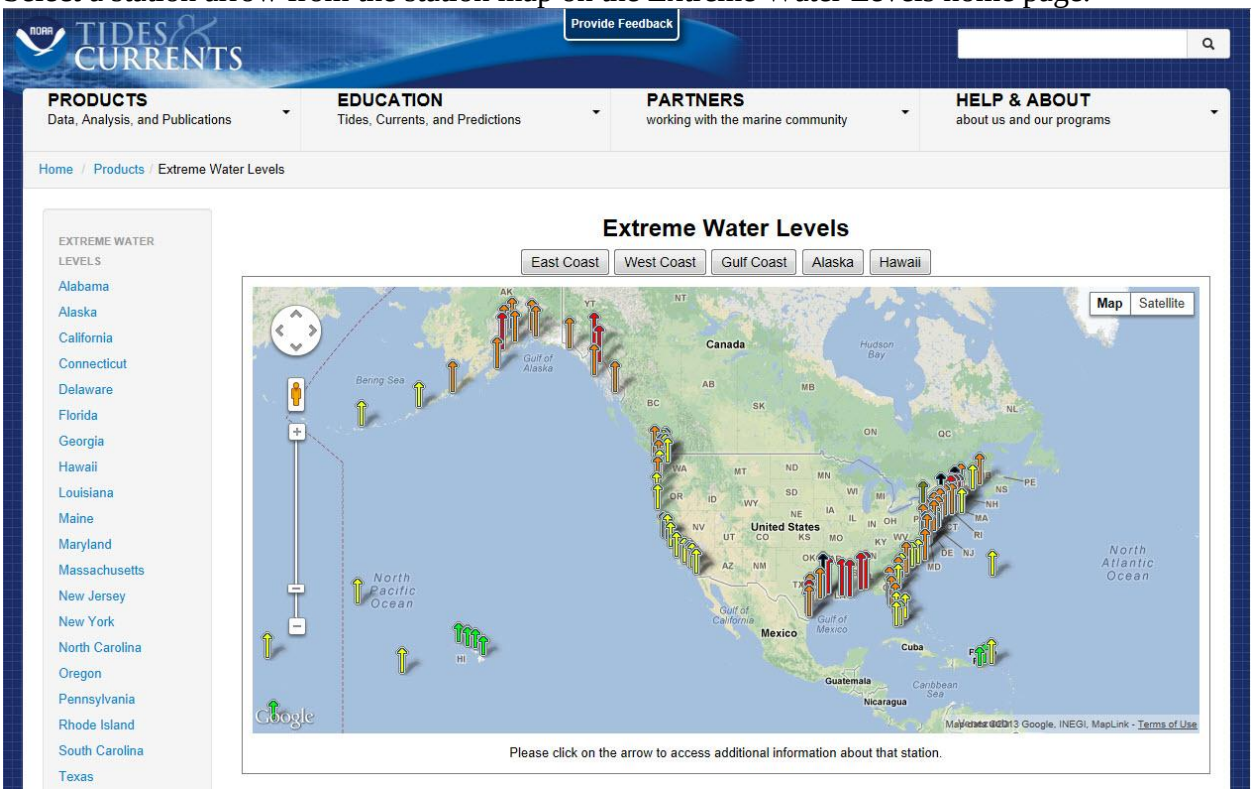
EXTREME WATER LEVELS USERS' GUIDE

Introduction

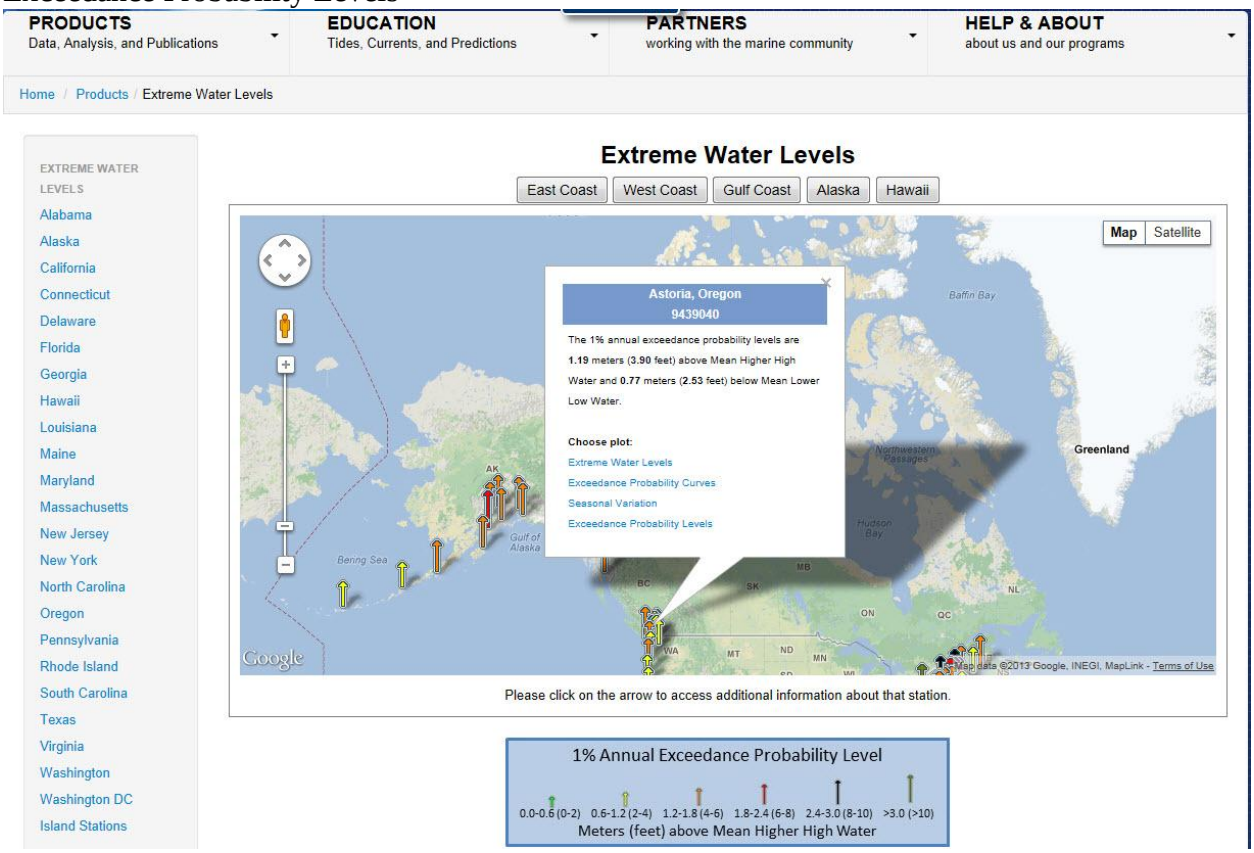
The Extreme Water Levels product provides web-based access to Exceedance Probability Statistics at approximately 110 NOAA Center for Operational Oceanographic Products and Services (CO-OPS) water level stations with at least 30 years of water level observations. Exceedance probability is the likelihood that water levels will exceed a given elevation based on a statistical analysis of historic observations. CO-OPS computes exceedance probability statistics to determine the extreme water levels that are likely to occur every year, every other year, every 10 years, and every 100 years. Extremely high or low water levels at coastal locations are an important public concern and a factor in coastal hazard assessment, navigational safety, coastal management and planning, and ecosystem management.

Steb-by-Step

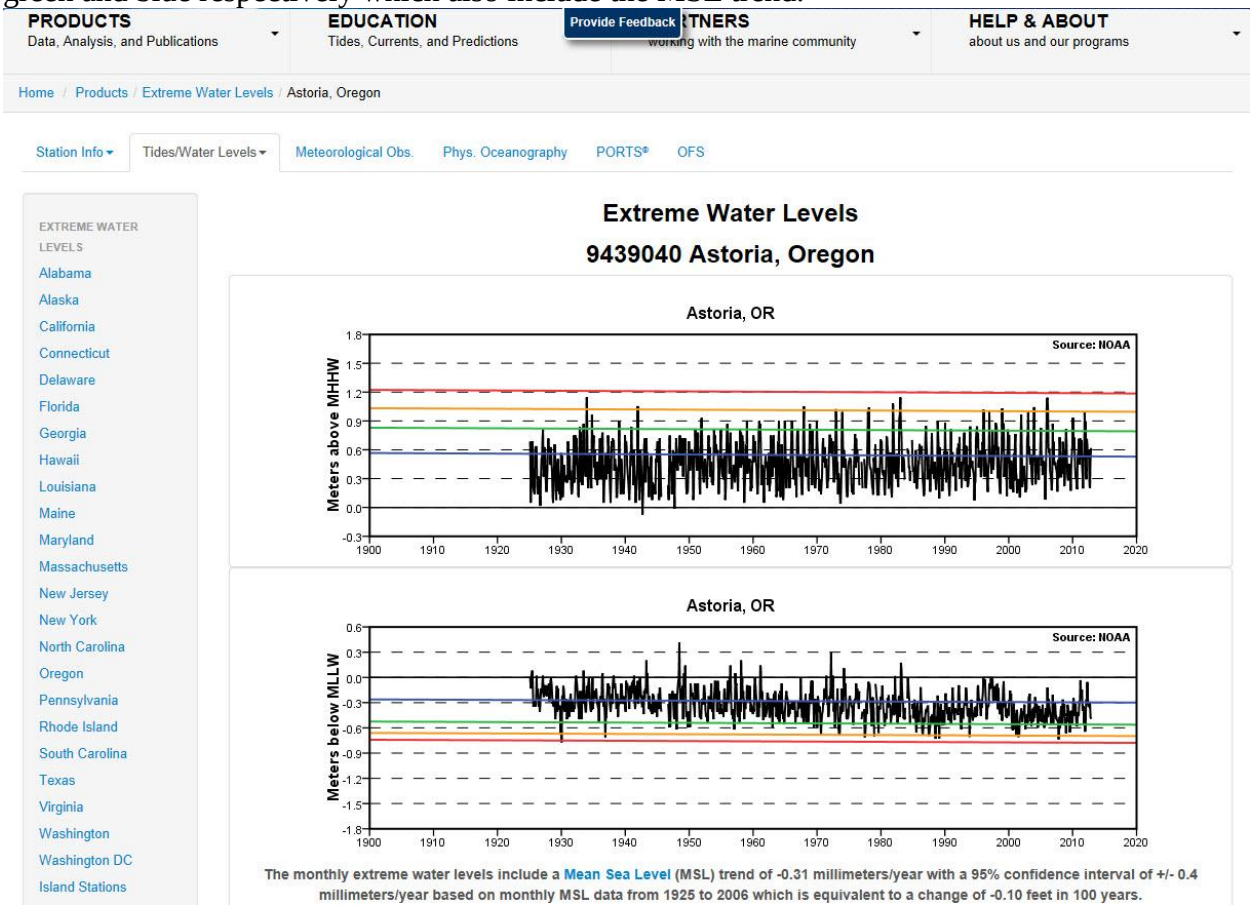
1. Select a station arrow from the station map on the Extreme Water Levels home page.



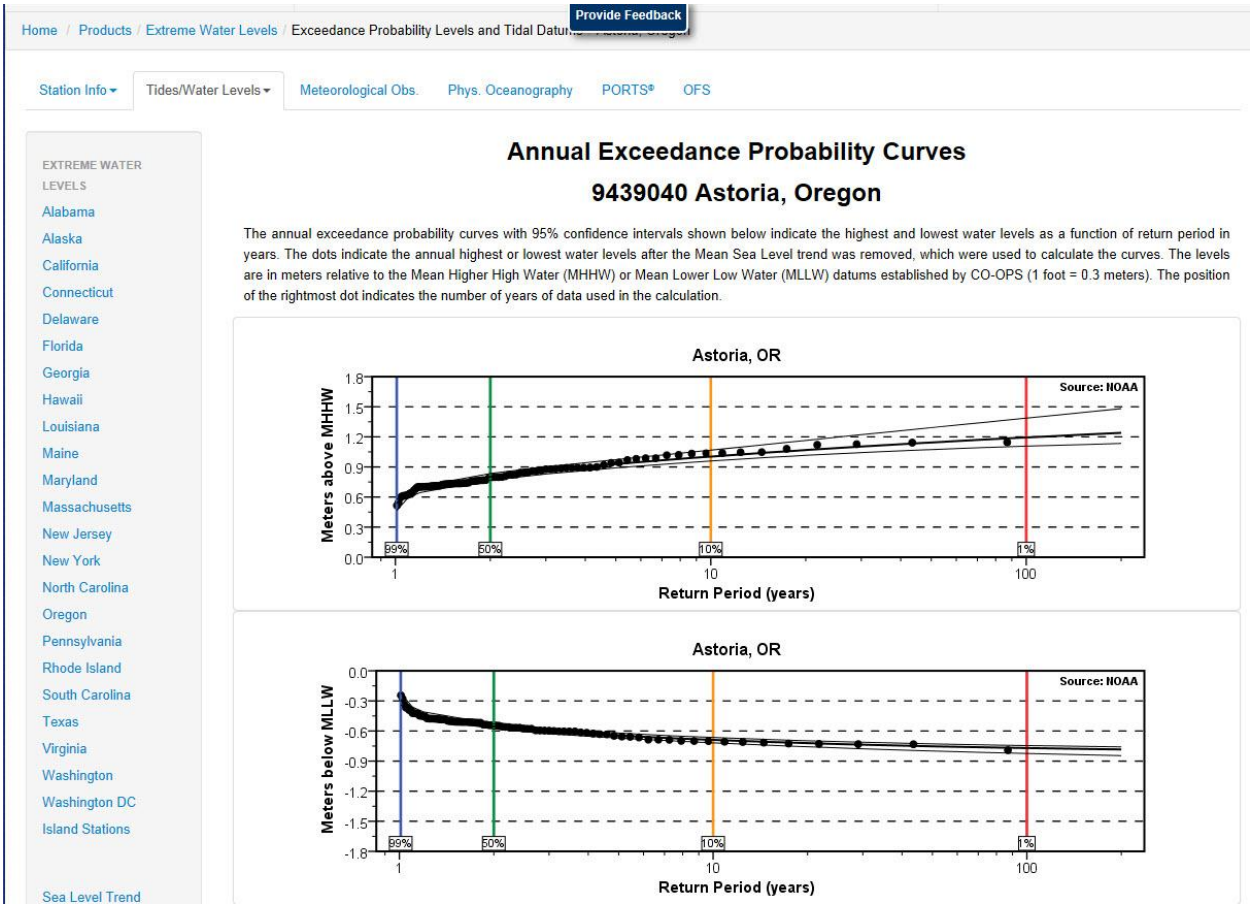
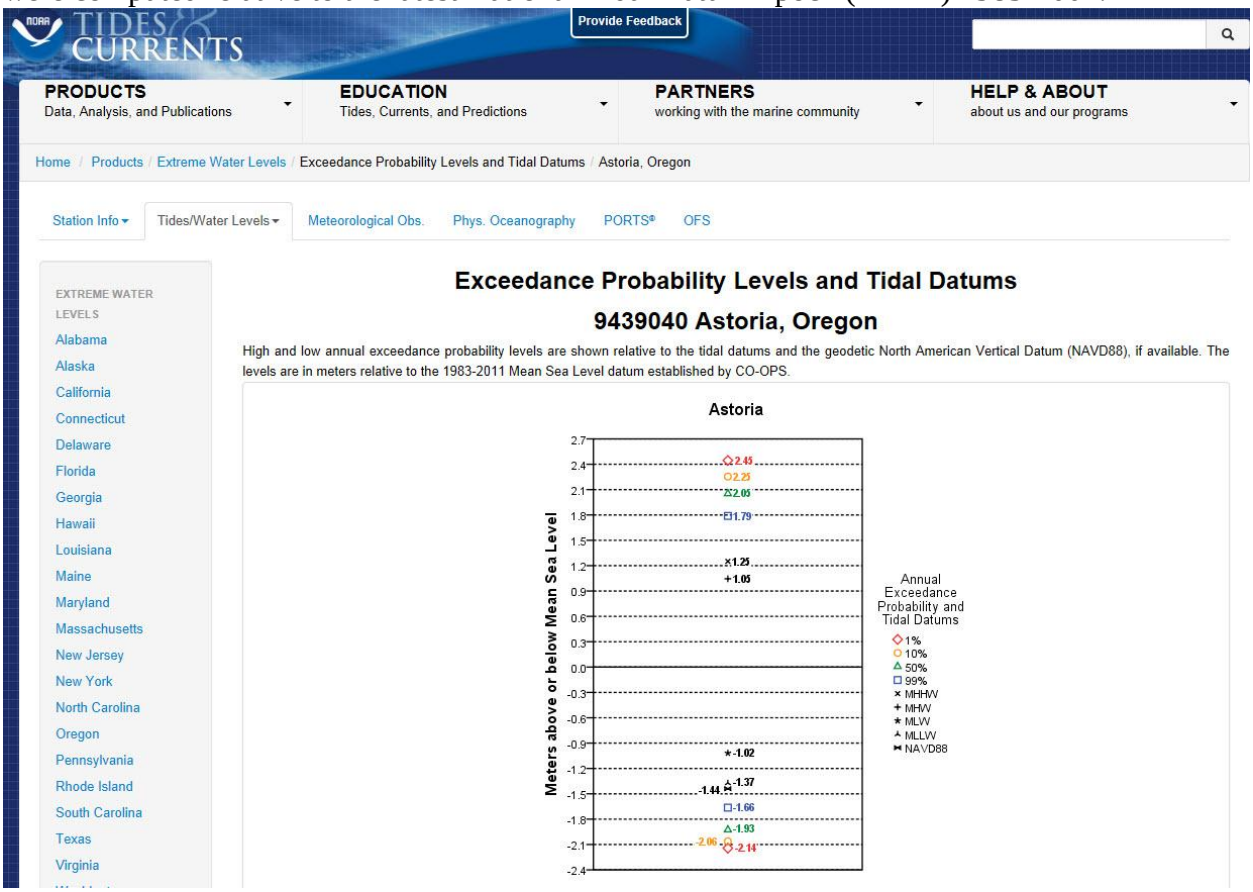
2. A pop-up will appear stating the 1% annual exceedance probability levels for the selected station as well 3 plot options: Extreme Water Levels, Exceedance Probability Curves, and Exceedance Probability Levels



3. The Extreme Water Levels page for the selected station contains the monthly extreme water levels in meters above MHHW and meters below MLLW. The monthly extreme water levels are the individual highest and lowest water levels tabulated for each month from the observed water level data at each water level station. These extreme water levels are affected by the long-term MSL trend for the selected station. Additionally, the plots show the 1%, 10%, 50%, and 99% exceedance probability levels plotted in red, orange, green and blue respectively which also include the MSL trend.



4. The Exceedance Probability Curves were calculated by fitting the three parameters of the Generalized Extreme Value (GEV) probability distribution function to annual maximum or annual minimum data using iterative maximum likelihood estimation. The 99% exceedance probability level equals the water level expected every 1 year and is the return period marked on the plots in blue. The 50% exceedance probability level equals the water level expected every 2 years and is the return period marked on the plots in green. The 10% exceedance probability level equals the water level expected every 10 years and is the return period marked on the plots in orange. The 1% exceedance probability level equals the water level expected every 100 years and is the return period marked on the plots in red. The upper and lower curves represent the spread of the 95% confidence interval which depends on the variability of the data and the length of the series used. As shown in the probability curves, the level of confidence in the exceedance probability level decreases for longer return periods. Probability level estimates obtained from this product should be used with full appreciation and acknowledgement of the associated confidence levels.



5. Exceedance Probability Levels are provided relative to tidal datums and, where possible, relative to the geodetic datum NAVD88. The plots are biased to MSL such that MSL equals 0.0 on the vertical left-hand scale. The 1% exceedance probability levels are marked by red diamonds. The 10% exceedance probability levels are marked by orange circles. The 50% exceedance probability levels are marked by green triangles. The 99% exceedance probability levels are marked by blue squares. On average, the 1% level will be exceeded in only 1 year per 100 years. The 10% level will be exceeded on average in 10 years per every 100 years. The 50% level will be exceeded on average in 50 years per every 100 years. The 99% level will be exceeded on average in 99 out of every 100 years and, in some years, could be exceeded more than once. All tidal datums, including MSL were computed relative to the latest National Tidal Datum Epoch (NTDE) 1983-2001.