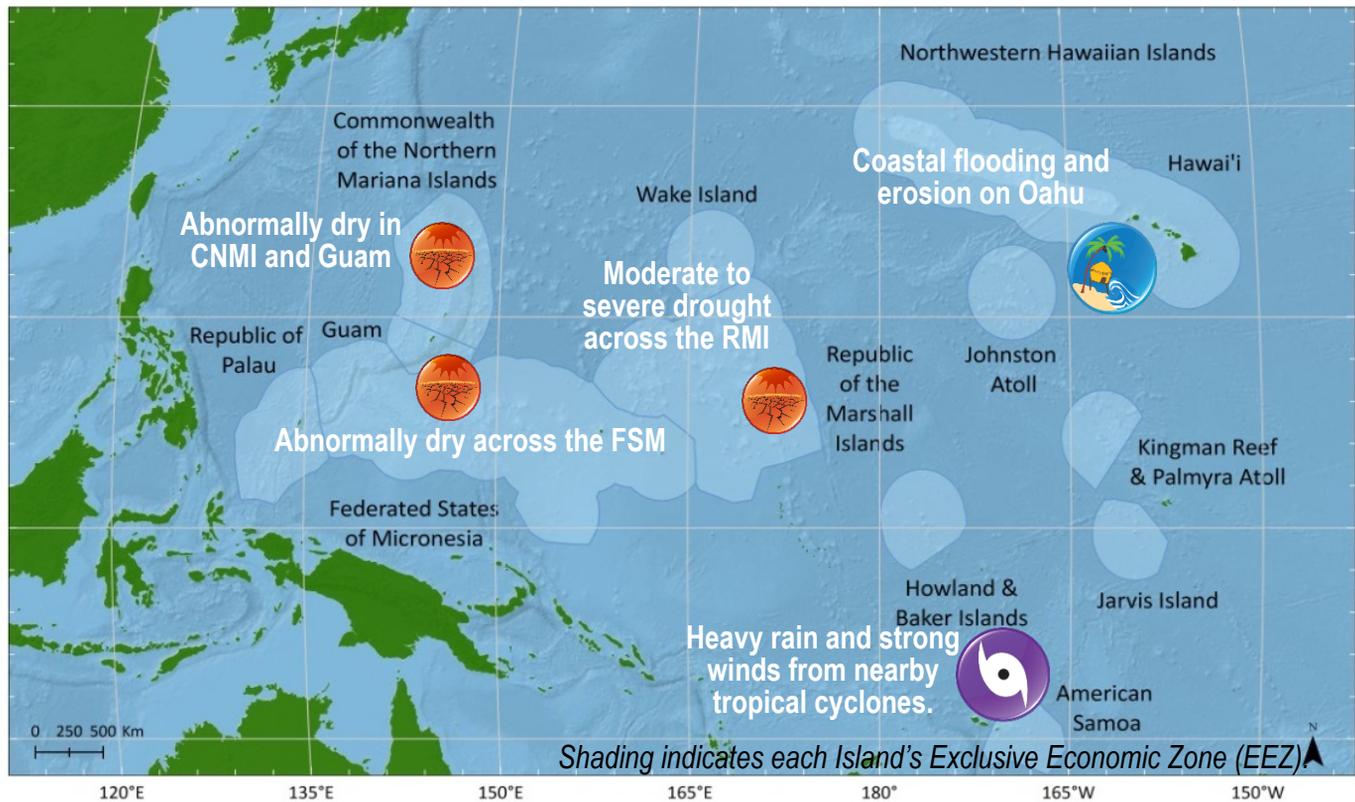
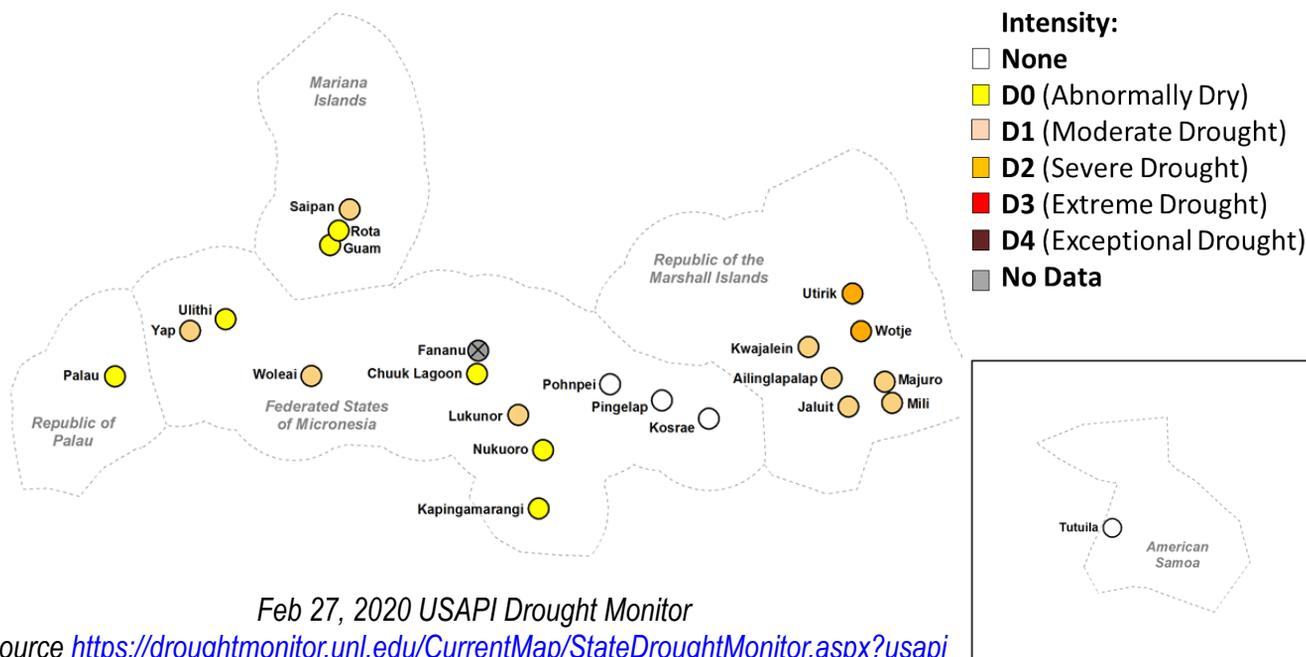


## Significant Events – For December 2019 – February 2020



## Highlights for Hawaii and the U.S. Affiliated Pacific Islands

- Abnormally dry to drought conditions persist across much of Guam, the CNMI, the Federated States of Micronesia and the Republic of the Marshall Islands.
- Coastal flooding and erosion occurred on Oahu in December and January due to a combination of exceptionally high tides and high waves.
- Over Presidents' Day weekend American Samoa experienced torrential rain and gale force winds, resulting in power outages, landslides, and the closure of roads, airports, and schools.
- The all-time highest hourly water level recorded by NOAA's Honolulu Harbor tide gauge on December 25, 2019. The high tide occurred very early in the morning.
- At the end of December Typhoon Phanfone formed in Micronesia and moved across in the western north Pacific.



February **rainfall** in the Marianas totaled less than 2 inches on some northern locations, including Tinian (1.90 inches, or 58% of normal) and Saipan Airport (1.77 inches, or 68% I). Guam International Airport had a February total of 3.79 inches (84% of normal). In the Republic of Palau, a wetter weather pattern developed in late February. However, year-to-date rainfall through March 2 at WSO Koror was only 12.50 inches (59% of normal). In the FSM, generally wet conditions on Pohnpei, Pingelap, and Kosrae contrasted with varying degrees of dryness across central and western islands. February rainfall totaled less than 4 inches at Chuuk Lagoon (2.67 inches, or 37% of normal), Lukunor (2.93 inches, or 30%), Yap (3.28 inches, or 55%), and Ulithi (3.37 inches, or 70%). In late February showers swept across the southern sections of the Marshall Islands, providing some drought relief. Farther north, however, severe drought persisted on Utirik and Wotje. Weekly rainfall totaled more than an inch only once during the first 9 weeks of 2020 on Utirik and twice on Wotje. Despite a few recent days of mostly dry weather, there are no dryness-related concerns in American Samoa.

**Sea levels** continued to be moderately above normal (+5 to +10 cm) throughout most of the tropical central Pacific. Hawaii remains within a broad region of above-normal sea levels, with the Honolulu tide gauge setting an all-time record hourly high during December.

At the end of December Typhoon Phanfone formed in Micronesia and moved across in the western north Pacific. The period from November to January is climatologically the less active half of the **Tropical Cyclone (TC)** season in the southwest Pacific. Given ENSO conditions in the basin, the expectation was that activity from Nov 2017 to Jan 2019 would be normal (~4 storms) and four named storms formed in February. Of the four storms that formed, one attained major status, Uesi, reaching Australian Category 3 status.



Road damage on windward Oahu in January. Photo courtesy of Honolulu Star-Advertiser.

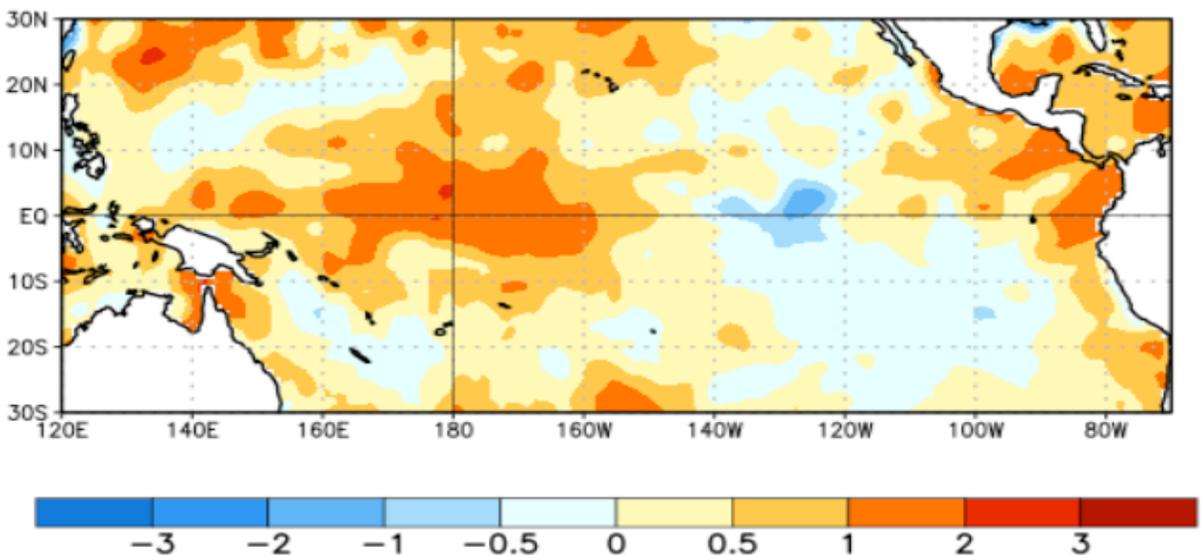


Flooded roads in Samoa and American Samoa. Photo courtesy of Radio New Zealand.

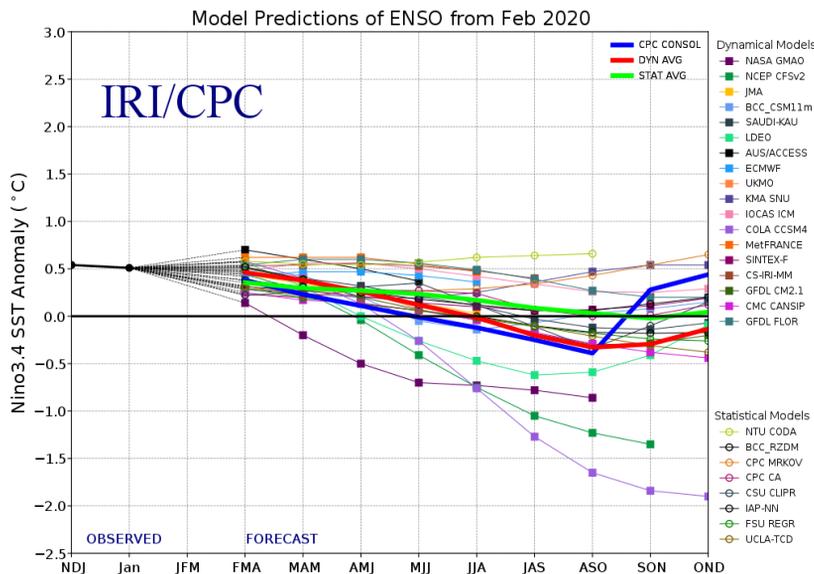
**Facilities and Infrastructure** – On northwest exposures of Oahu, coastal flooding caused by anomalously high tides and high waves occurred on December 12. Trade wind swell and high tides led to the collapse of a coastal road in Hauula, windward Oahu the night of January 4. Strong trades with 10-15' steady windswell through January 4-14, exacerbated the coastal erosion.

Heavy rain and gale force winds at the end of December 2019 and again on President's Day caused flooding and damage leading to power outages on Tutuila, and forcing schools and the airport to close. The outlying Manu'a islands were also impacted.

**Water Resources** – Between February 15 and 28, Majuro's reservoir storage jumped 7.04 million gallons (from 21.24 to 28.28 million gallons) – or from 59 to 79 percent of capacity.



Average Sea Surface Temperatures for the week centered on February 5, 2020. Source: NOAA NWS CPC



Feb 2020 IRI/CPC Forecast

Source <https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/>

According to ENSO prediction models, **ENSO-neutral is favored through Northern Hemisphere spring 2020** (~60% chance), continuing through summer 2020 (~50% chance). It is expected that oceanic temperatures will remain elevated in the near term, particularly in the western and central

equatorial Pacific Ocean, with a gradual decrease into the spring and summer. NOAA's Coral Reef Watch 4-month **bleaching** outlook projects **high heat stress** (Alert Level 1 and 2) over an area extending from the Gilbert to the northern Line Islands.

Over the next six months, dynamical models suggest: near-to-above-normal **sea levels** in the western half of the Pacific south of 5° N; to the north, around Yap and Guam, slightly below-normal; and above normal in the Hawaii region during the first half of 2020.

During the period March through May, **rainfall** is projected to be near to above normal for much of RMI, FSM, and the Hawaiian Islands. Meanwhile, near to below normal rainfall is projected for American Samoa, Guam, and the CNMI.

TC activity for western north Pacific. Is expected to be near normal, following ENSO neutral conditions. Activity for the latter portion of the southwest Pacific TC season is expected to be near normal, so another 3-4 new storms by the end of May is possible.

NOAA NWS Weather Forecast Office Honolulu:  
<http://www.prh.noaa.gov/pr/hnl/>

NOAA NWS Weather Forecast Office Guam:  
<http://www.prh.noaa.gov/pr/guam/>

NOAA National Centers for Environmental Information:  
<http://www.ncei.noaa.gov/>

NOAA NMFS Pacific Island Fisheries Science Center:  
<http://www.pifsc.noaa.gov/>

NOAA OceanWatch - Central Pacific:  
<http://oceanwatch.pifsc.noaa.gov/>

NOAA Coral Reef Watch:  
<http://coralreefwatch.noaa.gov/>

USGS Pacific Islands Water Science Center:  
<http://hi.water.usgs.gov/>

USGS Science Center – Pacific Coastal and Marine Science Center:  
<http://walrus.wr.usgs.gov/>

University of Hawaii - Joint Institute of Marine and Atmospheric Research:  
<http://www.soest.hawaii.edu/jimar/>

University of Guam - Water and Environmental Research Institute:  
<http://www.weriguam.org/>

University of Hawaii Sea Level Center:  
<https://uhslc.soest.hawaii.edu/>

University of Hawaii Asia Pacific Data Research Center (APDR) -  
<http://apdr.soest.hawaii.edu/index.php>