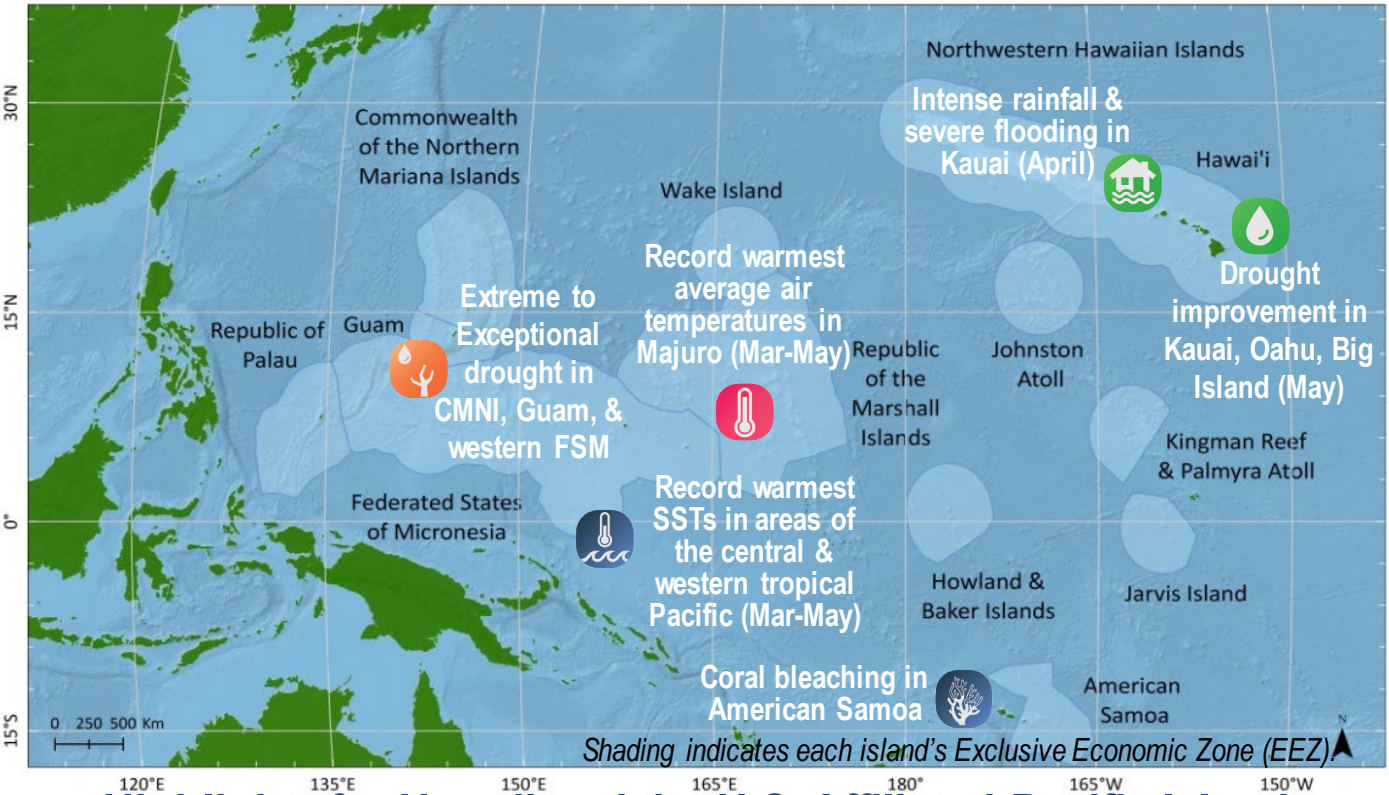
Quarterly Climate Impacts and Outlook

Hawaii and U.S. Affiliated Pacific Islands
June 2024

Significant Events – *For March 2024–May 2024*



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

- ENSO-neutral conditions were present (6/13/24) with a transition to La Niña favored to development during July-September 2024 (65% chance) and persist into the Northern Hemisphere winter 2024-25 (85% chance during November-January), according to the latest ENSO diagnostic discussion by NOAA Climate Prediction Center (CPC).
- For the March-May (MAM) period, precipitation was below normal across areas of the U.S. Affiliated Pacific Islands (USAPI) including Palau, Commonwealth of the Northern Mariana Islands (CNMI), and in the western portions of the Federated States of Micronesia (FSM). Conversely, normal to above-normal rainfall was observed across areas of the Republic of the Marshall Islands (RMI), southern FSM, American Samoa, and in areas of the Hawaiian Islands (Kauai, Oahu, windward side of Hawaii Island).
- For the MAM period, Extreme to Exceptional Drought (D3-D4) conditions were observed in Guam, CNMI, and in western FSM where numerous small, low-lying islands experienced water and food shortages leading to an international disaster relief effort.
- According to climate reanalysis data, record warmest SSTs were observed during MAM in areas of the western and central tropical Pacific Ocean during the MAM period.

John Marra (john.marra@noaa.gov) David Simeral (david.simeral@dri.edu)
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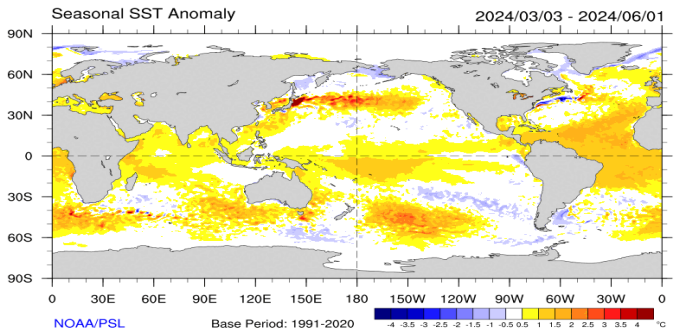
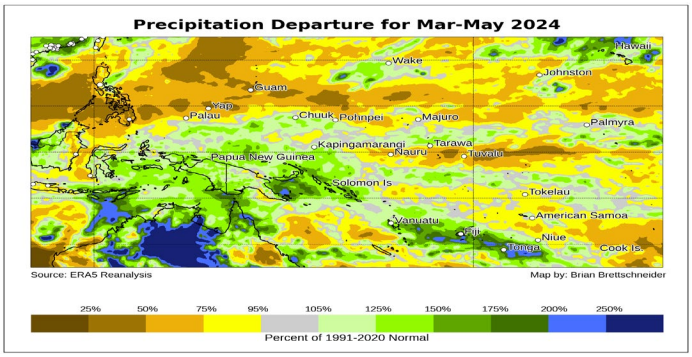
Climate Overview – *For March 2024–May 2024*





Seasonal sea surface temperature anomaly map for 3/3/24 to 6/1/24 (left) and 3-month seasonal precipitation departures from normal for the March–May 2024 period (right) for the central and western tropical Pacific with warmer colors representing drier-than-normal conditions and cooler colors wetter-than-normal conditions.
Source: NOAA Physical Sciences Laboratory (left); ERA5 Reanalysis, B. Brettschneider, National Weather Service (right).

By the end of the MAM period, SSTs were slightly above normal across the central and western tropical Pacific Ocean, while areas of below-normal SSTs were observed within a few degrees of the equator in areas of the eastern Pacific Ocean. According to the NOAA CPC update (6/10/24), Niño region SST departures were above normal across the equatorial Pacific Ocean with Niño 3.4 at 0.1°C, Niño 3 at -0.3°C, Niño 1+2 at -0.5°C, and Niño 4 at 0.8°C.

During the MAM period, below-normal sea levels (5-15 cm) were observed across areas of the equatorial western and central (western portions) Pacific Ocean. By the end of the MAM period, sea level anomalies generally moderated throughout the tropical Pacific with previously below-normal sea levels in the western Pacific transitioning towards near normal. Overall, the sea level pattern is consistent with the beginning of transition to neutral ENSO conditions and the Pacific Meridional Mode was also near normal, according to the University of Hawaii Sea Level Center.

During the MAM period, drought conditions were observed across areas of CNMI (Saipan), Guam, and western islands of FSM, and RMI, with the most severe drought conditions (D4) observed in western Yap State (FSM). In contrast, median precipitation was above normal across areas of southern FSM and in American Samoa. For MAM, Airai (Palau) recorded 24.01 in. (80% of normal). In FSM, Yap observed 8.5 in. (44% of normal; 5th driest Mar-May), Kapingamarangi 47.38 in. (134% of normal), Pohnpei 57.45 in. (105% of normal), Lukunor 32.78 in. (142% of normal), Kosrae 51.94 in. (95% of normal), and Chuuk 26.46 in. (77% of normal). In the Mariana Islands, Saipan observed 4.59 in. (76% of normal; 9th driest Mar-May) and Guam 12.61 in. (118% of normal). In the RMI, Majuro observed 26.68 in. (104% of normal), while Kwajalein logged 19.97 in. (116% of normal). **In terms of temperature anomalies, Majuro logged its warmest 3-month (Mar-May) mean minimum temperature (81º F) on record, and Pago Pago its 2nd warmest (80.2º F) for the contemporaneous period**. For MAM, precipitation in American Samoa was above normal (38.81 in., 117% of normal, 4th wettest May) at Pago Pago. In the Hawaiian Islands, dry conditions prevailed across much of the island chain during March. Conversely, April and May brought increased storm activity including well-above-normal rainfall to the windward side of the Big Island, Oahu, and in Kauai where **the Lihue Airport set a daily rainfall record on 4/12/24 of 8.17 in**. For the MAM period, Lihue observed 17.57 in. (179% of normal), Honolulu 6.54 in. (166% of normal), Molokai 2.66 in. (47% of normal), Kahului 3.08 in. (66% of normal), Kailua-Kona 1.66 in. (74% of normal), and Hilo 38.96 in. (134% of normal). **Of note, an unusual late-season Kona Low** (latest to directly impact the main Hawaiian Islands since 2002) **brought minor flooding to areas of Oahu with 2-day rainfall totals of up to 10 inches**.

In the Northwest Pacific region (west of 135ºE), the tropical cyclone (TC) season has gotten off to a slow start with only 1 named storm and a regional Accumulated Cyclone Energy (ACE) Index of 9.9 (normal 30.4) by 6/10/24. In the South Pacific region (east of 135ºE), the ACE Index was below normal at the end of the season (4/30) with a total of 9 named storms and an ACE Index of 50.5 (normal 67.3), according to the Colorado State University, Tropical Meteorology Project.

John Marra (john.marra@noaa.gov) David Simeral (david.simeral@dri.edu)
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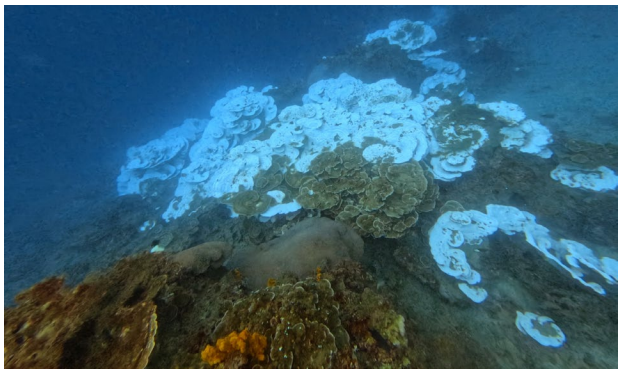
Sectoral Impacts – *For March 2024–May 2024*



Observed coral bleaching (*Porites rus* colony) at a depth of 15-20m at Utulei, Tutuila Island, American Samoa. Source: Eric Brown, National Park Service.

Drought disaster relief supplies arriving in an outer island of the Federated States of Micronesia. Source: Office of the President, FSM.

Community members unloading drought-related relief supplies in Sapwuahfik Atoll, Pohnpei State, FSM. Source: International Organization for Migration, United Nations.

Ecosystems – During the MAM period, coral bleaching has been documented in the surrounding waters of American Samoa, the Philippines, Wallis and Futuna, New Caledonia, Indonesia, French Polynesia, Vietnam, Costa Rica, and along the Great Barrier Reef (Australia). Currently, American Samoa and the Northern Cook Islands are in Bleaching Alert Level 4, which represents the risk of severe, multi-species mortality (>50% of the corals), according to the NOAA Coral Reef Watch.

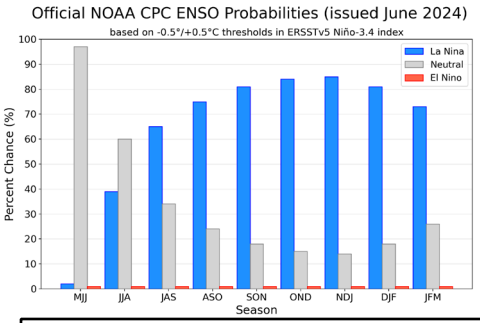
Facilities and Infrastructure – In the Hawaiian Islands, a strong low-pressure system northwest of the state brought very heavy rainfall ranging from 10 to 13 in. over a 12-hr period in the southern and southeast portions of Kauai on 4/12/24. The intense rainfall from the system led to severe flooding and numerous evacuations (Wailua and Koloa areas) as well as road closures due to flooding and landslides, according to the National Weather Service (NWS) Forecast Office in Honolulu. Moreover, the Kauai Emergency Management Agency reported damages to 177 residences and 26 businesses. In addition, an anomalous late-season Kona Low system (5/10-13, 5/16-18) impacted areas of the Hawaiian Islands, primarily in Oahu, with intense rainfall (up to 10 in.) and flash flooding.

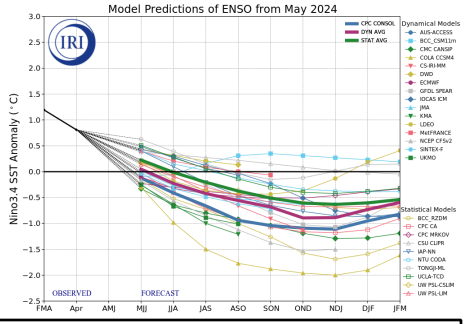
Heat – During the MAM period, the observing station at the NWS Forecast Office at the Majuro Airport observed its warmest 3-month (Mar-May) mean minimum air temperature (81.0°F) and its warmest mean average temperature (83.9°F) on record dating back to 1955. Similarly, Pago Pago International Airport (American Samoa) logged its 2nd warmest mean minimum (80.2°F) and mean average (84.6°F) temperatures for the contemporaneous period.

Water Resources – On 3/12/24, President Wesley Simina (Federated States of Micronesia) declared a state of emergency in response to severe drought conditions impacting numerous islands across FSM. Responding to the situation, emergency relief supplies, including food and water, were delivered to affected communities in Pohnpei, Yap, and Chuuk states. The relief effort was a multinational effort coordinated through the FSM government in cooperation with the U.S. government as well as Australia, Japan, and various international aid agencies, including USAID and the United Nations International Office of Migration. In Majuro (RMI), reservoir storage reached 92% of total capacity (36,000,000 gallons) on 5/31/24.

John Marra (john.marra@noaa.gov) David Simeral (david.simeral@dri.edu)

Seasonal Outlook – *For June 2024–August 2024*

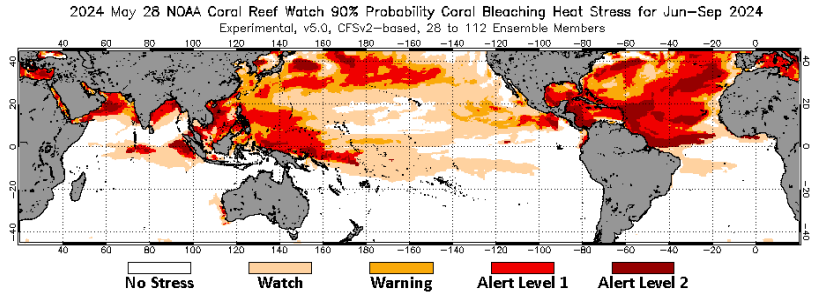




Forecast for each of the three possible ENSO categories for the next 8 overlapping 3-month seasons. Blue bars show the chances of La Niña, gray bars the chances for neutral, and red bars the chances for El Niño (left); and ENSO forecast model predictions (right). Source: NOAA CPC (left); Columbia University IRI (right).

According to the latest ENSO prediction model simulations (above right), the majority of models indicate ENSO-neutral conditions will persist into the summer months and is favored to transition to La Niña during the July-September 2024 (65% chance) period and persist into the Northern Hemisphere winter 2024-25 (85% chance, according to the NOAA CPC (6/13/24).

The NOAA's Coral Reef Watch four-month coral bleaching heat stress outlook (Jun-Sep 2024) calls for a high probability (90%) of high heat stress (Alert Level 1-2) developing in areas across much of the western tropical Pacific Ocean, including areas of CNMI, Guam, FSM, and American Samoa.



NOAA Coral Reef Watch four-month coral bleaching heat stress outlook for Jun-Sep 2024. Red and maroon colors represent areas with a high probability of coral bleaching heat stress Alert Levels 1 & 2. Source: NOAA NESDIS.

During the period of June-August 2024, below-normal precipitation is forecasted for most of the USAPI, including central and western FSM, Guam, CNMI, and the Hawaiian Islands. Average to below-average rainfall is expected in Palau and western portions of RMI. Average precipitation is expected in eastern FSM, while above-normal precipitation is forecasted for American Samoa, according to the NOAA Pacific ENSO Applications Climate Center.

According to NOAA's central Pacific hurricane season outlook (5/21/24), there is a 50% chance of below-normal tropical cyclone activity with 1-4 TCs (normal 4 to 5) expected, 30% chance of near-normal, and a 20% of above-normal. In the Western North Pacific, the NOAA's TC Outlook calls for below-normal activity for FSM, RMI,CNMI, and Guam, while below-normal to normal TCs for Palau.

Regional Partners

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

NOAA National Centers for Environmental Information:
https://www.ncei.noaa.gov/

NOAA NMFS Pacific Island Fisheries Science Center:
https://www.fisheries.noaa.gov/about/pacific-islands-fisheries-science-center

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

NOAA OceanWatch - Central Pacific Node:
https://oceanwatch.pifsc.noaa.gov/index.html

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

University of Guam - Water and Environmental Research Institute:
https://weri.uog.edu/

University of Hawaii - Asia Pacific Data Research Center (APDRC):
https://apdrc.soest.hawaii.edu/

University of Hawaii – Cooperative Institute for Marine & Atmospheric Research:
https://www.soest.hawaii.edu/jimar/index.htm

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

USGS Science Center - Pacific Coastal and Marine Science Center:
https://www.usgs.gov/pacific-coastal-and-marine-science-center

USGS Pacific Islands Water Science Center:
https://www.usgs.gov/pacific-coastal-and-marine-science-center

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

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