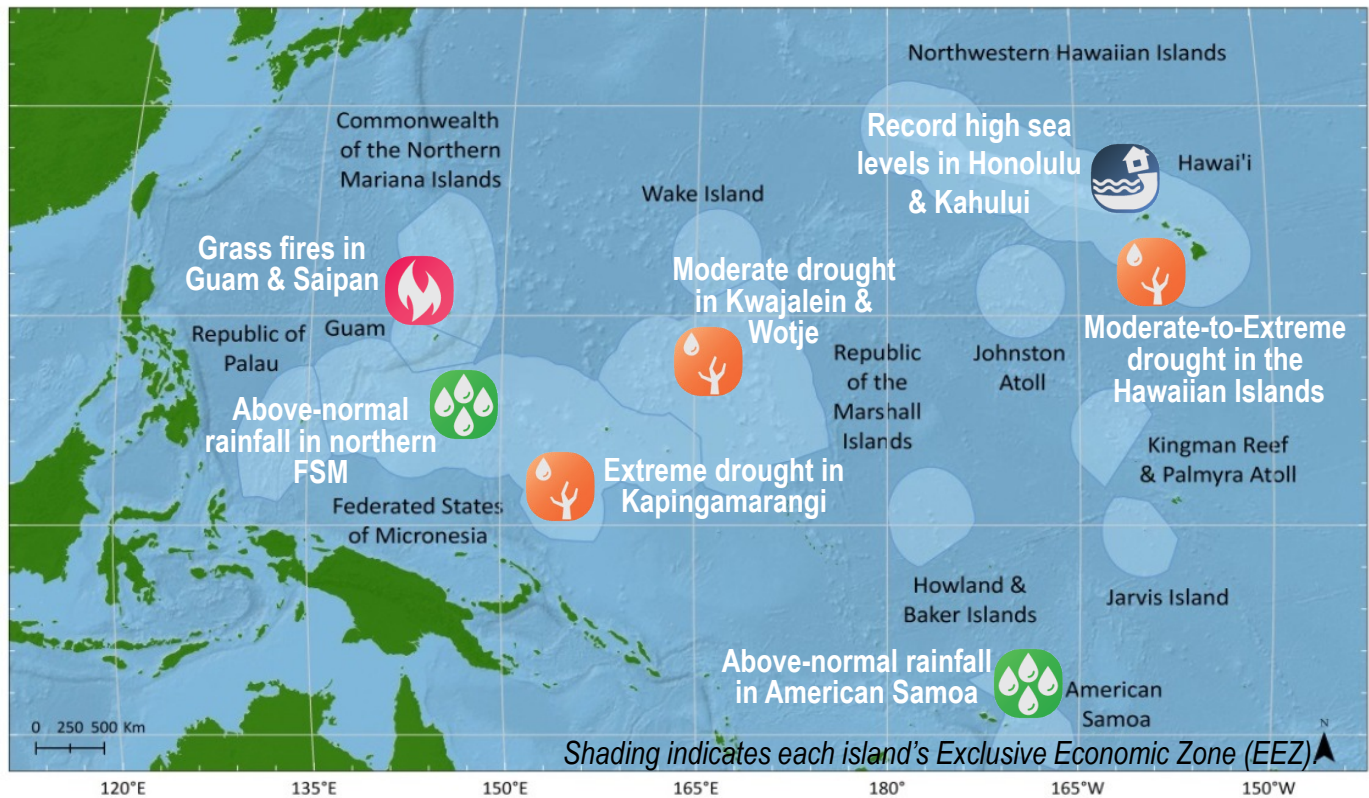


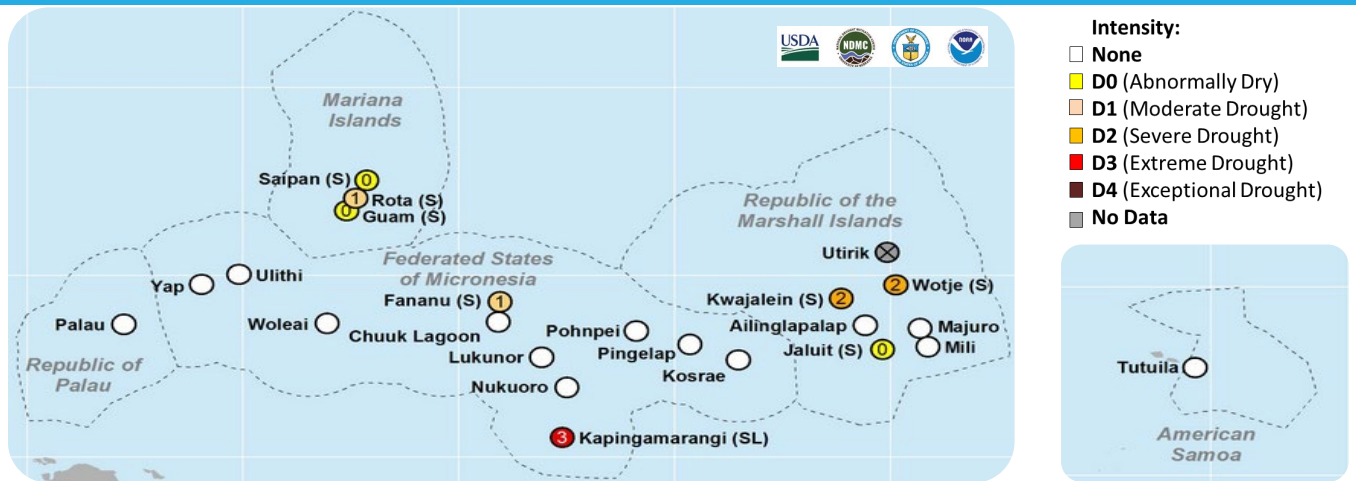
Significant Events – For December 2020–February 2021



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

- La Niña Advisory in effect for the Northern Hemisphere winter 2021 with a 60% chance of a transition from La Niña to ENSO-neutral conditions during the Northern Hemisphere spring 2021 (April-June).
- Moderate-to-extreme drought conditions across portions of the Hawaiian Islands including Hawai'i, Kaho'olawe, Lāna'i, Maui, and Moloka'i. Extreme (D3) drought conditions were observed in the Federated States of Micronesia (FSM) on Kapingamarangi Atoll while Moderate (D1) drought was observed in the Republic of the Marshall Islands (RMI) on Kwajalein and Wotje.
- Kapingamarangi (FSM) observed its driest year on record in 2020. In American Samoa, Pago Pago logged its wettest year on record in 2020. For the DJF period, precipitation was well above normal in areas of FSM including Kosrae, Lukunor, and Yap.
- Hilo (Hawai'i) and Kahului (Maui) both observed their hottest year on record in 2020.
- Honolulu (O'ahu), Kahului (Maui), and Mokuoloe (O'ahu) set records for monthly mean high sea levels in January.

# Climate Overview – For December 2020–February 2021



February 23, 2021 USAPI Drought Monitor

Source: <https://droughtmonitor.unl.edu/CurrentMap/StateDroughtMonitor.aspx?usapi>

Across the central and eastern equatorial Pacific Ocean, sea-surface temperatures (SSTs) were below normal with La Niña conditions present and a La Niña Advisory still in effect as of the end of February. All four Niño regions observed negative SST anomalies by the end of February—with the Niño 3.4 region at  $-1.2^{\circ}\text{C}$ , Niño 3 at  $-0.9^{\circ}\text{C}$ , Niño 1+2 at  $-1.1^{\circ}\text{C}$ , and Niño 4 at  $-1.0^{\circ}\text{C}$ .

Consistent with the ongoing La Niña event, sea levels in the tropical north-central and far western Pacific were above normal. Conversely, along the equator (east of  $\sim 160^{\circ}\text{E}$ ) and the eastern Pacific, sea levels were below normal. In the Hawaiian Islands, a prolonged period of above-normal sea levels was observed during 2020 with Honolulu setting record highs in June, July, September, October, and November. For January 2021, Honolulu, Kahului, and Mokuoloe broke monthly mean high sea-level records while daily extreme high sea-level records were broken in Hilo (1/15, 26-27), Honolulu (1/13-14), Kahului (1/14-16), Nawiliwili (1/11, 14-15) and Mokuoloe (1/12, 14-15, 26).

For the December through February period, Extreme (D3) drought conditions persisted on Kapingamarangi while other areas of drought developed by February in RMI (Kwajalein, Wotje), FSM (Fananu), and CNMI (Rota). Median precipitation for the DJF period was above normal with Saipan observing 12.88 in. (127% of normal) while Guam observed 13.14 in. (88% of normal). In Palau, above-normal rainfall was observed for the DJF period with Koror observing 40.47 in. (119% of normal). In western FSM, Yap observed above-normal precipitation for DJF with 37.08 in. (170% of normal). Elsewhere in FSM for DJF, Chuuk observed 43.32 in. (145% of normal), Pohnpei 52.57 in. (131% of normal), Kosrae 79.21 in. (148% of normal), and Lukunor 53.11 in. (165% of normal). Conversely, Kapingamarangi (FSM) continued to observe below-normal rainfall for DJF with 15.55 in. (47% of normal). In the RMI, Majuro observed 32.18 in. (114% of normal) for DJF while Kwajalein logged 8.33 in. (53% of normal). In American Samoa, periods of the South Pacific Convergency Zone (SPCZ) moving over the region fueled continuation of the wet trend with Pago Pago observing 49.03 in. (122% of normal) for DJF. In the Hawaiian Islands, Hilo observed 44.66 in. (147% of normal) for DJF while Honolulu logged 5.08 in. (67% of normal), Kahului 4.44 in. (55% of normal), and Lihue 7.83 in. (65% of normal).

Tropical cyclone (TC) activity has been near normal in the South Pacific region (east of  $135^{\circ}\text{E}$ ) with a total of seven named storms since December and an Accumulated Cyclone Energy (ACE) Index of 40 by the end of February—slightly below normal. To date, the most significant TC event in the southwest Pacific for the 2020-21 season occurred in mid-December with Tropical Cyclone Yasa that reached Category 5 (on the Saffir-Simpson Hurricane Scale), causing widespread damage across the island of Vanua Levu, Fiji.

# Sectoral Impacts – For December 2020–February 2021



Coastal erosion leading to park closures in Jan.-Feb. at Puamana Beach Park, Maui. Photo credit: Maui Co.



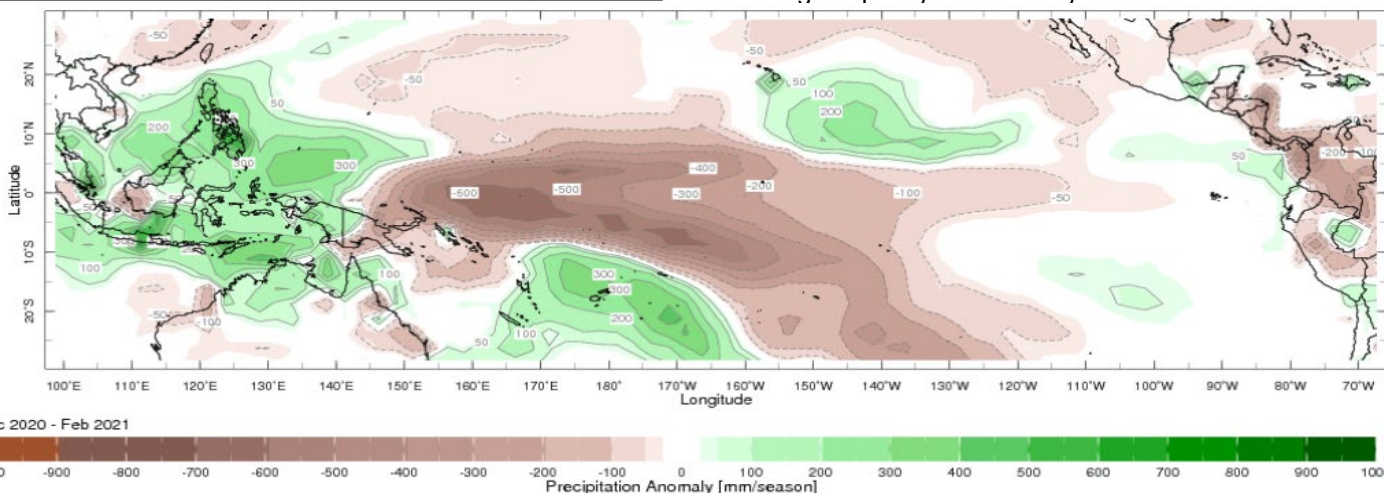
Wildfire activity on Capitol Hill, Saipan (Northern Mariana Islands) on January 21, 2021. Photo credit: Department of Fire & Emergency Medical Services, CNMI.

**Agriculture** – In Maui County, Governor David Ige issued an emergency proclamation in January 2021 because of the impacts of drought and economic losses suffered by local farms and ranches. On Maui and Moloka'i, lack of forage and available water has led to cattle deaths as well as mortality among the non-native axis deer population. On Kapingamarangi, local crops—particularly taro and breadfruit—have been severely impacted by the effects of the short and long-term drought leading the Kapingamarangi Municipal Government to declare a State of Emergency (Jan. 29) to address food shortages.

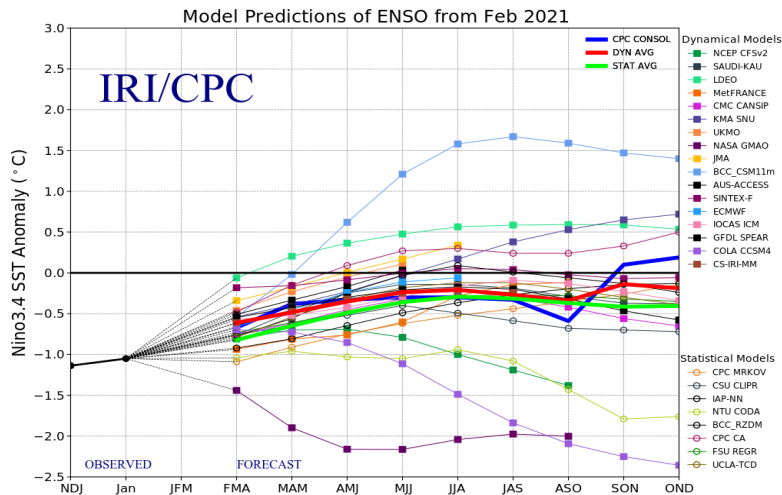
**Ecosystems** – Shallow backreef coral bleaching (*Porites rus*, *Pocillopora damicornis*, *Porities cylindrica*) was observed at the Coconut Point backreef as well as at Nu'uuli Uta on Tutuila, American Samoa. In Guam and Saipan, numerous grass fires were observed during January and February.

**Facilities and Infrastructure** – In mid-January, high-surf warnings were in effect as a giant northwest swell (40-50 ft. waves) impacted north and west shores of Kaua'i, O'ahu, and Moloka'i as well as north shores of Maui leading to temporary beach closures. On Kaua'i, heavy rainfall and flash flooding in late February led to closures of Kuhio Hwy.

**Water Resources** – On Kapingamarangi, reserve tanks remained full by February, but the island's large water tank was slightly below 50% full and well water remained unsafe to drink. On Majuro (RMI), reservoir storage was at 91% of total storage capacity on February 28.



Seasonal precipitation anomalies for December 2020–February 2021. Areas with above-normal precipitation are depicted in **green** while areas with below-normal amounts are depicted in **brown**. Source: IRI; NOAA CPC CAMS-OPI.



February 2021 IRI/CPC Forecast

Source: <https://iri.columbia.edu/our-expertise/climate/forecasts/ens0/current/>

According to the majority of ENSO prediction models (see IRI/CPC forecast above), **La Niña will continue through the winter of 2020-21 and is expected to dissipate during spring 2021 with a likely transition during AMJ 2021 to neutral conditions (60% chance)**. Looking ahead at the summer months, most of the models predict a continuation of ENSO-neutral conditions at least through the end of the Northern Hemisphere summer.

NOAA's Coral Reef Watch four-month (Mar-Jun 2021) coral bleaching heat stress outlook calls for a **high probability of high heat stress (Alert Level 1) from an area at ~5° N extending eastward from the International Date Line to ~170° W** and a bleaching **warning** for areas of the equatorial western Pacific including portions of FSM and RMI.

During the period March 2021 through May 2021, rainfall is projected to be **above normal** in Palau while **normal-to-above-normal** precipitation is forecasted for the Northern Mariana Islands, Guam, areas of the FSM (Yap, Chuuk), RMI (Kwajalein, Majuro), and the Hawaiian Islands for Hilo and Lihue. **Normal** rainfall amounts are forecasted for Pohnpei and Kosrae (FSM) and for Honolulu and Kahului while **below-normal** rainfall is expected in American Samoa, according to the NOAA Pacific ENSO Applications Climate (PEAC) Center.

With La Niña conditions expected to transition to neutral during spring 2021, dynamical models (CFSv2, ACCESS-S1 [Australia]) suggest a **likelihood of sea levels remaining above normal in the western Pacific and below normal in the eastern Pacific**. In the tropical southwestern Pacific, there is a likelihood of increasing sea-level anomalies in areas, especially around the Samoan Islands, but uncertainty is higher closer to the equator.

NOAA NWS Weather Forecast Office Honolulu & Guam:

<http://www.prh.noaa.gov/pr/hnl/>  
<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 (APDRC): <http://apdrc.soest.hawaii.edu/index.php>

Western Regional Climate Center: <https://wrcc.dri.edu/>