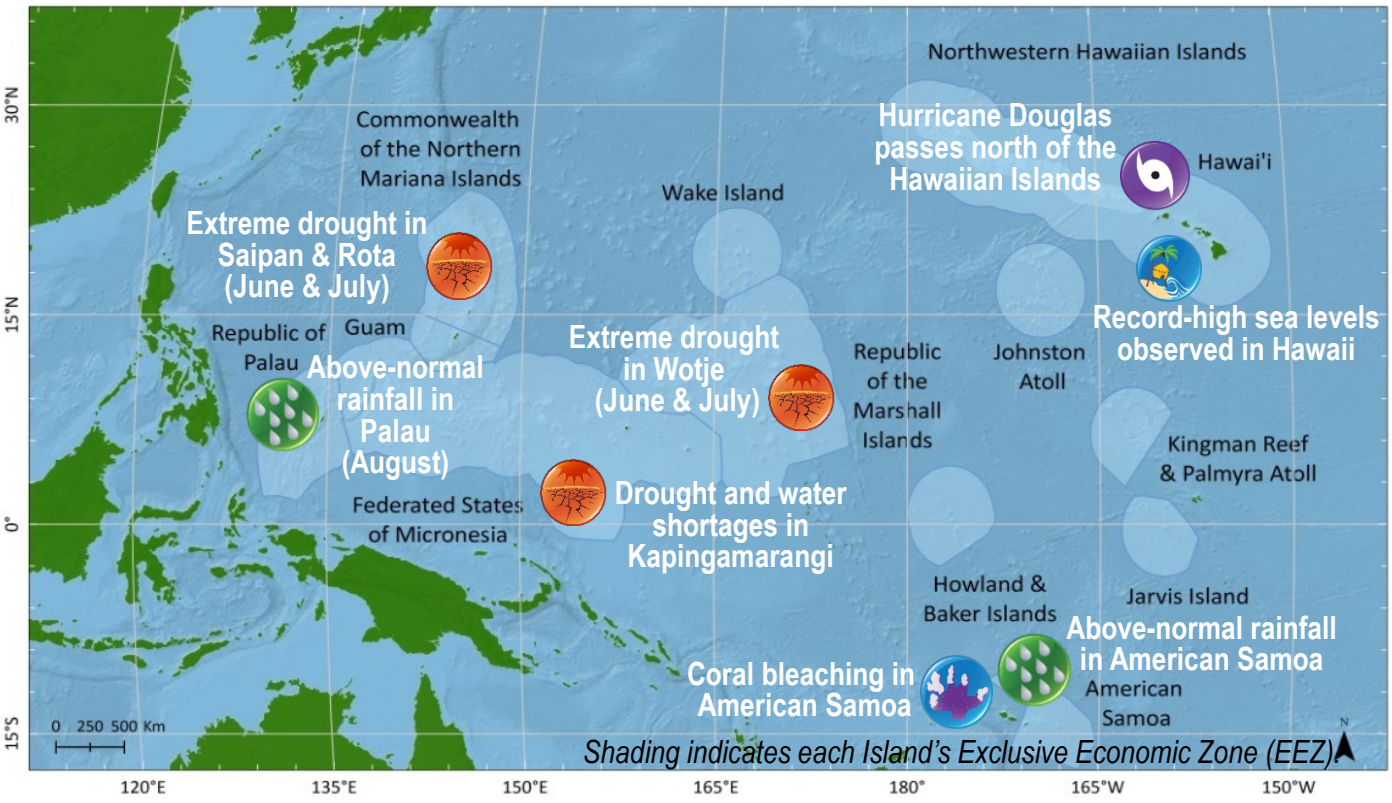
Significant Events – *For June–August 2020*



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

- La Niña Advisory in effect (issued 9/10/20) for the Northern Hemisphere fall 2020 and expected to persist through winter 2020-21 (~75% chance).
- Moderate-to-extreme drought conditions across the Commonwealth of the Northern Marianna Islands (CNMI), southern Federated States of Micronesia (FSM) on Kapingamarangi, and in the Republic of the Marshall Islands (RMI) on Wotje Atoll.
- 3rd driest June-August period on record for Saipan (CNMI), Kapingamrangi (FSM), and Pohnpei (FSM). Wettest June and June-August period on record at Pago Pago, American Samoa.
- Above-normal ocean temperatures and coral bleaching around American Samoa.
- Record-high daily and monthly sea levels in June and July in Honolulu, Hawaii.
- Hurricane Douglas passes just to the north of the Hawaiian Islands in late July with only minor impacts observed.

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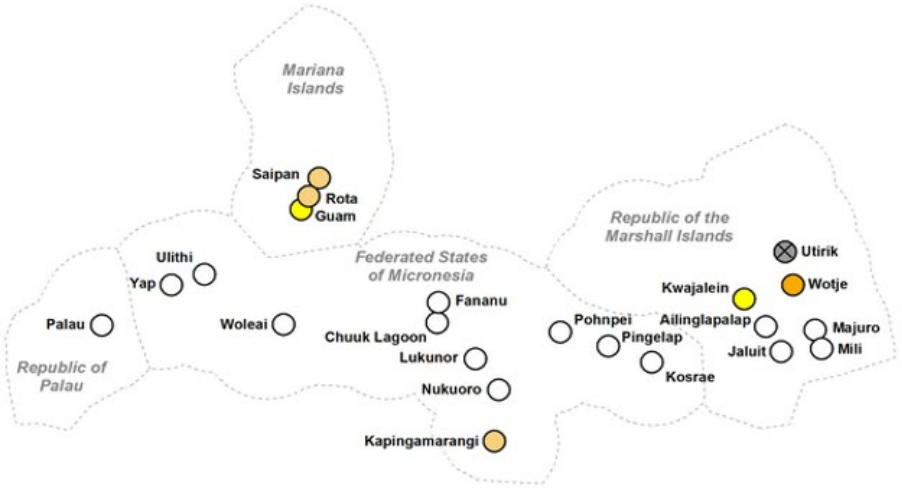
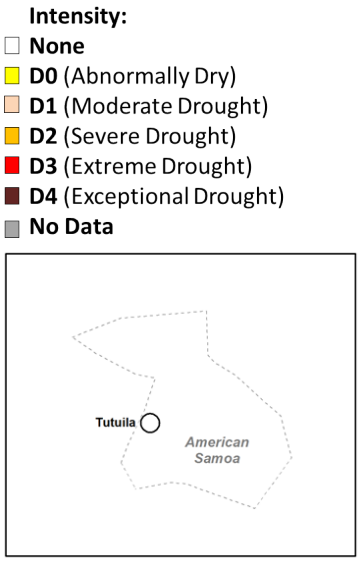
Climate Overview – *For June–August 2020*





August 25, 2020 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 in effect (9/10/20). All four Niño regions were observing negative SST anomalies—with the Niño 3.4 region at -0.9ºC, and the Niño 1+2 and Niño 3 regions with SST anomalies cooler than -1.0ºC. Around American Samoa, waters were approximately +1.0ºC above normal while waters around RMI, FSM, and CNMI ranged from +0.2ºC to +2.0ºC above normal.

Sea levels were above normal in the tropical areas of the north-central Pacific and in parts of the far western Pacific while sea levels were near to slightly below normal along the equator in the eastern Pacific. Near Hawaii, above-normal sea levels were observed including **record daily** (in June & July) **and monthly** (July) **high sea levels** in Honolulu and Kahului as well as record daily high sea levels in Hilo and Nawiliwili during June.

Drought conditions significantly improved across the Marianas, western FSM, and in areas of RMI since early summer. Median precipitation for the period (JJA) was below normal with Saipan observing 15.95 in. (65% of normal) while Guam observed 24.34 in. (71% of normal) for JJA. In Palau, above-normal rainfall was observed across most areas in August with Airai observing 22.13 in. (155% of normal). In western FSM, Yap observed above-normal precipitation in June with 18.56 in. (154% of normal) leading to improvement in drought conditions while rainfall was below normal for JJA with Kapingamarangi logging 14.4 in. (38% of normal) and Pohnpei observing 35.22 in. (76% of normal). Conversely, Kosrae (FSM) observed above-normal precipitation for JJA with 50.32 in. (108% of normal). In the RMI, Majuro observed 35.65 in. (104% of normal) for JJA with the Majuro reservoir at 86% of total capacity by August 31 while Kwajalein saw below-normal rainfall for the contemporaneous period with 20.15 in. (74% of normal). In American Samoa, the JJA period was the wettest on record with Pago Pago observing 42.09 in. (235% of normal). In the Hawaiian Islands, Hilo observed its 6th driest JJA period on record with 13.98 in. (50% of normal) and its 3rd highest JJA average temperature (78.4°F) on record. Elsewhere, JJA precipitation was below normal in Honolulu (75% of normal), Kahului (27% of normal), and Lihue was above normal at 119%.

Tropical cyclone (TC) activity has been below normal in both the Central North Pacific and in the Northwest Pacific regions. In the Northwest, all TC activity has been west or north of Micronesia with only 11 named storms since May and an ACE Index (Accumulated Cyclone Energy) of 41.6 by August 31—about ~50% of normal. In the Central North Pacific region, the only significant TC was Hurricane Douglas—that tracked just north of Hawaii in late July.

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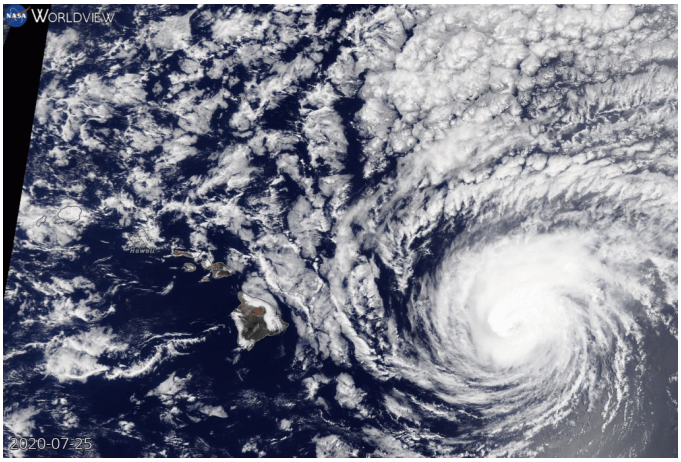
Sectoral Impacts – *For June–August 2020*



Hurricane Douglas approaching the Hawaiian Islands on July 25. Photo credit: NASA.

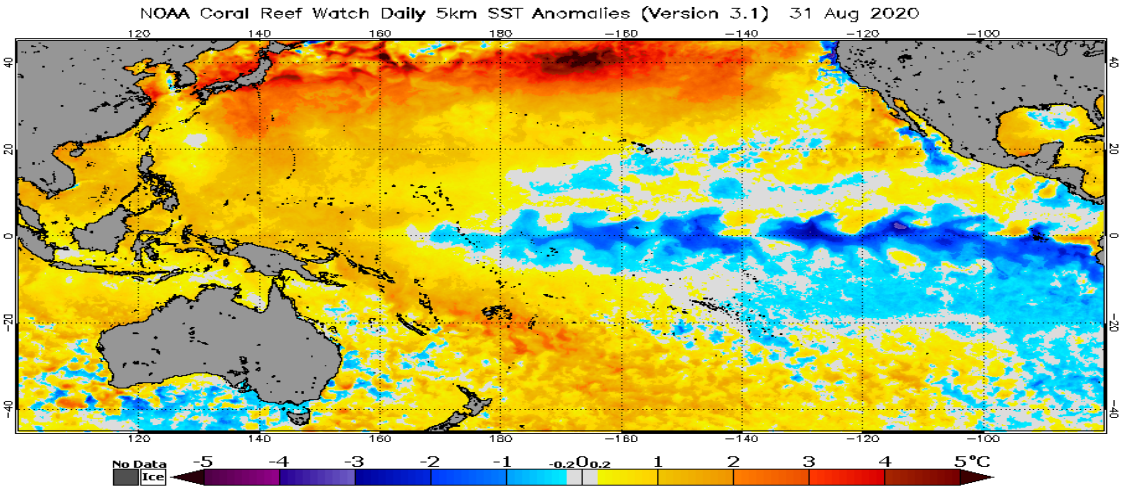
Flash flooding during a severe storm event (July 31) on the island of Tutuila, American Samoa. Photo credit: Christie Ma Hyrum.

Agriculture – Hot and dry conditions across the island chain in August led to drought impacts—including deterioration of pasture conditions on the Big Island (Ka'u, Mauna Kea slopes), Maui (Kihei-Maalaea), and in western Molokai.

Ecosystems – Anomalously warm ocean temperatures and coral bleaching (at depths >5 meters) were reported around the island of Tutuila in American Samoa during June and July by the National Park Service.

Facilities and Infrastructure –In early June, coastal flooding and erosion occurred on Oahu in some low-lying areas with southern exposures—including Waikiki. In late July, Hurricane Douglas steered north of the Hawaiian Islands with only minimal impacts reported including minor coastal flooding and road damage in east Oahu and minor flooding on Maui and Kauai. On the east coast of Tutuila, sea levels rose rapidly during mid-June causing coastal erosion, inundation, and threatened homes in the villages of Aua, Amouli, and Lauli'i. Additionally, high-intensity rainfall during a storm event on 7/31 caused flooding of roads on Tutuila. On Guam, heavy rainfall on 8/27-28 caused flooding of rivers, streams, roads, and homes.

Water Resources – In August, the majority of household water tanks on Kapingamarangi Atoll (FSM) were at 10% or lower with reports of the community's emergency reserve water supply being used.



Daily 5 km Satellite Sea Surface Temperature Anomalies (°C) on August 31, 2020. Source: NOAA Coral Reef Watch

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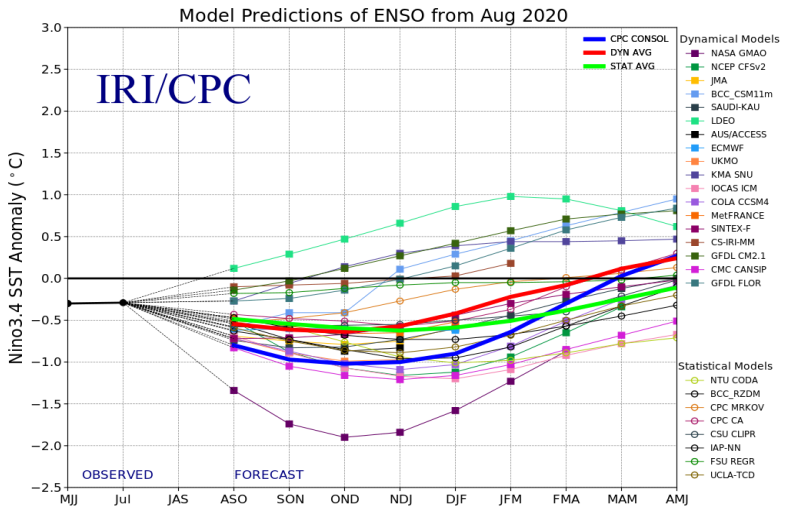
http://apdrc.soest.hawaii.edu/Hawaii_USAPI_Climate_Summary/dashboard

Seasonal Outlook – *For Sept–Nov 2020*



August 2020 IRI/CPC Forecast
Source https://iri.columbia.edu/our- expertise/climate/forecasts/enso/current/

According to the majority of ENSO prediction models, **La Niña conditions were present in early September and favored (~75% chance) to persist during the Northern Hemisphere fall 2020 and continuing through winter 2020-21.**

NOAA's Coral Reef Watch 4-month (Sept-Dec 2020) bleaching outlook calls for **a high probability of high heat stress (Alert Levels 1 and 2) in areas around Guam, and the Federated States of Micronesia** by the end of September and are likely to remain through November. For the Hawaiian Islands, a bleaching **Warning** through most of October and November is expected.

During the period from September through November 2020, rainfall is projected to be near normal to below normal for CNMI, Guam, areas of RMI (Kosrae, Kwajalein, Pohnpei), and the Hawaiian Islands while normal rainfall is forecasted for Yap (FSM). In other areas of FSM (Chuuk), RMI (Majuro), and in American Samoa, normal-to-above-normal rainfall is expected. In the Republic of Palau, above-normal rainfall is forecasted.

During the next six months, many dynamical models suggest development of a La Niña sea-level pattern in the equatorial Pacific with above-normal sea levels in the west and below-normal sea levels in the east. For the islands of the tropical western Pacific as well as Micronesia, there is a likelihood of increasing sea-level anomalies. Around Hawaii, near-normal sea levels are expected to continue for the next 6 months.

Regional Partners

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/

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