Sea-level Rise Glossary for Washington State

Absolute sea-level - The height of the ocean surface relative to a fixed, unmoving reference point, such as the center of the earth.

Anthropogenic - Resulting from or produced by human activities.

Base Flood Elevation (BFE) - The elevation of the "100-year flood," used as the national standard by federal agencies for requiring flood insurance and regulating new development.

Bathtub mapping of sea-level rise - Sea-level rise mapping using a single value of water level rise in all locations. This method does not take into account storm tide, waves or wind.

Bathymetry - The measurement of water depths in oceans, seas and lakes; also, the information derived from such measurements.

Coastal erosion - The wearing away of land, or the removal of beach or dune sediments by wave action, tidal currents, wave currents or drainage. A combination of episodic inundation events and relative sea-level rise will serve to accelerate coastal erosion**.**

Climate change - A change in the state of the climate that can be identified (e.g., by using statistical tests) by changes in the mean and/or the variability of its properties, and that persists for an extended period, typically decades or longer. Climate change may be due to natural internal processes or external forcings such as modulations of the solar cycles, volcanic eruptions and persistent anthropogenic changes in the composition of the atmosphere or in land use.

Climate projections - A range of plausible pathways, scenarios or targets that capture the relationships between human choices, emissions, concentrations and temperature change.

Coastal Inundation - Water covering land that was once historically tidal but has been disconnected from flow due to natural or anthropomorphic causes.

Digital elevation model (DEM) – A three-dimensional computer-generated representation of the Earth's surface above a certain datum (such as sea level) in digital form often used in geographic information systems (GIS).

Extreme Water Level (EWL) – Future extreme water levels are the sum of the water level associated with multiple processes; tides, storm surge and wave run-up.

Flood Insurance Rate Maps or Regulatory flood maps - A Flood Insurance Rate Map (FIRM) is a regulatory flood map produced by FEMA used by most communities. At a minimum, flood maps show flood risk zones and their boundaries, and may also show floodways and Base Flood Elevations (BFEs).

Glacio-isostatic adjustment (GIA) -The long-term (many millennia) response of the Earth system to the global redistribution of ice and water associated with deglaciation after the last glacial maximum about 20,000 years ago. GIA has a vertical land movement component, and also a gravitational component that can modify absolute sea-level.

Global sea-level rise - Caused by a change in the volume of the world's oceans due to temperature increase, deglaciation (uncovering of glaciated land because of melting of the glacier), and ice melt.

Greenhouse gas - The gaseous constituents of the atmosphere, both natural and anthropogenic, that absorb and emit radiation at specific wavelengths within the spectrum of terrestrial radiation emitted by the Earth's surface, the atmosphere itself, and by clouds.

Intergovernmental Panel on Climate Change (IPCC) - The United Nations body for assessing the science related to climate change. Through its assessments, the IPCC determines the state of knowledge on climate change. It identifies where there is agreement in the scientific community on topics related to climate change, and where further research is needed. The reports are drafted and reviewed in several stages, thus guaranteeing objectivity and transparency. The IPCC does not conduct its own research. IPCC reports are neutral, policy-relevant but not policy-prescriptive. The assessment reports are a key input into the international negotiations to tackle climate change. Created by the United Nations Environment Programme (UN Environment) and the World Meteorological Organization (WMO) in 1988, the IPCC has 195 members.

Interpolation Methods used to estimate values between two known values.

Light Detection and Ranging (LIDAR) – A remote sensing method capable of measuring distance and direction to an object by emitting timed pulses of light and measuring the time between when a pulse was emitted and when its echo was received. When combined with a Global Positioning System (GPS), LIDAR technology can be used to map coastal topography faster and more thoroughly than traditional surveying methods.

Local sea-level - The height of the water as measured along the coast relative to a specific point on land. See also Relative Sea-level.

Mean Higher High Water (MHHW) - Coastal Washington State experiences a mixed semi-diurnal tidal pattern, with two unequal low and high tides per day. Mean higher high water is the average of the highest water level observed in each day over a period interest. An official

MHHW tidal datum is established by NOAA for each tide station by averaging over a designated 19.6-year "tidal epoch" period.

Probabilistic [framework, projections] - A probabilistic method or model is based on the theory of probability or the fact that randomness plays a role in predicting future events. Probabilistic models incorporate random variables and probability distributions into the model of an event or phenomenon.

Relative sea-level Rise (RSLR) - A change in sea-level for some location, relative to the adjacent land elevation. This could occur due to a change in sea-level or vertical movement of the land surface (i.e.: uplift or subsidence). Also known as **local sea-level rise**.

Representative Concentration Pathways (RCPs) - Greenhouse gas scenarios that include 21st century changes in the concentrations of the full suite of greenhouse gases, and particulates, and chemically active gases; as well as changes in land use and land cover. The word "representative" signifies that each RCP provides only one of many possible scenarios that would lead to the specific radiative forcing characteristics. The term pathway emphasizes that not only the long-term concentration levels are of interest, but also the trajectory taken over time to reach that outcome.

Resilience - The capacity of a system, community, or society potentially exposed to hazards to adapt, by resisting or changing, in order to reach and maintain an acceptable level of functioning and structure. This is determined by the degree to which the social system is capable of organizing itself to increase its capacity for learning from past disasters for better future protection and to improve risk reduction measures.

Risk - The probability of harmful consequences or expected losses (death and injury, losses of property and livelihood, economic disruption, or environmental damage) resulting from interactions between natural or human-induced hazards and vulnerable conditions.

Salinity intrusion - As the sea-levels rise, the "salt front" (location of the freshwater-saltwater line) may progress further inland. This encroachment may be further exacerbated by drought, reduced rainfall or changes in water use and demand. Saltwater intrusion can result in the need for water utilities to increase treatment, relocate water intakes, or development of alternate sources of fresh water.

Sea-level rise (SLR) - The upward trend in average sea-level height. The upward trend in average sea-level height linked to three primary factors: 1) thermal expansion of the ocean, 2) melting glaciers and 3) loss of Greenland and Antarctica's ice sheets.

Still water level - Coastal water elevation due to everything except waves: tides, storm surge, seasonal and annual water level cycles, as well as the long-term average sea level trend. This is the water level measured by tide gauges, which are specifically designed to remove any water level components related to waves.

Storm surge - Water that is pushed toward the shore by the force of the winds swirling around the storm.

Subduction zone [processes, earthquake] - The process in which older and denser sea floor subducts under continental or younger sea floor plates. This process then brings the sea floor plate down into the Earth's upper mantle.

Subsidence - A decrease in the elevation of the land surface. This can occur gradually or suddenly, and can be driven by a variety of processes, including earthquakes, GIA, groundwater extraction and sediment compaction.

Thermal Expansion- When the ocean warms, seawater becomes less dense and expands, raising sea-level.

Tide gauge - An instrument fitted with sensors that continuously record the height of the surrounding water-level to help with tide monitoring.

Tidal Datum - For marine applications, a base elevation used as a reference from which to reckon heights or depths. It is called a tidal datum when defined in terms of a certain phase of the tide. Tidal datums are local datums and should not be extended into areas which have differing hydrographic characteristics without substantiating measurements. In order that they may be recovered when needed, such datums are referenced to fixed points known as bench marks.

Total water-level – The maximum coastal water elevation on the shoreline, including waves and wave run-up. Where waves are present, the TWL will be higher than the SWL measured at a nearby tide gauge

Uplift - Same as subsidence but describing an increase in land elevation.

Vertical land movement (VLM) - Also known as vertical land motion. It is the long term (multi-decadal) rate of change of the surface of the land relative to an absolute reference frame.

Wave runup - A complex phenomenon that is known to depend on the local water-level, the incident wave conditions (height, period, steepness and direction), and the nature of the beach or structure being run up (e.g., slope, reflectivity, height, permeability and roughness).

Sources used for Glossary:

Sea-level Rise and Coastal Flood Risk Assessment: Island County, Washington, Miller, et. al. (2016)
IPCC 5 (2013)
FEMA
NOAA Coastal Inundation

EPA Climate Adaptation Resource Center
NOAA Tides and Currents
NASA Sea-level Change Glossary

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