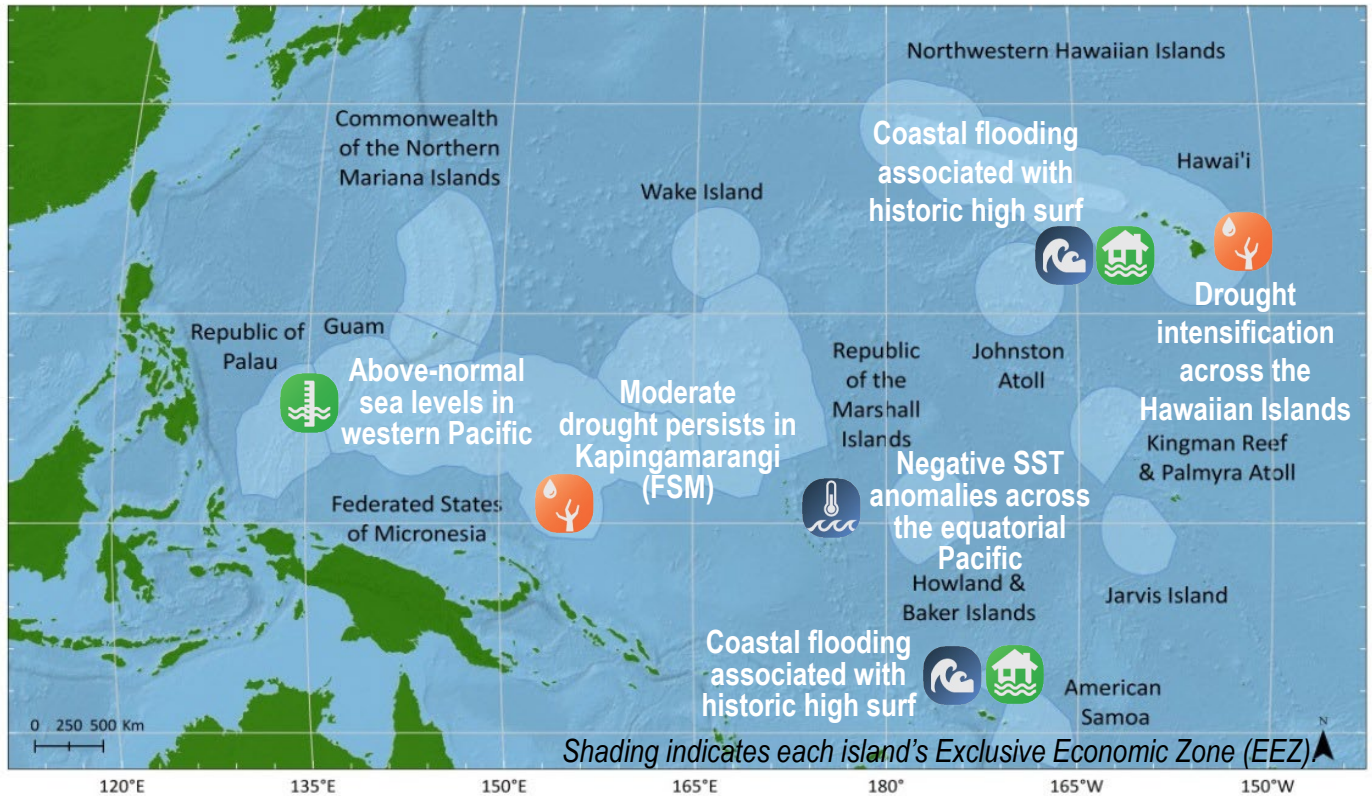




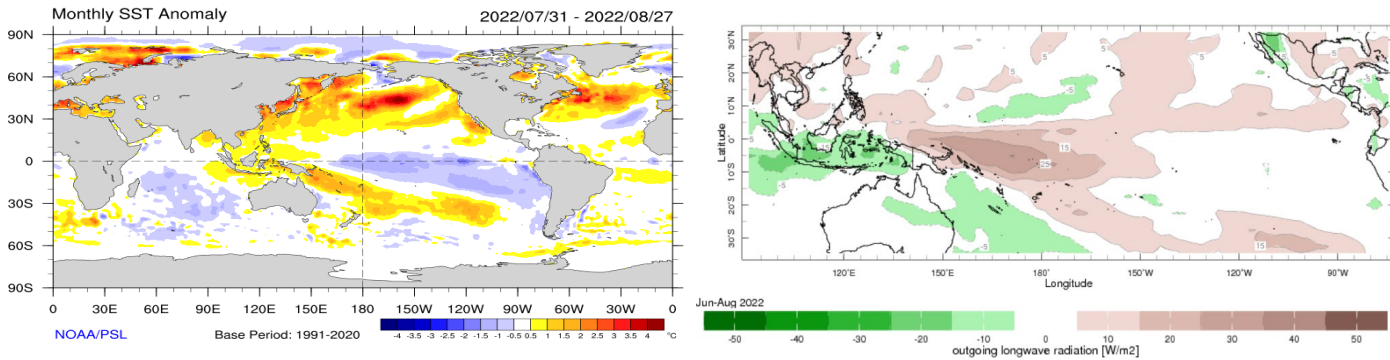
Significant Events – For June 2022–August 2022



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

- La Niña Advisory was in effect (Sept 5) with below-normal sea surface temperatures (SSTs) observed across most of the equatorial Pacific Ocean. La Niña is likely to continue with changes for La Niña gradually decreasing from 86% in the coming season to 60% during the December-February 2022-23 period, according to NOAA Climate Prediction Center.
- For the June-August (JJA) period, the U.S. Affiliated Pacific Islands (USAPI) were drought-free with exception of lingering Moderate drought (D1) conditions in the Federated States of Micronesia (FSM) in Kapingamarangi.
- For the JJA period, precipitation was above normal in Saipan, isolated areas of both FSM (Kosrae, Pohnpei) and the Republic of the Marshall Islands (RMI) (Kwajalein), and in American Samoa. Conversely, below-normal rainfall was observed in Palau, Guam, western and southern FSM (Yap, Kapingamarangi), southern RMI (Majuro), and across much of the Hawaiian Islands.
- Satellite analysis (August) showed above-normal sea levels occurring across the tropical western Pacific and into the far western portions of the tropical central Pacific, while below-normal sea levels were observed across most of the tropical central and eastern Pacific.
- A historic south-swell event in mid-July caused significant impacts from American Samoa to the Hawaiian Islands.

# Climate Overview – For June 2022–August 2022



Monthly sea surface temperature anomaly map for 7/31/22 to 8/4/22 (left) and seasonal outgoing long-wave radiation anomalies for Jun–Aug 2022 (right). Areas with more rain/clouds than normal are depicted in **green**, while areas with fewer clouds/less rain are depicted in **brown** (right). Sources: NOAA PSL, NOAA NCEP Climate Prediction Center, IRI.

**Across most of the equatorial Pacific Ocean (east of 160°E), sea surface temperatures (SSTs) were below normal with La Niña conditions present.** All four Niño regions registered negative SST anomalies on the NOAA CPC update (9/5/22) at the end of the JJA period: Niño 3.4 region at  $-0.8^{\circ}\text{C}$ ; Niño 3 at  $-0.4^{\circ}\text{C}$ ; Niño 1+2 at  $-0.4^{\circ}\text{C}$ ; and Niño 4 at  $-1.1^{\circ}\text{C}$ .

During JJA, **above-normal sea levels were observed across much of the equatorial western Pacific, while near-normal to below-normal levels were observed across much of the tropical central and eastern Pacific, except for June when above-normal levels were observed in the central Pacific from the Equator to  $\sim 5^{\circ}\text{N}$ .** In the Hawaiian Islands, near-normal to slightly-below-normal sea levels (monthly means) were observed during JJA. In the western Pacific, monthly mean sea levels were above normal (10-20 cm) throughout JJA with numerous daily extreme-high sea level records broken during the period (July-August data currently not available) including in Guam (6/10-18), Saipan (6/17-18, 20), Pohnpei, (6/13-14, 28, 7/10-16, 27-28), Kapingamarangi (6/16-17, 29), Pago Pago (6/10-12, 14-21, 27-28) and the Hawaiian Islands at Nawiliwili (6/15-16), according to the University of Hawai'i Sea Level Center.

During the JJA period, **most of the U.S. Affiliated Pacific Islands were drought-free** except for Moderate (D1) drought observed in southern FSM at Kapingamarangi, according to the U. S. Drought Monitor. **Median precipitation for the JJA period ranged from 54% to 138% of normal across areas of the tropical western Pacific** including in Palau, with Airai recording 43.5 in. (83% of normal). In FSM (for JJA), Yap observed 36.15 in. (82% of normal), Kapingamarangi 16.17 in. (42% of normal), Pohnpei 64.37 in. (138% of normal, 6<sup>th</sup> wettest), Lukunor 22.26 in. (54% of normal, driest on record), Kosrae 62.22 in. (136% of normal, 7<sup>th</sup> wettest), and Chuuk 29.77 in. (77% of normal, 6<sup>th</sup> driest). In the Mariana Islands, Saipan observed 28.55 in. (116% of normal) and Guam 27.74 in. (81% of normal). In the RMI, Majuro observed 27.13 in. (79% of normal, 8<sup>th</sup> driest) for JJA, while Kwajalein logged 31.82 in. (117% of normal). In American Samoa, precipitation was above normal (21.6 in., 122% of normal) at Pago Pago. **Across most of the Hawaiian Islands, below-normal rainfall was observed during JJA, exacerbating drought-related conditions across the island chain.** For the JJA period, Lihue observed 3.58 in. (61% of normal), Honolulu 0.32 in. (17% of normal), Molokai 1.02 in. (49% of normal), Kahului 0.16 in. (13% of normal), Kailua Kona 4.02 in. (225% of normal), and Hilo 17.96 in. (64% of normal).

In the Northeast Pacific (east of 180°), tropical cyclone (TC) activity has been **normal**, with 11 named storms with an ACE Index of 80.9 (normal 80.3) by 8/31/22. In the Northwest Pacific, TC activity has been **below normal** with an ACE (Accumulated Cyclone Energy) Index of 58.6 (normal 131.8) and 8 named storms by the end of August, according to the Colorado State University, Department of Atmospheric Science, Tropical Meteorology Project.



# Sectoral Impacts – For June 2022–August 2022

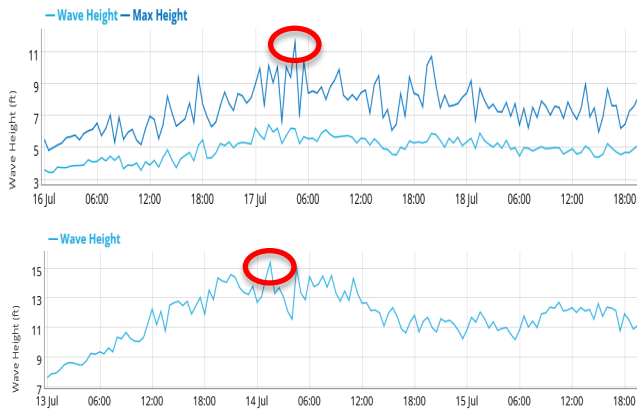


Observed coastal flooding (July 14) in Tutuila, American Samoa associated with the historic south-swell event observed during mid-July 2022. Photo credit: National Weather Service, Pago Pago.

**Agriculture** – In Maui, the prolonged drought has exacerbated issues associated with axis deer encroachments onto farmlands resulting in severe damage to crops, pastures, and losses for local producers. In late August, the Hawai'i Board of Agriculture approved an emergency loan program to address the on-going issue and will accept applications beginning Sept. 1 through Dec. 31, 2022. Additionally, in Upcountry and West Maui, water systems are in a Stage 1 Water Shortage declaration status.

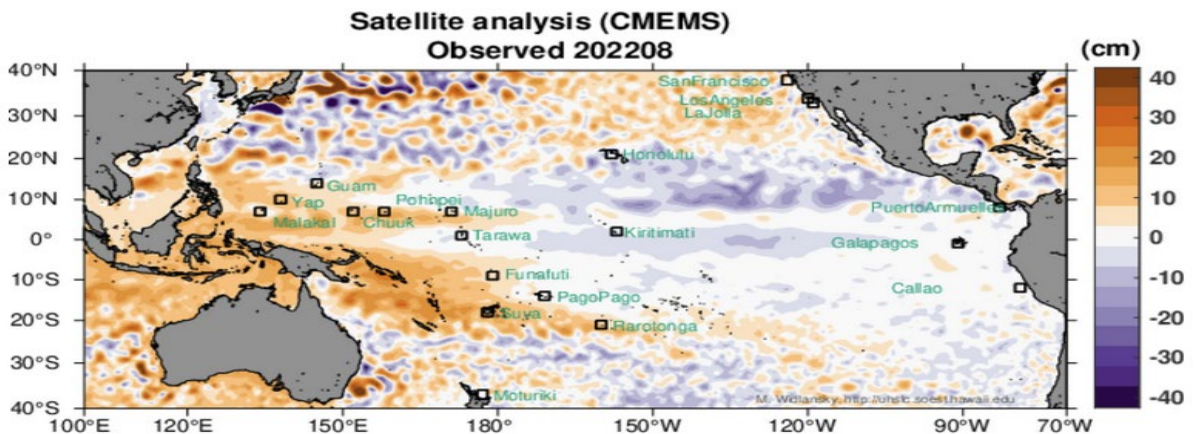
**Facilities and Infrastructure** – In American Samoa, the historic south swell in mid-July caused considerable damage along the coastlines of Tutuila, Aunu'u, and the Manu'a Islands, with the Governor Mauga declaring a state of emergency in response. On July 14, the PacIOOS buoy off Aunu'u recorded a peak wave height of 15.42 feet. Moreover, airport operations were disrupted with the Pago Pago Airport temporarily closed due to surf reaching the runway as well as on Ofu Island where debris covered portions of the runway. In the Hawaiian Islands, the historic surf event caused numerous impacts including road closures on Kauai, Oahu, and Maui as well as property damage on Oahu, Maui, and the Big Island. Between July 15-18, lifeguards made more than 2,000 rescues around Oahu's coastlines, with the island normally averaging approximately 2,400 rescues annually.

**Water Resources/Wildfire** – On the Big Island, the Leilani Fire burned nearly 20,000 acres in the southern extent of the South Kohala District during August 2022, according to the Hawai'i Department of Land and Natural Resources. In Majuro (RMI), reservoir storage reached 87% of total capacity (28,000,000 million gallons) on Sept 1, 2022.

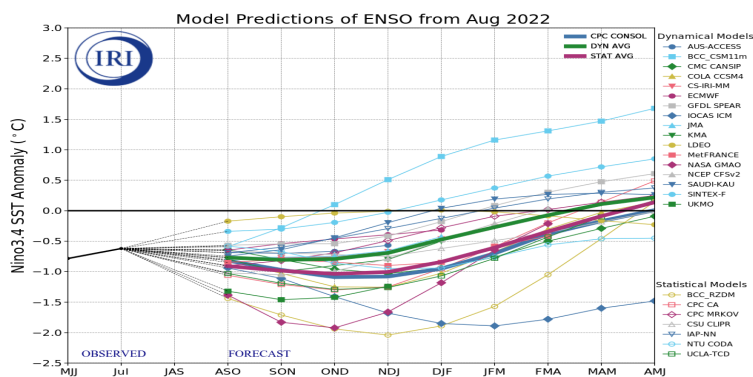


Time-series of observed wave height from buoys at the Pearl Harbor Entrance, Oahu, (7/16-18/22) and Aunu'u, American Samoa (7/13-15/22) during the historic surf event.

Data Source: <http://www.pacioos.hawaii.edu/waves-category/buoy/>



Satellite analysis of observed sea level height anomalies for August 2022. **Warm colors** represent above-normal sea levels and **cool colors** represent below-normal sea levels. Source: University of Hawaii Sea Level Center.



ENSO forecast model predictions – August 2022  
 Source: IRI/CPC. <https://iri.columbia.edu/our-expertise/climate/forecasts/enso/current/>

According to the majority of ENSO prediction models (see IRI/CPC forecast above), there is a high probability that **La Niña** conditions will continue through the Northern Hemisphere winter 2022-23. The odds for La Niña are forecasted to decrease progressing through the Northern Hemisphere winter (54% chance for January-March 2023).

NOAA’s Coral Reef Watch four-month (Sept 2022–Dec 2022) coral bleaching heat stress outlook calls for a **high probability (90%) of heat stress** bleaching **Alert Level 1** (bleaching likely) in the western Pacific including areas in eastern portions of FSM in the vicinity of 5-10°N latitude. A bleaching **Warning** (possible bleaching) is forecasted for areas including northern RMI and western FSM.

During the period of September through November 2022, **near-normal to below-normal** precipitation is forecasted for much of USAPI, including areas of FSM (Chuuk, Pohnpei), RMI (Majuro), American Samoa, and across the Hawaiian Islands. **Below-normal** precipitation is forecasted for Kosrae (FSM). Meanwhile, **above-normal** rainfall is expected in Palau, while **normal** rainfall levels are forecasted for Yap (FSM), Kwajalein (RMI), and in the Mariana Islands (Guam, Saipan), according to the NOAA Pacific ENSO Applications Climate (PEAC) Center.

For the next 3 to 6 months, dynamical models (NOAA CFSv2, ACCESS-S2 [Australia]) suggest continuation of **above-normal sea level anomalies** for many of the South Pacific Islands and areas west of 180° in the tropical Pacific. The forecast of high seasonal sea levels, combined with long-term sea level rise, may raise the high tide water levels by up to 20 cm above tide calendar predictions for some locations in the South Pacific region. Conversely, **below-normal sea level anomalies** are forecasted across much of the tropical central and eastern Pacific Ocean—consistent with the continuing La Niña event, according to model data from the University of Hawaii Sea Level Center.

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

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

NOAA NMFS Pacific Island Fisheries Science Center:  
<https://www.fisheries.noaa.gov/region/pacific-islands#science>

NOAA NWS Weather Forecast Office Honolulu & Guam:  
<https://www.weather.gov/hfo/>  
<https://www.weather.gov/gum/>

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

NPS Pacific Island Inventory & Monitoring Network:  
<https://www.nps.gov/im/pacn/index.htm>

University of Guam - Water and Environmental Research Institute:  
<https://veri.uog.edu/>

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

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

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

USGS Science Center – Pacific Coastal and Marine Science Center:  
<https://www.usgs.gov/centers/pcmssc>

USGS Pacific Islands Water Science Center:  
<https://www.usgs.gov/centers/piwsc>

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