.
- Cycle** — (Statistics) A periodic, repetitive fluctuation in time series data from either a constant mean or trend line. Typically, the oscillations of a cycle will be greater than one year in length. Cycles within a year are termed *Seasonality*.
- Cycle of Erosion** — A qualitative description of river valleys and regions passing through the stages of youth, maturity, and old age with respect to the amount of erosion that has been effected.
- Cyclone** — (Meteorology) An atmospheric system characterized by the rapid, inward circulation of air masses about a low-pressure center, usually accompanied by stormy, often destructive, weather. Cyclones circulate counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere. Also see *Typhoon* and *Coriolis Effect*.
- Cyclonic Precipitation** — Precipitation which results from the lifting of air converging into a low-pressure area, or

Cyclone.

Cyclonic Storm — A rain or snow event that results from air that is forced to rise over (1) a wedge of cold air that is slipping beneath it (cold front), or (2) a wedge of warmer air that is overriding (warm front).

Cypress Knees — Part of a cypress tree's root system that juts out of the ground, extending above the high water mark.

Cypress Swamp — A wetland environment common throughout the southeastern United States in which cypress trees are a dominant species.