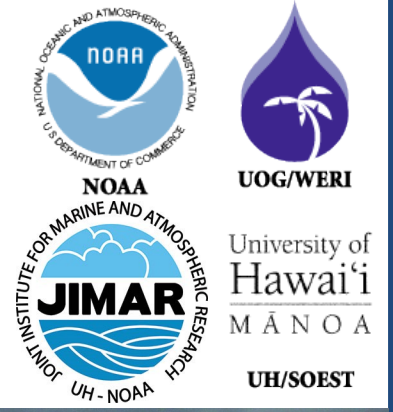




# NWS Climate Services

## October PEAC Audio Conference Call Summary

### 10 October, 1430 HST (11 October 2019, 0030 GMT)



**September rainfall totals reported (Sony)**  
 % Normal: **blue** above normal & **red** below normal. Departure from normal: **blue**-above & **red**-below

	Rainfall	% Normal	Normal	Departure	3 mon
	Inches	September	Inches	inches	JAS
Koror	8.74	66	13.18	-4.44	42.69
Yap	8.82	65	13.50	-4.68	32.65
Chuuk	15.81	135	11.71	4.10	43.59
Pohnpei	19.47	155	12.55	6.92	50.85
Kosrae	9.78	69	14.22	-4.44	35.58
Kwajalein	9.89	92	10.74	-0.85	24.76
Majuro	11.73	105	11.17	0.56	31.54
Guam NAS	21.03	166	12.66	8.37	45.58
Saipan	21.99	211	10.09	11.24	46.38
Pago Pago	5.28	80	6.53	-1.29	31.38
Lihue	3.16	163	1.94	1.22	6.60
Honolulu	2.13	355	0.60	1.53	2.43
Kahului	0.21	111	0.19	0.02	0.63
Hilo	8.16	88	9.31	-1.15	27.12

## Reports from around the Region

### Hawaii (Kevin)

September began with heavy afternoon showers along the Kona and leeward Kohala slopes of the Big Island and the Upcountry region of Maui. Fortunately, there were no significant flooding impacts during this event. Conditions settled the next day with mainly moderate to fresh trade winds that persisted through September 13. For the remainder of the month after September 13, many areas of the state had higher than average rainfall. This was due to a combination of warmer than average sea surface temperatures locally, low level winds transporting ample amounts of moisture from the deep tropics, and several upper level disturbances northwest of the state creating unstable conditions aloft.

The first event during this period involved a surface low pressure trough north of the island chain, combined with an upper level low pressure system northwest of Kauai. Periods of heavy rain occurred on the Big Island, Maui, Oahu, and Kauai. Heavy rainfall on the evening of September 14 over the windward slopes of Oahu caused Waikane Stream to overflow its banks onto Kamehameha Highway. On the afternoon of September 15, heavy rainfall once again flared up over portions of the Big Island, Maui, and Oahu, which produced minor flooding of small streams and roads. A flare-up of heavy rain occurred over Kauai late that night and continued into the pre-dawn hours of September 16. Runoff from this rainfall briefly caused Hanalei River to overflow onto Kuhio Highway, which forced its closure for about an hour.

Weather conditions became more active again on September 22 when another episode of enhanced moisture from the deep tropics combined with a low pressure system aloft. Heavy afternoon rainfall occurred over Upcountry Maui on September 22, followed by briefly heavy rainfall over west Kauai and leeward Kohala and Kona on September 23. A reinforcing upper level disturbance helped trigger thunderstorms and heavy rainfall over Kauai and Oahu on September 25 and 26, and over leeward Maui on the afternoon of September 27. None of these heavy rain events resulted in significant flooding problems.

Two tropical cyclones, Akoni and Kiko, entered the central North Pacific basin during the month. Neither system had any significant impacts on rainfall across the state.

#### Island of Kauai :

The May through September dry season ended with above average rainfall at most of the gages on Kauai. The U.S. Geological Survey's (USGS) gage on Mount Waialeale had the highest monthly total of 39.44 inches (130 percent of average) and the highest daily total of 6.01 inches on September 23. This was the same event that briefly closed Kuhio Highway at Hanalei Bridge. The Kapahi and Lihue Variety Station gages both recorded their highest September total since 1996.

Kauai rainfall totals for 2019 through the end of September were near to above average at most of the gages. The few below average totals were mostly along the lower southern slopes from Koloa to Port Allen. Mount Waialeale had the highest year-to-date total of 230.57 inches (79 percent of average).

#### Island of Oahu:

Most of the gages on Oahu posted above average rainfall totals for September. The Nuuanu Upper gage had the highest monthly total of 16.44 inches (186 percent of average). The highest daily total of 5.85 inches came from the Waihee Pump gage on September 14, which was the same flash flood event where Waikane Stream overflowed onto Kamehameha Highway. While many areas were rather wet during the month, it was not nearly as wet as September 2015, which had record breaking rainfall.

Rainfall totals for 2019 through the end of September were near average at most of the gages across Oahu. The Manoa Lyon Arboretum gage had the highest year-to-date total of 110.51 inches (100 percent of average).

Maui County: September rainfall totals were near to above average at most of the gages across Maui County. The USGS' rain gage at West Wailuaiki Stream had the highest monthly total of 15.66 inches (110 percent of average), while the highest daily total of 2.56 inches came from Ulupalakua Ranch on September 14. The lowest rainfall totals were from Maui's central valley, and were in line with recent brush fire activity and drought conditions.

Maui County rain gages have mostly recorded near average rainfall totals for 2019 through the end of September. The rain gage at West Wailuaiki Stream had the highest year-to-date total of 163.59 inches (95 percent of average).

Island of Hawaii: Windward Big Island monthly totals were mostly near to below average. However, much of the rest of the island had above average totals. The USGS' Saddle Road Quarry gage had the highest monthly total of 15.25 inches (155 percent of average). For the second consecutive month, all four gages in the Kona coffee belt region logged more than 10 inches of rainfall. However, none came close to breaking September records because of the high bar set by the results in 2015. The highest daily total, Honaunau's 2.74 inches on September 2, also came from the Kona slopes. The Kohala Ranch total of 7.66 inches was notable since it was more than 10 times its average for September. This rainfall did not occur in one event, but involved 4 separate days during the month with more than one inch recorded.

Most of the windward Big Island rainfall totals for 2019 through the end of September were near to below average, while the rest of the island had mostly near to above average totals. The USGS' Saddle Road Quarry rain gage had the highest year-to-date total of 128.98 inches (124 percent of average).

## **American Samoa:**

### **Kwajalein:** (Jason Sezler)

Reported of stagnant monsoon trough north of Kwajalein. There were some reports of minor damage to boats from west winds and swells.

### **Majuro:**

Majuro is expecting average to above rainfall for the next upcoming months.

### **Pohnpei:** (Eden)

Pohnpei is currently receiving rainfall and trade winds in the area. No inundation presently.

### **Kosrae:** (Wilfred)

9.78 inches of rain recorded for the month of September. Some water deployment were authorized by the Governor recently.

### **Chuuk:**

Lots of rain.

### **Yap:** (Justin)

Several thunderstorms previously came through but no significant damage.

## **Palau:**

Rainfall: If it weren't for the two events that occurred in the first two weeks of September with the monsoon troughs linked to 93W and 95W, Palau's rainfall totals would have been nearly half of what is seen above. Towards the last week of September the sea breeze effect and a surface trough helped to increase precipitation totals. Otherwise, it's been a dry second half of September. Palau rainfall totals are below for both the median (11.77) and the mean (12.09) based on 1981-2010 climatology.

King Tides: Unfortunately, there aren't any impressive stories and pictures to share from Sep's new moon. I blame that in part to the fact that Palauans and residents were occupied with Palau's Independence Day festivities that started the first week of Sep and ended last night at the capital in Melekeok with fireworks. There were only a couple of photos posted on social media of some tidal inundation at Ngatpang State dock. See attached photos from Lorraine Tellei's Fb post.

Air quality: Poor air quality was mainly due to the westerlies from the monsoon, leaving a haze over the Republic for weeks. Currently, the trades are temporary back and the air is much cleaner.

## **Guam/CMNI:**

Active monsoon across Guam and CNMI. Typhoon Hagibis intensified near Guam.

### **Tropical Cylone:** (Lander absent)

Hagibis observed moving towards central Japan. Expecting some additional activities in the upcoming months.



**PEAC Teleconference: Sea-Level Outlook—October 10, 2019**

All values are in inches (1 inch=25.4 mm); Seasonal cycle removed.

Tide Gauge stations	Seasonal Forecasts SON (mean <sup>1</sup> ) (ano)	SD of JAS (mean)	Monthly mean <sup>1</sup> anomaly			Current State/Trend  JAS 2019	Seasonal Forecasts SON (max <sup>2</sup> ) (ano)	SD of JAS (max)	Monthly max <sup>2</sup> anomaly		
			Observed rise/fall						Observed rise/fall		
			Jul/2019	Aug/2019	Sep/2019				Jul/2019	Aug/2019	Sep/2019
Marianas, Guam	+3	3.6	+4.5	+4.5	+4.5	Above	+19	3.4	+18	+20	+19
Malakal, Palau	0	4.5	-1.5	+2	+0.5	Normal	+36	4.6	+36	+40	+39
Yap, FSM	+3	4.8	+4	**	+2	Normal	+30	4.2	+27	+32	+31
Chuuk, FSM***	+3	*	+4.5	+5.2		Above	+29	*			
Pohnpei, FSM	+4	3.4	+7	+6	+8	Above	+36	3.3	+39	+39	+33
Kapingamarangi	+4	**	**	+4	+4	**	**	**	**	+30	+25
Majuro, RMI	+4	2.5	+5.5	+5.5	+8	Above	+40	3.2	+44	+50	+50
Kwajalein, RMI	+4	3.0	+4.5	+3.5	+4.5	Above	+40	3.5	+43	+43	+43
Pago Pago*	+7 [+10]	3.4	+9 [+14]	+10 [+15]	+7 [+12]	Above	(+35) [+40]	3.6	+36	+40	+38
Honolulu	+3	1.8	+4	+5.5	+3	Above	+28	2.3	+26	+30	+20
Hilo	+4	1.8	+6	+5	+5	Above	+28	2.4	+29	+28	+25

+/- indicate positive anomaly (rise) and negative anomaly (fall) respectively. Note that any changes between (0~±1) inch is considered to be negligible. Also note that changes within the range of (+/-) 2 inches are unlikely to cause any adverse climatic impact. \*\*\* (Experimental) Satellite Aviso Altimetry data, \*\* Data currently unavailable; Figures in parenthesis ( ) for monthly-max anomaly indicates difference between the maximum anomaly for the given month and the long-term monthly average anomaly.

1: Difference between the mean sea level for the given month and the 1983 through 2001 monthly mean sea level value at each station (seasonal cycle removed); 2: Same as 1 except for maxima; SD stands for standard deviations.

\* In Pago Pago, There was a level shift (approximately 5 inches) in American Samoa at the time of September 2009 earthquake. So, -5 inches has been adjusted (shown in parenthesis [ ]) to the current tide-gauge values of Pago Pago.

**Current Conditions:** Models and expert opinion suggest that El Niño has already transitioned to ENSO neutral—

- Since January 2019, the pattern of sea level variability corresponded very well with WP El Niño, where the positive sea level anomaly is located over/or near the central Pacific and maximum near 160°E-180 (i.e., Pohnpei, Kwajalein, and Majuro) and the negative SLA is located near 130°E-150°E (i.e., Koror) (also see Kug, J.-S., et al. (2009). Currently, the sea level pattern looks like impacted by La Niña.
- The MJO displays eastward propagating signal across eight phases from the Indian Ocean to the Pacific and later the western hemisphere.

**Impacts:** There are reports of minor-to-moderate inundations in the low-lying atolls with some minor damages.

**Forecasts for SON:** PEAC-CCA<sup>1</sup> Statistical model is predicting above-normal sea level to the north Pacific islands (Koror, Yap, and Chuuk). Other FSM stations (Chuuk, Pohnpei) and RMI's stations are likely to remain in higher than normal state. In Hawaii, both Honolulu and Hilo are likely to be elevated.

El Niño has already transitioned to ENSO neutral—this is most likely to continue through Northern Hemisphere winter 2019-20 (50-55% chance). So, the sea level is also likely to come back to normal by the end of 2019.

Kug, J.-S., et al. (2009). Two types of El Niño events: Cold tongue El Niño and warm pool El Niño. J. Climate, 22, 1499–1515 (available @ <https://journals.ametsoc.org/doi/pdf/10.1175/2008JCLI2624.1>).

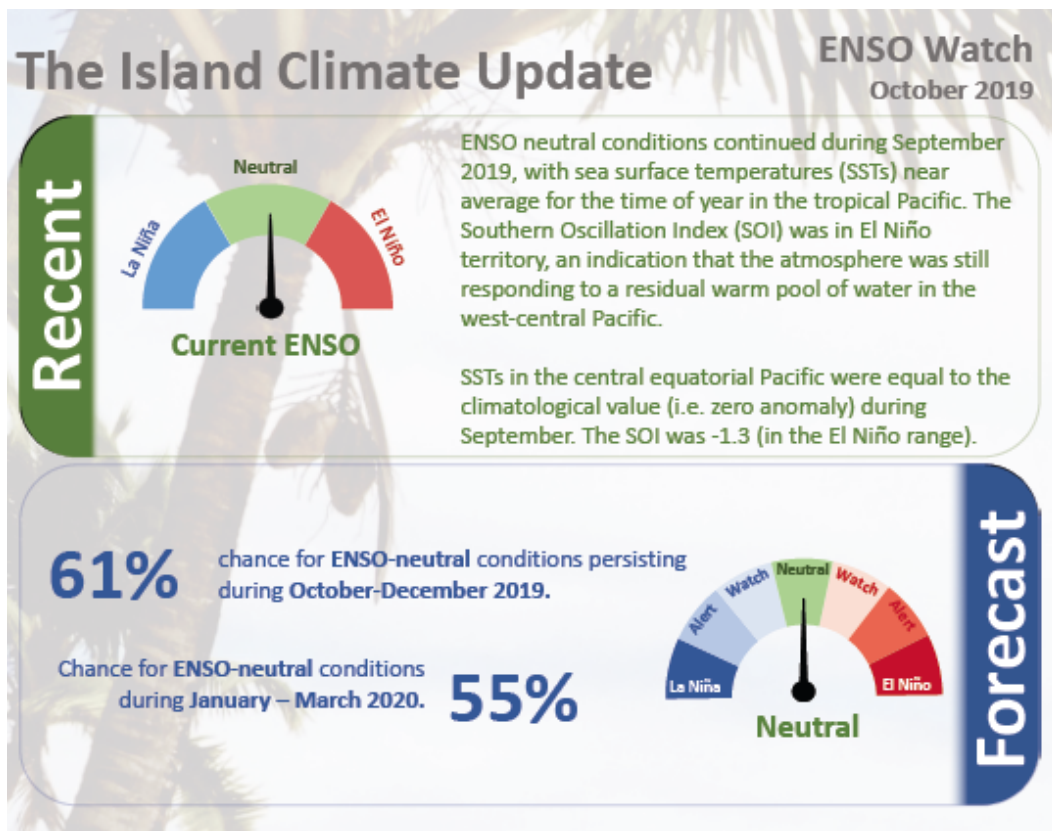
Chowdhury M. R., Chu P-S, and Guard C. (2014): An Improved Sea Level Forecasting Scheme for Hazards Management in the U.S.-Affiliated Pacific Islands. *Int. J. Climatology* 6, 2320-2329.

**Current State of ENSO and predictions: (Rashed) ENSO Alert System Status: *Not Active***

**Synopsis: ENSO-neutral is favored during the Northern Hemisphere fall 2019 (~85% chance), continuing through spring 2020 (55-60% chance).**

Near-average sea surface temperatures (SST) were evident in the east-central Pacific Ocean during most of September, though SST anomalies increased during the past couple of weeks. In the last week, the SST indices in the westernmost Niño-4 and Niño-3.4 regions were +1.0°C and +0.5°C, respectively, and the indices in the easternmost Niño-3 and Niño-1+2 regions remained near-to-below average (+0.3°C and -0.6°C respectively). The subsurface temperature anomalies (averaged across 180°-100°W) increased during the month partially because a downwelling oceanic Kelvin wave expanded eastward. This wave was triggered by low-level westerly wind anomalies across the western and central equatorial Pacific Ocean. At upper-levels, easterly wind anomalies prevailed over much of the Pacific during September. Also, the region of suppressed convection over Indonesia intensified and expanded to the Date Line. Despite the recent warming, the overall oceanic and atmospheric system remained consistent with ENSO-neutral.

The majority of models in the IRI/CPC plume continue to favor ENSO-neutral (Niño-3.4 index between -0.5°C and +0.5°C) through the Northern Hemisphere spring. Many dynamical forecast models, including the NCEP CFSv2, suggest Niño-3.4 SST index values will remain near +0.5°C during the next month or so before decreasing, but remaining above zero. Consequently, forecasters believe the recent oceanic warmth reflects sub-seasonal variability and is not indicative of an evolution toward El Niño. However, chances for El Niño remain between approximately 25-30% through the winter and spring. In summary, ENSO-neutral is favored during the Northern Hemisphere fall 2019 (~85% chance), continuing through spring 2020 (55-60% chance; click [CPC/IRI consensus forecast](#) for the chance of each outcome for each 3-month period).



Source: NIWA Island Climate Update:

October 2019



## Rainfall Verification and Outlooks for OND (Con't)

<i>Location</i>	<i>Rainfall Outlook</i>	<i>Final Probabilities</i>
<b>Palau</b>		
Koror	<b>Below</b>	<b>45:35:20</b>
<b>FSM</b>		
Yap	Average-below	<b>35:35:30</b>
Chuuk	Average-below	<b>30:35:30</b>
Pohnpei	Average-Above	<b>30:35:35</b>
Kosrae	Average	<b>30:40:30</b>
<b>RMI</b>		
Kwajalein	Average-Above	<b>30:35:35</b>
Majuro	Average	<b>30:40:30</b>
<b>Guam and CNMI</b>		
Guam	Average-Above	<b>30:35:35</b>
Saipan	Average-Above	<b>30:35:35</b>
<b>American Samoa</b>		
Pago Pago	Average-Above	<b>30:35:35</b>
<b>State of Hawaii</b>		
Lihue	Average-Above	<b>30:35:35</b>
Honolulu	Average-Above	<b>30:35:35</b>
Kahului	Average-Above	<b>30:35:35</b>
Hilo	Average-Above	<b>30:35:35</b>

### Note:

Interpretation of tercile probability Example:  
 The Avg-above probability, **30:35:35** forecasts in OND season means there is a **35%** chance (probability) for occurrence of excess rainfall during the OND season, **35%** chance for occurrence of rainfall within a pattern considered normal during the OND season, and **30%** chance for occurrence of deficit rainfall during the OND season. Also note that excess and deficit limit for each of the stations are different

## Drought monitoring updates.

### A. End-of-September Monthly Drought Assessment:

- i. With WxCoder III data, we have 23 stations in the monthly analysis.
  - ii. September was wet (more than the 4- or 8-inch monthly minimum needed to meet most water needs) in the Marianas and Republic of Palau, and western and northern portions of the FSM, and northern portions of the RMI. It was dry (less than 8 inches) at southern FSM and RMI stations and at Pago Pago. The end-of-September monthly analysis (September 30) is consistent with the weekly analyses for September 24 and October 1 (and, in fact, is identical to the October 1 analysis). Compared to the end-of-August analysis:
    - a. Drought/Abnormal dryness improved in the northern RMI:
      1. D1 improved to D-Nothing at Uirik
      2. D1 improved to D0 at Wotje
    - b. Conditions stayed the same (D2) at Jaluit
    - c. Abnormal dryness (D0) developed in American Samoa and southern stations in the FSM (Woleai, Lukunor, Nukuoro, & Kapingamarangi)
    - d. Others: The rest of the stations were D-Nothing (no drought or abnormal dryness)
    - e. Ulithi was missing for the last several months, and Fananu for much of the month, so they could not be analyzed for the month.
  - iii. Some September 2019 precipitation ranks:
    - a. Nukuoro: driest September (in 37 years of data)
    - b. Lukunor: 3<sup>rd</sup> driest September (36)
    - c. Ailinglapalap: 4<sup>th</sup> driest September (36)
    - d. Jaluit: 5<sup>th</sup> driest September (36), driest or 2<sup>nd</sup> driest Jul-Sep thru Oct-Sep
    - e. 6<sup>th</sup> driest September at Pingelap (36), Woleai (38), Yap (69)
    - f. Kapingamarangi: 8<sup>th</sup> driest September (28)
    - g. Saipan: wettest September (39)
- B. Current (Weekly) Drought Conditions: The discussion above is the monthly (end of September) analysis. The latest weekly USAPI USDM assessment may show different USDM classifications. The latest weekly USAPI USDM assessment is for October 8.
- i. For October 8, differences include:
    - a. Worsening at Tutuila (D0 to D1) (precip indicators say D1, but vegetation is green)
    - b. Will probably change to D0 or D-Nothing next week (based on over 1" of rain yesterday, green vegetation, and change to 4" monthly min threshold)
- C. September 2019 NCEI State of the Climate Drought Report: I will include a discussion of USAPI drought and climate conditions in my September 2019 NCEI SotC Drought report (which will go online tomorrow or Tuesday).
- i. The web page url:
    - a. <https://www.ncdc.noaa.gov/sotc/drought/201909#det-reg-pacis-usapi>



## Drought monitoring updates (CON'T).

- D. Next Week & Next Month: I will be USDM author for the October 15 & 22 USDM, so the next 2 weeks will be busy. Then I fly to Australia for the GEO Ministerial Summit and will be gone October 31-November 11.
- E. North America Commission for Environmental Cooperation Survey: As part of a project to improve drought indices, drought monitoring, and drought products in the US, Canada, & Mexico, a group of us are working with a contractor to run a survey on drought indices used in the 3 countries. We plan to have the contractor send the survey request to you for USAPI input, so please do participate in the survey! **CEC is in the process of selecting the contractor.**
- F. USAPI USDM Authors: -- NO CHANGE IN STATUS
  - i. The OCONUS (USAPI) USDM became an operational product at the beginning of March, with authorship rotating amongst the NCEI, NDMC, USDA, & CPC authors.
  - ii. There are 7 USAPI USDM (OCONUS) authors: Ahira Sanchez-Lugo and myself (Richard Heim) from NCEI; Curtis Riganti, Claire Shield, and Deb Bathke from NDMC; Brad Rippey (from USDA); Anthony Artusa (from CPC).
    - a. Claire, Curtis, & Brad have authored besides Ahira & me.

**With the June 4 map, the U.S. Virgin Islands have been added to the USDM product suite. The USDM web site (<https://droughtmonitor.unl.edu/>) has been revised so that two USDM products (sets of maps) are produced each week: a CONUS USDM and an OCONUS USDM. The OCONUS USDM includes the USAPI and the US Virgin Islands (dots), while the CONUS USDM is what has been done for years (50 States & Puerto Rico) (polygon shapefiles).**

- G. Automated Ingest of Daily Rainfall Data: -- NO CHANGE IN STATUS
  - i. Automated Program: -- NO CHANGE IN STATUS—I modified the automated program that ingests the USAPI station daily data to send out a master file of the current data to the authors, in case NCEI's web pages go down because of a future government shut down or for other reasons.
  - ii. Updates and Fixes
    - a. **Follow up on why Kwajalein & Palau are not getting into the automated process.**
      - 1. **Thank you, Chip, for getting the metadata for Jaluit and Woleai changed so they are getting into the automated system!**
      - 2. **Chip: Kwajalein is in the Super Form in WxCoder III, but it is not in the regular station list. Question: Can Kwajalein's data be automatically transmitted daily from WxCoder III into the NOAAPort data feed? (need to find out station I.D. and other info to get it in to the NOAAPort feed)**
      - 3. **Chip: C/would you send me the COOP station i.d. number and NWSLI code for Palau International Airport, so we can get that station into the automated data base.**
    - b. **Find out why Saipan's ASOS data are being transmitted and getting into our automated process instead of the manual gauge WxCoder III data.**
    - c. **Add new stations to the automated process (Capital Hill 1, Nimitz Hill, Palau International Airport, Mwoakil-  
loa). I need to identify the WxCoder I.D. call sign and the COOP station numbers for these stations, then find them in our (NCEI) metadata base, then determine if they are being captured from the NOAAPort feed.**
  - d. **I had a good meeting with Bill Ward (when I was in Honolulu last month) about getting automated observations set up.**

## Drought monitoring updates (CON'T).

iii. Web interface: url is:

a. <https://www.ncdc.noaa.gov/temp-and-precip/drought/usapi-pcp/>

b. The "All Indicators" tab is the most used tab by USDM authors:

1. <https://www.ncdc.noaa.gov/temp-and-precip/drought/usapi-pcp/all>

c. The "Weekly", "Monthly", and "Seasonal" tabs have data tables as well as maps plotting the values.

d. The web page is updated automatically every day by a computer program that automates the ingest and processing of the data. The program runs every morning at 10 a.m. EST; it also sends out an email every day containing daily and weekly rainfall totals for several USAPI stations.

e. Some data on the web page are color coded to indicate wet or dry conditions (weekly and monthly precipitation totals), missing days (grey), and USDM categories (monthly and seasonal rank percentiles).

f. The web page is for internal use by NWS Pacific Island personnel and USDM author personnel. It is not for public release (NCEI does not have the staff to answer questions from the public and media and other users about why there is missing data).

H. USAPI Listserv: -- NO CHANGE IN STATUS

- i. NDMC (National Drought Mitigation Center) set up a listserv for communication of the USAPI USDM analyses and discussion, similar to the listservs that were set up for the Mainland and for the U.S. Virgin Islands. **We have been using this for communications, both for sending out the USAPI USDM analyses and it is also for NWS offices to report drought impacts to the authors and rest of the group.**
- ii. If others want to be added to the listserv, let me (Richard Heim) or Brian Fuchs know and Brian will get them added.
- iii. There is also a DMUpdate Listserv for those who just want to know when the new USDM maps are released.

**Participants:**

**NWS Climate Services Program Managers (CSPMs):**

**WSO Climate Service Focal Points (CSFPs):**

(Majuro)

Wilfred (Kosrae)

Kikuko (Palau)

Sanchez (Chuuk)

Justin (Yap)

Jason (Kwajalein)

Eden (Pohnpei)

(Pago Pago)

Chip (Guam & CNMI)

**PEAC Principal Research Scientist: Rashed Chowdhury**

**CPC Forecaster:**

**NWS MIC, Honolulu: Christopher Brenchley**

**Pacific RISA: Krista**

**Additional Attendees: John Marra**

**WERI Scientist:**

**WFO Guam : Chip Guard**

**NCEI: Richard Heim**

**NWS Hydrologist: Kevin Kodama**

***\*\* Next Call– 14 November 2019, 1430 HST (15 November 2019, 0030 GMT)\*\****