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MEASURING AND UNDERSTANDING CHANGING SEA LEVEL

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In today's society, sea level rise and climate change are on the forefront of discussion, and are starting to be incorporated into coastal planning and engineering. However, to make informed decisions that will protect life, property, and the environment, it is important to understand what sea level really means, how it is measured, and where to find the most accurate and recent information for your area.

Sea level has implications on habitat restoration, coastal engineering, coastal hazard management and storm surge modeling, marine boundary delineation, development of nautical charts, and many other applications. Measuring sea level is the first step in applying it to address a specific need. NOAA's Center for Operational Oceanographic Products and Services (CO-OPS) operates the National Water Level Observation Network (NWLON), which has measured sea level in the U.S. for over 150 years. CO-OPS also provides analysis of sea level trends at over 100 locations in the U.S., as well as regional and international trends. It also provides statistics on the frequency and duration of inundation and exceedance probability, information on water levels during extreme events. It is the primary source for sea level data in the U.S., but it is important to apply this information appropriately.

The latest report from the Intergovernmental Panel on Climate Change (IPCC) estimates rates of global sea level rise approximately 1.7-1.8 millimeters per year based on a combination of tide gauge records and satellite altimeter data. However, local sea level trends are variations relative to the land and vary widely geographically due to a range of causes, such as channel dredging, crustal motion attributed to glacial rebound, or local subsidence. Rates of sediment deposition or loss could also have a highly localized effect and should be considered when accounting for long-term sea level trends.

NOAA's National Geodetic Survey (NGS) provides critical information on land elevations, and changes over time, allowing one to decouple local and global sea level trends. By operating instruments such as continuous GPS stations and Surface Elevation Tables (SETs), NGS is able to measure both regional crustal motion and local subsidence or deposition, which is necessary to understand changing coastal dynamics. Only by accurately measuring and mapping the land-water interface can one monitor and understand changes over time.

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