



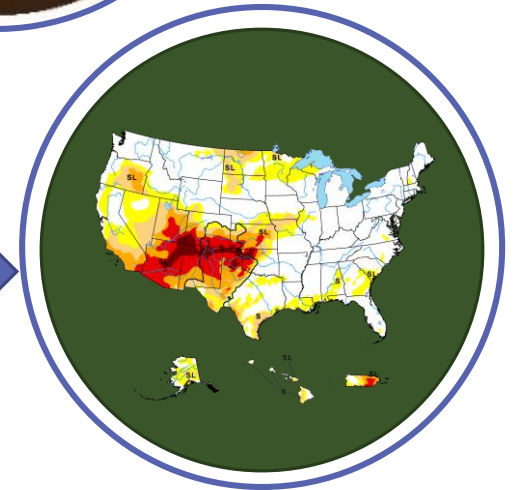
DROUGHT MONITOR SOUTHEAST ALASKA

The National Drought Mitigation Center & The U.S. Drought Monitor

Deborah Bathke, NDMC & Aaron Jacobs, NWS
Southeast Alaska Drought Workshop
Juneau, Alaska
May 7, 2019



Objectives



TODAY'S TALK

The National Drought Mitigation Center (NDMC)

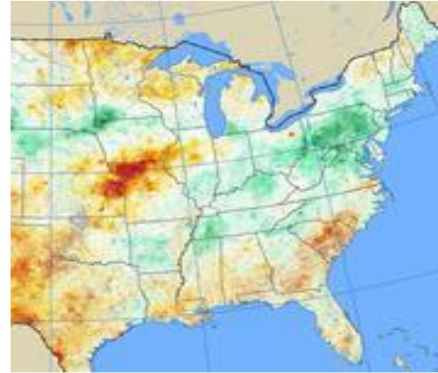


Planning



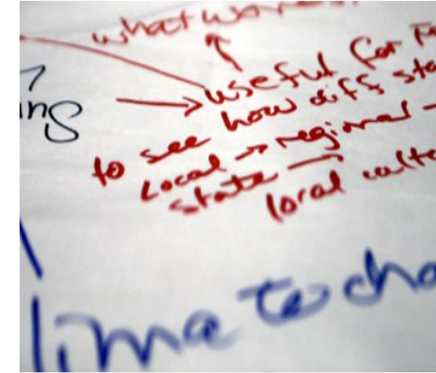
Increases
ability to
cope

Monitoring



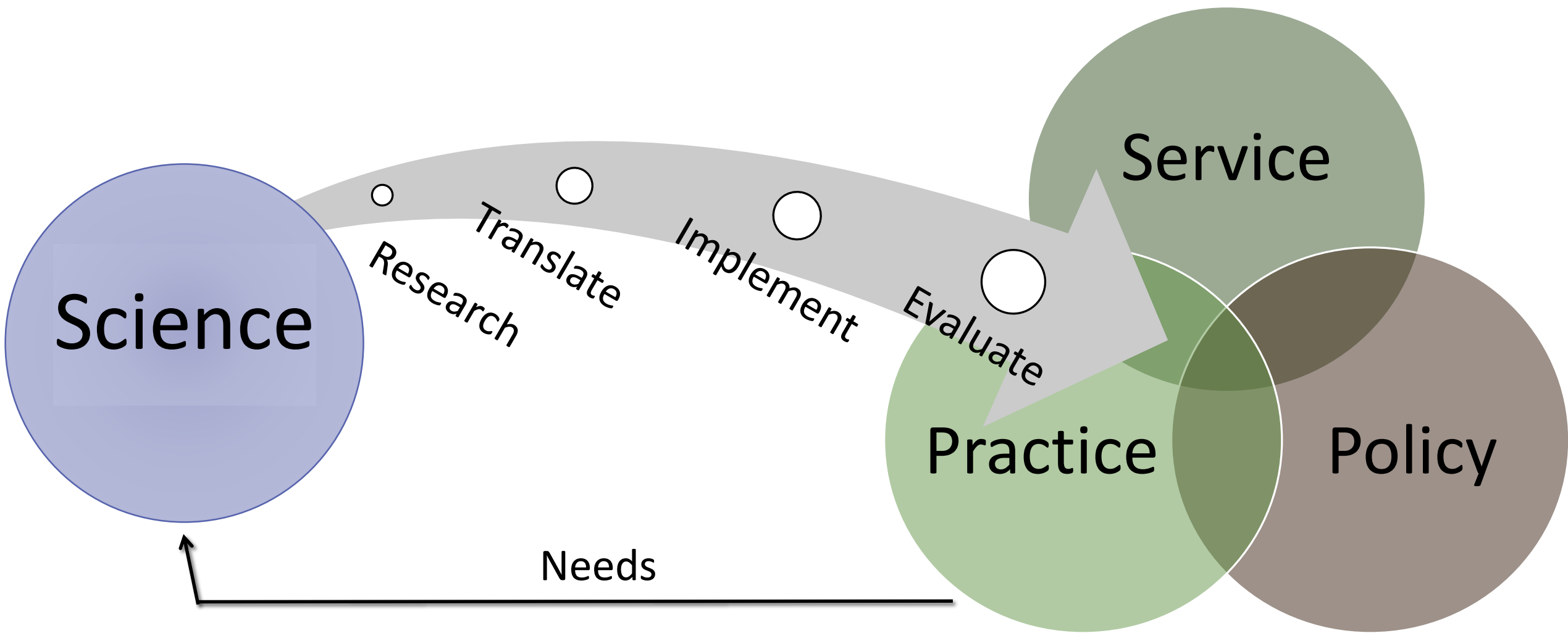
Provides the
foundation
for proactive
management

Education



Helps
translate
science into
practice

Help Build Drought Resilience



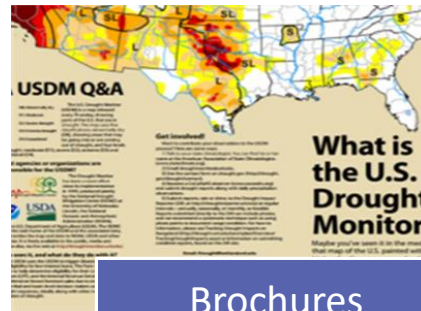
Science into Action



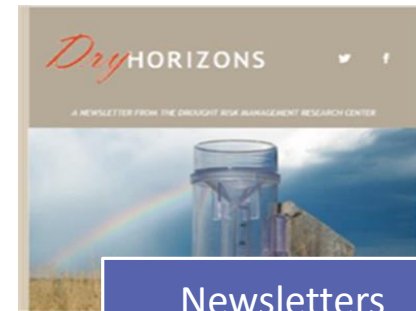
Invited Talks



Displays



Brochures



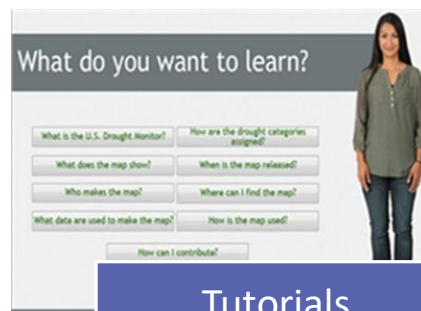
Newsletters



Training Workshops



Webinars



Tutorials



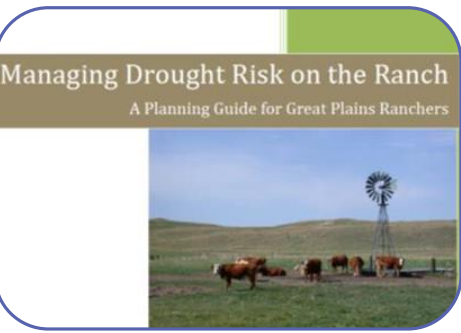
Games



Kid's Activities

Education & Outreach

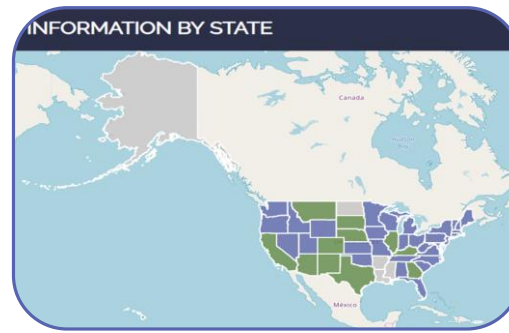
Managing Drought Risk on the Ranch



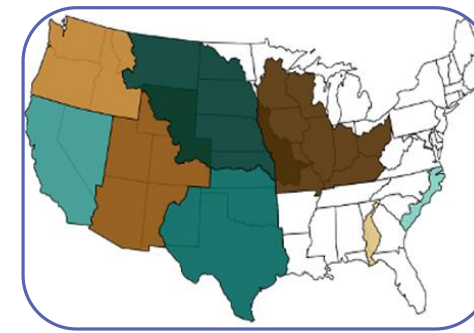
Drought Ready Communities



State Drought Plans



Regional Drought Early Warning Systems



NDMC International Activities



Individual

Local

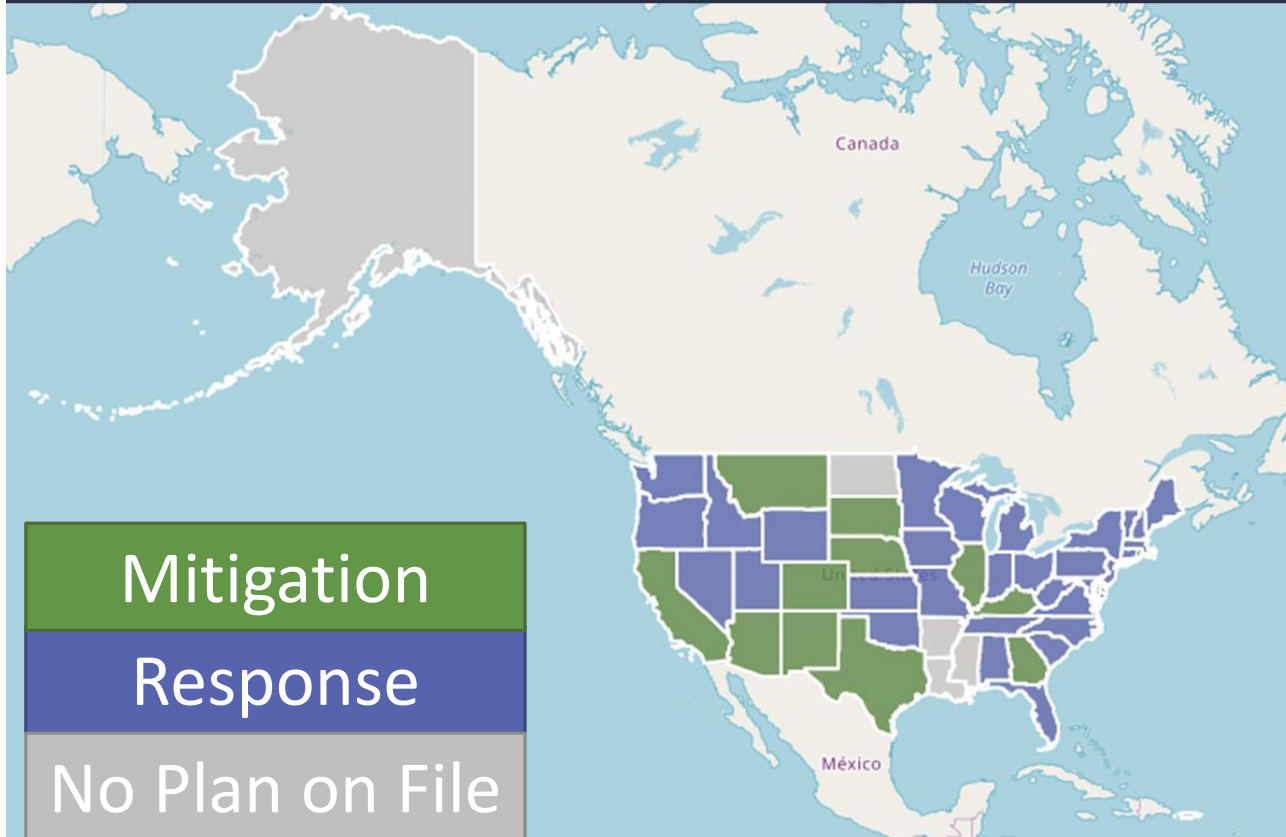
State

Regional

International

Planning information & resources at all scales

INFORMATION BY STATE



Contacts

John Dunker
 Alaska Department of Natural Resources
 (907) 965-2533
 John_Dunker@dnr.state.ak.us

Gary Prokosch
 Alaska Department of Natural Resources
 (907) 269-8645
 gary.prokosch@alaska.gov

State Climatologist

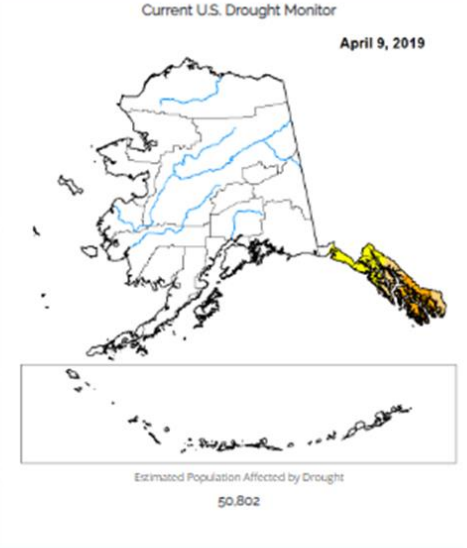
Peter Olsson
 Alaska State Climate Center
 (907) 474-7885
 olsson@aefc.uas.alaska.edu

Lead Agency

Alaska Department of Natural Resources

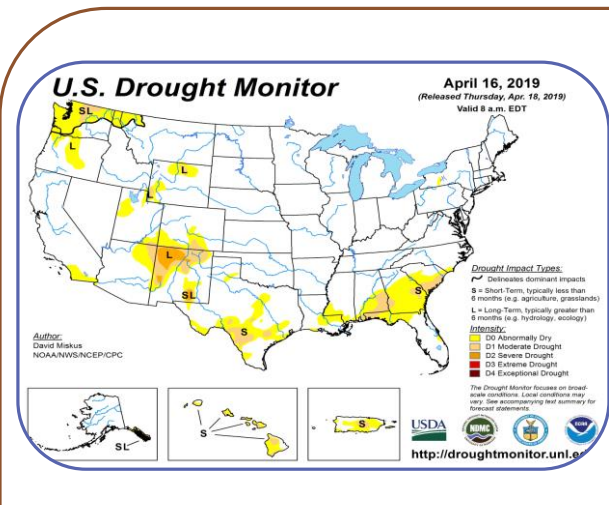
State Drought Websites

No websites on file

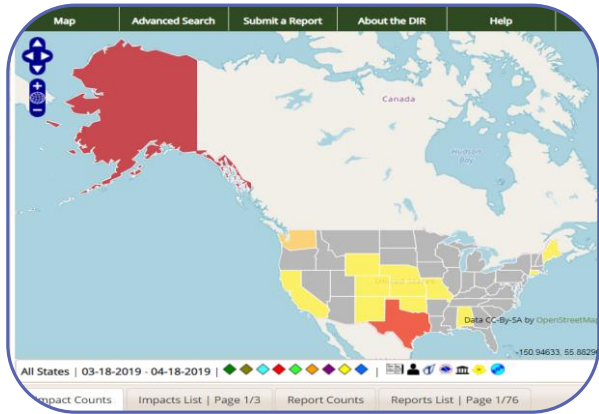


STATE PLANS		
Drought Plan	General Hazard Plan	Water Plan
No current plan on file	State of Alaska Hazard Mitigation Plan Released in 2018 Alaska Division of Homeland Security and Emergency Management	Alaska Water Resources Program Released in 2018 Alaska Department of Natural Resources
Climate Plan		
No current plan on file		

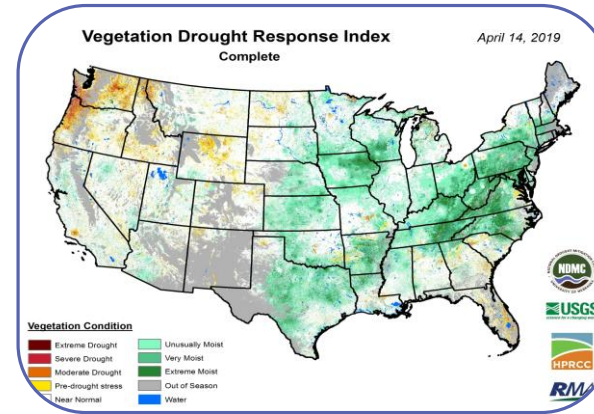
Drought Plan Status



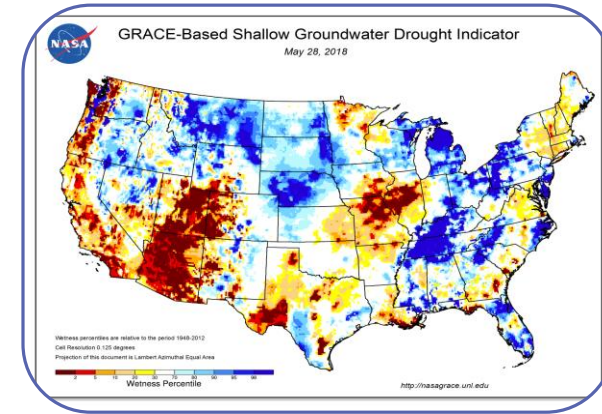
U.S. Drought Monitor



Drought Impact Reporter



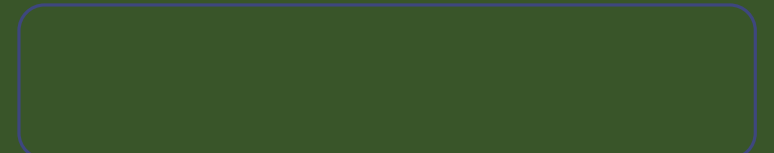
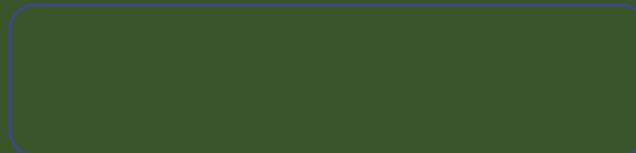
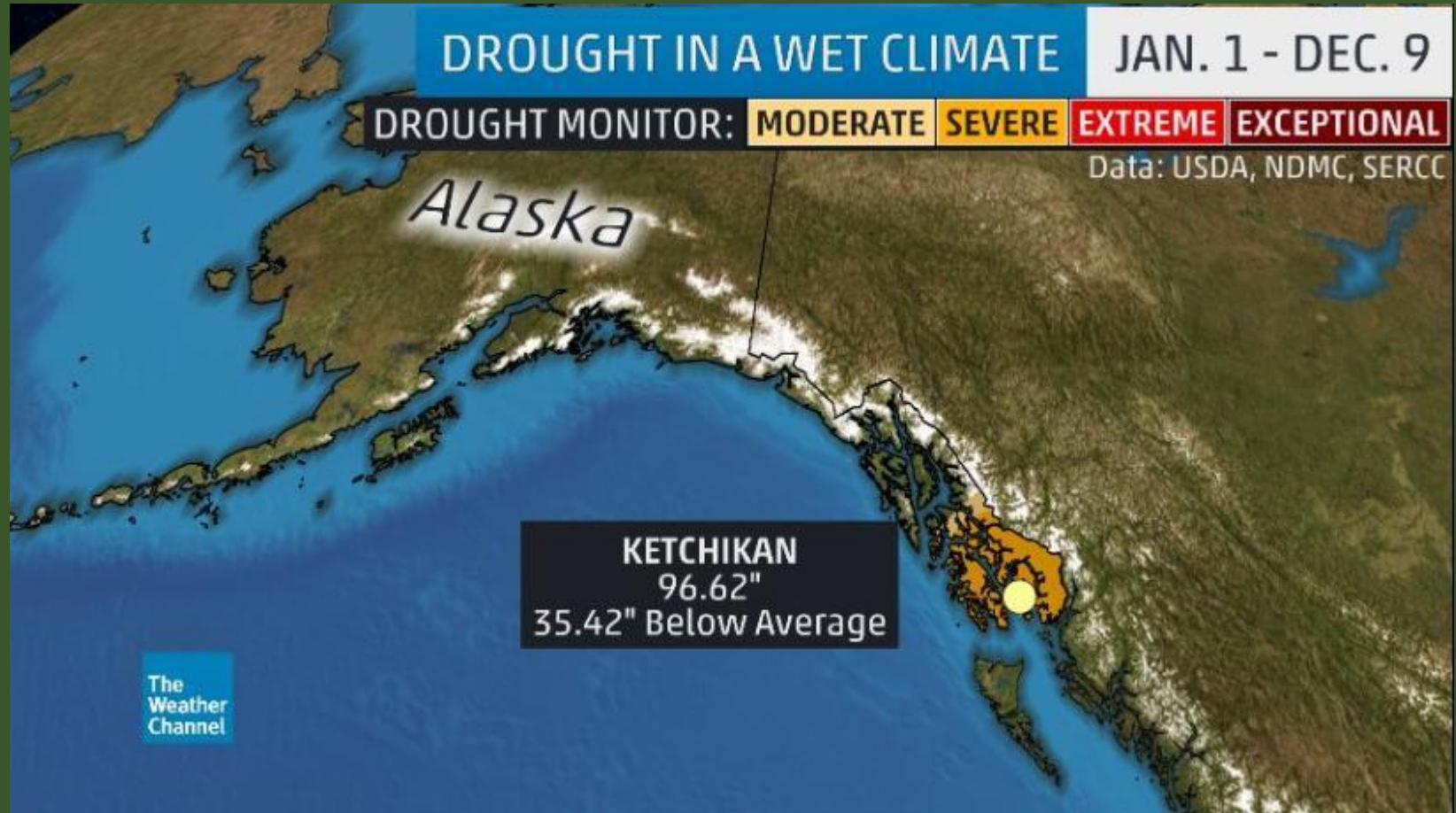
VegDRI & Quick DRI



Satellite-based Groundwater & Soil Moisture

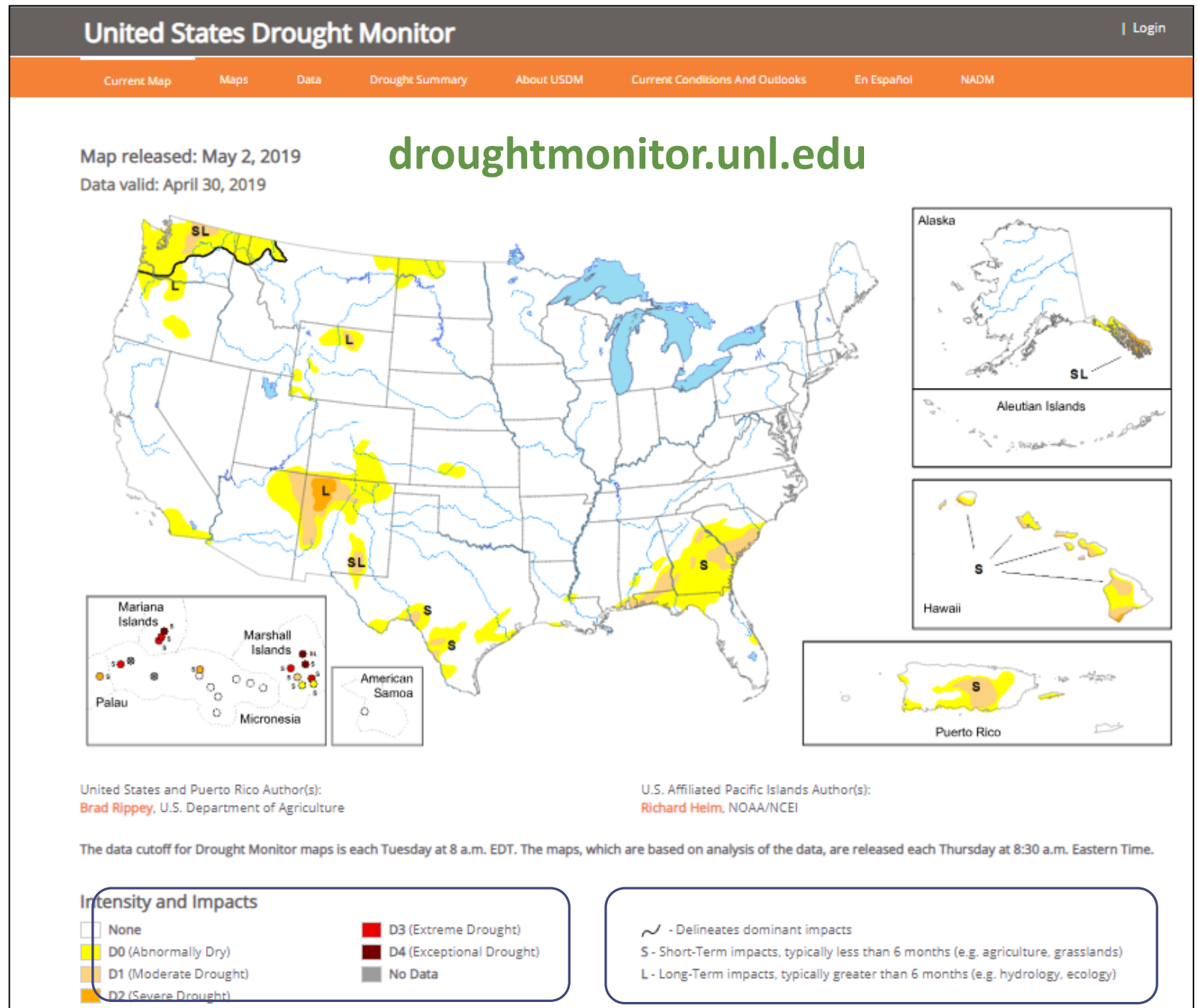
Monitoring tools to assess conditions & trigger action

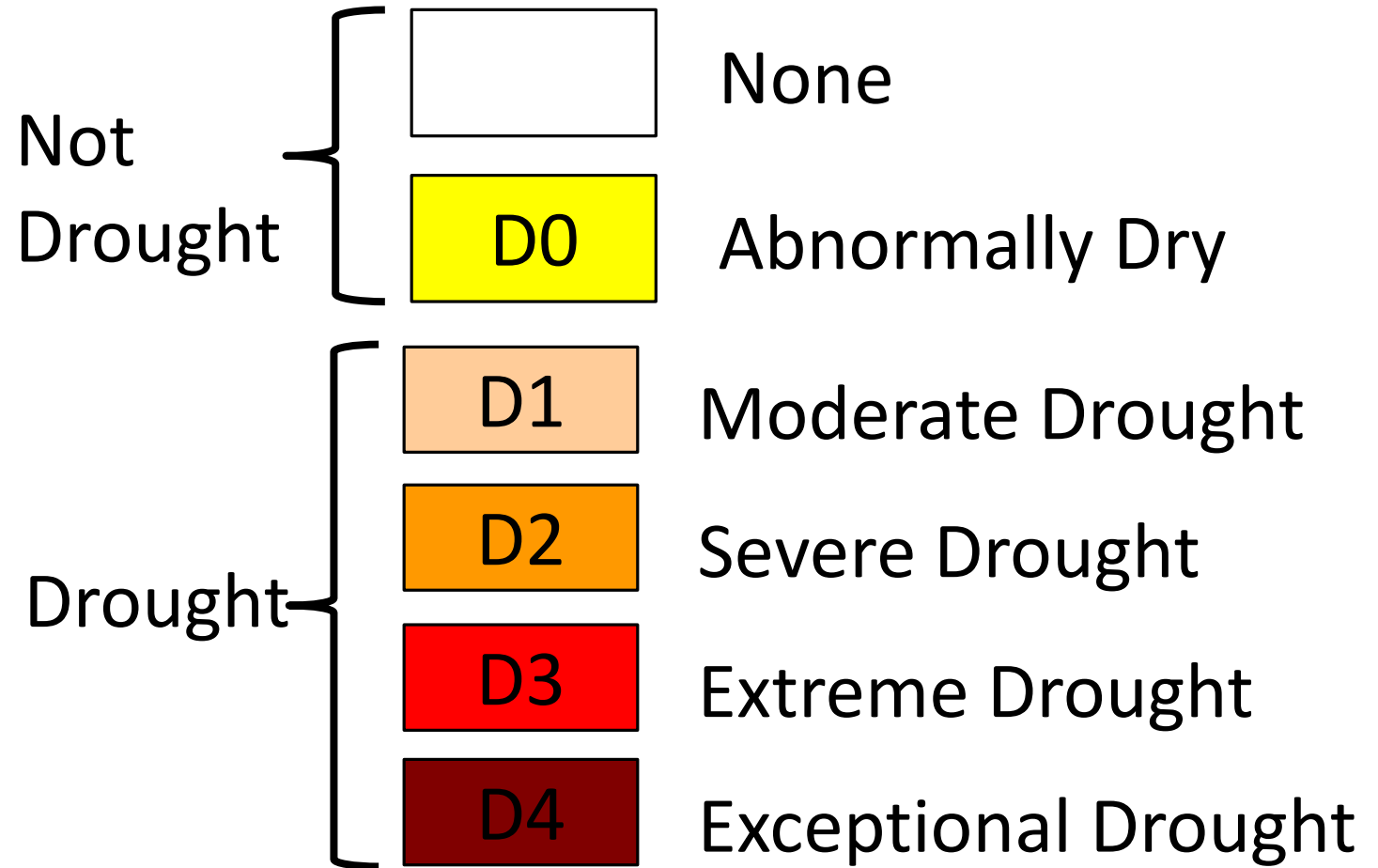
The U.S. Drought Monitor (USDM)



Takeaway #1

The map synthesizes a lot of information.

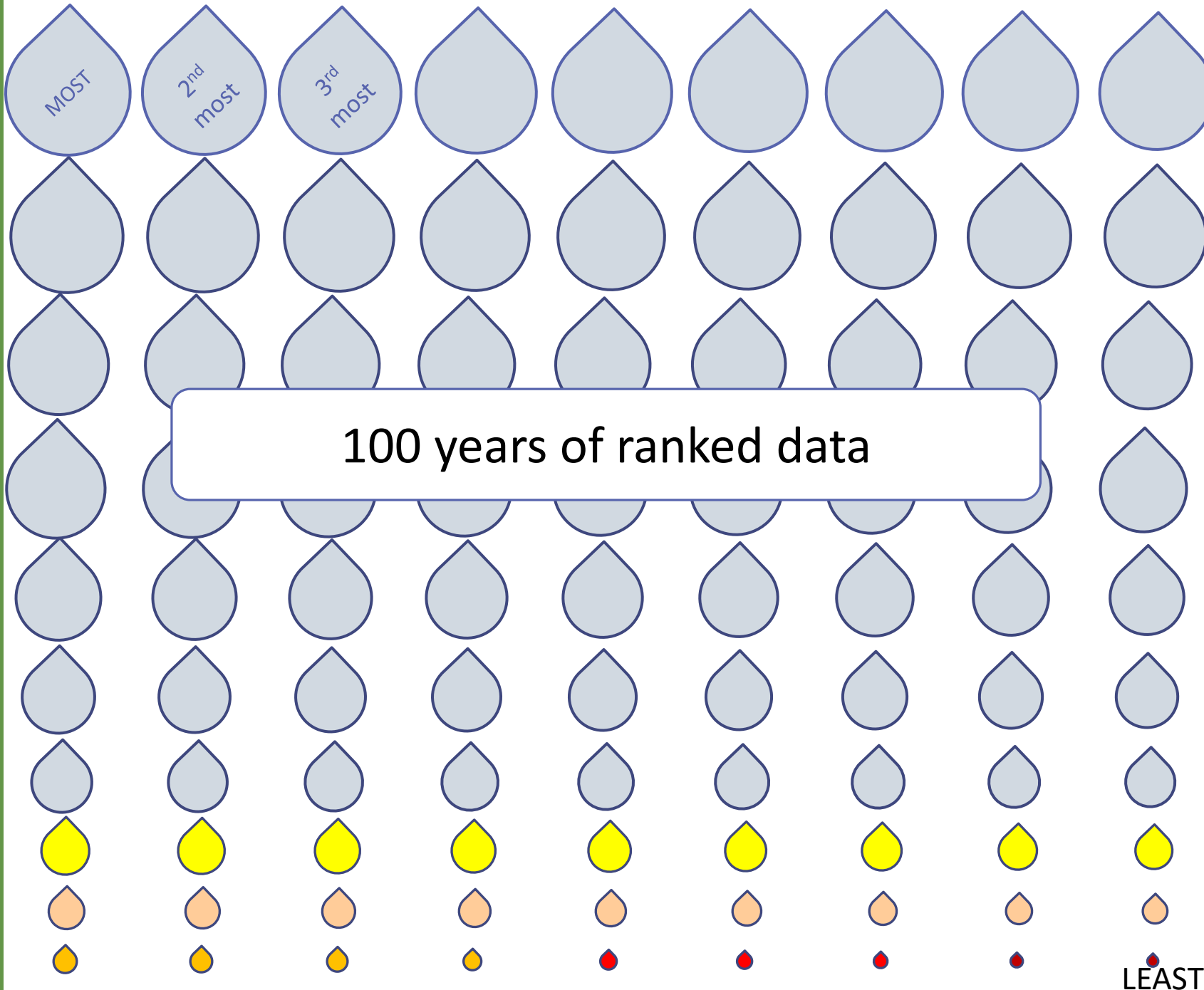




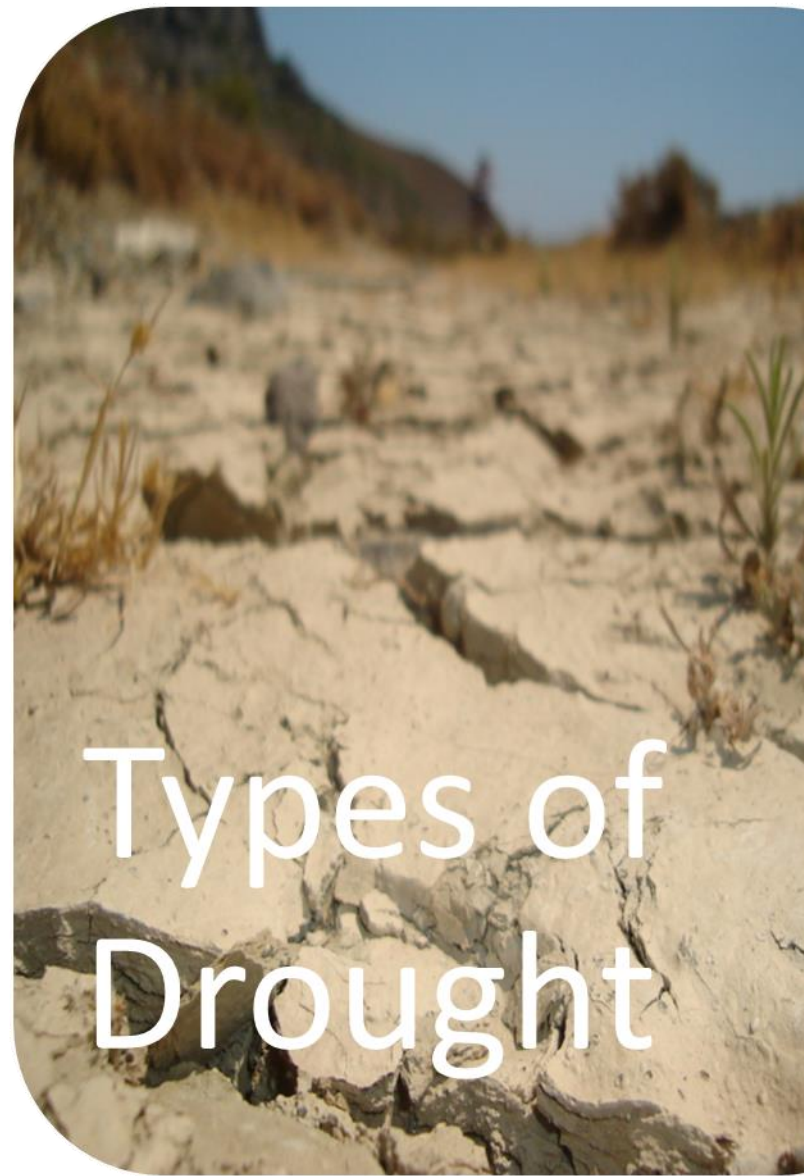
Map colors indicate drought intensity

Intensity is based on historical likelihood

			Percentile
Yellow	D0	Abnormally Dry	21-30
Light Orange	D1	Moderate Drought	11-20
Orange	D2	Severe Drought	6-10
Red	D3	Extreme Drought	3 - 5
Dark Red	D4	Exceptional Drought	1 - 2



Map strives to represent different perspectives



Types of Drought



Meteorological



Agricultural



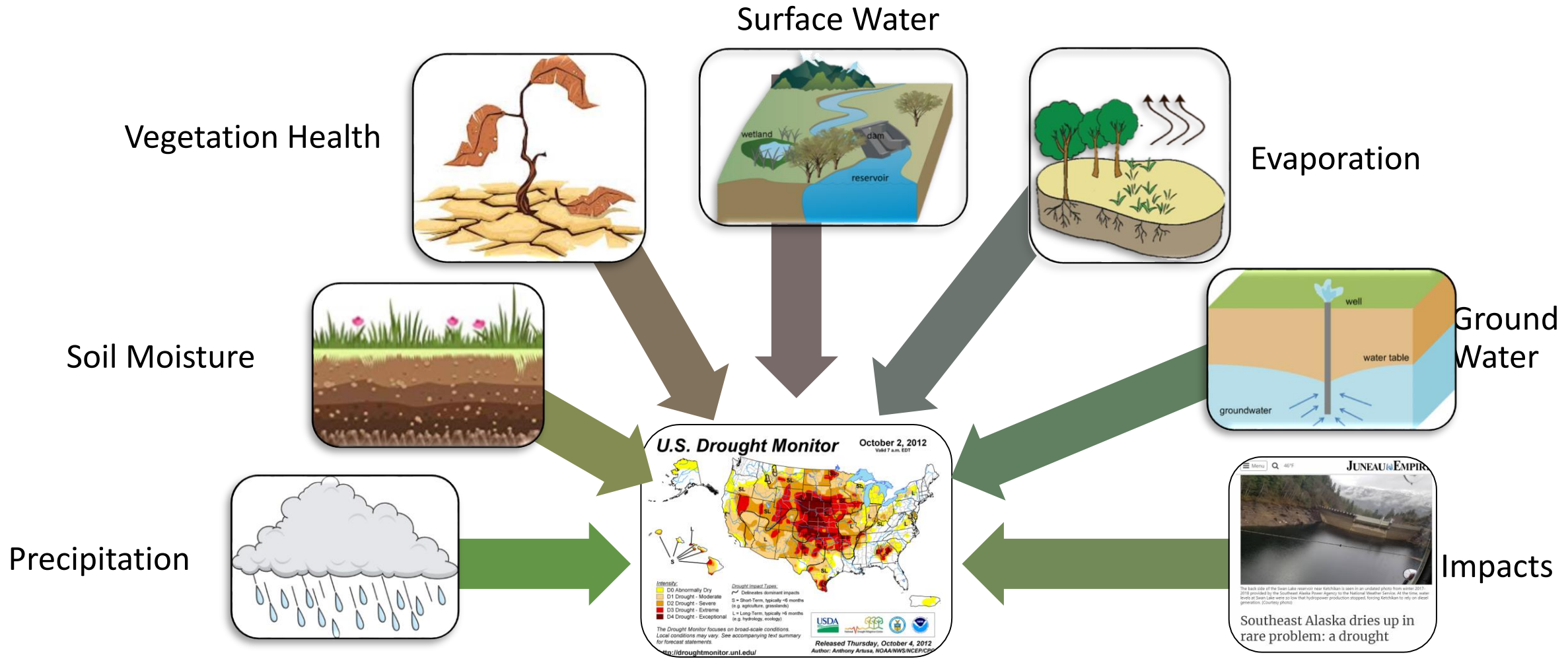
Hydrological



Ecological



Socio-economic



Perspectives captured by incorporating multiple types of data



S = short term
typically < 6 months

separates
drought
timescales

L = long term,
typically > 6 months

Map depicts short- and long-term conditions



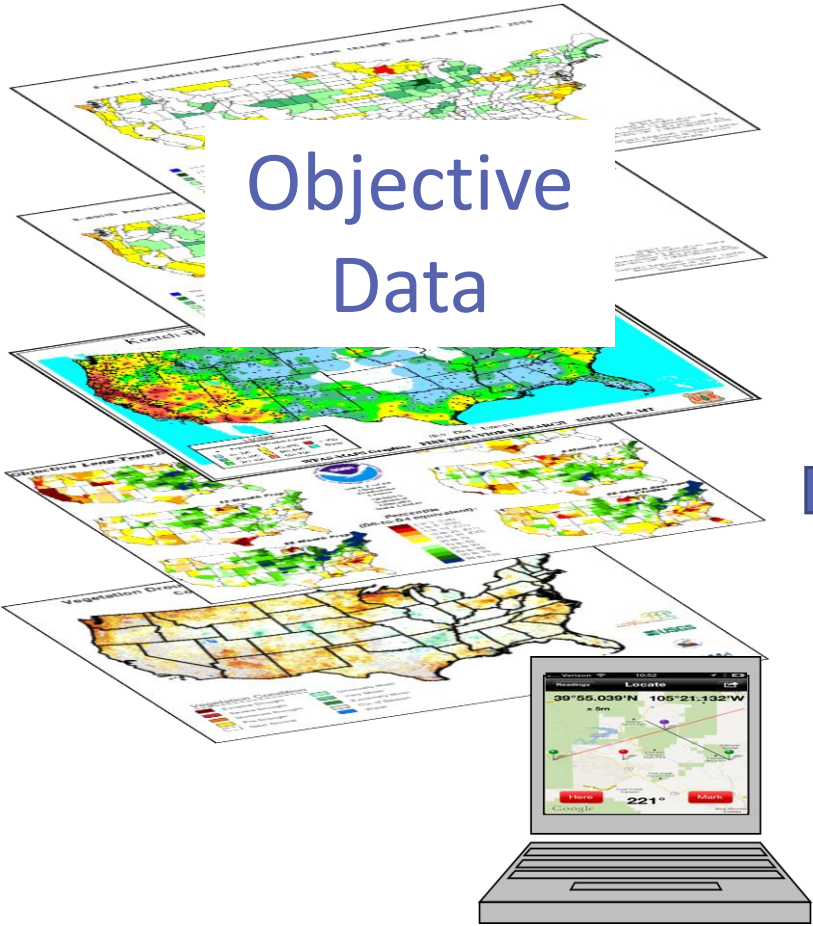
Monthly

Seasonal

Inter-annual

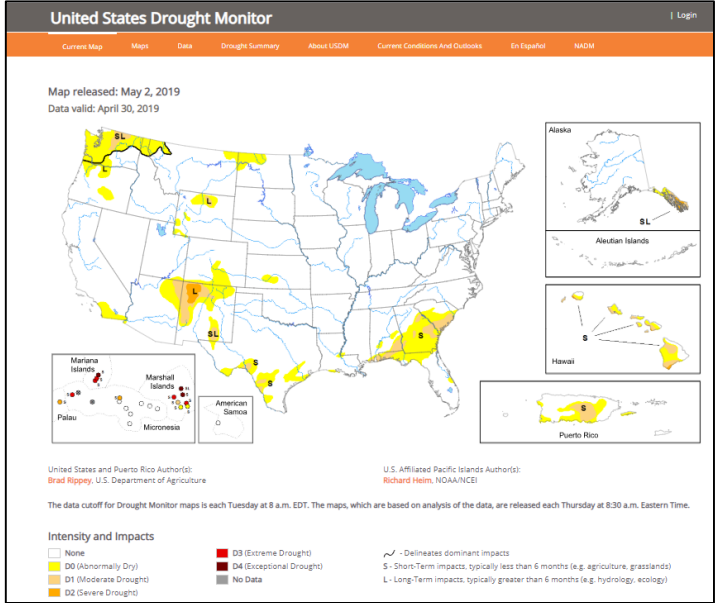
Category	Description	Possible Impacts
D0	Abnormally	Going into drought; short-term dryness slowing planting, growth of crops or pastures. Coming out of drought; some lingering water deficits; slowly recovered
D1		
D2		
D3	Extreme Drought	Major crop/pasture losses; widespread water shortages or restrictions
D4	Exceptional Drought	Exceptional and widespread crop/pasture losses; shortages of water in reservoirs, streams, and wells creating water emergencies

Length evaluated by examining a range of timescales



Objective
Data

Subjective
Expertise



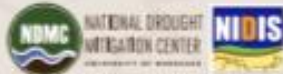
Map results from a convergence of evidence

Takeaway #2

The map is a participatory process

THE U.S. DROUGHT MONITOR NETWORK IMPROVING DROUGHT EARLY WARNING


Based on a survey of the network by the National Drought Mitigation Center, with funding by the National Integrated Drought Information System.



The network in action

This is a conceptual illustration of how the network of 425+ observers gathers and reports climate information and inputs to authors of the U.S. Drought Monitor map and revises each week. Observers are in all 50 states and Puerto Rico, a U.S. territory, and they use input from local stakeholders (represented by yellow dots) in their recommendations to the author.


✂ Network of observers ● Stakeholders ★ Author location ★ USDM operational home



HOW DOES IT WORK?

1 Observers get a working copy of the week's drought map with proposed category changes based on drought indicators by Monday of each week. They provide feedback on its accuracy, and their suggestions are reviewed and if verified are incorporated into the finalized map, released on Thursdays.

Do observers consult stakeholders about conditions?




WHO CREATES THE MAP?

2 Authors are from the National Drought Mitigation Center, U.S. Department of Agriculture, National Oceanic and Atmospheric Administration, National Centers for Environmental Information, Western Regional Climate Center, and Climate Prediction Center.

How many hours do observers spend gathering local input?


When area is experiencing severe or worse drought

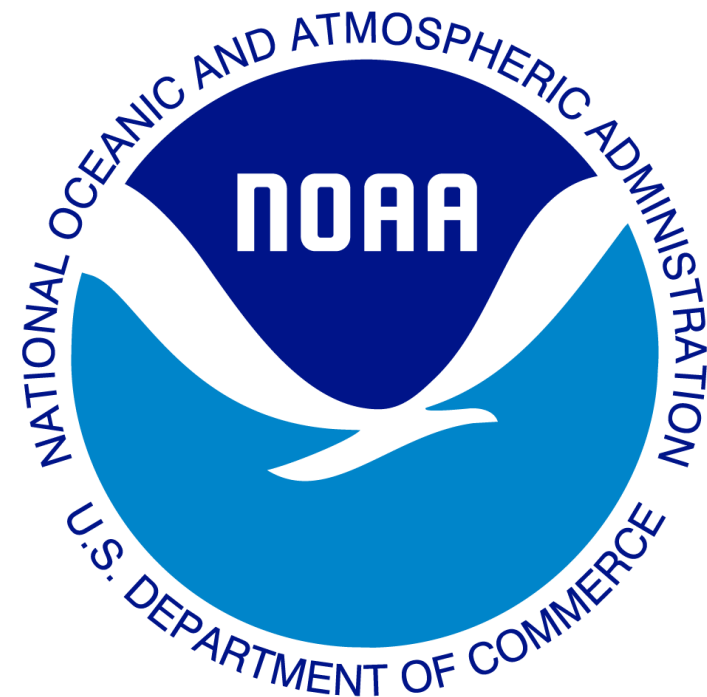


Want to know more? Email droughtmonitor@ndmc.edu

The final product

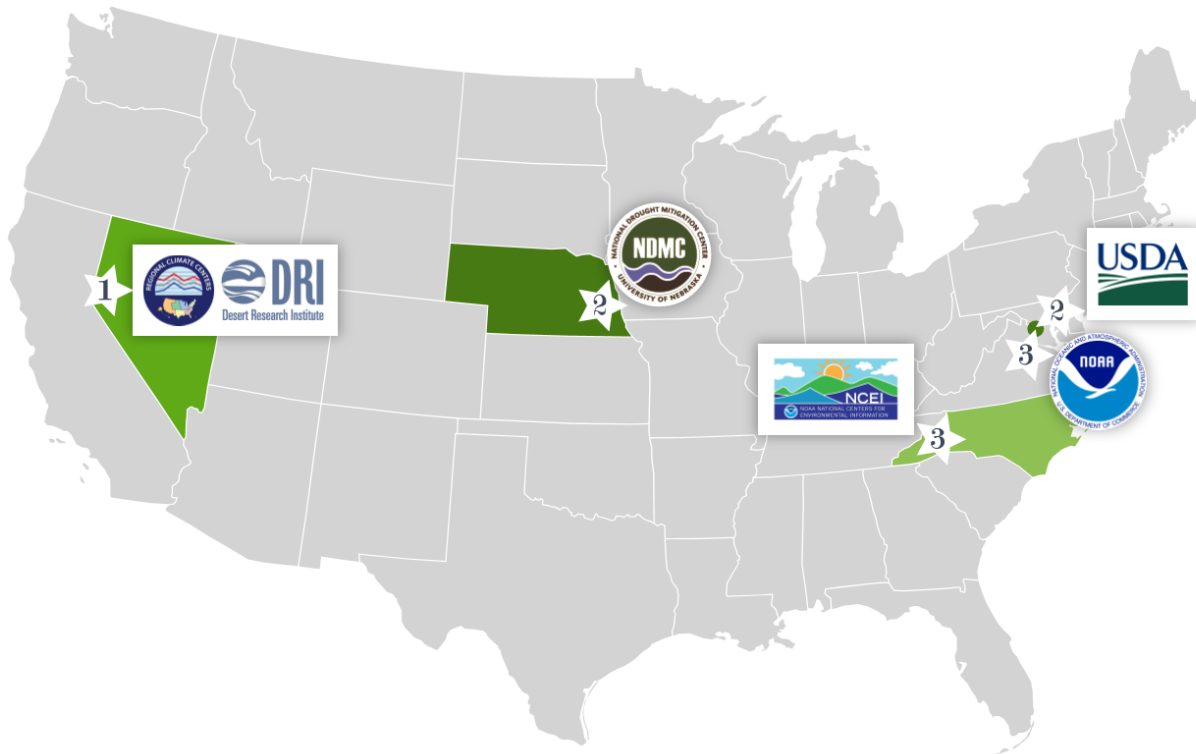
The U.S. Drought Monitor map is released weekly and is available at: droughtmonitor.noaa.gov



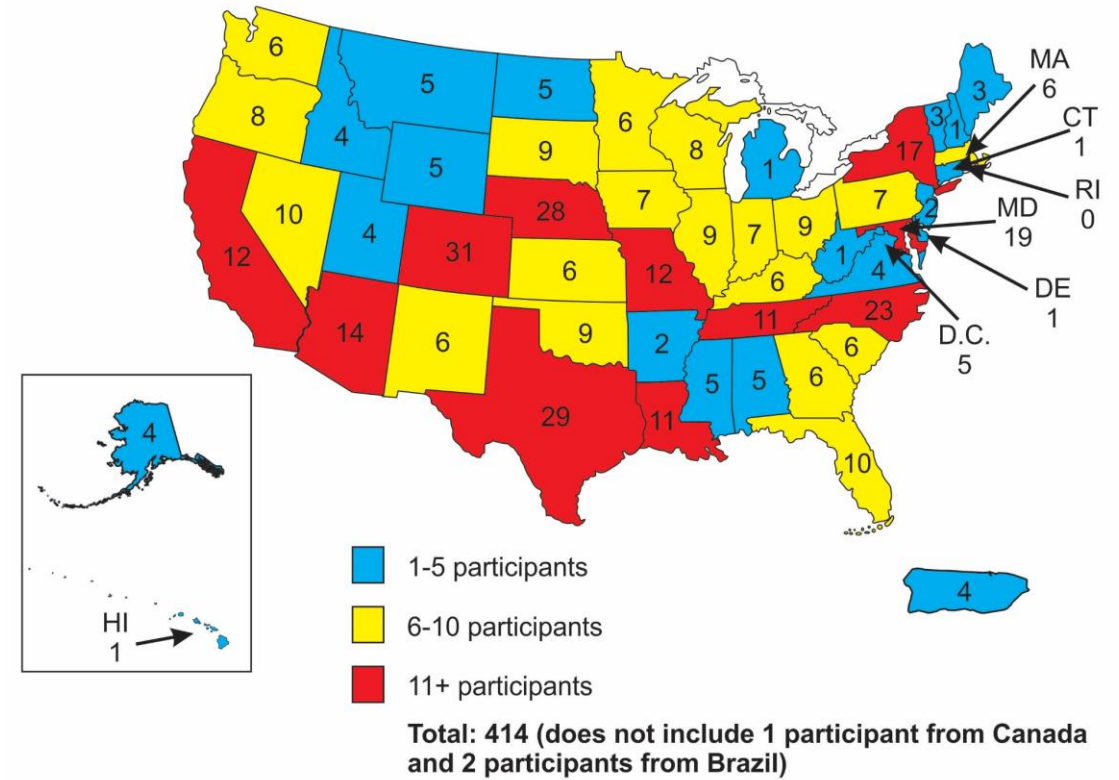


Partners collaborate on map standards & methodology

USDM Authors



Local Experts



Authors interpret data & involve local experts in discussion

Condition Monitoring



cocorahs.org

2019 Survey

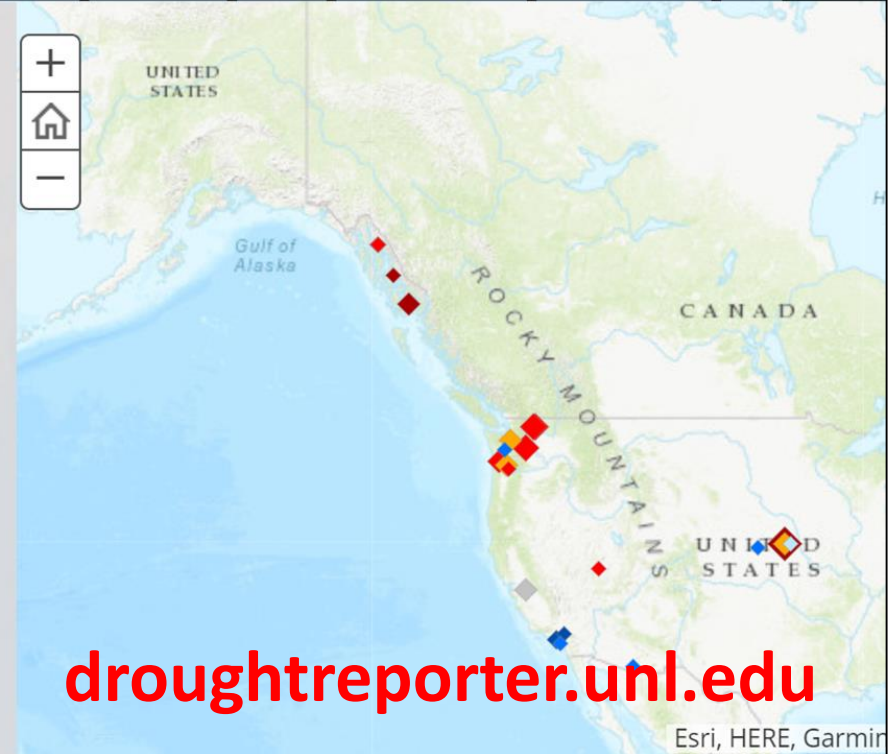
A Story Map

Overview Crop Production Livestock Production Water Supply Habitat Recreation/Tourism Business/Industry

Legend

How dry or wet is it?

- ◆ Severely Dry
- ◆ Moderately Dry
- ◆ Mildly Dry
- ◆ Near Normal
- ◆ Mildly Wet
- ◆ Moderately Wet
- ◆ Severely Wet



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The public reports impacts to provide information on the effects of drought

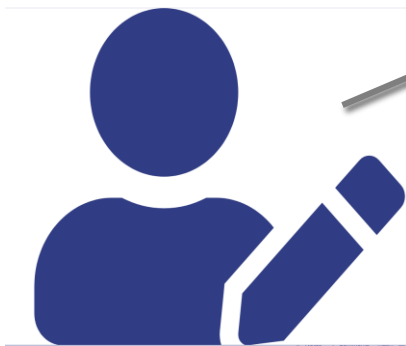
USDM

Convergence of Evidence

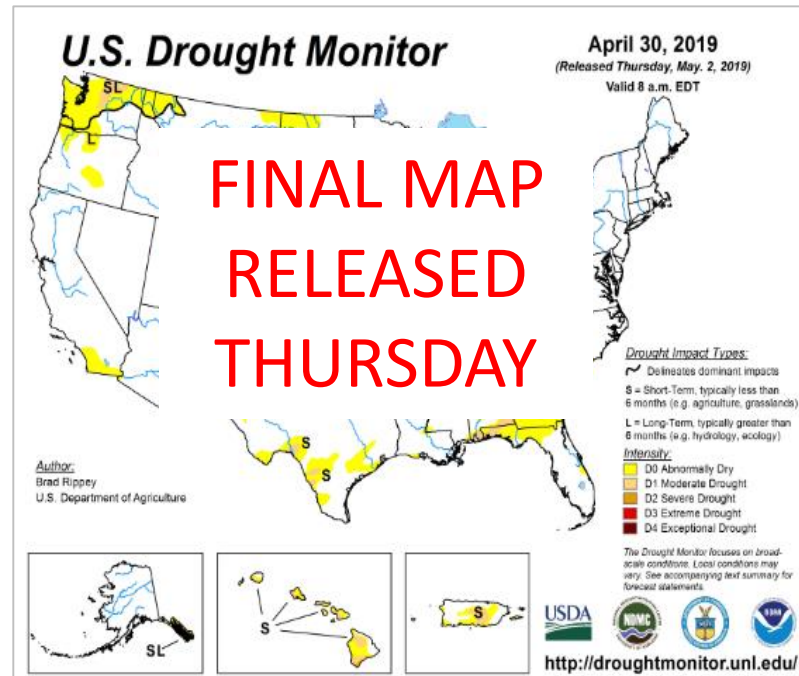
Objective data



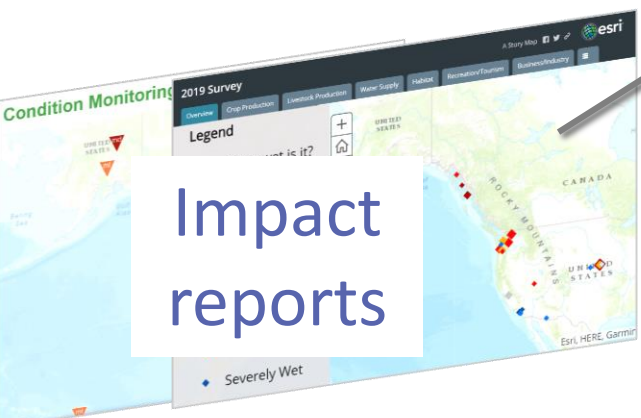
Author



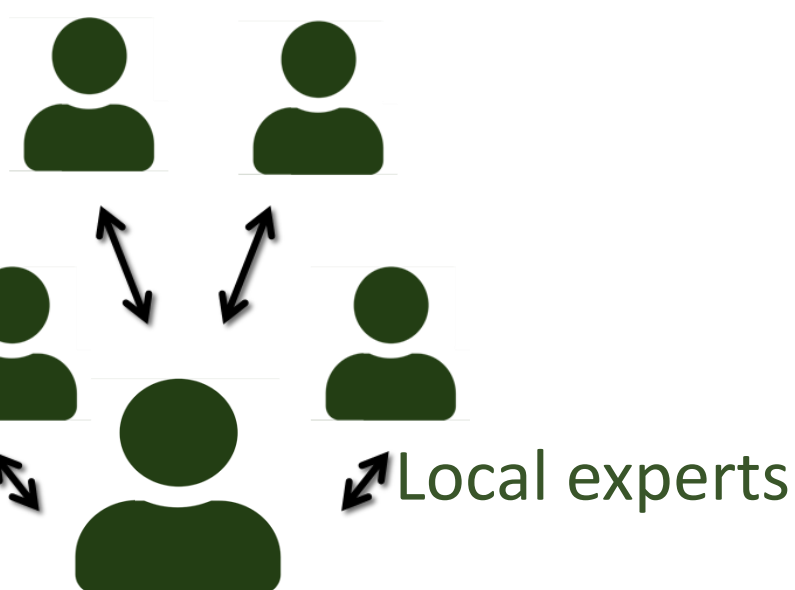
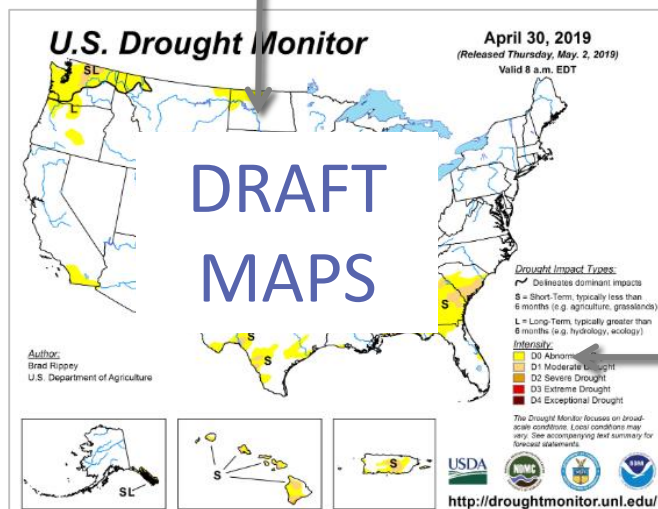
FINAL MAP
RELEASED
THURSDAY

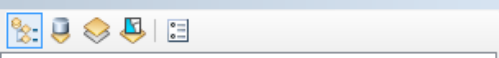


Impact reports



DRAFT
MAPS

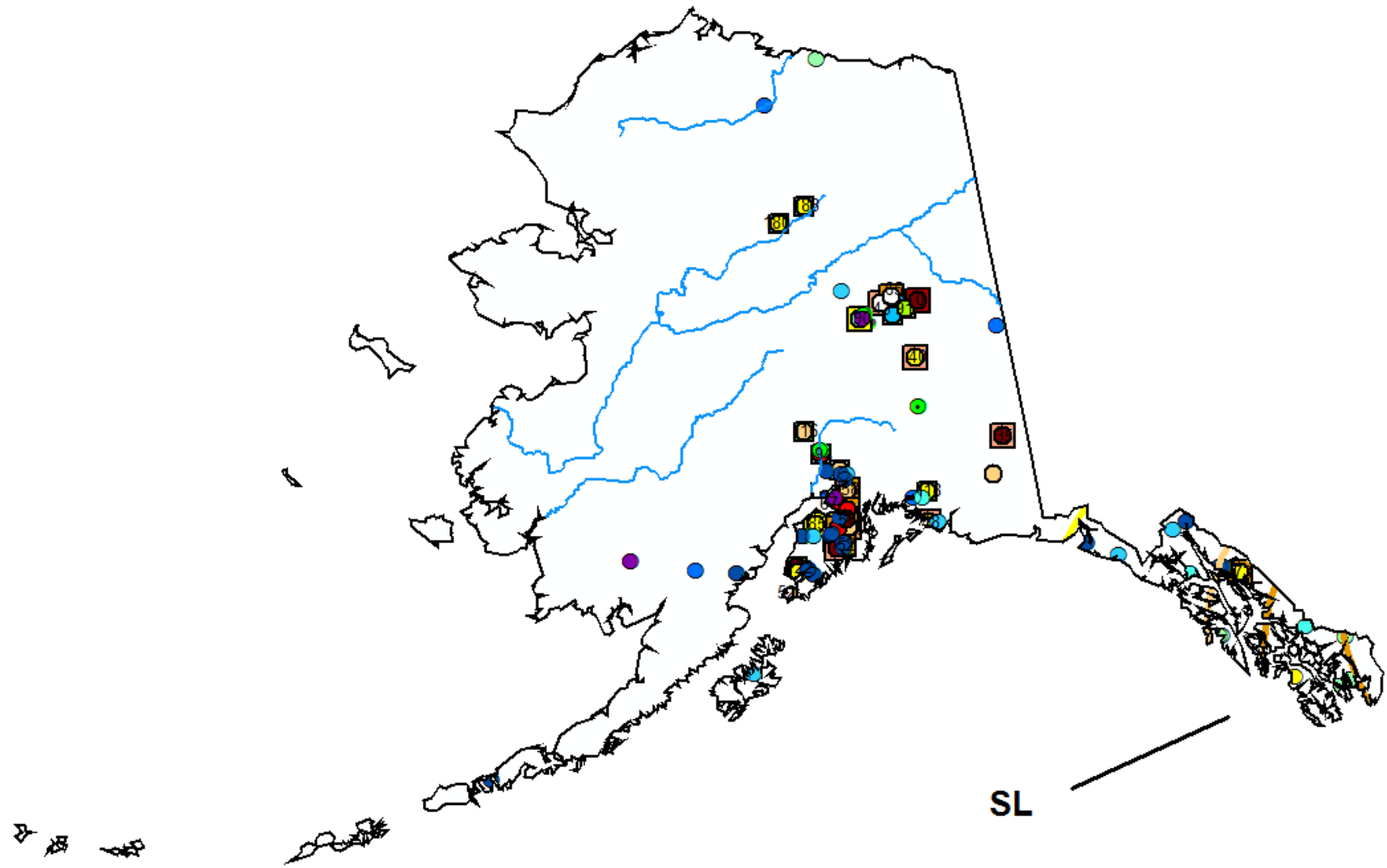




- Alaska
 - Rivers Alaska
 - Alaska
 - Impact-S-L
 - Impact-LinePointers
 - Alaska Mask
 - USDM EDIT
 - DM OLD
 - AHPS Precipitation (Alaska)
 - O O O USGS Streamflow Pctiles
 - COCORAHS Condition Reports
 - DFPPM_4WK_current.tif
 - GFS
 - NRCS
 - Well Data
 - RADAR BEAM MASK
 - Alaska Shaded Relief
- Hawaii
- Puerto Rico
- CONUS

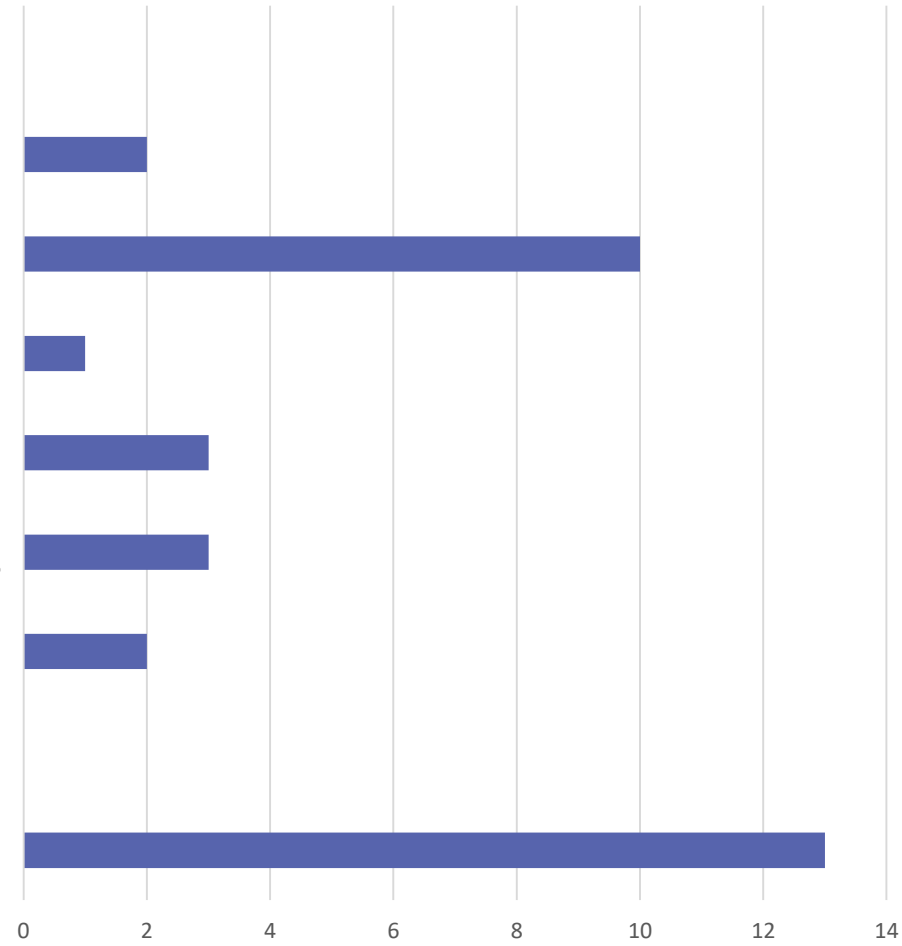


GIS Layers for Alaska



SE AK Drought Impacts

Agriculture
Business and industry
Energy
Fire
Plants & Wildlife
Relief, Response, &...
Society & Public Health
Tourism & Recreation
Water Supply & Quality



Air quality affected by diesel power generation in southeast Alaska

Dates of Impact: 2019-04-04 to unknown
Affected Area(s): Ketchikan Gateway Borough, AK, Ketchikan, AK, Wrangell-Petersburg Census Area, AK, Petersburg, AK, Wrangell, AK

Higher than normal fire activity near Juneau, Alaska

Dates of Impact: 2019-04-01 to unknown
Affected Area(s): Juneau City and Borough, AK, Juneau, AK

Public emergency, more diesel generators in Ketchikan, Alaska

Dates of Impact: 2019-03-21 to unknown
Affected Area(s): Ketchikan Gateway Borough, AK, Ketchikan, AK

Diesel surcharge delayed implementation of electric rate increase in Ketchikan, Alaska

Dates of Impact: 2019-03-07 to 2019-10-01
Affected Area(s): Ketchikan Gateway Borough, AK, Ketchikan, AK

Low water supplies threaten hatchery near Petersburg, Alaska

Dates of Impact: 2019-03-02 to 2019-04-21
Affected Area(s): Wrangell-Petersburg Census Area, AK, Petersburg, AK

Diesel replacing hydropower in several Alaska cities

Dates of Impact: 2019-02-28 to 2019-03-29
Affected Area(s): Ketchikan Gateway Borough, AK, Ketchikan, AK, Wrangell-Petersburg Census Area, AK, Petersburg, AK, Wrangell, AK

Reservoir water too warm for salmon fry in Juneau, Alaska

Dates of Impact: 2019-01-15 to 2019-03-02
Affected Area(s): Juneau City and Borough, AK, Juneau, AK

Higher electricity rates in Juneau, Alaska

Dates of Impact: 2018-12-17 to 2019-06-30
Affected Area(s): Juneau City and Borough, AK, Juneau, AK

Drought impacts in southeast Alaska

Dates of Impact: 2018-10-08 to 2018-10-11
Affected Area(s): Prince of Wales-Outer Ketchikan Census Area, AK, Metlakatla, AK

Surplus power interrupted in Juneau, Alaska

Dates of Impact: 2018-09-28 to 2019-04-01
Affected Area(s): Juneau City and Borough, AK, Juneau, AK

Ketchikan, Alaska relying on diesel powered generators, hydropower

Dates of Impact: 2018-08-31 to 2019-04-15
Affected Area(s): Ketchikan Gateway Borough, AK, Ketchikan, AK

Alternate energy source in use on Prince of Wales Island, Alaska

Dates of Impact: 2018-07-26 to unknown
Affected Area(s): Prince of Wales-Outer Ketchikan Census Area, AK

Metlakatla, Alaska relying on alternate power source

Dates of Impact: 2018-01-01 to 2018-12-07
Affected Area(s): Prince of Wales-Outer Ketchikan Census Area, AK, Metlakatla, AK

Dry weather impeding hydropower production in Ketchikan, Alaska

Dates of Impact: 2016-12-29 to unknown
Affected Area(s): Ketchikan Gateway Borough, AK, Ketchikan, AK, Wrangell-Petersburg Census Area, AK, Petersburg, AK

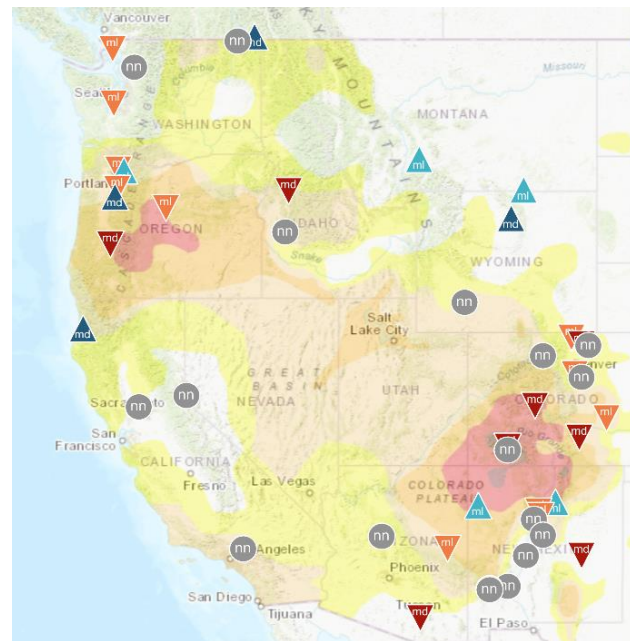
Providing Input into the USDM

LOCAL CONTACTS

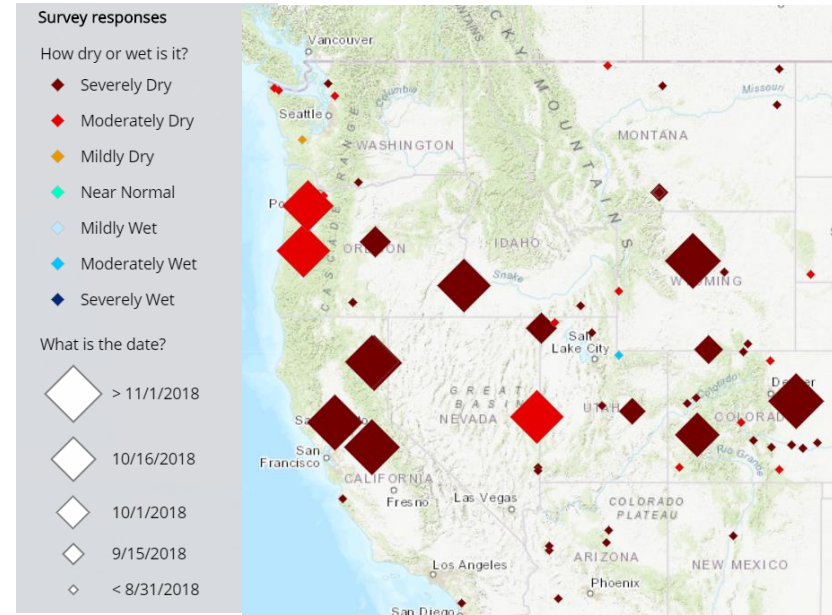
- Join the USDM listserv
- Contact Aaron Jacobs



cocorahs.org

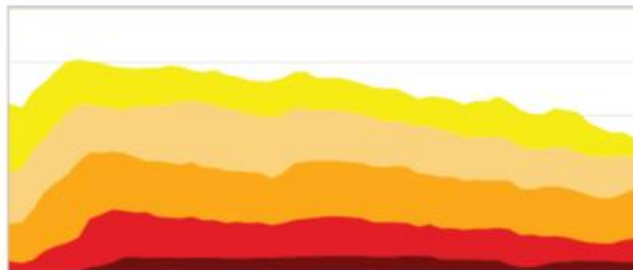


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Takeway #3

It's more than just a map



Time Series

View a graph of the U.S. Drought Monitor statistics for a chosen area.

Week	Name	D0-D4	D1-D4	D2-D4	D3-D4	D4
2017-06-06	82.04	16.96	7.80	1.23	0.50	0.00
2017-05-30	81.09	18.31	5.28	1.12	0.28	0.00
2017-05-23	85.73	14.27	4.92	1.23	0.41	0.00
2017-05-16	82.42	16.58	5.01	1.39	0.43	0.00
2017-05-09	84.99	15.11	5.71	1.30	0.18	0.00
2017-05-02	85.94	14.31	4.90	1.30	0.13	0.00
2017-04-25	78.33	21.67	6.11	1.07	0.33	0.00
2017-04-18	73.04	26.96	6.30	1.44	0.00	0.00
2017-04-11	72.01	26.99	5.17	1.44	0.00	0.00
2017-04-04	70.27	29.73	6.63	1.30	0.10	0.00
2017-03-28	64.47	35.59	14.20	2.62	0.21	0.00
2017-03-21	63.78	36.32	15.87	3.74	0.43	0.00

Tabular Data Archive

View the U.S. Drought Monitor data in tabular format for a selected area.



GIS Data Files

Get GIS data files for each week including shapefiles, kmz, wms and more.

2017-06-06	82.04	16.96	7.80	1.23	0.50	0.00
2017-05-30	81.09	18.31	5.28	1.12	0.28	0.00
2017-05-23	85.73	14.27	4.92	1.23	0.41	0.00
2017-05-16	82.42	16.58	5.01	1.39	0.43	0.00
2017-05-09	84.99	15.11	5.71	1.30	0.18	0.00
2017-05-02	85.94	14.31	4.90	1.30	0.13	0.00
2017-04-25	78.33	21.67	6.11	1.07	0.33	0.00
2017-04-18	73.04	26.96	6.30	1.44	0.00	0.00
2017-04-11	72.01	26.99	5.17	1.44	0.00	0.00
2017-04-04	70.27	29.73	6.63	1.30	0.10	0.00
2017-03-28	64.47	35.59	14.20	2.62	0.21	0.00
2017-03-21	63.78	36.32	15.87	3.74	0.43	0.00

Data Download

Download U.S. Drought Monitor statistics.



Metadata

Information about the GIS data and other U.S. Drought Monitor data file formats.



FSA Eligibility Tool

Tool to determine if an area qualifies for disaster payments from the Farm Service Agency.

A narrative explains any changes

This Week's Drought Summary

An active weather pattern maintained historically low drought coverage across the contiguous United States, with only a few areas currently experiencing dryness (D0) or moderate to severe drought (D1 to D2). Prior to April 2019, the record-low drought coverage across the Lower 48 States during the 20-year history of the U.S. Drought Monitor stood at 4.52% on May 23, 2017. During the drought-monitoring period ending on the morning of April 30, locally significant precipitation fell in dryness- and drought-affected areas across the Rockies, Intermountain West, northern Plains, and parts of the South. In contrast, little or no precipitation fell in the Far West and the southern Atlantic region.

Northeast

Neither dryness nor drought exists in the Northeast. In fact, significant topsoil moisture surpluses exist in much of the Northeast, according to the U.S. Department of Agriculture (USDA). On April 28, topsoil moisture was rated 100% surplus in Connecticut and 77% surplus in Massachusetts.

Southeast

Short-term dryness (D0) continued to worsen in portions of the southern Atlantic States. In addition, moderate drought (D1) expanded or developed in portions of Georgia and South Carolina. Parts of Florida are being monitored for possible introduction of D0. On April 28, the USDA rated topsoil moisture 37% very short to short in Florida and 27% very short to short in

week across southern Palau. This near-equatorial trough, convergence, and occasional trade-wind disturbances comprised the Inter-Tropical Convergence Zone (ITCZ). South of the equator, a surface trough persisted just south of the Samoan Islands; it occasionally meandered north to bring rain to American Samoa. Satellite-based estimates of 7-day precipitation (QPE) showed the ITCZ as a long band of 2+ inches of precipitation that stretched the length of the Pacific from west of the Date Line, across Micronesia, to Indonesia. Within this band, a large area of 4+ inches of rain was indicated over the USAP mostly south of 7 degrees N latitude. Over Palau and Yap State, the band was limited mostly to about 4 to 7 N, but extended to about 2 degrees N over the eastern Federated States of Micronesia (FSM) and the Marshall Islands (MI), and to near the equator over Chuuk and Pohnpei States. North and south of this band, the QPE showed little to no precipitation. South of the equator, the QPE showed a large band of 2+ inches of rain over the eastern Samoan Islands and south and east of the islands, associated with the southern trough, with embedded areas of 4+ inches.

This week continued dry with less than half an inch of rain received at the regular-reporting stations, and the month was dry (less than the 4 inch monthly minimum needed to meet most water needs). Based on data available as of this writing, weekly rainfall amounts ranged from 0.24 inch at Saipan to 0.43 inch at Tinsan. A Red Flag Warning was issued for Guam on April 29 due to the dry weather coupled with windy conditions. Based on data received so far, Guam recorded 1.96 inches of rain for March-April 2019, and this ranks as the third driest such 2-month period in the 63-year record. With 1.41 inches for April, 1.99 inches for March, and 2.84 inches for February, March's classification was upgraded to D3.5. Guam continued at D3.5 and

Alaska, Hawaii, and Puerto Rico

Southeastern Alaska's region of dryness (D0) and moderate to severe drought (D1 to D2) received mostly light precipitation. However, some heavy precipitation in southernmost Alaska resulted in some slight trimming in the coverage of D2. In Ketchikan, April rainfall totaled 13.73 inches (146% of normal).....

degradation in the condition of pastures and other vegetation. Meanwhile, parts of eastern Puerto Rico received heavy rain and experienced local flooding, necessitating a reduction in the coverage of dryness (D0) and moderate drought (D1). In contrast, D1 was expanded in portions of south-central Puerto Rico, where low aquifer levels were among several drought-related problems.

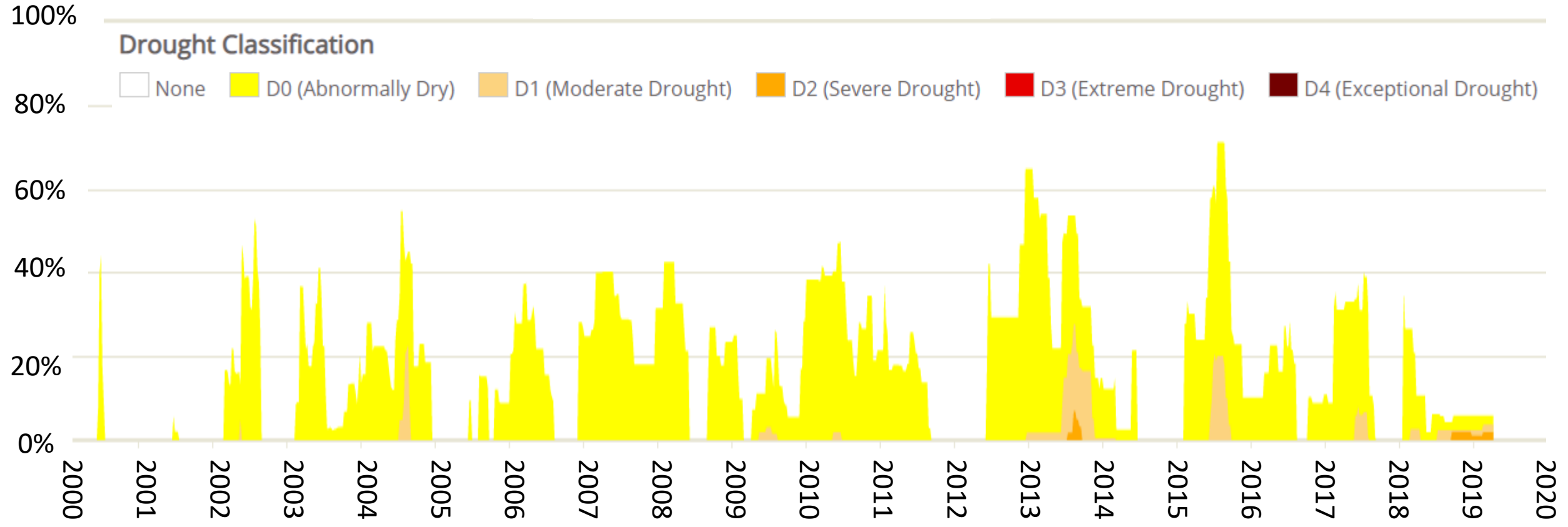
Pacific Islands

The overall weather pattern changed little during this USDM week (4/24/19-4/30/19). Dry trade winds blowing out of the North Pacific subtropical ridge (North Pacific High) inhibited precipitation across northern portions of Micronesia. As these faster trade winds encountered

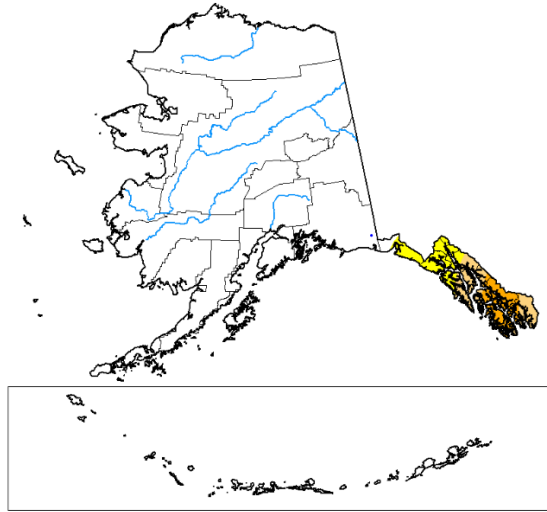
inches or more along an axis stretching from the southeastern Plains into the lower Great Lakes region. In contrast, areas west of the Rockies will experience mostly dry weather and a gradual warming trend. During the weekend, a new surge of cold air will arrive across the northern Plains and upper Midwest, accompanied by rain and snow showers.

The NWS 6- to 10-day outlook for May 7 - 11 calls for the likelihood of wetter-than-normal weather nearly nationwide. Below-normal precipitation should be limited to northern California and the Pacific Northwest. Meanwhile, warmer-than-normal conditions across the Southeast and the Far West should contrast with below-normal temperatures in most other regions, including a large area stretching from the Southwest into large sections of the Rockies, Plains, and upper Midwest.

Alaska Percent Area



Timeseries provides a history

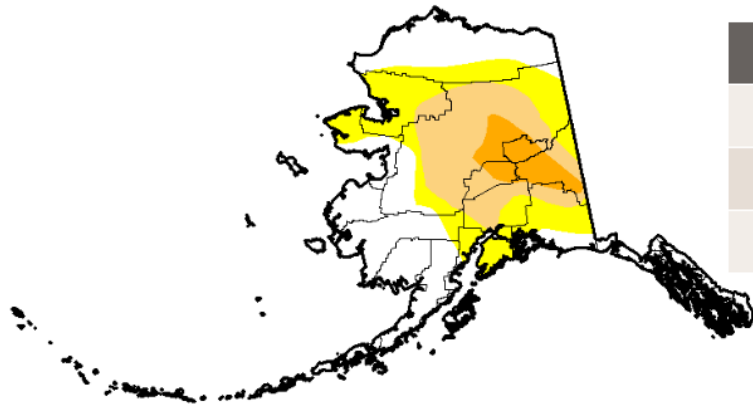


Percent Area

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
2019-04-30	94.17	5.83	3.74	1.69	0.00	0.00	11
2013-08-27	46.42	53.58	27.66	6.98	0.00	0.00	88
Change	-47.75	47.75	23.92	5.29	0.00	0.00	77

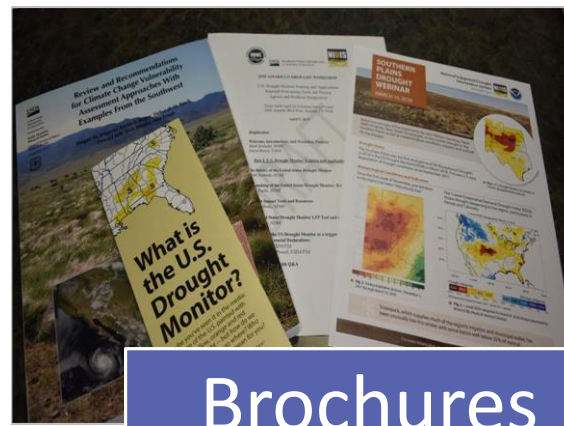
Population

Week	None	D0-D4	D1-D4	D2-D4	D3-D4	D4	DSCI
2019-04-30	620,589	68,104	50,802	12,624	0	0	11
2013-08-27	130,991	557,703	168,219	93,553	0	0	88
Change	-489598	489599	117417	80929	0	0	77





Tutorials



Brochures



Webinars



Media



Workshops

Additional information



Drought is a normal part of climate



No single agency is in charge of monitoring drought



USD is increasingly used for federal programs

Why participate?

The Local Process





Southeast Alaska Local Drought Monitor(DM) Contact: Aaron Jacobs



(Senior Service Hydrologist/Meteorologist NOAA National Weather Service in Juneau)

- Look at current and past rainfall/snow data (weekly/monthly)
- Determines if there are deficits for drought impacts.
- Reach out to community's hydro power companies for impacts.
- Reach out to ADF&G about fisheries issues.
- Search for news articles
- Make drought category(D0-D4) recommendations to DM author.
- ***HOW CAN YOU IMPROVE/HELP THIS PROCESS????***



How to improve SEAK drought impact reporting & What type of information is needed



- Use the **Drought Reporter** to pass on impacts.
- Send email to local DM contact
- Call local DM contact
- Reservoir levels compare to rule curve
- Water restrictions/conservation
- Use of diesel power (how much: intermittent/full time)
- Low stream flows
- Fisheries (Fish kills, hatcheries impacts, other?)
- Forest/ecology impacts
- Impacts from low snowpack (winter sports)



National Weather Service Weather-Ready Nation(WRN) Ambassador Initiative



What is it?

- Formally recognize NOAA partners who are improving the nation's readiness, responsiveness, and overall resilience against extreme weather, **water**, and climate events.
- The WRN Ambassador initiative helps unify the efforts across government, native, non-profits, academia, and private industry toward making the nation more **ready, responsive, and resilient** against extreme environmental hazards.
- Weather-Ready Nation(WRN) is a strategic outcome where society's response should be equal to the risk from all extreme weather, water, and climate hazards.



National Weather Service Weather-Ready Nation(WRN) Ambassador Initiative



Why be a part of this?

- Building a Weather-Ready Nation requires more than government **alone**. We must involve everyone in an effort to move people – and society – toward heeding warnings, taking action, and influencing their circles of family, friends, and social network to act appropriately.
- WRN Ambassadors: Serve a pivotal role in affecting societal change & inspire others to be better informed and prepared, helping to minimize or even avoid the impacts of these natural disasters (**drought**)
- Engage with NOAA NWS personnel on potential collaboration opportunities (**Southeast Alaska drought**)
- How to sign up: go to <https://www.weather.gov/wrn/amb-tou>





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e | ndmc@unl.edu

 /NationalDroughtMitigationCenter

 @droughtcenter

Deborah Bathke
dbathke2@unl.edu

Aaron Jacobs
aaron.jacobs@noaa.gov

