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B-Horizon — (1) The lower soil zone which is enriched by the deposition or precipitation of material from the overlying zone, or *A-Horizon*. (2) A mineral horizon of a soil, below the A-horizon, sometimes called the *Zone of Accumulation* and characterized by one or more of the following conditions: an illuvial accumulation of humus or silicate clay, iron, or aluminum; a residual accumulation of sesquioxides or silicate clays; darker, stronger, or redder coloring due to the presence of sesquioxides; a blockly or prismatic structure. Along with the A-horizon soil zone, these two zones constitute part of the *Zone of Eluviation*.

Babble — To make a continuous low, murmuring sound, as flowing water.

BAC — See *Biological Activated Carbon (BAC) Process*.

Backbar Channel — A channel formed behind a bar connected to the main channel but usually at a higher bed elevation than the main channel. Backbar channels may or may not contain flowing or standing water.

Backfill, or Backfilling — process of filling the notches carved in the earth from strip mining in order to restore the original slope. This is intended to reduce soil erosion and allow for the reestablishment of vegetation.

Backflow — (1) The backing up of water through a conduit or channel in the direction opposite to normal flow. (2) The undesirable flow of water from a plumbing system back into the community potable water supply (3) A reverse flow condition created by a difference in water pressures that causes water to flow back into the distribution pipes of a drinking water supply from any source other than the intended one. Backflow prevention assemblies prevent contamination and are required by city and state laws. Also referred to as *Back Siphonage*.

Backflow Preventer — A device that allows liquids to flow in only one direction in a pipe. Backflow preventers are used on sewer pipes to prevent a reverse flow during flooding situations. Also referred to as a *Check Valve*.

Back Lands — Generally refers to lands lying back from and not contiguous to a highway or water course.

Back Pressure — A pressure that can cause water to *Backflow* into the water supply when a user's waste water system is at a higher pressure than the public system.

Back Siphonage — A reverse flow condition created by a difference in water pressures that causes water to flow back into the distribution pipes of a drinking water supply from any source other than the intended one. Also referred to as *Backflow*.

Back Swamp — Marshy area of a flood plain at some distance from and lower than the banks of a river confined by natural levees.

Backrush — The seaward return of water after the landward motion of a wave. Also referred to as *Backwash*.

Backset — An eddy or countercurrent in water.

Backshore — The part of a shore between the *Foreshore* and the landward edge that is above high water except in the most severe storms.

Backslope — The slope component that is the steepest, straight then concave, or merely concave middle portion of an erosional slope.

Backwash — (1) A backward flow of water, also referred to as *Backrush*. (2) (Water Quality) The reversal of flow through a rapid sand filter to wash clogging material out of the filtering medium and reduce conditions causing loss of head (pressure).

Backwashing — In a wastewater or water treatment facility, the flow of clean water in a direction opposite (upward) to the normal flow of raw water through rapid sand filters in order to clean them.

Backwater — (1) A small, generally shallow body of water attached to the main channel, with little or no current of its own. (2) Water backed up or retarded in its course as compared with its normal or natural condition of flow. In *Stream Gaging*, a rise in *Stage* produced by a temporary obstruction such as ice or weeds, or by the flooding of the stream below. The difference between the observed stage and that indicated by the *Stage-Discharge Relation*, is reported as backwater.

Backwater Curve — The longitudinal profile of the water surface in an open channel where the water surface is raised above its normal level by a natural or artificial obstruction. The term is sometimes used in a generic sense to denote all water surface profiles, or profiles where the water is flowing at depths greater than critical.

Backwater Effect — The rise in surface elevation of flowing water upstream from and as a result of an obstruction

to flow such as a narrow bridge opening, buildings or fill material that limits the area through which the water must flow. In stream gaging, a rise in stage produced by a temporary obstruction such as ice or weeds, or by the flooding of the stream below. The difference between the observed stage and that indicated by the stage-discharge relation is reported as backwater. Also referred to as heading up.

Backwater Flooding — Flooding caused by a restriction or blocking of flow downstream. Examples include a narrowing of the channel, logjam, ice jam, high flow in a downstream confluence stream, or high tide blocking high river flows from entering estuaries.

Backwater Pools — A pool type formed by an eddy along channel margins downstream from obstructions such as bars, rootwads, or boulders, or resulting from backflooding upstream from an obstructional blockage. Backwater pools are sometimes separated from the channel by sand or gravel bars.

Bacteria (Singular: Bacterium) — (1) Microscopic one-celled organisms which live everywhere and perform a variety of functions. While decomposing organic matter in water, bacteria can greatly reduce the amount of oxygen in the water. They also can make water unsafe to drink. (2) Microscopic unicellular organisms, typically spherical, rod-like, or spiral and threadlike in shape, often clumped into colonies. Some bacteria cause disease, while others perform an essential role in nature in the recycling of materials, for example, decomposing organic matter into a form available for reuse by plants. Some forms of bacteria are used to stabilize organic wastes in wastewater treatment plants, oil spills, or other pollutants. Disease-causing forms of bacteria are termed “pathogenic.” Some forms of bacteria harmful to man include:

- [1] **Total Coliform Bacteria** – A particular group of bacteria that are used as indicators of possible sewage pollution. They are characterized as aerobic or facultative anaerobic, gram-negative, nonspore-forming, rod-shaped bacteria which ferment lactose with gas formation within 48 hours at 3°C. In the laboratory these bacteria are defined as all the organisms that produce colonies with a golden-green metallic sheen within 24 hours when incubated at 35°C plus or minus 1.0°C on M-Endo medium (nutrient medium for bacterial growth). Their concentrations are expressed as numbers of colonies per 100 milliliter (ml) of sample.
- [2] **Fecal Coliform Bacteria** – Bacteria that are present in the intestine or feces of warm-blooded animals. They are often used as indicators of the sanitary quality of the water. In the laboratory they are defined as all the organisms that produce blue colonies within 24 hours when incubated at 44.5°C plus or minus 0.2°C on M-FC medium (nutrient medium for bacterial growth). Their concentrations are expressed as numbers of colonies per 100 ml of sample.
- [3] **Fecal Streptococcal Bacteria** – Bacteria found also in the intestine of warm-blooded animals. Their presence in water is considered to verify fecal pollution. They are characterized as gram-positive, cocci bacteria which are capable of growth in brain-heart infusion broth. In the laboratory they are defined as all the organisms that produce colonies which produce red or pink colonies within 24 hours at 35°C plus or minus 1.0°C on KF-streptococcus medium (nutrient medium for bacterial growth). Their concentrations are expressed as numbers of colonies per 100 ml of sample.

Bacterial Plate Count — A system used to quantify the number of bacteria in a sample of solid or liquid material by measuring the growth of bacterium into full colonies.

Bactericidal — Able to kill bacteria.

Bacteriostatic — A substance that inhibits bacterial growth but is not necessarily lethal.

Badlands — Barren land characterized by roughly eroded ridges, peaks, and mesas.

Baffle — A flat board or plate, deflector, guide, or similar device constructed or placed in flowing water or slurry systems to cause more uniform flow velocities to absorb energy and to divert, guide, or agitate liquids.

Bag of Waters — The double-walled fluid-filled sac that encloses and protects the fetus in the womb and that breaks releasing its fluid during the birth process

Bail — To remove water, as from the bottom of a boat or other vessel.

Bailer — An instrument such as a long pipe with a valve at the lower end used to extract a water sample from a groundwater well. Also used to remove slurry from the bottom or side of a well as it is being drilled.

Bajada — (1) A long outwash detrital (sedimentary) slope at the base of a mountain range. (2) A broad, continuous alluvial slope or gently inclined detrital surface, extending along and from the base of a mountain range out into and around an inland basin, formed by the lateral coalescence of a series of separate but confluent alluvial fans, and having an undulating character due to the convexities of the component fans. It occurs most commonly in semiarid and desert regions, as in the southwestern United States. A bajada is a surface of deposition, as contrasted a pediment (a surface of erosion that resembles a bajada in surface form), and its top often merges with a pediment.

Balanced Operation — Operation of a canal system where the water supply exactly matches the total flow demand.

- Balanced Groundwater Scenario (BGS)** — A term referring to the development of a scenario exploring changes in cropping patterns such that long-term ground water withdrawals do not exceed long-term groundwater recharge rates. Also see *Agricultural Restructuring Scenario (ARS)*, *Ground Water Overdraft*, and *Ground Water Mining*.
- Ball Cock** — A self-regulating device controlling the supply of water in a tank, cistern, or toilet by means of a float connected to a valve that opens or closes with a change in water level.
- Ball Valve** — A valve regulated by the position of a free-floating ball that moves in response to fluid or mechanical pressure.
- Ballast** — Heavy material, often seawater, placed in the hold of a ship to gain stability. Periodic discharges of this ballast water from oil tankers constitute a significant portion of the oil introduced into the oceans of the world each year.
- Ballena** — A major landform comprising distinctively round topped ridgeline remnants of fan alluvium. The ridge's broadly rounded shoulders meet from either side to form a narrow crest and merge smoothly with the concave backslopes. In ideal examples, the slightly concave footslopes of adjacent ballenas merge to form a smoothly rounded drainage way.
- Bank, and Banks** — The slope of land adjoining a body of water, especially adjoining a river, lake, or a channel. With respect to flowing waters, banks are either right or left as viewed facing in the direction of the flow. As *Banks*, a large elevated area of a sea floor.
- Bank and Channel Stabilization** — Implementation of structural features along a streambank to prevent or reduce bank erosion and channel degradation.
- Bankfull Channel** — The stream channel that is formed by the dominant discharge, also referred to as the active channel, which meanders across the floodplain as it forms pools, riffles, and point bars.
- Bankfull Discharge** — See *Dominant Discharge*.
- Bankfull Stage** — The stage at which a stream first begins overflows its natural banks. More precisely, an established river stage at a given location along a river which is intended to represent the maximum safe water level that will not overflow the river banks or cause any significant damage within the river reach. Bankfull stage is a hydraulic term, whereas *Flood Stage* implies resultant damage.
- Banking (Water)** — See *Water Banking*.
- Bank Storage** — The water absorbed into the banks of a stream, lake, or reservoir, when the stage rises above the water table in the bank formations, then returns to the channel as effluent seepage when the stage falls below the water table. Bank storage may be returned in whole or in part as seepage back to the water body when the level of the surface water returns to a lower level.
- Baptism** — (1) A Christian sacrament marked by ritual use of water and admitting the recipient to the Christian community; (2) A non-Christian rite using water for ritual purification.
- Bar** — (1) A sand or gravel deposit found on the bed of a stream that is often exposed during low-water periods. (2) An elongated landform generated by waves and currents, usually running parallel to the shore, composed predominantly of unconsolidated sand, gravel, stones, cobbles, or rubble and with water on two sides. (3) A component landform comprised of elongate, commonly curving, low ridges of well sorted sand and gravel that stand above the general level of a *Bolson* floor and were built by the wave action of a Pleistocene lake. (4) A unit of pressure equal to 10^6 dynes per cm^2 , 100 kilopascals, or 29.53 inches of mercury.
- Barothermograph** — An instrument which records simultaneous barometric pressure and temperature on the same chart.
- Bar Racks** — (Water Quality) The closely spaced rods, often in the form of a screen, that remove large solids from the wastewater entering a sewage treatment plant.
- Bar Screen** — (Water Quality) In wastewater treatment, a device used to remove large solid materials.
- Barrage** — An artificial obstruction, such as a dam or an irrigation channel, built in a watercourse to increase its depth or to divert its flow either for navigation or irrigation. Sometimes the purpose is to control peak flow for later release.
- Barrel** — (1) A measure of liquid volume (conventionally) equal to 42 U.S. gallons (34.9723 Imperial gallons), or 158.9873 liters. (2) Any of various units of volume or capacity. In the U.S. Customary System, it varies, as a liquid measure, from 31 to 42 U.S. gallons (approximately 120 to 159 liters) as established by law or usage.
- Bartlett Decree [Nevada]** — The Bartlett Decree was issued on January 2, 1931 by Judge George A. Bartlett and adjudicated water rights along the Humboldt River and its tributaries. In addition to adjudicating the river system's water rights, this decree also recognized that the surface waters within the Humboldt River system were already fully appropriated, leaving no surplus water for irrigation during an average, or normal water year. Another important finding of the Bartlett Decree recognized the differences in growing seasons between the Humboldt

River's upper basin and its lower basin and therefore divided the river system into two districts, District No. 1 below Palisade (USGS gaging station 10322500) and District No. 2 above Palisade. The Bartlett Decree also recognized the seasonal and ephemeral nature of many streams within the Humboldt River Basin through the concept of "flash streams" and the special need to accommodate water appropriators along such stream systems. These water courses were defined as streams "that have a sudden or flash flow or flush flow for a comparatively brief period of time, while such stream is draining the particular basin or source of supply fed by melting snows... These flash streams in varying degrees are typical of the necessity of cumulating the flow during the flush for the particular rights to be served. Where lands are entitled to irrigation from such flash streams, they must be served at the times when the water is available." The Bartlett Decree established three classes of lands with different irrigation requirements (water duties) and irrigation periods (both with respect to the number of days of allowable irrigation and the specific periods of irrigation). These irrigable land classes included: (1) Harvest crop lands (Class A) – all lands devoted to cultivated crops, including irrigated native or other grass lands which normally receive sufficient water to produce a crop which will justify cutting for hay, although it may sometimes be pastured and not cut; (2) Meadow pasture lands (Class B) – all grass lands free from brush which receive sufficient water to produce what may be classed as good pasture, but not sufficient to warrant cutting for hay; and (3) Diversified pasture lands (Class C) – all lands from which the brush has not been cleared but which are artificially irrigated to some extent for the production of grasses for pasturage. Further, the irrigation periods within the Humboldt River system varied by both the class of the land and whether it was in District No. 1 (below Palisade) or District No. 2 (above Palisade). Due to extensive review and corrections of the written findings by Judge Bartlett, the final Bartlett Decree would not be entered until October 20, 1931. The Bartlett Decree was subsequently modified by the *Edwards Decree*. With respect to adjudication of the Humboldt River, also see *Carville Decree*.

Basalt — (Geology) A dark volcanic rock composed of microscopic grains of augite, feldspar, and olivine. Some basalts have many holes that give the rock a swiss-cheese-like appearance. As the lava cools, gases escape, leaving holes of different sizes.

Basalt Aquifers — Aquifers found in basalt rock in areas of past volcanic activity, particularly in the Pacific Northwest region of the United States and in Hawaii.

Base — (1) Any of various typically water-soluble and bitter tasting compounds that in solution have a pH greater than 7, are capable of reacting with an acid to form a salt, and are molecules or ions able to take up a proton from an acid or able to give up an unshared pair of electrons to an acid. (2) Chemicals that release hydroxide ions (OH^-) in solution. Such solutions have a soapy feel, neutralize acids, and conduct electricity.

Base Flood (100-Year Flood) — The flood having a 1 percent average probability of being equaled or exceeded in a given year at a designated location. It may occur in any year or even in successive years if the hydrologic conditions are conducive for flooding. Also see *Hundred-Year Flood*, *X-Year Flood*, and *X-Year Flood, Y-Duration Rain*.

Base Flood (FEMA) — A term used in the *National Flood Insurance Program (Federal Emergency Management Agency)* to indicate the minimum size flood to be used by a community as a basis for its floodplain management regulations; presently required by regulation to be that flood which has a one-percent chance of being equaled or exceeded in any given year. Also known as a *100-Year Flood* or *One-Percent Chance Flood*.

Base Flood Elevation (BFE) — (1) The height in relation to mean sea level (MSL) expected to be reached by the waters of the *Base Flood* at specific points in the floodplain of *Riverine* areas. (2) The elevation for which there is a one-percent chance in any given year that flood levels will equal or exceed it. (3) The elevation shown on the Flood Insurance Rate Map (FIRM) for Zones AE, AH, A1-A30, AR, AR/A, AR/AE, AR/A1-A30, AR/AH, AR/AO, V1-V30, and VE that indicates the water surface elevation resulting from a flood that has a 1-percent or greater chance of being equaled or exceeded in any given year. The BFE is generally based on statistical analysis of stream flow records for the watershed and rainfall and runoff characteristics in the general region of the watershed, and application of hydraulic backwater models.

Base Floodplain — The floodplain that would be inundated by a *One-Percent Chance Flood (100-Year Flood)*.

Base Flow — (1) The flow that a perennially flowing stream reduces to during the dry season. It is supported by groundwater seepage into the channel. (2) The fair-weather or sustained flow of streams; that part of stream discharge not attributable to direct runoff from precipitation, snowmelt, or a spring. Discharge entering stream channels as effluent from the groundwater reservoir. (3) The volume of flow in a stream channel that is not derived from surface run-off. Base flow is characterized by its flow regime (frequency, magnitude, and duration daily, seasonally, and yearly), by minimum low flow events and in context of the size and complexity of the stream and its channel.

Base Level — (1) The elevation to which a stream-channel profile has developed. (2) The lowest level to which a land surface can be reduced by the action of running water.

Base Period — A period of time specified for the selection of data for analysis. The base period should be sufficiently long to contain data representative of the averages and deviations from the averages that must be expected in other periods of similar and greater length. For example, the U.S. Weather Bureau computes values of average, heavy, and light monthly precipitation from data observed during the base period of 1931–1960. For ground-water studies, the base period should both begin and end at the conclusion of a dry trend so that the difference between the amount of water in transit in the soil at the ends of the base period is minimal.

Base Runoff — Sustained or fair weather runoff. In most streams, base runoff is composed largely of ground-water effluent. The term base flow is often used in the same sense as base runoff. However, the distinction is the same as that between streamflow and runoff. When the concept in the terms base flow and base runoff is that of the natural flow in a stream, base runoff is the more appropriate term.

Base Width — (1) The time interval between the beginning and end of the direct runoff produced by a storm. (2) The time period covered by a *Unit Hydrograph*.

Baseline — The condition that would prevail if no action were taken.

Baseline (Data) — A quantitative level or value from which other data and observations of a comparable nature are referenced. Information accumulated concerning the state of a system, process, or activity before the initiation of actions that may result in changes.

Basic — Describing a solution, sediment, or other material that has a pH greater than 7.0.

Basic Hydrologic Data — Includes inventories of features of land and water that vary only from place to place (e.g., topographic and geologic maps), and records of processes that vary with both place and time (e.g., records of precipitation, streamflow, ground-water, and quality-of-water analyses). *Basic Hydrologic Information* is a broader term that includes surveys of the water resources of particular areas and a study of their physical and related economic processes, interrelations and mechanisms.

Basin — (1) (Hydrology) A geographic area drained by a single major stream; consists of a drainage system comprised of streams and often natural or man-made lakes. Also referred to as *Drainage Basin*, *Watershed*, or *Hydrographic Region*. See *Basins [Nevada]*. (2) (Irrigation) A level plot or field, surrounded by dikes, which may be flood irrigated. (3) (Erosion Control) A catchment constructed to contain and slow runoff to permit the settling and collection of soil materials transported by overland and rill runoff flows. (4) (Nautical) A naturally or artificially enclosed harbor for small craft, such as a yacht basin.

Basin and Range [Nevada] — A region of north-trending mountains ranges and valleys encompassing western Utah and essentially all of Nevada. This geologic territory includes virtually all of the *Great Basin* and extends south and east through Arizona, New Mexico, and Texas all the way into Mexico. The Basin and Range can be differentiated from its surrounding geologic regions by its uplifted and tilted ranges separated by broad elongated basins. The Great Basin forms a unique part of this geologic region in as much as this hydrologic area has no drainage to the ocean.

Basin Fill — Unconsolidated material such as sand, gravel, and silt eroded from surrounding mountains and deposited in a valley.

Basin Floor — A generic term for the nearly level, lowermost major physiographic part of intermontane basins, i.e., of both *Bolsons* and semi-bolsons. The floor includes all of the alluvial, eolian, and erosional landforms below the piedmont slope.

Basin-Floor Remnant — A flattish topped, erosional remnant of any former landform of a basin floor that has been dissected following the incision of an axial stream.

Basin Lag — (1) The time from the centroid (centermost point in time based on total period rainfall) of rainfall to the hydrograph peak. (2) The time from the centroid of rainfall to the centroid of the *Unit Hydrograph*.

Basin Management (of Water) — Also referred to as *Water or Watershed Management*, it is 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 man. Basin management for water production is concerned with the quality, quantity, and timing of the water which is produced.

Basin of Origin — The area (hydrographic region or area) from in surface waters naturally occur or from which groundwater is removed.

Basin Yields — The amount of water which will flow from a drainage or catchment area in a given storm.

Basins [Nevada] — The *U.S. Geological Survey (USGS)* and the *Nevada Division of Water Resources, Department of Conservation and Natural Resources*, have divided the state into discrete hydrologic units for water planning and management purposes. These have been identified as *232 Hydrographic Areas* (256 areas and sub-areas,

combined) within 14 major *Hydrographic Regions* or *Basins*. These 14 Nevada Hydrographic Regions (Basins), along with the approximate surface areas (Nevada only), counties of coverage, extension into adjoining states, and number of hydrographic areas and sub-areas are:

- [1] **Northwest Region** – Covers 3,052 square miles (7,905 square kilometers or 1,953,280 acres) of northern Washoe and Humboldt counties and encompasses 16 hydrographic areas; also extends into the State of California to the west and the State of Oregon to the north;
- [2] **Black Rock Desert Region** – Covers 8,632 square miles (22,357 square kilometers or 5,524,480 acres) of parts of Washoe, Humboldt, and Pershing counties and includes 17 valleys (hydrographic areas), two of which are divided into two hydrographic sub-areas each; also extends into the State of California to the west and the State of Oregon to the north;
- [3] **Snake River Basin** – Covers 5,230 square miles (13,546 square kilometers or 3,347,200 acres) in parts of Elko and Humboldt counties to include eight hydrographic areas; also extends into the states of Oregon and Idaho to the north and the State of Utah to the east;
- [4] **Humboldt River Basin** – Covers over 16,843 square miles (43,623 square kilometers or 10,779,520 acres) in parts of eight counties – Elko, White Pine, Eureka, Humboldt, Lander, Nye, Pershing, and Churchill – and the largest stream (Humboldt River) wholly within Nevada. This basin contains 34 hydrographic areas and one hydrographic sub-area; this basin is one of only two that are wholly contained within the State of Nevada;
- [5] **West Central Region** – Covers 1,656 square miles (4,289 square kilometers or 1,059,840 acres) and includes parts of Pershing, Lyon, and Churchill counties and comprises five hydrographic areas; this basin is one of only two that are wholly contained within the State of Nevada;
- [6] **Truckee River Basin** – Encompasses 2,300 square miles (5,957 square kilometers or 1,472,000 acres) containing parts of Washoe, Pershing, Churchill, Lyon, Douglas, Carson City, and Storey counties comprising 12 hydrographic areas; has its origin to the west in the State of California;
- [7] **Western Region** – Covers 602 square miles (1,559 square kilometers or 385,280 acres) and is wholly contained in Washoe County and contains nine valleys (hydrographic areas) one of which is divided into two sub-areas and another divided into one hydrographic sub-area; also extends to the west into the State of California;
- [8] **Carson River Basin** – Covers 3,519 square miles (9,114 square kilometers or 2,252,160 acres) and includes parts of six counties – Douglas, Carson City, Lyon, Storey, Churchill, and Pershing – containing five hydrographic areas and one hydrographic sub-area along the Carson River and its tributaries; has its origin to the west in the State of California;
- [9] **Walker River Basin** – Covers 3,046 square miles (7,889 square kilometers or 1,949,440 acres) of Mineral, Lyon, and Douglas counties (and a very small portion of Churchill County) including five hydrographic areas, one of which has been divided into three hydrographic sub-areas; has its origin to the west in the State of California;
- [10] **Central Region** – By far the largest hydrographic region in Nevada covering 46,783 square miles (121,167 square kilometers or 29,941,120 acres) in 13 counties – Nye, Elko, White Pine, Lincoln, Clark, Humboldt, Pershing, Churchill, Lander, Eureka, Lyon, Mineral, and Esmeralda. This region includes 78 valleys (hydrographic areas), 10 of which are divided into two hydrographic sub-areas and one into three hydrographic sub-areas; extends to the south and west into the State of California;
- [11] **Great Salt Lake Basin** – Covers 3,807 square miles (9,860 square kilometers or 2,436,480 acres) of the easternmost portions of Elko, White Pine, and Lincoln counties. It consists of eight hydrographic areas, one of which is divided into four hydrographic sub-areas; extends to the east into the State of Utah;
- [12] **Escalante Desert Basin** – This basin covers a large area in Utah but only a very small part of it is in Lincoln County – 106 square miles (275 square kilometers or 67,480 acres) – and is made up of only one hydrographic area; extends to the east into the State of Utah;
- [13] **Colorado River Basin** – Covers 12,376 square miles (32,054 square kilometers or 7,920,640 acres) including parts of Clark, Lincoln, Nye, and White Pine counties and is divided into 27 hydrographic areas; extends to the south into the State of California, borders the Colorado River to the east and south, and extends into the states of Arizona and Utah to the east;
- [14] **Death Valley Basin** – Covers 2,593 square miles (6,716 square kilometers or 1,659,520 acres) of Nye and Esmeralda counties including eight hydrographic areas, one of which has been divided into two hydrographic sub-areas; extends into the State of California to the south and west.

[A listing of Nevada's Hydrographic Regions, Areas and Sub-Areas is presented in Appendix A-1 (hydrographic

regions, areas and sub-areas), Appendix A-2 (listed sequentially by area number) Appendix A-3 (listed alphabetically by area name), and Appendix A-4 (listed alphabetically by principal Nevada county(ies) in which located).]

- Bath** — The act of soaking or cleansing a body, as in water or steam. Also, the water used for such cleansing.
- Bathe** — (1) To take a bath or go into the water for swimming or other recreation. (2) To become immersed in or as if in liquid; to seem to wash or pour over; suffuse.
- Batholith** — A mass of *Igneous* rock that forms intrusively and can rise to the surface.
- Bathing Water** — Water in swimming pools or natural fresh or marine waters used for swimming.
- Bathometer** — An instrument used to measure the depth of water.
- Bathtub Effect** — The accumulation of *Leachate* in a landfill containing a good liner, but not equipped with a leachate collection and removal system.
- Bathyal Zone** — The ocean stratum beneath the *Euphotic Zone* and above the *Abyssal Zone*, or to the bottom of the *Continental Shelf*. The density of life in this zone depends on organic material settling from the euphotic zone and is generally inversely proportional to the depth.
- Bathymetric Map** — A map showing the depth of water in lakes, streams, or oceans.
- Bathymetry** — (1) The measurement of the depth of large bodies of water. (2) The measurement of water depth at various places in a body of water. Also the information derived from such measurements.
- Bathyscaphe** — A free-diving, self-contained deep-sea research vessel consisting essentially of a large flotation hull with a crewed observation capsule fixed to its underside, capable of reaching depths of 10 kilometers (6.2 miles) or more.
- Bathysphere** — A reinforced spherical deep-diving chamber in which persons are lowered by a cable to study the oceans. The bathysphere, limited to depths of about 900 meters (3,000 feet), has been supplanted by the safer and more navigable *Bathyscaphe*.
- Bathythermograph** — An instrument designed to record water temperature as a function of depth.
- Baumé** — Being, calibrated in accordance with, or according to either of two arbitrary hydrometer scales for liquids lighter than water or for liquids heavier than water that indicate specific gravity in degrees.
- Bay** — A part of a sea or lake, indenting the shoreline; a wide inlet not so large as a *Gulf*.
- Bay-Delta [California]** — Refers to the region encompassing the Sacramento-San Joaquin river delta system forming a basically delta or triangular structure extending from south Sacramento in the north to below Stockton in the south to the San Francisco Bay in the west. The Bay-Delta is the largest remaining *Estuarine* system on the West Coast of the United States. The Bay-Delta contains approximately 738,000 total acres (1,153 square miles) interlaced with hundreds of miles of water waterways. Of this total area, 520,000 acres are in agriculture, 35,000 acres are contained in cities and towns, 50,000 acres are covered with water, and 133,000 acres remain undeveloped. The gross value of the Bay-Delta's agricultural production totals over \$500 million per year. Deep water ship channels run through the Bay-Delta and connect both Sacramento and Stockton to the San Francisco Bay and the Pacific Ocean. As much of the Bay-Delta's land area is up to 21 feet below the water level, waters flowing throughout this system are controlled by over 1,100 miles of levees. Rivers flowing into the Bay-Delta include the Sacramento, San Joaquin, Mokelumne, Cosumnes, and Calaveras, which, along with their tributaries, carry 47 percent of California's total surface runoff. The Bay-Delta serves as the major collection point for the water that serves over two-thirds of California's total population. Along with associated pumping facilities, the Bay-Delta provides the source waters for a number of major water development projects to include the California Aqueduct, the Central Valley Project's Delta-Mendota Canal, the Contra Costa Canal, and the North and South Bay Aqueducts. Within the Bay-Delta system may be found extensive populations of fauna and flora to include 230 species of birds, 45 species of mammals, 52 species of fish, 25 species of reptiles and amphibians, and 150 species of flowering plants. Major *Anadromous* fish using the Bay-Delta include Salmon, Striped Bass, Steelhead Trout, American Shad, and Sturgeon. Also referred to as the *Sacramento-San Joaquin Delta*. Also see *Central Valley Project (CVP) [California]* and *State Water Project (SWP) [California]*.
- Bayesian Inference** — (Statistics) Bayes' theorem recognizes that a decision maker usually has some expectation (an *a priori* model) of what will occur even before acquiring information, and provides a procedure for using new evidence to produce a revised *a posteriori* estimate of probability. Also see *Statistical Inference* and *Classical Inference*.
- Bayou** — In general, a creek, secondary watercourse, or minor river, tributary to another river or other body of water. A term regularly used in the lower Mississippi River basin and in the Gulf-coast region of the United States to denote a large stream or creek, or small river, characterized by a slow or imperceptible current through alluvial lowlands or swamps. May also refer to an estuarial creek or inlet on the Gulf coast; a small bay, open cove, or

harbor; also, a lagoon, lake or bay, as in a sea marsh or among salt-marsh islands.

Beach — (1) A sloping landform on the shore of larger water bodies, generated by waves and currents and extending from the water to a distinct break in landform or substrate type (e.g., a foredune, cliff, or bank.) (2) A generic term for offshore bars, barrier bars, and beach terraces. (3) To run a ship up onto a beach or shore.

Beach Erosion — The carrying away of beach materials by wave action, tidal currents, or littoral currents, or by wind.

Beach Plain — A major landform of *Bolson* floors comprised of numerous, closely spaced offshore bars and intervening lagoons built by a receding Pleistocene lake.

Beach, Public — Beach dedicated by a governmental body to the common use of the public, which the unorganized public and each of its members have a right to use while it remains so designated.

Beach Terrace — A component landform occurring on the lower piedmont slope that consists of a wave-cut scarp and a wave-built terrace of well sorted sand and gravel marking a still-stand of a Pleistocene lake.

Bead — A small, round object, especially a drop of moisture, as beads of sweat.

Beaufort's Scale — (Meteorology) A scale devised by Sir F. Beaufort, Royal Navy, in 1805, in which the strength of the wind is indicated by numbers from 0 to 12. The corresponding terms are: calm [0], light air [1], light breeze [2], gentle breeze [3], moderate breeze [4], fresh breeze [5], strong breeze [6], moderate gale [7], fresh gale [8], strong gale [9], whole gale [10], storm [11], hurricane [12]. Also see *Wind Scale*.

Bed — (1) The bottom of a body of water, such as a stream. (2) An underwater or intertidal area in which a particular organism is established in large numbers. (3) (Geology) A rock mass of large horizontal extent bounded, especially above, by physically different material (as in *Bedrock*).

Bedew — To wet with or as if with *Dew*.

Bed Load — (1) Sediment particles up to rock, which slide and roll along the bottom of the streambed. (2) Material in movement along a stream bottom, or, if wind is the moving agent, along the surface. (3) The sediment that is transported in a stream by rolling, sliding, or skipping along or very close to the bed. In USGS reports, bed load is considered to consist of particles in transit from the bed to an elevation equal to the top of the bed-load sample nozzle (usually within 0.25 feet of the streambed). Contrast with material carried in *Suspension* or *Solution*.

Bed Load Discharge — The quantity of sediment, typically measured in tons per day, that is moving as bed load, reported as dry weight, that passes a cross section in a given time.

Bed Material — The sediment mixture of which a streambed, lake, pond, reservoir, or estuary bottom is composed.

Bedrock — (Geology) The solid rock beneath the soil (*Zone of Aeration* or *Zone of Saturation*) and superficial rock. A general term for solid rock that lies beneath soil, loose sediments, or other unconsolidated material.

Bedscarp (Nick Point) — An abrupt change in grade in the bottom of a stream channel that moves progressively upstream; the change in grade forms a waterfall. Also, the location where a streambed is actively eroding downward to a new base level.

Bed Slope — The inclination of the channel bottom.

Beheaded Stream — The lower section of a stream that has lost its upper portion through diversion or *Stream Piracy*.

Bell — A hollow, usually inverted vessel, such as one used for diving deep below the surface of a body of water.

Belt of Soil Moisture — Subdivision of the *Zone of Aeration*. Belt from which water may be used by plants or withdrawn by soil evaporation. Some of the water passes down into the intermediate belt, where it may be held by molecular attraction against the influence of gravity.

Bench Flume — A flume built on constructed benches or terraces along hillsides or around mountain slopes when the ground is too rough or too steep to permit the use of an excavated canal.

Bench Land (Soils) — A general term describing porous and coarse-textured (sandy-gravelly) well-drained soils, overlying a deep water table (if occurring), that exhibits relatively low water holding capacity and rapid infiltration of irrigation water.

Bench Lands [Nevada] — The U.S. Department of the Interior, Bureau of Reclamation criteria (revised 1992) has defined *Bottom Land* for Nevada's *Newlands Irrigation Project*, located in Churchill County, Nevada, as "those lands with a five-foot soil profile having a holding capacity equal to or exceeding 8 inches and/or a water table within 6 feet of the surface for a period equal to or exceeding 150 days. If neither of these factors apply, the land is designated as *Bench Land*." Lands classified as bench (or bottom) according to Bureau of Reclamation criteria, above, will be limited to maximum water deliveries (duty) in accordance to the provision of the *Orr Ditch Decree* and the *Alpine Decree*, which are identical in establishing water duties and establish the following limits: (1) Eligible lands designated as *Bench Lands* may receive a maximum of 4.5 acre-feet per acre per year (AF/acre/year); (2) eligible lands designated as *Bottom Lands* may receive a maximum of 3.5 acre-feet per acre per year (AF/acre/year).

Benchmark — Data used as a base for comparative purposes with comparable data.

Beneficial Use (of Water) — (1) The amount of water necessary when reasonable intelligence and diligence are used for a stated purpose. (2) A use of water resulting in appreciable gain or benefit to the user, consistent with state law, which varies from one state to another. Most states recognize the following uses as beneficial:

- [1] domestic and municipal uses;
- [2] industrial uses;
- [3] irrigation;
- [4] mining;
- [5] hydroelectric power;
- [6] navigation;
- [7] recreation;
- [8] stock raising;
- [9] public parks;
- [10] wildlife and game preserves.

(3) The cardinal principle of the (*Prior Appropriation Doctrine*). A use of water that is, in general, productive of public benefit, and which promotes the peace, health, safety and welfare of the people of the State. A certificated water right is obtained by putting water to a beneficial use. The right may be lost if beneficial use is discontinued. A beneficial use of water is a use which is of benefit to the appropriator and to society as well. The term encompasses considerations of social and economic value and efficiency of use. In the past, most reasonably efficient uses of water for economic purposes have been considered beneficial. Usually, challenges have only been raised to wasteful use or use for some non-economic purpose, such as preserving instream values. Recent statutes in some states have expressly made the use of water for recreation, fish and wildlife purposes, or preservation of the environment a beneficial use. Also see *Appropriative Water Rights*.

Benefit-Cost Ratio — (1) The relationship of the economic benefits of an action to its total costs. (2) An economic indicator of the efficiency of a proposed project, computed by dividing benefits by costs; usually, both the benefits and the cost are discounted, so that the ratio reflects efficiency in terms of the present value of future benefits and costs.

Benthic — (1) The bottom of lakes or oceans. See *Benthic Region*. (2) Referring to organisms that live on the bottom of water bodies. See *Benthic Invertebrates* and *Benthic Organisms*.

Benthic Invertebrates — Aquatic animals without backbones that dwell on or in the bottom sediments of fresh or salt water. Examples are clams, crayfish, and a wide variety of worms.

Benthic Organisms — Those organisms living at or near the bottom of a body of water. They include a number of types of organisms, such as bacteria, fungi, insect larvae and nymphs, snails, clams, and crayfish. They are useful as indicators of water quality. See *Indicator Species*. Also see *Benthic Invertebrates*.

Benthic Region — The bottom of a body of water, supporting the *Benthos*.

Benthos — (1) All the plant and animals living on or closely associated with the bottom of a body of water. (2) Organisms living within a stream's substrate.

Bentonite — A clay material that swells as it dries, filling gaps and sealing itself against a well casing. It is commonly used to seal abandoned dewatering wells at mines. Concrete, by contrast, shrinks as it cures, and can therefore leave gaps around a wellhead casing that can allow contaminated water from the surface to penetrate into the well.

Berg — A mass of floating or stationary ice; and *Iceberg*.

Bernoulli Effect — The phenomenon of internal pressure reduction with increased stream velocity in a fluid. Named after Daniel Bernoulli.

Bernoulli's Equation — Under conditions of steady flow of water, the sum of the velocity head, the pressure head, and the head due to elevation at any given point is equal to the sum of these heads at any other point plus or minus the head losses between the points due to friction or other causes.

Berm — (1) A narrow ledge or path as at the top or bottom of a slope, stream bank, or along a beach. (2) (Dam) A horizontal step or bench in the upstream or downstream face of an *Embankment Dam*.

Best Available Demonstrated Technology (BADT) — The level of effluent limitation technology required by the 1972 *Clean Water Act (CWA)* to be used in setting new source performance standards for new industrial direct dischargers of water pollutants.

Best Available Technology Economically Achievable (BAT) — A national goal under the *Water Pollution Control Act of 1972 (Public Law 92-500)*, commonly referred to as the *Clean Water Act* which provides that industry shall use the best treatment technically and economically achievable for a category or class of point sources. Under this concept, pollution control will consider such factors as the age of the facilities and equipment involved, processes employed, engineering aspects of the control techniques, process changes, cost of the reductions, and environmental

impacts other than water quality, including energy requirements.

Best Conventional Control Technology (BCT) — The level of water pollution control technology required of existing dischargers for the treatment of conventional pollutants by the 1977 *Clean Water Act (CWA)*.

Best Management Practices (BMP) — (1) A generally accepted practice for some aspect of natural resources management, such as water conservation measures, drainage management measures, or erosion control measures. Typically incorporates conservation criteria. (2) A set of field activities that provide the most effective means for reducing pollution from a nonpoint source. (3) Accepted methods for controlling *Non-Point Source (NPS) Pollution* as defined by the 1977 *Clean Water Act (CWA)*; may include one or more conservation practices. Also refers to water conservation techniques of proven value. See, for example, *Best Management Practices (BMP) – Urban Water Use*.

Best Management Practices (BMP)–Urban Water Use — Water conservation measures that generally meet one of two criteria: (1) Constitutes an established and generally accepted practice among water purveyors that provides for the more efficient use of existing water supplies or contributes towards the conservation of water; or (2) Practices which provide sufficient data to clearly indicate their value, are technically and economically reasonable, are environmentally and socially acceptable, are reasonably capable of being implemented by water purveyors and users, and for which significant conservation or conservation-related benefits can be achieved. See Appendix C-1, *Best Management Practices – Urban Water Use*, for a more complete itemization of BMPs and Potential BMPs.

Best Practicable Control Technology (BPT) — A national goal under the *Water Pollution Control Act* of 1972 (*Public Law 92–500*, or the *Clean Water Act*) which provides that industry shall use the best treatment practices practical, with due consideration to cost, age of the plant and equipment, and other factors.

Bias — An error in data gathering or analysis caused by faulty program design, mistakes on the part of personnel, or limitations imposed by available instrumentation or data sources.

Bicarbonate — (Water Quality) A compound containing the HCO_3^- group, for example, sodium bicarbonate (NaHCO_3), which ionizes in solution (water) to produce HCO_3^- . Also see *Carbonate* and *Carbonate Buffer System*.

Biennial Plant — A plant that lives for two years, producing vegetative growth the first year, usually blooming and fruiting in the second year, and then dying.

Bifurcate — Dividing structure which splits the flow of water.

Bilge Water — Water that collects and stagnates in the bilge or bottom-most areas of a ship.

Billabong — (Australian) (1) A dead-end channel extending from the main stream of a river. (2) A streambed filled with water only in the rainy season. (3) A stagnant pool or backwater.

Billow — A large wave or swell of water.

Bimodal Distribution — (Statistics) A collection of observations with a large number of values centered (as in a *Normal Distribution*) around each of two points. For example, in a sampling of the heights of a population, the sample results would tend to be concentrated around an average heights for males and a second average height for females.

Bioaccumulants — Substances that increase in concentration in living organisms as they take in contaminated air, water, or food because the substances are very slowly metabolized or excreted. Also see *Biological Magnification*.

Bioaccumulation — The increase in concentration of a chemical in organisms that reside in environments contaminated with low concentrations of various organic compounds. Also used to describe the progressive increase in the amount of a chemical in an organism resulting from rates of absorption of a substance in excess of its metabolism and excretion.

Bioassay — A method for quantitatively determining the concentration of a substance by its effects on the growth of a suitable animal, plant, or microorganism under controlled conditions.

Biochemical Oxidation — The process by which bacteria and other microorganisms feed on complex organic materials and decompose them. Self-purification of waterways and activated sludge and trickling filter wastewater treatment processes depend on this principle.

Biochemical Oxygen Demand (BOD) — (1) A measure of the quantity of dissolved oxygen, in milligrams per liter, necessary for the decomposition of organic matter by microorganisms, such as bacteria. (2) A measure of the amount of oxygen removed from aquatic environments by aerobic micro-organisms for their metabolic requirements. Measurement of BOD is used to determine the level of organic pollution of a stream or lake. The greater the BOD, the greater the degree of water pollution. Also referred to as *Biological Oxygen Demand (BOD)*.

Biochemical Oxygen Demand (BOD) Loading — (Water Quality) The BOD content, commonly expressed in pounds/day, of wastewater passing into a waste treatment system or a body of water. The greater the BOD content, the greater the degree of pollution.

Biocide — A chemical substance that kills living organisms. Typically used to include materials that can kill desirable

as well as undesirable organisms.

Bioclimatic Zones — Also referred to as *Biomes*, these constitute the earth's ten zones differentiated by climate, soil, water, and plant and animal life. See *Biome*.

Biocoenosis — A community of animal and plant life.

Bioconcentration — (1) The process by which an individual organism directly concentrates a substance from the surrounding air, water, or soil. (2) The increase in concentration of a chemical in an organism resulting from absorption levels exceeding the rate of metabolism and excretion.

Bioconcentration Factor (BCF) — Used to describe the accumulation of chemicals in aquatic organisms that live in contaminated environments. Also see *Bioconcentration*.

Bioconcentration Potential (BCP) — The maximum concentration of a chemical in an organism resulting from the rate of absorption equaling the rate of metabolism and excretion.

Bioconversion — The conversion of organic materials, such as plant or animal waste, into usable products or energy sources by biological processes or agents, such as certain microorganisms.

Biodegradable — Capable of being decomposed by biological agents or microorganisms, especially bacteria. The property of a substance that permits it to be broken down by micro-organisms into simple, stable compounds such as carbon dioxide and water.

Biodegradation — The metabolic breakdown of materials into simpler components by living organisms. A more specific form of *Biotransformation*.

Biodenitrification — The controlled use of microbes, usually bacteria, to reduce level of nitrates (NO_3^-) and thereby reclaim contaminated water or wastewater. The process consists of several stages to decompose the nitrates first into nitrites and then into nitrogen gas, N_2 . Upon entering the treatment process, sodium sulfite (Na_2SO_3) is added as a reducing agent to the wastewater to remove the oxygen from the water. To break down the nitrates, the bacteria must have a carbon food source and typically ethanol is added for the bacteria to feed on. In order to survive, however, the bacteria need oxygen which they obtain by breaking down the nitrate ions, first to nitrite and then to harmless nitrogen gas. Also referred to as *Endogenous Respiration*.

Biodisc — (Water Quality) A large rotating cylinder possessing surface features that allow for the growth of attached microorganisms. The cylinder revolves and contacts the wastewater along one side while the other side is exposed to air, thereby maximizing the oxygenation of the water and stimulating decomposition of dissolved or suspended organic material.

Biodiversity — (1) The variety of life and its processes. Biodiversity includes the diversity of landscapes, communities, and populations (genetic variation). Also called *Biological Diversity* or *Biotic Diversity*. (2) Refers to the variety and variability of life, including the complex relationships among microorganisms, insects, animals, and plants that decompose waste, cycle nutrients, and create the air that we breathe. Diversity can be defined as the number of different items and their relative frequencies. For biological diversity, these items are organized at many levels, ranging from complete *Ecosystems* to the biochemical structures that are the molecular basis of heredity. Thus, the term encompasses different ecosystems, species, and genes. It is generally accepted that human survival is dependent upon the conservation and preservation of this diversity of life forms. Typically five levels of biodiversity are recognized:

- [1] **Genes** – Genetic diversity encompasses the variety of genetically coded characteristics of plant and animal populations;
- [2] **Populations** – Groups of individuals of a species that interbreed or interact socially in an area;
- [3] **Species** – The level at which most organisms are recognizable as distinct from all others;
- [4] **Natural Communities** – Groups of species that typically occur in recognizable units, such as redwood forests, coastal sage scrub, or oak woodlands. A natural community includes all the vegetation and animal life, and their interactions within that community; and
- [5] **Ecosystems** – A collection of natural communities. An ecosystem can be as small as a rotting log or a puddle of water, but current management efforts typically focus on larger landscape units, such as a mountain range, a river basin, or a watershed.

Biofouling — The gradual accumulation of waterborne organisms (as bacteria and protozoa) on the surfaces of engineering structures in water that contributes to corrosion of the structures and to a decrease in the efficiency of moving parts.

Biogas — Methane gas produced during the *Anaerobic* decomposition of the remains of plants or animal wastes by bacteria.

Biogenic — Used to describe changes in the environment resulting from the activities of living organisms.

Biogeochemical Cycling — The flow of chemical substances to and from the major environmental reservoirs:

Atmosphere, Hydrosphere, Lithosphere, and Biosphere. As chemicals move in the cycle, they often change chemical form, usually existing in a characteristic form in each reservoir. As an example, carbon (in the lithosphere) exists mainly as carbon dioxide in the atmosphere, carbonic acid, bicarbonate, or the carbonate ion when dissolved in water (hydrosphere), and as more complex organic compounds in animals and plants (biosphere).

Biogeochemistry — The study of the transformation and movement of chemical materials to and from the *Lithosphere, the Atmosphere, the Hydrosphere, and the bodies of living organisms (the Biosphere).*

Biogeography — The study of the geographic distribution of organisms.

Bioindicator — A living organism that denotes the presence of a specific environmental condition. For example, the presence of coliform bacteria identifies water that is contaminated with human fecal material.

Biological Activated Carbon (BAC) Process — The combination of *Ozonation* and *Granular Activated Carbon (GAC)* for the removal of dissolved organics, particularly *Dissolved Organic Carbon (DOC)* from drinking water. This water treatment method has seen more widespread use in Europe primarily due to: (1) the generally poorer quality of surface waters there; (2) the greater concern and more stringent standards for chlorination byproducts; and (3) the strict aesthetic demand of European consumers. Also referred to as the *Biologically Enhanced Activated Carbon Process.*

Biological Additives — Cultures of bacteria, enzymes, or nutrients that are introduced into an oil discharge or other wastes to promote decomposition.

Biological Community — All of the living things in a given environment.

Biological Control — The direct human introduction of living organisms – predators, parasites, or pathogens – to eliminate or control undesirable species. The practice is usually considered an ecologically sound alternative to the application of chemical pesticides.

Biological Diversity — The number and kinds of organisms per unit area of volume; the composition of species in a given area at a given time.

Biological Magnification — Refers to the process whereby certain substances such as pesticides or heavy metals move up the food chain, work their way into rivers or lakes, and are eaten by aquatic organisms such as fish, which in turn are eaten by large birds, animals or humans. The substances become concentrated in tissues or internal organs as they move up the chain. Also see *Bioaccumulants* and *Bioaccumulation.*

Biological Opinion — A document which states the opinion of the *U.S. Fish and Wildlife Service (USFWS)* as to whether a federal action is likely to jeopardize the continued existence of a threatened or endangered species or result in the destruction or adverse modification of critical habitat.

Biological Oxidation — Decomposition of complex organic materials by microorganisms. Occurs in the self-purification of water bodies and in activated sludge wastewater treatment processes.

Biological Oxygen Demand (BOD) — (1) The amount of oxygen required to stabilize decomposable matter by aerobic action. (2) (Water Quality) An indirect measure of the concentration of biologically degradable material present in organic wastes. It usually reflects the amount of oxygen consumed in five days by biological processes breaking down organic waste. Also see *BOD5.* Also referred to as *Biochemical Oxygen Demand (BOD).*

Biological Processes — Processes characteristic of, or resulting from, the activities of living organisms.

Biological Treatment — A treatment technology that uses bacteria to consume organic wastes.

Biological Wastewater Treatment — The use of bacteria to degrade and decompose organic materials in wastewater.

Biology — (1) The science of life and of living organisms, including their structure, function, growth, origin, evolution, and distribution. It includes *Botany* and *Zoology* and all their subdivisions. (2) The life processes or characteristic phenomena of a group or category of living organisms. (3) The plant and animal life of a specific area or region.

Biomagnification — The process by which a substance is passed up the food chain resulting in an especially high level of the substance at upper levels of the food chain. A biological process wherein a contaminant's concentration increases at each level up the food chain, including humans. Thus, the availability of such contaminants, even in the seemingly insignificant parts per trillion range, often are ecologically important.

Biomass — (1) The total mass of living matter within a given unit of environmental area, typically expressed as mass per unit area or volume of habitat. (2) Plant material, vegetation, or agricultural waste used as a fuel or energy source. Some methods of determining biomass in a sample include:

[1] **Ash Mass** – The mass or amount of residue present after the residue from the dry mass determination has been ashed in a muffle furnace at a temperature of 500°C for 1 hour. The ash mass values of zooplankton and phytoplankton are expressed in grams per cubic meter (g/m³), and periphyton and benthic organisms in grams per square mile (g/mi²).

[2] **Dry Mass** – The mass of residue present after drying in an oven at 105°C for zooplankton and

periphyton, until the mass remains unchanged. This mass represents the total organic matter, ash and sediment, in the sample. Dry-mass values are expressed in the same units as ash mass.

- [3] **Organic Mass or Volatile Mass** – Refers to the mass of a living substance as the difference between the dry mass and ash mass and represents the actual mass of the living matter. The organic mass is expressed in the same units as for the ash mass and dry mass.

- [4] **Wet Mass** – The mass of living matter plus contained water.

Biomass Pigment Ratio — An indicator of the total proportion of periphyton which are autotrophic (plants). Also referred to as the *Autotrophic Index*.

Biomat — (1) (Hydraulics) A term used in subsoil hydraulics to describe a clogging layer of typically densely packed decaying organic matter which impedes the downward flow of water. (2) (Water Quality) A restrictive layer that develops beneath the distribution lines of the *Soil Absorption System (SAS)* of *Septic Tanks* at the gravel-soil or bed-soil interface. As the *Septic Tank Effluent (STE)* is not suitable for direct discharge into surface waters or onto land surfaces because of the presence of biodegradable organics and high bacterial content that may include *Pathogens*, the effluent typically undergoes further purification by three processes: absorption, filtration, and microbiological decomposition. The biomat constitutes a clogging mat, *Anaerobic* in nature, characterized as a black slimy layer, and composed of accumulated suspended solids, minerals, bacterial cells, microorganism fragments, polysaccharides, and polyuronides. The biomat is extremely active biologically and helps ensure the conditions for optimal treatment of the effluent by restricting the infiltration rate into the soil, inducing unsaturated soil conditions and reducing the chances of high dispersion below the system. Biomats are also highly effective in removing bacterial and pathogens from the STE and can also detain viruses that can be present in the effluent. Also referred to as *Biocrust*, *Clogging Mat*, and *Clogging Zone*.

Biome — A major regional or global *Biotic* community of plants and animals whose composition is determined by soil and the prevailing climate. The earth is characterized by ten *Bioclimatic Zones* or *Biomes* which consist of:

- [1] **Tundra** – treeless areas between the icecap and the tree line of Arctic regions, having a permanently frozen subsoil and supporting low-growing vegetation such as lichens, mosses, and stunted shrubs.
- [2] **Taiga** – the subarctic, evergreen coniferous forests of northern Eurasia located just south of the tundra and dominated by firs and spruces.
- [3] **Temperate Forest** – forested areas characterized by deciduous plants and moderate temperatures, weather, or climate.
- [4] **Grassland** – areas, such as a prairie or meadow, of grass or grasslike vegetation.
- [5] **Savanna** – flat grasslands of tropical or subtropical regions.
- [6] **Desert** – barren or desolate areas, especially dry, often sandy regions of little rainfall, extreme temperatures, and sparse vegetation.
- [7] **Montane** – cool, moist zones usually located near the timberline and usually dominated by evergreen trees.
- [8] **Tropical Rain Forest** – dense evergreen forests occupying a tropical region typically with an annual rainfall of at least 2.5 meters (100 inches).
- [9] **Tropical Dry Forest** – tropical or subtropical forests similar to tropical rain forests excepting that many of the plant species are deciduous and there exists a well-defined dry season.
- [10] **Islands** – land masses, especially ones smaller than a continent, entirely surrounded by water.

Biomonitoring — The use of living organisms to test the suitability of an effluent for discharge into receiving waters or to test the quality of such receiving waters downstream from the discharge. Also see *Bioassay*.

Bioremediation — Simply, the use of biological techniques to clean up pollution. More specifically, the use of specialized, naturally-occurring micro-organisms with unique biological characteristics, appetites, and metabolisms as a form of waste cleanup. A critical underpinning of this process is the ability to economically generate a sufficient biomass of the appropriate microbes to accomplish in weeks or months what would normally take nature years to do. Typically, this is done either by applying a sufficient concentration of such microbes directly to the polluted area or by applying various concentrations of chemicals which, in turn, stimulate and foster the rapid growth of appropriate micro-organisms.

Biosolids — A nutrient-rich organic material resulting from the treatment of wastewater. Biosolids contain nitrogen and phosphorus along with other supplementary nutrients in smaller doses, such as potassium, sulfur, magnesium, calcium, copper and zinc. Soil that is lacking in these substances can be reclaimed with biosolids use. The application of biosolids to land improves soil properties and plant productivity, and reduces dependence on inorganic fertilizers. The terms biosolids, *Sludge*, and *Sewage Sludge* can be used interchangeably.

Biosphere — In its broadest sense, the entire planetary ecosystem including all living organisms and those parts of

the earth and its atmosphere in which living organisms exist or that are capable of supporting life, to include, in addition to the plant and animal species:

- [1] *Atmosphere* – the gaseous layer covering the earth;
- [2] *Lithosphere* – the solid portion of the earth's crust and mantle;
- [3] *Hydrosphere* – that portion of the earth composed of liquid water; and

Also referred to as the *Ecosphere*. In a more restrictive sense, may also refer to only the living organisms on earth and not to their physical and chemical environments.

Biota — The plant and animal life of a region or ecosystem, as in a stream or other body of water.

Biotechnical Slope Protection — A process involving the use of live and dead woody cuttings and poles or posts collected from native plants to revegetate watershed slopes and stream banks. The cuttings, posts, and vegetative systems composed of bundles, layers, and mats of the cuttings and posts provide structure, drains, and vegetative cover to repair eroding and slumping slopes. Also referred to as *Soil Bioengineering*.

Biotechnology — The use of microorganisms, such as bacteria or yeasts, or biological substances, such as *Enzymes*, to perform specific industrial or manufacturing processes. Applications include the production of certain drugs, synthetic hormones, and bulk foodstuffs as well as the *Bioconversion* of organic waste and the use of genetically altered bacteria in the cleanup of oil spills and other hazardous materials.

Biotic — Pertaining to life or living things, or caused by living organisms.

Biotic Community — (1) A naturally occurring assemblage of plants and animals that live in the same environment and are mutually sustaining and interdependent. (2) A group of interacting organisms within a given area. Plant communities are characterized by a distinctive physiognomy or appearance, such as woodland or forest. At a regional scale, the biotic community is called a *Biome* (e.g., the western coniferous forest biome).

Biotic Integrity — The ability of a community to recover and maintain system processes within historic variability.

Biower — (Water Quality) A means of wastewater treatment in which the waste is allowed to fall through a tower packed with synthetic media, on which there is biological growth. Similar to a trickling filter in concept.

Biotransformation — Conversion of a substance into other compounds by organisms. A more general form of *Biodegradation*.

Bilvolume — See *Cells Volume*.

Bittern — The bitter water solution of bromides, magnesium, and calcium salts remaining after sodium chloride is crystallized out of seawater.

Black Ice — A thin, nearly invisible coating of ice, as on the surface of a road or sidewalk, that is usually caused by freezing mist and is extremely hazardous.

Black Smoker — A vent in a geologically active region of the sea floor from which issues superheated water laden with minerals (as sulfide precipitates).

Blackwater — Water that contains animal, human, or food wastes; wastewater from toilet, latrine, and aqua privy flushing and sinks used for food preparation or disposal of chemical or chemical-biological ingredients. Compare to *Greywater*.

Blanch — To scald or parboil in water or steam in order to remove the skin from, whiten, or stop enzymatic action in (as food for freezing).

Blanket (of a Dam) — A portion of the physical structure of a dam designed to affect the dam's hydrologic characteristics, particularly its seepage and strength characteristics. Types of dam blankets include:

- [1] *Drainage Blanket* – A drainage layer placed directly over the dam's foundation material;
- [2] *Grout Blanket* – The injection of grout to consolidate a layer of the foundation, resulting in greater impermeability and/or strength; and
- [3] *Upstream Blanket* – An impervious layer placed on the reservoir floor upstream of a dam; in the case of an Embankment Dam, the blanket may be connected to the impermeable element in the dam itself.

Blanket Mires — See *Peatland*.

Bleat — To dim with water or tears.

Blending — The mixing or combination of one water source with another, typically a finished source of water with raw water to reuse water while still satisfying water quality standards, for example, mixing of product water from a desalting plant with conventional water to obtain a desired dissolved solids content, or mixing brine effluents with sewage treatment plant effluents in order to reduce evaporation pond size.

Blinds — Water samples containing a chemical of known concentration given a fictitious company name and slipped into the sample flow of the lab to test the impartiality of the lab staff.

Bloom — (1) In aquatic ecosystems, the rapid growth or proliferation of algae, commonly referred to as *Algal Bloom* or *Algae Bloom*; often related to pollution, especially when pollutants accelerate growth. (2) Also a visible, colored

area on the surface of bodies of water caused by excessive planktonic growth.

Blowdown — The water drawn from boiler systems and cold water basins of cooling towers to prevent the buildup of solids.

Blowhole — A hole in ice to which aquatic mammals, such as dolphins and seals, come to breathe.

Blowout — A sudden escape of a confined gas or liquid, as from a well.

Blue-Green Algae — A group of phytoplankton which often cause nuisance conditions in water, so called because they contain a blue pigment in addition to chlorophyll.

Blue Water — The open sea.

BMP — See *Best Management Practices (BMP)* and *Best Management Practices (BMP) — Urban Water Use*.

BOB — To move up and down briefly or repeatedly, as in water.

BOD — See *Biochemical Oxygen Demand (Biological Oxygen Demand)*.

BOD5 — The amount of dissolved oxygen consumed in five days by biological processes breaking down organic matter. Also see *Biological Oxygen Demand (BOD)*.

Body Fluid — the total body water, contained principally in blood plasma and in intracellular and interstitial fluids. Also see *Body Water Content*.

Body Water Content — That portion of the human body composed of water; expressed as a percentage of total body volume. Specifically, the human body is comprised of approximately 65–70 percent water: 67 percent of the water in the body is located within cells; 25 percent between cells; and the rest, about 8 percent, is located in the blood. If more than 8 percent of the body's water is lost, death will result.

Bog — (1) A term frequently associated with *Wetlands*, bogs are poorly drained freshwater wetlands that are characterized by a build-up of peat. Sphagnum mosses are also frequently found in many bogs. (2) A quagmire filled with decayed moss and other plant and vegetable matter; wet spongy ground, where a heavy body is apt to sink; a small, soggy marsh; a morass. (3) (Ecology) A wet, overwhelmingly vegetative substratum which lacks drainage and where humic and other acids give rise to modifications of plant structure and function. Bogs depend primarily on precipitation for their water source, and are usually acidic and rich in plant residue with a conspicuous mat of living green moss. Only a restricted group of plants, mostly *mycorrhizal* (fungi, heaths, orchids, and saprophytes), can tolerate bog conditions. Also referred to as *Peat Bog*. Also see *Peatland*.

Bog Hole — A hole containing soft mud or quicksand.

Boil — To change from a liquid to a vapor by the application of heat. Also see *Boiling Point*.

Boiling Point — The temperature at which the vapor pressure of a liquid is equal to the pressure exerted on the liquid. (Water) When the atmospheric pressure is 86 centimeters of mercury (sea level), the boiling point of water is, by definition, 100°C (Celsius) or 212°F (Fahrenheit). The boiling point decreases with elevation.

Boiling Water Reactor (BWR) — A nuclear reactor in which water, used as both coolant and moderator, is allowed to boil in the core. The resulting steam can be used directly to drive a turbine generating electric power.

Boiloff — The vaporization of liquid.

Bolson — An alluvium-floored basin, depression, or wide valley, mostly surrounded by mountains and drained by a system that has no surface outlet; an undrained or an internally drained intermontane basin. Bolson fill is the alluvial *Detritus* that fills a bolson; also commonly called bolson deposits. Also see *Semi-Bolson*.

Bolson Floor — A specific identification for the floor of a bolson as compared with a *Semi-Bolson* floor.

Bong — A water pipe that consists of a bottle or a vertical tube partially filled with liquid and a smaller tube ending in a bowl, used often in smoking narcotic substances.

Boom — A floating device used to contain oil on a body of water.

Borax — A white crystalline compound that consists of a hydrated sodium borate $\text{Na}_2\text{B}_4\text{O}_7 \cdot 10\text{H}_2\text{O}$, that occurs as a mineral or is prepared from other minerals, and that is used especially as a flux, cleansing agent, and water softener, as a preservative, and as a fireproofing agent.

Border — A soil berm 15 to 18 inches tall thrown up with a disk to keep flood irrigation water inside a given portion of the pasture.

Border Ditch — A ditch used as a border of an irrigated strip or plot, water being spread from one or both sides of the ditch along its entire length.

Border Irrigation — A surface method of irrigation by flooding between two confining border levees or dikes. Typically, these borders vary from 100 to 200 feet wide by 1,000 to 3,960 feet long.

Bore — A high, often dangerous wave caused by the surge of a flood tide upstream in a narrowing *Estuary* or by colliding tidal currents. Also referred to as an *Eagre*.

Boreal Forest — A northern forest, as in the boreal forest *Biome*, characterized by evergreen conifers and long winters. The boreal forest, also referred to as a *Taiga*, is found in the northern parts of North America, Europe,

and Asia.

Borehole — A hole bored or drilled in the earth, as an exploratory well; a small-diameter well drilled especially to obtain water.

Botany — The branch of *Biology* that studies plants, including their structure, function, growth, origin, evolution, and distribution.

Bottled Water [General] — Water sold commercially generally for its health, therapeutic, or purity values. In the United States, bottled water is considered a food product and as such is regulated by the Food and Drug Administration (FDA). Beginning in May 1996, the FDA required all bottled waters to carry accurate labels: “spring water” must come from a spring; “mineral water” must carry a certain mineral content; “sterile” water must be processed to meet FDA standards for commercial sterility; and if water comes from municipal supplies, it must be labeled as such. See *Bottled Water [Food and Drug Administration]* and *Bottled Water [Nevada]*.

Bottled Water [Food and Drug Administration (FDA)] — As defined by the FDA [Department of Health and Human Services, Federal Register, Part III, 21 CFR Part 165, Subpart B—Requirements for Specific Standardized Beverages, effective May 13, 1996] bottled water is water that is intended for human consumption and that is sealed in bottles or other containers with no added ingredients except that it may optionally contain safe and suitable antimicrobial agents. Fluoride may be optionally added within certain specified limitations. Bottled water may be named bottled water, drinking water, or alternatively one of the following terms may be used as appropriate:

- [1] **Artesian Water or Artesian Well Water** – Water from a well tapping a confined aquifer in which the water level stands at some height above the top of the aquifer.
- [2] **Ground Water** – Water from a subsurface saturated zone that is under a pressure equal to or greater than atmospheric pressure; ground water must not be under the direct influence of surface water.
- [3] **Mineral Water** – Water containing not less than 250 parts per million (ppm) total dissolved solids (TDS), coming from a source tapped at one or more bore holes or springs, originating from a geologically and physically protected underground water source; mineral water shall be distinguished from other types of water by its constant level and relative proportions of minerals and trace elements at the point of emergence from the source; no minerals may be added to this water. Mineral water containing less than 500 ppm TDS must be labeled “low mineral content”. Conversely, if the water has more than 1,500 ppm TDS, it must be labeled “high mineral content”.
- [4] **Purified Water** – Water that has been produced by distillation, deionization, reverse osmosis, or other suitable processes and that meets the definition of “purified water” in the *United States Pharmacopeia*. May also be called demineralized water, purified drinking water, or alternatively, based on the process used, deionized (drinking) water, distilled (drinking) water, reverse osmosis (drinking) water, etc.
- [5] **Sparkling Bottled Water** – Water that, after treatment and possible replacement of carbon dioxide, contains the same amount of carbon dioxide from the source that it had at emergence from the source.
- [6] **Spring Water** – Water derived from an underground formation from which water flows naturally to the surface of the earth; shall be collected only at the spring or through a bore hole tapping the underground formation feeding the spring.
- [6] **Sterile or Sterilized Water** – Water that meets the requirements under “Sterility Tests” in the *United States Pharmacopeia*.
- [7] **Well Water** – Water from a hole bored, drilled, or otherwise constructed in the ground which taps the water of an aquifer.

Other label statements for bottled water include “low mineral content” for TDS levels below 500 ppm, “high mineral content” for TDS levels above 1,500 ppm, or when the water comes from a community water system, it must be labeled “from a community water system,” or, alternatively, “from a municipal source.”

Bottled Water [Nevada] — According to Nevada Administrative Code (NAC) Chapter 445A, “Bottled Water,” effective November 1994, bottled water may be labeled and sold as:

- [1] **Distilled Water** – Water that is demineralized by distillation and complies with the requirements for purified water set forth in the *United States Pharmacopeia*.
- [2] **Drinking Water** – Water that is filtered and disinfected by a process approved by the health authority.
- [3] **Mineral Water** – Water that is clearly distinguishable from other types of water by its specific content of minerals and trace elements which remain constant at the water’s point of emergence; boreholes or springs from which mineral water is produced must originate from an underground source which is geologically and physically protected from contamination.
- [4] **Natural Water** – Water that is produced from a well (*Natural Well Water*) or an artesian well (*Natural Artesian Water*) and no minerals have been added or removed from the water; may be filtered and must be

disinfected by a process approved by the health authority.

[5] **Purified Water** – Water that is demineralized by distillation, deionization, or reverse osmosis and complies with the requirements for purified water set forth in the *United States Pharmacopeia*.

[6] **Spring Water** – Water that is produced from a point at the surface where the water flows naturally from an underground formation or through a borehole adjacent to that point in a manner approved by the health authority.

[7] **Municipal Water** – Water that is produced from a public water system; may be sold and labeled as distilled water, drinking water, purified water if it complies with specific filtration and disinfection requirements.

Bottom — (1) The deepest or lowest part, as the bottom of a well. (2) The solid surface under a body of water. (3) Often *Bottoms*: Low-lying alluvial land adjacent to a river, also referred to as bottomland. (4) (Nautical) The part of a ship's hull below the water line.

Bottomland, also Bottom Land (Soils) — A general term describing generally rich, loamy or fine-textured and poorly drained soils, overlying a shallow water table or possibly adjacent to a stream, lake or other body of water, that exhibits relatively good water holding capacity and slow to moderate infiltration of irrigation water; often associated with a river's floodplain.

Bottom Land Hardwoods — Forested freshwater *Wetlands* adjacent to rivers in the southeastern United States, especially valuable for wildlife breeding, nesting, and habitat.

Bottom Lands [Nevada] — The U.S. Department of the Interior, *Bureau of Reclamation (USBR)* criteria (revised 1992) has defined *Bottom Land* for Nevada's *Newlands Irrigation Project*, located in Churchill County, Nevada, as "those lands with a five-foot soil profile having a holding capacity equal to or exceeding 8 inches and/or a water table within 6 feet of the surface for a period equal to or exceeding 150 days. If neither of these factors apply, the land is designated as *Bench Land*." Lands classified as bottom (or bench) according to USBR criteria, above, will be limited to maximum water deliveries (duty) in accordance to the provision of the *Orr Ditch Decree* and the *Alpine Decree*, which are identical in establishing water duties and establish the following limits: (1) Eligible lands designated as *Bench Lands* may receive a maximum of 4.5 acre-feet per acre per year (AF/acre/year); (2) eligible lands designated as *Bottom Lands* may receive a maximum of 3.5 acre-feet per acre per year (AF/acre/year).

Bottom Material — See *Bed Material*.

Bottom Outlet — An opening at a low level from a reservoir generally used for emptying or for scouring sediment and sometimes for irrigation releases. Also referred to as *Low-Level Outlet* or *Sluiceway*.

Boulder — Rock fragments larger than 60.4 cm (24 inches) in diameter.

Boundary Conditions — Flow conditions imposed at the ends of a pipeline or canal reach by various physical structures, which must be described mathematically to solve the general equation of flow for hydraulic transient computer models.

Boundary Layer — The layer of reduced velocity in fluids, such as air and water, that is immediately adjacent to the surface of a solid past which the fluid is flowing.

Bound Water — Water molecules that are held tightly to soil or other solids. This water is not easily removed by normal drying and is not available for other purposes such as plant growth.

Bourn, also Bourne — A stream, brook, or rivulet; in southern England, a winter stream of the chalk downs.

B.P. — Before present.

BPI Pan — A circular evaporation pan, 6 feet in diameter and 2 feet deep, made of unpainted galvanized iron. The pan is buried in the ground so that about 4 inches of the rim extend above the surrounding ground and the water surface is maintained at about ground level. (BPI stands for Bureau of Plant Industry, U.S.D.A., which introduced this instrument.)

Brackish — Having a somewhat salty taste, especially from containing a mixture of seawater and fresh water. Also see *Brackish Water*.

Brackish Water — Generally, water containing dissolved minerals in amounts that exceed normally acceptable standards for municipal, domestic, and irrigation uses. Considerably less saline than sea water. Also, *Marine* and *Estuarine* waters with *Mixohaline* salinity (0.5 to 30‰ due to ocean salts). Water containing between 1,000–4,000 parts per million (PPM) *Total Dissolved Solids (TDS)*. The term brackish water is frequently interchangeable with *Saline Water*. The term should not be applied to inland waters.

Braided Stream — (1) A stream which divides into a network of channels branching and reuniting, separated by islands. (2) A complex tangle of converging and diverging stream channels (*Anabranches*) separated by sand bars or islands. Characteristic of flood plains where the amount of debris is large in relation to the discharge.

Braiding (of River Channels) — Successive division and rejoining of riverflow with accompanying islands.

Branch — (1) A tributary of a river or other body of water. (2) A divergent section of a river, especially near the

mouth.

Branch of the Sea — (Legal) Rivers in which the tide ebbs and flows.

Branch Water — (Chiefly Southern United States) Plain water from a stream, especially when mixed with a liquor such as whiskey.

Brash — A mass or pile of rubble, refuse, or fragments, as of stone, brush, or ice.

Brawl — To flow noisily, as turbulent water.

Breach — (1) A gap or rift, especially in or as if in a solid structure such as a dike or dam. (1) The breaking of waves or surf.

Break — (1) To emerge above the surface of the water. (2) (Geology) A marked change in topography such as a fault or deep valley.

Breakaway Walls — Any type of walls, whether solid or lattice, and whether constructed of concrete, masonry, wood, metal, plastic or any other suitable building material which is not part of the structural support of the building and which is designed to break away under abnormally high tides or wave action without causing any damage to the structural integrity of the building on which they are used or any building to which they might be carried by flood waters. A breakaway wall shall have a safe design loading resistance of not less than ten and no more than twenty pounds per square foot. Use of breakaway walls must be certified by a registered engineer or architect and shall meet the following conditions: (1) breakaway wall collapse shall result from a water load less than that which would occur during the base flood, and (2) the elevated portion of the building shall not incur any structural damage due to the effects of wind and water loads acting simultaneously in the event of the base flood.

Breaker — A small water cask.

Breakpoint Chlorination — The addition of chlorine to water or wastewater until the chlorine demand has been satisfied and further additions result in a residual that is directly proportional to the amount added beyond the breakpoint.

Breakthrough — A crack or break in a filter bed that allows the passage of *Floc* or particulate matter through a filter. As a result, it will cause an increase in filter effluent *Turbidity*.

Breakthrough Curve — A plot of relative concentration versus time, where relative concentration is defined as C/C_0 ; the concentration at a point in the ground-water flow domain divided by the source concentration.

Breakup — The cracking and shifting of ice in rivers or harbors during the spring.

Breakwater — A barrier that protects a harbor or shore from the full impact of waves.

Brew — To prepare (as tea) by infusion in hot water.

Brim — The upper surface of a body of water.

Brine — (1) Water saturated with or containing large amounts of a salt, especially of sodium chloride. According to *U.S. Geologic Survey (USGS)* classification, water classified as brine contains more than 35,000 ppm (parts per million) total dissolved solids (TDS) of salt; (2a) The water of a sea or an ocean; (2b) A large body of salt water. (3) The wastewater resulting from desalting. It is higher in dissolved solid content than feedwater or product water. Also see *Saline Water*.

Brine Disposal — Removing water that contains high concentrations of salt.

Brine Mud — Waste material, often associated with well-drilling or mining, composed of mineral salts or other inorganic compounds.

Brink — (1) The upper edge of a steep or vertical slope. (2) The margin of land bordering a body of water.

British Thermal Unit (BTU) — A unit of heat energy equal to the amount of heat required to raise the temperature of one pound of water one degree *Fahrenheit*. More precisely, the quantity of heat required to raise the temperature of one pound of water from 60°F to 61°F at a constant pressure of one atmosphere. Also, the quantity of heat equal to 1/180 of the heat required to raise the temperature of one pound of water from 32°F (its freezing point) to 212°F (its boiling point) at a constant pressure of one atmosphere. The British Thermal Unit is used when the measurement is in degrees Fahrenheit (°F) on the *Fahrenheit Scale* and the *Calorie* is used when temperature is measured in degrees *Celsius* (°C) on the *Centigrade Scale*.

Broad-Leaved Deciduous — Woody *Angiosperms* (trees or shrubs) with relatively wide, flat leaves that are shed during the cold or dry season; e.g., black ash (*Fraxinus nigra*).

Broad-Leaved Evergreen — Woody *Angiosperms* (trees or shrubs) with relatively wide, flat leaves that generally remain green and are usually persistent for a year or more; e.g., red mangrove (*Rhizophora mangle*).

Broadcast Spawners — Fish that release their eggs and milt in the water column.

Bromide — A salt which naturally occurs in small quantities in sea water; a compound of bromine.

Brook — A natural stream of water, smaller than a river or creek; especially a small stream or rivulet which breaks directly out of the ground, as from a spring or seep; also, a stream or torrent of similar size, produced by copious

rainfall, melting snow and ice, etc.; a primary stream not formed by tributaries, though often fed below its source, as by rills or runlets; one of the smallest branches or ultimate ramifications of a drainage system.

Brownian Movement — The constant, random, zigzag movement of small particles dispersed in a fluid medium, caused by collision with molecules of the fluid. Named after Robert Brown (1773–1858), the British botanist who first described it. Also referred to as *Brownian Motion*.

Browsing — The consumption by livestock and wildlife of leaves and shoots from woody plants. See *Grazing*.

Bubble — (1) A thin, usually spherical or hemispherical film of liquid filled with air or gas, as a soap bubble. (2) A globular body of air or gas formed within a liquid, as air bubbles rising to the surface of a body of water.

Bubbler — A drinking fountain from which a stream of water bubbles upward.

Bucket — (1) A cylindrical vessel used for holding or carrying water or other liquids; a pail. (2) A receptacle on various machines, such as the compartments on a water wheel, used to gather and convey water.

Buddle — An inclined trough in which crushed ore is washed with running water to flush away impurities.

Buffer — A solution which is resistant to pH changes, or a solution or liquid whose chemical makeup tends to neutralize acids or bases without a great change in pH. Surface waters and soils with chemical buffers are not as susceptible to acid deposition as those with poor buffering capacity.

Buffer Strips — (1) Strips of grass or other erosion-resisting vegetation between or below cultivated strips or fields. (2) Grassed or planted zones which act as a protective barrier between an area which experiences livestock grazing or other activities and a water body. Also referred to as a *Buffer Zone*.

Buffer Zone — (1) A protective, neutral area between distinct environments. (2) An area which acts to minimize the impact of pollutants on the environment or public welfare. For example, a buffer zone may be established between a composting facility and nearby neighborhoods to minimize odor problems. Also see *Buffer Strips*.

Bulkhead — A low wall of stones, concrete, or piling built to protect a shore, or fills, from wave erosion.

Bulking Sludge — (Water Quality) Sludge that does not settle to the bottom of a clarifier, causing a rise in the level of suspended solids and biochemical oxygen demand in water leaving a wastewater treatment facility.

Bund — An embankment used especially in India to control the flow of water.

Buoy — (Nautical) A float, often having a bell or light, moored in water as a warning of danger or as a marker for a channel. Also, to keep afloat or aloft.

Buoyancy — The tendency of a body to float or rise when submerged in a fluid.

Buran — A violent windstorm of the Eurasian steppes, accompanied in summer by dust and in winter by snow.

Burble — (1) A gurgling or bubbling sound, as of running water. (2) A separation in the *Boundary Layer* of a fluid about a moving streamlined body, such as the wing of an airplane through air or the keel of a sailboat through water, causing a breakdown in the smooth flow of fluid and resulting in turbulence.

(United States) Bureau of Indian Affairs (BIA) — An agency of the U.S. Department of the Interior which has the primary responsibility for exercising the federal government's trust relationship with Indian tribes. The BIA was first established in 1824 in the War Department, then transferred to the Department of the Interior in 1849. The BIA has prime responsibility to provide services to Indian tribes and plays a central role in the settlement process of Indian water rights disputes. The BIA exercises prime trust responsibility in providing federal government protection for Indian resources and federal assistance in resource development and management. Quite often this responsibility complicates the Department of the Interior's other broad responsibilities to manage the use of lands and natural resources on public lands through its *Bureau of Land Management (BLM)* land use programs, its *Bureau of Reclamation (USBR)* water-related projects, and its *U.S. Fish and Wildlife Service (USFWS)* wildlife and habitat restoration programs, which may frequently come in conflict with the Bureau of Indian Affairs Indian water rights issues. [For example, in *Nevada v. United States* (463 U.S. 129{1983}), the United States Supreme Court held that the United States (Department of the Interior) could adequately represent more than one interest simultaneously, and so it is not subject to the same standards as a private trustee. In this case, the Court found that claims made by the United States on behalf of the Pyramid Lake Paiute Indian Tribe to protect fisheries should have been asserted in prior litigation. Nevertheless, the Court found the failure to do so was not a breach of its trust obligations to the tribe, even though the United States also had protected the competing interests of non-Indian irrigators.] Also see *Negotiated Settlement* and *Truckee River Operating Agreement (TROA)*.

(United States) Bureau of Land Management (BLM) — An agency of the U.S. Department of the Interior responsible for the stewardship of the nation's public lands. The Bureau of Land Management is committed to the sustained management, protection, and improvement of these lands in a manner consistent with the needs of the American people. The BLM's management philosophy is based on the principles of multiple use and sustained yield of our nation's resources within a framework of environmental responsibility and scientific technology. The resources under the BLM's oversight include recreation, rangelands, timber, minerals, watersheds, fish and

wildlife, wilderness, air, and scenic, scientific and cultural values. The BLM oversees the largest natural resource base in the federal government. This base includes 270 million acres of public lands ranging from old growth forests in the Pacific Northwest to sun drenched desert ecosystems in the Southwest to Arctic tundra in Alaska. The BLM also supervises mineral leasing and operations on an additional 300 million acres of federal mineral estate that underlie other surface ownerships. BLM managed public lands provide habitat for thousands of wildlife and plant species, including some 220 federally-listed threatened and endangered species and 1,200 species considered candidates for listing. The BLM manages over 169,000 miles of fish bearing streams and more than 50 million acres of forested lands. In addition, the BLM is caretaker of an estimated 4 million cultural properties, including 400 listed in the *National Register of Historic Places*. The BLM also manages more than 1.6 million acres of designated wilderness and 22.8 million acres of wilderness study areas. More than 46,500 wild horses and burros roam BLM land in the West. The BLM permits and manages various uses of the public lands, including grazing, mining, recreation, and timber operations. These activities traditionally have been managed on an individual basis. However, more recently the BLM's management efforts have shifted to a more comprehensive ecosystem basis of managing such lands to insure sustained benefits for future generations of Americans. The Bureau of Land Management has its headquarters office in Washington, D.C. There are an additional eleven state offices for managing resources in the western states of Alaska, Arizona, California, Idaho, Montana, Nevada, New Mexico, Oregon, Utah, and Wyoming. BLM resources for the Eastern United States are managed out of Springfield, Virginia. The BLM also supports a National Interagency Fire Center (NIFC) in Boise, Idaho as well as a public information service center (SC) in Denver, Colorado and a centralized employee training center in Phoenix, Arizona. In Nevada alone, the BLM manages some 48 million acres of public lands or approximately 67 percent of all lands in Nevada.

(United States) Bureau of Reclamation (BOR, and USBR) — An agency of the U.S. Department of the Interior responsible for many of the dam, reservoir, and irrigation projects in the Western United States. The USBR reclamation program was authorized by the Reclamation Act of 1902 which was initially intended to reclaim the arid and semiarid lands of the Western United States by conserving and supplying irrigation water to make them productive. Since that beginning, the USBR's mission has expanded considerably to include multipurpose water development by providing water for irrigation, hydroelectric power, water for homes, businesses and factories, outdoor recreation, flood control, fish and wildlife enhancement, improved water quality, river regulation and control, and other related uses of water. Currently the USBR administers some 322 storage dams, 14,490 miles of canals, 174 pumping plants, and 50 hydroelectric plants. USBR water irrigates 146,000 farms in the West, provides part or all the water needs on nearly 10 million acres, yielding enough food for 33 million people, and also provides 620 billion gallons of water a year of municipal and industrial use in western towns and cities. In terms of its original intent and broad governing guidelines, the U.S. Bureau of Reclamation is primarily responsible for water projects with respect to developing water sources for agriculture and commerce, while the *U.S. Army Corps of Engineers (COE)* has had primary responsibility for water projects which protect property from potential flood damage. In reality, however, quite often these federal agencies' project goals overlap with USBR's dams and reservoirs providing important flood protection and the COE's water projects – dams, locks, and canals – providing important water transportation linkages and benefits to commerce.

Buried Drain — A covered drain usually made of clay, concrete, or plastic pipe installed beneath the ground surface at a planned grade and depth for conveyance of excess groundwater.

Burn — (Chiefly Scottish) (1) A brook; a rivulet. (2) Water, especially that used in brewing.

Bushel — (1) A unit of volume or capacity in the U.S. Customary System, used in dry measure and equal to 4 pecks, 2,150.42 cubic inches, or 35.24 liters. (2) A unit of volume or capacity in the British Imperial System, used in dry and liquid measure and equal to 2,219.36 cubic inches or 36.37 liters.

Butt — A large cask especially for wine, beer, or water.

Butt End — The bottom end of a cutting taken from a riparian plant that will root if planted in soil (it is opposite the budding tip's end of the cutting).

Buttress Dam — A dam consisting of a watertight upstream face supported at intervals on the downstream side by a series of buttresses. Also see *Dam*.

Bypass, also By-Pass — A pipe or channel used to conduct a liquid around another pipe or a fixture.

Bypass System — A structure in a dam that provides a route for fish to move through or around the dam without going through the turbines.

Bypassed — The situation of a fan or pediment surface that once had sediment spread across it by ephemeral washes, but that is now protected from surficial stream erosion or alluviation because the drainageways crossing it are now incised.

