



Update on U.S. Drought Monitor and NADM-Related Activities

Richard R. Heim Jr.*

*NOAA / NESDIS / National Centers for Environmental Information
Asheville, North Carolina USA*

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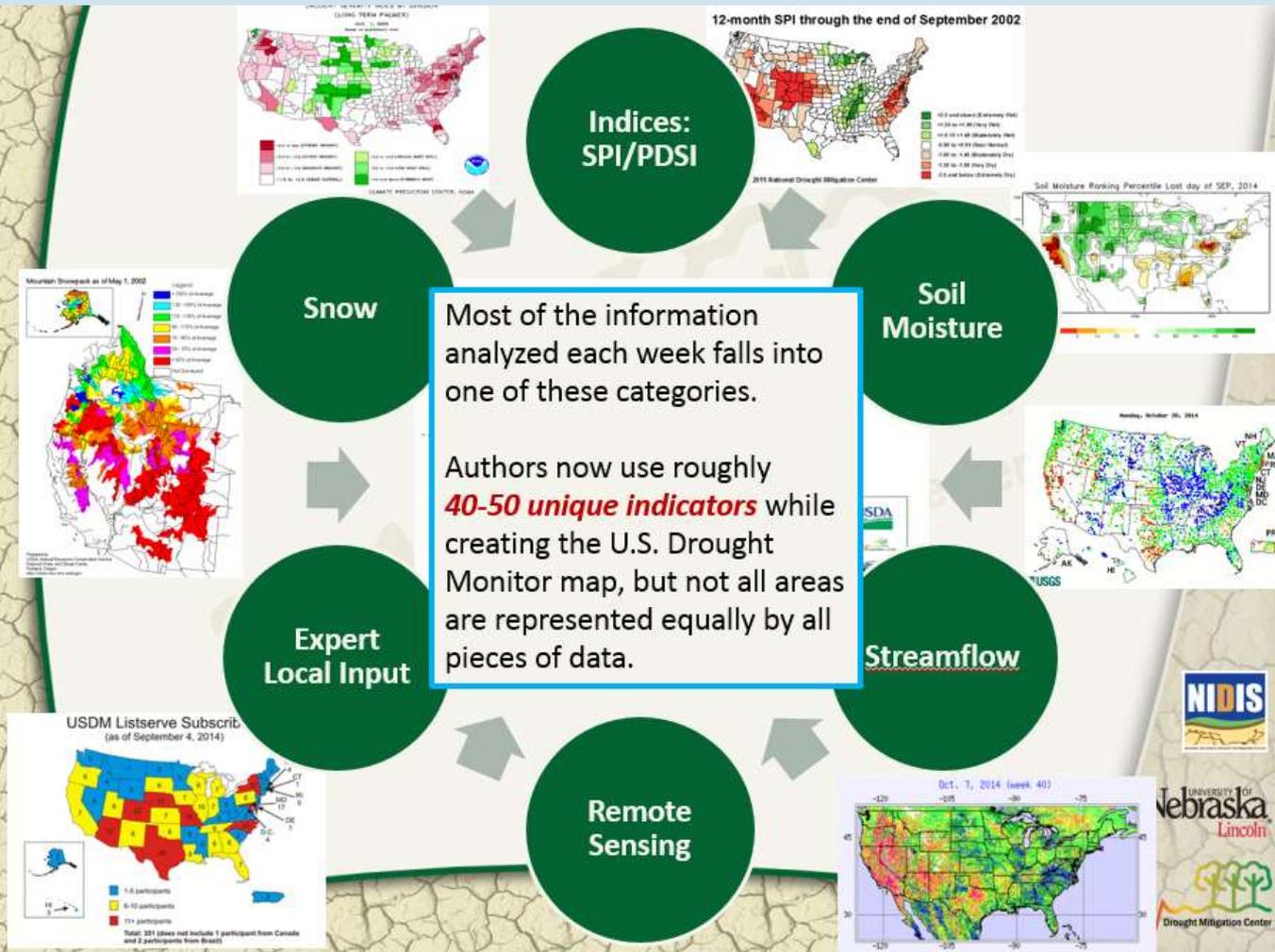
* with contributions from other USDM authors

Overview

- Preparation of the U.S. Drought Monitor (USDM)
 - GIS overlay of drought indicator data
 - Drought impacts discussion
 - WFO, HUC, Climate Hub depictions of USDM
- Incorporation of U.S. Virgin Islands into USDM
- Incorporation of U.S.-Affiliated Pacific Islands (USAPI) into USDM
- NADM transboundary basins & eco-regions
- NADM social media outreach

Preparation of USDM

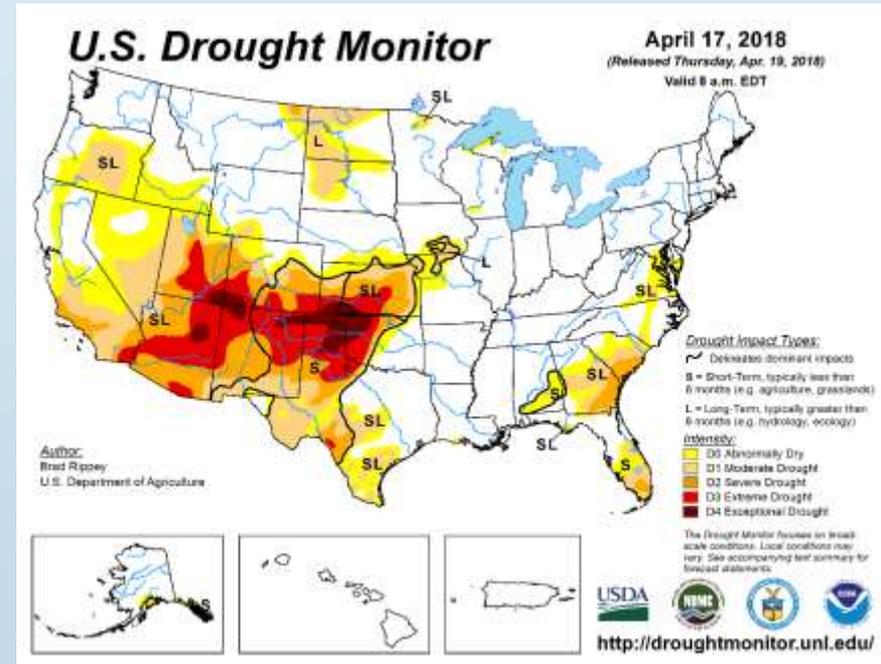
- “Convergence of Evidence” Approach
 - dozens of drought indicators + expert local input



graphic courtesy of NDMC

Preparation of USDM

- Produced weekly
- 50 States & Puerto Rico
- ~ a dozen authors from NOAA, USDA, NDMC
- percentile classification into D0-D4 classes

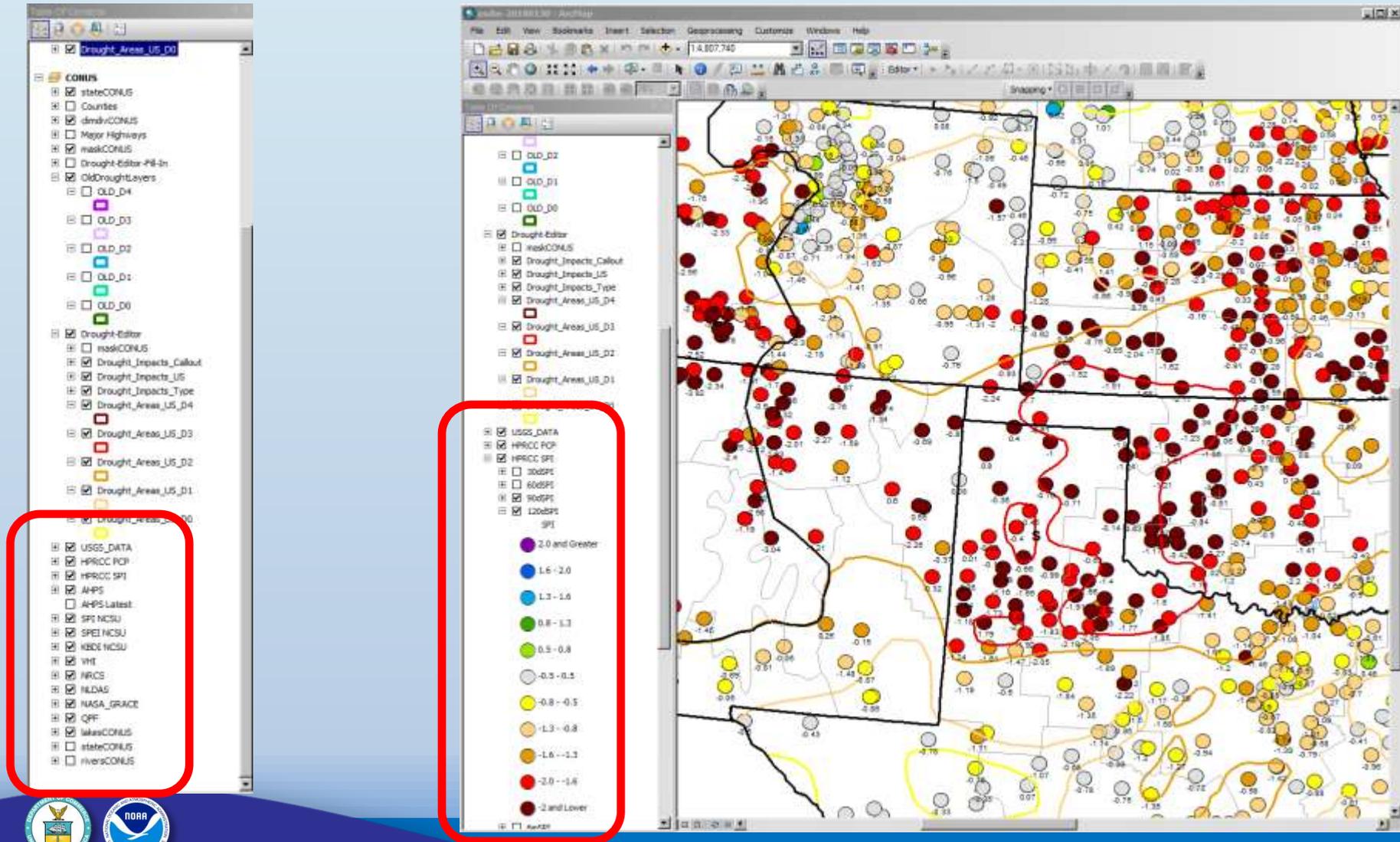


- | | | |
|---------------------------|---|--------------------------------------|
| • D4: Exceptional Drought |  | (<i>2nd</i> percentile) |
| • D3: Extreme Drought |  | (<i>5th</i> percentile) |
| • D2: Severe Drought |  | (<i>10th</i> percentile) |
| • D1: Moderate Drought |  | (<i>20th</i> percentile) |
| • D0: Abnormally Dry |  | (<i>30th</i> percentile) |

- historical occurrence / likelihood
- objective
- not subjective or anecdotal

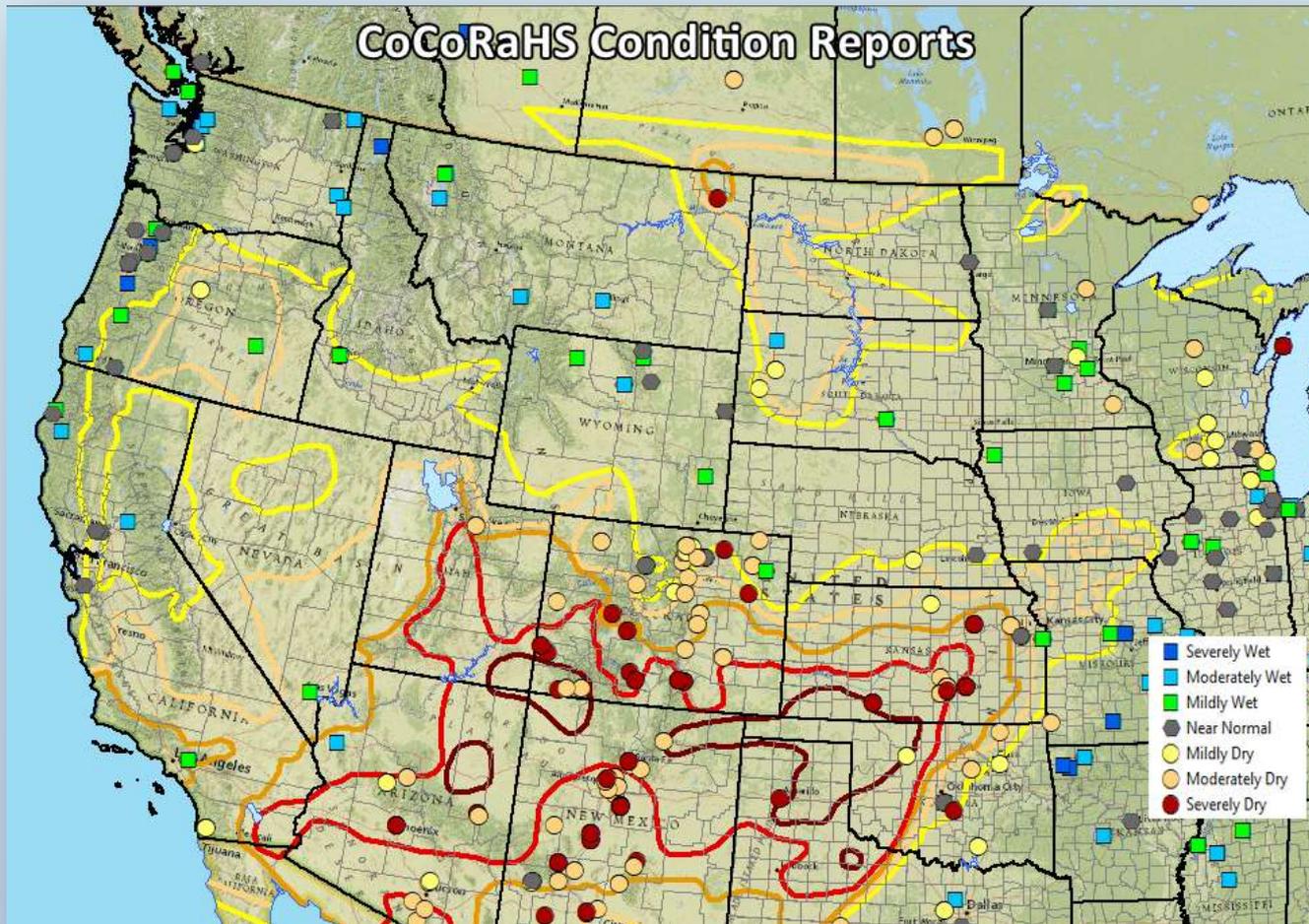
GIS Overlay of Indicator Data

- USDM produced in an ArcGIS environment



New GIS Data Sources

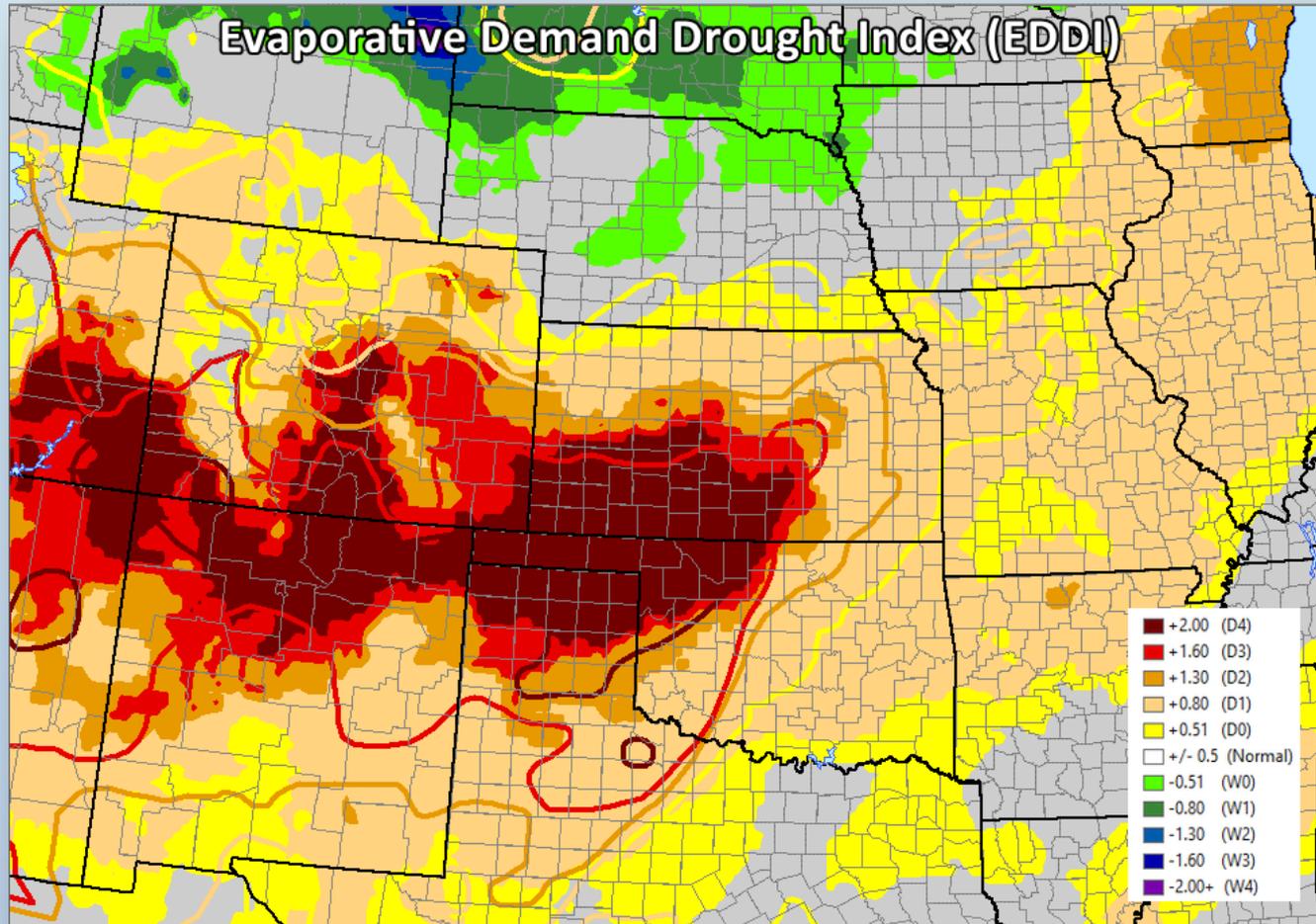
- CoCoRaHS Impact Reports



Slide courtesy of Eric Luebehusen

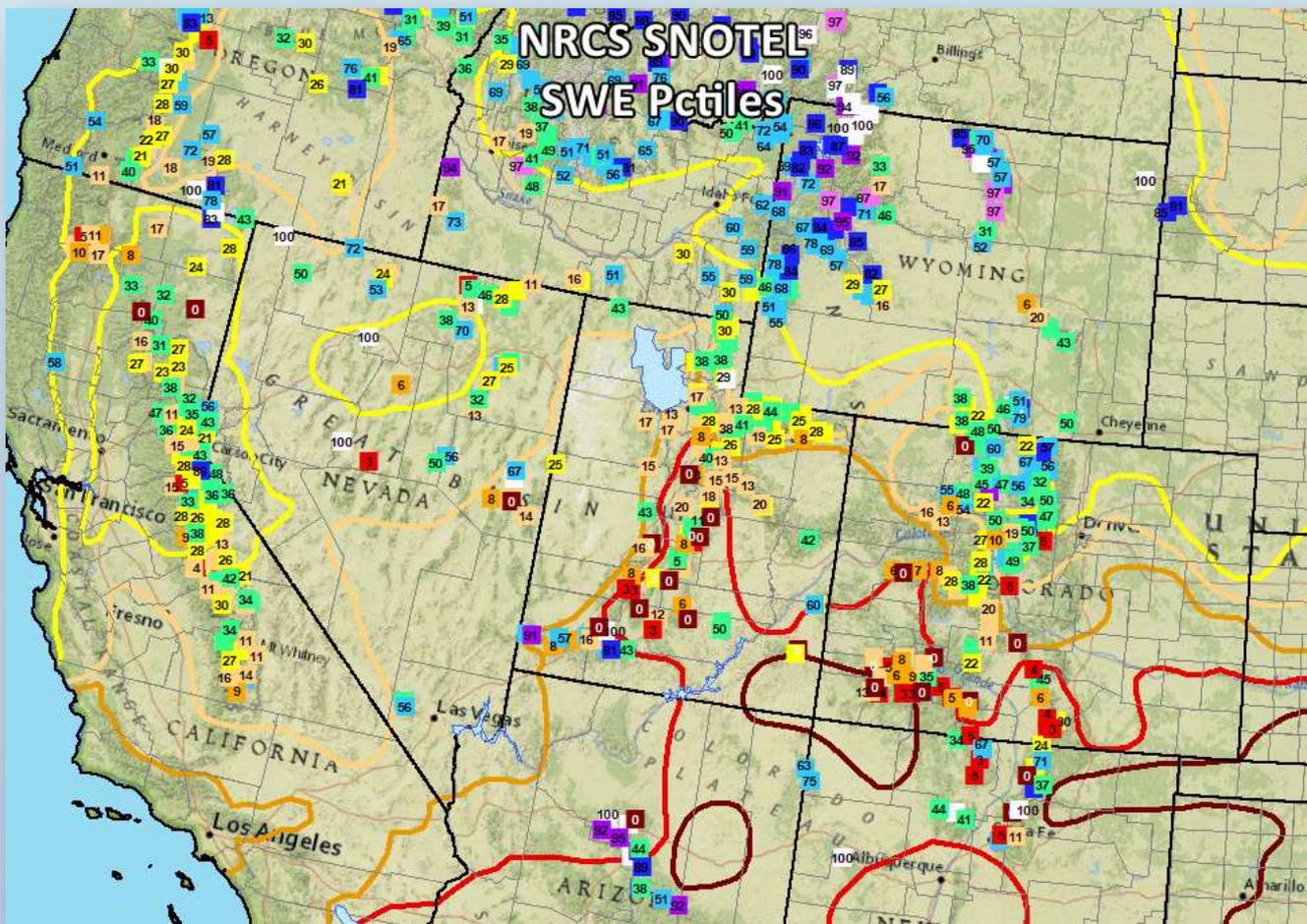
New GIS Data Sources

- NOAA's Evaporative Demand Drought Index (EDDI)



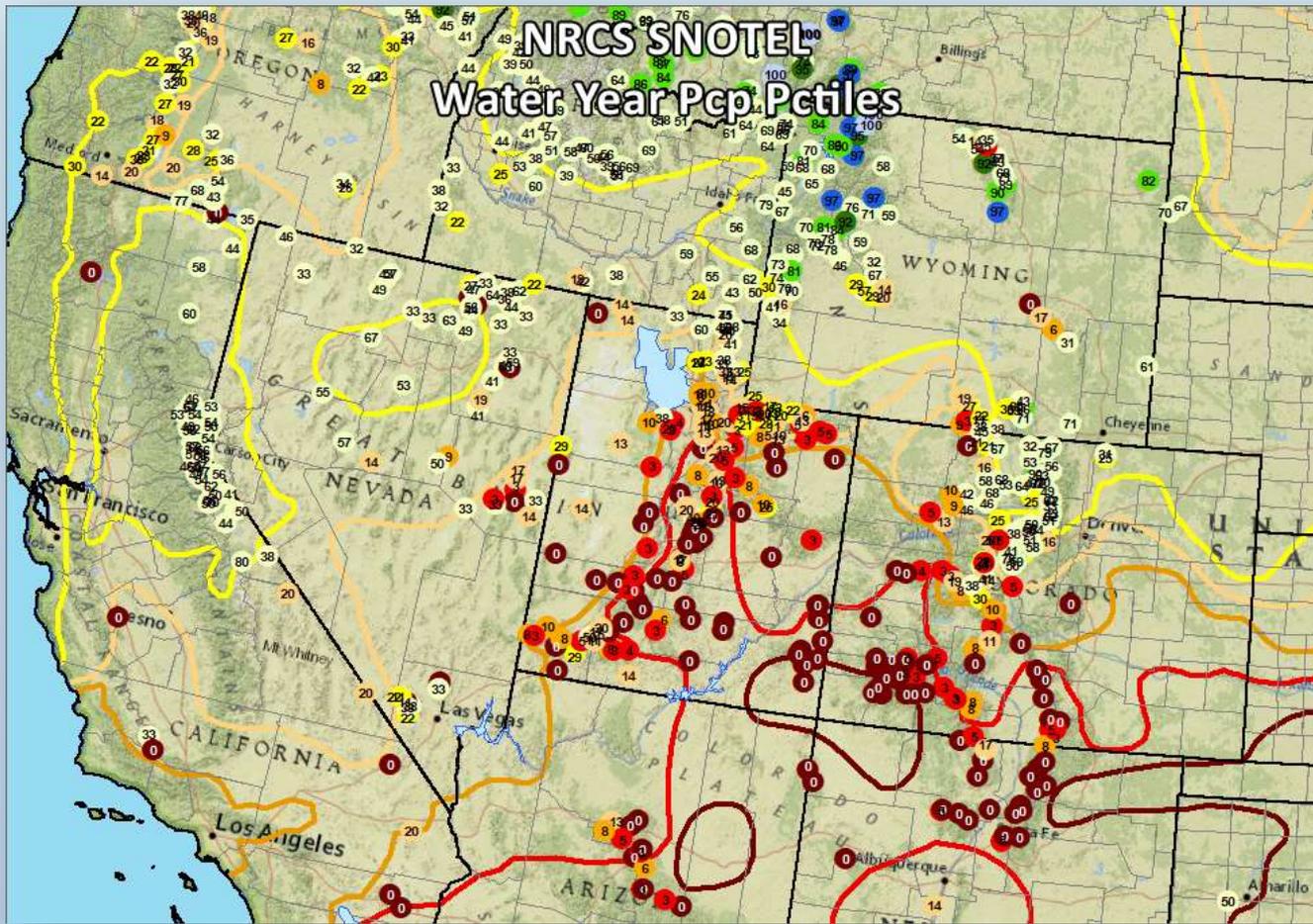
New GIS Data Sources

- USDA's NRCS SNOTEL SWE (new CSV interface)



New GIS Data Sources

- USDA's NRCS Pcp (new CSV interface)



Impacts Information is Crucial

- Agricultural & hydrological impacts, water shortages / restrictions
- Need to standardize
- Historical context important, but the history is frequently lacking
- NDMC's Drought Impact Reporter
- IMPACTS: There's a location, season, crop type, soil type, and water rights component to standardizing impact reports – P. Goble, Colo. Clim. Ctr.
- MULTIPLE TIME SCALES: I think each area has to integrate all the time scales and indicators differently – B. Bolinger, Colo. Clim. Ctr.

Drought Severity Classification

Guidelines

Category	Description	Possible Impacts
D0	Abnormally Dry	<p>Going into drought:</p> <ul style="list-style-type: none"> • short-term dryness slowing planting, growth of crops or pastures <p>Coming out of drought:</p> <ul style="list-style-type: none"> • some lingering water deficits • pastures or crops not fully recovered
D1	Moderate Drought	<ul style="list-style-type: none"> • Some damage to crops, pastures • Streams, reservoirs, or wells low, some water shortages developing or imminent • Voluntary water-use restrictions requested
D2	Severe Drought	<ul style="list-style-type: none"> • Crop or pasture losses likely • Water shortages common • Water restrictions imposed
D3	Extreme Drought	<ul style="list-style-type: none"> • Major crop/pasture losses • Widespread water shortages or restrictions
D4	Exceptional Drought	<ul style="list-style-type: none"> • Exceptional and widespread crop/pasture losses • Shortages of water in reservoirs, streams, and wells creating water emergencies

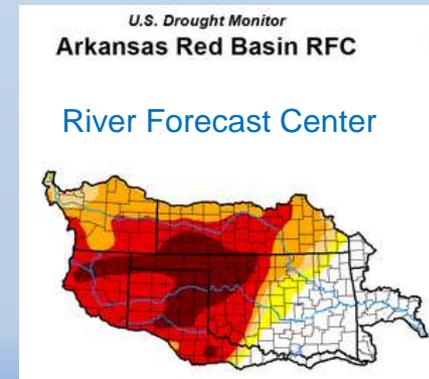
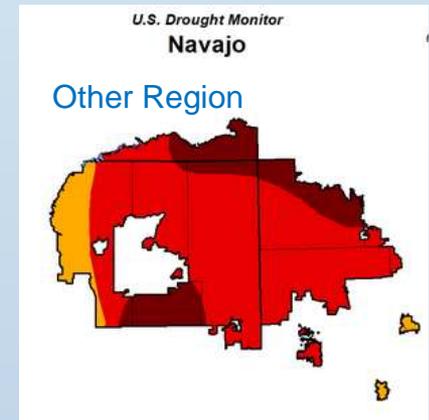
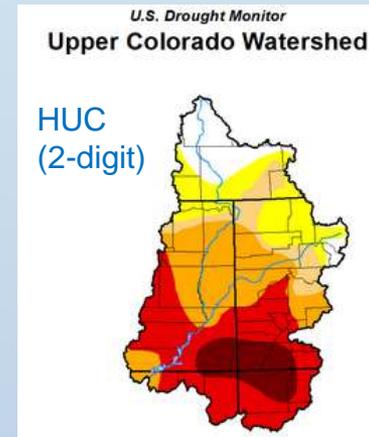
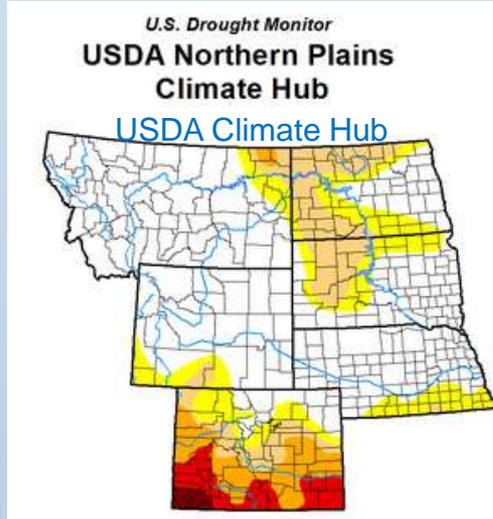
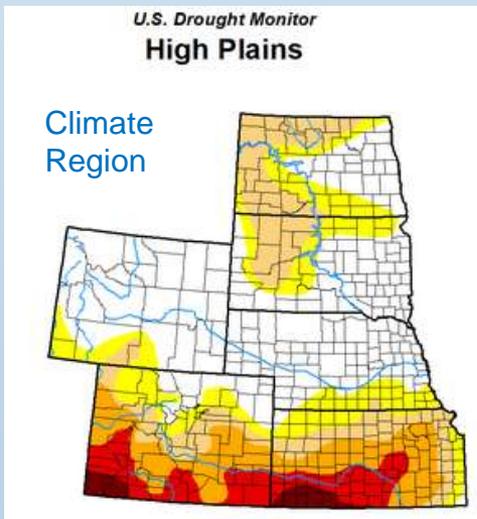
- NDMC is working to develop a state level Drought Severity Classification table for each state using data from the Drought Impact Reporter as well as correspondence from people at the state level.
- Should become available in 2018 or early 2019.

<http://droughtmonitor.unl.edu/AboutUSDM/DroughtClassification.aspx>

WFO, HUC, Climate Hub Depictions

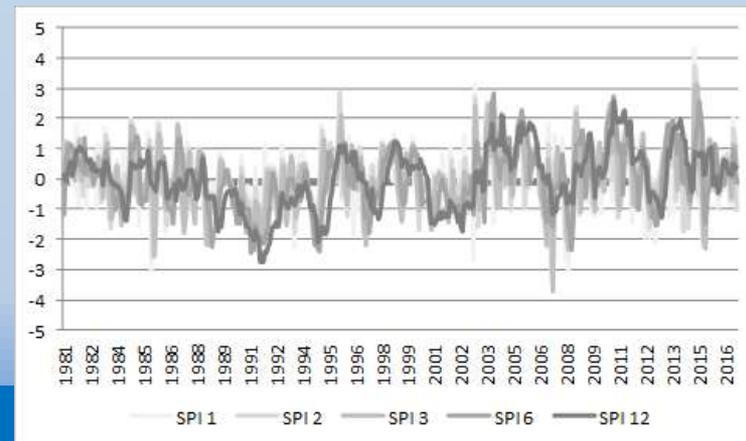
Date: April 17, 2018 Area type: River Forecast C... Area: Arkansas-Red Basin RFC Map type: Cumulative Statistics

- Area types: National, Climate Region, State, HUC, NWS Weather Forecast Offices, River Forecast Center, USDA Climate Hubs, Other Regions



US Virgin Islands into USDM

- USDM covers the 50 States & Puerto Rico
- Working on getting US Virgin Islands included
- Issues:
 - Precipitation Data: Near-real time, historical, missing
 - Not many stations (St. Thomas/King AP, St. Croix AP, 6 active COOP stations)
 - 1981-2016 SPI values have been computed for St. Thomas/King AP & examined
 - Small size of islands
 - few drought indicators



Size of Islands – HI, PR, VI, USAPI

Island	Area (sq. mi.)
Hawaii, Hawaii	4028
Maui, Hawaii	727
Oahu, Hawaii	597
Kauai, Hawaii	552
Molokai, Hawaii	260
Lanai, Hawaii	141
Puerto Rico	3363
Vieques, Puerto Rico	52
Mona, Puerto Rico	22
Culebra, Puerto Rico	11

filled polygon depiction

Island	Area (sq. mi.)
Guam	212
Pohnpei	129
American Samoa	77
Koror	61
Chuuk	47
Kosrae	42
Yap	39
Kwajalein	1.2
St. Croix, VI	83
St. Thomas, VI	31
St. John, VI	20

point / dot depiction

USAPI into USDM – Issues

- Geography: large spatial extent, isolated small islands
- Hydrology: few streams or reservoirs, groundwater uses, no snowpack, rainwater catchment important
 - Rainwater catchments may be important for water for many islands, can provide water for weeks if no rain falls
- Tropical Climate: precip mean & S.D. large, T.C.'s important
- Time scale: long-term impacts (USAPI) vs. short-term (CONUS)
- Drought: can begin rapidly, intensify rapidly, and end rapidly
- Data: few drought indicators, mainly just precipitation & SPI

→ A Different Way of Looking at Drought

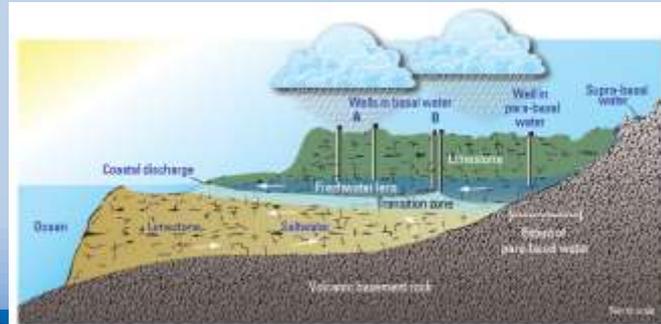
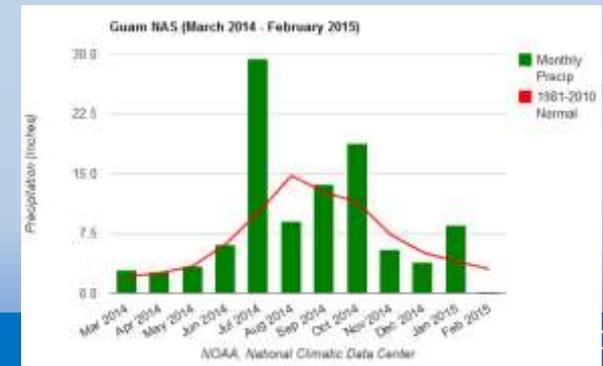


Figure 6. Schematic cross section of the study area showing groundwater occurrence and movement, Northern Guam Lera Aquifer, Guam



USAPI Drought Monitoring Criteria

- Monthly SPI
 - Can be useful for determining Dx intensity once drought is established, but not for triggering drought
- Monthly Percent of Normal Precipitation
 - Not as useful if normal is too much different from the monthly minimum precip drought trigger
- Daily precipitation trigger
 - Weekly minimum rainfall needed to meet water needs = (monthly min*) / 4
 - 2 or 3 consecutive weeks of no rainfall or low (below weekly min) rainfall → Drought onset

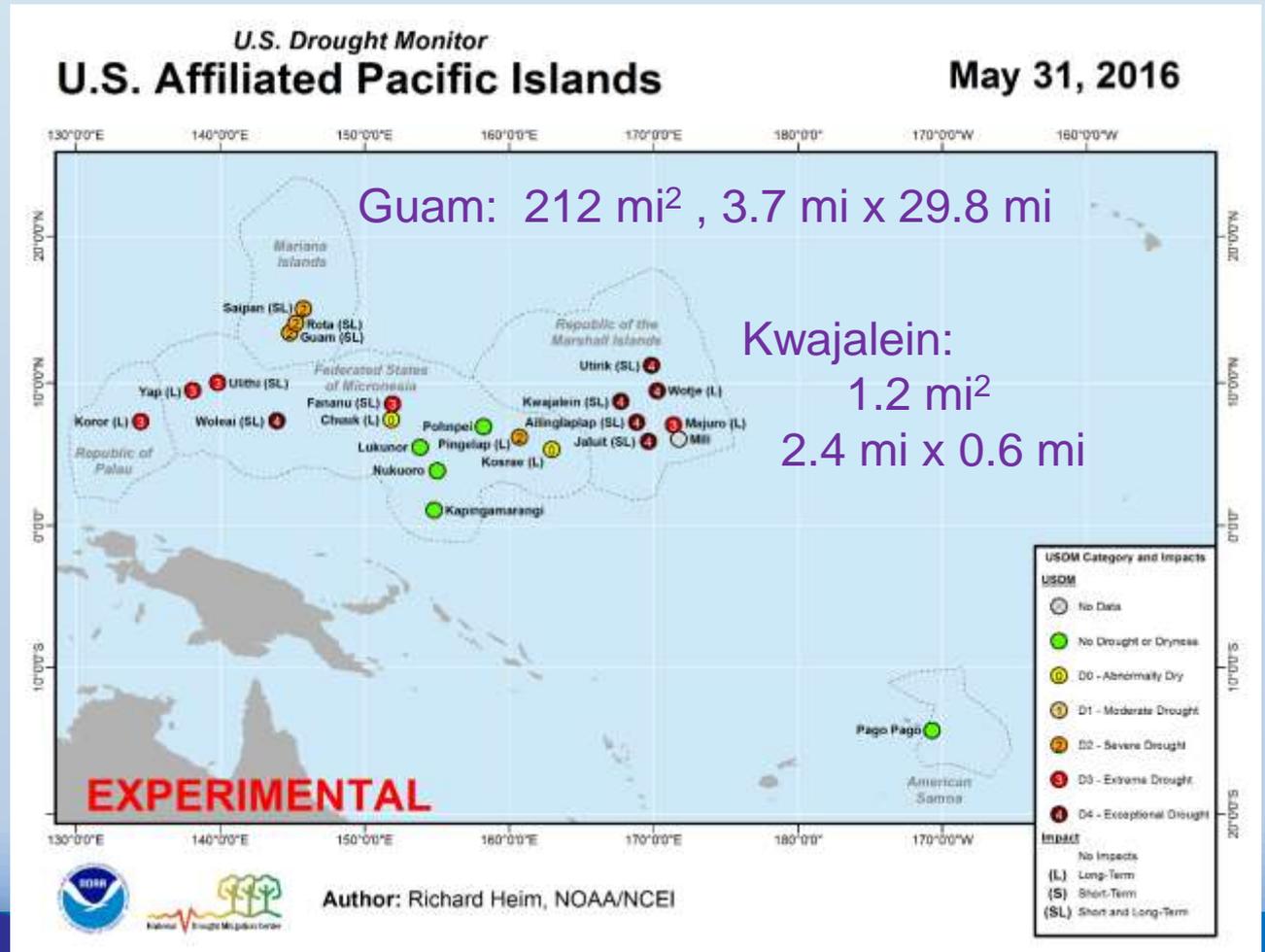
* Monthly min = 4 or 8 inches, depending on island

USAPI Plotted as Points

- Monthly mapping:
 - Drought condition plotted as points instead of polygons due to small size of islands

Hawaii, Big Island:
4,028 mi²
93 mi across

USDM:



USAPI Tools – Monthly Precip, Percent of Normal Precip, SPI

SELECTED PACIFIC ISLANDS STANDARDIZED PRECIPITATION INDEX (SPI) SUMMARY
 NATIONAL WEATHER SERVICE HONOLULU HI
 DATA THROUGH THE END OF MAR 2018

SPI VALUES BASED ON PROVISIONAL COOPERATIVE OBSERVER AND TELEMETERED RAINFALL DATA FROM SELECTED PACIFIC ISLANDS.

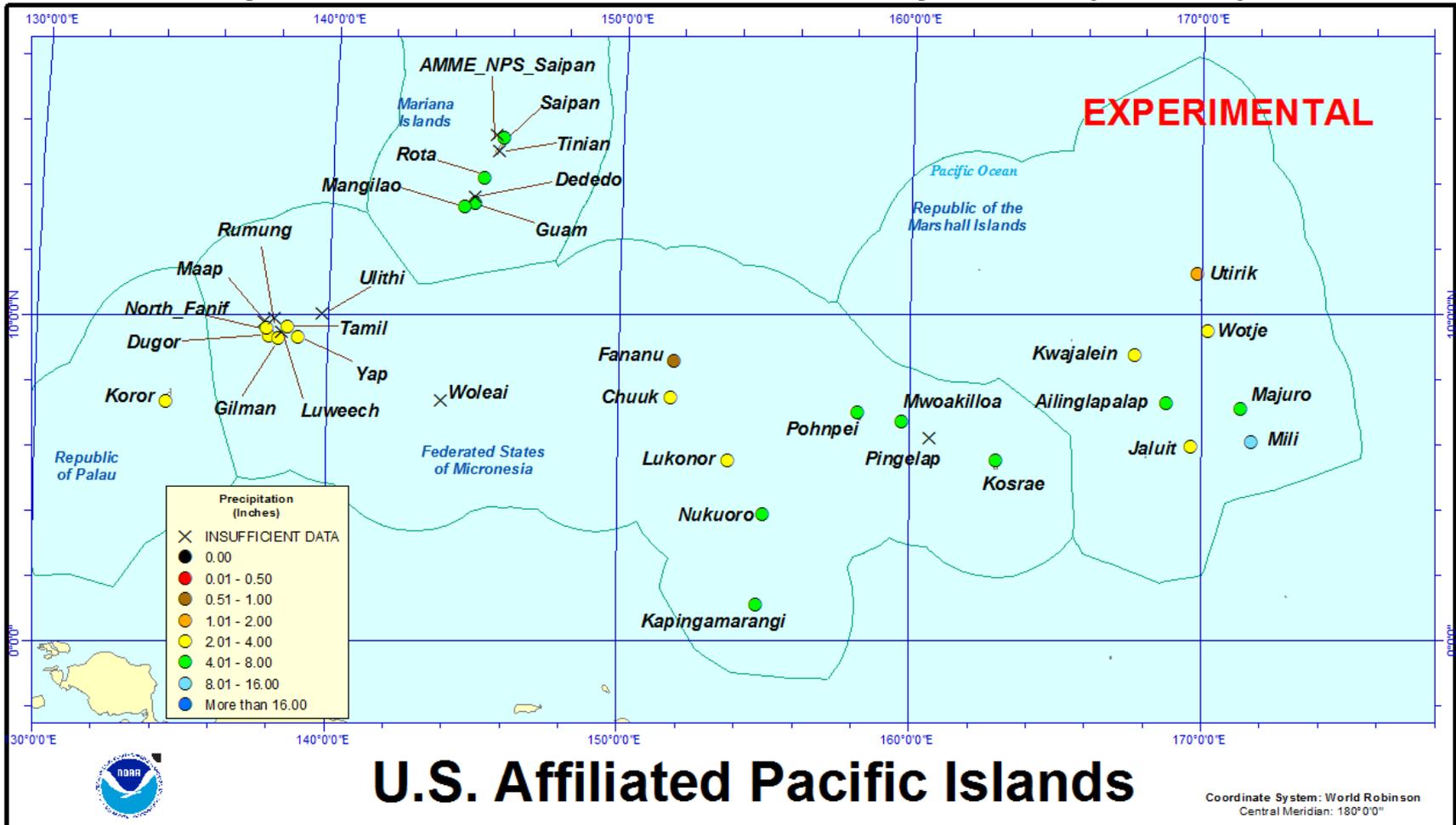
NOTE: THIS SUMMARY WAS DEVELOPED AND PRODUCED IN SUPPORT OF RAINFALL MONITORING REQUIREMENTS. THE SPI PROVIDES A NORMALIZED VIEW OF MONTHLY RAINFALL. FOR MORE INFORMATION ON THE SPI AND THE PRODUCTION OF THIS SUMMARY, PLEASE SEE THE [SPI INFORMATION PAGE](#).

SPI CATEGORIES ARE AS FOLLOWS:	
2.00 AND GREATER	EXTREMELY WET
1.50 TO 1.99	VERY WET
1.00 TO 1.49	MODERATELY WET
0.99 TO -0.99	NEAR NORMAL
-1.00 TO -1.49	MODERATELY DRY
-1.50 TO -1.99	VERY DRY
-2.00 AND LESS	EXTREMELY DRY
-99.00	MISSING DATA

STATION	1-MO	2-MO	3-MO	6-MO	12-MO	18-MO	24-MO
WSO CHUUK	0.42	0.81	0.72	0.66	-0.23	0.24	-0.29
WFO GUAM	-0.84	-0.53	-1.23	-0.37	-0.28	0.25	0.16
WSO KOROR	-1.49	-0.54	-0.58	-0.08	0.28	1.11	0.60
WSO MAJURO	1.67	1.37	1.60	1.79	1.79	2.30	1.70
WSO PAGO PAGO	-0.99	1.90	1.64	1.51	1.17	0.83	0.96
WSO POHNPEI	3.45	3.13	3.07	2.63	2.46	2.43	2.03
WSO YAP	1.52	1.27	1.28	1.28	0.51	1.58	0.79
SAIPAN AP	-1.22	-0.95	-0.79	-1.33	-1.42	-1.56	-0.70
KWAJALEIN	1.79	1.56	2.02	1.22	0.79	1.23	0.53
KOSRAE AP	0.56	0.71	0.57	0.97	1.11	1.28	0.71
LUKUNOR	-0.38	-0.25	-0.12	-0.12	-0.95	-0.08	-0.53

USAPI Tools – Weekly Precip, Month-to-date Precip

April 16, 2018 Month-to-Date Precipitation (Inches)



Automated Processing of USAPI Operationally Transmitted Daily Data

- Near-real time daily precipitation data (operationally transmitted) are merged with historical GHCN-Daily data
- 7-day & monthly precipitation totals, and number of days missing statistics, are computed daily
- A web interface is being developed for USDAM authors; will have tables containing:
 - Weekly precipitation total and number of days missing
 - Monthly precipitation total and number of days missing
 - Monthly percent of normal precipitation (if available)
 - Monthly and seasonal precipitation ranks

Samples of USAPI Tables – Weekly Precip

Weekly Precipitation for weeks ending on Tuesday		-9.99 = missing																	
		2017	2017	2017	2017	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018	2018
		5-Dec	12-Dec	19-Dec	26-Dec	2-Jan	9-Jan	16-Jan	23-Jan	30-Jan	6-Feb	13-Feb	20-Feb	27-Feb	6-Mar	13-Mar	20-Mar	27-Mar	3-Apr
American_Samoa	Pago_Pago	2.93	6.78	3.19	0.33	1.48	4.98	2.53	4.23	2.87	0.02	-9.99	-9.99	-9.99	0.00	-9.99	-9.99	-9.99	-9.99
FSM	Dugor	1.83	1.46	4.14	1.54	8.17	0.83	3.88	3.88	1.09	1.91	1.60	1.35	2.23	0.02	-9.99	-9.99	-9.99	-9.99
FSM	Gilman	2.49	1.47	2.15	2.67	7.93	1.92	3.41	4.77	0.99	4.62	2.54	0.25	3.49	0.00	-9.99	-9.99	-9.99	-9.99
FSM	Fananu	1.36	3.08	1.09	2.32	0.68	1.62	1.00	1.93	4.52	5.91	0.24	1.16	0.00	0.27	0.00	0.16	1.29	0.81
FSM	Kapingamarangi	21.26	2.66	6.78	3.77	8.09	0.65	0.75	2.50	4.26	4.54	0.32	10.26	3.52	5.90	8.91	3.17	1.21	0.34
FSM	Kosrae	3.57	8.09	2.50	3.55	4.85	1.91	8.71	2.77	2.54	4.37	3.47	3.79	5.42	6.07	6.32	7.56	0.47	0.52
FSM	Lukunoch	2.95	2.16	2.13	0.33	2.41	1.19	3.15	0.90	3.12	6.88	1.02	1.58	2.16	1.31	0.41	0.63	4.46	0.22
FSM	Luweech	1.65	1.36	2.26	1.71	7.22	0.72	3.20	2.50	1.13	1.36	1.22	0.62	0.96	0.00	-9.99	-9.99	-9.99	-9.99
FSM	North_Fanif	1.58	1.87	4.59	1.87	9.06	0.74	3.34	4.28	1.12	1.74	1.82	0.78	1.73	0.27	0.01	0.90	3.88	2.42
FSM	Nukuoro	10.39	3.32	4.18	1.83	0.80	1.61	3.35	2.23	5.08	3.51	2.06	13.97	3.92	0.94	1.84	1.13	1.27	0.54
FSM	Pingelap	4.14	4.64	5.16	4.96	2.39	0.80	1.10	0.00	0.50	1.82	0.80	0.00	4.10	1.00	2.40	-9.99	-9.99	-9.99
FSM	Rumung	1.37	2.28	2.56	1.59	7.82	0.66	2.65	3.72	1.00	0.01	1.23	0.60	0.25	-9.99	0.21	0.19	2.67	2.27
FSM	Tamil	1.83	0.63	3.65	1.55	8.53	0.90	3.17	3.52	1.56	0.01	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99
FSM	Ulithi	2.27	4.31	3.84	1.12	4.77	2.56	1.48	4.18	0.82	0.00	1.42	0.53	2.45	0.31	0.85	0.03	2.20	1.37
FSM	Woleai	0.85	0.63	4.83	0.16	1.03	2.25	5.70	3.24	3.20	0.06	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99
FSM	Yap	1.94	0.54	3.20	1.23	6.40	1.49	3.68	3.58	1.39	0.00	2.03	0.79	2.38	0.15	0.13	0.60	3.85	3.14
FSM	Pohnpei	2.78	2.27	3.77	11.58	2.25	3.76	6.52	4.55	3.91	8.67	2.73	1.79	7.00	14.17	6.29	25.60	8.46	3.36
FSM	Chuuk	5.52	2.04	2.47	1.53	3.98	1.80	1.85	2.37	3.71	9.75	1.14	0.95	0.99	3.70	0.14	6.68	1.28	1.80
Marianas	Rota	1.11	1.40	0.59	0.38	0.41	0.34	0.39	0.33	0.86	0.56	0.88	0.77	0.41	0.12	0.31	0.85	0.16	0.75
Marianas	Saipan	0.61	0.31	0.13	0.54	0.11	0.32	0.39	0.28	0.87	0.80	0.37	0.13	0.23	0.20	0.53	0.63	0.01	0.51
Marianas	Tinian	0.37	1.20	0.60	0.26	-9.99	0.46	0.95	0.68	0.52	0.24	0.72	0.39	0.15	0.05	0.18	0.20	0.37	0.47
Marianas	Dededo	1.27	0.47	0.96	0.71	0.59	0.50	0.23	0.12	0.46	0.89	0.91	0.97	0.91	0.51	0.56	0.14	-9.99	0.38
Marianas	Inarajan_Ag_Stn	1.38	0.86	1.28	0.77	1.95	0.12	0.43	0.26	0.22	0.48	0.57	0.99	1.16	0.33	0.21	2.31	0.41	0.29
Marianas	Mangilao	1.39	2.04	0.91	0.99	0.57	0.33	0.16	0.07	0.46	0.78	0.52	0.71	1.51	0.40	-9.99	-9.99	-9.99	-9.99
Marianas	Guam	1.83	1.11	0.72	0.67	0.52	0.33	0.04	0.23	0.24	0.74	0.99	0.43	0.50	0.74	0.04	0.20	0.29	0.63
Palau	Koror	1.15	4.91	3.72	6.91	1.37	4.26	1.89	1.62	0.58	0.78	5.65	1.62	1.00	0.22	0.02	0.98	1.32	0.23
RMI	Ailinglupalap	3.18	7.56	0.75	0.73	0.20	0.15	2.95	3.28	3.80	1.89	0.25	2.20	0.33	0.15	0.90	0.99	5.78	0.90
RMI	Jaluit	2.67	4.85	1.81	1.28	2.84	1.28	0.69	2.20	2.08	3.24	0.48	3.30	1.13	0.00	-9.99	-9.99	-9.99	-9.99
RMI	Mili	2.83	9.41	1.86	6.51	1.80	2.19	3.93	1.22	2.70	2.05	0.45	1.66	2.90	3.21	2.20	1.60	3.92	3.23
RMI	Utirik	1.13	0.75	-9.99	-9.99	0.00	0.15	0.00	0.96	1.94	0.51	0.37	0.19	0.00	0.05	0.78	0.05	0.41	1.26
RMI	Wotje	0.95	2.46	1.32	0.00	0.00	0.00	0.00	2.48	1.40	1.04	0.15	0.92	0.00	1.08	2.60	0.28	0.90	6.09
RMI	Kwajalein	1.80	1.73	1.37	0.41	0.39	1.64	0.83	8.26	2.30	1.05	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99	-9.99
RMI	Majuro	2.36	9.55	3.88	4.50	0.37	2.13	3.95	4.49	2.89	4.26	0.68	4.33	1.08	1.20	4.95	4.11	7.92	2.60



Samples of USAPI Tables – Weekly Number Days Missing

		Number of Days Missing Each Week for weeks ending on Tuesday																	
		2017 5-Dec	2017 12-Dec	2017 19-Dec	2017 26-Dec	2018 2-Jan	2018 9-Jan	2018 16-Jan	2018 23-Jan	2018 30-Jan	2018 6-Feb	2018 13-Feb	2018 20-Feb	2018 27-Feb	2018 6-Mar	2018 13-Mar	2018 20-Mar	2018 27-Mar	2018 3-Apr
American_Samoa	Pago_Pago	0	0	0	0	0	0	0	0	0	5	7	7	7	6	7	7	7	7
FSM	Dugor	0	0	0	0	0	0	0	0	0	0	0	0	0	6	7	7	7	7
FSM	Gilman	0	0	0	0	0	0	0	0	0	0	0	0	6	7	7	7	7	7
FSM	Fananu	0	0	0	0	0	0	0	0	0	0	0	1	1	0	2	0	1	2
FSM	Kapingamarangi	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	3	5
FSM	Kosrae	0	0	0	0	0	0	1	0	0	1	0	0	0	0	0	1	5	4
FSM	Lukunoch	0	0	1	0	0	0	1	0	1	0	0	2	0	1	4	0	0	2
FSM	Luweech	0	0	0	0	0	0	0	0	0	0	0	0	6	7	7	7	7	
FSM	North_Fanif	0	0	0	0	0	0	0	0	0	0	0	0	1	3	1	2	4	
FSM	Nukuoro	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	3	5	
FSM	Pingelap	0	0	0	0	0	0	0	0	3	0	0	0	2	0	7	7	7	
FSM	Rumung	0	0	0	0	0	0	0	0	0	6	3	1	3	7	5	5	3	6
FSM	Tamil	1	0	0	0	0	0	0	0	0	6	7	7	7	7	7	7	7	7
FSM	Ulithi	0	0	0	0	0	0	0	0	0	6	2	0	2	1	4	3	1	3
FSM	Woleai	1	0	0	0	3	0	0	0	0	6	7	7	7	7	7	7	7	7
FSM	Yap	0	0	0	0	0	0	0	0	0	6	2	1	1	1	3	2	1	3
FSM	Pohnpei	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	3
FSM	Chuuk	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Marianas	Rota	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Marianas	Saipan	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	1
Marianas	Tinian	2	2	3	5	7	6	2	6	4	4	0	2	3	4	4	3	3	5
Marianas	Dededo	3	5	2	4	4	2	3	3	3	3	4	4	6	5	6	7	6	6
Marianas	Inarajan_Ag_Stn	2	3	3	4	3	2	4	2	2	2	2	2	3	2	3	2	3	3
Marianas	Mangilao	2	3	2	3	4	2	3	4	2	1	2	2	6	7	7	7	7	7
Marianas	Guam	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Palau	Koror	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
RMI	Ailinglapalap	0	0	0	0	0	0	0	0	0	0	0	0	3	4	3	0	1	1
RMI	Jaluit	0	0	0	0	0	0	0	0	0	0	0	1	0	6	7	7	7	7
RMI	Mili	0	0	0	0	0	0	0	0	0	0	0	0	3	3	3	1	3	3
RMI	Utirik	0	4	7	7	5	0	0	0	0	1	0	1	2	3	4	3	1	1
RMI	Wotje	0	0	0	0	0	0	0	0	0	0	0	1	3	2	4	3	0	1
RMI	Kwajalein	0	0	0	0	0	0	0	0	0	5	7	7	7	7	7	7	7	7
RMI	Majuro	0	0	0	0	0	0	0	0	0	0	0	0	1	2	3	0	0	0

Samples of USAPI Tables – Monthly Precip & Num Days Msg

Monthly Precipitation		-9.99 and -99 = missing										
Days Missing Each Month												
		2017	2017	2017	2017	2017	2017	2017	2017	2018	2018	2018
		MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR
American_Samoa	Pago_Pago	23.24	5.02	4.66	7.79	6.27	20.11	12.89	12.07	15.37	0.02	0.00
American_Samoa	Pago_Pago	0	0	0	0	0	0	0	0	0	27	30
FSM	Dugor	6.00	10.80	-9.99	10.41	13.52	24.76	11.20	14.78	11.72	7.11	-9.99
FSM	Dugor	0	0	31	0	0	0	0	0	0	0	-99
FSM	Chuuk	9.41	8.50	11.87	11.65	12.91	14.64	11.15	13.52	10.00	12.70	13.56
FSM	Chuuk	0	0	0	0	0	0	0	0	0	0	0
Marianas	Rota	1.65	4.61	3.78	10.64	15.00	22.91	2.94	3.42	2.24	2.39	1.55
Marianas	Rota	0	0	0	0	0	0	0	0	0	0	0
Marianas	Saipan	1.59	4.63	6.46	8.60	8.48	7.02	1.89	1.52	2.33	1.12	1.53
Marianas	Saipan	0	0	0	0	0	0	0	0	0	0	1
Marianas	Tinian	0.96	10.51	2.20	6.18	6.61	8.33	1.53	2.30	2.61	1.50	0.80
Marianas	Tinian	13	9	19	9	12	10	15	17	21	9	16
Marianas	Dededo	2.67	7.35	6.53	11.67	11.85	16.95	4.23	3.02	1.76	3.68	1.59
Marianas	Dededo	12	9	13	10	15	10	15	17	13	15	26
Marianas	Mangilao	1.89	7.45	-9.99	12.04	13.60	17.38	4.33	4.98	1.53	3.93	-9.99
Marianas	Mangilao	11	14	31	9	12	9	12	13	12	7	-99
Marianas	Guam	1.90	8.40	9.87	9.73	14.92	18.47	4.23	4.50	0.94	2.72	1.39
Marianas	Guam	0	0	0	0	0	0	0	0	0	0	0
Palau	Koror	12.61	15.54	23.20	13.00	18.90	14.03	9.55	17.90	8.38	9.04	2.75
Palau	Koror	0	0	0	0	0	0	0	0	0	0	0
RMI	Ailinglapalap	2.82	9.45	7.92	6.21	12.31	7.85	9.08	12.24	10.78	4.32	8.27
RMI	Ailinglapalap	0	0	0	0	2	0	0	0	0	0	10
RMI	Jaluit	2.33	5.41	8.56	5.22	7.40	5.40	10.47	9.30	7.80	8.15	-9.99
RMI	Jaluit	0	0	31	0	0	3	0	0	0	1	-99
RMI	Mili	0.41	-9.99	-9.99	-9.99	-9.99	13.34	13.39	21.10	10.66	7.06	13.46
RMI	Mili	21	30	31	31	30	18	0	0	0	0	12
RMI	Utirik	1.39	1.60	1.50	4.59	3.80	6.26	9.30	1.86	3.56	0.61	2.50
RMI	Utirik	0	0	4	0	1	0	0	23	0	4	11
RMI	Wotje	1.14	8.85	5.16	1.26	13.71	6.50	9.08	4.63	4.37	2.00	10.57
RMI	Wotje	0	0	4	0	2	0	0	0	0	4	9
RMI	Kwajalein	5.21	10.80	6.92	6.29	22.07	9.83	9.41	4.72	14.46	0.00	-9.99
RMI	Kwajalein	0	0	0	0	0	0	0	0	0	27	31
RMI	Majuro	4.94	13.02	12.53	13.00	20.93	18.21	10.27	19.59	15.77	8.29	19.36
RMI	Majuro	0	0	0	0	0	0	0	0	0	0	6



Samples of USAPI Tables – Monthly Percent of Normal Precip

Monthly Percent of Normal Precipitation		-100.0 = Missing											
		2017	2017	2017	2017	2017	2017	2017	2017	2017	2018	2018	2018
		MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC	JAN	FEB	MAR	
American_Samoa	Pago_Pago	218.8	85.7	72.0	123.6	82.1	198.9	114.1	83.1	106.1	0.2	0.0	
Marianas	Rota	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0
Marianas	Saipan	57.4	103.0	78.2	70.8	83.1	62.0	31.9	36.2	65.4	43.0	79.4	
Marianas	Tinian	28.7	208.1	21.1	49.6	53.0	74.4	21.9	54.3	63.4	45.3	33.3	
FSM	Gilman	75.3	91.9	-100.0	84.8	75.4	190.3	125.7	141.3	178.7	185.8	-100.0	
FSM	Kapingamarangi	118.3	84.6	109.9	31.9	98.3	73.2	61.5	472.6	85.4	200.5	144.7	
FSM	Kosrae	110.1	75.2	97.1	89.3	142.1	135.8	149.5	105.4	91.7	139.9	116.8	
FSM	Lukunoch	73.7	58.2	100.0	62.6	81.9	116.5	121.1	70.4	117.6	96.8	63.9	
FSM	Luweech	33.1	52.3	-100.0	65.2	84.3	243.0	98.1	124.7	125.8	65.7	-100.0	
FSM	North_Fanif	80.0	105.2	86.3	75.5	103.5	198.2	149.4	162.3	164.6	102.1	146.5	
FSM	Nukuoro	190.2	105.3	105.9	66.0	166.2	262.6	196.6	117.4	83.8	175.0	36.6	
FSM	Pingelap	53.6	42.6	91.6	50.0	84.7	123.1	135.6	137.3	20.4	64.5	27.2	
FSM	Rumung	71.9	69.9	55.9	42.1	115.8	228.1	111.7	139.1	157.8	35.7	102.5	
FSM	Tamil	83.4	72.8	-100.0	65.2	137.0	168.0	103.2	152.3	177.6	-100.0	-100.0	
FSM	Ulithi	84.0	22.1	66.8	61.1	46.0	263.8	74.9	214.7	163.3	91.6	102.4	
FSM	Woleai	77.5	83.1	133.1	30.4	56.6	110.5	111.6	78.4	192.1	44.4	-100.0	
FSM	Yap	63.5	61.9	121.5	53.1	91.5	155.0	103.3	121.4	159.5	86.8	147.5	
FSM	Pohnpei	100.5	132.2	108.5	52.7	102.4	80.6	94.2	131.2	166.7	174.5	390.3	
FSM	Chuuk	80.2	69.6	95.8	86.4	100.5	128.4	101.1	122.7	98.6	174.9	153.9	
Marianas	Dededo	57.4	95.0	51.1	74.1	89.7	160.5	44.6	48.1	34.8	86.2	54.4	
Marianas	Mangilao	45.1	110.1	-100.0	78.2	112.4	157.8	47.4	88.0	32.0	102.7	-100.0	
Marianas	Guam	44.1	118.5	81.3	56.7	105.3	156.5	46.1	75.3	18.9	60.1	50.2	
Palau	Koror	100.7	86.3	128.0	93.4	156.3	116.3	80.2	150.0	75.6	94.8	33.2	
RMI	Ailinglapalap	26.2	86.5	68.7	58.3	115.5	71.6	67.2	131.9	171.1	87.9	135.5	
RMI	Jaluit	21.5	52.2	67.8	45.9	65.8	48.6	101.0	89.4	80.3	131.0	-100.0	
RMI	Mili	4.1	-100.0	-100.0	-100.0	-100.0	143.6	139.3	186.7	125.5	77.8	179.7	
RMI	Utirik	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	-100.0	
RMI	Wotje	23.1	157.8	119.7	24.0	177.1	74.7	117.7	98.4	180.6	128.5	520.7	
RMI	Kwajalein	78.8	137.4	70.3	60.5	202.7	83.1	85.0	58.1	360.6	0.0	-100.0	
RMI	Majuro	50.1	119.2	105.0	113.8	172.4	137.2	77.6	169.5	190.4	108.8	256.5	

Samples of USAPI Tables – Monthly & Seasonal Precip Ranks

Latest year month ranked: 3 2018

Station	MAR-MAR		FEB-MAR		JAN-MAR		DEC-MAR		NOV-MAR		OCT-MAR		SEP-MAR		AUG-MAR		JUL-MAR		JUN-MAR		MAY-MAR		APR-MAR		P.O.R.	
	Rank	NYR																								
Pago_Pago	10	52	50	52	50	52	47	52	46	52	50	52	46	52	46	52	45	52	45	52	48	52	46	52	1966-2018	
Saipan	4	37	8	37	8	37	4	29	2	29	1	29	2	29	2	29	2	29	2	29	2	29	2	29	1981-2018	
Fanapu	2	5	4	5	4	5	3	5	3	5	2	4	2	3	3	3	2	3	3	3	1	2	1	2	2003-2018	
Kapingamarangi	24	28	27	28	22	24	22	22	22	22	20	20	17	18	15	16	14	15	13	14	12	13	12	13	1962-2018	
Kosrae	44	48	41	47	35	43	28	40	31	38	30	35	29	33	27	32	26	32	24	31	24	31	23	30	1954-2018	
Lukonor	11	34	15	34	16	34	12	33	13	33	14	32	12	32	9	21	8	21	8	21	5	21	3	21	1981-2018	
Nukuoro	4	35	20	35	15	35	16	34	23	33	29	33	31	33	31	33	32	33	31	32	31	32	30	32	1981-2018	
Pingelap	-99	34	-99	34	-99	34	-99	33	-99	33	-99	33	-99	33	-99	32	-99	32	-99	32	-99	31	-99	31	1981-2018	
Ulithi	23	36	21	36	25	35	32	34	30	34	33	34	32	34	30	34	27	34	21	34	20	34	22	34	1981-2018	
Woleai	17	36	10	33	18	32	14	31	15	30	15	30	13	28	10	27	9	24	9	24	10	22	9	22	1968-2018	
Yap	65	67	61	67	62	67	62	67	59	67	61	67	61	67	54	67	57	67	51	66	43	66	43	66	1951-2018	
Pohnpei	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	67	66	66	66	66	66	66	66	1951-2018
Chuuk	45	67	56	67	52	67	52	67	51	67	52	67	51	67	43	67	42	67	37	66	31	66	24	66	1951-2018	
Guam	7	62	13	61	3	61	4	61	1	61	11	61	15	61	6	61	5	61	10	61	9	61	14	61	1957-2018	
Koror	5	67	16	67	16	67	30	67	22	67	29	67	41	67	36	67	47	67	45	66	45	66	39	66	1951-2018	
Ailinglapalap	28	35	24	35	29	35	28	33	22	33	19	33	23	33	19	32	13	32	10	32	7	32	8	32	1981-2018	
Jaluit	21	35	25	35	22	35	18	33	20	33	17	33	13	33	5	33	5	33	5	33	3	33	3	33	1981-2018	
Mili	32	35	26	34	28	34	31	32	29	32	31	32	-99	31	-99	31	-99	31	-99	31	-99	31	-99	31	1981-2018	
Utrik	14	15	12	14	12	14	9	11	6	8	6	7	2	6	2	5	2	5	1	3	1	3	1	3	1985-2018	
Wotje	33	35	32	35	32	35	28	32	30	32	29	32	30	32	27	32	28	32	29	32	25	32	27	32	1981-2018	
Kwajalein	63	66	61	66	66	66	65	66	64	66	60	66	66	66	65	66	65	66	62	66	57	66	55	65	1952-2018	
Majuro	63	64	63	64	62	64	64	64	62	64	63	64	64	64	64	64	64	64	64	64	63	63	62	63	1954-2018	

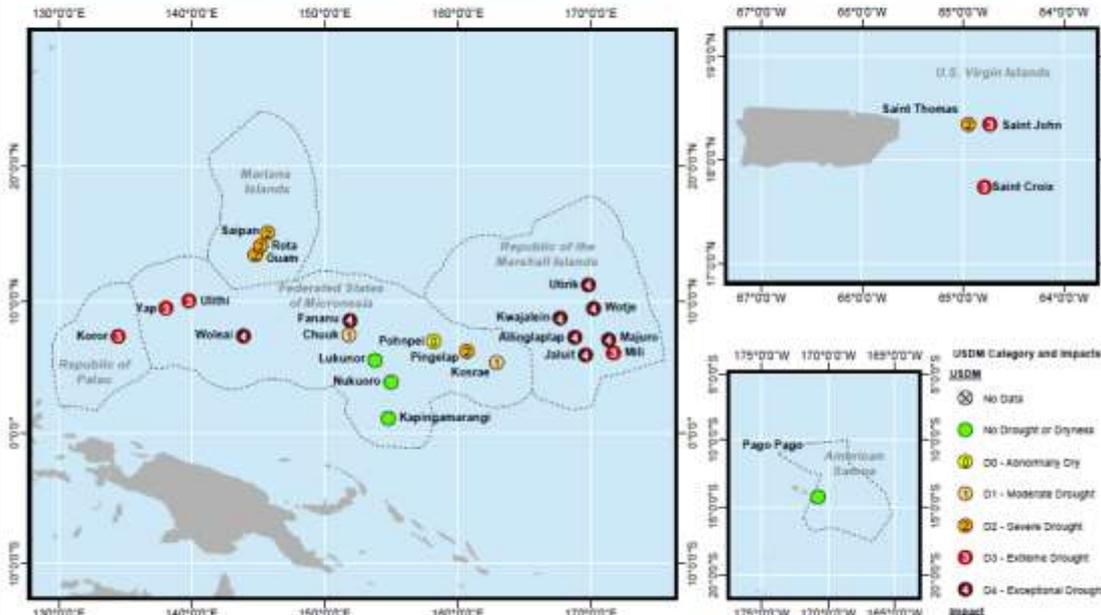


USAPI and USVI on USDM – Mock Ups

- Likely a 2-page USDM:
 - page 1 = CONUS, AK, HI, PR
 - page 2 = USVI & USAPI

U.S. Drought Monitor
U.S. Affiliated Pacific Islands
and Virgin Islands

October 31, 2013



USDM Category and Impacts

USDM

- No Data
- No Drought or Dryness
- D0 - Abnormally Dry
- D1 - Moderate Drought
- D2 - Severe Drought
- D3 - Extreme Drought
- D4 - Exceptional Drought

Impact

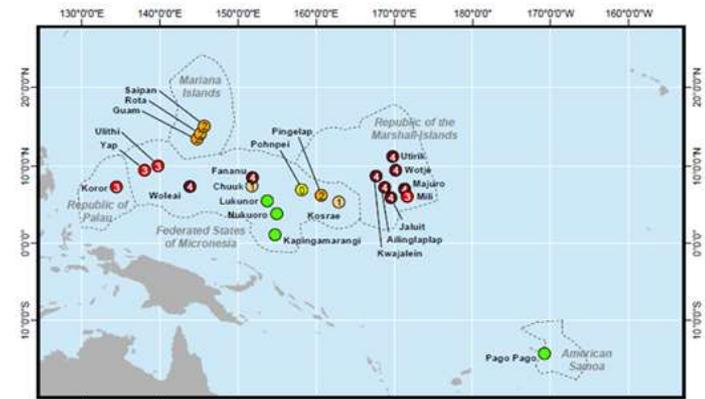
- No Impacts
- (L) Long-Term
- (S) Short-Term
- (SL) Short and Long-Term

Author
Author Name
NOAA/NWS/NCEP/Climate Prediction Center



U.S. Drought Monitor
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Impact

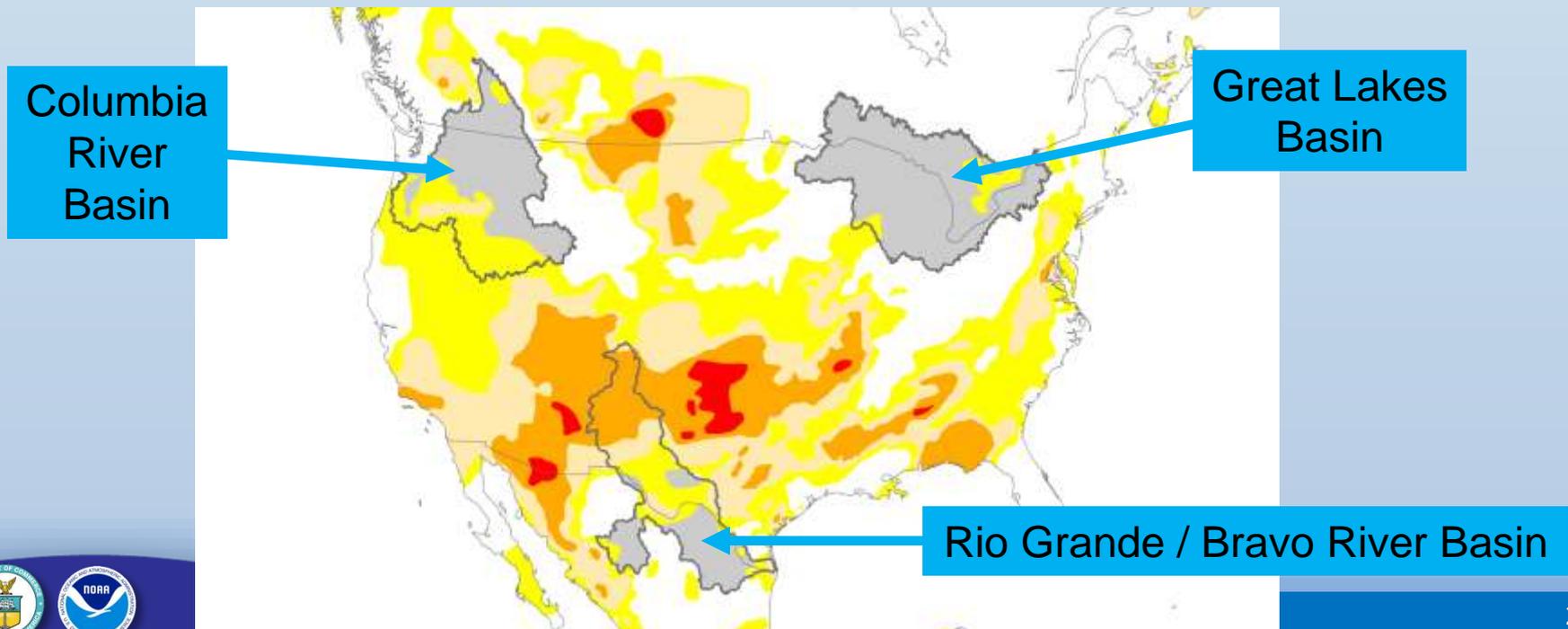
- No Impacts
- (L) Long-Term
- (S) Short-Term
- (SL) Short and Long-Term

Author
Author Name
NOAA/NWS/NCEP/Climate Prediction Center



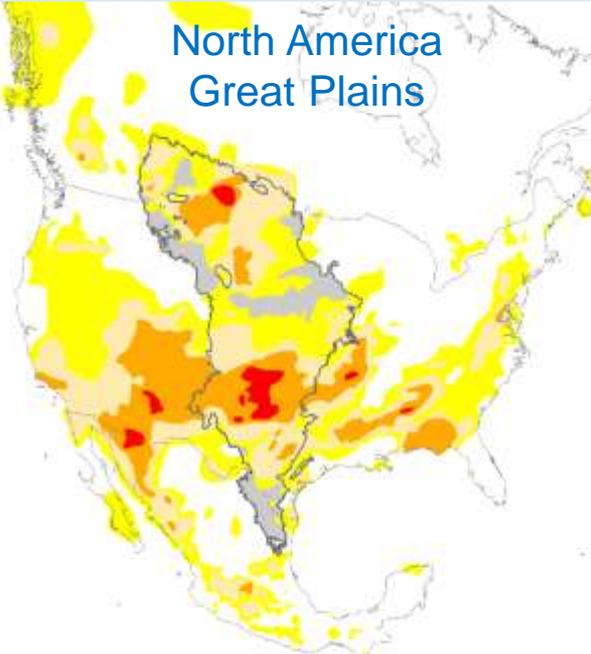
NADM Transboundary Regions

- Percent area and percent of population in drought are being computed for 3 North America transboundary river basins and 5 eco-regions
- Statistics are included in NADM narrative
- Web interface is being developed

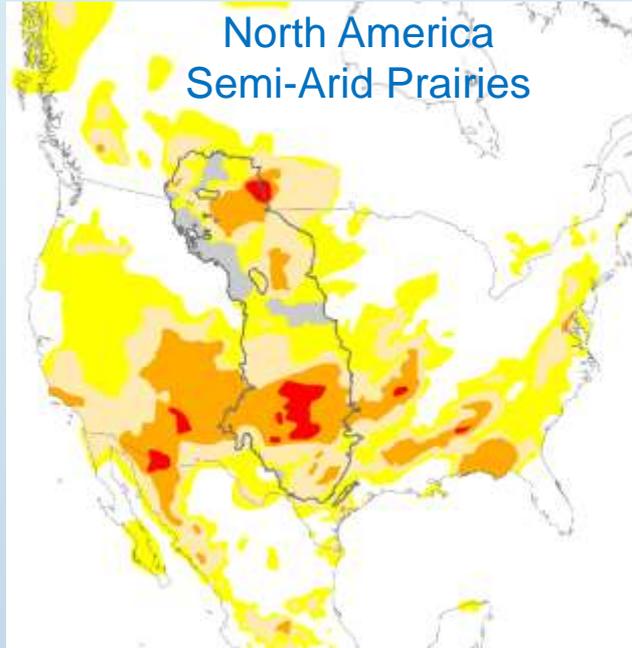


N. America Eco-Regions (from EPA)

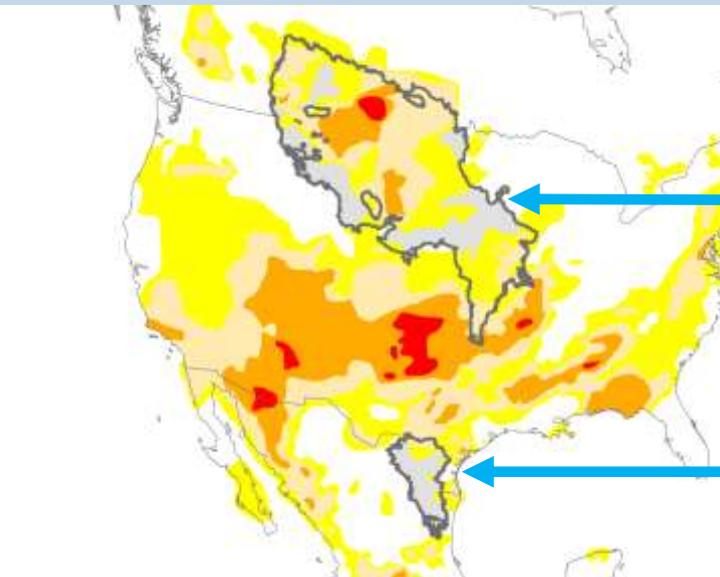
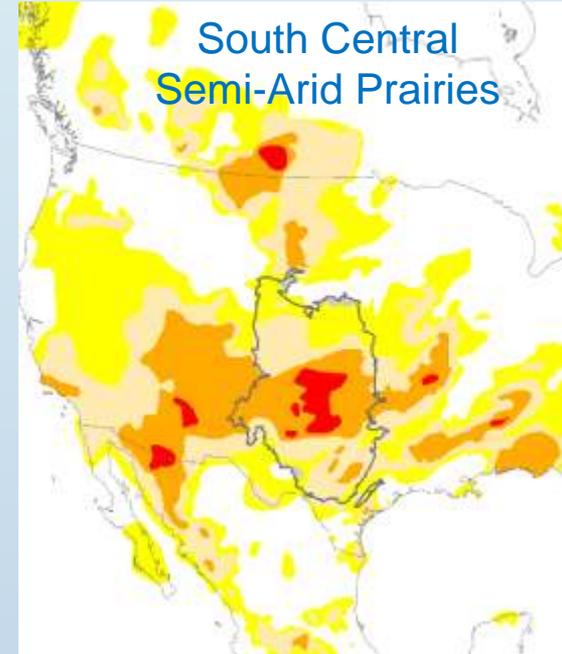
North America
Great Plains



North America
Semi-Arid Prairies



South Central
Semi-Arid Prairies



Temperate and West-Central
Semi-Arid Prairies

Tamaulipas-Texas Semi-arid Plain



NADM Social Media Outreach

- NCEI has had a social media outreach for USDM for years
 - Web site, Facebook page, Twitter
- NCEI initiated a social media outreach for NADM following the 2016 NADM Forum in Texas
 - Facebook page, Twitter
 - The social media document is provided to SMN and AAFC for coordinated release in all 3 countries
 - Information based on NADM web sites at NCEI (continental statistics) and NDMC (change maps and national statistics)

<https://www.drought.gov/nadm/>

<http://droughtmonitor.unl.edu/nadm/ChangeMaps.aspx>

Thank You!

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 - NWS Offices and Partners in the USAPI
 - PEAC Center (Pacific ENSO Application Climate Center)
 - NDMC (National Drought Mitigation Center)
 - USDM authors at CPC, NDMC, USDA, WRCC
 - And probably others whom I've forgotten