California Water Plan Update 2013 Glossary

This glossary contains terms used in the text of California Water Plan Update 2013 *as well as additional terms related to water resources.*

100-year flood event — A flood event having a 1 percent chance of exceedance in any given year (also known as a base flood).

500-year flood event — A flood event having a 0.2 percent chance of exceedance in any given year.

A

abandoned well — A well whose use has been permanently discontinued or which is in a state of such disrepair that no water can be produced. Because abandonment is a state that also involves intent on the part of the well owner, a definition that prescribes a set of conditions and a time limit for use in applying standards appears in Section 21 of Chapter II (Standards), of the California Well Standards 74-81, available at http://www.water.ca.gov/groundwater/wells/standards.cfm. Abandoned wells pose a groundwater quality concern because they provide a vertical conduit for contamination of the aquifer. State law (Health and Safety Code Section 115700) requires that all "permanently inactive wells" or abandoned wells be properly destroyed.

acre-foot (af) — The volume of water that would cover 1 acre to a depth of 1 foot; equal to 43,560 cubic feet or 325,851 gallons. An acre-foot of water is considered enough water to meet the needs of two families of four for one year.

adaptation (measures/strategies) — Adjustments to natural and human systems to moderate harm or to exploit beneficial opportunities in response to actual or expected effects of climate change.

adaptive capacity — The ability of systems, organizations, and individuals to (1) adjust to actual or potential adverse changes and events; (2) take advantage of existing and emerging opportunities that support essential functions or relationships; or (3) cope with adverse consequences, mitigate damages, and recover from system failures. Adaptive capacity is an indicator of how well a system will adjust to or recover from external changes or large perturbations (e.g., severe floods or droughts). *See also* "resilience."

adjudication (water rights) — A determination of water rights for an entire stream or groundwater basin. In the context of an adjudicated groundwater basin, landowners or other parties have turned to the courts to settle disputes over how much groundwater can be extracted by each party to the decision.

advanced treatment — Any wastewater treatment processes beyond tertiary treatment. The types of treatment processes may include reverse osmosis, micro- or nanofiltration, ozonation, or advanced oxidation.

ag effective precipitation on irrigated lands — For the California Water Plan water portfolios, this represents the annual precipitation used by crops planted in developed irrigated land areas.

agricultural applied water use — For the California Water Plan water portfolios, this represents the applied water used for irrigated agriculture, including water applied for groundwater recharge.

agricultural discharge standards — For the California Water Plan future scenarios, this represents the State and federal water-quality regulations regarding discharge of water used for agricultural production to streams, rivers, groundwater aquifers, or evaporation ponds.

agricultural land stewardship — Farm and ranch landowners, the stewards of the state's agricultural land, producing public environmental benefits in conjunction with the food and fiber they have historically provided while keeping land in private ownership to the greatest extent feasible.

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agricultural water use efficiency — The ratio of applied water to the amount of water required to sustain agricultural productivity. Efficiency is increased through the application of less water to achieve the same beneficial productivity or by achieving more productivity while applying the same amount of water.

alfalfa summer dry-down — The practice of ceasing irrigation to an alfalfa field in the mid-summer months when forage quality and yield may be low while water demand is high. Then resuming irrigation in the fall when temperatures are cooler.

alluvial/alluvium — A general term for clay, silt, sand, gravel, or similar unconsolidated detrital material deposited during comparatively recent geologic time by a stream or other body of running water, as a sorted or semi-sorted sediment in the bed of the stream or on its floodplain or delta, as a cone or fan at the base of a mountain slope.

alluvial fan — A fan-shaped deposit formed where a fast flowing stream flattens, slows, and spreads, typically at the exit of a canyon onto a flatter plain.

alluvial fan flooding — Flows of shallow depth and high velocity, with sediment transport, along uncertain flow paths on the surface and at the toe of alluvial fans. Typically caused by localized rainstorms, often with snowmelt.

anadromous fish — Migratory fish that are born in freshwater, migrate to the ocean where they live their adult life, and migrate back to fresh water to lay their eggs. Salmon and steelhead are two very common anadromous fish in California.

anthrodiversity —The human aspect of biodiversity that denotes the value of varied human habitats (e.g., rural, suburban and urban), to support contemporary cultures, heritages and lifestyles. Examples of human habitat attributes (which are valued differently by individuals and/or cultures) include, but are not limited to, climate, built environment, crime rate, proximity to recreational opportunities, ability to engage in animal husbandry or agriculture at the household scale, proximity to family and family heritage, belief systems and values, quality and level of public service (e.g., schools, roads), proximity to medical care, and so forth.

anthropogenic — Of human origin or resulting from human activity.

applied water reduction — A decrease in the amount of water needed to meet the demand for beneficial use. Applied water reduction can be a supply for both new (real) water and reused water. *See also* "new water."

applied water use — For the California Water Plan water portfolios, this represents the total amount of water diverted from any source to meet the demands of water users, without adjusting for water that is used up, returned to the developed supply, or irrecoverable. Applied water is the quantity of water delivered to the intake to a city water system, a factory, or a farm headgate, either directly or by incidental flows to a marsh or wetland for wildlife areas. For existing instream use, applied water demand is the portion of the streamflow dedicated to instream use or reserved under the federal or State Wild and Scenic Rivers acts or the flow needed to meet salinity standards in the Sacramento-San Joaquin Delta under State Water Resources Control Board standards.

appropriative right — The right to use water that is diverted or extracted by a nonriparian or nonoverlying party for nonriparian or nonoverlying beneficial uses. In California, surface water appropriative rights are subject to a statutory permitting process, while groundwater appropriation is not. *See also* "riparian right" and "pueblo right."

aquifer — A body of rock or sediment that is sufficiently porous and permeable to store, transmit, and yield significant quantities of groundwater to wells and springs.

aquifer remediation — *See* "groundwater remediation/aquifer remediation."

aquitard — A confining bed or formation composed of rock or sediment that retards but does not prevent the flow of water to or from an adjacent aquifer. It does not readily yield water to wells or springs, but stores groundwater.

area of origin acts — State of California legislative acts providing special assurances to those counties and areas where the State's water resources originate, so as to allow for their own population and economic growth. *See also* "area of origin," as defined in California Water Code Sections 10500-10506 and 11460-11463.

artesian aquifer — A body of rock or sediment containing groundwater that is under greater than hydrostatic pressure (i.e., a confined aquifer). When an artesian aquifer is penetrated by a well, the water level will rise above the top of the aquifer. *See also* "confined aquifer," "semi-confined aquifer," and "unconfined aquifer."

artesian pressure — Hydrostatic pressure of artesian water, often expressed in terms of pounds per square inch; or the height, in feet above the land surface, of a column of water that would be supported by the pressure.

artificial recharge — The intentional addition of water to a groundwater reservoir by human activity, such as putting surface water into dug or constructed spreading basins or injecting water through wells. Also referred to as intentional recharge or managed recharge. *See also* "Category 1 recharge area."

atmospheric river — A weather pattern that forms a narrow corridor of concentrated moisture in the atmosphere that drops torrential rains as it passes over land.

available groundwater storage capacity — The volume of a groundwater basin that is unsaturated and capable of storing groundwater.

available soil water — The amount of water held in the soil that can be extracted by a crop; available soil water is often expressed in inches per foot of soil depth. It is the amount of water released between in situ field capacity and the permanent wilting point.

average annual runoff — The average value of total annual runoff volume calculated for a selected period of record, at a specified location, such as a dam or stream gauge. *See also* "normal."

average year water demand — Demand for water under average hydrologic conditions for a specific level of development.

B

background water conservation — For the California Water Plan future scenarios, this represents water conservation occurring independent of best management practices and efficient water management practices (e.g., plumbing code changes, natural placement, and actions that water users implement on their own).

basin — *See* "hydrologic basin."

basin irrigation — Irrigation by flooding areas of level land surrounded by dikes. "Basin irrigation" is used interchangeably with "level border irrigation" but usually refers to smaller areas.

basin management objectives (BMOs) — *See* "management objectives."

basin plan — A basin plan or water quality control plan establishes a comprehensive program of actions designed to preserve, enhance, and restore water quality in all water bodies in California. The basin plan is each regional water quality control board's master water quality control planning document, and it designates beneficial uses of surface water and groundwater. The basin plan contains numeric and/or narrative water quality objectives and spells out a program by which the objectives can be achieved with their boundaries.

beneficial use — (1) As part of the nine regional water quality control boards' basin planning efforts, up to 25 water-quality beneficial use categories for water have been identified for mostly human and instream uses. From Section 13050(f) of California's Porter-Cologne Water Quality Control Act: "'Beneficial uses' of the waters of the state that may be protected against water quality degradation include, but are not necessarily limited to, domestic, municipal, agricultural, and industrial supply; power generation; recreation; aesthetic enjoyment; navigation; and preservation and enhancement of fish, wildlife, and other aquatic resources or preserves." (2) As part of the State Water Resources Control Board's water rights program, the California Water Code Section 1240 states, "The appropriation must be for some useful or beneficial purpose, and when the appropriator or his successor in interest ceases to use it for such a purpose [typically five years or greater] the right ceases." In the water rights process, beneficial uses are defined in the California Code of Regulations. Categories of beneficial uses recognized in California include aquaculture, domestic, fire protection, fish and wildlife, frost protection, heat control, industrial use, mining, municipal, power, recreation, stockwatering, and water quality control.

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bioregion — A relatively large area of land or water that characterizes a geographically distinct assemblage of natural communities and species.

biosolids — Wastewater treatment residuals, not including material removed during preliminary treatment, treated to levels that allow agronomic use in accordance with federal law.

blending treatment — A process of reducing the concentration of a contaminant in one water source by blending or dilution with water that has a lower concentration.

blue water — Fresh surface water and groundwater (i.e., the water in freshwater lakes, rivers, and aquifers) (definition taken in part from Hoekstra et al. 2011). The California Water Plan quantifies components of blue water in the water portfolios. See, for example, water portfolio components for "groundwater net change in storage," surface water total available Storage," "applied water," "instream flows," "Wild and Scenic rivers net water use," and various "return flow" definitions.

blue water footprint — The volume of surface water and groundwater consumed as a result of the production of a good or service. Consumption refers to the volume of fresh water used and then evaporated or incorporated into a product. It also includes water abstracted from surface or groundwater in a catchment and returned to another catchment or the sea. It is the amount of water abstracted from groundwater or surface water that does not return to the catchment from which it was withdrawn, unless the water is reused in a downstream process. In the latter case, the second use is a second blue water footprint for the same water (definition taken in part from Hoekstra et al. 2011). The California Water Plan quantifies components of blue water footprint in the water portfolios as "net water use (demand)."

border irrigation — Irrigation by flooding strips of land, rectangular in shape and cross-leveled, bordered by dikes. Water is applied at a rate sufficient to move it down the strip in a uniform sheet. Border strips having no downfield slope are referred to as level border systems. Border systems constructed on terraced lands are commonly referred to as benched borders.

brackish water — Water with a salinity that exceeds normally acceptable standards for municipal, domestic, and irrigation uses but has less salinity than seawater.

brownfields — Generally speaking, brownfields are abandoned or unused industrial and commercial facilities/sites where expansion or redevelopment is complicated by real or perceived environmental contamination. They can be in urban, suburban, or rural areas. The U.S. Environmental Protection Agency's Brownfields Program helps communities mitigate potential health risks and restore the economic viability of such areas or properties.

Bulletin No. 118 — A Department of Water Resource's report that inventories the extent and condition of groundwater in California. Bulletin 118 was last updated in 2003 and titled *California's Groundwater.*

C

California Central Valley Groundwater-Surface Water Simulation Model (C2VSim) — An integrated numerical model that simulates water movement through the linked land surface, groundwater, and surface water flow systems in California's Central Valley. The C2VSim model contains monthly historical stream inflows, surface water diversions, precipitation, land use, and crop acreages from October 1921 through September 2009. C2VSim dynamically calculates crop water demands, allocates contributions from precipitation, soil moisture, and surface water diversions, and calculates the groundwater pumpage required to meet the remaining demand. The model simulates the historical response of the Central Valley's groundwater and surface water flow system to historical stresses, and can also be used to simulate the response to projected future stresses. Additional information is available at: http://baydeltaoffice.water.ca.gov/modeling/hydrology/C2VSim/index_C2VSIM.cfm.

California Irrigation Management Information System (CIMIS) — CIMIS is a network of automated weather stations that are owned and operated cooperatively between the California Department of Water Resources and local agencies. The stations are installed in most of the agricultural and urban areas in the state and provide farm and large landscape irrigation managers and researchers with "real time" weather data to estimate reference evapotranspiration (ETo) use to estimate crop and landscape evapotranspiration (ET) rates and make irrigation management decisions.

California Native American Tribe — A federally recognized California Native American Tribe or a non-federally recognized California Native American Tribe that is on the contact list maintained by the Native American Heritage Commission.

California Statewide Groundwater Elevation Monitoring (CASGEM) — The California Department of Water Resources (DWR) developed the CASGEM program in response to Senate Bill X7 6 (Chapter 1, Statutes of 2009) that added provisions of groundwater monitoring to Division 6 of the California Water Code (Section 10920 et seq.). The intent of the CASGEM program is to establish a permanent, locally managed program of regular and systematic monitoring in all of California's alluvial groundwater basins. The CASGEM program will rely and build on the many established, local, long-term groundwater monitoring and management programs. DWR's role is to coordinate the CASGEM program, to work cooperatively with local entities, and to maintain the collected elevation data in a readily and widely available public database.

California Water Resources Simulation Model (CALSIM) — A surface water storage allocation model developed by the California Department of Water Resources (DWR) - for the State Water Project. CALSIM II is the latest application of the generic CALSIM model to simulate State Water Project/Central Valley Project operations. The model is a product of joint development between DWR and the U.S. Bureau of Reclamation. *See also* "water resource integrated modeling system."

capacity building — Capacity building is the process of equipping entities, usually public agencies, with certain skills or competencies or abilities for general upgrading of its performance capability by providing assistance, funding, resources, training, and more. For example, capacity building is one of three fundamental elements of conjunctive water use management, along with project construction and groundwater management.

catastrophic vulnerability — For the California Water Plan future scenarios, this represents the probability and magnitude of potential negative economic, public health, and environmental impacts associated with water management actions.

catchment — The area of land that catches and collects water above a reservoir or other storage structure.

Category 1 recharge area — An area that is an active recharge area at the present time under the control of water management agencies. The infiltration rate at these areas is high, and they are carefully managed to maintain that high infiltration rate and to protect the quality of the water that is being recharged. At most sites, monitoring activities track groundwater levels, the rate of movement of the recharged water into the aquifer, and chemical changes. *See also* "Category 2 recharge area" and "Category 3 recharge area."

Category 2 recharge area — An area that is known to have a fairly high infiltration rate but that is not under the control of a water management agency. There may be little or no monitoring of these areas. Programs should be considered that monitor recharge, prevent potential contaminating activities, and educate the public about the importance of protecting the quantity and quality of their water supply, to enable people to select appropriate actions to protect water quality. *See also* "Category 1 recharge area" and "Category 3 recharge area."

Category 3 recharge area — An area with a lower infiltration rate making the area much less suitable for an artificial recharge program managed by a local water agency. These areas may have a lower degree of monitoring and management of potential contaminating activities. *See also* "Category 1 recharge area" and "Category 2 recharge area."

cathodic protection well — Cathodic protection wells are installed to protect metallic objects in contact with the ground from electrolytic corrosion. Such objects include petroleum, natural gas, and water pipelines, and related storage facilities; power lines; telephone cables; and switchyards. Cathodic protection wells are sometimes used to control electrolytic corrosion in large water wells.

Central Valley Flood Protection Plan (CVFPP) — The CVFPP is a State plan that describes the challenges, opportunities, and a vision for improving flood management in the context of integrated water management in the Central Valley. The CVFPP documents the current and future risks associated with flooding and recommends improvements to the Federal-State flood protection system to reduce the occurrence of major flooding and the consequence of flood damage that could result. The plan was adopted by the Central Valley Flood Protection Board in June 2012 and will be updated every five years.

Central Valley Project deliveries — For the California Water Plan future scenarios, this represents the volume of surface water supplied to a given area through the Central Valley Project.

Central Valley Project – base deliveries — For the California Water Plan water portfolios, this represents the delivery of prior rights water to Central Valley Project contractors.

Central Valley Project – project deliveries — For the California Water Plan water portfolios, this represents the delivery of project water to Central Valley Project contractors.

Central Valley Salinity Alternatives for Long-Term Sustainability (CV-SALTS) — CV-SALTS is a collaborative stakeholder-driven and -managed program to develop sustainable salinity and nitrate management planning for the Central Valley.

check irrigation — Modification of a border strip with small earth ridges or restrictions (checks) constructed or inserted at intervals to retain water as it flows down the strip.

chemical of emerging concern (CEC) — Constituents, such as personal care products and pharmaceuticals, that may be present in wastewater and may not be easily removed by most wastewater treatment processes.

CIMIS — *See* "California Irrigation Management Information System (CIMIS)."

Clean Water Act — Federal legislation enacted in 1972 to restore and maintain the chemical, physical, and biological integrity of the surface waters of the United States. The stated goals of the act are that all waters be fishable and swimmable.

climate change — Changes in long-term average temperature, precipitation, wind, or other variables in a specific region.

closed basin — A basin in which no stream naturally exits the basin into another river or ocean.

cloud seeding — Typically occurs in the wintertime where special substances (e.g., silver iodide) are injected into the clouds that enable snowflakes and raindrops to form more easily. *See also* "precipitation enhancement."

coastal flooding — Inundation at locations normally above the level of high tide and often caused by storm surges occurring with high tides. Impacts include property damage and beach erosion.

Colorado River deliveries — (1) For the California Water Plan water portfolios, this represents the volume of water diverted from the Colorado River by Metropolitan Water District of Southern California, Imperial Irrigation District, Coachella Valley Water District, the Yuma Project, and others under California's entitlement to use Colorado River water. (2) For the California Water Plan future scenarios, this represents California's right to import water from the Colorado River. California's allocation is 4.4 million acre-feet per year plus 50 percent of any declared surplus.

commercial activity mix — For the California Water Plan future scenarios, this represents the mix of high- and low-water-using commercial activity. Note that commercial activity is broken into two factors: total commercial activity and commercial activity mix. The latter allows designation of the type of commercial activity that is occurring. *See also* "total commercial activity."

community water system — A public water system that serves at least 15 service connections used by yearlong residents or that regularly serves at least 25 yearlong residents. *See also* "public water system."

component 1 (C1) water — Refers to 60,000 acre-feet of transfer water that the Yuba County Water Agency (YCWA), as part of a purchase agreement under the Yuba Accord, agreed to provide to the California Department of Water Resources, to be shared equally with the U.S. Bureau of Reclamation. C1 water is typically surface water stored in YCWA's New Bullards Bar Reservoir, and available quantities of C1 water depend on operational limitations of the YCWA's Yuba Project.

confined aquifer — An aquifer that is bounded above and below by formations of distinctly lower permeability than that of the aquifer itself. An aquifer containing confined groundwater. *See also* "artesian aquifer," "unconfined aquifer," and "semi-confined aquifer."

conjunctive management (use) of surface and groundwater storage — Coordinated and planned management of both surface and groundwater resources in order to maximize the efficient use of the resource; that is, the planned and managed operation of a groundwater basin and a surface water storage system combined

through a coordinated conveyance infrastructure. Water is stored in the groundwater basin for later and planned use by intentionally recharging the basin during years of above-average surface water supply. Surface water and groundwater resources typically differ significantly in their availability, quality, management needs, and development and use costs. Managing both resources together, rather than in isolation from one another, allows water managers to use the advantages of both resources for maximum benefit.

conservation offset — Actions by the developer of a proposed project to save water at or above the demand level of the project.

conservation tillage — A tillage practice that leaves plant residues on the soil surface for erosion control and moisture conservation.

consumed fraction — The portion of agricultural applied irrigation water that satisfies evapotranspiration.

consumptive use — A quantity of applied water that is not available for immediate or economical reuse. It includes water that evaporates, transpires, or is incorporated into products, plant tissue, or animal tissue. Consumptively used water is removed from available supplies without return to a water resource system (in uses such as manufacturing, agriculture, landscaping, or food preparation; and, in the case of Colorado River water, water that is not returned to the river). *See also* "nonconsumptive use."

contaminant — Any substance or property preventing the use of, or reducing the usability of, water for ordinary purposes such as drinking, preparing food, bathing, washing, recreation, and cooling. Any solute or cause of change in physical properties that renders water unfit for a given use. (Generally considered synonymous with pollutant.)

contaminant plume — A mixture of chemicals or leachate in groundwater at a certain concentration or toxicity.

conveyance — A conveyance provides for the movement of water. Conveyance infrastructures include natural watercourses, such as streams, rivers, and groundwater aquifers; and constructed facilities, such as canals and pipelines, including control structures such as weirs. Conveyance facilities range in size from small, local, end-user distribution systems to large systems that deliver water to or drain areas as large as multiple hydrologic regions. Conveyance facilities also require associated infrastructure, such as pumping plants and power supply, diversion structures, fish ladders, and fish screens.

conveyance applied water — For the California Water Plan water portfolios, this represents the total amount of water used to convey water from the source to the use (e.g., if 200 acre-feet is diverted into a canal and 180 acre-feet arrive at its place of use, then 20 acre-feet is the amount of conveyance applied water). This includes water that is both recoverable (outflows such as seepage and deep percolation) and irrecoverable (depletions such as evapotranspiration, evaporation, or deep percolation to a salt sink).

conveyance evaporation and evapotranspiration – ag — For the California Water Plan water portfolios, this represents the water that is irrecoverable from major water supply conveyance systems due to evaporation and evapotranspiration by vegetation in and near canals. This refers to water intended for agricultural uses.

conveyance evaporation and evapotranspiration – managed wetlands — For the California Water Plan water portfolios, this represents the water that is irrecoverable from major water supply conveyance systems due to evaporation and evapotranspiration by vegetation in and near canals. This refers to water intended for managed wetlands uses.

conveyance evaporation and evapotranspiration – urban — For the California Water Plan water portfolios, this represents the water that is irrecoverable from major water supply conveyance systems due to evaporation and evapotranspiration by vegetation in and near canals. This refers to water intended for urban uses.

conveyance facilities — Canals, pipelines, pump lifts, ditches, etc., used to move water from one area to another.

conveyance irrecoverable water — The amount of water that evaporates, is used by plants (evapotranspiration), and/or percolates to a salt sink during transport.

conveyance outflow — The outflow needed to meet water quality and beneficial uses in the Delta. *See also* "outflow."

conveyance outflow to Mexico — For the California Water Plan water portfolios, this represents the estimated annual flow of water from the All-American Canal to seepage flowing to Mexico.

conveyance return flows to developed supply (other HR) – ag — For the California Water Plan water portfolios, this represents the portion of agricultural conveyance water that seeps through channels and returns as surface flow in another hydrologic region. Data shown in the "Water Portfolio by Planning Area" tables (Volume 5, *Technical Guide*) include conveyance return flows to developed supply in both planning area and region.

conveyance return flows to developed supply (other HR) – managed wetlands — For the California Water Plan water portfolios, this represents the portion of managed wetlands conveyance water that seeps through channels and returns as surface flow in another hydrologic region. Data shown in the "Water Portfolio by Planning Area" tables (Volume 5, *Technical Guide*) include conveyance return flows to developed supply in both planning area and region.

conveyance return flows to developed supply (other HR) – urban — For the California Water Plan water portfolios, this represents the portion of urban conveyance water that seeps through channels and returns as surface flow in another hydrologic region. Data shown in the "Water Portfolio by Planning Area" tables (Volume 5, *Technical Guide*) include conveyance return flows to developed supply in both planning area and region.

conveyance seepage – ag — For the California Water Plan water portfolios, this represents the portion of agricultural conveyance water that seeps through channels and returns to surface or groundwater.

conveyance seepage – managed wetlands — For the California Water Plan water portfolios, this represents the portion of managed wetlands conveyance water that seeps through channels and returns to surface or groundwater.

conveyance seepage – urban — For the California Water Plan water portfolios, this represents the portion of urban conveyance water that seeps through channels and returns to surface or groundwater.

cost recovery — For the California Water Plan future scenarios, cost recovery designates who (marginal or existing users) pays the marginal and existing water costs. It also specifies circumstances where other revenue sources are used to recover costs. Costs can include capital, operation and maintenance, financing, and environmental compliance (documentation, permitting, and mitigation).

cover crop — A close-growing crop that provides soil protection, seeding protection, and soil improvement between periods of normal crop production or between trees in orchards and vines in vineyards. When plowed under and incorporated into the soil, cover crops may be referred to as green manure crops.

critical conditions of overdraft — Critical conditions of overdraft refers to a groundwater basin in which a continuation of present practices would probably result in significant adverse overdraft-related environmental, social, or economic impacts. The definition was created after an extensive public input process during the development of the California Department of Water Resources' Bulletin 118-80 report.

crop coefficient — A numerical factor (normally identified as Kp or Kc) that relates the evapotranspiration (ET) of an individual crop (ETc) to reference evaporation or some other index.

crop idling — For the California Water Plan future scenarios, this represents the temporary or permanent fallowing of land previously under irrigation that results in a reduction in stresses to a water system (e.g., alternate land use must result in a reduction in water use or an enhancement of water quality, or both).

crop rotation — A system of farming in which a succession of different crops is planted on the same land area, as opposed to growing the same crop time after time (monoculture).

crop unit water use — For the California Water Plan future scenarios, this represents the volume of irrigation water used per unit area of land, commonly expressed in acre-feet per acre. As used in scenario evaluation, a change in unit water use can be a function of evapotranspiration rates and cultural practices but not agricultural use efficiency, which is captured under its own distinct factor.

cross-connection — An unprotected actual or potential connection between a drinking water system and any source or system containing unapproved water or a substance that cannot be approved as safe, wholesome, and potable. Cross-connection is defined in the California Code of Regulations, Title 17, Section 7583.

***Cryptosporidium* —** *Cryptosporidium* is a significant concern in drinking water because it contaminates most surface waters used as drinking water sources in the United States, is resistant to chlorine and other disinfectants, and has caused waterborne disease outbreaks in the United States. Consuming water with *Cryptosporidium* can cause gastrointestinal illness, which may be severe and sometimes fatal for people with weakened immune systems (which may include infants, the elderly, and people who have AIDS). In 2006 the U.S. Environmental Protection Agency promulgated the Long Term 2 Enhanced Surface Water Treatment Rule (LT2ESWTR) to reduce illness linked to the contaminant *Cryptosporidium* and other pathogenic microorganisms in drinking water.

D

DBCP (or 1,2-dibromo-3-chloropropane) — DBCP is a health concern at certain levels of exposure, and a primary drinking water standard has been established for this contaminant. DBCP was once a popular pesticide; however, agricultural use of this pesticide was suspended in California in 1977.

debris flow flooding — Flows made up of water, liquefied mud, and debris that can form and accelerate quickly, reach high velocities, and travel great distances. They are commonly caused by heavy localized rainfall on hillsides denuded of vegetation.

dedicated (or developed) water supplies — For the California Water Plan water portfolios, this represents water distributed among urban and agricultural uses, and which is used to protect and restore the environment or for storage in surface water and groundwater reservoirs. In any year, some of the dedicated supply includes water that is used multiple times (reuse) and water held in storage from previous years. This is about 40 percent to 50 percent of the total annual water supply received from precipitation and imported from Colorado, Oregon, and Mexico.

deep percolation — Percolation of water through the ground and beyond the lower limit of the root zone of plants into groundwater. Efficient agricultural and urban irrigation practices limit or eliminate deep percolation. For the California Water Plan water portfolios, this represents the movement of applied water to a usable groundwater aquifer.

deep percolation of applied water – ag — For the California Water Plan water portfolios, this represents the portion of applied water for agricultural uses that percolates to the groundwater, including the water used for leaching accumulated salts from the root zone. This does not include reuse, evaporation, evapotranspiration of applied water, or flows/percolation to a salt sink.

deep percolation of applied water – urban — For the California Water Plan water portfolios, this represents the portion of applied water for urban outdoor uses that percolates to the groundwater. This does not include reuse, evaporation, evapotranspiration of applied water, or flows/percolation to a salt sink.

deep percolation of applied water – wetlands — For the California Water Plan water portfolios, this represents the portion of applied water for managed wetlands that percolates to the groundwater. This does not include reuse, evaporation, evapotranspiration of applied water, or flows/percolation to a salt sink.

Delta outflow — Freshwater outflow from the Sacramento-San Joaquin Delta (Delta) to protect the beneficial uses within the Delta from the incursion of saline water.

Delta Primary Zone — This zone is the Sacramento-San Joaquin Delta (Delta) land and water area of primary State concern and statewide significance, as described in Section 12220 of the California Water Code, but not within either the urban limit line or sphere of influence line of any local government's general plan or studies existing as of January 1, 1992. California Public Resources Code Section 29728 states: "The precise boundary lines of the Delta Primary Zone includes the land and water areas as shown on the map titled 'Delta Protection Zones' on file with the California State Lands Commission. Where the boundary between the primary zone and secondary zone is a river, stream, channel, or waterway, the boundary line shall be the middle of that river, stream, channel, or waterway." The Delta Primary Zone consists of approximately 500,000 acres.

Delta Secondary Zone — This zone is the Sacramento-San Joaquin Delta (Delta) land and water area within the boundaries of the legal Delta not included within the Delta Primary Zone, subject to the land use authority of local government, and which includes the land and water areas shown on the map referenced in "Delta

Primary Zone," above. The Secondary Zone consists of approximately 238,000 acres. (California Public Resources Code Section 29731.)

depletion — For the California Water Plan water portfolios, this represents the quantity of water consumed within a service area and no longer available as a source of supply. Depletion includes evaporation, evapotranspiration, and outflow to a salt sink.

desalination — A treatment process to remove salts from water to produce a water of lesser salinity than the source water. *See* "total desalination."

detailed analysis units (DAUs) — DAUs are the smallest study area for the analysis of water supply and use.

detention basin — A basin that stores stormwater for a limited amount of time and is designed to reduce stormwater flows downstream of the basin.

developed water supply — *See* "dedicated water supplies."

dewvaporation (atmospheric pressure desalination) — Desalination through humidification and subsequent dehumidification (collection of evaporated water).

direct diversions — For the California Water Plan water portfolios, this represents the amount of water diverted directly from streams and rivers and not withdrawn from storage in reservoirs.

direct potable reuse — The planned introduction of [highly treated] recycled water either directly into a (potable) public water supply distribution system downstream of any water treatment plant, or into a raw water supply immediately upstream of a water treatment plant (California Water Code Section 13561[b]).

direct reuse — The use of recycled water that has been transported from a wastewater treatment plant to a reuse site without passing through a natural surface water body or groundwater.

discharge area — An area where the groundwater that has been recharged flows out of the aquifer under natural conditions or is removed from the aquifer by wells. *See also* "recharge area."

distribution system (or water distribution system) — (1) A system of ditches or conduits and their controls that conveys water from a supply canal to points of delivery. (2) An interconnected series of pipes, storage facilities, and components that convey treated drinking water and meet the fire protection needs for cities, homes, schools, hospitals, businesses, industries, and various facilities. Public water systems depend on distribution systems to provide an uninterrupted supply of pressurized safe drinking water to all consumers.

domestic well — A water well used to supply water for the domestic needs of an individual residence or local small water system of four or fewer service connections or homes. Small water systems with 1-4 service connections are not defined by either the California Health and Safety Code or Title 22 of the California Code of Regulations. The California Department of Public Health and various county environmental health agencies throughout the state, acting as the drinking water program primacy agency for "state small water systems" or "small community water systems," generally define private domestic wells as wells serving up to four service connections. On the other hand, some local health agencies define a private domestic well as serving an individual residence (single connection) and a "local small (or shared) water system" as having two to four service connections (Governor's Drinking Water Stakeholder Group 2014).

drainage basin — *See* "watershed."

drinking water standards — State and federal regulations regarding drinking water quality delivered by public water systems to customers. Primary drinking water standards, called "maximum contaminant levels" or MCLs, are established to protect public health by limiting the levels of contaminants in drinking water. Secondary drinking water standards, called "secondary maximum contaminant levels" or SMCLs, are established for aesthetic considerations, such as taste, color, and odor. These contaminants are not considered to present a risk to human health at the SMCL.

drinking water system — *See* "public water system," "community water system."

drinking water treatment and distribution — Drinking water treatment refers to the physical, biological, and chemical processes that make water suitable for drinking by ensuring that drinking water standards are met. A drinking water distribution system is an interconnected series of pipes, storage facilities, and components that convey drinking water and meet the fire protection needs of customers. Public water systems depend

on distribution systems to provide an uninterrupted supply of pressurized safe drinking water to all consumers.

drip irrigation — A method of micro irrigation wherein water is applied to the soil surface as drops or small streams through emitters. Discharge rates are generally less than 8 liters per hour (2 gallons per hour) for single-outlet emitters and 12 liters per hour (3 gallons per hour) per meter for line-source emitters.

drought condition — Hydrologic conditions during a defined period, greater than one dry year, when precipitation and runoff are much less than average.

drought preparedness — The magnitude and probability of economic, social, or environmental consequences that would occur as a result of a sustained drought under a given study plan. Evaluation criteria measure the "drought tolerance" of study plans.

drought year supply — The average annual supply of a water development system during a defined drought period.

dry-weather runoff — Dry-weather runoff occurs when, for example, excess landscape irrigation water flows to a storm drain. It is a concern because it can carry a significant amount of pollutants to surface waters.

duty of water — The total volume of irrigation water required to mature a particular type of crop. It includes consumptive use, evaporation, and seepage, as well as the water returned to streams by percolation and surface water.

E

economic incentives — Financial assistance and pricing policies intended to influence water management, including amount of use, time of use, wastewater volume, and source of supply, among other related factors.

ecosystem restoration — The activity of improving the condition of natural landscapes and biotic communities.

ecosystem valuation methods — Ecosystems perform a multitude of complex and interrelated functions that not only provide basic biological support, but also provide valuable goods and services to society (e.g., enhanced water supply and quality, flood damage reduction, recreation). If these goods and services can be identified and measured, then it may be possible to place monetary values on them by using market or non-market valuation methods.

ecozone — *See* "bioregion."

effective porosity — The interconnected portion of the total voids or open spaces in alluvium and rocks that is capable of transmitting fluids.

effective precipitation — That portion of precipitation that supplies crop evapotranspiration. It includes precipitation stored in the soil before and during the growing season.

effective rooting depth — The depth from which soil moisture is extracted; it is determined by the crop rooting characteristics and soil depth limitations.

efficient water management practice (EWMP) — Technology or procedures employed by an agricultural water supplier to increase the beneficial use of water. There are 16 EWMPs defined in California Water Code Section 10608.48.

electrical conductivity (EC) — The measure of water's ability to conduct an electrical current. Conductivity depends on the ion concentration and temperature and can be used to approximate the total dissolved solids in the water.

energy costs — For the California Water Plan future scenarios, this represents the cost of energy use related to producing, conveying, and applying water. It also refers to the cost of energy use for processes and inputs not directly related to water but which can affect the demand for water (e.g., the cost of nitrogen fertilizer or tractor manufacturing).

energy production — Both instantaneous capacity (megawatt) and energy produced (kilowatt hours).

environmental equity/justice — Equal protection from environmental hazards for individuals, groups, or communities regardless of race, ethnicity, or economic status. The fair treatment of people of all races, cultures, and incomes with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies (Government Code Section 65040.12[e]).

environmental water — Minimum flow levels of a specific quality needed to ensure the continued viability of fish and wildlife resources for a particular water body. This is water used to maintain and enhance beneficial uses related to the preservation and enhancement of fish, wildlife, and other aquatic resources or preserves, as specified in the Porter-Cologne Water Quality Control Act.

environmental water (flow-based) — For the California Water Plan water portfolios, this represents the amount of water dedicated to instream fishery uses, rivers designated as Wild and Scenic, required and actual Sacramento-San Joaquin Delta outflow, and the Environmental Water Account.

environmental water (land-based) — For the California Water Plan water portfolios, this represents the amount of water used for fresh- and brackish-water managed wetlands and native vegetation.

Environmental Water Account — An element of the CALFED Bay-Delta Program's overall management strategy for the San Francisco Bay/Sacramento-San Joaquin Delta ecosystem. Its purpose is to protect fish of the Bay-Delta estuary through environmentally beneficial changes in the operations of the Central Valley Project and State Water Project.

environmental water quality — Water quality in terms of ecosystem health, recreation, salinity intrusion, usability per sector, treatment costs, etc. Aquatic species and water bodies are vulnerable to changes in water quality.

ETAW — *See* "evapotranspiration of applied water."

ethylene dibromide — Ethylene dibromide is a health concern at certain levels of exposure, and a primary drinking water standard has been established for this contaminant. Ethylene dibromide was once a popular pesticide and was used as a gasoline additive, but both uses have now been discontinued.

ETo (reference evapotranspiration) — The evapotranspiration rate from an extended surface of 3- to 6-inch-tall (8- to 15-centimeter-tall) green grass cover of uniform height, actively growing, completely shading the ground, and not short on water (the reference evapotranspiration rate reported by the California Irrigation Management Irrigation System).

eutrophic conditions — Eutrophic conditions exist in a body of water that has high primary productivity resulting from excessive nutrients and is subject to algal blooms, resulting in poor water quality. Typically, such a body of water is deficient in oxygen in the deeper regions — ranging from hypoxic to anoxic. These conditions do not favor fish species, such as trout, which require or prefer cold, well-oxygenated water.

evaluation criteria — The technical information that will be used to compare the favorability of different response packages of resource management strategies against future scenarios in *California Water Plan Update 2013*. They are designed to identify and measure potential effects on water supply, the environment, energy use or production, recreational opportunities, groundwater overdraft, and more.

evaporation — The physical process by which a liquid or solid is transformed to a gaseous state.

evaporation from lakes — For the California Water Plan water portfolios, this represents the annual surface evaporation from natural lakes.

evaporation from reservoirs — For the California Water Plan water portfolios, this represents the annual surface evaporation from constructed surface water reservoirs.

evaporation and evapotranspiration from native vegetation — For the California Water Plan water portfolios, this represents the evaporation of precipitation from land surfaces and the evapotranspiration of precipitation by trees, brush, grass, and other plants.

evaporation and evapotranspiration from unirrigated ag — For the California Water Plan water portfolios, this represents the evaporation of precipitation and the evapotranspiration of precipitation by dry-farmed crops.

evaporation and evapotranspiration from wastewater urban — For the California Water Plan water portfolios, this represents the portion of urban wastewater that either evaporates or is used by plants.

evaporative demand — The collective influence of all climatic factors on the rate of evaporation of water.

evapotranspiration (ET) — The amount of water transpired by plants, retained in plant tissues, and evaporated from plant tissues and surrounding soil surfaces. *See also* "green water."

evapotranspiration of applied water (ETAW) — The amount of consumptive use by crops, landscapes, or other vegetation. ETAW is the portion of evapotranspiration (ET) that was provided by applied irrigation water.

evapotranspiration of applied water – ag — For the California Water Plan water portfolios, this represents the applied water consumptively used through evaporation and transpiration by agricultural crops.

evapotranspiration of applied water – urban — For the California Water Plan water portfolios, this represents the applied water consumptively used through evaporation and transpiration by urban areas, parks and other recreation areas, and energy production.

evapotranspiration of applied water – wetlands — For the California Water Plan water portfolios, this represents the applied water consumptively used through evaporation and transpiration by managed wetlands.

excess Delta outflow — For the California Water Plan water portfolios, this represents the freshwater outflow from the Sacramento-San Joaquin Delta that exceeds the amount required by law.

expected annual damage (EAD) — EAD is the value that measures the severity of flood loss in any given year. EAD does not mean that this amount of damage will occur in any particular year, but rather that over a long period, the average damages will tend to approach that amount.

extraction wells — In the process of extracting groundwater for remediation, groundwater flows through the aquifer(s) toward the extraction wells, where it is removed for treatment.

F

finished water — Finished water is treated or conditioned to the point that it meets drinking water standards and is suitable for distribution to consumers for all drinking water uses.

firm water supply — The Central Valley Project Improvement Act Section 3406(d) (Refuge Water Supply) establishes the primary goal of providing a "firm water supply" for wildlife refuges. *See also* "firm-yield approach."

firm-yield approach — To deliver the same amount of water every year regardless of water supply conditions.

flash flooding — Quickly forming floods with high-velocity flows often caused by stationary or slow-moving storms. Flash floods typically occur on steep slopes and impermeable surfaces, and in areas adjacent to local streams and creeks.

flood fight — The emergency measures used to prevent levee failure from seepage, erosion, or overtopping during high water.

flood hazard — The Federal Emergency Management Agency defines a flood hazard as any flood event or condition with the potential to cause fatalities, injuries, property damage, infrastructure damage, agricultural loss, environmental damage, business interruption, or other loss.

flood insurance rate map (FIRM) — A FIRM is the official map of a community on which the Federal Emergency Management Agency has delineated the special flood hazard areas, the base flood elevations, and the risk premium zones applicable to the community.

flood irrigation — A method of irrigation in which water is applied to the soil surface without flow controls, such as furrows, borders, or corrugations.

flood management — *See* "flood risk management."

flood risk — Flood risk is the likelihood of consequence of inundation within an identified area, given a specified climate condition, land use condition, and flood management system (existing or planned) in place. The consequence may be direct or indirect economic cost, loss of life, environmental impact, or other specified measure of flood effect. Flood risk is a function of the following components:

- Loading, which is the frequency and magnitude of flooding.
- Performance of flood management measures.
- Exposure and vulnerability, which are the relationship between the flood hazard (rising or flowing water) and its effect on life loss, property, and/or environmental resources.
- Consequence.

Therefore, flood management actions may reduce risk by changing loading, performance, exposure, vulnerability, and/or consequence.

flood risk management — Flood risk management seeks to reduce flood risks by managing the floodwaters to reduce the probability of flooding (including by levees and dams) and by managing the floodplains to reduce the consequences of flooding. Flood risk management requires integrating and synchronizing programs at various levels of government designed to reduce flood risk. (U.S. Army Corps of Engineers 2013)

floodplain — The extent of the flood hazard for a 100-year (1 percent chance of exceedance in a given year) or 500-year (0.2 percent chance of exceedance in a given year) event, as determined by the Central Valley Flood Protection Plan, Federal Emergency Management Agency, or U.S. Army Corps of Engineers.

floodplain management — Actions designed to reduce risks to life, property, and the environment resulting from flooding. Actions can include watershed management, infrastructure construction and operation, variations in land use practices, floodway designations, etc.

FloodSAFE California — FloodSAFE California refers to the California Department of Water Resources multi-faceted initiative launched in 2006 to improve public safety through flood management, in the context of integrated water management, and to reduce potential flood damages in areas of the state with the highest risk. Although led at the State level and initially funded by bond money from Propositions 1E (2006) and 84 (2006), FloodSAFE implementation relies on the cooperation and assistance of federal partners, tribal entities, local sponsors, and other stakeholders. The FloodSAFE vision is a sustainable system of flood management, with an integrated water management approach and emergency response throughout California, which improves public safety, protects and enhances environmental and cultural resources, and supports economic growth by reducing the probability of destructive floods, promoting beneficial floodplain processes, and lowering the damages caused by flooding.

flow diagram — A diagram that characterizes a region's hydrologic cycle by documenting sources of water, such as precipitation and inflows, and tracks the water as it flows (through many different uses) to its ultimate destinations.

flow diagram table — An itemized listing of all the categories contained in a flow diagram but including more detailed information, organized by "inputs" and "withdrawals."

fluvial — The processes associated with rivers and streams comprising the motion of sediment and erosion of or deposition on the river bed.

forecast-coordinated operations (FCOs) — Forecast-coordinated operations refers to improving tools to forecast precipitation and river flows to allow drawing down flood management reservoirs in anticipation of major runoff so that more reservoir space is available to control downstream flood releases from a reservoir without affecting water supply.

forgone use — The difference between the quantity of water demanded and the supply available for use.

full cost — (1) All monetary costs associated with project planning, implementation, financing, or impact mitigation plus any recurring costs required to sustain benefits; *plus* (2) all nonmonetary costs that are incurred either at implementation or on a recurring basis, such as unmitigable environmental or cultural impacts, public trust, environmental justice, or other nonmarket-based societal values. (Coincides with California Environmental Quality Act/National Environmental Policy Act study requirements and other permitting requirements.)

furrow irrigation — A method of surface irrigation in which water is supplied to small ditches or furrows and guided across a field.

G

geomorphology — Geomorphology looks at the processes that shape and alter the surface features of the land. By studying landforms, including their origin and patterns, scientists attempt to comprehend the history and dynamics of landscapes.

***giardia* —** *Giardia* is a significant concern in drinking water, because consuming water with *giardia* can cause gastrointestinal illness. Since 1971, *giardia* has been the most commonly identified pathogen in waterborne outbreaks reported in the United States. In 1989 the U.S. Environmental Protection Agency promulgated the Surface Water Treatment Rule (SWTR) to prevent waterborne disease caused by viruses, *legionella*, and *giardia lamblia*.

goals — The California Water Plan goals are the desired outcomes and are founded on the statewide vision. Meeting the goals requires coordination among State, federal, tribal, and local governments and agencies.

gray water — Untreated wastewater that has not been affected by infectious, contaminated, or unhealthy bodily wastes, and which does not present a threat from contamination by unhealthful processing, manufacturing, or operating wastes. Gray water includes, but is not limited to, wastewater from bathtubs, showers, bathroom washbasins, clothes washing machines, and laundry tubs, but does not include wastewater from kitchen sinks or dishwashers. (California Water Code Section 14876 and Health and Safety Code Section 17922.12)

gray water footprint — The gray water footprint of a product is an indicator of freshwater pollution that can be associated with the production of a product over its full supply chain. It is defined as the volume of fresh water that is required to assimilate the load of pollutants based on existing ambient water quality standards. It is calculated as the volume of water that is required to dilute pollutants to such an extent that the quality of the water remains above agreed-upon water quality standards. This definition differs from general urban water use terms in which gray water is any wastewater that comes from an urban dwelling that does not contain bodily wastes (e.g., washing machine effluent) (definition taken in part from Hoekstra et al. 2011). *See also* "urban wastewater produced."

grayfield land — *See* "brownfields."

green water — The precipitation on land that does not run off or recharge the groundwater but is stored in the soil or temporarily stays on top of the soil or vegetation. Eventually, this part of precipitation evaporates or transpires through plants. Green water can be made productive for crop growth (but not all green water can be taken up by crops, because there will always be evaporation from the soil and because not all periods of the year or areas are suitable for crop growth) (definition taken in part from Hoekstra et al. 2011). *See also* "conveyance seepage – ag" and "ag effective precipitation on irrigated lands."

green water footprint — The volume of rainwater consumed during the production process. This is particularly relevant for agricultural and forestry products (products based on crops or wood), where it refers to the total rainwater evapotranspiration (from fields and plantations) plus the water incorporated into the harvested crop or wood (definition taken in part from Hoekstra et al. 2011). *See also* "ag effective precipitation on irrigated lands."

greenhouse gas emissions (GHGs) — Also referred to as carbon intensity or carbon footprint. The storage and transport of water generates hydroelectricity, which is California's largest source of energy that does not produce GHG emissions. At the same time, though, water conveyance, groundwater extraction, water and wastewater treatment, and especially water use can involve the use of substantial amounts of carbon-based energy, which in turn results in GHG emissions that contribute to climate change. Each water management strategy should be evaluated for its contribution to the accumulation of GHGs in our atmosphere.

groundwater — Water that occurs beneath the land surface and fills the pore spaces of the alluvium, soil, or rock formation in which it is situated. It excludes soil moisture, which refers to water held by capillary action in the upper unsaturated zones of soil or rock. Groundwater classified as underflow of a surface water system, a "subterranean stream flowing through a known and definite channel," is subject to statutory permitting processes. However, most groundwater in California is presumed to be "percolating water" (i.e., water in underground basins and groundwater that has escaped from streams and is not subject to a permitting process). *See also* "subterranean stream."

Glossary

groundwater banks — Consist of water that is "banked" during wet or above-normal water years. The water to be banked is provided by the entity that will receive the water in times of need. Although transfers or exchanges may be needed to get the water to the bank and from the bank to the water user, groundwater banks are not transfers in the typical sense. The water user stores water for future use; this is not a sale or lease of water rights. It is typical for fees to apply to the use of groundwater banks.

groundwater basin — An alluvial aquifer or a stacked series of alluvial aquifers with reasonably well-defined boundaries in a lateral direction and having a definable bottom. *See also* "recharge basin."

groundwater budget — A numerical accounting — the groundwater equation — of the recharge, discharge, and changes in storage of an aquifer, part of an aquifer, or a system of aquifers.

groundwater extractions – adjudicated — For the California Water Plan water portfolios, this represents the amount of water withdrawn from basins that have been adjudicated from the beginning of the water year to the end of the water year.

groundwater extractions – banked — For the California Water Plan water portfolios, this represents the amount of water withdrawn from formal interagency banking programs from the beginning of the water year to the end of the water year.

groundwater extractions – unadjudicated — For the California Water Plan water portfolios, this represents the amount of water withdrawn from basins that are not adjudicated or part of a contract banking program from the beginning of the water year to the end of the water year.

groundwater in storage — The quantity of water in the zone of saturation.

groundwater management — The planned and coordinated management of a groundwater basin or portion of a groundwater basin with a goal of long-term sustainability of the resource.

groundwater management plan — A comprehensive document developed for the purpose of groundwater management and adopted by an agency having appropriate legal or statutory authority.

groundwater mining — The process, deliberate or inadvertent, of extracting groundwater from a source at a rate in excess of the replenishment rate such that the groundwater level declines persistently, threatening exhaustion of the supply or at least a decline of pumping levels to uneconomic depths.

groundwater monitoring network — A series of monitoring wells at appropriate locations and depths to effectively cover the area of interest. Scale and density of monitoring wells are dependent on the size and complexity of the area of interest and the objective of monitoring.

groundwater natural recharge — For the California Water Plan water portfolios, this represents the percolation to groundwater basins from precipitation falling on the land and from flows in rivers and streams.

groundwater overdraft — The condition of a groundwater basin in which the amount of water withdrawn by pumping exceeds the amount of water that recharges the basin over a period of years during which water supply conditions approximate average conditions.

groundwater quality — Groundwater quality is a measure of the chemical, physical, bacteriological, and radiological characteristics of groundwater. Groundwater may be contaminated by either naturally occurring or anthropogenic (human-caused) sources of contamination. Groundwater that becomes contaminated by anthropogenic sources is difficult to cleanup and may take on the order of decades for the water cycle to displace the contaminated groundwater with clean water. *See also* "water quality."

groundwater recharge — The natural or managed infiltration or injection of water into a groundwater aquifer.

groundwater recharge applied water — The amount of water that is intentionally recharged through deep percolation methods into a water bank or other unconfined alluvial aquifer system for storage for future use. Applied water is an outflow or "return flow to developed supply" that goes into groundwater storage.

groundwater recharge evaporation and evapotranspiration (GW recharge E+ET) — For the California Water Plan water portfolios, this represents the amount of evaporation and evapotranspiration occurring from intentional groundwater recharge.

groundwater recharge facility — A structure that serves to conduct surface water into the ground for the purpose of replenishing groundwater. The facility may consist of dug or constructed spreading basins, pits, ditches, furrows, streambed modifications, or injection wells.

groundwater recharge – adjudicated basins — For the California Water Plan water portfolios, this represents the amount of water recharged into groundwater basins that have been adjudicated by a court of law.

groundwater recharge – contract banking — For the California Water Plan water portfolios, this represents the amount of water recharged into groundwater basins under formal contract programs.

groundwater recharge – unadjudicated basins — For the California Water Plan water portfolios, this represents the amount of water recharged into groundwater basins that are neither adjudicated nor part of formal contract banking programs.

groundwater remediation/aquifer remediation — Groundwater remediation involves extracting contaminated groundwater from an aquifer, treating it, and then either returning it to the aquifer or using it for agricultural or municipal purposes. Aquifer remediation is usually accomplished by treating groundwater while it is still in the aquifer by using in-situ methods involving biological, physical, or chemical treatment or electrokinetics.

groundwater source area — An area where groundwater may be found in economically retrievable quantities outside of normally defined groundwater basins. This generally refers to areas of fractured bedrock in foothill and mountainous terrain where groundwater development is based on successful well penetration through interconnecting fracture systems. Well yields are generally lower in fractured bedrock than within groundwater basins. *See also* "groundwater basin."

groundwater storage — Groundwater storage can be defined in three different ways, depending on the context of its use: (a) the quantity of water that occurs beneath the land surface and fills the pore spaces of the alluvium, soil, or rock formation beneath the land surface; (b) the volume of usable physical space available to store water in the pore spaces of the alluvium, soil, or rock formation beneath the land surface; or (c) the act of storing water in the pore spaces of the alluvium, soil, or rock formation beneath the land surface.

groundwater storage capacity — The volume of void space that can be occupied by water in a given volume of a formation, aquifer, or groundwater basin.

groundwater subbasin — A subdivision of a groundwater basin created by dividing the basin by using geologic and hydrologic conditions or institutional boundaries. *See* "groundwater basin."

groundwater subsurface inflow — For the California Water Plan water portfolios, this represents the amount of water that flows into a region underground.

groundwater subsurface outflow — For the California Water Plan water portfolios, this represents the amount of water that flows underground and out of a region.

groundwater table — The upper surface of the zone of saturation in an unconfined aquifer.

guiding principles — The guiding principles of the California Water plan describe the core values and philosophies that dictate how to achieve a vision, mission, and goals. In other words, guiding principles describe how to make decisions and do business.

H

halophytes — Highly salt-tolerant grasses.

hazardous waste — Waste that poses a present or potential danger to human beings or other organisms because it is toxic, flammable, radioactive, or explosive, or has some other property that produces substantial risk to life.

hydraulic barrier — A barrier created by injecting fresh water to control seawater intrusion in an aquifer or that is created by injecting water to control migration of contaminants in an aquifer.

hydraulic conductivity — A measure of the capacity for a rock or soil to transmit water; this generally is expressed in units of feet per day (ft/day) or centimeters per second (cm/sec).

hydrograph — A graph that shows some property of groundwater or surface water as a function of time at a given point.

hydrologic basin — Where conceptually any drop of water that falls in the basin will flow to a stream or groundwater basin within it. A subset is the groundwater basin, which can be within a hydrologic basin. The California Department of Water Resources' hydrologic regions are collections of the larger hydrologic basins. Basin names are based on published and unpublished reports, topographic maps, and local terminology. Names of more recently delineated basins or subbasins are based on the principal geographic feature, which in most cases corresponds to the name of a valley. In the case of a subbasin, its formal name should include the name of the basin (e.g., Sacramento Valley Groundwater Basin, North American Subbasin). However, both locally and informally, the term subbasin is used interchangeably with basin (e.g., North American Basin).

hydrologic cycle — The circulation of water from the ocean through the atmosphere to the land and ultimately back to the ocean.

hydrologic region — A geographical division of the state based on the local hydrologic basins. The California Department of Water Resources divides California into 10 hydrologic regions that correspond to the state's major water drainage basins: North Coast, North Lahontan, Sacramento River, San Francisco Bay, Central Coast, San Joaquin River, Tulare Lake, South Coast, South Lahontan, and Colorado River.

hydrologic unit — The United States is divided and subdivided into successively smaller hydrologic units, which are classified into four levels: regions, subregions, accounting units, and cataloging units. The hydrologic units are arranged within each other, from the smallest (cataloging units) to the largest (regions). Each hydrologic unit is identified by a unique hydrologic unit code (HUC) consisting of two to eight digits, based on the four levels of classification in the hydrologic unit system. (*Visit* http://water.usgs.gov/GIS/huc.html for more information.)

hydrology — A science related to the occurrence and distribution of natural water on Earth, including the annual volume and the monthly timing of runoff.

hydromodification — Channel modification (channelization), flow alterations, levees, and dams.

hydrostratigraphy — A geologic framework consisting of a body of rock having considerable lateral extent and composing a reasonably distinct hydrologic system.

hygroscopic materials — Substances that take up water from the air. Some hygroscopic materials are being tried as supplemental cloud-seeding agents.

hyporheic zone — The region of saturated sediments beneath and alongside the active channel, which contains some proportion of surface water that was part of the flow in the surface channel and went back underground and could mix with groundwater.

hypoxic zone — As defined by the U.S. Geological Survey's Toxic Substances Hydrology Program, "Zones of hypoxia develop in water bodies, typically estuaries and coastal waters, when dissolved oxygen concentrations fall below the level to sustain most aquatic animal life. Hypoxia can be caused by a variety of factors, including excess nutrients, primarily nitrogen and phosphorus, and water body stratification due to saline or temperature gradients. These excess nutrients, eutrophication, promote algal growth. As dead algae decompose, oxygen is consumed in the process, resulting in low levels of oxygen in the water."

I

impaired waters — A water body that has been determined under State and federal law as not meeting water quality standards, or having the potential to not meet such standards in the future. Impaired waters are included on California's 303(d) list.

indirect potable reuse — The planned use of recycled water for replenishment of a groundwater basin or an aquifer that has been designated as a source of water supply for a public water system (California Water Code 13561[c]). *See also* "surface water augmentation."

indirect reuse — The reuse of recycled water after it has been discharged into and comingled with a natural surface water body.

industrial activity mix — For the California Water Plan future scenarios, this represents a mix of high- and low-water-using industrial activity. Note that industrial activity is broken into two factors: total industrial activity and industrial activity mix. The latter factor allows designation of the type of industry that is occurring. This is necessary to account for the large variation in water demands by industry type. *See also* "total industrial activity."

infiltration — The flow of water downward from the land surface into and through the upper soil layers.

infiltration basin — A shallow basin designed to infiltrate stormwater into the ground.

infiltration capacity — The maximum rate at which infiltration can occur under specific conditions of soil moisture.

Infiltration rate — The quantity of water that can enter the soil in a specified time interval.

inflow from Mexico — For the California Water Plan water portfolios, this represents the New River and Alamo River inflows from Mexico.

inflow from Oregon — For the California Water Plan water portfolios, this represents the Klamath River inflow from Oregon.

infrastructure — The underlying foundation or basic framework of a system. For water supply, this includes the canals, pipelines, pumps, reservoirs, and treatment plants that make up a treatment and delivery system.

injection wells — Injection wells are used primarily to recharge confined aquifers. The design of an injection well for artificial recharge is similar to that of a water supply well. The principal difference is that water flows from the injection well into the surrounding aquifer under either a gravity head or a head maintained by an injection pump.

in-lieu recharge — The practice of providing surplus surface water to historical groundwater users, thereby leaving groundwater in storage for later use. *See also* "groundwater recharge."

instream environmental — For the California Water Plan water portfolios, this represents the instream flows used only for environmental purposes.

instream flows — For the California Water Plan water portfolios, this represents the use of water within its natural watercourse as specified in an agreement, water rights permit, court order, Federal Energy Regulatory Commission license, etc. They support natural ecosystems; create habitat for plants and animals; and may provide additional benefits, such as recreation. *See also* "required instream flows."

instream recharge — Recharge that allows water to percolate through a streambed itself.

instream uses — The beneficial uses of water within a stream or river without diversion from the stream.

integrated on-farm drainage management — An integrated agricultural water management system that applies subsurface drainage water to a sequence of increasingly salt-tolerant crops.

integrated regional water management (IRWM) — IRWM is a collaborative effort to manage all aspects of water resources in a region and is the application of integrated water management (IWM) principals at the regional scale to improve public safety, environmental stewardship, and economic stability. IRWM is based on regional water managers and resource planners being best suited and best positioned to manage regional and local water resources to meet regional needs.

integrated water management (IWM) — IWM is a comprehensive and collaborative approach for managing water to concurrently achieve social, environmental, and economic objectives. In the California Water Plan, these objectives are focused toward improving public safety, fostering environmental stewardship, and supporting economic stability. The integrated approach delivers higher value for investments by

considering all interests, providing multiple benefits, and working across jurisdictional boundaries at the appropriate geographic scale. Examples of multiple benefits include improved water quality, better flood management, restored and enhanced ecosystems, and more reliable water supplies.

Integrated Water Resources Information System (IWRIS) — IWRIS is a data management tool for water resources data. It is a Web-based geographic information system (GIS) application that allows one to access, integrate, query, and visualize multiple sets of data. Some of the databases include the California Department of Water Resources' Water Data Library, the California Data Exchange Center (CDEC), U.S. Geological Survey streamflow, Local Groundwater Assistance Grants (AB303), and data from local agencies. *See also* "Water PIE."

intercropping — The simultaneous planting of two or more crops in the same field. The practice is used to help control pest populations that can occur on monoculture crops; it is sometimes called "polycropping" or "plant stratification."

interfluves — Smaller watersheds or areas outside of the larger watershed boundaries used at the regional planning scale.

interregional import projects — For the California Water Plan future scenarios, this represents the movement of water between hydrologic regions through such mechanisms as the State Water Project and federal water projects.

interties — An interconnection permitting passage of utility service (e.g., water or electricity) between two or more systems, such as electric and water utility systems.

invasive species — Non-indigenous plants or animals that adversely affect the habitats they invade economically, environmentally, and/or ecologically.

ion exchange — Processes of purification, separation, and decontamination of aqueous and other ion-containing solutions with solid ion exchangers, such as sodium carbonate used for water softening.

irrecoverable water — For the California Water Plan water portfolios, this represents the amount of applied water that flows or percolates to a salt sink, is used by the growth process of plants (evapotranspiration), or evaporates from a conveyance facility or drainage canal. *See also* "recoverable water."

Irrigated Lands Regulatory Program — State Water Resources Control Board and Regional Water Quality Control Board program regulating discharges from irrigated agriculture through conditional waivers of Waste Discharge Requirements.

irrigation efficiency (IE) — The efficiency of water application and use, calculated by dividing a portion of applied water that is beneficially used by the total applied water, expressed as a percentage. The two main beneficial uses are crop water use (evapotranspiration or ET) and leaching to maintain a salt balance.

irrigation water requirements — The quantity of water, exclusive of precipitation, that is required for various irrigation purposes.

J

joint powers agreement (JPA) — An agreement entered into by two or more public agencies that allows them to jointly exercise any power common to the contracting parties. JPA is defined in California Government Code Title 1, Division 7, Chapter 5 (commencing with Section 6500).

K

Keyline systems — Keyline systems of water and soil conservation were developed in Australia during the 1950s by mining geologist and inventor P.A. Yeomans, as a response to increasing desertification and erosion of the landscape. Keyline agriculture is a permaculture farming technique offering holistic farm design. Keyline is a set of principles, techniques, and systems that coordinates into a development plan for rural and urban landscapes. The result is a strategic master plan to develop the natural or existing landscape through regeneration and enhancement. On Keyline properties, the typical vistas are of lakes with water

birds, roads along the contours and ridge lines, contour tree belts, healthy crops, and green pasture growing in dark, biologically fertile soil.

L

lacustrine — Natural lake, pond, and human-made reservoir ecosystems.

land subsidence — Land subsidence occurs in areas experiencing significant declines in groundwater levels. When groundwater is extracted from aquifers in sufficient quantity, the groundwater level is lowered and the water pressure, which supports the sediment grains structure, decreases. In unconsolidated deposits, as aquifer pressures decrease, the increased weight from overlying sediments may compact the fine-grained sediments and permanently decrease the porosity of the aquifer and the ability of the aquifer to store water. Elastic land subsidence is the reversible and temporary fluctuation of the earth's surface in response to seasonal groundwater extraction and recharge. Inelastic land subsidence is the irreversible and permanent decline in the earth's surface due to the collapse or compaction of the pore structure within the fine-grained portions of an aquifer system (U.S. Geological Survey 1999). Land subsidence thus results in irreversible compaction of the aquifer and permanent loss of aquifer storage capacity, and has serious effects on groundwater supply and development. Land subsidence due to aquifer compaction causes costly damage to the gradient and flood capacity of conveyance channels, to water system infrastructure (including wells), and to farming operations.

law of demand — People will purchase less of a good or service as its price increases.

leaching efficiency — The ratio of the average salt concentration in drainage water to an average salt concentration in the soil water of the root zone when near field capacity.

leaching requirements — The fraction of water entering the soil that must pass through the root zone to prevent soil salinity from exceeding a specific value.

leaky confining layer — A low-permeability layer that can transmit water at sufficient rates to furnish some recharge from an adjacent aquifer to a well.

legacy pollutants — Examples of legacy pollutants are mercury, extracted from the Coast Ranges and used to process gold in the Sierra Nevada mines in the 19th century; industrial chemicals, such as polychlorinated biphenyls (PCBs), used in electrical transformers; and pesticides, such as dichloro-diphenyl-trichloroethane (DDT).

lithologic log — A record of the lithology of the soils, sediments, or rock encountered in a borehole from the surface to the bottom.

lithology — The description of rocks, especially in hand specimens and in outcrops, on the basis of such characteristics as color, mineralogic composition, and grain size.

local deliveries — For the California Water Plan water portfolios, this represents the amount of water delivered by local water agencies and individuals. It includes direct deliveries of water from streamflows, as well as local water-storage facilities. It also includes water supply for instream and Wild and Scenic river flows — a change from *California Water Plan Update 2005*, wherein there was a separate category for dedicated environmental water.

local imports — For the California Water Plan water portfolios, this represents the amount of water transferred by local agencies from other regions of the state.

low-impact development (LID) — LID uses site design and stormwater management to maintain the site's pre-development runoff rates and volumes. Design techniques filtrate, filter, store, evaporate, and detain runoff close to the source of rainfall. LID can be used to benefit water quality and to address the modifications to the hydrologic cycle, and it can be a means to augment local water supply through either infiltration or water harvesting. LID is seen in California as an alternative to conventional stormwater management.

Glossary

M

managed wetlands applied water use — For the California Water Plan water portfolios, this represents the applied water use for managed wetland areas.

management allowable depletion (MAD) — The percentage of available water that an irrigator will allow plants to deplete before irrigating, or the depth of water that an irrigator will allow plants to extract from the root zone between irrigations.

management objectives — Objectives that set forth the priorities and measurable criteria of water management (e.g., improve water quality, augment water supplies, improve water use efficiency).

matching water quality to use — A resource management strategy recognizing that not all water uses require the same quality of water. High-quality water sources can be used for drinking and industrial purposes that benefit from higher quality water, whereas lesser quality water is adequate for other uses.

maximum contaminant level (MCL) — The maximum permissible level of a contaminant in drinking water delivered to any user of a public water system. MCLs are drinking water standards set in federal and State Safe Drinking Water Act regulations.

Mediterranean climate — Most of California has this type of climate, characterized by cool, rainy winters and dry summers.

micrograms per liter — Chemical contaminants in water are often measured in micrograms per liter (µg/L) or parts per billion.

microirrigation — The frequent application of small quantities of water as drops, tiny streams, or miniature sprays through emitters or applicators placed along a water delivery line. Microirrigation encompasses a number of methods or concepts, such as bubbler, drip, trickle, mist, and spray irrigation.

milligrams per liter — Chemical contaminants in water are often measured in milligrams per liter (mg/L) or parts per million.

mission statement — The California Water Plan's mission statement describes the collaborative efforts to prepare for California's most pressing statewide and regional water management issues and challenges, the California Water plan's unique purpose, and its overarching reason for existence. It identifies what the water plan should do, why, and for whom.

mitigation (measurements/strategies) — In the context of climate change, this represents the reduction of human activities that affect global climate change; it includes strategies to reduce greenhouse gas emissions.

methyl tertiary butyl ether (MTBE) — An additive originally put in gasoline to reduce air pollution, but later found to be a source of groundwater pollution. The State of California ordered a phase-out of its use in California gasoline by the end of 2003.

monitoring well — A well used to obtain water quality samples or measure groundwater levels.

multicropping — The practice of consecutively producing two crops (double cropping) or more of either like or unlike commodities on the same land within the same year. An example of double cropping might be to harvest a wheat crop by early summer and then plant corn or beans on that acreage for harvest in the fall. Suitable climates and reliable water supplies are important factors with this practice.

municipal recycled water — Recycled water that wholly or in part is derived from municipal wastewater and is subsequently beneficially reused. Beneficial reuses are not limited to municipal applications.

Municipal Separate Storm Sewer System (MS4) — A system of pipes, ditches, or gullies that is owned and/or operated by a municipal government entity for collecting and conveying stormwater and is separate from the collection system for municipal wastewater.

municipal wastewater — Municipal wastewater comes primarily from domestic sources but also includes wastewater from commercial, industrial, and institutional sources that discharge to a common collection system, where it mixes with domestic wastewater before treatment.

N

National Flood Insurance Program (NFIP) — The NFIP is a federal program created by the U.S. Congress to mitigate future flood losses nationwide. The NFIP requires local communities to enforce building and zoning ordinances in exchange for access to affordable, federally backed flood insurance protection for property owners.

National Pollutant Discharge Elimination System (NPDES) — A provision of the Clean Water Act that prohibits discharge of pollutants into waters of the United States unless a permit is issued that complies with the Clean Water Act. The State and regional boards issue waste discharge requirements that serve as NPDES permits in California.

National Priorities List (NPL) — The U.S. Environmental Protection Agency's list of the most serious uncontrolled or abandoned hazardous waste sites identified for possible long-term remedial action under Superfund. The list is based primarily on the score a site receives from the Hazard Ranking System. The EPA is required to update the NPL at least once a year. A site must be on the NPL to receive money for remedial action from the Superfund Trust Fund.

natural recharge — Replenishment of an aquifer generally from snowmelt and runoff, through seepage from the surface. Recharge of an aquifer that occurs without human interference — also referred to as unintentional recharge.

natural treatment — Application of natural processes, such as wetlands or aquifer treatment, to filter or biologically remove contaminants from water.

naturally occurring conservation — *See* "background water conservation."

naturally occurring contaminants — Contaminants that exist naturally in the environment (e.g., arsenic, uranium, fluoride) and are not human-made or human-introduced. Naturally occurring contaminants are considered pollutants when they exceed a maximum contaminant level (MCL).

net groundwater — For the California Water Plan water portfolios, this represents the amount of groundwater extraction in excess of deep percolation.

net water savings — In the context of agricultural water use efficiency, this represents the reduction in the amount of water used that becomes available for other purposes while maintaining or improving crop yield.

net water use (demand) — For the California Water Plan water portfolios, this represents the amount of water needed in a water service area to meet all requirements. It includes the consumptive use of applied water, the irrecoverable water from the distribution system, and the outflow leaving the service area. It does not include reuse of water within a service area. *See also* "applied water use."

new water — Water that is legally and empirically available for a beneficial use; it can be developed through many strategies, such as capture of surplus water, desalination of ocean water, and reductions in depletion. (This is the same as "real water.") The term denotes, in part, recycled water that is an augmentation to the state's overall water supply, such as the reuse of wastewater discharged to the ocean, rather than planned reuse of wastewater inland where unplanned indirect reuse may already be occurring downstream. The Recycled Water Task Force made this distinction in estimating future potential. Of an estimated potential of 1.5 million acre-feet per year of additional recycled water use by 2030, 1.2 million acre-feet per year was estimated to be "new water." *See also* "saved water."

non-potable — Water that is unsafe to drink because it contains contaminants and/or is untreated. *See also* "potable."

nonconsumptive environmental water use — Water dedicated to instream environmental needs that does not reduce the available water supply downstream for other uses.

non-point-source pollution — Diffuse pollution sources that are not subject to National Pollutant Discharge Elimination System (NPDES) permitting. The pollutants are generally carried off the land by runoff. Common non-point sources are agriculture, forestry, mining, dams, channels, and saltwater intrusion. *See also* "point-source."

nontransient-noncommunity water system — A public water system that is not a community water system and that regularly serves the same non-residential users for at least six months per year. Examples include schools, places of employment, and institutions. *See also* "community water system," "transient noncommunity water system."

O

objectives — Objectives tell what we will do and why we are doing it in order to accomplish one or more goals.

offstream recharge — Offstream recharge uses suitable recharge sites outside a streambed. In some operations, water must be pumped some distance from its source to an offstream recharge area.

oligotrophic lake — Deep clear lake with few nutrients, little organic matter, and a high dissolved-oxygen level. (Lake Tahoe is an example).

onsite wastewater treatment system (OWTS) — Any individual residential sewage treatment and wastewater dispersal system, such as a septic system.

operational flexibility — The temporal or spatial operational efficiency of existing and proposed infrastructure to maximize benefits.

operational yield — An optimal amount of groundwater that should be withdrawn from an aquifer system or a groundwater basin each year. It is a dynamic quantity that must be determined from a set of alternative groundwater management decisions subject to goals, objectives, and constraints of the management plan.

optimal fluoridation — When a water treatment facility and distribution system are able to provide a consistent level of fluoride at the appropriate prophylactic level.

ordinance — A law set forth by a governmental authority.

other federal deliveries — For the California Water Plan water portfolios, this represents the sum of deliveries from federal projects other than the Central Valley Project.

outflow — For the California Water Plan water portfolios, this represents the amount of applied water and conveyance water leaving a service area; also conveyance outflow. *See also* other "outflow" entries within the context of the water portfolio.

outflow to Mexico — For the California Water Plan water portfolios, this represents the runoff that flows from California to Mexico.

outflow to Nevada — For the California Water Plan water portfolios, this represents the runoff that flows from California to the state of Nevada.

outflow to Oregon — For the California Water Plan water portfolios, this represents the runoff that flows from California to the state of Oregon.

overdraft — *See* "groundwater overdraft."

overlying right — Property owners above a common aquifer possess a mutual right to the reasonable and beneficial use of a groundwater resource on land overlying the aquifer from which the water is taken. Overlying rights are correlative (related to one another), and overlying users of a common water source must share the resource on a pro rata basis in times of shortage. A proper overlying use takes precedence over all non-overlying uses.

P

pelagic fish — Fish that live in open water, often near the surface. Many river-dwelling anadromous fishes, such as shad, are also pelagic spawners.

perched groundwater — Groundwater supported by a zone of material of low permeability located above an underlying main body of groundwater.

percolating water — Water in underground basins and groundwater that has escaped from streams and is not subject to a permitting process.

percolation — The process in which water moves through a porous material, usually surface water migrating through soil toward a groundwater aquifer.

perennial yield — The maximum quantity of water that can be withdrawn annually from a groundwater basin over a long period of time (during which water supply conditions approximate average conditions) without developing an overdraft condition.

permeability — The capability of soil or other geologic formations to transmit water.

pesticide — Any of a class of chemicals used for killing insects, weeds, or other undesirable entities. Pesticides are most commonly associated with agricultural activities, but they also have significant domestic use in California.

petrichor — The pleasant smell that accompanies the first rain after a dry spell.

planned reuse — The deliberate direct or indirect use of recycled water without relinquishing control over the water during its delivery.

planning area (PA) — A subsection of a hydrologic region containing a number of detailed analysis units (DAUs).

point source — A specific site from which wastewater or polluted water is discharged into a water body. *See also* "non-point-source pollution."

pollution (of water) — The alteration of physical, chemical, or biological properties of water by the introduction of any substance into it that adversely affects the water's beneficial uses.

pollution prevention — Improving water quality for all beneficial uses by protecting water at its source, and thus reducing the need and cost for other water management actions and treatment.

population density — For the California Water Plan future scenarios, this represents the average number of people per square mile for a planning area.

population distribution — For the California Water Plan future scenarios, this represents the geographic location within California of the population projection.

population projection — For the California Water Plan future scenarios, this represents the 2050 forecast of population made by the California Department of Finance or other agencies.

porosity — The ratio of the voids or open spaces in alluvium and rocks to the total volume of the alluvium or rock mass.

possible contaminating activity (PCA) — Human activities that are actual or potential origins of contamination for a drinking water source. PCAs include sources of both microbiological and chemical contaminants that could have an adverse effect on drinking water sources.

potable — Water that is safe for drinking and cooking. *See also* "non-potable."

precautionary principle approach — When an activity raises threats to the environment or human health, precautionary measures are taken even if some cause-and-effect relationships are not fully established. Key elements of the principle include exercising precaution in the face of scientific uncertainty; exploring alternatives to possibly harmful actions; placing the burden of proof on proponents of an activity rather than on victims or potential victims of the activity; and using democratic processes to carry out and enforce the principle, including the public right to informed consent.

precipitation — For the California Water Plan water portfolios, this represents the amount of precipitation that falls on an area as either rain or snow.

precipitation enhancement — The action of artificially stimulating clouds ("cloud seeding") to produce more rainfall/snowfall than would occur naturally.

prescriptive right — Rights obtained through the open and notorious adverse use of another's water rights. By definition, adverse use is not the use of a surplus, but the use of non-surplus water to the direct detriment of the original rights holder.

primary treatment — The initial stage of wastewater treatment involving physical mechanisms such as screens, sedimentation tanks, or filters to remove material from wastewater.

privately owned water systems — These include investor-owned utilities, mutual water companies, mobile home parks, and water associations. They also may include various commercial enterprises, such as restaurants, hotels, resorts, and employee housing, which have their own water supply.

public goods — Public goods are resources or services common to all individuals in society that everyone benefits from or enjoys. These resources or services may include water quality protection, flood management, environmental protection, and national parks. Public goods usually are not exchanged in a market place, and consumption of these goods by one individual does not preclude consumption by other individuals.

public trust doctrine — A legal doctrine recognizing public rights in the beds, banks, and waters of navigable waterways, and the State's power and duty to exercise continued supervision over them as trustee for the benefit of the people.

public water system — A system for the provision of water for human consumption through pipes or other constructed conveyances that has 15 or more service connections or regularly serves at least 25 individuals daily at least 60 days out of the year. *See also* "community water system."

pueblo right — A water right possessed by a municipality that, as a successor of a Spanish or Mexican pueblo, is entitled to the beneficial use of all needed naturally occurring surface water and groundwater of the original pueblo watershed. Pueblo rights are paramount to all other claims.

purple pipes — Part of a dual piping network. Purple pipe is used to distribute municipal recycled water to distinguish it from pipelines that distribute potable drinking water.

R

rainfed agriculture — When all crop consumptive water use is provided directly by rainfall.

Ranney collectors — Horizontal wells adjacent to or under the bed of a stream.

rate structure — For the California Water Plan future scenarios, a rate structure designates the rate basis for cost recovery (e.g., flat, uniform, or tiered). Block/tiered rates are assumed to provide cost signals to consumers. Costs can include capital, operation and maintenance, financing, environmental compliance (e.g., documentation, permitting and mitigation), and so forth.

raw water — An untreated water supply.

real water — Estimates of real water are the estimates of the water supply benefits from the transfer within the water system. There is a risk that these estimates will be inaccurate and that the transfers will result in unintended consequences to other water users, local economies, or the environment. A key challenge is to improve methods for quantifying these uncertainties and include adequate monitoring and assurances when implementing water transfers. *See also* "new water" and "water transfers."

recharge — Water added to an aquifer or the process of adding water to an aquifer. Groundwater recharge occurs either naturally as the net gain from precipitation or artificially as the result of human influence. *See also* "artificial recharge."

recharge area — An area where surface water infiltrates into the ground and reaches a saturated zone in either an unconfined aquifer or a confined aquifer. The recharge area for an unconfined aquifer is the ground surface above the aquifer. The recharge area for a confined aquifer is always some distance away from the area where wells have been built that extract groundwater from the aquifer. In other cases, recharge of the confined aquifer may occur only where a stream has eroded through the aquitard into the confined aquifer, allowing recharge to occur through the stream bottom. *See also* "discharge area."

recharge area protection — The action of keeping recharge areas from being paved over or otherwise developed and guarding the recharge areas so they do not become contaminated.

recharge basin — A surface facility constructed to infiltrate surface water into a groundwater basin. Recharge basins are frequently used to recharge unconfined aquifers. Water is spread over the surface of a basin or pond in order to increase the quantity of water infiltrating into the ground and then percolating to the water table. Recharge basins concentrate a large volume of infiltrating water on the surface. As a result, a groundwater mound forms beneath the basin. *See also* "groundwater recharge" and "groundwater recharge facility."

reclaimed water — See "recycled water."

recoverable water — For the California Water Plan water portfolios, this represents the amount of applied water that is available for supply or reuse, including surface runoff to non-saline bodies of water and deep percolation that becomes groundwater. *See* "irrecoverable water."

recreation — For the California Water Plan future scenarios, this represents the water-dependent recreation activities that are consumptive (e.g., parks), flat-water (e.g., boating), or flow-based (e.g., whitewater rafting).

recreation (reservoir-based) — Flat-water recreation, such as boating and skiing, in the form of future storage facilities as well as operation of existing surface storage facilities.

recreation (watercourse-based) — Activities that are dependent on instream flows, such as whitewater rafting.

recycled water — (1) Water that, as a result of treatment of waste, is suitable for a direct beneficial use or a controlled use, which would not otherwise occur and is therefore considered a valuable resource (California Water Code Section 13050(n)). (2) For the California Water Plan water portfolios, this represents the application of treated water/reclaimed water to meet a beneficial use, supplanting a potable or potentially potable supply, and also represents the treated municipal, industrial, or agricultural wastewater to produce water that can be reused. *See also* "indirect reuse."

recycled water – urban desalination — For the California Water Plan water portfolios, this represents the reclamation of water through desalination for urban uses.

recycled water – urban wastewater — For the California Water Plan water portfolios, this represents the treatment of urban wastewater for reuse.

regional exports — For the California Water Plan water portfolios, this represents water transferred out of a hydrologic region.

regional imports — For the California Water Plan water portfolios, this represents water transferred into a hydrologic region from an adjoining area.

regional reports — In the California Water Plan, the 12 regional reports each describe the watersheds and water conditions, population and land use, and activities that influence a region's water use and supply reliability. The regional reports focus on California's 10 hydrologic regions, which correspond to the state's major water drainage basins, and two important regional areas that overlie hydrologic boundaries but encompass communities that share common water issues or interests: the Sacramento-San Joaquin Delta region and the Mountain Counties area, which includes the foothills and mountains of the western slope of the Sierra Nevada and a portion of the Cascade Range.

regional self-sufficiency — The degree to which a regional area implements regional water management options, such that it can provide all its needs for water from within its borders.

related action — Related actions are part of the *California Water Plan Update 2013* strategic plan and tell how objectives will be carried out. They describe specific actions in measurable, time-based statements of intent. They emphasize the results of actions at the end of a specific time. Some related actions must be undertaken by State government or communities over which the California Department of Water Resources has no authority. In these cases, measure and time must be part of the entities' own strategic plans.

Glossary

releases for Delta outflow – Central Valley Project (CVP) — For the California Water Plan water portfolios, this represents releases from CVP reservoirs to supplement natural flows in order to meet outflow requirements for protection of beneficial uses in the Sacramento-San Joaquin Delta.

releases for Delta outflow – Environmental Water Account (EWA) — For the California Water Plan water portfolios, this represents releases for endangered species protection and recovery under the CALFED EWA program that began in Water Year 2001.

releases for Delta outflow – State Water Project (SWP) — For the California Water Plan water portfolios, this represents releases from SWP reservoirs to supplement natural flows in order to meet outflow requirements for protection of beneficial uses in the Sacramento-San Joaquin Delta.

remaining natural runoff – flow to salt sinks — For the California Water Plan water portfolios, this represents the instream or wild and scenic river natural runoff that flows to the ocean or another salt sink.

required Delta outflow net water use — For the California Water Plan water portfolios, this represents the freshwater outflow from the Sacramento-San Joaquin Delta required by law to protect the beneficial uses within the Delta from the incursion of saline water.

required instream flow — The amount of water required for instream use by agreement, water rights permit, or State/federal acts.

Reservoir System Simulation (ResSim) — ResSim can simulate a range of reservoir operating conditions and accurately simulate downstream flows at specific control-point locations.

residual risk — Residual risk is the likelihood of damage or other adverse consequence remaining after flood management actions are taken.

resilience — The capacity of a resource/natural system to adapt to and recover from changed conditions after a disturbance.

resource management strategy — A project, program, or policy that helps federal, State, or local agencies manage water and related resources. Resource management strategies in the California Water Plan are grouped by the following management objectives: reduce water demand, improve operational efficiency and transfers, increase water supply, improve water quality, practice resource stewardship, improve flood management, and recognize people's relationship to water. Although most of the resource management strategies have multiple potential benefits, any individual site-specific project or program within a resource management strategy may contribute only one benefit or a few benefits.

return flow to developed supply (other HR) – ag — For the California Water Plan water portfolios, this represents the surface return flows from irrigated agriculture to stream channels that are available for use in another hydrologic region (HR).

return flow to developed supply (other HR) – urban — For the California Water Plan water portfolios, this represents the surface return flows from urban areas to stream channels that are available for use in another hydrologic region (HR).

return flow to developed supply (other HR) – wetlands, wild and scenic, instream — For the California Water Plan water portfolios, this represents the surface return flows from managed wetlands, wild and scenic rivers, and instream flows to stream channels that are available for use in another hydrologic region (HR).

return flows evaporation and evapotranspiration – ag — For the California Water Plan water portfolios, this represents the evaporation and evapotranspiration by weeds and other vegetation in fringes of fields and in and near agricultural drains and sump areas.

return flows to salt sink – ag — For the California Water Plan water portfolios, this represents the agricultural return flows that go to saline water bodies, such as the Salton Sea or the ocean, or to saline groundwater basins.

return flows to salt sink – urban — For the California Water Plan water portfolios, this represents the urban return flows that go to saline water bodies, such as the Salton Sea or the ocean, or to saline groundwater basins.

return flows to salt sink – wetlands — For the California Water Plan water portfolios, this represents the managed wetlands return flows that go to saline water bodies, such as the Salton Sea or the ocean, or to saline groundwater basins.

return-flow system — A system of pipelines or ditches to collect and convey surface or subsurface runoff from an irrigated field for reuse.

reuse groundwater — For the California Water Plan water portfolios, this represents the amount of deep percolation from untreated raw applied and conveyance water offsetting groundwater extraction.

reuse of return flows within region – ag — For the California Water Plan water portfolios, this represents the reuse of agricultural irrigation system tailwater and return flows to local distribution systems and streams within a region; this does not include reuse of excess applied water that percolates to groundwater.

reuse of return flows within region – urban — For the California Water Plan water portfolios, this represents the reuse of urban tailwater and return flows to local distribution systems and streams within a region; this does not include reuse of excess applied water that percolates to groundwater.

reuse of return flows within region – wetlands, wild and scenic, instream — For the California Water Plan water portfolios, this represents the reuse of managed wetlands irrigation system tailwater and return flows, wild and scenic river flows, and required instream flows to local distribution systems and streams within a region; this does not include reuse of excess applied water that percolates to groundwater.

reuse surface water — For the California Water Plan water portfolios, this represents the amount of untreated raw applied water recaptured for use through surface drainage facilities.

reused agricultural water — Water that is used by more than one grower and is, therefore, not available for reallocation should one grower become increasingly efficient (i.e., applied water reductions minus real water equals zero).

reused water — The application of previously used water to meet a beneficial use, whether treated or not prior to the subsequent use. *See also* "recycled water."

reverse osmosis — A method of purifying water by applying pressure to force a solution of saline water through a membrane, retaining the solute (higher concentrated saline water) on one side and allowing the pure solvent (water) to pass to the other side. This is the reverse of the normal osmosis process, which is the natural movement of solvent (water) from an area of low solute concentration, through a membrane, to an area of high solute concentration (saline water) when no pressure is applied. Reverse osmosis removes most drinking water contaminants, and is also used in wastewater treatment.

riparian habitat — Areas adjacent to rivers and streams with a differing density, diversity, and productivity of plant and animal species relative to nearby uplands.

riparian right — A water right that comes with the ownership of land adjacent to a water source wherein owners of land adjacent to a stream have the right to make reasonable use of a correlative share of the natural flow stream. These rights are senior to most appropriative rights. *See also* "appropriate right" and "pueblo right."

risk — Most risks originate from such hazards as floods, earthquakes, and droughts that would occur even if all uncertainty could be eliminated. Reducing uncertainty provides a clearer view of what the risks to the system are. Risk is the probability of the occurrence (multiplied by) consequences of the occurrence over a range of potential events.

risk-based water deliveries — Balances increasing deliveries in a given year with the risk of not meeting full deliveries in a subsequent dry year.

robust decision-making (RDM) — For the California Water Plan future scenarios, RDM analysis is a new approach to decision support when conditions present deep uncertainty. RDM uses computational methods to identify the scenarios most likely to break assumptions embedded in a long-term resource management plan.

root zone — The portion of the soil profile through which plant roots readily penetrate to obtain water and plant nutrients, expressed in inches or feet of depth.

runoff — (1) Rainfall, snowmelt, or irrigation water in excess of what can infiltrate the soil surface and be stored in small surface depressions. A major transporter of nonpoint-source pollutants to rivers, streams, and lakes. (2) For the California Water Plan water portfolios, this represents the volume of surface flow from an area.

runoff-incidental — For the California Water Plan water portfolios, this represents is the portion of precipitation that would have been used by natural vegetation but now contributes to runoff. This is a result of roads, paved areas, building roofs, land drainage systems, fields developed for irrigation, and other changes in land use.

runoff-natural — For the California Water Plan water portfolios, this represents the portion of precipitation that runs off the land and makes up the natural flow in rivers.

S

Sacramento-San Joaquin Delta Reform Act of 2009 — The Delta Reform Act established a new governance approach for the Sacramento-San Joaquin Delta that is focused on achieving the coequal goals of protecting, restoring, and enhancing the Delta ecosystem, and providing a more reliable water supply for California. The Delta Reform Act created the Delta Stewardship Council and gave it the direction and authority to serve two primary governance roles: 1) set a comprehensive, legally enforceable direction for how the State manages important water and environmental resources in the Delta through the adoption of a Delta Plan, and 2) ensure coherent and integrated implementation of that direction through coordination and oversight of State and local agencies proposing to fund, carry out, and approve Delta-related activities.

Safe Drinking Water Act — The federal Safe Drinking Water Act (SDWA) was passed in 1974 to protect public health by regulating the nation's public drinking water supply. Under the SDWA, the U.S. Environmental Protection Agency sets standards for drinking water quality and oversees the states, localities, and water suppliers who implement those standards. In addition, the State has enacted the California SDWA to ensure that all residents have safe drinking water.

safe yield — The maximum quantity of water that can be continuously withdrawn from a groundwater basin without adverse effect.

saline-sodic soils — Soils with both salt and sodium accumulation requiring special management; these soils are common in the San Joaquin Valley.

salinity — Generally, the concentration of mineral salts dissolved in water. Salinity may be expressed in terms of concentration or as electrical conductivity. When describing salinity influenced by sea water, salinity often refers to the concentration of chlorides in the water.

salt water intrusion — The movement of salt water into a body of fresh surface water or groundwater. It may be called seawater intrusion if it comes from the ocean.

salts — Minerals that cause salinity. Water may pick up additional salts as it passes through the air, over and under the ground, or as households and industry use it.

saturated zone — The zone in which all interconnected openings are filled with water, usually underlying the unsaturated zone.

saved water — Saved water is water that is prevented from evaporating from soil or flowing to salt sinks, such as saline surface or groundwater or ocean. *See* "new water."

scenarios — Scenarios capture a broad range of uncertain factors that affect water management, but over which water managers have little control. Scenarios are used to test the robustness of strategies by evaluating how well strategies perform across a wide range of possible future conditions. The California Water Plan organizes scenarios around themes of population growth, land use patterns, and climate change.

sea level rise — An increase in the height of the average or peak sea level at coastal or tidal locations, usually with regard to projected impacts resulting from climate change.

seasonal vs. permanent crop mix — For the California Water Plan future scenarios, this represents the shift in crop type between seasonal and permanent. This factor depicts the diminished ability to reduce water use during

times of increased water scarcity (due to shifting from seasonal to permanent crops). In other words, shortage losses increase when shifting from seasonal to permanent.

seawater intrusion barrier — A system designed to retard, cease, or repel the advancement of seawater intrusion into potable groundwater supplies along coastal portions of California. The system may be a series of specifically placed injection wells or a combination of injection and pumping wells where water is injected or pumped to form a hydraulic barrier.

Secchi disk — A small white disk of specific size used to measure the depth clarity of a water body.

secondary porosity — Voids in a rock formed after the rock has been deposited; not formed with the genesis of the rock, but later, as a result of other processes. Fractures in granite and caverns in limestone are examples of secondary openings.

secondary treatment — The second stage of wastewater treatment focused on removal of dissolved and suspended organic matter remaining after primary treatment. It is usually accomplished by micro-organisms converting suspended waste solids into biomass that settles out.

seepage — The gradual movement of water into, through, or from a porous medium; also, infiltration of water into soil from canals, ditches, laterals, watercourses, reservoirs, storage facilities, or other water bodies, or from a field.

semi-confined aquifer — A semi-confined aquifer, or leaky confined aquifer, is an aquifer that has aquitards either above or below that allow water to leak into or out of the aquifer, depending on the direction of the hydraulic gradient. *See also* "artesian aquifer," "confined aquifer," and "unconfined aquifer."

service area — The geographic area served by a water agency.

slow rise flooding — Slow rise flooding occurs as a gradual inundation as waterways or lakes overflow their banks and is most often caused by heavy precipitation, especially with heavy snowmelt. It includes riverine flooding in deep floodplains and ponding of water in low-lying urban areas, as well as gradual flooding in areas adjacent to local streams and creeks.

soil moisture — The water in soils; usually expressed as a percentage of the dry weight of the soil. It may also be expressed on a wet weight or a volume basis.

soil texture — Soil texture refers to the percentage of sand, silt, and clay particles in a soil. Sand, silt, and clay particles are defined by their size. Soil texture has important effects on soil properties, such as water-holding capacity, drainage class, consistence, and chemical properties.

solar evaporator — An enhanced evaporation system that uses timed sprinklers or other equipment that allows the discharge rate to be set and adjusted as necessary to avoid standing water within the surface of the solar evaporator.

solute transport (analysis) — The ability to analyze and predict the movement of solutes in groundwater systems in order to determine the impacts of groundwater contamination.

source water — The body of water from which water is taken for beneficial use.

specific retention — The ratio of the volume of water a rock or sediment will retain against the pull of gravity to the total volume of the rock or sediment.

specific yield — The ratio of the volume of water a rock or soil will yield by gravity drainage to the total volume of the rock or soil.

spring — A location where groundwater flows naturally to the land surface or a surface water body. *See also* "artesian aquifer."

spreading basins - Structures built to increase groundwater recharge. Water is spread over a spreading basin so it may infiltrate into the ground and then percolate to the water table.

sprinkler irrigation — A method of irrigation in which water is sprayed or sprinkled through the air to the ground surface.

stakeholder — Individuals or groups who can affect or be affected by an organization's activities; or individuals or groups with an interest or "stake" in what happens as a result of any decision or action. Stakeholders do not necessarily use the products or receive the services of a program.

State Plan of Flood Control (SPFC) — Collectively, the facilities, lands, programs, conditions, and mode of operation and maintenance for the State-Federal flood protection system in the Central Valley.

State Water Project (SWP) deliveries — (1) For the California Water Plan future scenarios, this represents the volume of water imported to a given study area from the State Water Project. (2) For the California Water Plan water portfolios, this represents the sum of all deliveries to State Water Project contractors.

statewide water management systems — These include physical facilities (more than 1,200 State, federal, and local reservoirs, as well as canals, treatment plants, and levees), which make up the backbone of water management in California; and statewide water management programs, which include water-quality standards, monitoring programs, economic incentives, water pricing policies, and statewide water-efficiency programs, such as appliance standards, labeling, and education.

statutory permitting system — A water rights permitting system defined in the California Water Code and administered by the State Water Resources Control Board.

stochastic simulation — This is also known as Monte Carlo simulation or model sampling. An example of this type of analysis is the U.S. Army Corps of Engineers' software program, HEC-FDA (flood damage assessment software), which directly incorporates uncertainties into a flood damage analysis.

stormwater (runoff) — Water that is originated during a precipitation event and may collect and concentrate diffused pollutants and carry them to watercourses, causing degradation. Runoff in the urban environment, both storm-generated and dry-weather flows, has been shown to be a significant source of pollutants to the surface waters of the nation. In California, the authority to regulate urban and stormwater runoff under the National Pollutant Discharge Elimination System has been delegated by the U.S. Environmental Protection Agency to the State Water Resources Control Board and the nine regional water quality control boards. *See* Volume 3, Chapter 20, "Urban Stormwater Runoff Management."

strategic plan — The long-term goals of an organization or program and an outline of how they will be achieved (e.g., adopting specific strategies, approaches, and methodologies).

stratigraphy — The science of rocks. It is concerned with the original succession and age relations of rock strata and their form, distribution, lithologic composition, fossil content, geophysical and geochemical properties — all characters and attributes of rocks as strata — and their interpretation in terms of environment, mode of origin, and geologic history.

stream ecosystems — Stream ecosystems are labeled according to their inhabitants; thus, area streams are referred to by these labels: conifer forest snowmelt streams, trout headwater streams, trout/sculpin streams, sucker/dace/redside streams, and whitefish cutthroat/sucker streams.

stream order — A systematic process for describing the degree of branching of a stream network within a watershed.

subirrigation — Application of irrigation water below the ground surface by raising the water table to within or near the root zone.

subsidence — *See* "land subsidence."

subsurface drip irrigation — Application of water below the soil surface through emitters, with discharge rates generally in the same range as drip irrigation. This method of water application is different from and not to be confused with subirrigation, where the root zone is irrigated by water table control.

subterranean stream — Subterranean streams "flowing through known and definite channels" are regulated by California's surface water rights system. The following physical conditions must be present in a subterranean stream flowing in a known and definite channel: 1) a subsurface channel must be present, 2) the channel must have relatively impermeable bed and banks, 3) the course of the channel must be known or capable of being determined by reasonable inference, and 4) groundwater must be flowing in the channel.

surface irrigation — Irrigation in which the soil surface is used as the conduit, as in furrow and border irrigation, and as opposed to sprinkler, drip, and subirrigation.

surface storage — Surface storage uses reservoirs to collect water for later release and use.

surface storage facilities — The volume and yield of usable reservoir storage in a given area.

surface supply — Water supply obtained from streams, lakes, and reservoirs.

surface water — As defined under the California Surface Water Treatment Rule, California Code of Regulations Title 22, Section 64651.83, surface water means "all water open to the atmosphere and subject to surface runoff" and hence would include all lakes, rivers, streams, and other water bodies. Surface water includes all groundwater sources that are deemed to be under the influence of surface water (i.e., springs, shallow wells, wells close to rivers, etc.), which must comply with the same level of treatment as surface water.

surface water augmentation — The planned placement of recycled water into a surface water reservoir used as a source of domestic drinking water supply (California Water Code Section 13561(d)) or into any surface water when discharged for the purpose of aquatic habitat enhancement. *See also* "indirect potable reuse."

surface water net change in storage — For the California Water Plan water portfolios, this represents the difference between the water released from and water flowing into surface reservoirs.

surface water storage – beginning of year — For the California Water Plan water portfolios, this represents the amount of water stored in lakes and reservoirs at the beginning of the water year.

surface water storage – end of year — For the California Water Plan water portfolios, this represents the amount of water stored in lakes and reservoirs at the end of the water year.

surface water total available storage — For the California Water Plan water portfolios, this represents the total developed surface storage available in a region.

surge irrigation — A surface irrigation technique wherein flow is applied to furrows (or, less commonly, borders) intermittently during a single irrigation set.

surplus water — Water that is not being used directly or indirectly to benefit environmental, agricultural, or urban use sectors.

sustainability — A sustainable system or process has longevity and resilience. A sustainable system manages risk but cannot eliminate it. A sustainable system generally provides for the economy, the ecosystem, and social equity. Water sustainability is the dynamic state of water use and supply that meets today's needs without compromising the long-term capacity of the natural and human aspects of the water system to meet the needs of future generations. For example, planning ways to eventually eliminate drafting more groundwater than can be recharged over the long term is one approach for improving sustainability.

sustainable development — *See* "sustainability."

system reoperation — Changing existing water system operation and management procedures or priorities to either meet competing beneficial uses or derive more total benefits from the water system by operating more efficiently.

T

Table A — Table A is an exhibit that corresponds to the contracts between the California Department of Water Resources and the 29 State Water Project (SWP) water contractors, in which are defined the terms and conditions governing the water delivery and cost repayment for the SWP. All water-supply-related costs of the SWP are paid by the contractors, and Table A serves as a basis for allocating some of the costs among the contractors. In addition, Table A plays a key role in the annual allocation of available supply among contractors. Table A is simply contractual language for apportioning available supply and cost obligations under the contract.

Table A Water — The maximum amount of State Water Project (SWP) water that the State agreed to make available to an SWP contractor for delivery during the year. Table A amounts determine the maximum

water a contractor may request each year from the California Department of Water Resources. The State and SWP contractors also use Table A amounts to serve as a basis for allocation of some SWP costs among the contractors.

tailwater — The runoff of irrigation water from the lower end of an irrigated field.

tertiary treatment — Water treatment processes beyond secondary treatment. Granular media, such as sand or anthracite coal, or a membrane are used to filter out most of the solids remaining after secondary treatment. After filtration, finish water is usually disinfected with chlorine or ultraviolet light to inactivate bacteria, viruses, and other microorganisms prior to discharge or recycling.

third-party impacts — The occurrence of incidental economic impacts on parties not directly related to impact-causing water management actions. For example, agricultural land retirement can affect local tax revenues or labor conditions.

tile water (tile drainage) — The water drained from agricultural fields by the practice of removing excess water from the subsurface of soil with a network of underground pipes that allow subsurface water to move out from between soil particles and into the tile line. Water flowing through tile lines is often ultimately deposited into surface water. Water enters the tile line either via the gaps between tile sections, in the case of older tile designs, or through small perforations in modern plastic tile. Tile drainage brings soil moisture levels down for optimal crop growth and is used as a primary method of controlling soil salinity.

total capital cost — The total monetary cost required for "turnkey" implementation, including environmental and third-party impact mitigation, storage, conveyance, energy, capitalized operations and maintenance, administrative costs, planning costs, legal costs, and engineering costs.

total commercial activity — For the California Water Plan future scenarios, this represents the amount of commercial activity (e.g., employment, productivity, commercial land use) that occurs in a given study area. This factor is a driver of (and indicator for) commercial water use and includes institutional water use (e.g., government offices, schools), as well. *See also* "commercial activity mix."

total desalination — For the California Water Plan water portfolios, this represents the amount of water from any source that is desalted by reverse osmosis or other processes. *See also* "desalination."

total dissolved solids — A measure of the residual minerals dissolved in water and that remain after evaporation of a solution. Usually expressed in milligrams per liter. *See also* "salinity."

total industrial activity — For the California Water Plan future scenarios, this represents the total amount of industrial activity (e.g., employment, productivity, industrial land use) that occurs in a given study area. This factor is a driver of (and indicator for) industrial water use.

total irrigated crop area — For the California Water Plan future scenarios, this represents the total area of irrigated crops (by type) planted in a planning area during a given year. This number includes multiple cropping.

total maximum daily load (TMDL) — An evaluation of the condition of an impaired surface water that appears on the federal Clean Water Act Section 303(d) list, which establishes limitations on the amount of pollution that water can be exposed to without adversely affecting its beneficial uses and allocates proportions of the total limitation among dischargers to the impaired surface water.

total population — For the California Water Plan future scenarios, this represents the statewide total population projection regardless of geographical distribution.

traditional (or tribal) ecological knowledge (TEK) — California Native American Tribes' traditional practices for land stewardship consider the need for sustainability and regeneration for future generations. As with many other first peoples, these traditional practices and knowledge have been maintained and passed down through generations and make up the basis of what is termed traditional (or tribal) ecological knowledge.

transient-noncommunity water system (TNC)— A public water system that is not a community water system or a nontransient-noncommunity water system (California Code of Regulations, Title 22, Section 64401.85). TNCs provide water to 25 or more people for at least 60 days/year, but not to the same people and not on a regular basis (e.g., those using campgrounds, parks, ski resorts, rest stops, gas stations, and motels).

transpiration — An essential physiological process in which plant tissues give off water vapor to the atmosphere.

tsunami flooding — Tsunami flooding occurs as a result of high-speed ocean waves triggered by mass movement that displaces a large volume of water. Earthquakes and underwater landslides may cause a tsunami, and the impact on land depends on wave height and inundation area.

U

unaccounted-for water — Unaccounted-for water (sometimes referred to as water losses) is the seepage, deep percolation, and runoff of water resulting from deteriorated and aging infrastructure. Water utilities conduct audits to identify water main leaks, unmetered water use for parks and recreation consumption, water theft, and inaccurate meters.

uncertainty — Uncertainty is what we do not know about the system. For example, engineers do not know the foundation conditions under all California levees. Uncertainty can be reduced by reducing data gaps to increase knowledge.

unconfined aquifer — An aquifer that is not bounded on top by an aquitard. The upper surface of an unconfined aquifer is the water table. *See also* "artesian aquifer," "confined aquifer," and "semi-confined aquifer."

underground stream — A body of water flowing as a definite current in a distinct channel below the surface of the ground, usually in an area characterized by joints or fissures.

unit applied water — The quantity of water applied to a specific crop per unit area (sometimes expressed in inches of depth).

unplanned reuse — Reuse of treated wastewater effluent by a second party that occurs after disposal by an unrelated first party. *See also* "indirect reuse."

unsaturated zone — The zone below the land surface in which pore space contains both water and air.

urban commercial use — For the California Water Plan water portfolios, this represents the water used by light industry and non-manufacturing business establishments, including retail services, office buildings, restaurants, dry cleaners, and other consumer-oriented services or businesses. This also includes employee uses and recreational facilities (temporary lodging) and may include institutional or governmental use, as well.

urban energy production — For the California Water Plan water portfolios, this represents the water used by refineries and for cooling in thermoelectric power generation.

urban industrial use — For the California Water Plan water portfolios, this represents water use in water-intensive manufacturing that utilizes cooling towers — for processing, manufacturing, and other industrial plant uses (e.g., canneries, mills, other large, complex users of supply), as defined by the North American Industry Classification System (NAICS). This water can be used as cooling water or for rinsing, washing, diluting, and other sanitation operations. Also included are employee uses and landscape irrigation.

urban land use management — Planning for the housing and economic development needs of a growing population, while providing for the efficient use of water and other resources.

urban large landscape — For the California Water Plan water portfolios, this represents the water used to irrigate recreational and large landscape areas, such as golf courses, parks, play fields, highway medians, and cemeteries.

urban residential use – multi-family-exterior — For the California Water Plan water portfolios, this represents the amount of water used outside a residential, multi-family housing unit for such purposes as landscape irrigation, swimming pools, car washing, sidewalk cleaning, and the watering of domestic animals.

urban residential use – multi-family-interior — For the California Water Plan water portfolios, this represents the amount of water used within a residential, multi-family housing unit (with two or more units), which houses two or more households (such as duplexes, apartments, or condominiums). Uses include personal hygiene, cooking, drinking, and laundry.

urban residential use – single-family-exterior — For the California Water Plan water portfolios, this represents the amount of water used outside a single-family, detached housing unit for purposes including landscape irrigation, swimming pools, car washing, sidewalk cleaning, and the watering of domestic animals.

urban residential use – single-family-interior — For the California Water Plan water portfolios, this represents the amount of water used within a single-family, detached housing unit for such uses as personal hygiene, cooking, drinking, and laundry.

urban runoff management — A broad series of activities to manage both urban stormwater and dry-weather runoff that carry pollutants.

urban wastewater produced — For the California Water Plan water portfolios, this represents the flow from urban areas into urban wastewater treatment plants.

Urban Water Management Planning Act — California Water Code Sections 10610 through 10657. The act requires urban water suppliers to prepare urban water management plans that describe and evaluate sources of water supplies, efficient uses of water, demand management measures, implementation strategies and schedules, and other relevant information and programs within their water service areas. Urban water suppliers (California Water Code Section 10617) are either publicly or privately owned and provide water for municipal purposes, either directly or indirectly, to more than 3,000 customers or supply more than 3,000 acre-feet of water annually.

urban water use — For the California Water Plan water portfolios, this represents the use of potable and non-potable water for urban purposes, including residential, commercial, industrial, recreation, energy production, military, and institutional classes. These are types of uses rather than places of use.

urban water use efficiency — Methods or technologies resulting in the same beneficial residential, commercial, industrial, and institutional uses with less water or increased beneficial uses from existing water quantities.

usable storage capacity — The quantity of groundwater of acceptable quality that can be economically withdrawn from storage.

use values — Use values are based on water taken up and utilized in the environment. Non-use values are not associated with actual use of, or even an option to use, an ecosystem or its service.

V

variable fluoridation — Fluoridation at levels up to the optimal level, which depends on many factors, including time of year, water demand, and the use of sources that may not have fluoridation treatment facilities. Variable fluoridation is most often the result of a water system receiving fluoridated water from a wholesale provider, while also using local unfluoridated water sources.

vernal pools — Vernal pools are a type of temporary wetlands. They are depressions in areas where low-permeability soils (e.g., clay or hardpan) prevent rainwater from draining downward into the subsoils. When rain fills the pools in the winter and spring, the water collects and remains in the depressions. In the springtime, the water gradually evaporates away, until the pools become completely dry in the summer and fall.

vision statement — The California Water Plan's vision statement describes the desired future for California water resources and management. It serves as a foundation for water and flood planning during the planning horizon.

volatile organic compound (VOC) — A human-made organic compound that readily vaporizes in the atmosphere. These compounds are often highly mobile in the groundwater system and are generally associated with industrial activities. VOCs are referred to as hydrocarbons.

W

wastewater reclamation — "Water reclamation," or "wastewater reclamation," can have two meanings: (1) the process of treating wastewater for beneficial use, then storing and distributing it as recycled water; and (2)

the actual use of recycled water. The latter definition is the more common of the two; that is, although the usage depends on the context, water reclamation is most often understood to mean the treatment of water of impaired quality to produce a water of suitable quality for intended use. *See also* "water recycling" and "water reuse."

water bag transport/storage technology — Diverting water in areas that have unallocated fresh water supplies, storing the water in large inflatable bladders, and towing them to an alternate coastal region.

water balances — Analyses of the total developed/dedicated supplies, uses, and operational characteristics for a region; the analyses show what water was applied to actual uses so that use equals supply. *See also* "water portfolio."

water demand — The desired quantity of water that would be used if the water were available and if a number of other factors, such as price, did not change. Demand is not static.

water demand elasticity — A phrase describing that the desire to use water is based on a number of factors, such as the intended use for the water, the price of water, and the cost of alternative ways to meet the intended use.

water demand management — The adaptation and implementation of a strategy by a water institution or consumer to influence the water demand and usage of water in order to meet any of these objectives: economic efficiency, social development, social equity, environmental protection, sustainability of water supply and services, and political acceptability.

water depletion — For the California Water Plan water portfolios, this represents the net water use minus water that can be recovered later, such as deep percolation and return flow, to the developed supply.

water exchanges — Typically, water delivered by one water user to another water user; the receiving water user will return the water at a specified time or when the conditions of the parties' agreement are met. *See also* "water transfers."

water from refineries — For the California Water Plan water portfolios, this represents the amount of water produced as a byproduct of the oil or gas refining process.

water in the environment — Consumptive and nonconsumptive use of water, not including agricultural and urban uses. Defined by the Sustainability Roundtable as "a measure of the water remaining in the environment after withdrawals and consumption."

Water Planning Information Exchange (Water PIE) — The California Department of Water Resources is building an online information exchange system called the Water Planning Information Exchange (Water PIE) to share water-related information among state, regional, and local agencies and governments, universities, and the public. This type of online information exchange system is being designed to support regional partnerships by providing a common way of developing and sharing information.

water portfolio — A picture of the water supply and use for a given year statewide or by region, subject to availability of data; it includes a flow diagram, a flow diagram table, water balances, and a summary table.

water quality — A description of the chemical, physical, and biological characteristics of water, usually with regard to its suitability for a particular purpose or use. *See also* "groundwater quality."

water quality control plan (basin plan) — Each regional water quality control board establishes the beneficial uses of the waters within its region. The basin plan contains numeric and/or narrative water quality objectives and spells out a program by which the objectives can be achieved within their boundaries.

water quality standards — State-adopted and U.S. Environmental Protection Agency-approved ambient standards for water bodies. The standards prescribe the use of the water body and establish the water quality criteria that must be met to protect designated uses.

water recycling — (1) The process of treating wastewater for beneficial use, storing and distributing recycled water, and the actual use of recycled water; (2) the reuse or recirculation of water through the same series of processes, pipes, or vessels more than once by one user, often without treatment between uses, such as in cooling towers or cascading uses within an industry where the wastewater from one process is the source water for another process. *See also* "recycled water" and "water reuse."

water reliability — For the California Water Plan future scenarios, water supply reliability is reported as the percentage of years in which water supply meets most of the water demand (e.g., 95 percent). Different reliability thresholds were defined for the urban and agricultural sectors to reflect different historical levels of delivery. For instream flows and other environmental objectives, water supply reliability is reported as the percentage of months in which water supply meets most of the water requirement (e.g., 95 percent).

Water Resource Integrated Modeling System (WRIMS model engine or WRIMS) — Formally named CALSIM, WRIMS is a generalized water-resources modeling system for evaluating operational alternatives of large, complex river basins. WRIMS integrates a simulation language for flexible operational criteria specification, a linear programming solver for efficient water allocation decisions, and graphics capabilities for ease of use. These combined capabilities provide a comprehensive and powerful modeling tool for water resource systems simulation. *See also* "CALSIM."

water reuse — The additional use of previously used water, with or without treatment. This term often takes on the more encompassing meaning in the first definition of "wastewater reclamation," above. "Direct reuse" is the use of recycled water that has been transported from a wastewater treatment plant to a reuse site without passing through a natural body of either surface or groundwater. This is also called "pipe-to-pipe" reuse, where the recycled water is conveyed in a distribution system after treatment. "Indirect reuse" is the use of recycled water indirectly after it has passed through a natural body of water after discharge from a wastewater treatment plant. Groundwater recharge is an example. Another is the reuse of Sacramento's wastewater after discharge by downstream users. "Planned reuse" is the deliberate direct or indirect use of recycled water without relinquishing control over the water during its delivery. Direct reuse is always considered planned because it involves delivery in a distribution system leading from the wastewater treatment plant to the point of reuse. "Unplanned reuse" or "incidental reuse" is the unplanned use of wastewater after disposal. The reuse of Sacramento's effluent by downstream users is considered unplanned; there is no planned intent by Sacramento to have the State Water Project pump a portion of its effluent to Southern California. *See* "wastewater reclamation."

water rights — In water law, the right of a user to use water from a water source (i.e., a lake, river, stream, creek, pond, or source of groundwater).

water service area — A geographic area in which a water agency is the designated water service provider.

water supply — For the California Water Plan water portfolios, this represents where the water came from each year to meet the water uses. *See also* "water use."

water supply exports — The amount of water that a region transfers to another to meet needs.

water supply imports — The amount of water brought in from other regions to meet needs. *See* "water transfer."

water table — *See* "groundwater table."

water transfer — A water transfer is defined in the California Water Code as a temporary or long-term change in the point of diversion, place of use, or purpose of use due to a transfer or exchange of water or water rights. A temporary water transfer has a duration of one year or less (California Water Code Section 1728), and a long-term water transfer has a duration of more than one year (California Water Code Section 1735). Many transfers, such as those among contractors of the State Water Project or Central Valley Project, do not fit this definition. A more general definition is that water transfers are a voluntary change in the way water is usually distributed among water users in response to water scarcity. Compare this with water exchanges, which are typically water delivered by one water user to another water user; the receiving water user will return the water at a specified time or when the conditions of the parties to the agreement are met.

water transfers – imported — For the California Water Plan water portfolios, this represents the amount of water transferred across hydrologic region boundaries from one agency to another. Transfer requires approval from the State Water Resources Control Board for a change in place of use.

water transfers – regional — For the California Water Plan water portfolios, this represents the amount of water transferred within a hydrologic region from one agency to another. Transfer requires approval from the State Water Resources Control Board for a change in place of use.

water treatment — Any method, technique, or process designed to remove solids and/or pollutants from water or wastewater. Specifically for drinking water, treatment is defined by Title 22, Section 64401.90, of the

California Code of Regulations as any physical, biological, or chemical processes, including blending, designed to affect water quality parameters to render the water acceptable for domestic use.

water use — For the California Water Plan water portfolios, this represents how applied water was used by urban and agricultural sectors and dedicated to the environment. *See also* "water supply."

water year — A continuous 12-month period for which hydrologic records are compiled and summarized. Different agencies may use different calendar periods for their water years. For the California Department of Water Resources, a water year is October 1 through September 30.

watershed — The land area from which water drains into a stream, river, or reservoir. The watershed for a major river may encompass a number of smaller watersheds that ultimately combine at a common point.

watershed management — The process of evaluating, planning, managing, restoring, and organizing land and other resource use within an area that has a single common drainage point.

watershed management area (WMA) — A WMA is a geographically defined watershed area where the regional water quality control board will implement the watershed approach. *See also* "Watershed Management Initiative."

Watershed Management Initiative (WMI) — The WMI is part of the State Water Resources Control Board's (SWRCB's) and the nine regional water quality control boards' (RWQCBs') strategic plan and establishes a broad framework overlying the numerous federally mandated and State-mandated priorities. As such, the WMI helps the SWRCB and RWQCBs achieve water resource protection, enhancement, and restoration while balancing economic and environmental impacts. *See also* "watershed management areas."

wellhead protection area — A protected surface and subsurface zone, which surrounds a well or well field that supplies a public water system, intended to keep contaminants from reaching the well water.

wet season — The period of time on an annual cycle in which the majority of rainfall occurs. In California, that period is from late October through March.

Wild and Scenic rivers — The federally designated and State-designated river systems under the 1968 National Wild and Scenic Rivers Act and the 1972 California Wild and Scenic Rivers Act. Many rivers in California, including many forks and tributaries — over 2,000 miles of river — are designated wild, scenic, or recreational.

wild and scenic rivers water — For the California Water Plan water portfolios, this represents the annual natural flows from the designated State and federal Wild and Scenic Rivers systems.

willingness to accept — A comparable concept to "willingness to pay" is called "willingness to accept" or "willingness to receive," which measures how much an individual would accept or receive as payment if he or she could be induced to forego a good or service. *See also* "willingness to pay."

willingness to pay — The economic value of a good or service to a person, measured by the maximum amount (in dollar terms) that he or she is willing to give up in order to acquire that good or service. *See also* "willingness to accept."

working landscape — An economically and ecologically vital and sustainable landscape where agricultural and other natural resource-based producers generate multiple public benefits while providing for their own and their communities' economic and social well-being.

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