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Wade — To walk in or through water or something else that similarly impedes normal movement.

Wadi, also Wady — A ravine or watercourse, dry except in the rainy season and some are permanently dry. Also see *Arroyo*.

Waft — (1) To cause to go gently and smoothly through the air or over water. (2) To convey or send floating through the air or over water.

Wake — The visible track of turbulence left by something moving through water.

(Final) Walker River Decree — See *Decree C-125 (Final Walker River Decree)* [Nevada].

(Interim) Walker River Decree — See *Decree 731 (Interim Walker River Decree)* [Nevada].

Walker River Irrigation District (WRID) [Nevada] — The litigation of *Pacific Live Stock Company v. Antelope Valley Land and Cattle Company* and the issuance of *Decree 731* caused a number of farmers in Smith and Mason valleys to band together in April 1919 and form the Walker River Irrigation District (WRID). WRID included all irrigated areas in Nevada on the East Walker River, the West Walker River, and the main Walker River, except those areas within the Walker River Indian Reservation. WRID moved to obtain the financing and rights to both Bridgeport and Topaz reservoir sites, sites which had earlier been selected and surveyed by the *U.S. Reclamation Service* (USRS, currently the *U.S. Bureau of Reclamation, USBR*). The water rights for Topaz Reservoir were obtained from the liquidation of the Antelope Valley Land and Cattle Company. Although WRID was established as a Nevada agency serving lands entirely within Nevada, its reservoirs would be located either entirely in California (Bridgeport Reservoir) or partially in California and Nevada (Topaz Reservoir). Funding for dam and reservoir construction and operation was obtained privately with water recipients obligated to pay off the debt. Initial funding was held down as WRID assumed no responsibility for the construction or maintenance of irrigation canals, ditches, or laterals.

Wallow — A pool of water or mud where animals go to wallow; the depression, pool, or pit produced by wallowing animals.

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

Warm Spring — A spring that brings warm water to the surface. A thermal spring. Temperatures typically are 15°F (9.5°C) or more above the mean air temperature.

Warning Stage — The *Stage* (or *Gage Height*) at which a general state of readiness must be maintained by concerned river interests in the event of further rises above *Flood Stage* (similar to a *Watch*). In some cases, initial action must be taken by concerned interests, such as livestock and equipment removal from the lowest overflow areas. This level may produce overbank flows sufficient to cause minor flooding of low-lying areas and local roads.

Wash — (1) To carry, erode, remove, or destroy by the action of moving water. To be carried away, removed, or drawn by the action of water. Removal or erosion of soil by the action of moving water. (2) A deposit of recently eroded debris. (3) Low or marshy ground washed by tidal waters. A stretch of shallow water. (4) (Western United States) The dry bed of a stream, particularly a watercourse associated with an alluvial fan, stream, or river channel. Washes are often associated with arid environments and are characterized by large, high energy discharges with high bed-material load transport. Washes are often intermittent and their beds sparsely vegetated. (5) Loose or eroded surface material (such as gravel, sand, silt) collected, transported, and deposited by running water, as on the lower slopes of a mountain range, especially coarse alluvium. (6) Turbulence in air or water caused by the motion or action of an oar, propeller, jet, or airfoil.

Wash Load — In a stream system, the relatively fine material in near-permanent suspension which is transported entirely through the system without deposition.

Washoe Project [Nevada] — Operated by the U.S. Bureau of Reclamation (USBR), the project provides flood control, hydroelectric power, and fishery and wildlife enhancement on the Truckee River. Principal features of the project include Prosser Creek Dam and Reservoir, Stampeded Dam and Reservoir, Stampede Power Plant, Marble Bluff Dam, and the Pyramid Lake Fishway.

Washoff — Materials transported from a land or soil surface by overland flow, often used to describe soil materials

transported off runoff test plots.

Washout — (1) Erosion of a relatively soft surface, such as a roadbed, by a sudden gush of water, as from a downpour or floods. (2) A channel produced by such erosion.

Wasteload Allocation (WLA) — A system designed to limit the total discharge of pollutant materials into a receiving body of water. Each *Point Source (PS)* of pollutants is allowed to release a specific fraction of the total amount of pollutant materials that can be expected to be assimilated by the stream. Pollution from *Non-Point Sources (NPS)* comprises the stream's *Load Allocation*.

Waste Pipe — A pipe that carries off liquid waste.

Waste Treatment Lagoon — An impoundment made by excavation or earth fill for biological treatment of wastewater. Also see *Constructed Wetland* and *Lagoon*.

Waste Treatment Plant — A facility containing a series of tanks, screens, filters and other processes by which pollutants are removed from water. More commonly referred to as *Wastewater Treatment Plant*.

Wastewater — (1) A combination of liquid and water-carried pollutants from homes, businesses, industries, or farms; a mixture of water and dissolved or suspended solids. (2) That water for which, because of quality, quantity, or time of occurrence, disposal is more economical than use at the time and point of its occurrence. Waste water to one user may be a desirable supply to the same or another user at a different location. Also referred to as *Domestic Wastewater*.

Wastewater Infrastructure — The plant or network for the collection, treatment, and disposal of sewage in a community. The level of treatment will depend on the size of the community, the type of discharges, and the designated use of the receiving water.

Wastewater Operations and Maintenance — Actions taken after the construction of a *Wastewater Treatment Plant* to assure that the facilities will be operated, maintained, and managed to reach prescribed effluent levels in an optimum manner.

Wastewater Reclamation — The planned reuse of waste water for specific beneficial purposes.

Wastewater Treatment — Any of the mechanical or chemical processes used to modify the quality of waste water in order to make it more compatible or acceptable to man and his environment.

Wastewater Treatment Plant — A water effluent treatment facility containing a series of tanks, screens, filters and other mechanical, biological, and chemical processes by which pollutants are removed from water. Less frequently referred to as *Waste Treatment Plant*.

Wasteway — (1) Channel for conveying or discharging excess water or wastewater. (2) (Irrigation) Structure used to divert surplus flow from the main canal into a natural or constructed drainage channel.

Waste Utilization — Using an agricultural or other waste on land in an environmentally acceptable manner while maintaining or improving soil and plant resources.

Water (H₂O) — The liquid that descends from the clouds in rain and which forms streams, lakes, and seas, and is a major constituent of all living matter. Pure water consists of *Hydrogen* (11.188 percent by weight) and *Oxygen* (88.812 percent by weight) in the proportion of two atoms of hydrogen to one of oxygen (H₂O), and is an odorless, tasteless, transparent liquid which is very slightly compressible. It has a slightly blue color which is observable only in thick layers of the liquid. At its maximum density, 39.2°F (or 4°C), it is the standard for specific gravities, one cubic centimeter weighing one gram. Water's weight per gallon (at 15°C or 59°F) is 8.337 pounds (3.772 kilograms). It is also the standard for specific heats. Its own specific heat is very great. It freezes at 32°F (0°C) and boils at 212°F (100°C) under atmospheric pressure at sea level. Pure water is an extremely poor conductor of electric current, although many *Aqueous* (water-based) solutions are conductors. Water is the most important of solvents, dissolving many gases, liquids, and solids. Natural waters of the earth, as those of springs, rivers, or the oceans, contain more or less dissolved matter, which is mostly removed by distillation. Rain water is nearly pure. Water is important chemically as a solvent and dissociating agent, as a catalytic agent, and often as one of the substances taking part in a chemical reaction. Ordinary water, described above, is a mixture of molecules containing hydrogen of atomic weight 1, with a small proportion (about 0.015 per cent) of molecules containing hydrogen of atomic weight 2. This latter kind of water, termed *Heavy Water* or *Deuterium Oxide*, D₂O, can be separated by fractional electrolysis or distillation and in other ways and is used as a moderator in certain nuclear reactors.

Water — (1) To pour or sprinkle on, make wet. (2) To dilute or weaken by adding water. (3) To irrigate land. (4) To take on a supply of water, as a ship. (5) To drink water, as an animal. (6) Any of various forms of water, for example, fresh water, waste water, etc.; often waters, as naturally occurring mineral water, such as those at a spa. (7) A body of water such as a sea, lake, river, or stream; waters, as a particular stretch of sea or ocean, especially that of a state or country, for example, U.S. waters.

- Water Administration** — A broad term referring to the collective role of defined state agencies to implement state and federal water laws, commonly through the development and implementation of appropriate statutes and regulations. This role can include oversight, approval, and enforcement responsibilities.
- Water Alliances For Voluntary Efficiency (WAVE)** — A water conservation program conceived by the *U.S. Environmental Protection Agency (EPA)* in December 1992 and designed to help increase water efficiency in U.S. lodging facilities. The program encourages participating hotels to install water efficient technologies for bathroom fixtures, dish washing and laundry facilities, cooling towers, and landscaping. The program's goal is to reduce water use and associated energy consumption, help inform hotel guests and employees about the importance of water conservation, and help hotels realize a monetary savings for their efforts. Program components consist of technical assistance, research material availability, computer software programs to survey water use and evaluate options, and public recognition of participation.
- Water Allocation** — In a hydrologic system in which there are multiple uses or demands for water, the process of measuring a specific amount of water devoted to a given purpose or use.
- Water Analysis** — The determination of the physical, chemical, and biological characteristics of water. Such analysis usually involves four kinds of examination: bacterial, chemical, microscopic, and physical.
- Water Application Efficiency** — The ratio of the volume of water stored in the root zone of a soil during irrigation to the volume of water applied.
- Water Audit** — A procedure that combines flow measurements and listening surveys (leak detection) in an attempt to give a reasonably accurate accounting of all water entering and leaving a system.
- Water Balance** — (1) A measure of the amount of water entering and the amount of water leaving a system. Also referred to as *Hydrologic Budget*. Also see *Hydrologic Equation*. (2) The ratio between the water assimilated into the body and that lost from the body; also, the condition of the body when this ratio approximates unity.
- Water Ballet** — A synchronized sequence of movements performed by a group of swimmers.
- Water Bank** — A mechanism for holding water for eventual use. A water bank may include the use of surface water reservoirs, underground storage facilities (e.g., groundwater recharge), or a combination of these mechanisms.
- Water Banking** — A water conservation and use optimization system whereby water is reallocated for current use or stored for later use. Water banking may be a means of handling surplus water resources and may involve aquifer recharge or similar means of storage. Typically, under such arrangements, an agency is created with the authority to purchase, sell, hold, and transfer water and water rights in addition to serving as a negotiator between buyers and sellers. In its broadest sense, all water rights would be covered under such water banking arrangements to include surface water, groundwater, treated wastewater effluent, and irrigation tailwater. Generally, participants in water banking arrangements will have their water rights protected from cancellation (non-beneficial use) for a specific period so long as their water is "deposited" in the water bank. Also see *Water Marketing*.
- Water-Based Recreation** — Those activities which require water for participation such as boating, swimming, sailing and canoeing.
- Water Bloom** — An accumulation of algae and especially of blue-green algae at or near the surface of a body of water. Also referred to as *Algal Bloom*.
- Waterborne** — (1) Floating on or supported by water, as, for example, afloat. (2) Transported or carried by water, for example, a disease transmitted by water contaminated by a disease-causing microorganism. (3) Transmitted in water.
- Waterborne Disease Outbreak** — The significant occurrence of acute infection illness associated with drinking water from a *Public Water System (PWS)* that is deficient in treatment, as determined by appropriate local or state agencies, or from untreated water sources.
- Water, Bottled** — See *Bottled Water*.
- Water Budget** — (1) (Hydrology) An accounting of the inflows to, the outflows from, and the storage changes of water in a hydrologic unit or system. Also see *Water Balance*. (2) (Conservation and Planning) The calculated amount of water a household should use based on the type and number of fixtures, landscape requirements, and size of family.
- Water Classification** — The separation of water in an area into classes according to usage, such as domestic consumption, fisheries, recreation, industrial, agricultural, navigation, power production, waste disposal, etc. Also see *Water Use, Types*.
- Water Clock** — The water clock, or *Clepsydra*, has been reliably dated to 1600 BC in Egypt. It functioned by water dripping through a hole in the base of a container, which lowered the water level past markings on the container sides. These markings were spaced to indicate fixed periods of time. Many variations were based on this design. Ctesibius of Alexandria made a clepsydra in which a figure floating on the water surface pointed to the time scale.

In another type, dripping water turned a wheel that was connected to pointers on a dial face similar to a modern clock. Before the third century BC the clepsydra was used by the Greeks to indicate intervals of time, especially in law court; later it functioned as a clock. Clepsydras were later used in Rome, the Arab world, and China.

Water Color — One of the most immediately apparent attributes of many natural waters and one that, together with visual clarity, strongly influences human aesthetic perception and recreational use. Color of waters is a guide to their composition, and remote sensing of water color is increasingly being used to infer water quality, particularly suspended solids and phytoplankton concentrations. The color of water, with water considered a translucent (i.e., not transparent) material, is commonly associated with transmitted light, for example, the color seen by a diver beneath the water's surface. However, the color of natural waters as observed from above is that associated with the upwelling light field that results from back scattering of sunlight illuminating the water volume. In this manner, the color of natural waters can be objectively specified using their spectral *Reflectance*, where the reflectance is defined as the ratio of the upwelling light to incident (downwelling) light.

Water Column — A hypothetical cylinder of water from the surface to the bottom of a stream, lake, or ocean within which the physical and/or chemical properties can be measured.

Water Commissioner — A person whose job is to make sure the water of each stream under his or her control is distributed in proper quantities at the right times to those who are authorized to receive it. Also referred to as *Ditch Rider* or *Mayordomo*. May be elected or hired by local water users or appointed by a state authority such as the state engineer or a judge.

Water Commitment — A commitment from a water purveyor to provide water service to a particular parcel of land and/or a specific development.

Water Conservation — The physical control, protection, management, and use of water resources in such a way as to maintain crop, grazing, and forest lands, vegetative cover, wildlife, and wildlife habitat for maximum sustained benefits to people, agriculture, industry, commerce, and other segments of the national economy. Water conservation measures result in a reduction in applied water due to more efficient water use such as the implementation of *Best Management Practices (BMP) — Urban Water Use*, or *Efficient Water Management Practices (EWMP) — Agricultural Water Use*. The extent to which these actions actually create a savings in water supply depends on how they affect new water use and depletion.

Water Conserving Irrigation System — Irrigation systems including a combination of drip irrigation, soaker hoses, bubblers, and low-trajectory spray heads for water distribution; zoning irrigation for different water-demand plant types; electronic timers with five-day programming and rain override devices, irrigation schedules for early morning watering every five to seven days; and soil moisture sensors.

Water Consumed — See *Consumptive Use*.

Water Contamination — Impairment of water quality to a degree which reduces the usability of the water for ordinary purposes, or which creates a hazard to public health through poisoning or spread of disease.

Water Content of Snow — The amount of liquid water contained in a snowpack. Also referred to as the *Snow Water Equivalent (SWE)* and is measured in inches of water.

Water Control — (Soil and Water Conservation) The physical control of water by such measures as conservation practices on land, channel improvements, and installation of structures for water retardation and sediment detention. As defined, this concept does not refer to the legal control of water rights.

Water-Cooled Reactor — A nuclear reactor that employs water to cool the reactor core. A nuclear reactor is a device designed to promote the fission of an appropriate fuel (such as uranium-235) in a controlled manner. The heat produced during the fission event must be removed from the device to prevent an excessive buildup. Water is usually used as the heat transfer agent. Other coolants used in nuclear reactors of other designs are liquid sodium and inert gases. Also see *Light Water Reactor (LWR)*.

Watercourse — A depression formed by runoff moving over the surface of the earth; any natural or artificial channel through which water flows; a lake, river, creek, stream, wash, arroyo, channel or other topographic feature on or over which waters flow at least periodically. Watercourses include specifically designated areas in which substantial flood damage may occur.

Watercourse Bed — That portion of the watercourse which carries water at ordinary stages.

Watercraft — (Nautical) A boat or ship; water vehicles considered as a group.

Water Crossing — A commonly used route for crossing a river or stream.

Water Cushion — A pool of water maintained to absorb the impact of water flowing from an overfall structure.

Water Cycle — The cycle of evaporation and condensation that controls the distribution of the earth's water as it evaporates from bodies of water, condenses, precipitates, and returns to those bodies of water. Also referred to as the *Hydrologic Cycle*.

- Water Dating** — To date groundwater, scientists determine how much of an isotope (such as carbon-14) is still present. An isotope is an element, such as carbon or chlorine, with one or more extra neutrons in its nucleus. By knowing the precise rate of decay of a radioactive isotope, scientists can then determine how long the water has been in the soil or an aquifer. Dating is also accomplished by analyzing the concentration of isotopes like carbon-14 and chlorine-36 in the groundwater, since such concentrations have varied over time due to changes in the earth's magnetic field. Scientists can also determine when a particular sample of groundwater fell as rainwater based upon the ratio of simple hydrogen (H¹) to its isotope, deuterium (H²). The presence of deuterium is strongly influenced by the atmospheric temperature; during colder periods, for example, the last glacial period, rainfall contained less deuterium than today.
- Water Dedications** — A controversial water rights policy that involves a trade-off in which a user can begin pumping groundwater in exchange for a guarantee to buy and retire a like amount of surface water in the future. Critics of the policy argue that dedications are often difficult to enforce and can lead to overuse of groundwater when a user fails to fulfill on the guarantee.
- Water Delivery System** — Reservoirs, canals, ditches, pumps, and other facilities to move water.
- Water Demand** — The water requirements for a particular purpose, such as irrigation, power production, municipal supply, plant transpiration, or storage.
- Water Demand Schedule** — A time distribution of the demand for prescribed quantities of water for specified purposes. It is usually a monthly tabulation of the total quantity of water that a particular water user intends to use during a specified year.
- Water Desalination** — The removal of salts, such as from a saline water supply, usually by *Electrodialysis* or *Reverse Osmosis*.
- Water Dilution Volume (WDV)** — The volume of water required to dilute radioactive waste to a concentration meeting drinking water standards. Typically expressed in cubic meters of water per metric ton of radioactive waste.
- Water Discharge** — The amount of water and sediment flowing in a channel, expressed as volume per unit of time. The water contains both dissolved solids (*Dissolved Load*) and suspended sediment (*Suspended Load*).
- Water Disposal System** — The complete system for removing excess water from land with minimum erosion. For sloping land, this may encompass a terrace system, terrace outlet channels, dams, and grassed waterways. For level land, it may include only surface drains or both surface and subsurface drains.
- Water Duty** — The total volume of irrigation water required to mature a particular type of crop. In stating the duty, the crop, and usually the location of the land in question, as well as the type of soil, should be specified. It also includes consumptive use, evaporation and seepage from on-farm ditches and canals, and the water that is eventually returned to streams by percolation and surface runoff. Also see *Alpine Decree [California and Nevada]*, *Orr Ditch Decree [California and Nevada]*, *Bench Lands [Nevada]*, and *Bottom Lands [Nevada]*, for additional information and examples of specific water duties.
- Water Duty [Nevada]** — The *Alpine Decree* and *Orr Ditch Decree* provide the basis for virtually all irrigation water duties relating to water diversions from the Truckee, Carson, and Walker rivers in Northern Nevada. These decrees provide for an annual maximum irrigation duty of 4.5 acre-feet per acre for water-righted *Bench Lands* and 3.5 acre-feet per acre for water-righted *Bottom Lands* delivered to farm headgates. These duties are based on the *Crop Water Requirement* on the irrigation of alfalfa, as it is the most prominent crop and the highest water-using crop grown in the *Newlands (Irrigation) Project* in west-central Nevada. However, neither decree identifies lands as to bottom or bench. This has created considerable controversy, particularly within the Newlands Project, which constitutes a principal water user of both Carson River waters and Truckee River (diverted) waters. Also see *Alpine Decree [California and Nevada]*, *Orr Ditch Decree [Nevada and California]*, *Bench Lands [Nevada]*, and *Bottom Lands [Nevada]*.
- Water Education For Teachers (Project WET) [Nevada]** — A statewide supplementary, interdisciplinary water education program with components for the education community (K-12) and the general public. The goal of *Nevada Project WET* is to facilitate and promote the awareness, appreciation, knowledge, and stewardship of Nevada's water resources through the development and dissemination of classroom ready teaching aides, teacher training, learning materials, and demonstration models as well as the maintenance of a resource bureau. The program is designed to provide useful, unbiased information in a straight-forward, neutral fashion addressing a wide variety of water-related topics to include: atmospheric water, surface water, ground water, water conservation, water pollution, water laws, water users, and competition for limited water resources. The International Office for Water Education (IOWE) was established at Utah State University in 1983 to promote water/science education. The *U.S. Geological Survey (USGS)* National Water Information Clearinghouse (NWIC) has been established to serve as a focus for the dissemination of water resource information to all levels of government, academia, the

private sector, and the general public. National Project WET at Montana State University coordinates the individual state WET programs. The *Nevada Division of Water Planning (Department of Conservation and Natural Resources)*, along with the Nevada Cooperative Extension, National Project WET, and the International Office for Water Education sponsor the Nevada Project WET program for the State of Nevada.

Water Equivalent (of Snow) — The depth or amount of water that would result from the complete melting of a sample of deposited snow, measured in inches of water.

Waterer — (1) A person who obtains or supplies drinking water. (2) A device used for supplying water to livestock and poultry. Also referred to as *Drinker*.

Water Exports — The artificial transfer (pipes, canals, aqueducts, etc.) of water to one region or subregion from another region. Also see *Interbasin Transfers*, *Water Importation*, and *Water Imports*.

Waterfall — A sudden, nearly vertical drop in a stream, as it flows over rock.

Waterflood — The process of waterflooding an oil well; to pump water into the ground around an oil well nearing depletion in order to loosen and force out additional oil.

Water Flow — The rate of flow of water measured in volume and time (e.g., cubic feet per second, or cfs).

Waterfront — (1) Land abutting a body of water. (2) The part of a town or city that abuts water, especially a district of wharves where ships dock.

Water Gap — A traverse cleft in a mountain ridge through which a stream flows; the gap cut through a resistant ridge by a superimposed or *Antecedent Stream*.

Water Garden — (1) A garden in which aquatic plants predominate. (2) A garden built about a stream or pool as a central feature.

Water Gate — A gate that provides access to a body of water; a *Floodgate*.

Water Gauge — An instrument indicating the level of water, as in a boiler, tank, reservoir, or stream.

Water Glass — An open tube or box having a glass bottom for making observations below the surface of the water.

Water Hammer — (1) Very rapid pressure wave in a conduit due to a sudden change in flow; the potentially damaging slam, bang, or shudder that occurs in a pipe when a sudden change in water velocity (usually as a result of too-rapidly starting a pump or operating a valve) creates a great change in water pressure. (2) A banging noise in steam pipes, caused by steam bubbles entering a cold pipe partially filled with water.

Water Hole — A small natural depression in which water collects, especially a pool where animals come to drink.

Water Hyacinth — A floating freshwater plant belonging to the genus *Eichhornia*. The plant was introduced into the United States in the late nineteenth century and has become a prolific nuisance weed that clogs waterways in the southern part of the country.

Water Ice — A dessert made of finely crushed ice that has been sweetened and flavored.

Water Importation — The act or process whereby water is brought into an area or region which would not naturally receive such waters. Typically, it refers to the artificial transport of water through aqueducts, canals, or pipelines from one water basin, drainage area, county or *Hydrographic Area* to another, thereby affecting the natural surface and groundwater drainage and flow patterns in both the water exporting and importing areas. In terms of a *Water Banking* or *Water Marketing* concept, such actions to move water from areas of low use to areas of high use place a more realistic monetary value on water as a scarce economic commodity and result in enhanced economic efficiency by putting existing water resources, wherever located, to more productive economic use. However, considerable public concern and controversy surround this practice. These concerns deal primarily with issues relating to altering the natural flows of both surface and ground waters, adverse environmental and habitat impacts on water exporting areas, the limitations placed on the long-term growth and development of the water exporting region or hydrographic area, the potentially adverse hydrologic effects on groundwater (water table and aquifer) conditions in the exporting area as well as the generally unknown effects on surrounding hydrographic areas and aquifer conditions, and the dependency acquired by the water importing area to continued diversions and water importations. The concept of a public policy limiting an area's development to its natural ability to support population growth only through existing and readily available natural resources, particularly water, is referred to as an *Antediluvian Policy*. Also see *Water Transfer*.

Water Imports — The artificial transfer (pipes, canals, aqueducts, etc.) of water into one region or subregion from another region. Also see *Water Importation*, *Water Exports*, and *Interbasin Transfers*.

Water Impoundment — A body of water created or stored by impoundment structures such as dams, dikes, and levees.

Watering Place — (1) A place where animals find water to drink; a watering hole. (2) A health resort with mineral springs; a spa.

Watering Point — A central source from which people without piped water can draw drinking water and transport

it to their homes.

Waterish — Resembling water; watery.

Water Jacket — A casing containing water circulated by a pump, used around a part to be cooled, especially in water-cooled internal-combustion engines.

Water Law — A law that has been instigated to control the right to the use of water. See (*Prior Appropriation Doctrine* and *Riparian Doctrine*).

Water Law [California] — The keystone to California's water law and policy, as spelled out in the California Constitution, requires that all uses of the State's waters be both reasonable and beneficial. It places a significant limitation on water rights by prohibiting the waste, unreasonable use, unreasonable method of use, or unreasonable method of diversion of water. California operates under a dual system of water rights for surface water which recognizes both the doctrine of *Riparian Water Rights* and *Appropriative Water Rights*. Under the *Riparian Doctrine*, the owner of land has the right to divert a portion of the natural flow of water flowing by his land for reasonable and beneficial use upon his land adjacent to the stream and within its watershed, subject to certain limitations. Under the (*Prior Appropriation Doctrine*), a person has a right to divert, store, and use water regardless of whether the land on which it is used is adjacent to a stream or within its watershed, provided that the water is used for reasonable and beneficial uses and is surplus to water from the same stream used by earlier appropriators. The rule of priority between appropriators is "*First in Time, First in Right*". Unlike Nevada which administers both surface and groundwater rights, there exists no statewide system for the administration of ground water rights in California, except for groundwater that is actually flowing in underground streams or water that flows in known and definite underground channels. Consequently, use of most ground water in California is unregulated, except in certain circumstances where individual basins have undergone special adjudications or where a local ground water management district has been established. Water rights in California are administered by the State Water Resources Control Board (SWRCB). Also see *California Doctrine*.

Water Law [Federal] — Except when provided by federal law, e.g., *Federal Reserved (Water) Rights*, federal water rights must satisfy the administration and permitting process of the state in which the federal project is located. An important 1978 U.S. Supreme Court case (*California v. United States*) held that unless state law conflicted with clear Congressional directives, the federal government must obtain water rights under state law for reclamation purposes. Under the federal reserved rights concept, the federal government reserves sufficient water rights when it withdraws land from the public domain to establish a federal reservation such as a national park or Indian reservation. Also see *Reservation Doctrine*, *Reserved Rights Doctrine*, and *Winters Doctrine* and *Winters Rights (Decision)*.

Water Law [Nevada] — Nevada's water law is based on the *Prior Appropriation Doctrine*. Furthermore, unlike some other states, Nevada has a statewide system for the administration of both ground water and surface water. *Appropriative Water Rights* are based on the concept of applying water to *Beneficial Use* and "*First in Time, First in Right*". Appropriative water rights can be lost through nonuse and they may be sold or transferred apart from the land. Due in large part to the relative scarcity of water in Nevada and numerous competing uses, Nevada has had a thriving market for water transfers for a number of years. Water rights in Nevada are administered by the State Engineer. Also see *Application*, *Water Right*, *Riparian Doctrine*, *Riparian Water Rights*, *Littoral Water Rights*, *Prescribed Water Rights*, and *Reserved Water Rights*.

Waterless — (1) Lacking water; dry. (2) Not requiring water, as a cooling system.

Water Level — (1) An instrument to show the level by means of the surface of water in a trough or in a U-shaped tube. (2) The surface of still water. (3) The level assumed by the surface of a particular body or column of water. (4) The water-surface elevation or stage of the free surface of a body of water above or below any datum (see *Gage Height*), or the surface of water standing in a well, usually indicative of the position of the water table or other potentiometric surface. (5) (Hydrology) Synonymous with the *Water Table*. (5) The *Water Line* of a ship.

Water-Level Gage — A gage which indicates the water level in a reservoir, stilling well, or other receptacle.

Water Level Pivot Point — A location along the water surface in a canal reach where the water level remains essentially constant during changes in flow.

Water Line — (Nautical) (1) The line on the hull of a ship to which the surface of the water rises. (2) Any of several lines parallel to this line, marked on the hull of a ship, and indicating the depth to which the ship sinks under various loads. (3) A pipeline carrying water. (4) A line marked on a structure or gage to indicate water depth. May be more specifically referred to as a high water line or a low water line when measuring water depths.

Waterlog, also Waterlogged, Waterlogging — (1) To soak or saturate with water. (2) A soil condition in which a high or perched water table is detrimental to plant growth, resulting from over-irrigation, seepage, or inadequate drainage. Also, the replacement of most of the soil air by water. (3) (Nautical) To make heavy and sluggish in the

water because of flooding, as in the hold of a ship.

Water Loss — (1) The sum of water lost from a given land area during a specified time period by transpiration, evaporation, and interception. (2) In irrigation, seepage and evaporation from land and ditches; excess water drained from the land surfaces and the deep percolation. The basic concept is that water loss is equal to *Evapotranspiration*, that is, water that returns to the atmosphere and thus is no longer available for use. However, the term is also applied to differences between measured inflow and outflow even where part of the difference may be *Seepage*.

Water Losses — Water which is unavailable or lost from a particular containment system.

Water Main — A principal pipe in a system of pipes for conveying water, especially one installed underground.

Waterman — (1) A man who makes his living from the water (as by fishing). (2) A boatman who plies for hire, usually on inland waters or harbors.

Water Management — (1) (General) Application of practices to obtain added benefits from precipitation, water, or water flow in any of a number of areas, such as irrigation, drainage, wildlife and recreation, water supply, watershed management, and water storage in soil for crop production. Includes *Irrigation Water Management* and *Watershed Management*. (2) (Irrigation Water Management) The use and management of irrigation water where the quantity of water used for each irrigation is determined by the water-holding capacity of the soil and the need for the crop, and where the water is applied at a rate and in such a manner that the crop can use it efficiently and significant erosion does not occur. (3) (Watershed Management) The analysis, protection, development, operation, or maintenance of the land, vegetation, and water resources of a drainage basin for the conservation of all its resources for the benefit of its residents. Watershed management for water production is concerned with the quality, quantity, and timing of the water which is produced. Also see *Basin Management*.

Watermark — (1) A mark showing the greatest height to which water has risen. (2) A line indicating the heights of high and low tide.

Water Marketing — A concept of water transfer and use borne out of increased demand by urban populations for water whereby a holder of water rights is allowed to sell or lease those rights in an open market to the highest bidder. As an example, in the United States one acre-foot of water typically yields only about \$400 on a farm versus \$400,000 in manufacturing (National Geographic Special Edition, *WATER: The Power, Promise, and Turmoil of North America's Fresh Water*, November 1993). Such water marketing arrangements, however, can only succeed where necessary water transport and delivery systems exist between supply points and demand points. There are a variety of transactions that are considered marketing transactions to include intrastate transfers, interstate transfers, interbasin transfers, groundwater, surface water, conserved water, water rights, short-term and long-term arrangements, etc. Also see *Water Banking*.

Water Mass — (Oceanography) An oceanographic term that refers to a large body of water whose density characteristics are distinct from the surrounding aquatic environment because of inherent temperature or salinity differences. Water masses are present in all oceans and are formed where water flows from one type of climatic or physiographic region into another. The North Atlantic Current is an example of a water mass distinguished by a difference in temperature. It is a relatively warm water body that retains its identity as far north as the Arctic Circle. The huge freshwater volume expelled by the Amazon River into the southern Atlantic Ocean is an example of a water mass distinguished by a difference in salinity.

Watermaster — Often an employee of a court hired to administer a court decree. Also may be an employee of a water department who distributes available water supplies at the request of water rights holders and collects hydrographic data. Also refers to a position within an irrigation project that is responsible for the internal distribution of project water.

Watermaster-Reported Headgate Deliveries — The watermaster-reported, measured and/or estimated farm headgate deliveries.

Water Meter — An instrument for recording the quantity of water passing through a particular outlet.

Water Mill — A mill whose machinery is moved by water.

Water Molecule — The smallest unit of water (chemical symbol H₂O); consists of two atoms of *Hydrogen* (chemical symbol H) and one atom of *Oxygen* (chemical symbol O).

Water of Crystallization — Water in chemical combination with a crystal, necessary for the maintenance of crystalline properties but capable of being removed by sufficient heat.

Water of Hydration — Water chemically combined with a substance in such a way that it can be removed, as by heating, without substantially changing the chemical composition of the substance.

Water Penetration — The depth to which irrigation water or rain penetrates the soil before the rate of downward movement becomes negligible.

- Water Permit** — A state license to appropriate water for a beneficial purpose.
- Water Pipe** — (1) A pipe that is a conduit for water. (2) An apparatus for smoking, such as a *Hookah*, in which the smoke is drawn through a container of water or ice and cooled before inhaling.
- Water Plan** — A document of issues, policies, strategies and action plans intended to effectively and economically execute a *Water Planning* process. Also see *Water Policy*.
- Water Planning** — Water planning is an analytical planning process developed and continually modified to address the physical, economic, and sociological dimensions of water use. As a planning process it must assess and quantify the available supply of water resources and the future demands anticipated to be levied upon those resources. Based upon this continuous supply and demand evaluation, water planning must also give direction for moving water supplies to points of use while encouraging users to be good and effective stewards of available water resources. The water planning process requires constant re-evaluation and updating to address changing social, political, economic, and environmental parameters. While the ultimate objective of such efforts is typically the development of a comprehensive, publicly-supported *Water Plan*, it is also critical to develop and maintain a comprehensive and viable water planning process that covers various aspects of water resource development, transport, water treatment, allocation among various competing uses, conservation, waste-water treatment, re-use, and disposal. Also see *Water Policy*.
- Water Policy** — Those actions governing the management, administration, and procedures used to implement and direct a formal *Water Planning* process by which water rights, water uses, and water diversions are evaluated, ranked, and allocated on the basis of specific public policy goals and objectives and designated, either by legislative mandate, regulation, or fiat, *Preferred Uses*. Similar in scope and purpose to water planning, a water policy approach to water planning is also inherently concerned with various aspects of water resource development, transport, water treatment, allocation among various competing uses, conservation, waste-water treatment, re-use, and disposal. However, unique to the water policy approach is that water-related actions are specifically governed by pre-determined, publicly-approved water-related stipulations such as environmental impacts, quality of life values, “*Highest and Best Use*” concepts and criteria, water quality standards, conservation issues, industry sector water allocations, economic diversity goals, etc. To effect such a policy approach to water planning, a *Public Scoping* process is essential to ascertain, quantify, and rank the specific policy goals used to allocate limited water resources among competing uses. Also see *Water Plan*.
- Water Pollution** — Generally, the presence in water of enough harmful or objectionable material to damage the water’s quality. More specifically, pollution shall be construed to mean contamination of any waters such as will create or is likely to create a nuisance or to render such waters harmful, detrimental or injurious to public health, safety or welfare, or to domestic, municipal, commercial, industrial, agricultural, recreational, or other legitimate uses, or to livestock, wild animals, birds, fish or other aquatic life, including but not limited to such contamination by alteration of the physical, chemical or biological properties of such waters, or change in temperature, taste, color or odor thereof, or the discharge of any liquid, gaseous, radioactive, solid or other substances into such waters. More simply, it refers to quality levels resulting from man’s activities that interfere with or prevent water use or uses.
- Water Polo** — A goal game similar to soccer that is played in water by teams of swimmers using a ball resembling a soccer ball.
- Water Potential** — The capability of soil water to do work as compared with free water.
- Waterpower** — (1) The energy produced by running or falling water that is used for driving machinery, especially for generating electricity; (2) A source of such energy, as a waterfall. (3) A water right owned by a mill.
- Water Privilege** — The right to use water especially as a source of mechanical power.
- Waterproof** — (1) Impervious to or unaffected by water. (2) Made of or coated or treated with rubber, plastic, or a sealing agent to prevent penetration by water. Also see *Water-Repellent*.
- Water Purification** — See *Purification (Water)* and *Purification Process (Water)*.
- Water Purveyor** — Anyone who sells drinking water to the public, usually the owner of a *Public Water Supply System (PWSS)*; a public utility, mutual water company, county water district, or municipality that delivers drinking water to customers.
- Water Quality** — (1) A term used to describe the chemical, physical, and biological characteristics of water, usually in respect to its suitability for a particular purpose. (2) The chemical, physical, and biological condition of water related to beneficial use. Also see *Drinking Water Standards* and *Drinking Water Standards [Nevada]*. [See Appendix B-9 for principal threats to water quality.]
- Water Quality-Based Limitations** — Effluent limitations applied to dischargers when mere technology-based limitations would cause violations of *Water Quality Standards*. Usually applied to dischargers into small streams.

- Water Quality-Based Permit** — A permit with an effluent limit more stringent than one based on technology performance. Such limits may be necessary to protect the designated use of receiving waters (e.g., drinking, recreation, industrial, irrigation, etc.).
- Water Quality Criteria** — A specific level or range of levels of water quality necessary for the protection of a water use; levels of water quality expected to render a body of water suitable for its designated use. The criteria are set for individual pollutants and are based on different water uses, such as a public water supply, an aquatic habitat, and industrial supply, or for recreation.
- Water Quality Indicators** — Constituents or characteristics of water that can be measured to determine its suitability for use.
- Water Quality Limited Segment** — A portion of a stream where the condition of the water does not meet water quality standards and/or where standards are not expected to be achieved after *Effluent Limitations* on all *Point Sources (PS)* of water pollution are applied. Therefore, controls beyond the technology-based discharge limits will be required for the stream segment to meet the *Ambient Water Quality Standards*.
- Water Quality Management** — Planning for the protection of a water's quality for various *Beneficial Uses*, for the provision of adequate wastewater collection, treatment, and disposal for municipalities and industries, and for activities that might create water quality problems, and regulating and enforcing programs to accomplish the planning goals and laws and regulations dealing with water pollution control.
- “Water Quality Standard” (Defined) [Nevada]** — (Nevada Revised Statutes 445A.420) Means the degree of pollution of water or the physical, chemical or biological condition of water, as expressed numerically or descriptively, used for controlling the quality of water in each segment of a stream and each other body of surface water in the State of Nevada.
- Water Quality Standards** — (1) A plan for water quality management containing four major elements: water use; criteria to protect uses; implementation plans, and enforcement plans. An anti-degradation statement is sometimes prepared to protect existing high quality water sources. (2) State-adopted and *U.S. Environmental Protection Agency (EPA)* approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.
- Water Ranching** — The purchase of agricultural lands solely for the purpose of acquiring associated water rights or underlying groundwater.
- Water Reactive** — Describing any substance that reacts spontaneously with water to release a flammable or toxic gas, such as sodium metal.
- Water Reclamation** — The treatment of water of impaired quality, including brackish water and sea water, to produce a water of suitable quality for the intended use.
- Water Recycling** — The treatment of urban waste water to a level rendering it suitable for a specific, direct, beneficial use.
- Water-Related Disaster** — A cyclic event involving water during which there is threat to or loss of human life or property (e.g., flood, hurricane, tsunami, etc.).
- Water-Related Disease** — An epidemic event caused by *Waterborne* virus or bacteria. Also see *Waterborne Disease Outbreak*.
- Water-Related Issue** — An allocation, use, rights, or environmental problem involving water that is complicated by the disagreement of two or more parties over the cause, effect, and/or resolution of the problem.
- Water-Related Land** — Land on which projected use and/or management practices may significantly affect the runoff pattern or quality of the water resources to which it relates and land that is significantly affected by existing or proposed measures for management or use of the water resources to which it relates.
- Water-Related Organizations** — See Appendix E-5 for a listing of national organizations directly involved in water-related issues.
- Water-Related Recreation Activity** — A recreation activity dependent upon or enhanced by water, including swimming, boating, water skiing, fishing, picnicking, camping, sightseeing, hiking, and nature walks.
- Water-Repellent** — Resistant to penetration by water but not entirely *Waterproof*. Synonymous with *Water-Resistant*.
- Water Requirement** — The total quantity of water, regardless of its source, required for a specified use under a predetermined or prescribed situation.
- Water Requirement (Agriculture)** — The total quantity of water, regardless of its source, required for production of crops at their normal growth under field conditions. It includes applied water, subsurface irrigation, and precipitation needed by the crops.
- Water Reservation** — A water right granted by a state entity (commonly to public entities and on behalf of the public) for existing or future beneficial uses or for the maintenance of a minimum instream flow, water level, or quality

of water.

Water-Resistant — Synonymous with *Water-Repellent*.

Water Resource(s) — The supply of groundwater and surface water in a given area.

Water Resource District — A legal entity established by state statute to facilitate local administration in all phases of water development, utilization, and control.

Water Resource Management — The decision-making, manipulative, and non-manipulative processes by which water is protected, allocated, or developed.

Water Resource Plan — A planning document or process which assesses both sources and uses of water and develops strategies for their most effective and efficient use according to public needs and criteria. Also see *Water Plan*, *Water Planning*, and *Water Policy*.

Water Resource Region — Natural drainage basin or hydrologic area that contains either the drainage area of a major river or the combined areas of a series of rivers.

Water Resource Subregion — A subregion of a *Water Resource Region* that includes the area drained by a river system, a reach of a river and its tributaries in that reach, a closed basin(s), or a group of streams forming a coastal drainage area.

Water Resources Regions [United States] — A designated natural *Drainage Basin* or *Hydrologic Area* that contains either the drainage area of a major river or the combined drainage areas of two or more rivers. Of the 21 designated water-resources regions, delineated by the *Water Resources Council* in 1970, 18 are in the conterminous United States, and one each are in Alaska, Hawaii, and Puerto Rico. The following represents a listing of U.S. water-resources regions and the states primarily and partly included:

- [1] **Region 01** — *New England Region* (Maine, New Hampshire, Massachusetts, Connecticut, Rhode Island, and part of Vermont)
- [2] **Region 02** — *Mid-Atlantic Region* (New York, Pennsylvania, New Jersey, Maryland, Washington D.C., Virginia, and parts of Vermont and West Virginia)
- [3] **Region 03** — *South Atlantic–Gulf Region* (North Carolina, South Carolina, Georgia, Alabama, Florida, and parts of Virginia and Mississippi)
- [4] **Region 04** — *Great Lakes Region* (Michigan, and parts of Wisconsin, Indiana, Ohio, and New York)
- [5] **Region 05** — *Ohio Region* (Indiana, Ohio, West Virginia, Kentucky, and parts of Illinois, Tennessee, Virginia, Pennsylvania, and New York)
- [6] **Region 06** — *Tennessee Region* (Tennessee and parts of Alabama, Georgia, Virginia, and North Carolina)
- [7] **Region 07** — *Upper Mississippi Region* (Minnesota, Wisconsin, Iowa, Illinois, and parts of Missouri and Indiana)
- [8] **Region 08** — *Lower Mississippi Region* (parts of Arkansas, Mississippi, Louisiana, Tennessee, Kentucky, and Missouri)
- [9] **Region 09** — *Souris–Red–Rainy Region* (parts of North Dakota and Minnesota)
- [10] **Region 10** — *Missouri Region* (Montana, Wyoming, North Dakota, South Dakota, Nebraska, and parts of Colorado, Kansas, Missouri, Iowa, and Minnesota)
- [11] **Region 11** — *Arkansas–White–Red Region* (Oklahoma and parts of Colorado, New Mexico, Kansas, Texas, Missouri, Arkansas, and Louisiana)
- [12] **Region 12** — *Texas–Gulf Region* (Texas and parts of New Mexico and Louisiana)
- [13] **Region 13** — *Rio Grand Region* (New Mexico and parts of Texas and Colorado)
- [14] **Region 14** — *Upper Colorado Region* (parts of Utah, Colorado, Wyoming, Arizona, and New Mexico)
- [15] **Region 15** — *Lower Colorado Region* (Arizona and parts of California, Nevada, Utah, and New Mexico)
- [16] **Region 16** — *Great Basin Region* (Nevada and parts of Utah, California, Oregon, Idaho, and Wyoming)
- [17] **Region 17** — *Pacific Northwest Region* (Washington, Oregon, Idaho, and parts of Montana, Wyoming, Nevada, and Utah)
- [18] **Region 18** — *California Region* (California and parts of Oregon and Nevada)
- [19] **Region 19** — *Alaska Region* (Alaska)
- [20] **Region 20** — *Hawaii Region* (Hawaii)
- [21] **Region 21** — *Caribbean Region* (Puerto Rico)

Also see *Hydrologic Unit Maps [USGS]* and *Hydrologic Units (Classification Codes) [USGS]*.

Water Resources Sub-Region [United States] — The 21 *Water Resources Regions* of the United States as designated by the *Water Resources Council* are further subdivided into 222 sub-regions. Each sub-region includes that area

drained by a river system, a reach of a river and its tributaries in that reach, a closed basin(s), or a group of streams forming a coastal drainage system. Also see *Hydrologic Unit Maps (USGS)* and *Hydrologic Units (USGS)*.

Water Resources Sub-Area — An approximation of a *Water Resources Sub-Region* using county boundaries. Also see *Water Resources Region [United States]*.

Water Right — (1) The legal right to use a specific quantity of water, on a specific time schedule, at a specific place, and for a specific purpose. (2) A legally-protected right, granted by law, to take possession of water occurring in a water supply and to put it to *Beneficial Use*. (3) A legal right to divert state waters for a beneficial purpose.

Water-Righted Acreage — The land base for which there are water rights.

Water Rights — (1) The legal rights to the use of water. (2) A grant, permit, decree, appropriation, or claim to the use of water for beneficial purposes, and subject to other rights of earlier date or use, called *Priority* or *Prior Appropriation*. They consist of *Riparian Water Rights*, *Appropriative Water Rights*, *Prescribed Water Rights*, and *Reserved Water Rights*. Also see *Water Law*, *Water Law [California]*, *Water Law (Federal)*, and *Water Law [Nevada]*.

Water Rights, Correlative Doctrine — When a source of water does not provide enough for all users, the water is reapportioned proportionately on the basis of prior water rights held by each user.

Water Sample — A representative part of a portion used to determine quality of a larger body of water.

Water Service Agency — An agency organized, founded, or established to produce and distribute water directly or indirectly to customers. The two major types are privately owned companies which consist of commercial companies and mutual water groups; and public companies which include water districts and municipally-owned water departments.

Water Service Reliability — The degree to which a water service system can successfully manage water shortages.

Watershed — (1) An area that, because of topographic slope, contributes water to a specified surface water drainage system, such as a stream or river. An area confined by topographic divides that drains a given stream or river. (2) (Catchment) The natural or disturbed unit of land on which all of the water that falls (or emanates from springs or melts from snowpacks), collects by gravity, and fails to evaporate, runs off via a common outlet. (3) All lands enclosed by a continuous hydrologic drainage divide and lying upslope from a specified point on a stream; a region or area bounded peripherally by a water parting and draining ultimately to a particular water course or body of water. Also referred to as *Water Basin* or *Drainage Basin*. (4) A ridge of relatively high land dividing two areas that are drained by different river systems. Also referred to as *Water Parting*.

Watershed Area (Drainage Area) — The watershed area at a point in the stream refers to the area of the earth from which the water concentrates toward that point, through the drainage system.

Watershed Lag — The time from the center of mass of effective rainfall to peak of hydrograph.

Watershed Management — (1) The planned manipulation of one or more factors of the natural or disturbed drainage so as to effect a desired change in or maintain a desired condition of the water resource. (2) The analysis, protection, development, operation or maintenance of the land, vegetation and water resources of a drainage basin for the conservation of all its resources for the benefit of its residents. Watershed management for water production is concerned with the quality and timing of the water which is produced. Also referred to as *Water Management* and *Basin Management*.

Watershed Planning — The formulation of a plan, based on the concept of a *Watershed*, a *Water Basin*, a *Hydrologic Region*, or a *Hydrologic Study Area (HSA)*, with the intent to assess climatological conditions, inventory existing ground and surface water resources, determine current water uses, project future socioeconomic and environmental demands for those resources, and explore feasible water-balancing options, so as to maximize the benefits to the inhabitants of a study area while simultaneously preserving and protecting the region's wildlife, habitat, and environmental conditions.

Watershed Project — A comprehensive program of structural and nonstructural measures to preserve or restore a water shed to good hydrologic condition. These measures may include detention reservoirs, dikes, channels, contour trenches, terraces, furrows, gully plugs, revegetation, and possibly other practices to reduce flood peaks and sediment production.

Watershed Protection — The treatment of watershed lands in accordance with such predetermined objectives as the control of erosion, stream flow, silting floods, and water, forage, or timber yield. Also see *Watershed Planning*.

Watershed Protection Approach (WPA) — A type of pollution management program supported by the *U.S. Environmental Protection Agency (EPA)* as being the most effective mechanism for achieving clean water and healthy, sustainable ecosystems throughout the United States. The WPA is a "placed-based" strategy that integrates water quality management activities within hydrologically defined drainage basins or watersheds as opposed to using conventional, politically-defined boundaries. The WPA allows stakeholders to tailor corrective actions to

local concerns within the coordinated framework of a state, Tribal, and national water program. In addition, an emphasis on public participation provides the opportunity to incorporate environmental justice issues into watershed management. Six basic objectives form the general foundations of EPA's watershed protection process:

- [1] identifying critical watersheds with EPA and state participation;
- [2] clearly defining the problems, general causes, and specific sources of risks and impairments to the watershed;
- [3] developing potential pollution prevention and control strategies;
- [4] implementing point and nonpoint source controls;
- [5] developing scientifically valid and practical indicators for gauging and reducing the risks in the watershed; and
- [6] developing ecological criteria that states may use in formulating future watershed protection standards.

Water-Sick — Land rendered unproductive because of excessive irrigation.

Waterside — (1) Land bordering a body of water; a bank or shore. (2) The margin of a body of water; a *Waterfront*.

Water Softener — An apparatus designed to remove divalent metal ions (the most important of these being calcium, magnesium, and iron) from water, often replacing the divalent or trivalent ions with the monovalent sodium ion. See *Ion Exchange*.

Water Softening — Any process, but most usually involving ion exchange, for removing from water, in whole or in part, those *Cations* which produce hardness (primarily calcium and magnesium). Also see *Hard Water* and *Hardness*.

Water Solubility — The maximum possible concentration of a chemical compound dissolved in water. If a substance is *Water Soluble* it can very readily disperse through the environment.

Water Soluble — Of a material that dissolves in water.

Waterspout — (1) A tornado or lesser whirlwind occurring over water and resulting in a funnel-shaped whirling column of air and spray. (2) A hole or pipe from which water is discharged.

Water Spreading — (1) (General) Diverting runoff from natural channels or gullies by means of a system of dams, dikes, or ditches, and spreading it over relatively flat areas. The purpose is to increase the growth of natural vegetation or to infiltrate and recharge the groundwater for subsequent withdrawal by pumps for irrigation. Also see *Artificial Recharge*. (2) (Reclamation Projects) A controversial practice of using surface water from *U.S. Bureau of Reclamation (USBR)* irrigation projects to grow crops outside district boundaries. As of 1995, it was estimated that across the 17 Western states water spreading occurred on at least 1.8 million irrigated acres.

Water Spreading Methods — Refers to surface irrigation by border or furrow.

Waterstop — A strip of metal, rubber, or other material used to prevent leakage through joints between adjacent sections of concrete.

Water Storage Pond — An impound for liquid wastes designed to accomplish some degree of biochemical treatment. Also see *Waste Treatment Lagoon*.

Water Supplier — One who owns or operates a *Public Water System (PWS)*.

Water Supply — (1) Any quantity of available water; a *Water System*. (2) The water available for a community or region. (3) The source and delivery system of such water.

Water Supply System — Includes the works and auxiliaries for collection, treatment, storage, and distribution of the water from the sources of supply to the free-flowing outlet of the ultimate consumer. Also see *Public Water System (PWS)*.

Water Surface Elevation — (1) Generally, the elevation of a water surface above or below an established reference level, such as (mean) seal level. (2) The height, in relation to the *National Geodetic Vertical Datum (NGVD)* of 1929, or other datum, of a body of water or, for flood determination, for the specification of floods of various magnitudes and frequencies in the floodplains or coastal or riverine areas. Also see *Mean Sea Level (MSL)*.

Water System — (1) A river and all its tributaries. (2) A *Water Supply*.

Water Table — (1) The surface of a groundwater body at which the water is at atmospheric pressure; the upper surface of the ground water reservoir. (2) The upper surface of the *Saturated Zone* that determines the water level in a well in an *Unconfined Aquifer*. (3) The level of groundwater; the upper surface of the *Zone of Saturation* for underground water. It is an irregular surface with a slope or shape determined by the quantity of ground water and the permeability of the earth material. In general, it is highest beneath hills and mountains and lowest beneath valleys. Also referred to as *Ground Water Table*.

Water-Table Aquifer — An *Unconfined Aquifer* within which is found the water table.

Water Table, Perched — The surface of a local zone of saturation held above the main body of groundwater by an impermeable layer or stratum, usually clay, and separated from the main body of groundwater by an unsaturated

zone.

Watertight — So tightly made that water cannot enter or escape.

Water Tower — A standpipe or elevated tank used as a reservoir or for maintaining equal pressure in a water system.

Water Transfer(s) — (1) Artificial conveyance of water from one area to another across a political or hydrological boundary. This is referred to as an import or export of water from one basin (inter-basin) or county (inter-county) to another. (2) Marketing arrangements that can include the permanent sale of a water right by the water right holder; a lease of the right to use water from the water right holder; the sale or lease of a contractual right to water supply. Also see *Water Importation*.

Water Treatment — Processes undertaken to purifier water acceptable to some specific use, e.g., drinking. Most water treatment processes include some form, or combination of forms, of sedimentation, filtration, and chlorination.

Water Treatment, Combined Technique — A relatively new water disinfection technique greatly reducing the need for chlorination while effectively destroying up to 99.9 percent of *coliphage* (intestinal bacteria) in raw water. The method combines two purification techniques that have been previously used separately for water purification — potassium permanganate and copper/silver ions — but in combination the processes kill bacteria up to 10 times faster than metal ions alone and up to 5 times faster than potassium permanganate alone.

Water Treatment Lagoon — An impound for liquid wastes designed to accomplish some degree of biochemical treatment. Also referred to as *Waste Treatment Lagoon* and *Water Storage Pond*.

Water Treatment Plants — Facilities that treat water to remove contaminants so that it can be safely used.

Water Use — The amount of water needed or used for a variety of purposes including drinking, irrigation, processing of goods, power generation, and other uses. The amount of water used may not equal the amount of water withdrawn due to water transfers or the recirculation or recycling of the same water. For example, a power plant may use the same water a multiple of times but withdraw a significantly different amount. Also see *Water Use, Types*, below.

Water Use Efficiency — (1) A measure of the crop production per unit of water used, irrespective of water source, expressed in units of weight per unit of water depth per unit area. (2) Marketable crop production per unit of water consumed in evapotranspiration. The concept of utilization applies to both *Dryland Farming* and irrigated agriculture.

Water Use Practices — Direct, indirect, consumptive, and nonconsumptive uses of water. These include domestic practices (e.g., washing, bathing, cooking, drinking), navigation, wildlife habitat management, irrigation practices, recreation activities, industrial uses, and hydroelectric power generation.

Water Use, Types — The use of water may be classified by specific types according to distinctive uses, such as the following:

- [1] Commercial Water Use
- [2] Domestic Water Use
- [3] Hydroelectric Power Water Use
- [4] Irrigation Water Use
- [5] Livestock Water Use
- [6] Mining Water Use
- [7] Navigational Water Use
- [8] Other Water Use
- [9] Public Water Use (same as *Utility Water Use*)
- [10] Residential Water Use (same as *Domestic Water Use*)
- [11] Rural Water Use
- [12] Thermolectric Power Water Use

Water Vapor — Water in a gaseous state, especially when diffused as a vapor in the atmosphere and at a temperature below boiling point.

Waterwall Incinerator — An energy recovery system used in some municipal waste incinerators. The combustion chamber of the incinerator is lined with steel tubes containing circulating water. The heat from the combustion boils the water, and the steam can be sold or used to turn turbines in an electric generator.

Water Wave — Water waves provide one of the most important mechanisms for transporting energy from one point to another on the sea surface. They are produced when the air-sea interface is distorted by a disturbing force such as the wind. A restoring force such as gravity, surface tension, or the *Coriolis Effect* (force) then acts to return the surface to its equilibrium position. The disturbance propagates on the surface of the water as a wave. Surface water waves may be classified according to the period (frequency) of the wave, and the nature of the disturbing and

restoring forces at different periods determines the characteristics of the wave. See *Wave Period*.

Waterway — (Nautical) A navigable body of water, such as a river, channel, or canal.

Water Well — An excavation where the intended use is for location, acquisition, development, or artificial recharge of ground water.

Water Well Report (Permitting) — A report which a water well contractor or landowner who is constructing his own well submits to a water resources department. It includes the location and dimensions of the well, its flow, a record of geologic materials encountered in drilling, the temperature of the ground water, possible chemical analysis of the water, constituent levels, and other relevant data.

Water Wheel — (1) A device such as a turbine or similar engine to transform the energy of flowing water into mechanical power. (2) A wheel with buckets attached to its rim for raising water.

Water Wings — A device consisting of a pair of joined inflatable waterproof bags that fit under the arms of a person, especially a child learning to swim, and provides buoyancy.

Water Witch — A person who predicts the presence of underground water with hand-held tools such as forked twigs (*Divining Rod*) or metal rods. The *United States Geological Survey (USGS)* and the National Water Well Association do not advise against using a water witch to search for ground water, but say that there is no scientific basis for the belief in water witchery. Also see *Douse* (also *Dowse* or *Dowsing*).

Water Withdrawal — Water removed from groundwater or surface water for use.

“Waters of the State” (Defined) [Nevada] — (Nevada Revised Statutes 445A.415) Means all waters situated wholly or partly within or bordering upon the State of Nevada, including, but not limited to: (1) All streams, lakes, ponds, impounding reservoirs, marshes, water courses, waterways, wells, springs, irrigation systems and drainage systems; and (2) All bodies or accumulations of water, surface and underground, natural or artificial.

Waterworn — Worn, smoothed, or polished by the action of water.

Waterworks — (1) The water system, including reservoirs, tanks, buildings, pumps, and pipes, that supplies water to a city, town, or other municipality. A single unit, such as a pumping station, within such a system. (2) An exhibition of moving water, such as a fountain or cascade.

Watery — (1) Filled with, consisting of, or soaked with water; wet or soggy. (2) Containing too much water.

Water Year — The 12-month period, October 1 through September 30. The water year is designated by the calendar year in which it ends. Therefore, the 2000 water year ends on September 30, 2000.

Water Yield — Runoff, including ground water outflow that appears in the stream, plus ground water outflow that leaves the basin underground. Water yield is the precipitation minus the *Evapotranspiration*.

Watt — A unit of power or the rate of energy use or conversion when one joule of energy (0.0238 calories) is used or converted per second.

Watt-Hour (Wh) — An electrical energy unit of measure equal to one watt of power supplied to, or taken from, an electrical circuit steadily for one hour.

Wave — A regular movement on a surface or within a material when energy travels through it. On the surface of an ocean or body of water, it is usually in the form of a curving swell or ridge.

WAVE — See *Water Alliances for Voluntary Efficiency (WAVE)*.

Wave Attack — The impact of waves on a stream bank.

Wave Celerity — The velocity of propagation of a wave through a liquid, relative to the rate of movement of the liquid through which the disturbance is propagated.

Wave Cut Platform — A gently sloping surface produced by wave erosion, extending far into the sea or lake from the base of the wave cut cliff.

Wave Machine — A device used for converting the energy of ocean waves into electrical energy. It can also make waves at a water recreation site for swimming or surfing.

Wave Periods — (Oceanography) Wind generates waves that have a wide range of periods; it is responsible for pure capillary waves (ripples), which have periods less than 0.1 second, and for most gravity waves, which have periods from 0.1 second to approximately 30 seconds. Wind-driven gravity waves contain, on the average, more energy than waves of any other period. Seas (waves being actively generated by the wind during a storm) have periods of 4–10 seconds, and swells (waves that have radiated from the wind storm) have periods of 10–30 seconds. Wind storms are also responsible for waves with periods longer than 30 seconds; these storms excite *Seiches* (standing waves that do not move forward but instead move up and down) whose typical periods range from 5–10 minutes, and storm surges (large waves having periods from 1–100 hours).

Weather — The composite condition of the near earth atmosphere, which includes temperature, barometric pressure, wind, humidity, clouds, and precipitation. Weather variations over a long period create the *Climate*.

Weathering — (1) The physical disintegration or chemical decomposition of rock due to wind, rain, heat, freezing,

thawing, etc. (2) The response of materials that were once in equilibrium within the earth's crust to new conditions at or near contact with water, air, or living matter. The breakdown of rock through a combination of chemical, physical, geological, and biological processes. The ultimate outcome is the generation of soil.

Weather Modification — The intentional or inadvertent alteration of clouds for the benefit of man. Also referred to as *Cloud Modification*. Also see *Cloud Seeding*.

Wedge Storage — The volume of water contained between two different water surface profiles within a canal pool.

Weep-Hole (Weephole) — (Engineering) (1) Opening left in a revetment, bulkhead, or wall to allow groundwater drainage. (2) Openings left in retaining walls, aprons, linings, or foundations to permit drainage and reduce pressure. A hole (as in a wall or foundation) that is designed to drain off accumulated water. Also referred to as *Weeper*.

Weeper — A hole or pipe in a wall to allow water to run off.

Weeping — Dropping rain as in weeping clouds.

Weighted Average — (1) (Data Analysis) For a series of recorded observations, the sum of the products of the frequency of certain values and the value of the observation, divided by the total number of observations. For example, for one measurement of 5 grams, three measurements of 7 grams, and two measurements of 2 grams, the weighted average is $[1(5) + 3(7) + 2(2)]/6 = 5$ grams. (2) (USGS) Used to indicate discharge-weighted average. It is computed by multiplying the discharge for a sampling period by the concentrations of individual constituents for the corresponding period and dividing the sum of the products by the sum of the discharges. A discharge-weighted average approximates the composition of water that would be found in a reservoir containing all the water passing a given location during the water year after thorough mixing in the reservoir.

Weir — (1) A barrier placed in a channel to divert fish or water. (2) A dam in a river to stop and raise the water, for the purpose of conducting it to a mill, forming a fishpond, or the like. When uncontrolled, the weir is termed a fixed-crest weir. (3) A fence of stakes, brushwood, or the like, set in a stream, tideway, or inlet of the sea, for taking fish. (4) A device for determining the quantity of water flowing over it from measurements of the depth of water over the crest or sill and known dimensions of the device. (5) A bank or levee built to hold a river in its bed, or to direct it into a new bed. (6) (Water Quality) A wall or obstruction used to control the flow from settling tanks and clarifiers to assure a uniform flow rate and avoid *Short-Circuiting*. Types of weirs include:

- [1] Broad-crested;
- [2] Sharp-crested;
- [3] Drowned; and
- [4] Submerged.

Weir Basin — (Irrigation) The wide, basinlike approach to the upstream side of a weir, being constructed so as to reduce to a minimum the effect of the momentum of the approaching water on the flow over the weir.

Weir Box — (Irrigation) A wooden or concrete box oblong in shape and open at both ends, set lengthwise in a canal and in which a weir for measurement of irrigation water is set cross-wise.

Weir Loading Rate — An expression of the flow over a weir calculated by dividing the flow by the total effluent weir length. Typical units are gallons per day per foot (gpd/ft).

Weir Notch — The opening in a weir for the passage of water.

Well (Water) — (1) An excavation (pit, hole, tunnel), generally cylindrical in form and often walled in, drilled, dug, driven, bored, or jetted into the ground to such a depth as to penetrate water-yielding geologic material and allow the water to flow or to be pumped to the surface. (2) An artificial excavation put down by any method for the purposes of withdrawing water from the underground aquifers. A bored, drilled, or driven shaft, or a dug hole whose depth is greater than the largest surface dimension and whose purpose is to reach underground water supplies or oil, or to store or bury fluids below ground.

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

Well Development — The application of a surging or brushing process to a well in order to draw fine material from the aquifer next to the well and increase its discharge capacity.

Well Drillers — Individuals who have the equipment and ability to drill or dig wells. Typically, such individuals must be licensed by state water resource agencies and are required to submit certain documents (*Water Well Reports* or *Well Logs*) pertaining to their operations.

Well Field — (1) One or more wells producing water from a subsurface source. (2) A tract of land which contains a number of wells for supplying a large municipality or irrigation district.

Well, Fully Penetrating — A well drilled to the bottom of an aquifer, constructed in such a way that it withdraws

water from the entire thickness of the aquifer.

Well Function — The mathematical function by means of which the unsteady drawdown can be computed at a given point in an aquifer at a given time due to a given constant rate of pumping from a well.

Wellhead — (1) The source of a well or stream. (2) A principal source; a *Fountainhead*. (3) The physical structure, facility, or device at the land surface from or through which ground water flows or is pumped from subsurface, water-bearing formations.

Wellhead Protection Area (WHPA) — The surface and subsurface area surrounding a water well or well field, supplying a public water system, through which contaminants are reasonably likely to move toward and reach such water well or well field.

Wellhead Protection (Program) — Programs intended to protect and preserve the quality of ground water used as a source of drinking water. A typical wellhead protection program will have a number of critical elements to include: (1) delineating the roles and responsibilities of state agencies, local governments, and water purveyors; (2) delineation of wellhead protection areas; (3) contaminant source inventories; (4) management options; (5) siting of new wells; (6) contingency and emergency planning; and (7) public participation. Typically, steps taken to protect and preserve the quality of a well are far less costly than actions necessary to restore a contaminated well.

Well Hydrograph — A graphic representation of the fluctuations of the water surface in a well, plotted as *Ordinate*, against time, plotted as *Abscissa*.

Well Injection — The subsurface emplacement of fluids into a well.

Well Interference — The effects of neighboring pumping wells on the discharge and drawdown at a particular pumping well.

Well Logs — A record that is kept during well drilling of the various formations and rock materials and the depths at which they are encountered. Synonymous with *Water Well Report*.

Well Monitoring — Measurement by on-site instruments or laboratory methods of well water quality.

Well Plug — Any watertight or gastight seal installed in a well to prevent the flow of fluids or gases.

Well Rig — Any power-driven percussion, rotary, boring, digging, jetting or auguring machine used in the construction of a well.

Well Screen — A filtering device used to keep sediment from entering a water well.

Wellspring — The source of a stream or spring.

Well Stimulation — Cleaning, enlarging, or increasing the pore space of a well used for the *Injection* of fluids into subsurface geological strata.

Well Yield — The volume of water discharged from a well in gallons per minute or cubic meters per day.

Westside (USBR) — The 17 Western States in which U.S. Bureau of Reclamation (USBR) projects are located, namely, Arizona, California, Colorado, Idaho, Kansas, Montana, Nebraska, Nevada, New Mexico, North Dakota, Oklahoma, Oregon, South Dakota, Texas, Utah, Washington, and Wyoming.

Wet — Consisting of, containing, covered with, or soaked with, water or other liquid; soaked with moisture; having water or other liquid upon the surface.

(Project) WET — See *Water Education for Teachers (Project WET) [Nevada]*.

Wet Adiabatic Lapse Rate — The rate of temperature decrease as a parcel of air saturated with water rises and the pressure decreases, given by:

$$\tilde{a}_s = -dT/dz$$

where:

dT is the temperature change;

dz is the change in altitude; and

\tilde{a}_s is the saturated (wet) *Adiabatic Lapse Rate*.

Because moisture is condensing in the rising parcel of air and releasing latent heat, the temperature drop with increasing altitude is less than the (dry) adiabatic lapse rate, or about 0.6°C per 100 meters (3.3°F per 1,000 feet). The rate assumes that there is no exchange of heat between the parcel and the surrounding air by conduction or mixing.

Wet Cooling — A type of cooling system which uses the evaporation of water to help dissipate excess heat. The devices used to effect this are more commonly referred to as “swamp coolers.”

Wet Deposition — The introduction of acidic material to the ground or to surface waters by sulfuric and nitric acids dissolved in rainfall or snow. Compare to *Dry Deposition*.

Wet Digestion — A solid waste stabilization process in which mixed solid organic wastes are placed in an open digestion pond to decompose anaerobically.

Wet Floodproofing — Protecting a building by allowing flood waters to enter so that internal and external hydrostatic pressures are equalized. Usually, only enclosed areas used for parking, storage, or building access are wet floodproofed. Contrast with *Dry Floodproofing*.

Wetland — An area that is periodically inundated or saturated by surface or groundwater on an annual or seasonal basis, that displays hydric soils, and that typically supports or is capable of supporting hydrophytic vegetation. Also see *Wetlands*.

Wetland Banking — A term used to describe actions required to be taken on the part of developers to mitigate and replace the loss of wetlands. Through various federal and state regulations governing land use on wetlands, when impacts to wetlands cannot be avoided or minimized, wetlands must be replaced. The replacement process allows for the creation or restoration of any number of wetlands to provide replacement credit for future wetlands impacts or debits, i.e., reductions in existing wetlands. Wetland banking not only insures successful wetland restoration, but also typically requires that replacement occurs before targeted wetlands are removed, thereby at least temporarily increasing the overall amount of wetlands. Also, wetland banking credits may frequently be sold in an open market arrangement thereby facilitating both more efficient land use planning and habitat preservation. Wetland creation under the wetland banking process also allows planners to target wetland construction in precisely those areas and watersheds which have the greatest need for the benefits of wetlands, e.g., flood storage, water quality improvement, habitat creation or preservation, etc. Also see *Wetland “Clumping” (Aggregation)*, *Wetland Mitigation*, *Wetland Mitigation Bank*, *Wetlands (General Definition)*, *Wetlands (COE and EPA)*, *Wetlands (NRCS)*, *Wetlands (USFWS)*, *Wetlands [California]*, *Wetlands [Nevada]*, *Wetlands, Benefits*, and *Wetlands, Palustrine*.

Wetland “Clumping” (Aggregation) — The concept of wetland “clumping”, or wetland aggregation, constitutes a fundamental issue of *Wetland Banking* programs and generally occurs when several small, fragmented wetlands, providing unique and specific benefits to a localized ecosystem, are destroyed and then, through the wetland banking process, their removal is compensated for by the creation of a single larger wetland, perhaps at some distance from those wetland which were removed. This concept of wetland aggregation does not take into account the relatively unique geographic functions that localized wetlands provide to a watershed and the needs of both plant and animal life specific to that habitat. Studies have shown that increasing the distances between the destroyed wetlands and the newly created wetlands has been a major reason for population declines in certain species. Currently, wetland rules are being considered to encourage the development of smaller, more numerous wetlands as part of a more responsive wetland banking mitigation and replacement program. Also see *Wetlands (General Definition)*, *Wetlands (COE and EPA)*, *Wetlands (NRCS)*, *Wetlands (USFWS)*, *Wetlands [California]*, *Wetlands [Nevada]*, *Wetlands, Benefits*, and *Wetlands, Palustrine*.

Wetland Mitigation — Unlike *Wetland Banking* or *Wetland “Clumping” (Aggregation)*, *Wetland Mitigation* deals with those actions taken to avoid, minimize, or deter the need to adversely affect existing *Wetlands* and similar habitats. *Wetland mitigation* deals in three fundamental areas:

- [1] **Avoidance** — involving a comprehensive evaluation of practicable alternatives to the proposed actions to demonstrate that the least environmentally damaging practicable alternative that satisfies the project purpose has been selected;
- [2] **Minimization** — where some actions adversely affecting existing wetland areas are unavoidable, then steps must taken to insure that such adverse effects are minimized to every extent possible; and
- [3] **Compensatory Mitigation** — in the case of extensive or substantive wetland impacts, then alternative actions must be taken in conjunction to the proposed project to insure that new areas are added to existing wetland inventory (banking) and/or that alternative and comparable wetland habitat is created (clumping and aggregation).

Wetland banking and clumping (aggregation) concepts are only involved in the compensatory mitigation stage, and possibly the minimization of impacts stage, when all other actions have failed to prevent substantive impacts on existing wetlands. Also see *Wetland Mitigation Bank*.

Wetland Mitigation Bank — An arrangement whereby private developers buy credits of an acre or so each for the right to drain and build on *Wetlands* on their own property. The practice is generally permitted under *Section 404* of the federal *Clean Water Act (CWA)*, which requires developers to provide an equal amount of *Constructed Wetlands* for each acre of wetland destroyed. As an additional requirement, the mitigating wetlands must be created on land that historically was a wetland at one time or another. Developers are also required to both restore and maintain the mitigating wetlands. In states without enabling legislation for such banks, jurisdiction falls under the authority of the *U.S. Army Corps of Engineers (COE)*. Also see *Wetland Banking*, *Wetland Clumping (Aggregation)*, and *Wetland Mitigation*.

Wetlander — A person who lives in proximity to *Wetlands* and whose culture is linked to them.

Wetlands, also Wetland (General) — Wetlands are those areas where water saturation is the dominant factor determining the nature of soil development and the types of plant and animal communities living in the surrounding environment. The identification of wetlands and associated habitats is regulated by complex federal legislation. The *U.S. Environmental Protection Agency (EPA)*, the *U.S. Army Corps of Engineers (COE)*, the (U.S. Department of Agriculture) *Natural Resources Conservation Service (NRCS)* (formerly the *Soil Conservation Service — SCS*), and the (Department of the Interior) *U.S. Fish and Wildlife Service (USFWS)*, have developed definitions of wetlands in response to their regulatory responsibilities. The single feature that all wetlands have in common is a soil or substrate that is saturated with water during at least a part of the growing season. These saturated conditions control the types of plants and animals that live in these areas. Other common names for wetlands are *Sloughs*, *Ponds*, *Swamps*, *Bogs*, and *Marshes*. Basically, all definitions of wetlands require that one or more attributes be met:

- [1] **Wetland Hydrology** — At some point of time in the growing season the substrate is periodically or permanently saturated with or covered by water;
- [2] **Hydrophytic Vegetation** — At least periodically, the land supports predominantly water-loving plants such as cattails, rushes, or sedges;
- [3] **Hydric Soils** — The area contains undrained, wet soil which is anaerobic, or lacks oxygen in the upper levels.

Wetlands (COE and EPA) — (Regulatory) The *U.S. Army Corps of Engineers (COE)* and the *U.S. Environmental Protection Agency (EPA)* have adopted a regulatory definition for administering the Section 404 permit program of the *Clean Water Act (CWA)* as follows: [Wetlands are] those areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands generally include swamps, marshes, bogs, and similar areas.

Wetlands (NRCS) — (Technical) The (U.S. Department of Agriculture) *Natural Resources Conservation Service (NRCS)* (formerly the *Soil Conservation Service — SCS*) uses the following definition for identifying wetlands on agricultural land in assessing farmer eligibility for U.S. Department of Agriculture program benefits under the “Swampbuster” provision of the *Food Security Act (FSA)* of 1985. As amended in 1990, the FSA states that the term “wetland,” except when such term is part of the term “converted wetland,” means land that

- [1] has a predominance of hydric soils;
- [2] is inundated or saturated by surface or ground water at a frequency and duration sufficient to support a prevalence of hydrophytic vegetation typically adapted for life in saturated soil conditions; and
- [3] under normal circumstances does support a prevalence of such vegetation.

For purposes of the 1990 amended FSA, and any other act, this term shall not include lands in Alaska identified as having high potential for agricultural development which have a predominance of permafrost soils.

Wetlands (USFWS) — (Regulatory and Environmental) The *U.S. Fish and Wildlife Service (USFWS)* has defined wetlands as follows: Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water. For purposes of this classification, wetlands must have one or more of the following three attributes:

- [1] at least periodically, the land supports predominantly *Hydrophytes (Hydrophytic Vegetation)*;
- [2] the substrate is predominantly undrained *Hydric Soils*; and
- [3] the substrate is nonsoil and is saturated with water or covered by shallow water at some time during the growing season of each year (*Wetland Hydrology*).

The term wetland includes a variety of areas that fall into one of five categories:

- [1] areas with hydrophytes and hydric soils, such as those commonly known as marshes, swamps, and bogs;
- [2] areas without hydrophytes but with hydric soils — for example, flats where drastic fluctuation in water level, wave action, turbidity, or high concentration of salts may prevent the growth of hydrophytes;
- [3] areas with hydrophytes but nonhydric soils, such as margins of impoundments or excavations where hydrophytes have become established but hydric soils have not yet developed;
- [4] areas without soils but with hydrophytes such as the seaweed-covered portion of rocky shores; and
- [5] wetlands without soil and without hydrophytes, such as gravel beaches or rocky shores without vegetation.

While *Wetlands* and *Deepwater Habitats* are defined separately, the USFWS approach to a definition views these two regimes as a continuum of an ecological classification system, and therefore both must be considered in an ecological approach to classification. The deepwater habitat/wetland classification includes five major systems:

- [1] Marine

- [2] Estuarine
- [3] Riverine
- [4] Lacustrine
- [5] Palustrine

The first four of these classifications include both wetland and deepwater habitats, but only the Palustrine System [see *Wetlands, Palustrine*] includes only wetland habitats. Wetlands have been found to provide many valuable functions to include groundwater recharge and discharge, flood flow alteration, sediment stabilization, sediment and toxicant retention, nutrient removal and/or transformation, diverse wildlife and aquatic habitats, and recreation [see *Wetlands, Benefits*]. Also see *Deepwater Habitat*. [See Appendix D-2 for an explanation of the Wetland and Deepwater Habitat Classification System and more detailed information on these systems.]

Wetlands [California] — Wetlands are transitional lands between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is often covered by shallow water during some parts of the year. Wetlands can be categorized according to specific habitat and type of vegetation. In general, wetlands are divided into:

- [1] **Saltwater and Brackish Water Marshes** — Usually located in coastal areas;
- [2] **Freshwater Wetlands** — Located primarily in the inland areas of California; and
- [3] **Freshwater Forested and Scrub Wetlands** — Commonly referred to as riparian habitat and exist along streams and adjacent to lakes.

Wetlands [Nevada] — (State Wildlife Management Areas—WMAs) Wetlands are those areas that are inundated or saturated by surface or groundwater at a frequency or duration sufficient to support, and that under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions. Wetlands typically include swamps, marshes, bogs, playas, springs, seeps, and similar areas. Wetlands are land transitional between terrestrial and aquatic systems where the water table is usually at or near the surface, or the land is covered by shallow water. For the purpose of this classification wetlands must have one or more of the following attributes:

- [1] **Hydrophytic Vegetation** — At least periodically, the land supports predominantly water-loving plants (hydrophytes), such as cattails, rushes, or sedges;
- [2] **Hydric Soil** — Contains undrained, wet soil which lacks oxygen in the upper region;
- [3] **Wetland Hydrology** — The substrate is periodically or permanently saturated with or covered by water at some point of time in the growing season during a 30-year mean hydrologic period.

Frequently in Nevada, wetlands within the state's *Wildlife Management Areas (WMAs)* are only wet during a portion of the year, and sometimes they are dry for more than a year at a time. Because of this, Nevada's regional differences in climate and hydrology must be considered for the purpose of wetland identification, inventory, and classification.

Wetlands, Benefits — Since colonial times, an estimated 54 percent of the total wetland areas in the United States have vanished. In a major study by the U.S. Department of the Interior, *U.S. Fish and Wildlife Service (USFWS)*, during the 20 years from the mid-1950s to the mid-1970s, such losses averaged 458,000 acres each year. More recent studies have clearly demonstrated that wetlands are precious ecological resources that nurture wildlife, purify polluted waters, check the destructive power of floods and storms, and provide a variety of recreational activities. The following constitutes a listing of some of the major benefits of these ecological systems:

- [1] **Waterfowl Breeding** — Over 12 million ducks nest and breed annually in northern U.S. wetlands. This area, when combined with similar habitats in the Canadian prairies, accounts for 60–70 percent of the continent's breeding duck population.
- [2] **Habitat for Waterfowl and Other Birds** — Some 2½ million of the 3 million mallards in the Mississippi Flyway and nearly 100 percent of our 4 million wood ducks spend the winter in flooded bottomland forests and marshlands throughout the south.
- [3] **Biological Diversity and Wildlife Habitat** — Wetlands provide food and shelter for a great variety of fur-bearing animals and other kinds of wildlife.
- [4] **Habitat for Threatened and Endangered Species** — At least one-third of the nation's threatened or endangered species live in wetland areas.
- [5] **Marine Fish and Shellfish Production** — Roughly two-thirds of our shellfish and important commercial and sport species of marine fish rely on coastal marshes for spawning and nursery grounds.
- [6] **Freshwater Fish** — Many of the 4½ million acres of open water areas found in our inland wetlands are ideal habitat for such sought-after species as bass, catfish, pike, bluegill, sunfish, and crappie.
- [7] **Timber Production** — Wetlands, especially bottomland forests, are rich sources of timber.
- [8] **Flood Control** — Wetlands temporarily store flood waters and thus reduce downstream losses of life and

property.

- [9] **Water Quality** — Wetlands act as natural water purification mechanisms. They remove silt and filter out and absorb many pollutants such as waterborne chemicals and nutrients.
- [10] **Saltwater Intrusion Control** — The flow of freshwater through wetlands creates groundwater pressure that prevents saltwater from invading public water supplies.
- [11] **Shoreline Stabilization** — By absorbing wave and storm energy and slowing water currents, wetland vegetation serves as a buffer against shoreline erosion.
- [12] **Reduction of Coastal Storm Damage** — Coastal marshes and mangrove stands help to blunt the force of major storms.
- [13] **Recreational Opportunities** — Wetlands offer unspoiled, open space for the aesthetic enjoyment of nature as well as activities such as hiking, fishing, hunting, photography, and environmental education.
- [14] **Groundwater Recharge and Discharge** — Water standing in or slowing moving through wetland areas provides important recharge opportunities to ground waters while water taken from the ground, for example through mine *Dewatering* operations, is frequently released into wetland areas for further treatment of potentially harmful substances.
- [15] **Sediment Stabilization** — Through their ability to slow the flow of water and the filtering capabilities of associated flora, wetlands provide important functions for the removal and trapping of sediment and other materials in water affecting its *Turbidity* and its levels of *Dissolved* and *Suspended Solids*.
- [16] **Sediment and Toxicant Retention** — Wetland vegetation inherently provides important functions in the retention and absorption of various dissolved and suspended materials in the waters entering these areas as well as providing for the removal of various chemical and toxic substances as well as some heavy metals.
- [17] **Nutrient Removal and/or Transformation** — Wetland vegetation readily absorbs for its own use various nitrate and phosphate-based nutrients in the water, thereby increasing *Dissolved Oxygen* levels and the quality of downstream waters.

Wetlands, Constructed — (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*.

Wetlands, Jurisdictional — An area that meets the criteria established by the *U.S. Army Corps of Engineers (Corps or COE)* for a *Wetlands* (as set forth in their *Wetlands Delineation Manual*). Such areas come under the jurisdiction of the Corps of Engineers for permitting certain actions such as dredge and fill operations. See *Wetlands*. [Also see *Classification of Wetlands and Deepwater Habitats of the United States*, U.S. Department of the Interior, Fish and Wildlife Service (USFWS). Appendix D-2 presents a summarization of this Wetland and Deepwater Habitat Classification System based upon USFWS criteria.]

Wetlands Management — The maintenance or modification of *Wetlands* to achieve desired functions.

Wetlands, Palustrine — Wetlands dominated by plants that persist throughout the year or the growing season. These areas are what most people think of when they see the term “wetland”, and include marshes, swamps, bogs, and wet meadows. Palustrine wetlands may be dominated by subtidal, permanently and intermittently flood areas (*Rock Bottom*, *Unconsolidated Bottom*, *Aquatic Bed*, and *Unconsolidated Shore*), mosses and lichens (*Moss-Lichen Wetlands*), erect, rooted, herbaceous hydrophytes such as sedges, rushes, grasses, cattails, and bulrushes (*Emergent Wetlands*), woody vegetation less than 6 meters (20 feet) tall (*Scrub-Shrub Wetlands*), or woody vegetation that is 6 meters (20 feet) or taller (*Forested Wetlands*). Palustrine wetlands may occur in the vicinity of springs, seeps, and flowing wells, on the floodplains of streams and creeks, around the shores of some lakes and reservoirs, adjacent to irrigation canals, and in areas influenced by irrigation or irrigation runoff. The following presents a more detailed description of these wetland classes:

- [1] **Rock Bottom** — The Class Rock Bottom includes all wetlands and deepwater habitats with substrates having an areal cover of stones, boulders, or bedrock 75 percent or greater and vegetative cover of less than 30 percent. Water regimes are restricted to subtidal, permanently flooded, intermittently exposed, and semipermanently flooded. The rock substrate of the rocky benthic or bottom zone is one of the most important factors in determining the abundance, variety, and distribution of organisms. The stability of the bottom allows a rich assemblage of plants and animals to develop. Rock bottoms are usually high-energy habitats with well-aerated waters.
- [2] **Unconsolidated Bottom** — The Class Unconsolidated Bottom includes all wetland and deepwater

habitats with at least 25 percent cover of particles smaller than stones, and a vegetative cover less than 30 percent. Water regimes are restricted to subtidal, permanently flooded, intermittently exposed, and semipermanently flooded. Unconsolidated bottoms are characterized by the lack of large stable surfaces for plant and animal attachment. They are usually found in areas with lower energy than rock bottoms, and may be very unstable.

- [3] ***Aquatic Bed*** — The Class Aquatic Bed includes wetlands and deepwater habitats dominated by plants that grow principally on or below the surface of the water for most of the growing season in most years. Water regimes include subtidal, irregularly exposed, regularly flooded, permanently flooded, intermittently exposed, semipermanently flooded, and seasonally flooded. Aquatic beds represent a diverse group of plant communities that requires surface water for optimum growth and reproduction. They are best developed in relatively permanent water or under conditions of repeated flooding.
- [4] ***Unconsolidated Shore*** — The Class Unconsolidated Shore includes all wetland habitats having three characteristics: (1) unconsolidated substrates with less than 75 percent areal cover of stones, boulders, or bedrock; (2) less than 30 percent areal cover of vegetation other than pioneering plants; and (3) any of the following water regimes: irregularly exposed, regularly flooded, irregularly flooded, seasonally flooded, temporarily flooded, intermittently flooded, saturated, or artificially flooded. Unconsolidated shores are characterized by substrates lacking vegetation except for pioneering plants that become established during brief periods when growing conditions are favorable. Erosion and deposition by waves and currents produce a number of landforms such as beaches, bars, and flats, all of which are included in this wetland class.
- [5] ***Moss-Lichen Wetlands*** — The Moss-Lichen Wetland Class includes areas where mosses or lichens cover substrates other than rock and where emergents, shrubs, or trees make up less than 30 percent of the areal cover. The only water regime is saturated. Mosses and lichens are important components of the flora in many wetlands, especially in the north, but these plants usually form a ground cover under a dominant layer of trees, shrubs, or emergents. In some instances higher order plants are uncommon and mosses or lichens dominate the flora. Such Moss-Lichen Wetlands are not common, even in the northern United States where they occur most frequently.
- [6] ***Emergent Wetlands*** — The Emergent Wetland Class is characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens. This vegetation is present for most of the growing season in most years. These wetlands are usually dominated by perennial plants. All water regimes are included except sub-tidal and irregularly exposed. In areas with relatively stable climatic conditions, Emergent Wetlands maintain the same appearance year after year. In other areas, such as the prairies of the central United States, violent climatic fluctuations cause them to revert to an open water phase in some years. Emergent Wetlands are found throughout the United States and occur in all Wetland Classification Systems except the Marine. Emergent Wetlands are known by many names, including marsh, meadow, fen, prairie pothole, slough, and savanna.
- [7] ***Scrub-Shrub Wetlands*** — The Class Scrub-Shrub Wetland includes areas dominated by woody vegetation less than 6 meters (20 feet) tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions. All water regimes except sub-tidal are included. Scrub-Shrub Wetlands may represent a successional stage leading to Forested Wetland, or they may be relatively stable communities. They occur only in the Estuarine and Palustrine Wetland Systems, but are one of the most widespread classes in the United States. Scrub-Shrub Wetlands are known by many names, such as shrub swamp, shrub carr, and pocosin (dismal).
- [8] ***Forested Wetlands*** — The Class Forested Wetland is characterized by woody vegetation that is 6 meters (20 feet) tall or taller. All water regimes are included except sub-tidal. Forested Wetlands are most common in the eastern United States and in those sections of the West where moisture is relatively abundant, particularly along rivers and in the mountains. They occur only in the Palustrine and Estuarine Wetland Systems and normally possess an overstory of trees, an understory of young trees or shrubs, and a herbaceous layer. Forested Wetlands in the Estuarine System, which include the mangrove forests of Florida, Puerto Rico, and the Virgin Islands, are known by such names as swamps, hammocks, heads, and bottoms. These names often occur in combination with species names or plant associations such as cedar swamp or bottomland hardwoods.

[Also see Appendix D-2 for an explanation of the Wetland and Deepwater Habitat Classification System and more detailed information on these *Ecosystems*.]

Wetlands, Seasonal — Wetland areas flooded or taking on the characteristics of a wetland only during specific periods

of the year or seasons. Also see *Playa, Pan,* and *Prairie Potholes.*

Wet Line — The length of sounding line below the water surface.

Wet Mass — The mass of living matter plus contained water.

Wet Meadow — Grassland with waterlogged soil near the surface but without standing water for most of the year.

Wet Milling — The mechanical size reduction of solid wastes that have been wetted to soften the paper and cardboard constituents.

WET, Nevada Project — See *Water Education for Teachers (Project WET) [Nevada].*

Wet Pack — A therapeutic pack moistened in hot or cold water.

Wet Scrubber — An air cleaning device that literally washes out the dust. Exhaust air is forced into a spray chamber, where fine water particles cause the dust to drop from the air stream. The dust-laden water is then treated to remove the solid material and is often recirculated.

Wet Scrubbing — A process that removes particles, gases, or vapors from an exhaust gas by passing the exhaust through a shower of water or water that contains an agent to react with the material to be removed.

Wet Suit — A tight-fitting permeable suit worn in cold water, as by skin divers, to retain body heat.

Wetted Perimeter — The length of the wetted contact between a stream of flowing water and its containing conduit or channel, measured in a plane at right angles to the direction of flow.

Wetting Agent — A chemical that reduces the surface tension of water and enables it to soak into porous material more readily.

Wet Weight — The weight of animal tissue or other substances including its contained water.

Wheeling — (1) (General) Carrying or conveying a commodity, such as gas, electricity, and water, to a buyer on behalf of an outside seller. (2) (Water) Using a conveyance system, such as a river, aqueduct, or pipeline, to transport water from a seller, or owner of the water, to a buyer. (3) (Water) the transportation of water, as the result of ad hoc contracts or other arrangements, in conveyance facilities in which the transferring party does not otherwise have the authority to use.

(Water) Wheeling [Colorado River Basin] — Smaller bodies of water entering into the Colorado River are considered Colorado River water upon contact. This water is then subject to the laws of the *Colorado River Compact*. If the water is diverted prior to reaching the Colorado River, however, it can be separately developed and put to use outside the limitations of the Colorado River Compact. If “wheeling” is approved by the United States federal government, this additional water source could be transferred from one state to another, or within a state, using the Colorado River as a conveyance system.

Whelm — To cover with water; submerge.

Whirlpool — A rapidly rotating current of water; a *Vortex*. Also see *Coriolis Effect*.

(Lake) Whitening — A phenomenon which occurs in moderately productive lakes when photosynthetic uptake of carbon dioxide (CO₂) causes the precipitation of small particles of calcite (mostly calcium carbonate, CaCO₃). Since small particles have a greater effect on water transparency and typical calcite particles are only 1–2 micrometers (µm) in diameter, the lake’s water takes on a milky appearance, hence lending to its name.

Whiteout — A polar weather condition caused by a heavy cloud cover over the snow, in which the light coming from above is approximately equal to the light reflected from below, and which is characterized by absence of shadow, invisibility of the horizon, and ability to discern only very dark objects.

White Squall — A sudden squall occurring in tropical or subtropical waters, characterized by the absence of a dark cloud and the presence of white-capped waves or broken water.

White Water — Turbulent or frothy water, as in rapids or surf.

Wicket — A sluice gate for regulating the amount of water in a millrace or a canal or for emptying a lock.

Wild and Scenic Rivers (Act) — A national system established under the Wild and Scenic Rivers Act of free-flowing rivers and streams which possess one or more of the following outstanding remarkable values: (1) scenic; (2) recreational; (3) geological; (4) fish and wildlife; (5) historic or cultural; or (6) other values, including biological or ecological. There are three classifications of rivers or river segments – wild, scenic and recreational – with classifications based on the condition of the river and the adjacent lands at the time of the study. The act defines these classifications as follows:

- (1) **Wild River** – Those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and water unpolluted, representing vestiges of rivers in primitive America;
- (2) **Scenic River** – Those rivers or sections of rivers that are free of impoundments, with shorelines or watersheds still largely primitive and shorelines largely undeveloped, but accessible in places by roads;
- (3) **Recreational River** – Those rivers or sections of rivers that are readily accessible by road or railroad that

may have some development along their shorelines, and that may have undergone some impoundments or diversions in the past.

Also see *Wild Rivers*, *Scenic Rivers*, and *Recreational Rivers* for permitted activities and restrictions.

Wild Rivers — A classification under the national *Wild and Scenic Rivers Act* to include those rivers or sections of rivers that are free of impoundments and generally inaccessible except by trail, with watersheds or shorelines essentially primitive and water unpolluted, representing vestiges of rivers in primitive America. The following represents restrictions applying to such designated rivers:

- (1) **Timber Production** – Cutting of trees is not permitted unless needed in association with a primitive recreation experience (i.e., clearing for trails and protection of users) or to protect the environment (i.e., fire control). Timber outside the boundary but within the visual corridors will be managed and harvested in a manner to provide special emphasis to visual quality.
- (2) **Water Supply** – All water supply dams and major diversions are prohibited.
- (3) **Hydroelectric Power** – No development of hydroelectric power facilities would be permitted.
- (4) **Flood Control** – No flood control dams, levees, or other works are allowed in the channel or river corridor. The natural appearance and essentially primitive character of the river areas must be maintained.
- (5) **Mining** – New mining claims and mineral leases are prohibited within one-quarter mile of the river. Valid claims would not be abrogated. Subject to regulations (i.e., 36 CFR 228) that the Secretaries of Agricultural and Interior may prescribe to protect the rivers included in the National System, other existing mining activity must be conducted in a way that minimizes surface disturbance, sedimentation, and visual impairment. Reasonable access will be permitted.
- (6) **Road Construction** – No roads or other provisions for overland motorized travel would be permitted within a narrow incised river valley or, if the river valley is broad, within one-quarter mile of the river bank. A few inconspicuous roads leading to the boundary of the river area at the time of the study will not disqualify wild river classification. Also, unobtrusive trail bridges could be allowed.
- (7) **Agriculture** – Agricultural use is restricted to a limited amount of domestic livestock grazing and hay production to the extent currently practiced. Row crops are prohibited.
- (8) **Recreational Development** – Major public-use areas, such as large campgrounds, interpretive centers, or administrative headquarters are located outside the wild river area. Simple comfort and convenience facilities, such as fireplaces or shelters may be provided as necessary within the river area. These should be harmonized with the surroundings.
- (9) **Structures** – A few minor existing structures could be allowed assuming such structures are compatible with the essentially primitive and natural values of the viewshed. New structures would not be allowed except in rare instances to achieve management objectives. Structures and activities associated with fisheries enhancement programs could be allowed.
- (10) **Utilities** – New transmission lines, gas lines, water lines, etc., are discouraged. Where no reasonable alternative exists, additional or new facilities should be restricted to existing right-of-way. Where new rights-of-ways are indicated, the scenic, recreation, and fish and wildlife values must be evaluated in the selection of the site.
- (11) **Motorized Travel** – Motorized travel on land or water could be permitted, but is generally not compatible with this classification.

Also see *Wild and Scenic Rivers Act*, *Scenic Rivers*, and *Recreational Rivers*.

Wilderness — Undeveloped land and associated water resources retaining their primeval character and influence, without permanent improvements or human habitation, which is protected and managed so as to preserve its natural condition and that (1) generally appears to have been affected primarily by the forces of nature with the imprint of man's work substantially unnoticeable; (2) has outstanding opportunities for solitude or a primitive and unconfined type of recreation; (3) is of sufficient size so as to make practical its preservation and use in an unimpaired condition; and (4) may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value.

Wilderness Act — A 1964 Act of Congress which established federal *Wilderness Areas*. As defined under this act, wilderness is undeveloped federal land without permanent improvements or human habitation; is protected and managed so as to preserve its natural conditions; has outstanding opportunities for solitude or primitive recreation; has at least 5,000 acres or is of sufficient size to make practical its condition; and may contain features of scientific, educational, scenic, or historical value as well as ecologic and geologic interest.

Wilderness Area — Land where the effects of man are not apparent. Large tracts of land that are set aside and allowed to develop without the intervention of man. Such activities as the construction of roads, development of

recreational facilities, removal of trees, or hunting are prohibited. The 1964 *Wilderness Act* allows the U.S. government to set aside sections within the national forests, national parks, and national wildlife refuges as wilderness areas. Currently there are about 450 such areas within the United States totaling 90 million acres, two-thirds of which are in Alaska.

(The) Wilderness Society — An American environmental organization concerned with the protection of wildlife habitat and wildlife refuges as well as the preservation of public lands.

Wilderness Study Area (WSA) — An area possessing wilderness characteristics as defined in the *Wilderness Act*, an identified pursuant to the *Federal Land Policy and Management Act* of 1976. These areas are maintained in their original condition and evaluated for possible inclusion in the *National Wilderness Preservation System*.

Wilderness Values — Values established in the *Wilderness Act*, such as solitude and naturalness.

Wildland — A non-urban, natural area which contains uncultivated land, timber, range, watershed, brush or grassland.

Wildlife Management Areas (WMAs) [Nevada] — Nevada's Wildlife Management Areas (WMAs) are lands and waters which have been acquired to effectuate a coordinated and balanced program resulting in the maximum revival of fish and wildlife and in the maximum recreational advantages to the people of the State of Nevada. Lands in Nevada set aside as WMAs currently total almost 275,000 acres (429 square miles). State WMAs are subject to supervision by the Nevada Board of Wildlife Commissioners. The following areas have been so designated and are identified by *Nevada Division of Wildlife (NDOW)* geographic region:

Region I:

- [1] ***Stillwater Wildlife Management Area*** — Located in Churchill County, initially established in 1948 as a Tri-Party Agreement among TCID, USFWS, and NDOW and subsequently in 1960 as a Two-Party Agreement between USFWS and NDOW, consists of 143,866 acres of lands under joint management by NDOW AND USFWS.
- [2] ***Mason Valley Wildlife Management Area*** — Located in Lyon County, initially established on March 26, 1955 with land acquisitions continuing through September 9, 1993, consists of 13,178 acres of owned land.
- [3] ***Scripps Wildlife Management Area*** — Located in Washoe County, initially established on March 20, 1957 with additional acquisitions through May 11, 1994, consists of 2,451 acres of owned land.
- [4] ***Fernley Wildlife Management Area*** — Located in Lyon and Churchill counties, initially established in 1952, consists of 13,019 total acres including 5,339 acres owned and 7,680 acres leased (USBR and TCID).
- [5] ***Humboldt Wildlife Management Area*** — Located in Pershing and Churchill counties, initially established on June 22, 1956 with land acquisitions continuing through June 15, 1982, consists of 36,336 total acres including 160 acres owned and 36,176.04 acres leased ((USBR and SPLC).
- [6] ***Alkali Lake Wildlife Management Area*** — Located in Lyon County, established on April 9, 1965 and consists of 3,448 acres of withdrawn land (USBR).
- [7] ***Sleeper Wildlife Management Area*** — Located in Humboldt County, established on November 17, 1989 and consists of 3,553 acres of withdrawn land (Nevada Gold Mining, Inc. and BLM).
- [8] ***Lagomarsino Wildlife Management Area*** — Located along the Truckee River in Storey County, initially established on April 10, 1978, consists of 120 acres of owned land donated by the federal government (GSA).

Region II:

- [9] ***Kingston Canyon Wildlife Management Area*** — (Includes the Birch Creek Unit) Located in Land County, initially established in 1967 and consists of 120 acres of owned land including the site of the Kingston Dam on Kingston Creek.
- [10] ***Cave Lake Wildlife Management Area*** — (Includes the Willow Creek Unit) Located in White Pine County, initially established in 1972 and consists of 1,325 acres of owned land under management agreement between NDOW and NDSP.
- [11] ***Franklin Lake Wildlife Management Area*** — Located in the southern portion of Elko County, initially established on June 20, 1988 and consists of 3,229 total acres of owned land (purchased from TNC).
- [12] ***Bruneau River Wildlife Management Area*** — Located in the northern portion of Elko County, initially established on June 28, 1991 and consists of 4,771 total acres of owned land (purchased from RMEF).

Region III:

- [13] ***Overton Wildlife Management Area*** — Located in Clark County, initially established August 8, 1969 with land acquisitions continuing through March 25, 1975, consists of 17,657 total acres with 3,082

acres owned and 14,575 acres leased (NPS and USBR).

- [14] **Wayne E. Kirch Wildlife Management Area** — Located in Nye County, initially established on April 10, 1959 with land acquisitions continuing through August 27, 1964, consists of 14,815 total acres with 9,222 acres owned and 5,593 acres withdrawn (BLM).
- [15] **Key Pittman Wildlife Management Area** — Located in Lincoln County, initially established on July 23, 1962 with additional acquisitions (BLM and R&PP) continuing through April 12, 1993, consists of 1,337 acres of owned land.
- [16] **Railroad Valley Wildlife Management Area** — Located in Nye County, initially established in 1968 and consists of 14,720 acres of withdrawn land (BLM) under a management agreement between BLM and NDOW.
- [17] **Schroeder Reservoir Wildlife Management Area** — Located in Lincoln County, initially established in 1960 and consists of 28 acres of NDSP-owned land managed by agreement between NDSP and NDOW.
- [18] **Eagle Valley Wildlife Management Area** — Located in Lincoln County, initially established in 1970, consists of 349 acres state-owned land and managed by agreement between NDSP and NDOW.

Nevada’s *Cooperative State Wildlife Management Areas* are areas established by agreement with private owners in order to provide a greater opportunity for the public to hunt, fish, trap, camp, boat or participate in other compatible recreational activity on private lands and to protect the landowner or lessee from damage due to trespass or excessive pressure. The following area has been so designated within Nevada:

- [19] **Fort Churchill Cooling Pond Cooperative Wildlife Management Area** — Located in Lyon County, initially established in 1969 and consists of 92 acres of land owned by SPPCo including cooling ponds and adjacent wetlands managed by NDOW.

[Explanation of agency acronyms used above: BLM = Bureau of Land Management; GSA = General Services Administration; NDOW = Nevada Division of Wildlife; NDSP = Nevada Division of State Parks; NPS = National Park Service; R&PP = Recreation and Public Purpose Act – BLM Land Patent Process; RMEF = Rocky Mountain Elk Foundation; SPLC = Southern Pacific Land Company; SPPCo = Sierra Pacific Power Company; TCID = Truckee–Carson Irrigation District; TNC = The Nature Conservancy; USBR = U.S. Bureau of Reclamation; USFWS = U.S. Fish and Wildlife Service.]

Wildlife Refuge — An area designated for the protection of wild animals, within which hunting and fishing are either prohibited or strictly controlled.

(National) Wildlife Refuge (NWR) System — See *National Wildlife Refuge (NWR) System* and *National Wildlife Refuges (NWR) [Nevada]*.

Wilting Point — (1) The minimum quantity of water in a given soil necessary to maintain plant growth. When the quantity of moisture falls below this point, the leaves begin to droop and shrivel up. In any given soil the minimum quantity is practically constant for all plants, but it increases with a decrease in the size of soil particles. (2) The tension at which water is held in the soil beyond which plants (normally) cannot withdraw soil moisture.

Wilting Point, Ultimate — The point at which the moisture content of the soil is such that all the leaves of plants growing in it are completely wilted and will not recover without the addition of water.

Wimple — A ripple, as on the surface of water.

Wind — Moving air.

Wind Scale — A systematic arrangement of words and/or numbers used for expressing and recording the velocity or force of the wind. The U.S. Weather Bureau scale uses a graduation of 13 scales [0–12] to represent different wind conditions. These wind conditions, along with corresponding wind speeds (in miles per hour) and the scale number are presented in the following table:

<u>Condition</u>	<u>Wind Speed (mph)</u>	<u>Scale Number</u>
Light	Less than 1	0
.	1–3	1
.	4–7	2
Gentle	8–12	3
Moderate	13–18	4
Fresh	19–24	5
Strong	25–31	6
.	32–38	7
Gale	39–46	8

..... 47–54 9
 Whole Gale 55–63 10
 64–75 11
 Hurricane Above 75 12

Also see *Beaufort’s Scale*.

Windows of Access — Refers to discrete time periods when flow conditions are suitable for fish migration in a channel or into or out of tributaries.

Windstorm — A storm with high winds or violent gusts but little or no rain.

Wingdam — A wall, crib, row of pilings, stone jetty, or other barrier projecting from the bank into a stream for protecting the bank from erosion, arresting sand movement, or for concentrating the low flow of a stream into a smaller channel.

Wing Wall — The side walls of a structure used to prevent sloughing of banks or channels and to direct and confine overfall.

Winter Irrigation — The irrigation of lands between growing seasons in order to store water in the soil for subsequent use by plants.

Winter Kill — The complete or partial kill of fish and other animals in a body of water, usually occurring during prolonged periods of ice and snow cover. The kill can be attributed to a number of circumstances including diminished dissolved oxygen due to a lack of photosynthesis; the depletion of dissolved oxygen by decomposing organic matter; the production of harmful chemicals (e.g., ammonia, hydrogen sulfide, and ethanes) resulting from anaerobic decomposition; and the harmful influence of insecticides and herbicides.

Winter Range — Areas used by migratory wildlife during the winter months. Typically these areas are low in elevation and have a shrub layer available to provide cover and forage.

Winters Doctrine — The doctrine of (federal) reservation rights. See *Winters Rights (Decision)*.

Winters Rights (Decision) — The U.S. Supreme Court precedent decision (*Winters v. United States*, 207 U.S. 564 [1908]) in which the Court prohibited any uses by non-Indians that interfered with the Indian tribes’ use of their reserved water. In *Winters*, the Court held that when reservations were established, Indian tribes and the United States implicitly reserved, along with the land, sufficient water to fulfill the purposes of the reservations. The ruling rests on the principle that Indian tribes retain all rights not explicitly relinquished. These federal reserved water rights are commonly known as *Winters Rights* as based on the *Winters Doctrine*. The court recognized these rights as having a priority date coinciding with the date the reservation was established, thus providing a means to integrate federally reserved rights with *Appropriative Water Rights* recognized under state law. Since reserved rights are not created by state law, *Winters Rights* retain their validity and seniority regardless of whether tribes have put the water to *Beneficial Use*. On-going conflicts concerning this ruling tend to involve non-Indian water users appropriating water under state law, water that previously may have been reserved for Indian tribes, though never quantified by courts or fully used on reservations. Also see *Reservation Doctrine*, *Reserved Rights Doctrine*, and *Winters Doctrine*, *Practically Irrigable Acreage (PIA)*, *(Prior) Appropriation Doctrine*, and *Water Law [Federal]*.

Wire-to-Water Efficiency — The efficiency of a pump and motor together. Also referred to as the *Overall Efficiency*.

Wisconsin — (Geology) Of or relating to one of the glacial stages of the *Pleistocene* epoch which occurred in North America, which consisted of the *Nebraskan* (first stage), *Kansan* (second stage), *Illinoian* (third stage), and *Wisconsin* (fourth stage).

Witch — To use a divining rod to find underground water or minerals; *Dowse*.

Withdrawal, Water — Water diverted from the ground or diverted from a surface-water source for use. It may be *Consumptively* or *Nonconsumptively* used, *beneficially* or *nonbeneficially* used, or returned in part for reuse. See also *Consumptive Use*, *Nonconsumptive Use*, and *Beneficial Use*.

Withdrawal Use — Use which requires that the water be removed from the ground or diverted from a stream or lake. This type includes irrigation, domestic, stock, public supply, electric power and industrial uses. The quantity of water withdrawn at a designated place for use is variously referred to as *pumpage*, *water intake*, *duty of water*, or *water requirement*.

Woodland — (1) Any land used primarily for growing trees and shrubs. Woodland includes, in addition to what is ordinarily termed “forest” or “forest plantations”, shelterbelts, windbreaks, wide hedge rows containing woodland species for wildlife food or cover, stream and other banks with woodland cover, etc. Also includes farmland and other lands on which woody vegetation is to be established and maintained. (2) An area or biotic community dominated by widely-spaced trees of short stature growing on warm, dry sites. In the Southwest United States, common woodland species are oak, pinyon, and juniper; these woodlands usually occur below 8,000 feet elevation.

Woodland Management — The management of *Woodlands* and plantations that have passed the establishment stage, including all measures designed to improve the quality and quantity of woodland growing stock and to maintain litter and herbaceous ground cover for soil, water, and other resource conservation. Some of these measures are planting, improvement cutting, thinning, pruning, slash disposal, and protection from fire and grazing.

Woody Debris — Coarse wood material such as twigs, branches, logs, trees, and roots that fall into streams.

Woody Plant — A seed plant (*Gymnosperm* or *Angiosperm*) that develops persistent, hard, fibrous tissues, basically xylem; e.g., trees and shrubs.

“Worst Drought of Record” — The series of (water) years when water supply and hydrologic conditions represented the least ever recorded.

WRID — See *Walker River Irrigation District (WRID) [Nevada]*.

Wringer — One that wrings, especially a device in which laundry is pressed between rollers to extract water.