



The following terms were collected from the 2009 [California Climate Change Adaptation Strategy](#)⁷³, the [Intergovernmental Panel on Climate Change Third Assessment Report](#)⁷⁴, the Coastal Commission’s Beach Erosion and Response (BEAR) document,⁷⁵ the [Commission’s Environmental Justice Policy](#), and the [California Coastal Act](#), unless otherwise noted. Some of these definitions are not used in the text of the report but are included as a resource on coastal-related adaptation issues.

Adaptation: Adjustment in natural or human systems in response to actual or expected climatic stimuli or their effects, which minimizes harm or takes advantage of beneficial opportunities.

Adaptation Pathway: A planning approach addressing the uncertainty and challenges of climate change decision-making. It enables consideration of multiple possible futures, and allows analysis/exploration of the robustness and flexibility of various options across those multiple futures.⁷⁶

Adaptive capacity: The ability of a system to respond to climate change (including climate variability and extremes), to moderate potential damages, to take advantage of opportunities, and to cope with the consequences.⁷⁷

Adaptive management: Involves monitoring the results of a management decision, and updating actions as needed and as based on new information and results from the monitoring.

Ambulatory (*as used in public trust boundaries*): Moveable, subject to change, or capable of alteration.⁷⁸

Aquifer: An underground layer of porous rock, sand, or other earth material containing water, into which wells may be sunk.

Armor: To fortify a topographical feature to protect it from erosion (e.g., constructing a wall to armor the base of a sea cliff), or to construct a feature (e.g., a seawall, dike, or levee) to protect other resources (e.g., development or agricultural land) from flooding, erosion, or other hazards.

Atmosphere-Ocean General Circulation Models (or Atmosphere-Ocean General Climate Models; ACGOM): Three-dimensional global models that dynamically link ocean density,

⁷³ CNRA 2009

⁷⁴ IPCC 2001

⁷⁵ Many of these definitions were extracted from: USACE 2002, Griggs and Savoy 1985 and Flick 1994.

⁷⁶ Ocean Protection Council 2018

⁷⁷ Willows and Connell 2003

⁷⁸ *West's Encyclopedia of American Law* 2008

circulation, and sea level using wind stress, heat transfer between air and sea, and freshwater fluxes as critical variables. (See also *General Circulation Models*)

Baseline (or Reference): Any datum against which change is measured. It might be a “current baseline,” in which case it represents observable, present-day conditions. It might also be a “future baseline”, which is a projected future set of conditions excluding the driving factor of interest (e.g., how would a sector evolve without climate warming). It is critical to be aware of what change is measured against which baseline to ensure proper interpretation. Alternative interpretations of the reference conditions can give rise to multiple baselines.⁷⁹

Beach: The expanse of sand, gravel, cobble or other loose material that extends landward from the low water line to the place where there is distinguishable change in physiographic form, or to the line of permanent vegetation. The seaward limit of a beach (unless specified otherwise) is the mean low water line.

Beach nourishment: Placement of sand and/or sediment (e.g., beneficial re-use of dredged sediment) on a beach to provide protection from storms and erosion, to create or maintain a wide(r) beach, and/or to aid shoreline dynamics throughout the littoral cell. The project may include dunes and/or hard structures as part of the design.

Bluff (or Cliff): A scarp or steep face of rock, weathered rock, sediment and/or soil resulting from erosion, faulting, folding or excavation of the land mass. The cliff or bluff may be a simple planar or curved surface or it may be step-like in section. For purposes of (the Statewide Interpretive Guidelines), “cliff” or “bluff” is limited to those features having vertical relief of ten feet or more and “seacliff” is a cliff whose toe is or may be subject to marine erosion.

Bluff top retreat (or Cliff top retreat): The landward migration of the bluff or cliff edge, caused by marine erosion of the bluff or cliff toe and subaerial erosion of the bluff or cliff face.

Caisson: A supporting piling constructed by drilling a casing hole into a geologic formation and filling it with reinforcing bar and concrete; used for foundations. (See also *Piling*)

Climate change: Any long-term change in average climate conditions in a place or region, whether due to natural causes or as a result of human activity.

Climate variability: Variations in the mean state of the climate and other statistics (e.g., standard deviations, the occurrence of extremes) on all temporal and spatial scales beyond that of individual weather events.

⁷⁹ Moser 2008

Coastal-dependent development or use: Any development or use which requires a site on, or adjacent to, the sea to be able to function at all.⁸⁰

Coastal Development Permit (CDP): Development in the coastal zone generally requires a Coastal Development Permit (CDP). In areas of retained jurisdiction and areas without a certified Local Coastal Program (LCP), the Commission is generally responsible for reviewing the consistency of CDP applications with the policies of Chapter 3 of the Coastal Act (Public Resources Code Sections 30200-30270). In areas with a certified LCP, the local government is responsible for reviewing the compliance of CDP applications with the requirements of the certified LCP and, where applicable, the public access and recreation policies of the Coastal Act. Certain local government actions on CDP applications are appealable to the Commission. On appeal, the Commission also applies the policies of the certified LCP and applicable public access and recreation policies of the Coastal Act.

Coastal-related development: Any use that is dependent on a coastal-dependent development or use.⁸¹

Coastal resources: A general term used throughout the Guidance to refer to those resources addressed in Chapter 3 of the California Coastal Act, including beaches, wetlands, agricultural lands, and other coastal habitats; coastal development; public access and recreation opportunities; cultural, archaeological, and paleontological resources; and scenic and visual qualities.

Community Benefits Agreements: Community benefits agreements are legal contracts between a developer and the impacted community and/or its representatives (governmental and non-governmental). These strategic agreements are mutually beneficial, as governments need support from their constituencies, developers need government for permit approvals, and community interests can be funded or furnished by the developer for their support of a project. Benefits can include commitments to hire directly from a community, contributions to economic trust funds, local workforce training guarantees, mitigation of increased pollution exposure, and more.⁸²

CoSMoS: The Coastal Storm Modeling System ([CoSMoS](#)) is a dynamic modeling approach that has been developed by the United States Geological Survey in order to allow more detailed predictions of coastal flooding due to both future sea-level rise and storms integrated with long-term coastal evolution (i.e., beach changes and cliff/bluff retreat) over large geographic areas (100s of kilometers).

⁸⁰ Public Resources Code § 30101

⁸¹ Public Resources Code § 30101.3

⁸² [U.S. Department of Energy](#)

Development: On land, in or under water, the placement or erection of any solid material or structure; discharge or disposal of any dredged material or of any gaseous, liquid, solid, or thermal waste; grading, removing, dredging, mining, or extraction of any materials; change in the density or intensity of use of land, including, but not limited to, subdivision pursuant to the Subdivision Map Act (commencing with Section 66410 of the Government Code), and any other division of land, including lot splits, except where the land division is brought about in connection with the purchase of such land by a public agency for public recreational use; change in the intensity of use of water, or of access thereto; construction, reconstruction, demolition, or alteration of the size of any structure, including any facility of any private, public, or municipal utility; and the removal or harvesting of major vegetation other than for agricultural purposes, kelp harvesting, and timber operations which are in accordance with a timber harvesting plan submitted pursuant to the provisions of the Z'berg-Nejedly Forest Practice of 1973 (commencing with Section 4511).⁸³

Disadvantaged, Marginalized, Underserved: SB 1000 (Leyva) (Ch. 587, Stats. 2016) added Government Code Section 65302(h)(4)(A), expanding the definition of “disadvantaged communities” for the purpose of general plans to mean “an area identified by the California Environmental Protection Agency pursuant to Section 39711 of the Health and Safety Code or an area that is a low-income area that is disproportionately affected by environmental pollution and other hazards that can lead to negative health effects, exposure, or environmental degradation.” This Guidance uses the terms “disadvantaged,” “marginalized,” and “underserved” interchangeably; it intends to encompass not only the definitions contemplated by SB 1000, but also to include other low-income and minority populations that are disproportionately burdened by or less able to prevent, respond, and recover from adverse environmental impacts.

Ecosystem-Based Management (EBM): An integrated approach to resource management that considers the entire ecosystem, including humans, and the elements that are integral to ecosystem functions.⁸⁴

Ecosystem services: Benefits that nature provides to humans. For example, plants, animals, fungi and micro-organisms produce services or goods like food, wood and other raw materials, as well as provide essential regulating services such as pollination of crops, prevention of soil erosion and water purification, and a vast array of cultural services, like recreation and a sense of place.⁸⁵

El Niño Southern Oscillation: The El Niño-Southern Oscillation (ENSO) is a recurring climate pattern involving changes in the temperature of waters in the central and eastern tropical Pacific Ocean. On periods ranging from about three to seven years, the surface waters across a

⁸³ Public Resources Code § 30106

⁸⁴ NOC 2011

⁸⁵ Hassan *et al.*, 2005

large swath of the tropical Pacific Ocean warm or cool by anywhere from 1°C to 3°C, compared to normal.⁸⁶

Emissions scenarios: Scenarios representing alternative rates of global greenhouse gas emissions growth, which are dependent on rates of economic growth, the success of emission reduction strategies, and rates of clean technology development and diffusion, among other factors.⁸⁷

Environmental Justice: The fair treatment and meaningful involvement of people of all races, cultures, incomes, and national origins, with respect to the development, adoption, implementation, and enforcement of environmental laws, regulations, and policies.⁸⁸

Environmentally Sensitive [Habitat] Area (ESHA): Any area in which plant or animal life or their habitats are either rare or especially valuable because of their special nature or role in an ecosystem and which could be easily disturbed or degraded by human activities and developments.⁸⁹

Equity: This Guidance uses the term “equity” as defined in the context of social and racial equity, where “equity” refers to the fairness of achieving outcomes for all groups and no one factor, such as race, can be used to predict outcomes.⁹⁰

Erosion: The wearing away of land by natural forces; on a beach, the carrying away of beach material by wave action, currents, or the wind. Development and other non-natural forces (e.g., water leaking from pipes or scour caused by wave action against a seawall) may create or worsen erosion problems.

Eustatic: Refers to worldwide changes in sea level.

Feasible (*as used in “least environmentally damaging feasible alternative”*): Capable of being accomplished in a successful manner within a reasonable period of time, taking into account economic, environmental, social, and technological factors.⁹¹

⁸⁶ National Weather Service

⁸⁷ Bedsworth and Hanak 2008

⁸⁸ Public Resources Code § 30107.3(a)

⁸⁹ Public Resources Code § 30107.5

⁹⁰ The Local & Regional Government Alliance on Race and Equity. *Advancing Racial Equity and Transforming Government: A Resource Guide to Put Ideas into Action* (2015).

⁹¹ Public Resources Code § 30108

Flood (or Flooding): Refers to normally dry land becoming temporarily covered in water, either periodically (e.g., tidal flooding) or episodically (e.g., storm or tsunami flooding).⁹²

General Circulation Models (or General Climate Models; GCM): A global, three-dimensional computer model of the climate system which can be used to simulate human-induced climate change. GCMs are highly complex and they represent the effects of such factors as reflective and absorptive properties of atmospheric water vapor, greenhouse gas concentrations, clouds, annual and daily solar heating, ocean temperatures and ice boundaries. The most recent GCMs include global representations of the atmosphere, oceans, and land surface.⁹³ (See also *Atmospheric-Ocean General Circulation Models*)

Green infrastructure: Refers to the use of vegetative planting, dune management, beach nourishment or other methods that mimic natural systems to capitalize on the ability of these systems to provide flood and erosion protection, stormwater management, and other ecosystem services while also contributing to the enhancement or creation of natural habitat areas.

Greenhouse gases (GHGs): Any gas that absorbs infrared radiation in the atmosphere. Greenhouse gases include, carbon dioxide, methane, nitrous oxide, ozone, chlorofluorocarbons, hydrochlorofluorocarbons, hydrofluorocarbons, perfluorocarbons, sulfur hexafluoride.⁹⁴

Hard protection: A broad term for most engineered features such as seawalls, revetments, cave fills, and bulkheads that block the landward retreat of the shoreline. (See also *Revetment, Seawall, Shoreline protective devices*)

Hybrid Armoring: Nature-based adaptation strategies that combines fixing the shoreline, such as with a buried revetment or other shoreline protective device, with a nature-based feature to provide ecological and other benefits. (See also *Nature-Based Adaptation Strategies and Soft Strategies*)

Impact assessment: The practice of identifying and evaluating the detrimental and beneficial consequences of climate change on natural and human systems.

Inundation: The process of dry land becoming permanently drowned or submerged, such as from dam construction or from sea level rise.⁹⁵

Implementation Plan (IP): Measures to implement a Land Use Plan, such as zoning ordinances, zoning district maps, and other implementing actions.

⁹² Flick *et al.*, 2012

⁹³ NASA Earth Observatory Glossary

⁹⁴ UNFCCC 2004

⁹⁵ Flick *et al.*, 2012

Land Use Plan (LUP): “Land use plan” means the relevant portions of a local government’s general plan, or local coastal element which are sufficiently detailed to indicate the kinds, location, and intensity of land uses, the applicable resource protection and development policies and, where necessary, a listing of implementing actions.⁹⁶

Local Coastal Program (LCP): A local government's (a) land use plans, (b) zoning ordinances, (c) zoning district maps, and (d) within sensitive coastal resources areas, other implementing actions, which, when taken together, meet the requirements of, and implement the provisions and policies of, this division at the local level.⁹⁷ Each LCP includes a **Land Use Plan (LUP)** which contains policies, and an **Implementation Plan (IP)** which includes accompanying measures to implement the plan (such as zoning ordinances, zoning district maps, and other implementing actions).

Low-Income Household, Area, or Community: There are several metrics available to identify households, areas or communities that make less income than the median or average area income. It is an indicator of vulnerability or less capacity since these individuals or communities have fewer resources to address environmental burdens. Below are several definitions and metrics that can be used to identify low-income households or communities.

- **Low-Income Household:** In California law, a low-income household is defined as “those with household incomes at or below 80% of the statewide median income or with household incomes at or below the threshold designated as low-income by the Department of Housing and Community Development.” A “low-income area” means an area with household incomes at or below 80% of the statewide median income or with household incomes at or below the threshold designated as low income by the Department of Housing and Community Development’s list of [state income limits](#) adopted pursuant to Section 50093. (Sources: AB 1550 and SB 1000 bill text)
- **Area Median Household Income (AMI):** The AMI is the median family income of a geographic area of the state. It provides a metric of household income that accounts for regional variation in income levels and cost of living. The AMI is calculated every year and used to determine income limits for “lower income households.” In California, the Department of Housing and Community Development publishes state income limits annually. (Sources: California Department of Housing and Community development, CA Health and Safety Code [Section 50093](#))
- **Federal Poverty Level (FPL):** A measure of income determined by federal poverty guidelines issued every year by the Department of Health and Human Services. FPLs are used to determine eligibility for federal and state assistance programs and benefits. Because the federal poverty level applies nation-wide, areas with a higher cost of living such as California, often use the number of households or individuals with incomes

⁹⁶ Public Resources Code § 30108.5

⁹⁷ Public Resources Code § 30108.6

below twice the federal poverty level (200% FPL) as an indicator of poverty. (Source: Healthcare.gov)

- **Housing Burdened Low-Income Households:** Percentage of households in a census tract that is both low income (making less than 80% of the HUD area median income) and paying greater than 50% of their income to housing costs. (Sources: CalEPA Office of Environmental Health and Hazard Assessment, Comprehensive Affordability Housing Strategy)

Mean sea level: The average relative sea level over a period, such as a month or a year, long enough to average out transients such as waves and tides. Relative sea level is sea level measured by a tide gauge with respect to the land upon which it is situated. (See also *Sea level change/sea level rise*)

Meaningful Engagement: The intentional outreach, inclusion, and consideration of the voices and perspectives from presently and historically underserved and marginalized communities in the design, development, implementation, and policies that may impact the health, environment, and livelihood of their communities.

Mitigation (as used in climate science): A set of policies and programs designed to reduce emissions of greenhouse gases.⁹⁸

Mitigation (as used in resource management): Projects or programs intended to minimize or offset impacts to resources.

Monitoring: Systematic collection of physical, biological, chemical, or economic data, or a combination of these data on a project in order to make decisions regarding project operation or to evaluate project performance.

Nature-Based Adaptation Strategies: A coastal adaptation and/or erosion control method that is comprised of natural or mostly natural elements, which contributes to the persistence and enhancement of coastal processes and ecological benefits while also offering protection services to inshore areas. (See also *Soft Strategies* and *Hybrid Armoring*)

Pacific Decadal Oscillation: The Pacific Decadal Oscillation (PDO) is a long-term ocean fluctuation of the Pacific Ocean. The PDO waxes and wanes approximately every 20 to 30 years.

Passive erosion: The process whereby erosion causes the shoreline to retreat and migrate landward of any hardened structures that have fixed the location of the back beach therefore resulting in the gradual loss of beach in front of the hardened structure.

⁹⁸ Luers and Moser 2006

Permit: Any license, certificate, approval, or other entitlement for use granted or denied by any public agency which is subject to the provisions of this division.⁹⁹

Piling (or Pile): A long, heavy timber or section of concrete or metal driven or drilled into the earth or seabed to serve as a support or protection. (See also *Caisson*)

Potential impacts: All impacts that may occur given a projected change in climate, including impacts that may result from adaptation measures.

Public Trust Lands: All lands subject to the Common Law Public Trust for commerce, navigation, fisheries, recreation, and other public purposes. Public Trust Lands include tidelands, submerged lands, the beds of navigable lakes and rivers, and historic tidelands and submerged lands that are presently filled or reclaimed and which were subject to the Public Trust at any time.¹⁰⁰ (See also *Tidelands, Submerged lands*)

Radiative forcing: Radiative forcing is a measure of the influence a factor has in altering the balance of incoming and outgoing energy in the Earth-atmosphere system and is an index of the importance of the factor as a potential climate change mechanism. In [the IPCC] report radiative forcing values are for changes relative to pre-industrial conditions defined at 1750 and are expressed in Watts per square meter (W/m²).¹⁰¹

Redevelopment: At a minimum, replacement of 50% or more of an existing structure. LCPs may also consider including limits on the extent of replacement of major structural components such as the foundation or exterior walls, or improvements costing more than 50% of the assessed or appraised value of the existing structure.

Revetment: A sloped retaining wall; a facing of stone, concrete, blocks, rip-rap, etc. built to protect an embankment, bluff, or development against erosion by wave action and currents. (See also *Hard protection, Seawall, Shoreline protective devices*)

Risk: Commonly considered to be the combination of the likelihood of an event and its consequences – i.e., risk equals the probability of climate hazard occurring multiplied the consequences a given system may experience.¹⁰²

⁹⁹ Public Resources Code § 30110

¹⁰⁰ 14 Cal. Code Regs § 13577(f). While most lands that are currently – or historically were – covered by the ebb and flow of the tides are public tidelands subject to the public trust doctrine and managed by the State Lands Commission, there are some additional land classifications that impact how tidelands are managed. These additional land types include recognized Rancho, Pueblo, and Presidio Lands that are not subject to State Lands Commission management or oversight; and lands that were sold off to private ownership. In other cases, some lands may be subject to boundary line agreements and other adjudications that “fixed” the location of the tidelands boundary but that may have associated ambulatory easements for public uses.

¹⁰¹ IPCC 2007

¹⁰² Burton *et al.*, 2004

Scenario-based analysis: A tool for developing a science-based decision-making framework to address environmental uncertainty. In general, a range of plausible impacts based on multiple time scales, emissions scenarios, or other factors is developed to inform further decision-making regarding the range of impacts and vulnerabilities.¹⁰³

Sea level: The height of the ocean relative to land; tides, wind, atmospheric pressure changes, heating, cooling, and other factors cause sea level changes.

Sea level change/sea level rise: Sea level can change, both globally and locally, due to (a) changes in the shape of the ocean basins, (b) changes in the total mass of water and (c) changes in water density. Factors leading to sea level rise under global warming include both increases in the total mass of water from the melting of land-based snow and ice, and changes in water density from an increase in ocean water temperatures and salinity changes. Relative sea level rise occurs where there is a local increase in the level of the ocean relative to the land, which might be due to ocean rise and/or land level subsidence.¹⁰⁴ (See also *Mean sea level, Thermal expansion*)

Sea level rise impact: An effect of sea level rise on the structure or function of a system.¹⁰⁵

Sea level rise projection: Projections are predictions of future sea level rise based on scientific information and models that relate climate and sea level, and they are based on assumed trajectories of future global emissions and warming. Kopp *et al.*, 2014 and the 2018 State SLR Guidance are examples of a studies that provided probabilistic sea level rise projections, including a set of projections based on an optimistic emissions scenario that assumed net-negative emissions in the last decades of the 21st century (Representative Concentration Pathway 2.5, or RCP 2.5) and a set based on a high-end, fossil-fuel-intensive emission scenario (RCP 8.5). Since there is uncertainty inherent in climate models and other information sources used to project the various drivers of SLR, projections are presented in ranges that reflect that uncertainty. Particular sea level rise amounts may be predicted more or less frequently by these studies, so projections can be presented probabilistically. Therefore, projections are often called emission-dependent (or conditional) and probabilistic. The median (50th percentile) projection can be reported, along with the likely range (17th to 83rd percentiles) and so on.

Sea level rise scenario: Scenarios are sea level rise amounts or trajectories that span the plausible range of future sea level rise. They are usually presented as ranges and are not necessarily actual predictions of how much sea level rise is expected to occur by a certain time. Rather, they are hypothetical futures that span the range of what is considered possible according to the current best available science. Examples of reports that provided sea level rise

¹⁰³ NOAA 2010

¹⁰⁴ IPCC 2007

¹⁰⁵ PCGCC 2007

scenarios include Parris *et al.*, 2012 – which provided global mean sea level rise scenarios for the year 2100 of 0.1, 0.5, 1.2, and 2.0 meters – and Hall *et al.*, 2016 – which provided scenarios for 2100 including 0.2, 0.5, 1.0, 1.5 and 2.0 meters – with the intent that these roughly even increments of sea level rise span the plausible range of sea level rise that could occur in the year 2100. This report provides five sea level rise scenarios, each constructed from a subset of probabilistic AR6 projections. The information embedded in the projections are used to quantitatively and qualitatively characterize the likelihood that each scenario will occur.

Seawall: A structure separating land and water areas, primarily designed to prevent erosion and other damage due to wave action. It is usually a vertical wood or concrete wall as opposed to a sloped revetment. (See also *Hard protection, Revetment, Shoreline protective devices*)

Sediment: Grains of soil, sand, or rock that have been transported from one location and deposited at another.

Sediment management: The system-based approach to the management of coastal, nearshore and estuarine sediments through activities that affect the transport, removal and deposition of sediment to achieve balanced and sustainable solutions to sediment related needs.

Sensitivity: The degree to which a system is affected, either adversely or beneficially, by climate-related stimuli. The effect may be direct (e.g., a change in crop yield in response to a change in the mean, range, or variability of temperature) or indirect (e.g., climatic or non-climatic stressors may cause people to be more sensitive to additional extreme conditions from climate change than they would be in the absence of these stressors).

Shore protection: Structures or sand placed at or on the shore to reduce or eliminate upland damage from wave action or flooding during storms.

Shared socioeconomic pathways (SSP): The set of conceivable global development, emissions, and warming futures defined by the IPCC in its Sixth Assessment Report. “SSP1, SSP2, ..., SSP5” is used to denote the five socio-economic scenario families. SSP1-1.9, SSP1-2.6, ..., SSP5-8.5 are used to denote various approximate radiative forcing levels of 1.9, 2.6, ..., or 8.5 W m⁻² reached by the end of the century, respectively.

Shoreline protective devices: A broad term for constructed features such as seawalls, revetments, riprap, earthen berms, cave fills, and bulkheads that block the landward retreat of the shoreline and are used to protect structures or other features from erosion and other hazards. (See also *Hard protection, Revetment, Seawall*)

Soft Strategies: Nature-based adaptation strategies that avoid fixing the shoreline with hard structures and instead rely on the use of dynamic systems to attenuate coastal hazards, such as dune or wetland restoration, or sand replenishment. (See also *Nature-Based Adaptation Strategies and Hybrid Armoring*)

Still water level: The elevation that the surface of the water would assume if all wave action were absent.

Storm surge: A rise above normal water level on the open coast due to the action of wind stress on the water surface. Storm surge resulting from a hurricane also includes the rise in water level due to atmospheric pressure reduction as well as that due to wind stress.

Submerged lands: Lands which lie below the line of mean low tide.¹⁰⁶ (See also *Public Trust Lands, Tidelands*)

Subsidence: Sinking or down-warping of a part of the earth's surface; can result from seismic activity, changes in loadings on the earth's surface, fluid extraction, or soil settlement.

Tectonic: Of or relating to the structure of the earth's crust and the large-scale processes that take place within it.

Thermal expansion: An increase in water volume in response to an increase in temperature, through heat transfer.

Tidal prism: The total amount of water that flows into a harbor or estuary and out again with movement of the tide, excluding any freshwater flow.

Tidal range: The vertical difference between consecutive high and low waters. The Great Diurnal Range is the difference between mean higher high water and mean lower low water; the Mean Range of tide is the difference in height between mean high water and mean low water.¹⁰⁷

Tidelands: Lands which are located between the lines of mean high tide and mean low tide.¹⁰⁸ (See also *Public Trust Lands, Submerged lands*)

Traditional Ecological Knowledge: Also called "indigenous knowledge" or "Native science," refers to the evolving knowledge acquired by indigenous and local peoples over hundreds or thousands of years through direct contact with the environment. This knowledge is specific to a location and includes the relationships between plants, animals, natural phenomena, landscapes, and timing of events that are used for lifeways, including but not limited to hunting, fishing, trapping, agriculture, and forestry. Traditional ecological knowledge is an accumulating body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the relationship of living beings (human and non-human) with one another and with the environment. It encompasses the world view

¹⁰⁶ 14 Cal. Code Regs § 13577(e)

¹⁰⁷ NOAA 2013

¹⁰⁸ 14 Cal. Code Regs § 13577(d)

of indigenous people which includes ecology, spirituality, human and animal relationships, and more.¹⁰⁹

Transfer of Development Rights (TDR): A device by which the development potential of a site is severed from its title and made available for transfer to another location. The owner of a site within a transfer area may retain property ownership, but not approval to develop. The owner of a site within a receiving area may purchase transferable development rights, allowing a receptor site to be developed at a greater density.¹¹⁰

Tsunami: A long period wave, or seismic sea wave, caused by an underwater disturbance such as an earthquake, submarine landslide, or subaerial landslide (slope failure from land into a water body). Tsunamis can cause significant flooding in low-lying coastal areas and strong currents in harbors. (Commonly misnamed a *Tidal wave*)

Vulnerability: The extent to which a species, habitat, ecosystem, or human system is susceptible to harm from climate change impacts. More specifically, the degree to which a system is exposed to, susceptible to, and unable to cope with, the adverse effects of climate change, including climate variability and extremes. Vulnerability is a function of the character, magnitude, and rate of climate variation to which a system is exposed, as well as of non-climatic characteristics of the system, including its sensitivity, and its coping and adaptive capacity.

Vulnerability assessment: A practice that identifies who and what is exposed and sensitive to change and how able a given system is to cope with extremes and change. It considers the factors that expose and make people or the environment susceptible to harm and access to natural and financial resources available to cope and adapt, including the ability to self-protect, external coping mechanisms, support networks, and so on.¹¹¹

Vulnerable Communities: Climate vulnerability describes the degree to which natural, built, and human systems are at risk of exposure to climate change impacts. Vulnerable communities¹¹² experience heightened risk and increased sensitivity to climate change and have less capacity and fewer resources to cope with, adapt to, or recover from climate impacts. These disproportionate effects are caused by physical (built and environmental), social, political, and/ or economic factor(s), which are exacerbated by climate impacts. These factors include, but are not limited to, race, class, sexual orientation and identification, national origin, and income inequality.

¹⁰⁹ U.S. Fish and Wildlife Service: Traditional Ecological Knowledge for Application by Service Scientists. (<https://www.fws.gov/nativeamerican/pdf/tek-fact-sheet.pdf>).

¹¹⁰ Cal OPR 1987

¹¹¹ Tompkins *et al.*, 2005

¹¹² Office of Planning and Research, 2018: Defining Vulnerable Communities in the Context of Climate Adaptation.

Wave: A ridge, deformation, or undulation of the surface of a liquid. On the ocean, most waves are generated by wind and are often referred to as wind waves.

Wave height: The vertical distance from a wave trough to crest.

Wave length (or Wavelength): The horizontal distance between successive wave crests or between successive troughs of waves.

Wave period: The time for a wave crest to traverse a distance equal to one wavelength, which is the time for two successive wave crests to pass a fixed point.

Wave runup: The distance or extent that water from a breaking wave will extend up the shoreline, including up a beach, bluff, or structure.