

# FSM Climate Impacts

**Boyd Mackenzie**

Staff Meteorologist

Weather Service Office, Chuuk





# FSM Climate Impacts (WET)



## Extreme rain events in Chuuk (FSM) since October 2023

- Impacts on plants: soil erosion and nutrient loss, oxygen deprivation, disease and fungal issues leading to rotting of sweet potato, eggplant, cucumber, cabbage, yam, sakau.
- Flooding and Landslides
- Water contamination of wells, rivers and streams.
- Marine and land transportation difficulties e.g. increased cancellation of flights, risk for fisherman, increase in pot holes and unsafe to drive.
- Increase in disease outbreak e.g. diarrhea, typhoid.
- Ocean sedimentation.



## Above average rainfall for Pohnpei and Kosrae



Flooding in Kosrae

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Flash flood in Pohnpei

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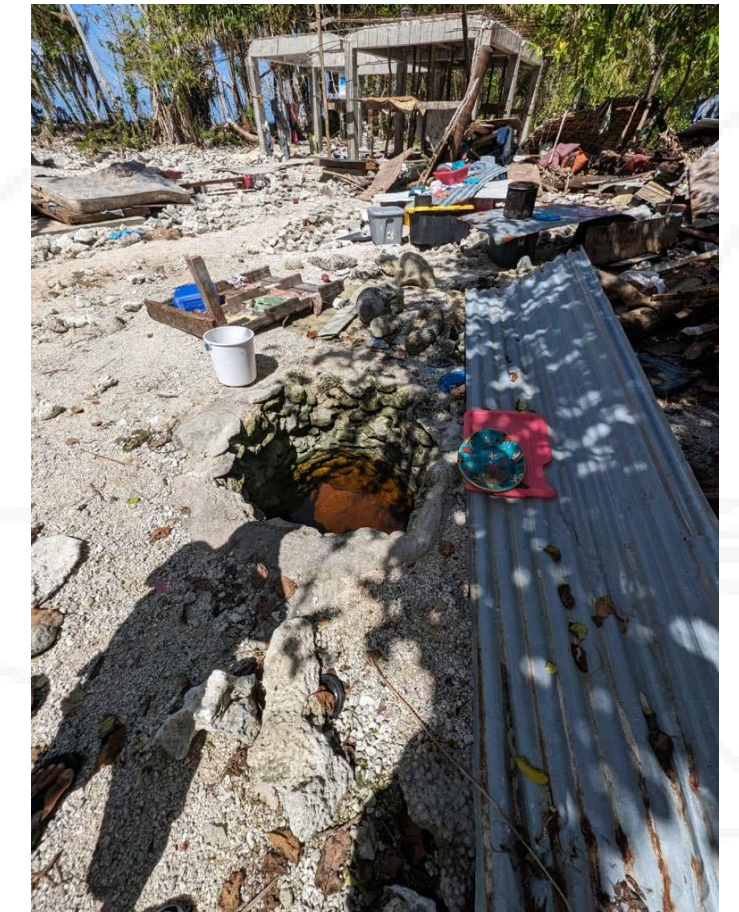
Road erosion in Pohnpei



# FSM Climate Impacts (DRY)

Extreme drought and swell events in Chuuk (FSM) since January 2024

- Impacts on plants: Salt water intrusion and prolonged drought damaging crops including taro, breadfruit, bananas
- Salt water contamination of wells, rivers and streams.
- Lack of fresh drinking water.
- Reported marine incidents due to hazardous waves and swells resulting in loss of life.
- Extreme swell events displacing properties.
- Increase in disease outbreak e.g. diarrhea, typhoid.
- State of Emergency declared and relief efforts were conducted delivering food, water, and materials to vulnerable affected islands.





# Below average rainfall and high swells for Pohnpei





**PACIFIC ISLANDS CLIMATE OUTLOOK FORUM-14  
PICOF-14**

# **Palau Climate and Impacts: Nov 2023 to Apr 2024**

**Kikuko Mochimaru**

Staff Meteorologist, National Climate Officer and National Data Officer

Palau National Weather Service Office-WSO Palau





# Presentation Outline

-Past 6 Months Climate Nov 2023 - Apr 2024

-General Impacts



**View of southwest Babeldaob (Airai and Aimeliik) and northwest Koror from Skojo, Meyuns**

Image Source: K. Mochimaru

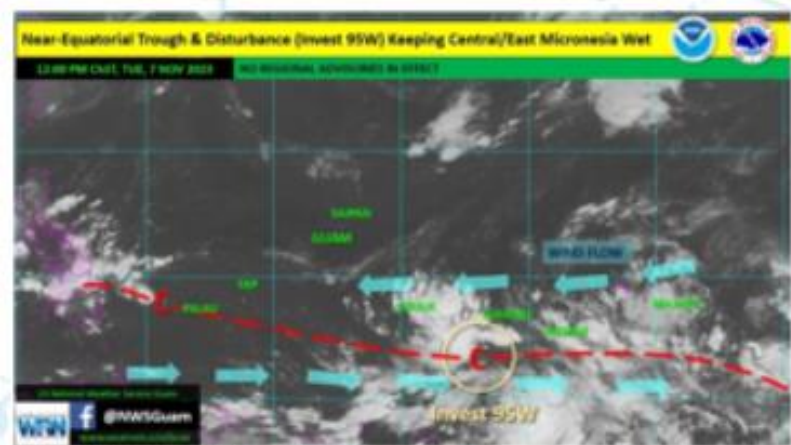


# Palau's Past 6-months Climate Summary, Nov 2023-Apr 2024:

El Niño 2023 & a General Drying Trend during this period. Highest Max Temp between 90-93°F, Lowest Min Temp upper 60s to lower 70s, Average Temperatures for Max Temps in the upper 80s, Min Temp in the mid-70s and Mean Temps in the low-80s. Haze (Dec 2023 to present).

**For Nov 2023:** General trade wind pattern over Palau for November 2023 with troughs at the Surface, Near the Equator, and monsoon-like influencing our weather. Formation of Invests 95W and 96W within surface through, Invest 95W becomes the 17<sup>th</sup> Tropical Cyclone in the west Pacific.

**Dec 2023:** Surface Trough, formation of Invest 91W and the NET. Decline in rainfall, hotter and drier days.



TUE, NOV 7 2023, 12PM ChST, NET and Invest 95W:  
<https://www.facebook.com/photo/?fbid=733715775456441&set=a.582771550550865>



SUN NOV 12 2023, 11AM ChST, Surface trough and embedded Invests 95W and 96W:  
<https://www.facebook.com/photo/?fbid=736499471844738&set=a.582771550550865>



Tropical Depression 17W (former 95W) Near Palau and Yap Monday, November 13, 2023 12PM ChST:  
<https://www.facebook.com/photo/?fbid=736897925138276&set=a.582771550550865>



Remnants of TD 17W PERSIST NEAR PALAU, INVEST 98W NEAR CHUUK, AND FORMER 97W NEAR KOSRAE, FRI NOV 17 2023 12:00PM ChST:  
<https://www.facebook.com/photo/?fbid=736897925138276&set=a.582771550550865>

ROP				
November 2023 Monthly Rainfall and Average Temperatures for Palau				
<b>Aimeliik</b> 9.02 inches 229.1 mm Tmax=87.9°F/30.8°C Tmin=78.3°F/24.1°C Tave=81.4°F/27.4°C	<b>Koror</b> 9.55 inches 242.6 mm Tmax=86.9°F/30.3°C Tmin=78.0°F/25.6°C Tave=82.3°F/27.9°C	<b>Peleliu (NW)</b> 14.69 inches 373.1 mm Tmax=90.7°F/32.6°C Tmin=81.7°F/27.6°C Tave=86.2°F/30.1°C	<b>Airai (AWS, SW)</b> 7.62 inches 193.5 mm Tmax=N/A Tmin=N/A Tave=N/A	<b>Airai (WSO Palau)</b> 9.45 inches 245.1 mm Tmax=87.9°F/30.8°C Tmin=76.3°F/24.6°C Tave=81.9°F/27.7°C
<b>Peleliu (AWS, SW)</b> 7.85 inches 200.0 mm Tmax=86.1°F/30.1°C Tmin=77.9°F/25.9°C Tave=82.1°F/27.8°C	<b>Melekeok (AWS, NW)</b> 9.33 inches 237.0 mm Tmax=86.6°F/30.3°C Tmin=74.2°F/23.4°C Tave=80.5°F/26.9°C	<b>Melekeok (SE coast)</b> 10.06 inches 255.5 mm		



WED DEC 6 2023, 12pm ChST Surface Trough:  
<https://www.facebook.com/photo/?fbid=750429713785047&set=a.582771550550865>

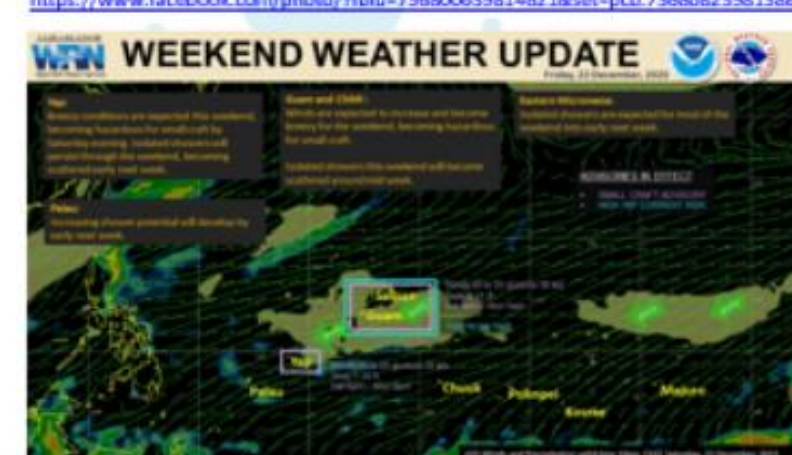
December 2023 Monthly Rainfall & 24-Hour Average Temperatures			
<b>Aimeliik</b> 6.39 inches 162.3 mm T-Max: 87.1°F/30.6°C T-Min: 76.3°F/24.1°C T-Ave: 81.2°F/27.3°C	<b>Koror</b> 6.43 inches 164.1 mm T-Max: 86.9°F/30.5°C T-Min: 78.5°F/25.9°C T-Ave: 82.8°F/28.2°C	<b>WSO Palau</b> P.O. Box 520 Airai, Palau 96940 Phone: (682) 867-1033 Fax: (682) 867-1436 Recruitment: (682) 867-1154/ROP/1193(ENH) Email: pr.wso.palau@nra.gov	<b>Peleliu</b> 6.65 inches 169.7 mm T-Max: 90.8°F/32.7°C T-Min: 81.7°F/27.6°C T-Ave: 86.3°F/30.2°C
<b>Melekeok (AWS, NW)</b> 7.37 inches 187.0 mm T-Max: 85.9°F/29.9°C T-Min: 74.5°F/23.8°C T-Ave: 80.3°F/26.8°C	<b>Melekeok</b> 6.42 inches 163.1 mm	<b>Airai (WSO Palau)</b> 7.46 inches 189.5 mm T-Max: 87.0°F/30.6°C T-Min: 76.5°F/24.7°C T-Ave: 81.8°F/27.7°C	<b>Airai (AWS, SW)</b> 6.46 inches 164.0 mm T-Max: N/A T-Min: N/A T-Ave: N/A
<b>Peleliu (AWS, SW)</b> 3.33 inches 84.5 mm T-Max: 87.1°F/30.6°C T-Min: 78.8°F/26.0°C T-Ave: 83.0°F/28.3°C			



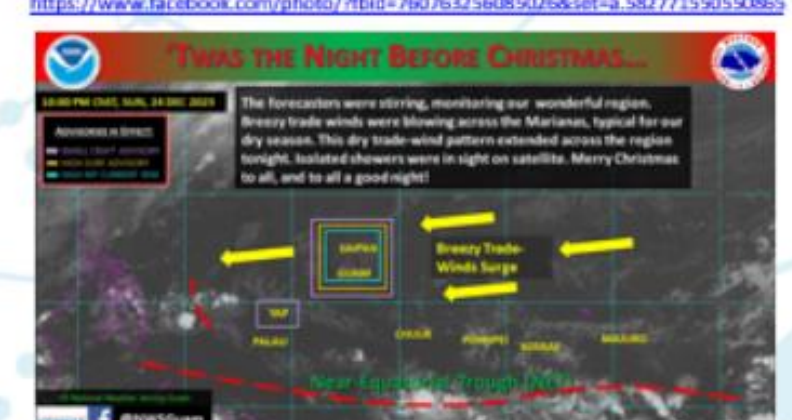
FRI DEC 15, 2023 5:30PM ChST, Invests 91W and 92W:  
<https://www.facebook.com/photo/?fbid=75626599892025&set=a.582771550550865>



SAT DEC 16 2023, 7:30PM ChST, Surface trough and embedded Invest 91W:  
<https://www.facebook.com/photo/?fbid=756900639814621&set=pcb.756808239813861>



Weekend Weather Update, FRI DEC 22, 2023:  
<https://www.facebook.com/photo/?fbid=760763256085026&set=a.582771550550865>



'Twas the Night Before Christmas...1000PM ChST, SUN DEC 24 2023:  
<https://www.facebook.com/photo/?fbid=762139179280767&set=a.582771550550865>



Weather Update on the evening of DEC 30, 2023:  
<https://www.facebook.com/NWSGuam/videos/1089973268688832>



# January 2024 Climate

## JAN 2024 CLIMATE DRIVERS FOR PALAU

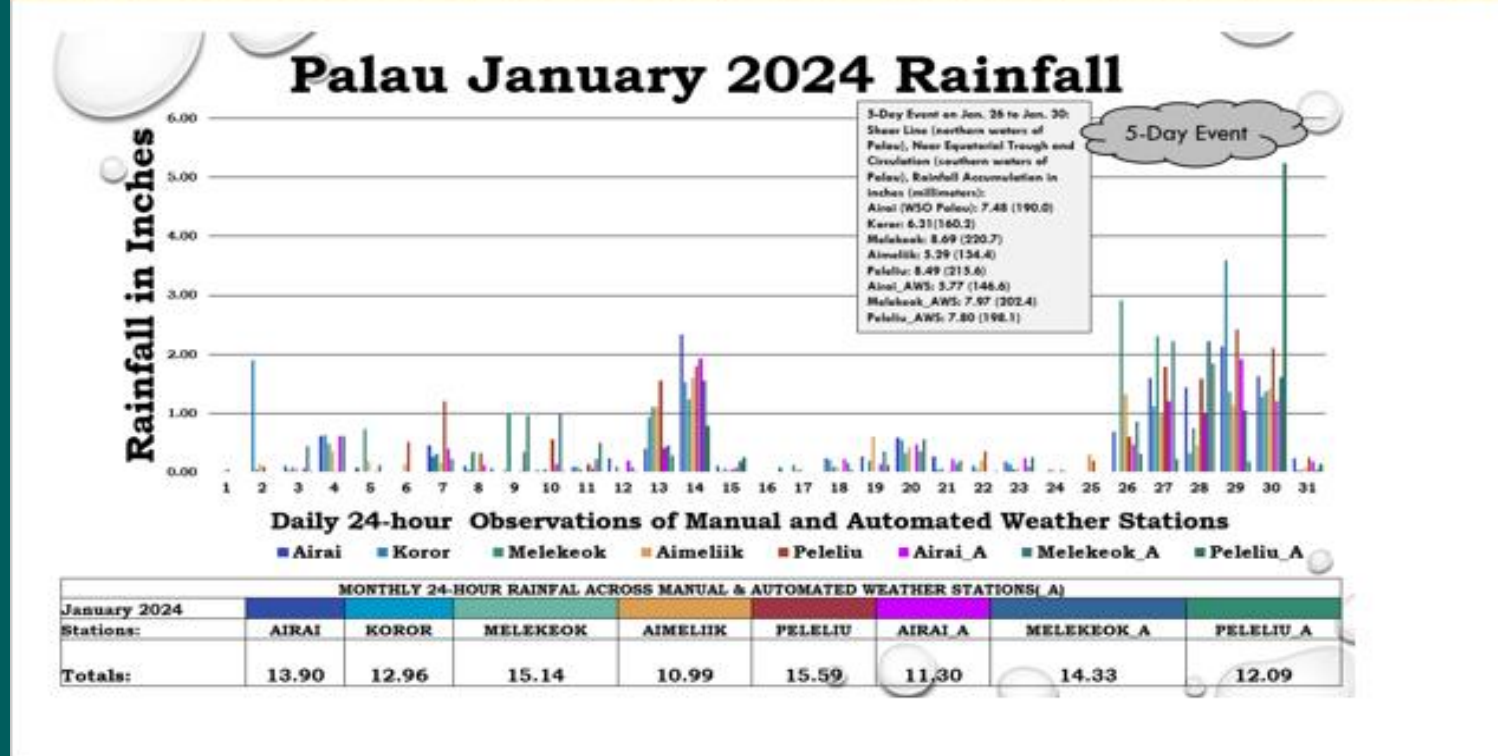
JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

**HAZE**  
**EL NINO**  
 Intertropical convergence zone (ITCZ):  
 ○ Near Equatorial Trough (NET)  
 ○ Circulation

**SHEAR LINE**  
 Strong pressure gradient, elevated & hazardous:  
 ○ Northeasterlies  
 ○ Seas  
 ○ Surf

January 2024 Micronesia ENSO Update:  
[https://www.weather.gov/media/gum/2024\\_January\\_Micronesia\\_ENSO\\_Update.pdf](https://www.weather.gov/media/gum/2024_January_Micronesia_ENSO_Update.pdf)



### January 2024 Monthly Rainfall & 24-Hour Average Temperatures

Station	Monthly Rainfall (inches/mm)	T-Max (F/C)	T-Min (F/C)	T-Ave (F/C)
Aimeliik	10.99 inches / 279.1 mm	87.0°F / 30.6°C	76.3°F / 24.6°C	81.7°F / 27.6°C
Koror	12.96 inches / 329.2 mm	85.8°F / 29.9°C	78.6°F / 25.9°C	82.8°F / 27.9°C
WSO Palau	13.90 inches / 353.0 mm	86.4°F / 30.2°C	76.3°F / 24.6°C	81.4°F / 27.4°C
Peleliu	15.59 inches / 396.0 mm	90.9°F / 32.7°C	80.7°F / 27.1°C	85.8°F / 29.9°C
Melekeok (AWS, NW)	14.33 inches / 364.0 mm	84.8°F / 29.3°C	74.5°F / 23.6°C	79.7°F / 26.5°C
Melekeok	15.14 inches / 384.6 mm	N/A	N/A	N/A
Airai (WSO Palau)	13.85 inches / 351.8 mm	86.4°F / 30.2°C	76.3°F / 24.6°C	81.4°F / 27.4°C
Airai (AWS, SW)	11.30 inches / 287.0 mm	86.9°F / 30.5°C	78.5°F / 25.8°C	82.7°F / 28.2°C

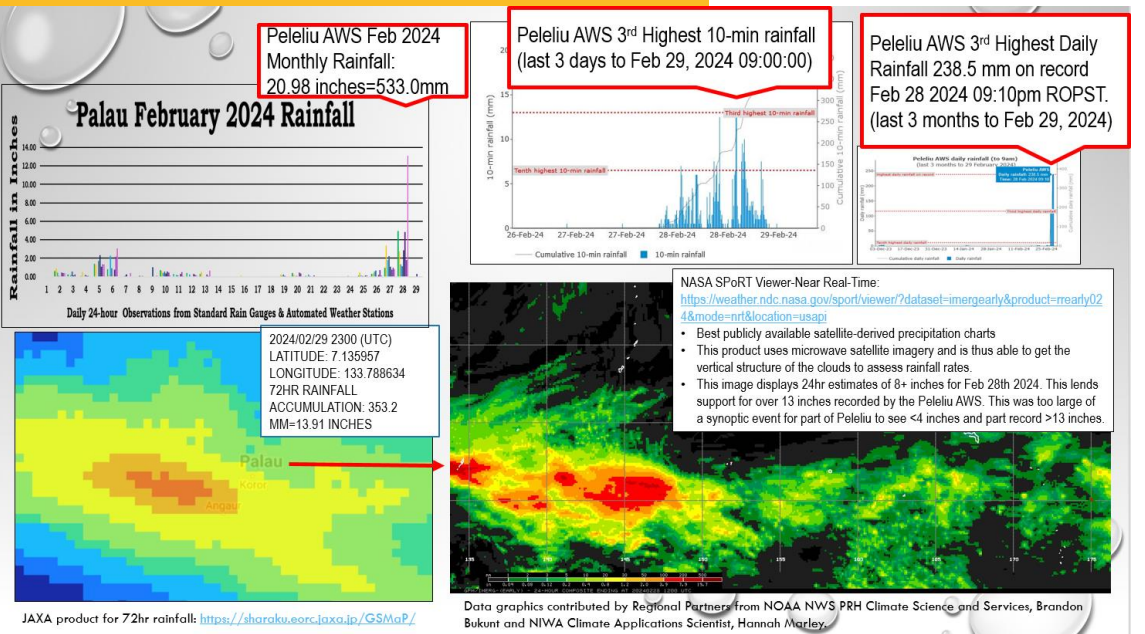
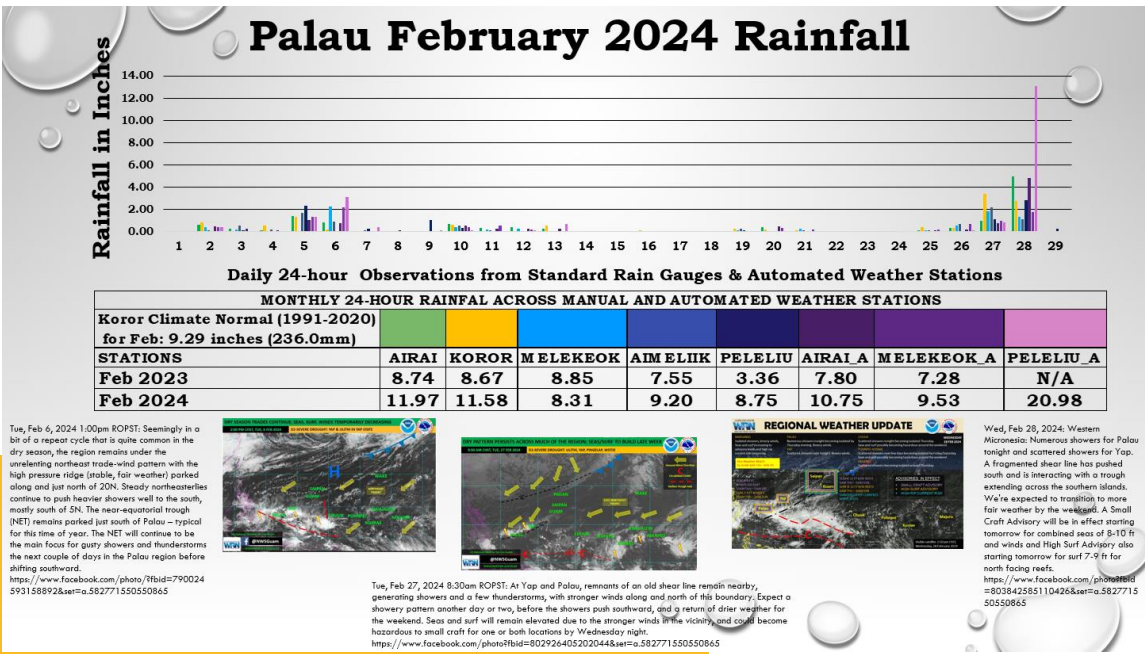
Jan 2024 Climate Drivers, Daily Rainfall, 24-hr Monthly Rainfall and Average Temperatures across Manual and Automated Weather Stations. Significant 5-Day event on Jan 26 to Jan 30, 2024, Torrential Rainfall from a combination of a Shear Line and interaction of the Near Equatorial Trough (NET), and circulation with in the NET. Accumulated rainfall ranged from 5.29in.(134.4mm) to 8.69in.(220.7mm) across standard 8" rain gauge and automated weather stations.



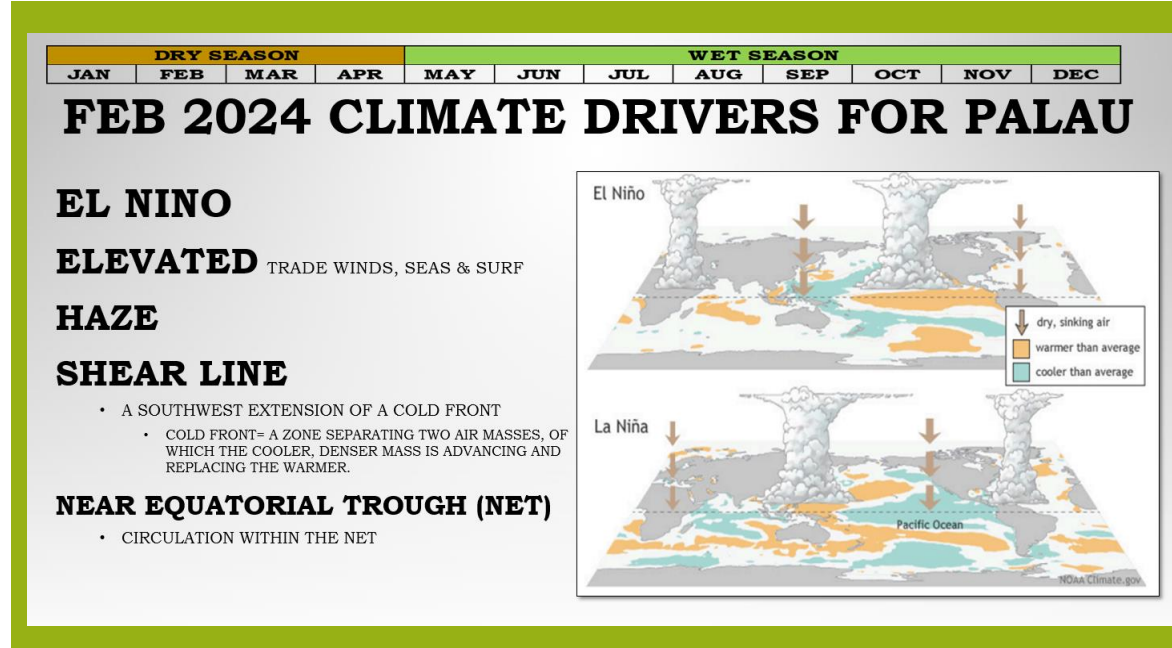
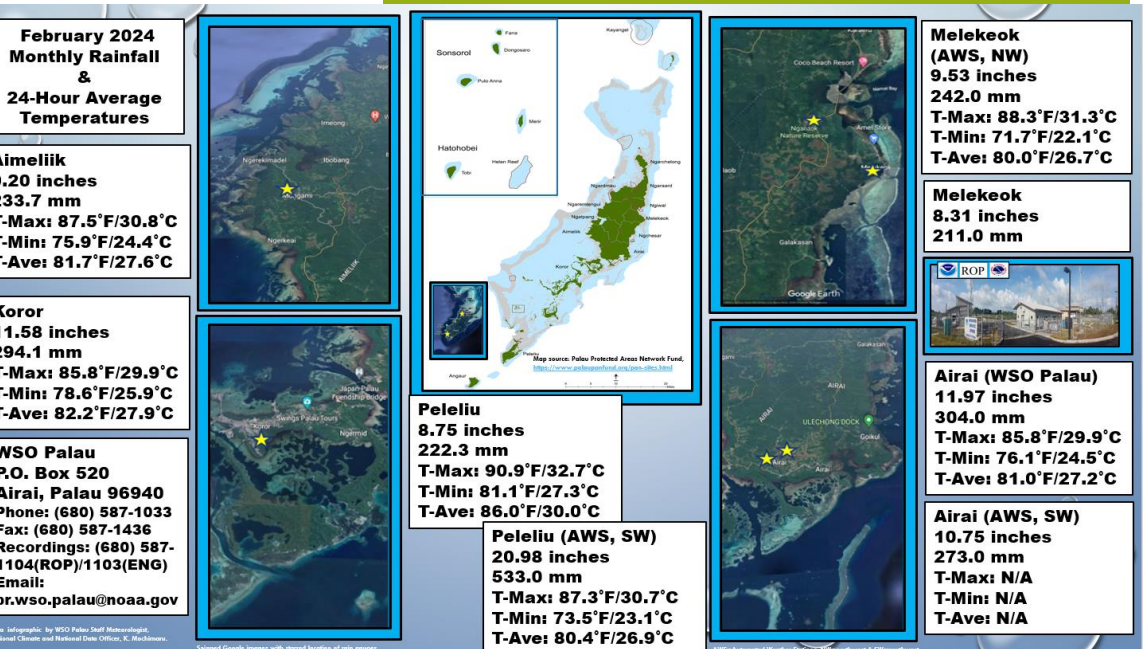
# Feb 2024 Climate

February 2024 Daily Rainfall and Climate features. Mostly dry conditions. Short term but impactful rainfall events Feb 5-6 and Feb 27-28.

Significant Rainfall Event for Peleliu Automated Weather Station. On Feb 28, Peleliu AWS recording the Highest Daily Rainfall at 9.39in.(238.5mm) and Highest Monthly Rainfall at 20.98in.(533.0mm).



24-hr Monthly Rainfall and Average Temperatures across Manual and Automated Weather Stations





# MAR & APR 2024 CLIMATE

**MAR 2024 CLIMATE DRIVERS FOR PALAU**

**EL NINO**  
**ELEVATED TRADE WINDS, SEAS & SURF**  
**HAZE**  
**SHEAR LINE**

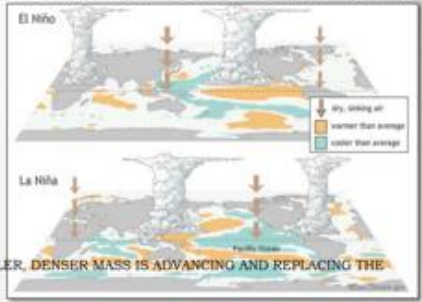
- A SOUTHWEST EXTENSION OF A COLD FRONT
- COLD FRONT= A ZONE SEPARATING TWO AIR MASSES, OF WHICH THE COOLER, DENSER MASS IS ADVANCING AND REPLACING THE WARMER.

**NEAR EQUATORIAL TROUGH (NET)**

- CIRCULATION WITHIN THE NET

**DRY AND ELEVATED TRADE WINDS**

**MARCH 26, 2024: ROP UNDER STAGE 1 OF THE DROUGHT ACTION PLAN: WATER SHORTAGE WATCH**

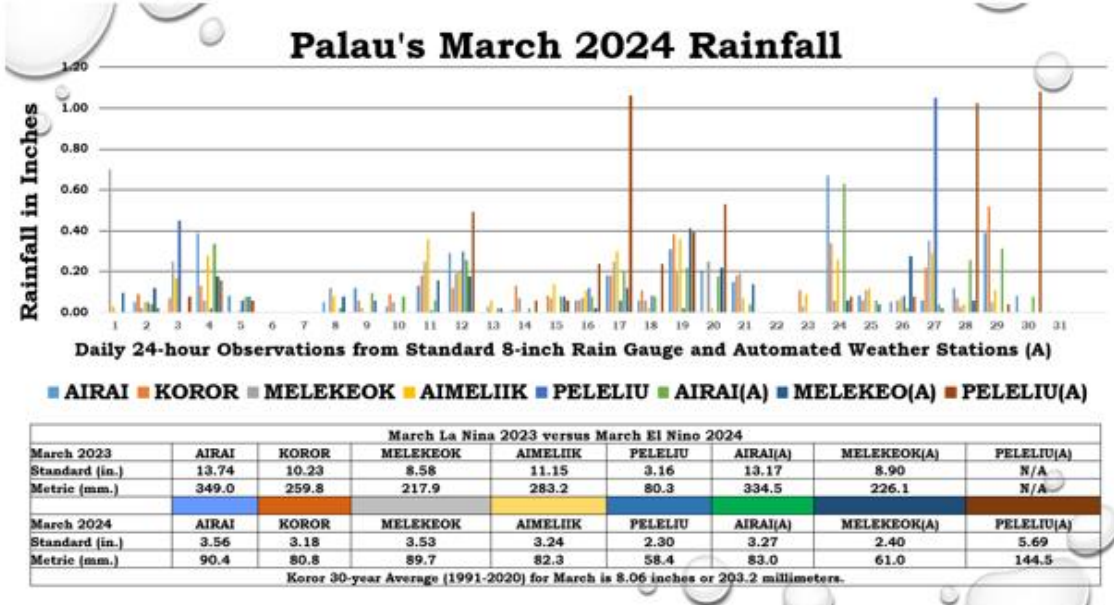


**REGIONAL WEATHER UPDATE**

**U.S. Drought Monitor**  
 U.S. Affiliated Pacific Islands  
 March 12, 2024

**WEEKEND WEATHER**

**DRY**



**March 2024 Monthly Rainfall & 24-Hour Average Temperatures**

<b>Aimelik</b> 3.24 inches 82.3 mm T-Max: 88.2°F/31.2°C T-Min: 75.6°F/24.2°C T-Ave: 81.9°F/27.7°C	<b>Koror</b> 3.18 inches 80.8 mm T-Max: 87.2°F/30.7°C T-Min: 78.1°F/25.6°C T-Ave: 82.7°F/28.2°C	<b>Melekeok (AWS, NW)</b> 2.40 inches 61.0 mm T-Max: N/A T-Min: N/A T-Ave: N/A	<b>Melekeok</b> 3.53 inches 89.7 mm	<b>Airai (WSO Palau)</b> 3.56 inches 90.4 mm T-Max: 87.0°F/30.6°C T-Min: 76.1°F/24.5°C T-Ave: 81.6°F/27.6°C	<b>Airai (AWS, SW)</b> 3.27 inches 83.0 mm T-Max: 89.3°F/31.8°C T-Min: 77.3°F/25.2°C T-Ave: 83.3°F/28.5°C
<b>WSO Palau</b> R.O. Box 520 Airai, Palau 96940 Phone: (680) 587-1033 Fax: (680) 587-1436 Recordings: (680) 587-1104(ROP)/1103(ENG) Email: pr.wso.palau@noaa.gov	<b>Peleliu</b> 2.30 inches 58.4 mm T-Max: 91.4°F/33.0°C T-Min: 82.1°F/27.8°C T-Ave: 86.8°F/30.4°C	<b>Peleliu (AWS, SW)</b> 5.69 inches 144.5 mm T-Max: 86.3°F/30.2°C T-Min: 77.7°F/25.4°C T-Ave: 82.0°F/27.8°C			

**STAGE 1: WATER SHORTAGE WATCH**

**What this means?**

- Water supply capacity for our main water resources (Ngerimel and Ngerikiil) is above 85%
- Voluntary customer actions needed

**What should you do to prepare?**

- Secure water storage container or water tank.
- Check for leaks and get them fixed immediately.
- Stay up to date with latest information from relevant agencies such as PPUC, NEMO and National Weather Service.

**Ways to Conserve Water**

- Fix leaks promptly.
- Turn off water while brushing teeth, lathering or shaving.
- Shorten your showers. Showers under 5 minutes can save 1,000 gals per month.
- Replace that worn out toilet flapper.
- Wash full loads only or check and adjust water level when washing smaller loads. Skip the extra rinse!
- Use rain water to wash your cars and water plants.

**Leaks - Chemars**

Slow, steady drip = 75 gals per week  
 Fast drip = 200 gals per week  
 Steady stream = 1,000 gals per week

**Learn how to use your water meter to check for leaks:**

- 1) Make sure all taps and water fixtures are turned OFF.
- 2) Locate your meter and record its reading.
- 3) Wait 5 minutes and if the reading changes when no water is being used, then you have a leak.

**#CONSERVEWATER #MONGERCOMEL A RALM**

Mostly dry conditions, elevated northeasterly trade winds. March 3rd fire located in a residential area in Airai or northeast of WSO Palau. Below average rainfall across all stations for March. On March 26, National Emergency Committee declared a Water Shortage Watch for the Republic of Palau under Stage 1 of the Drought Action Plan, due to water levels at Ngerimel and Ngerikiil reservoirs in Airai having significantly dropped due to insufficient rainfall and heightened water consumption.



# Past 6-months Climate Impacts

Kiribati Meteorological Service

11/04/2024







**Left:** Strong winds reported from Marakei, island in the northern part of Gilbert group.



**Right:** Local house destroyed by the strong wind on Marakei island.

## **On set of El Nino causes strong winds affecting islands of Kiribati and brought destructions to local houses on outer islands.**

Source: Social Media, FB **19/10/2023**





**Left:** Feeder roads flooded by continuation of rain affecting peoples movements in the area.

**Right:** Household wells are intruded resulting in the poor quality of water source.

**On set of El Nino causes heavy and continuation of heavy rainfall over Kiribati affecting feeder roads, flooded household wells but positively contribute to Drought recovery in Kiribati.**

Source: Social Media, FB **14/11/2023**





Left and Right images: Destruction to the Kiribati Oil Company Limited (KOIL) seawall at Kiritimati in the Line Islands.

**Hurricane force, low near 30N 160E north of Wake and the Marshall islands coincides with the high tide in Kiribati and greatly affecting the islands especially Kiritimati in the Line group.**

Source: KMS Report **23/01/2024**





Top images: **Left.** Coastal overtopping to the public road and gathering place (Maneaba) at Temaiku. **Right.** Central island, Abemama coastal flooding at the church compound.

## Spring tide events coupled with gusty wind, swell from the low pressure system (located at southwest of the Kiribati Group).

Source: KMS Report **10/03/2024**



**Bottom image:** Community Food Crop reserve (Bwabwai) inundated by seawater affects the quality of the crops and causes loss of such.



PICOF-14

# RMI Climate Impacts and Response 2024

**Mr. Nover Juria**

National Climate Expert

RMI, National Weather Service Office

April 16th, 2024

## Contributions from the RMI Climate Team

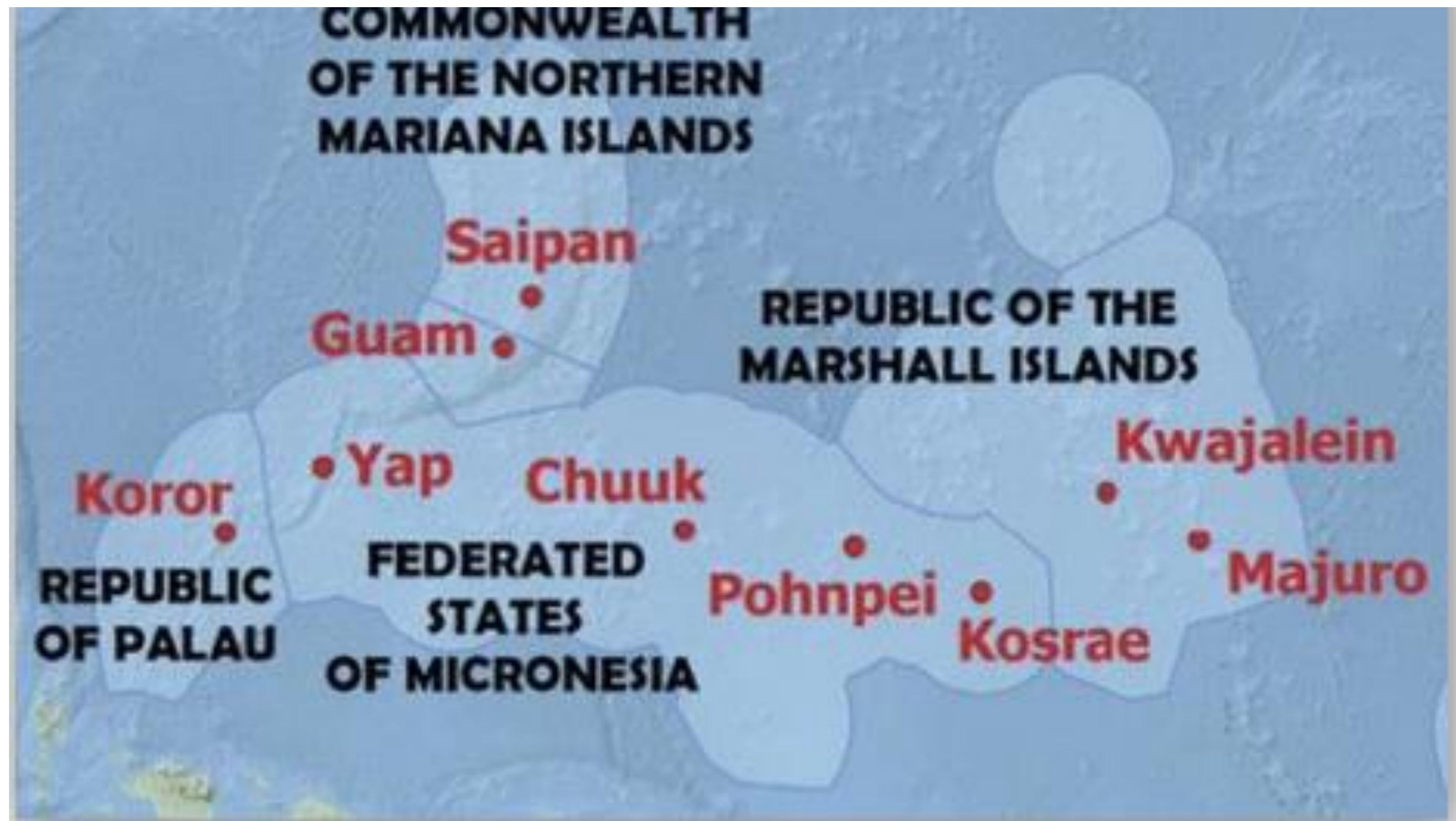
Mr. Reginald White – Meteorologist in Charge/Director

Mr. Lee Z. Jacklick – SWSS/Deputy Director

Mr. Samson Kaneko – National Ocean Expert







**Micronesian Region - Located East**

**RMI – Majuro and Kwajalein**



# Ongoing El Nino 2023-2024



Fig. 1: ENSO Status

## Drought Across the RMI

- a. Extreme Drought at the Northern RMI
- b. Moderate to Severe Drought at the Central & Southern Parts

### Affected Atolls:

- D3-Extreme Drought – Wotje Atoll
- D2- Severe Drought – Majuro Atoll
- D1-Moderate Drought – Kwajalein Atoll
- D0- Abnormally Dry – All other atolls

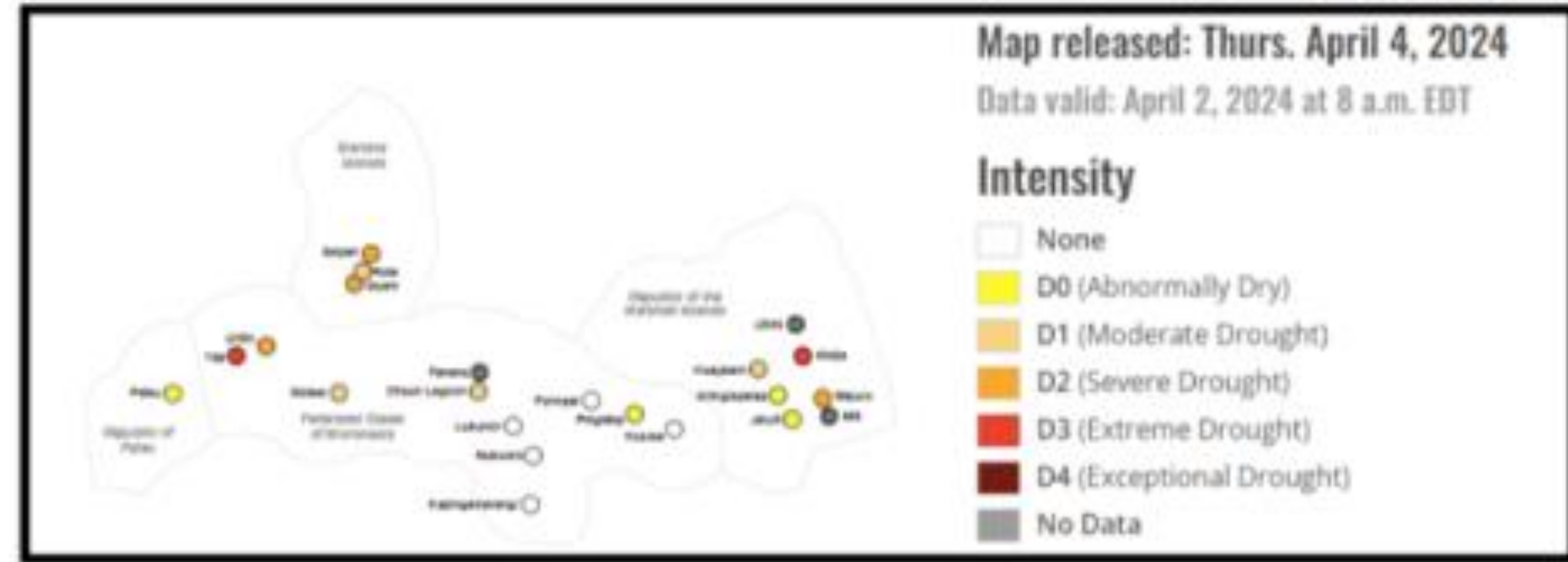
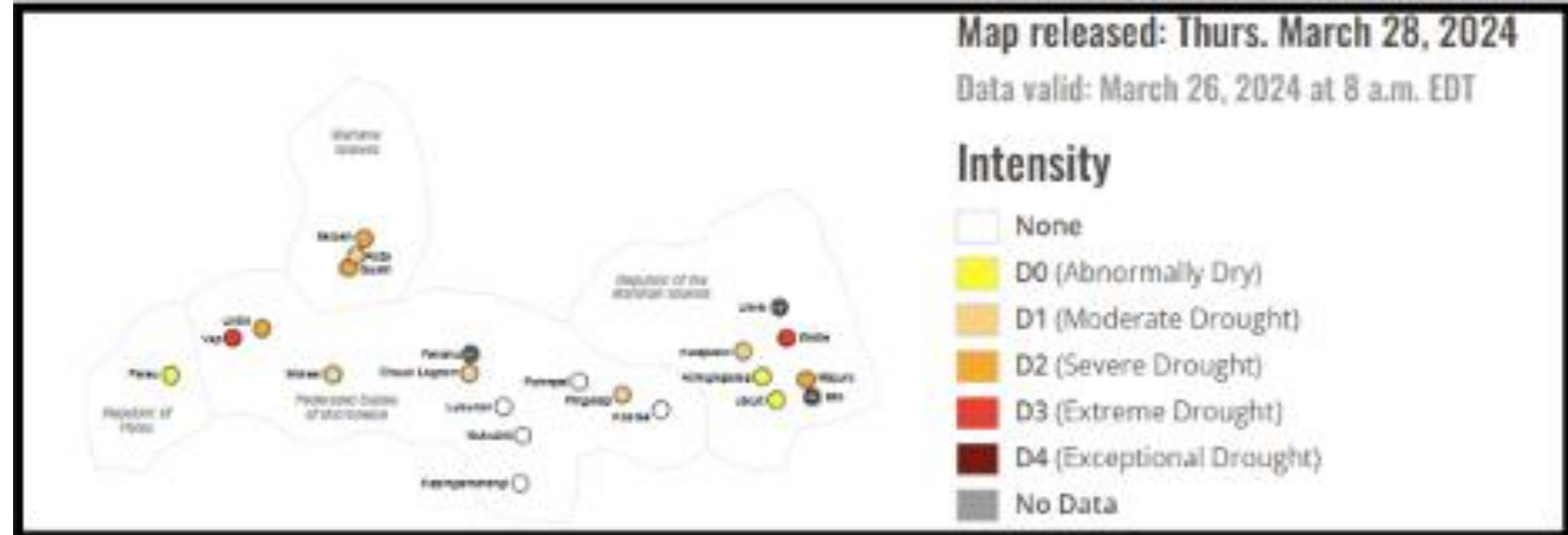


Fig. 2: Drought Maps for March & April 2024



# Drought Impacts

## 1. Water shortages for the last few months

- Empty water catchments at many households on Majuro causing many residents buying and collecting drinking waters from the businesses.
- Continued declining of the **36 million capacity** Water Reservoirs on Majuro from **~25 mil on 3/28/2024**-(top picture) to **~18 mil on 4/12/2024**-(bottom picture). That caused less days of water distribution for the residents from **4 days a week with 6 hours a day** to **only 2 days a week with only 3 hours**.



Fig. 3: Water Reservoir Levels



# Drought Impacts- Water Shortages on Majuro, the Capital



**Photos 1 & 2:** Majuro Residents buying and collecting drinking waters from one of the businesses on the island – Payless Supermarket

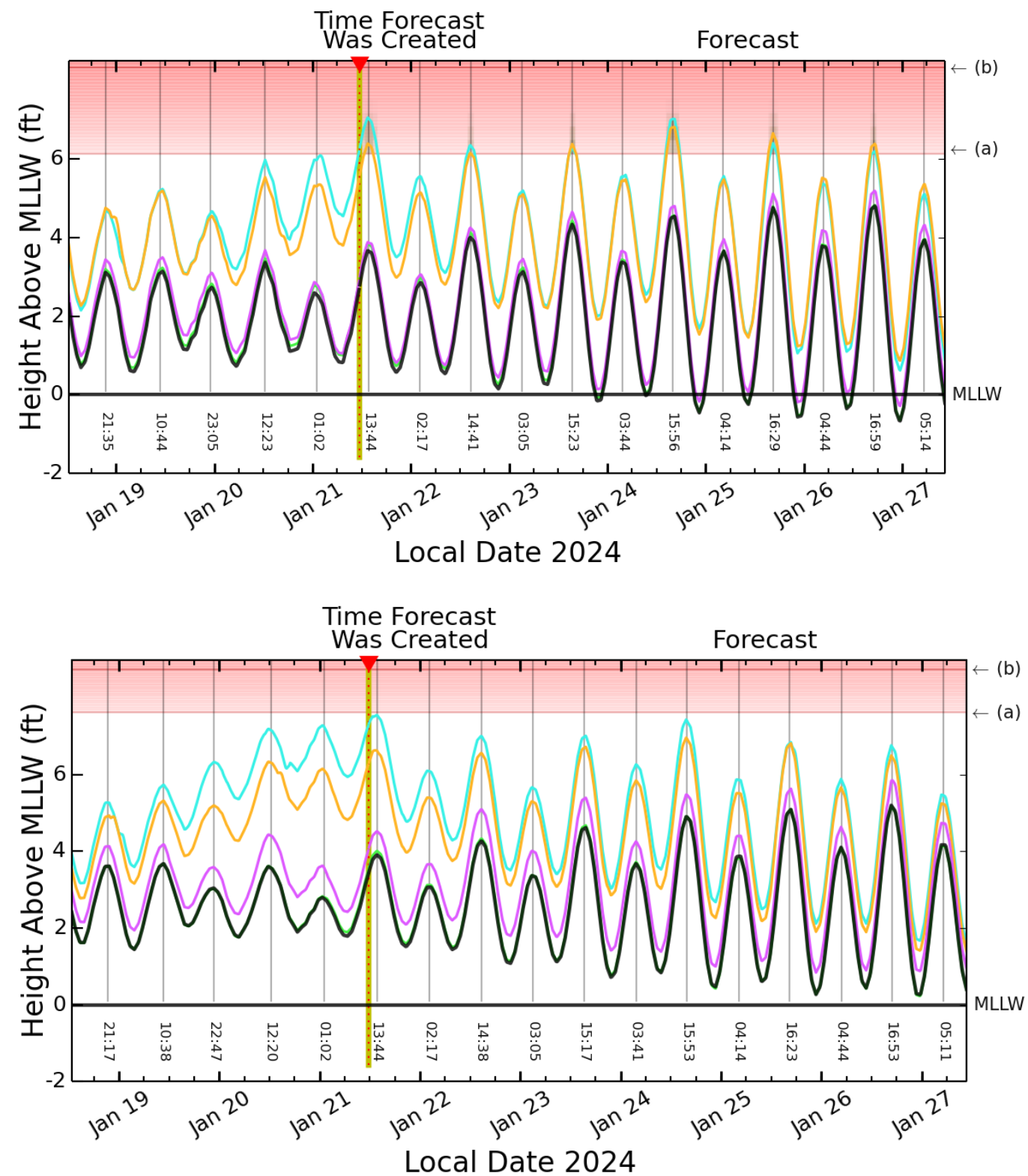


# King Tide Events

## RMI Inundation Events 2024

1. The combination of King Tide + Swells + High Tides between January 19th & January 21st caused the first inundation and flooding event, worst one on January 20th.

2. The combination of King Tide + Highest Tide of the month for the RMI caused the second inundation and flooding event on March 10th and March 11th.



**Fig 4 & 5:** Inundation Forecasts for Majuro (Top) and Kwajalein (Bottom) on January 20th and 21st.

Source: BoM, SPC, NOAA PacIOOS & NWSO

10 highest tides for 2024			10 lowest tides for 2024		
Date	Time	Height (m)	Date	Time	Height (m)
10-Mar	16:40	2.28	19-Sep	11:00	0.13
11-Mar	17:16	2.28	10-Mar	22:56	0.13
11-Feb	17:38	2.26	11-Mar	23:29	0.14
10-Feb	17:00	2.23	18-Sep	10:28	0.14
19-Sep	4:48	2.22	21-Aug	11:30	0.15
18-Oct	16:43	2.21	11-Feb	23:56	0.15
12-Feb	18:15	2.21	10-Feb	23:20	0.15
18-Sep	4:12	2.21	19-Sep	23:15	0.16
10-Apr	5:10	2.2	18-Sep	22:37	0.16
09-Mar	16:03	2.19	11-Mar	11:04	0.16

**Fig 6:** Tide Calendar showing March 10th one of the highest tides of the month for RMI for 2024.

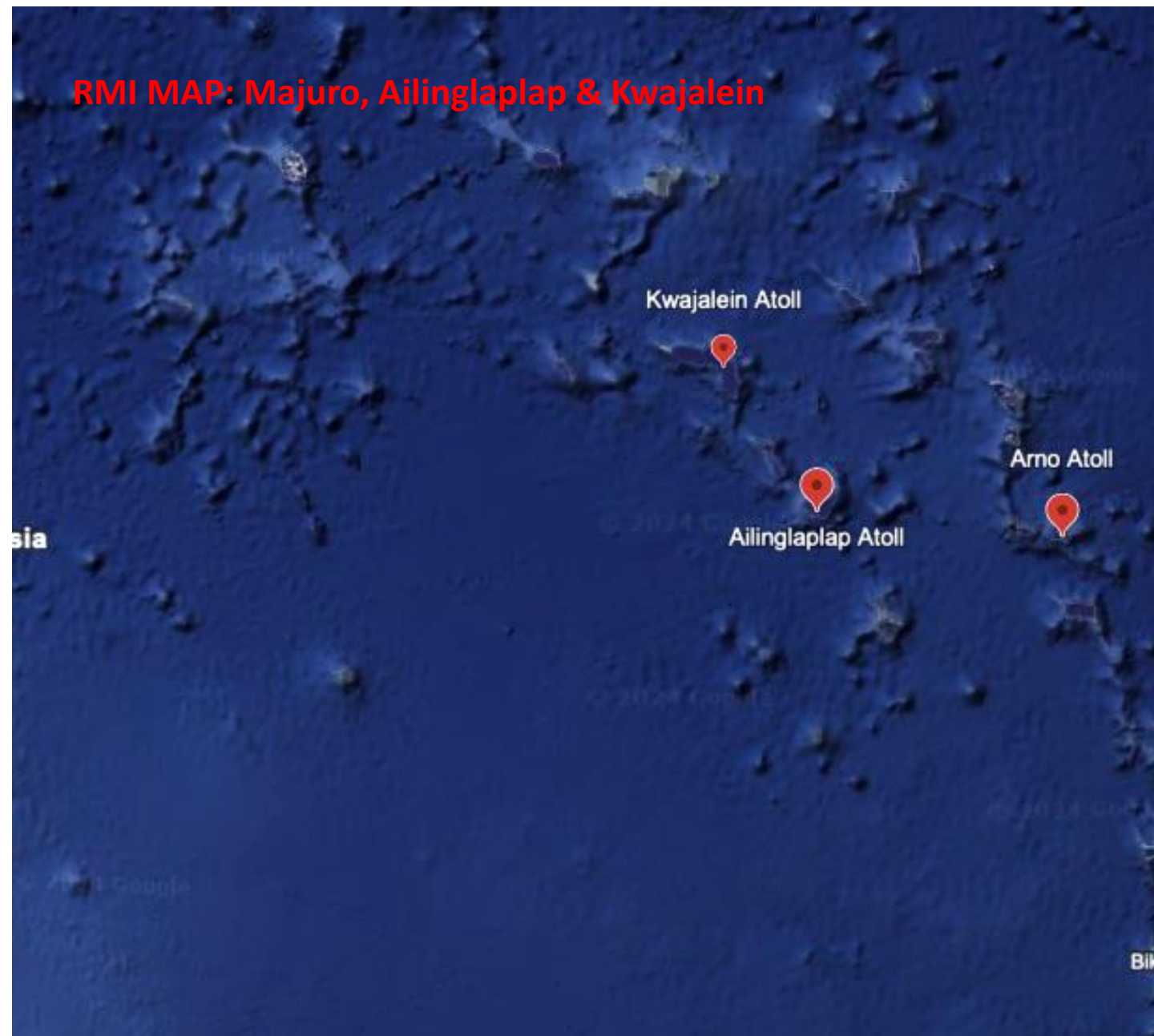




Ailinglaplap RUNWAY



Arno Water Catchment + Home



RMI MAP: Majuro, Ailinglaplap & Kwajalein

Roi Namur at Kwajalein Atoll WAVES-VIDEO



Ailinglaplap RUNWAY



Arno Living Home



RMI MAP: Majuro, Jaluit & Kwajalein



# March 10th, 2024 Event

Majuro Ocean Side – Damaged Seawall + House



Jaluit RUNWAY



Jaluit High School



Jaluit Residential



Ebeye, Kwajalein – CAUSEWAY to Gugeegue



Ebeye, Kwajalein – CAUSEWAY to Gugeegue - VIDEO





# RMI Government + NWSO Actions

- RMI National Weather Services Office (NWSO) has been monitoring the drought and inundation situations for the last few months and provide information and advice to the RMI Government. NWSO is part of the RMI Disaster Committee, and its main role is to monitor and advise the committee on any weather/climate disaster and impacts for the RMI.
- The RMI Office of the Chief Secretary, National Disaster Management Office (NDMO), and the WASH Cluster team have the main roles in dealing with the situations and impacts on ground, including monitoring and responding to the situations. Also seek and get supports from the RMI Cabinet and provide to the communities.
- NDMO called again for a meeting on April 10<sup>th</sup> 2024 to continue meeting with the Government Key Ministries to respond to the ongoing Drought and Inundation Impacts. This is their 4<sup>th</sup> meeting so far and they're having meetings regularly to respond to the ongoing impacts. They have already provided some assistance to the affected communities, including the northern atolls, Arno, Jaluit, and Majuro.

NEOC Meeting VI Sign-In Sheet

Date: April 10, 2024 Drought & Inundation

Name	Ministry/Office	Email	Phone
		Put your 4G or Mifi number if any?	
Jitka Ben	NDMO	458-5906	455-1821
Erica Peter	MIRCS	secgenmircs@gmail.com	455-2010
Kelly Lorenij	EPA	kellylorenij.rmi@epa@gmail.com	458-8912
TUMKI KETEDRMO	EPA	455-7528 (4G)	455-7528
Shawn Kies-Ryan	SPC	shawnkr@spc.int	456 3396
Kristina Reimers	EPA	kitinareimers@gmail.com	450-5162
Randon Jack	MNR/ESAC	randonj18@gmail.com 4g 458-3390	455-3848
Louis Kaminaga	MPWIU	k.lobaj@gmail.com	458-8317
Vladimir Gulfan	PSS	vgulfan@pss.edu.mh => 4G (458-5382)	457-2584
Angela Saunders	IDM	aksaunders@idm.int (NO minutes or 4G - IDM provides)	
Wayna Muller	mete: sr	waynamuller@gmail.com	455-0612
Aiti Kaians	MOHHS	aitikais@rmihealth.org	456-3226
Rolynn Jotai	OCS/NDMO	455-1050	455-1050
Nerita Juda	OCS/NDMO	458-1335	458-1335
Mikela Heine	OCS/NDMO	455-1495	455-1495

Fig 7: RMI Govn't Disaster Response Team





# Summary

- FSM
  - Impacts on plants: soil erosion and nutrient loss, oxygen deprivation, disease and fungal issues
  - Landsides and Flooding
  - Salt water intrusion and prolonged drought damaged crops and contaminated ground wells
  - State of Emergency declared and relief efforts were conducted delivering food, water, and materials to vulnerable affected islands.
- ROP
  - El Nino and Drying Trend (end of 2023 into early 2024).
  - Elevated Northeasterly Trade Winds: Convection found further south of Palau; over the southwest islands and near the equator.
  - Obscuration of Haze: Due mainly to Sea Salt, no obvious source. Beautiful sunsets.
  - Shear Line: Important source of convection, most especially if it interacts with the Near Equatorial Trough(NET) and/or a circulation/Invest Area.
  - NET and Circulation/Invest Area 94W.
  - Torrential rainfall totals in late Jan and late Feb but much milder in March due to the Shear Line-NET-Circulation/Invest Area.  
Enough rainfall to meet the monthly average rainfall threshold of 8 inches (203.2mm) of rainfall needed for most water needs.
  - March fire located northeast of WSO Palau.
  - Water Shortage Watch (March 26, 2024).
- Kiribati
  - November to April 2023/2024 season which coincide with the onset of the El Nino in the Tropical Pacific greatly affects lives and infrastructure in Kiribati.
  - The onset of the El Nino event positively impacts Kiribati from Drought to Drought recovery.
  - The sudden onset of weather extremes poses high risks to the communities around the Kiribati islands including the Line islands.
  - It was noted from impacts that Kiritimati islands were mostly affected by low pressure systems generated from the Northern Hemisphere and territory of the US while islands in the Gilbert Group are affected by low pressure systems generated and developed from the southern Hemisphere.





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