2021 Western Drought & Extreme Heat Assessment

Assessment Period: Aug 30-Sep 5, 2021

Publication Date: September 10, 2021

* Week 35 (August 30-September 5) is the last planned weekly report in this series

USDA NASS

Disaster Monitoring Team

Outline

- The attached slides provide an overview of the extreme heat and drought conditions in five NASS Regions: Northwest, Pacific, Mountain, Northern Plains, and Upper Midwest.
  - Slides 3-5 illustrate **temperature and precipitation anomalies** for the conterminous U.S. from September 1-8, 2021. This is based on PRISM Climate Group data and 30 years of climatological information.
  - Slides 6-11 illustrate areas impacted by **heat stress** for each region individually for Weeks 34 (Aug 23-29, 2021) & 35 (Aug 30-Sep 5, 2021) in 2021, Week 35 in 2020, and the Week 35 five-year average.
  - Slides 12-30 identify the resulting impact of the lack of precipitation and extreme heat on **cropland subsoil moisture**. Weekly average subsoil moisture, anomalies, and categorical levels for Week 35 (Aug 30-Sep 5, 2021) are illustrated. The information was obtained from the Crop-CASMA web application. Figures use a crop mask (gray) to block out non-cropland areas. An analysis was conducted to identify the percent of cropland at varying levels with extreme conditions highlighted.

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AGRICULTURE COUNTS

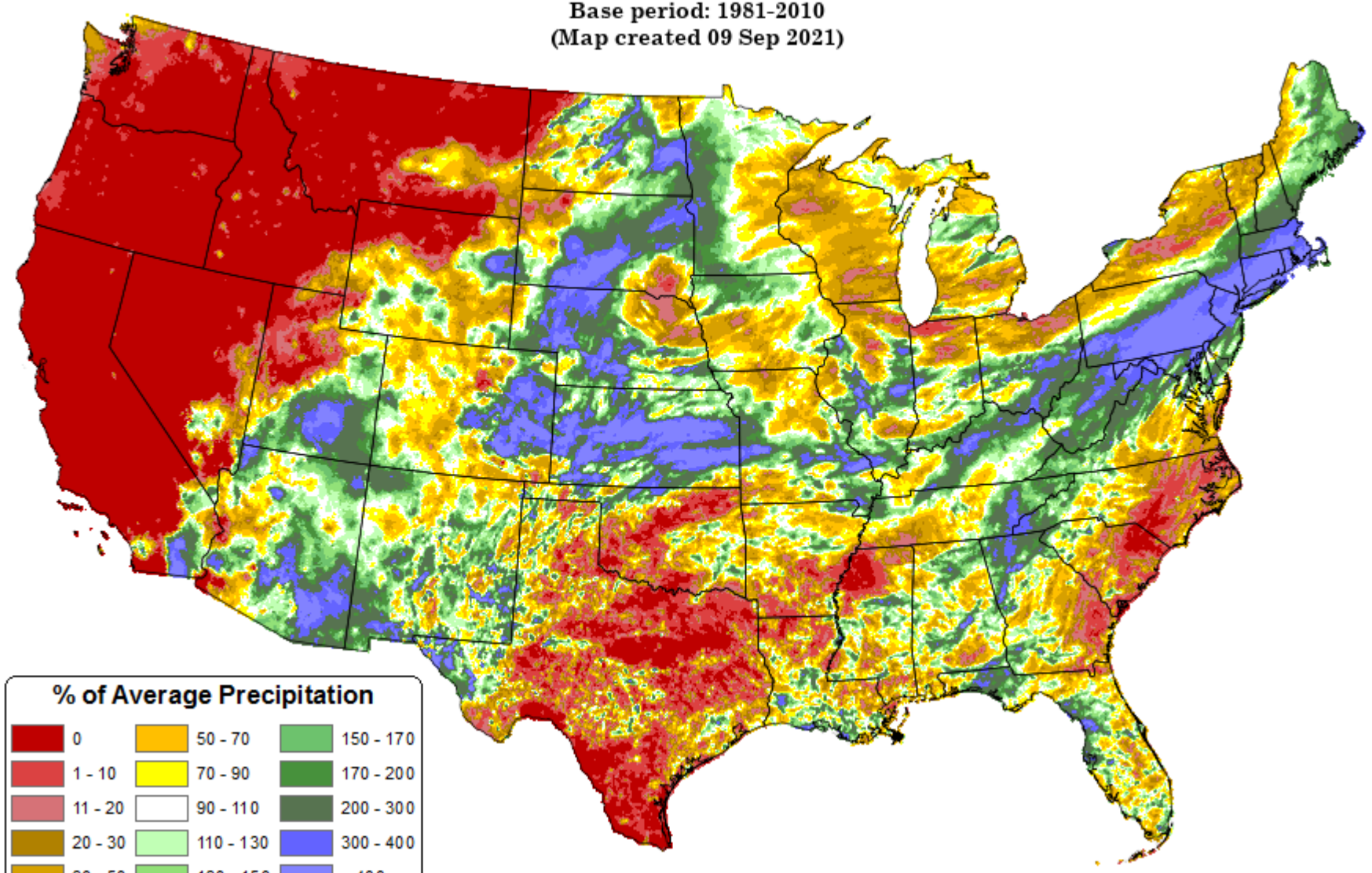
PRISM Climate Group Data

- Offers an "early glimpse" version of precipitation and temperature data from the current month
- The datasets are modeled using climatologically-aided interpolation (CAI), which uses the long-term average pattern (i.e., the 30-year normals) as first-guess of the spatial pattern of climatic conditions for a given month or day
- Data supported by USDA RMA

Map provided by PRISM Climate Group: https://prism.oregonstate.edu/mtd/

Total Precipitation Anomaly: 01 Sep 2021 - 08 Sep 2021

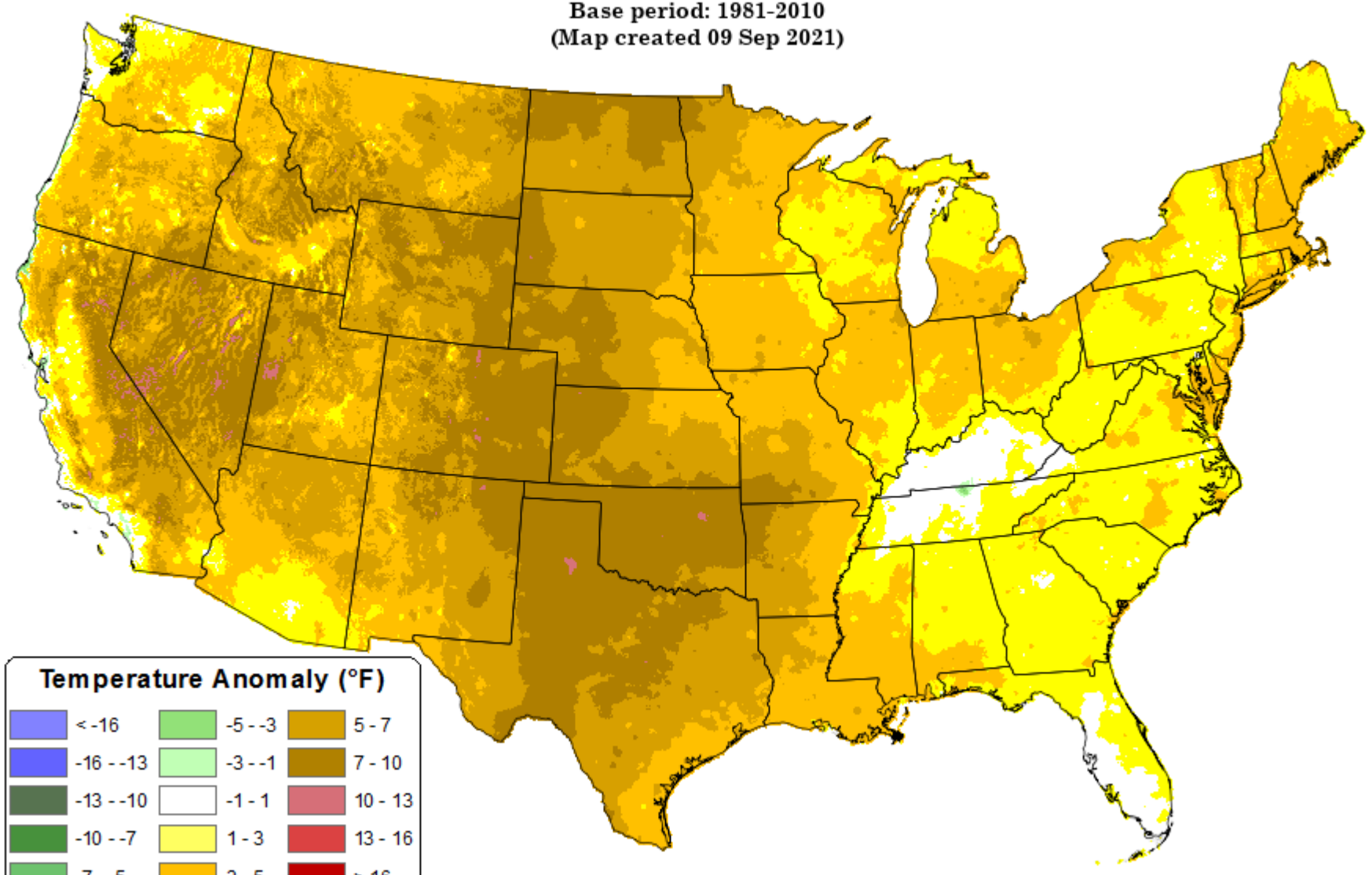
Period ending 7 AM EST 08 Sep 2021
Base period: 1981-2010
(Map created 09 Sep 2021)



Map provided by PRISM Climate Group: https://prism.oregonstate.edu/mtd/

Daily Mean Temperature Anomaly: 01 Sep 2021 - 08 Sep 2021

Period ending 7 AM EST 08 Sep 2021
Base period: 1981-2010
(Map created 09 Sep 2021)



Map provided by PRISM Climate Group: https://prism.oregonstate.edu/mtd/

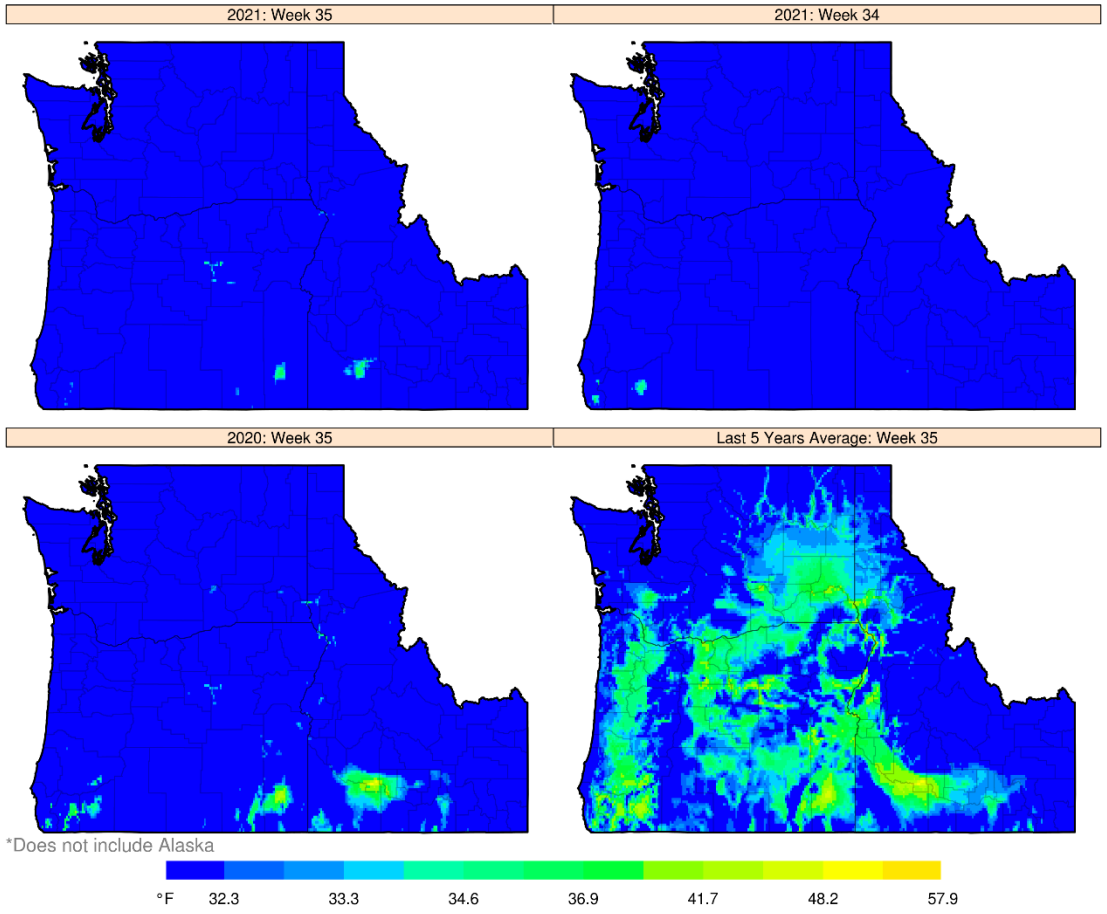
Heat Stress Data

- Data calculated using data from two main sources of gridded products, PRISM, and RTMA.
- Heat stress is calculated as the difference between the maximum observed temperature during the day and the selected threshold (Tdth).

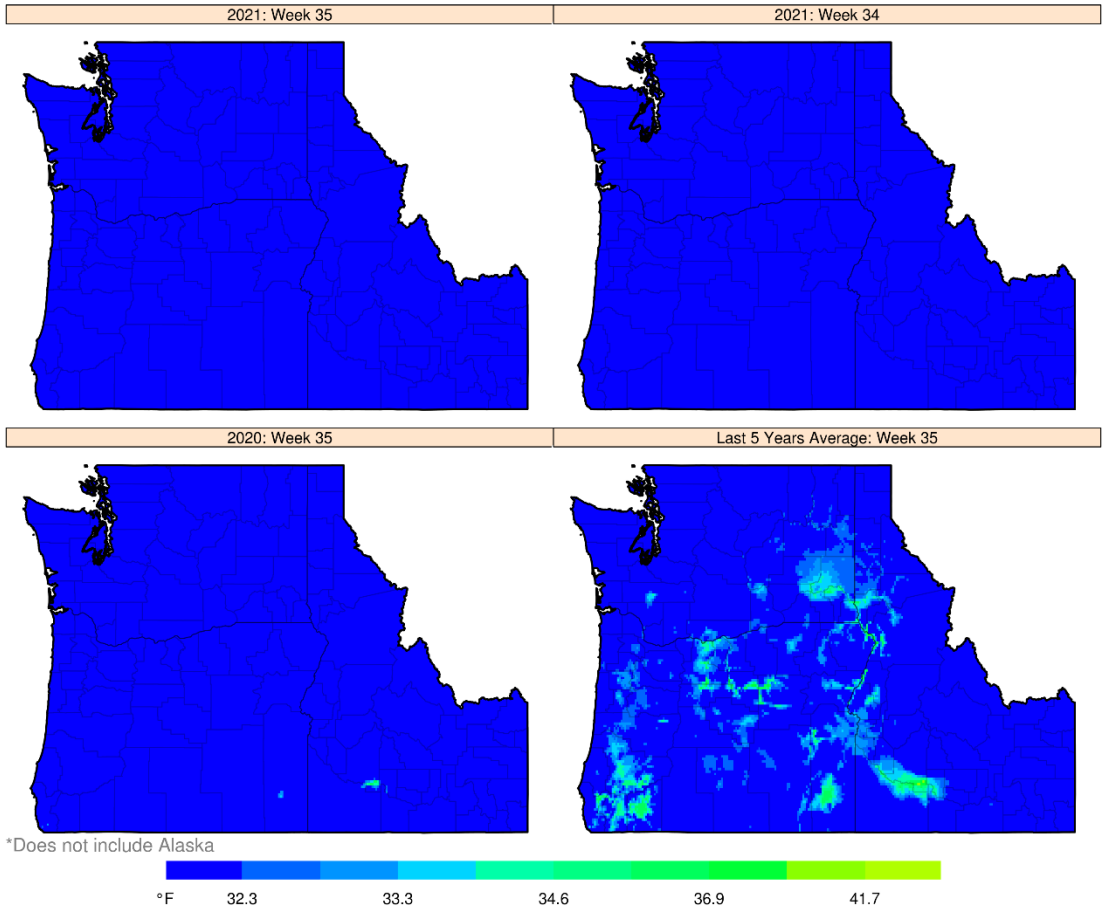
$$HSDD = \begin{cases} (T_{max} - Tdth), & \text{if } T_{max} \geq Tdth \\ 0, & \text{otherwise} \end{cases}$$

Source: NASS Climate-based Information System

Northwest Region - Heat Index (93°F) - 2021: Week 35
Accumulated Degrees above 93 Degrees



Northwest Region - Heat Index (97°F) - 2021: Week 35
Accumulated Degrees above 97 Degrees



Source: NASS Climate-based Information System

USDA AgroClimate UF University of Florida IFAS Extension

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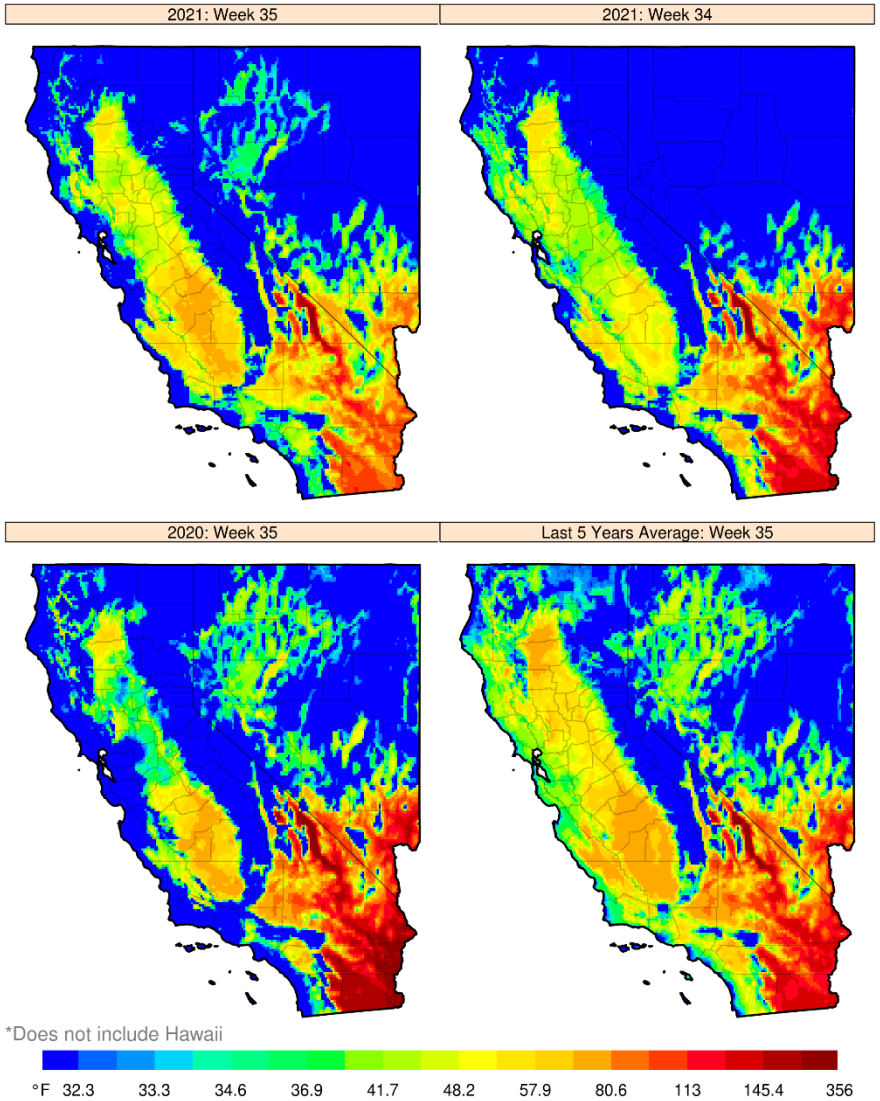
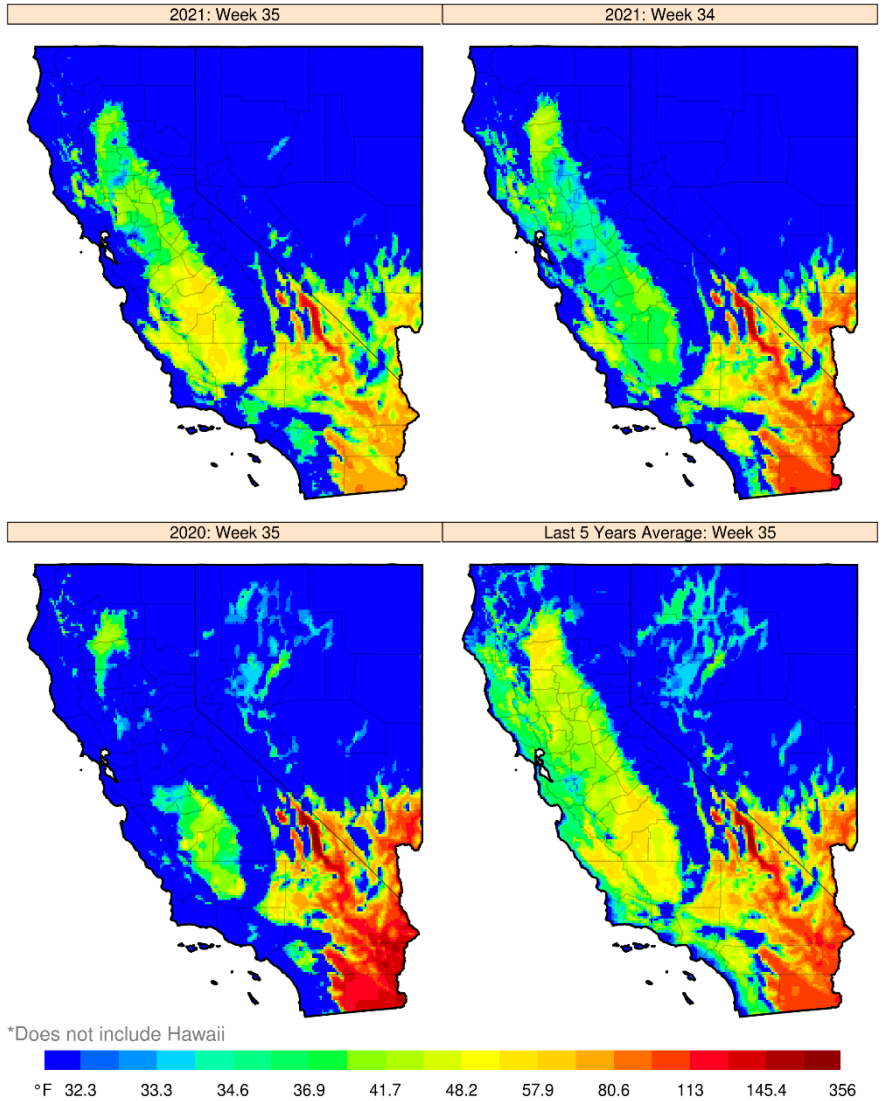
Agriculture Counts

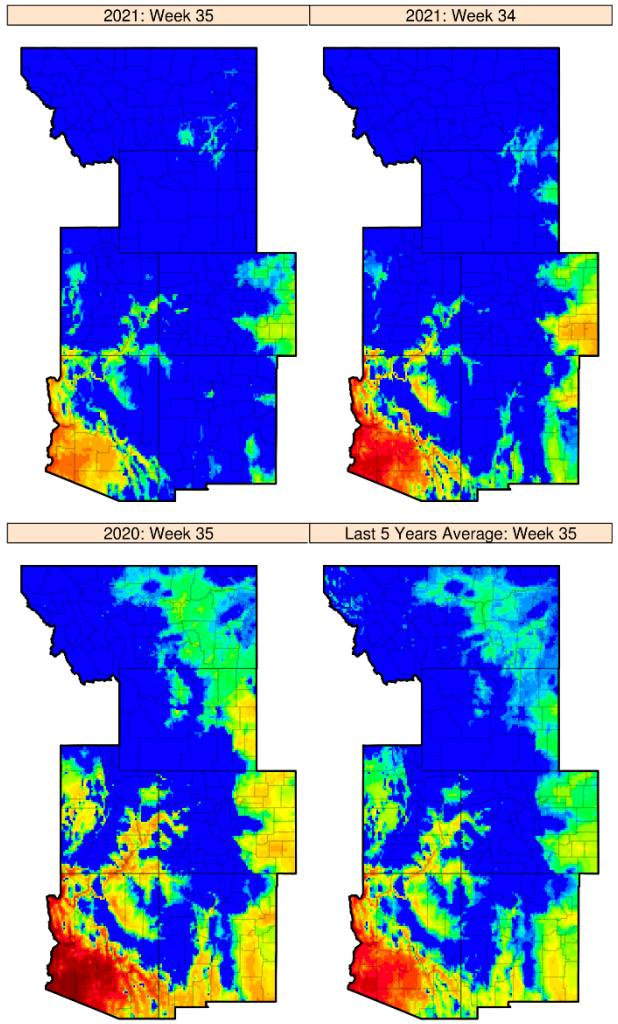
Pacific Region - Heat Index (93°F) - 2021: Week 35
Accumulated Degrees above 93 Degrees



Pacific Region - Heat Index (97°F) - 2021: Week 35
Accumulated Degrees above 97 Degrees

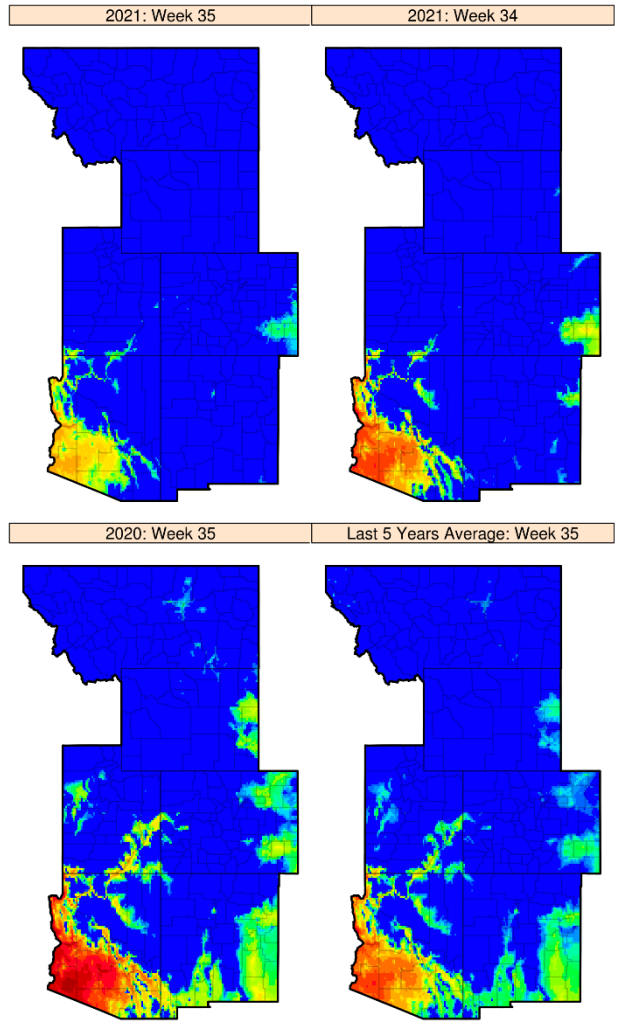


Mountain Region - Heat Index (93°F) - 2021: Week 35
Accumulated Degrees above 93 Degrees



°F 32.3 33.3 34.6 36.9 41.7 48.2 57.9 80.6 113 145.4 356

Mountain Region - Heat Index (97°F) - 2021: Week 35
Accumulated Degrees above 97 Degrees



°F 32.3 33.3 34.6 36.9 41.7 48.2 57.9 80.6 113 145.4 356

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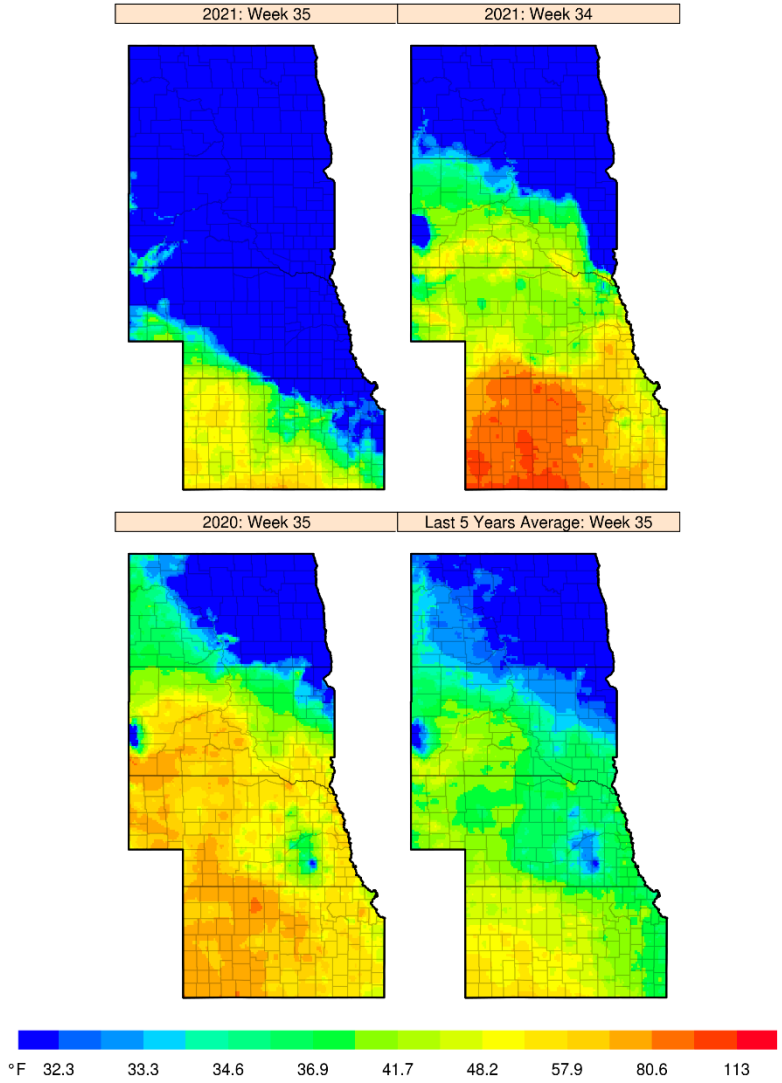
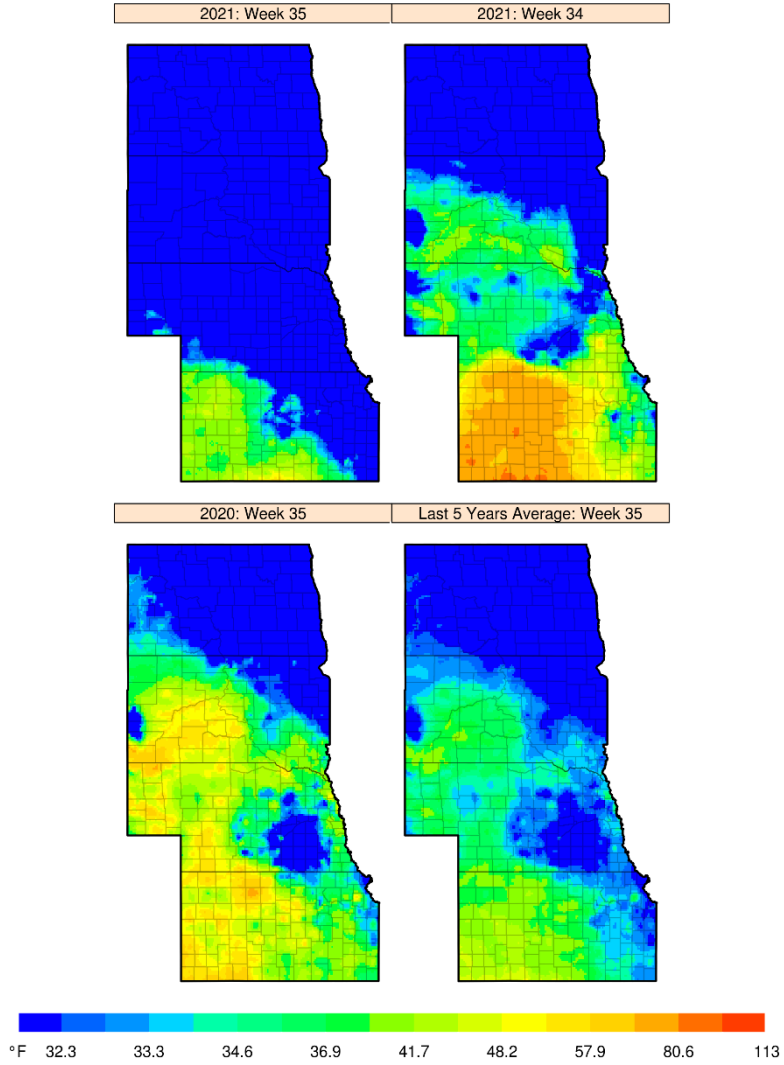
AGRICULTURE COUNTS

Northern Plains Region - Heat Index (90°F) - 2021: Week 35
Accumulated Degrees above 90 Degrees



Northern Plains Region - Heat Index (93°F) - 2021: Week 35
Accumulated Degrees above 93 Degrees



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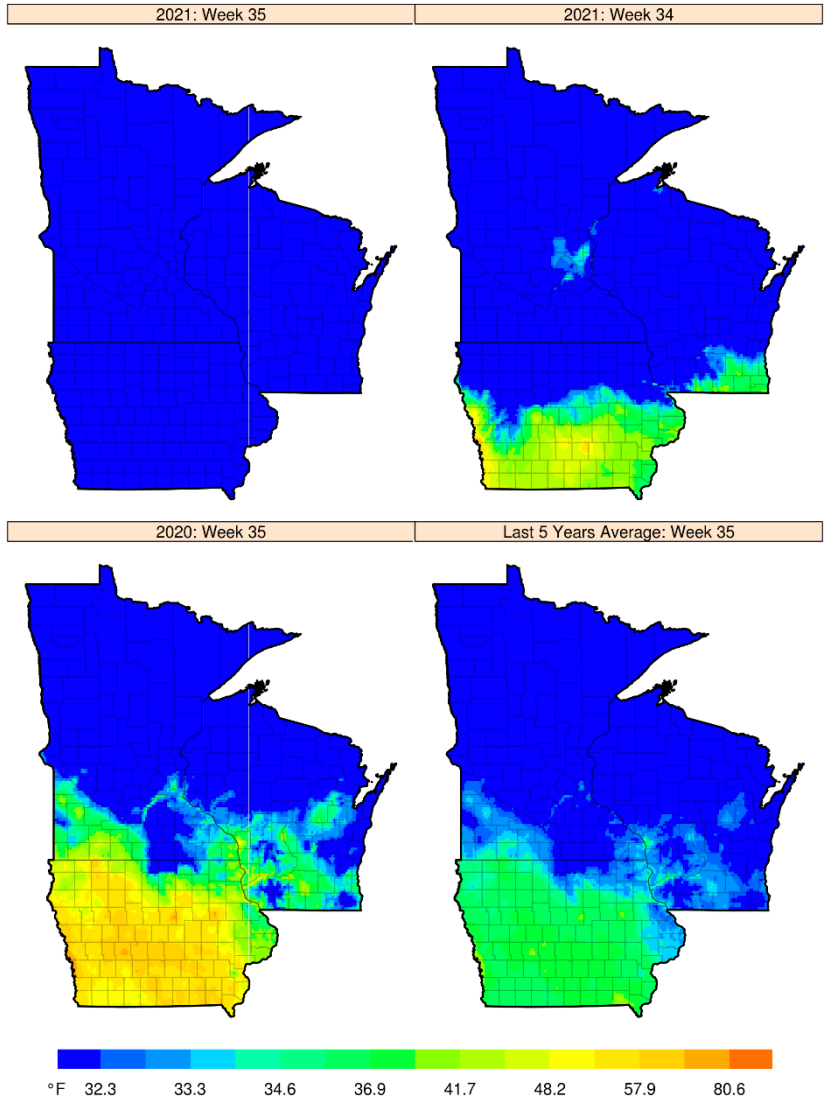
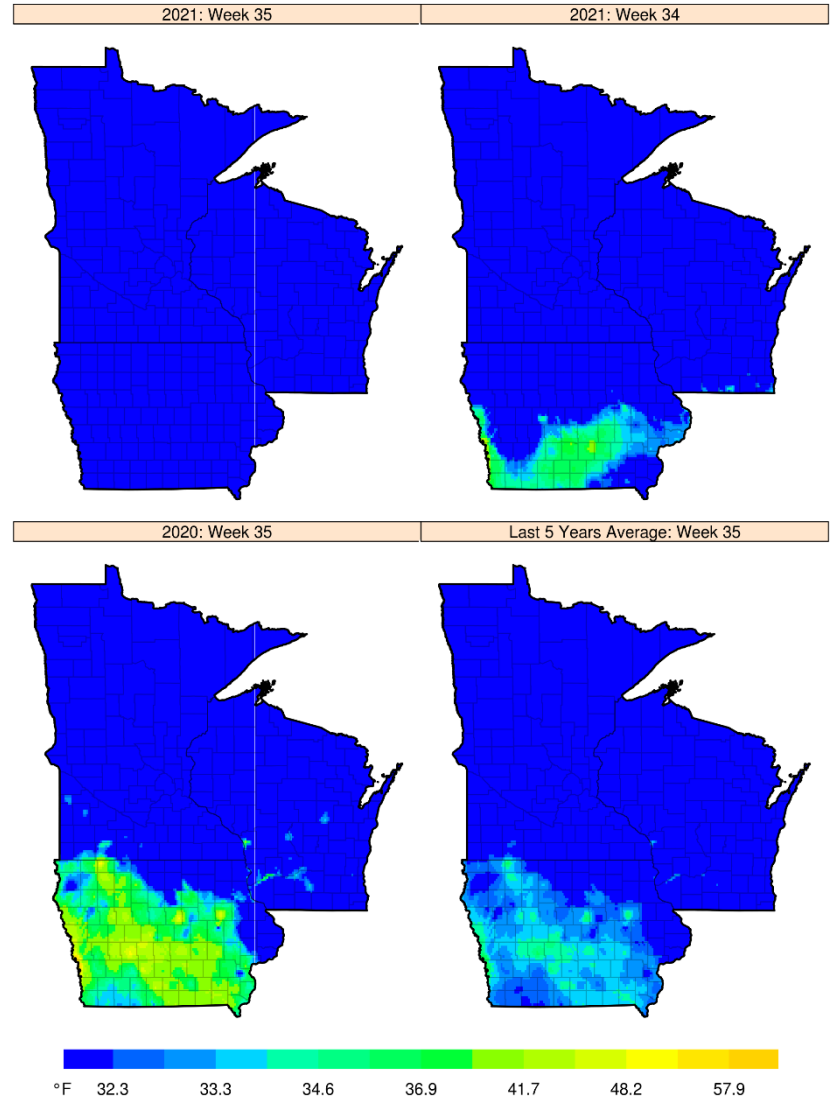
AGRICULTURE COUNTS

Upper Midwest Region - Heat Index (90°F) - 2021: Week 35
Accumulated Degrees above 90 Degrees



Upper Midwest Region - Heat Index (93°F) - 2021: Week 35
Accumulated Degrees above 93 Degrees



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AGRICULTURE COUNTS

Soil Moisture Data

- Hosted by Crop-CASMA (Crop Condition and Soil Moisture Analytics) https://nassgeo.csiss.gmu.edu/CropCASMA/
- Data Used
  - Sub Soil Moisture, 9km, Weekly, Year 2021, Week 35, Aug 30-Sep 5, 2021
  - Sub Soil Moisture Anomaly, 9km, Weekly, Year 2021, Week 35, Aug 30-Sep 5, 2021
  - Sub Soil Moisture Categorical, 9km, Weekly, Year 2021, Week 35, Aug 30-Sep 5, 2021
- Total Cropland derived by 2020 Cultivated Layer hosted on Crop-CASMA.

Sub Soil Moisture

- NASA Remotely Sensed Rootzone Soil (sub soil) is defined as the top 3.2 feet (approximately 1 meter).
- The NASA SMAP (Soil Moisture Active Passive) 9km soil moisture measurements are volumetric soil moisture (i.e. volumetric water content in the soil). It is simply the ratio of water volume to soil volume.
- Sub soil moisture measuring at 0.1 cm3/cm3 and below (10% water content) could be considered very dry.

Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Sub Soil Moisture Anomaly

- The soil moisture anomaly (SMA) in CropCASMA is a measure of deviation of the current soil moisture value from the "normal" soil moisture level, which is represented by a historical average soil moisture value (from 2015 to current).
- The SMA of a given location is defined by the following formula:

$$SMA = \frac{SM - \mathrm{SM}_m}{\mathrm{SM}_m} \times 100\%$$

where SM and SMm denote current soil moisture value and the historical average soil moisture value of a given location.

- Soil moisture anomaly below -40% could be considered very abnormal, which means there is 40% less soil moisture than normal conditions.

Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

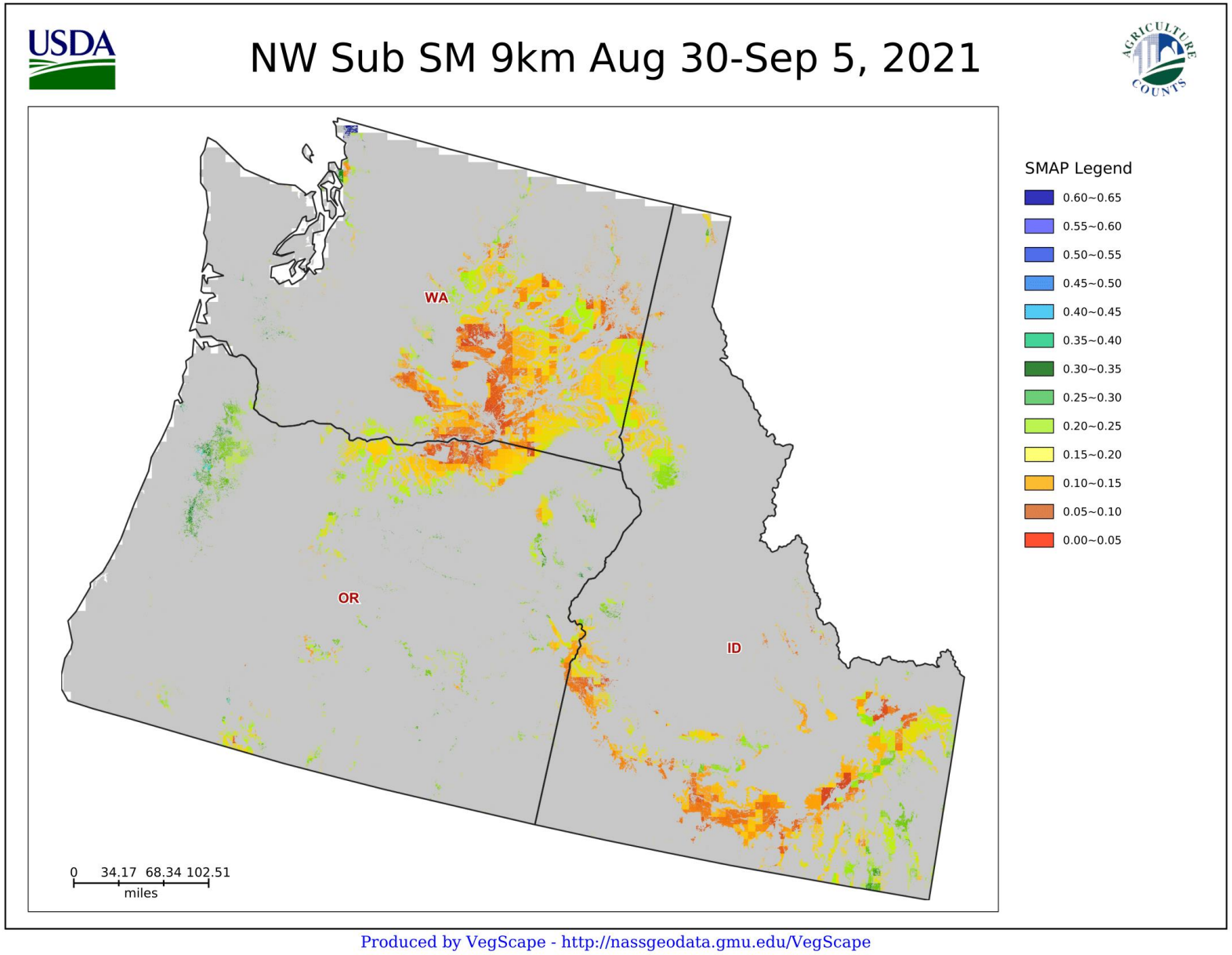
Sub Soil Moisture Categorical

- SMAP values are categorized into NASS categories which include:
  - Very Short - Soil moisture supplies are significantly less than what is required for normal plant development. Growth has been stopped or nearly so and plants are showing visible signs of moisture stress. Under these conditions, plants will quickly suffer irreparable damage.
  - Short - Soil dry. Seed germination and/or normal crop growth and development would be curtailed.
  - Adequate - Soil moist. Seed germination and/or crop growth and development would be normal or unhindered.
  - Surplus - Soil wet. Fields may be muddy and will generally be unable to absorb additional moisture. Young developing crops may be yellowing from excess moisture.

Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Northwest Region
Sub Soil Moisture 9km
Aug 30-Sep 5, 2021

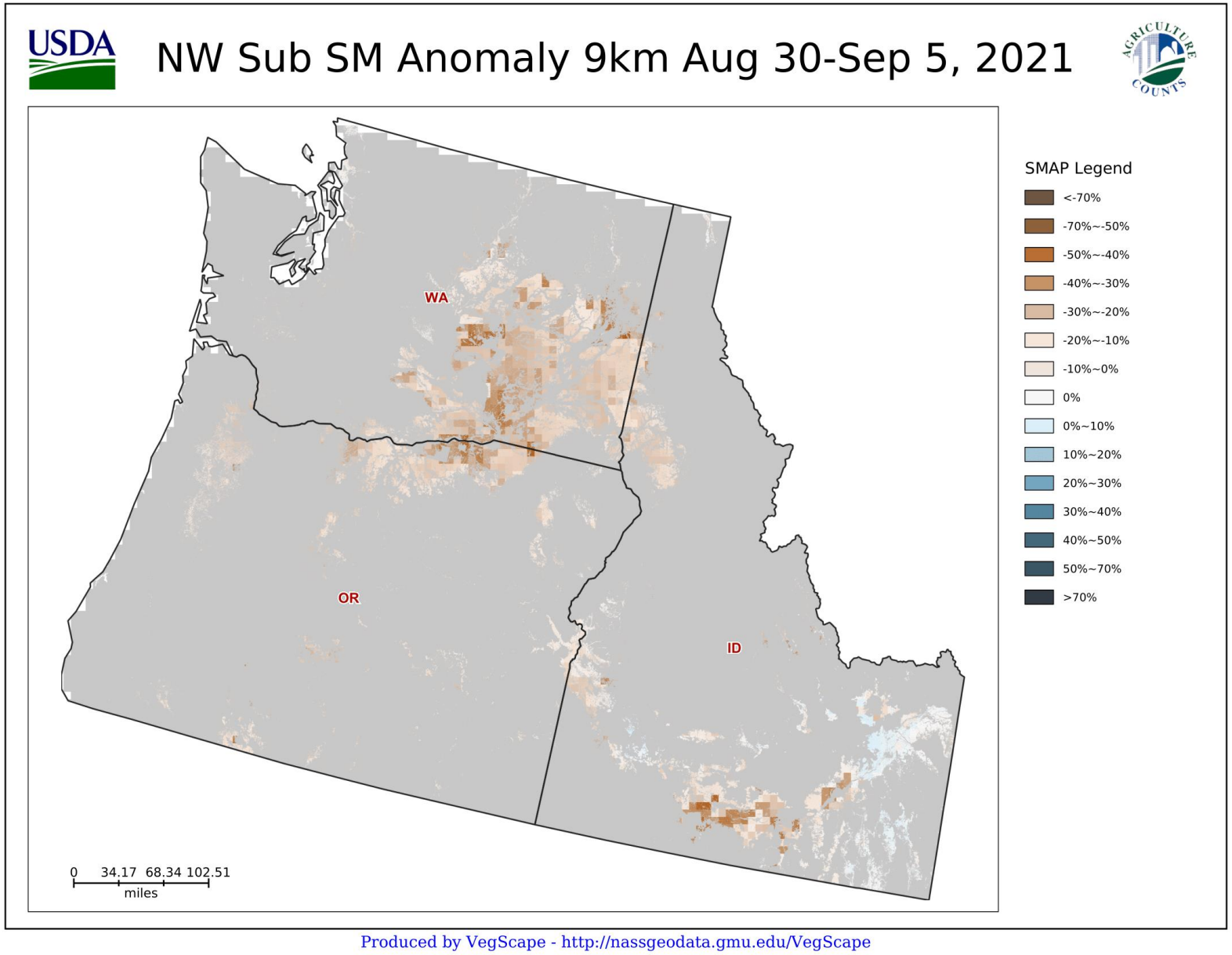
Sub Soil Moisture (9km, Aug 30-Sep 5, 2021)				
Volumetric Soil Moisture (cm3/cm3)	Northwest Region	Idaho	Oregon	Washington
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
0.0-0.05	5.48%	4.37%	5.86%	6.28%
0.05-0.1	18.46%	20.57%	6.88%	22.11%
0.1-0.15	28.70%	27.26%	21.28%	33.73%
0.15-0.2	35.08%	33.62%	39.20%	33.77%
0.2-0.25	9.86%	13.34%	18.07%	3.24%
0.25-0.3	1.95%	0.83%	7.27%	0.44%
0.3-0.35	0.22%	0.00%	0.98%	0.06%
0.35-0.4	0.09%	0.00%	0.46%	0.00%
0.4-0.45	0.00%	0.00%	0.00%	0.00%
0.45-0.5	0.00%	0.00%	0.00%	0.00%
0.5-0.55	0.00%	0.00%	0.00%	0.00%
0.55-0.6	0.00%	0.00%	0.00%	0.00%
0.6-0.65	0.16%	0.00%	0.00%	0.37%
> 0.65	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Northwest Region
Sub Soil Moisture Anomaly 9km
Aug 30-Sep 5, 2021

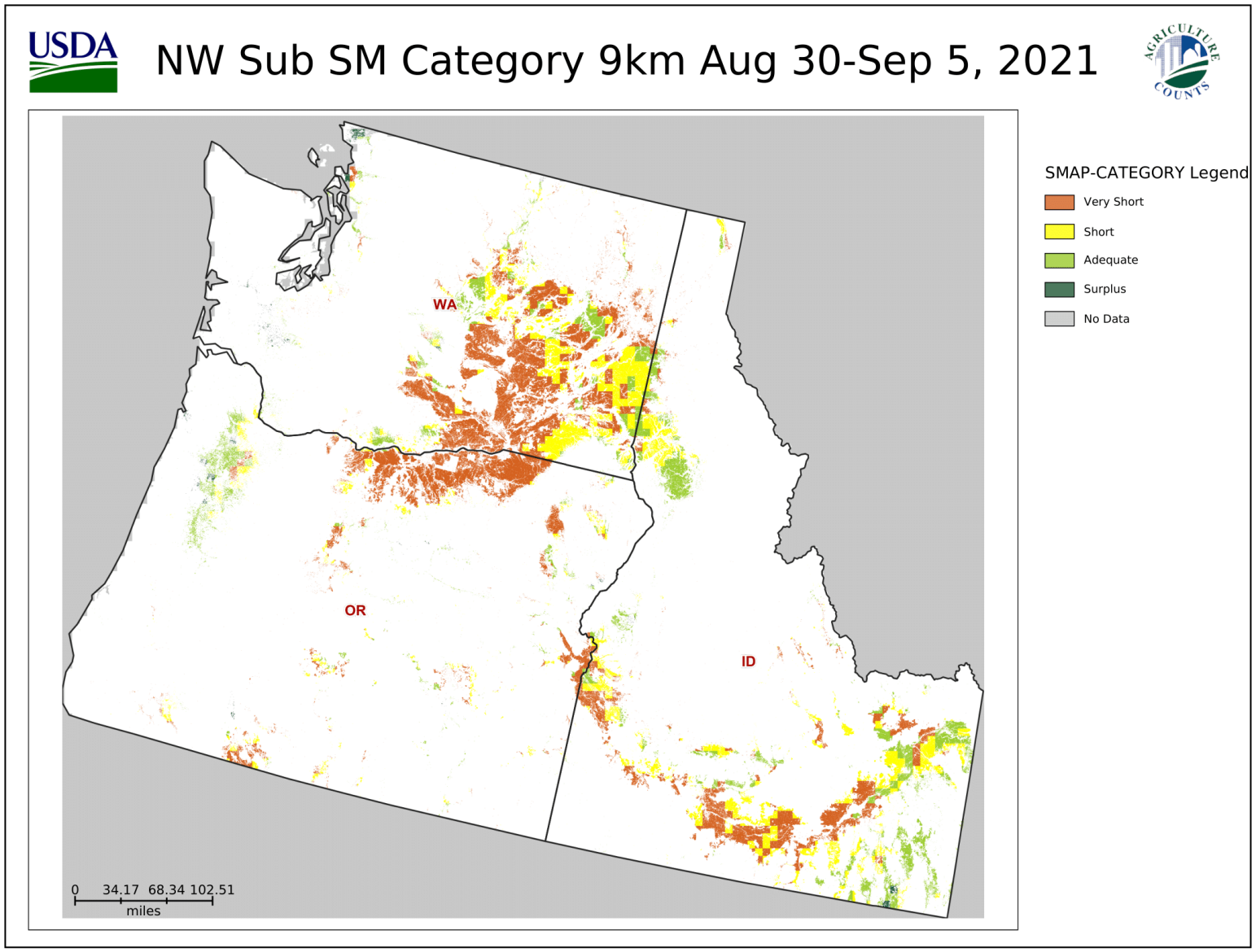
Sub Soil Moisture Anomaly (9km, Aug 30-Sep 5, 2021)				
Soil Moisture Anomaly	Northwest Region	Idaho	Oregon	Washington
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
<-70%	0.00%	0.00%	0.00%	0.00%
-70%~-50%	0.00%	0.00%	0.00%	0.00%
-50%~-40%	0.01%	0.00%	0.07%	0.00%
-40%~-30%	2.19%	1.98%	1.77%	2.60%
-30%~-20%	11.19%	8.51%	5.94%	16.08%
-20%~-10%	50.28%	25.46%	60.63%	65.83%
-10%~0%	28.70%	42.70%	31.59%	15.50%
0%~-10%	7.61%	21.31%	0.00%	0.00%
10%~20%	0.02%	0.05%	0.00%	0.00%
20%~30%	0.00%	0.00%	0.00%	0.00%
30%~40%	0.00%	0.00%	0.00%	0.00%
40%~50%	0.00%	0.00%	0.00%	0.00%
50%~70%	0.00%	0.00%	0.00%	0.00%
>70%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Northwest Region
Sub Soil Moisture Categorical 9km
Aug 30-Sep 5, 2021

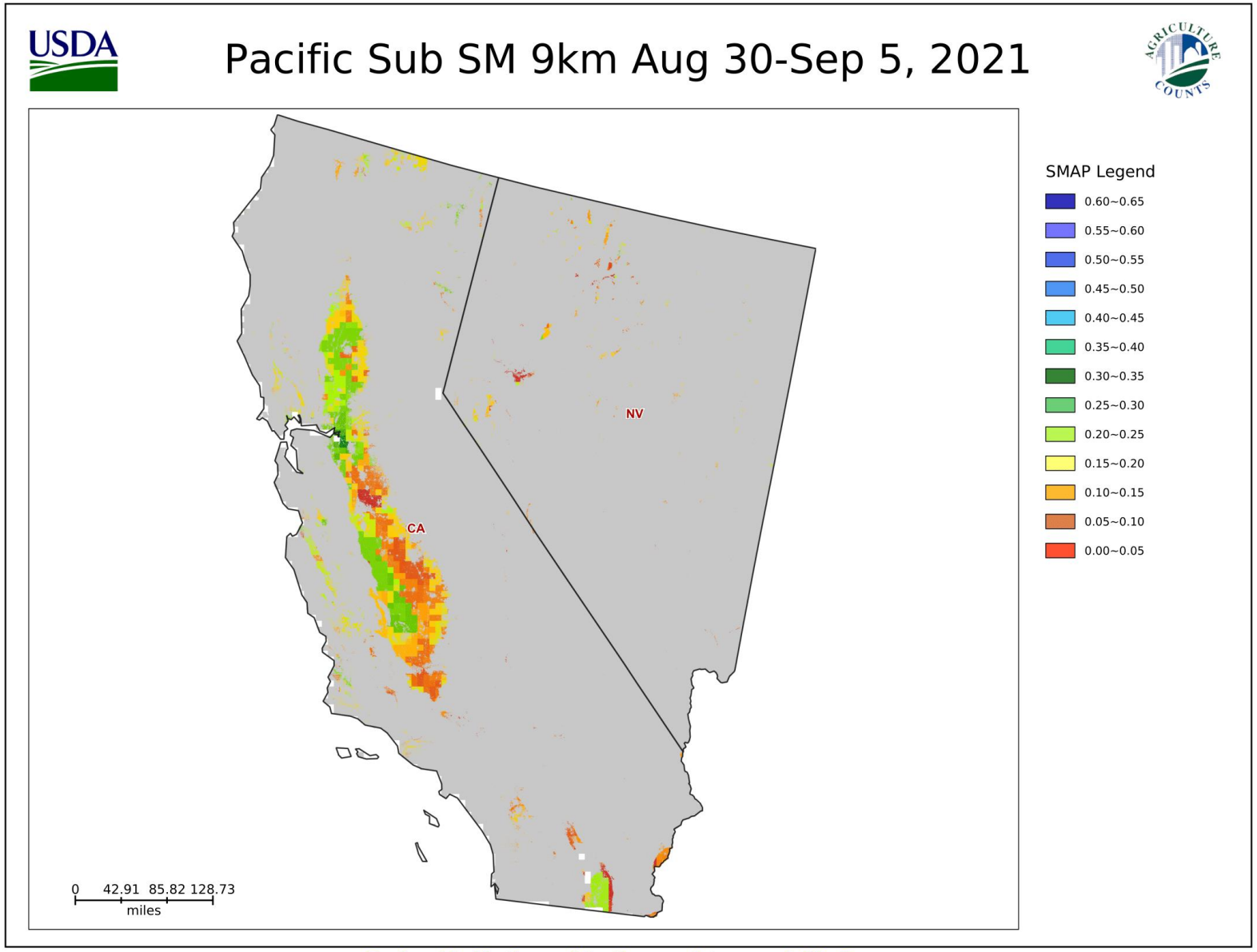
Sub Soil Moisture Categorical (9km, Aug 30-Sep 5, 2021)				
Categorical Soil Moisture	Northwest Region	Idaho	Oregon	Washington
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
Very Short	52.01%	34.70%	71.33%	57.57%
Short	27.33%	33.79%	12.73%	28.74%
Adequate	19.74%	31.01%	15.00%	12.40%
Surplus	0.72%	0.50%	0.94%	0.81%
No Data	0.21%	0.00%	0.00%	0.48%
Total	100.00%	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Pacific Region
Sub Soil Moisture 9km
Aug 30-Sep 5, 2021

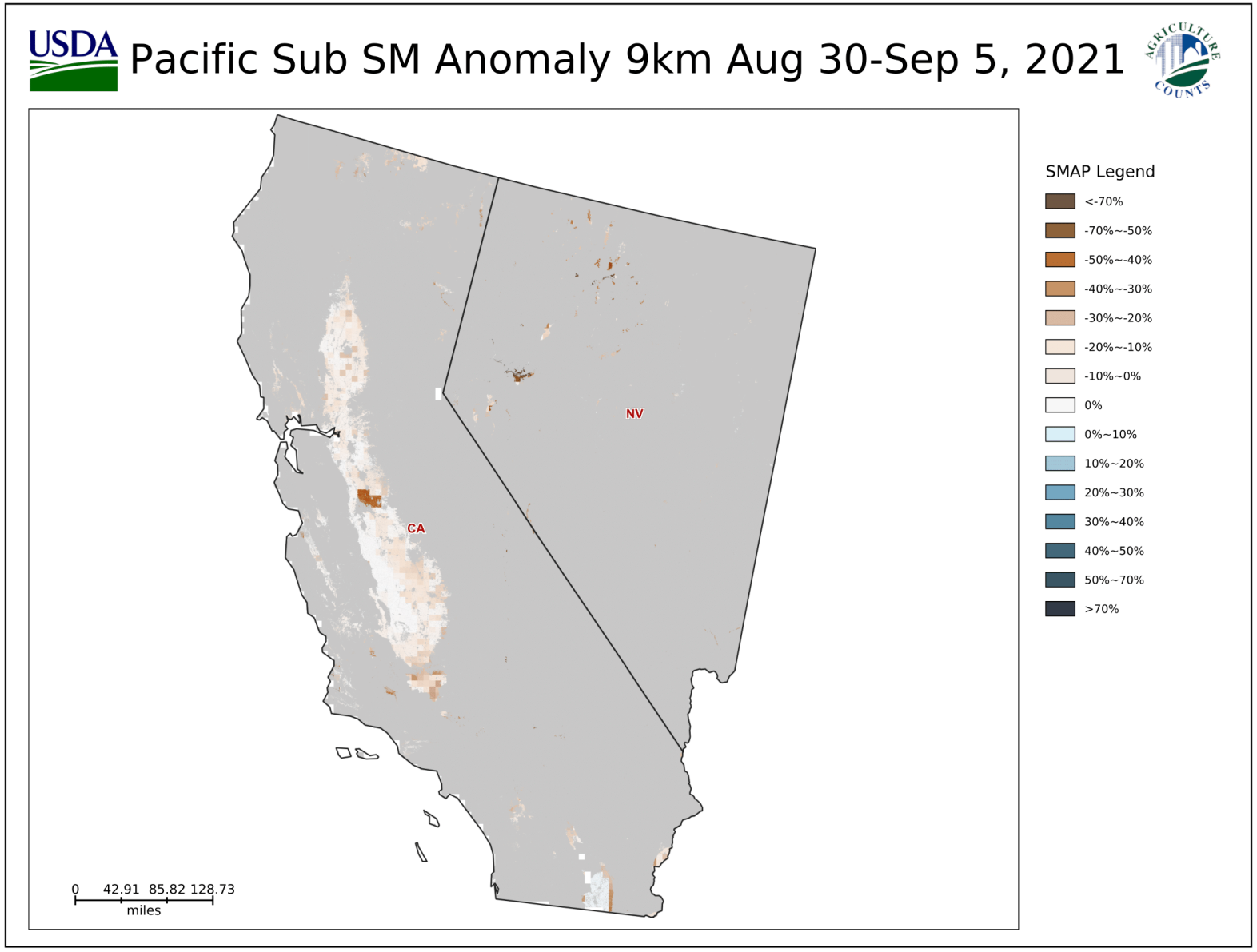
Sub Soil Moisture (9km, Aug 30-Sep 5, 2021)			
Volumetric Soil Moisture (cm3/cm3)	Pacific Region Percentage of Total Cropland	California Percentage of Total Cropland	Nevada Percentage of Total Cropland
0.0-0.05	8.78%	8.33%	19.43%
0.05-0.1	21.32%	21.32%	20.39%
0.1-0.15	20.83%	19.99%	40.51%
0.15-0.2	19.01%	19.24%	13.89%
0.2-0.25	28.88%	29.91%	5.54%
0.25-0.3	1.17%	1.21%	0.24%
0.3-0.35	0.01%	0.01%	0.00%
0.35-0.4	0.00%	0.00%	0.00%
0.4-0.45	0.00%	0.00%	0.00%
0.45-0.5	0.00%	0.00%	0.00%
0.5-0.55	0.00%	0.00%	0.00%
0.55-0.6	0.00%	0.00%	0.00%
0.6-0.65	0.00%	0.00%	0.00%
> 0.65	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Pacific Region
Sub Soil Moisture Anomaly 9km
Aug 30-Sep 5, 2021

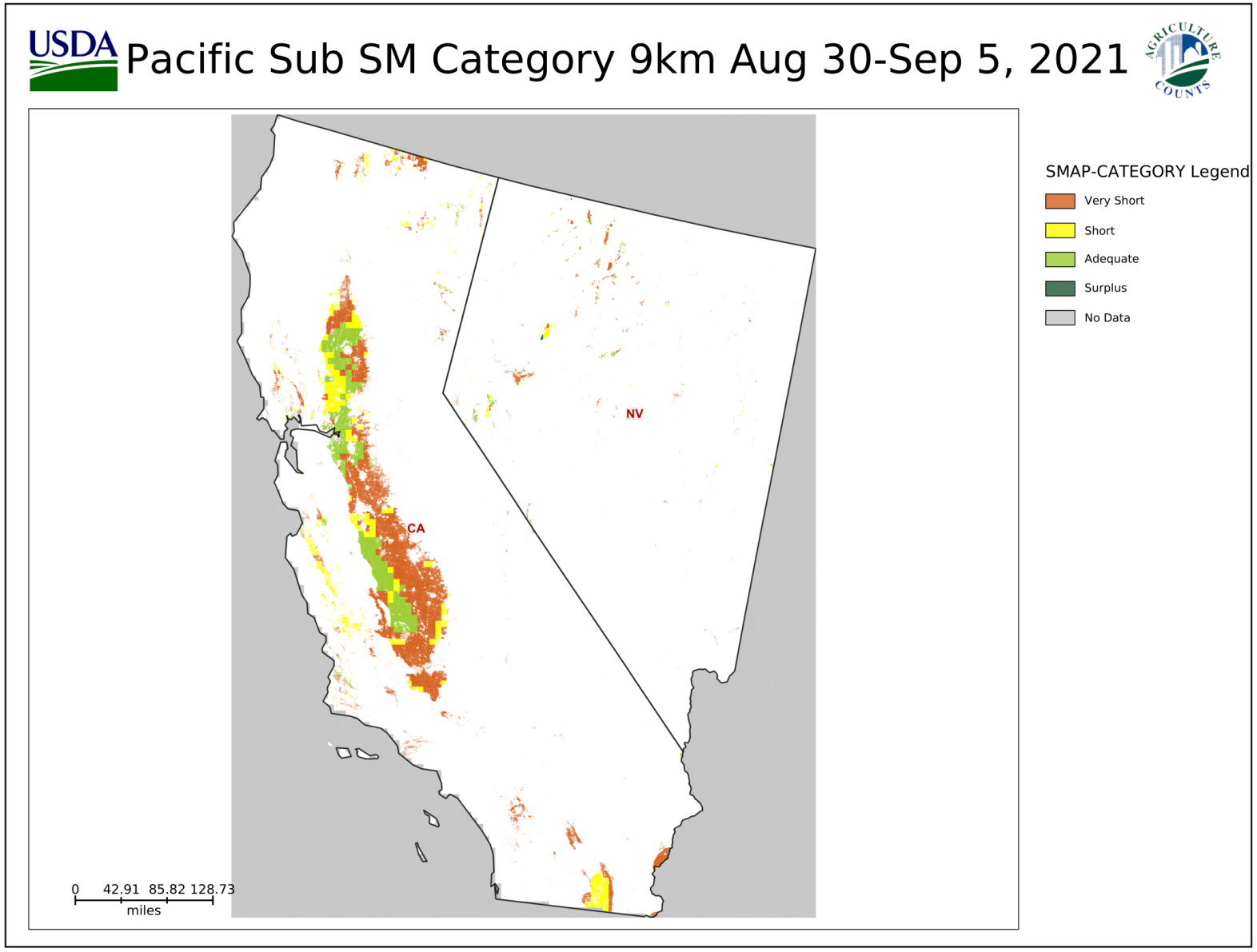
Sub Soil Moisture Anomaly (9km, Aug 30-Sep 5, 2021)			
Soil Moisture Anomaly	Pacific Region Percentage of Total Cropland	California Percentage of Total Cropland	Nevada Percentage of Total Cropland
<-70%	0.02%	0.00%	0.39%
-70%~-50%	0.46%	0.03%	10.49%
-50%~-40%	0.61%	0.24%	9.08%
-40%~-30%	1.56%	1.41%	4.51%
-30%~-20%	2.60%	2.02%	15.57%
-20%~-10%	17.61%	16.81%	35.88%
-10%~0%	71.36%	73.51%	22.58%
0%~-10%	5.78%	5.97%	1.51%
10%~20%	0.00%	0.00%	0.00%
20%~30%	0.00%	0.00%	0.00%
30%~40%	0.00%	0.00%	0.00%
40%~50%	0.00%	0.00%	0.00%
50%~70%	0.00%	0.00%	0.00%
>70%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Pacific Region
Sub Soil Moisture Categorical 9km
Aug 30-Sep 5, 2021

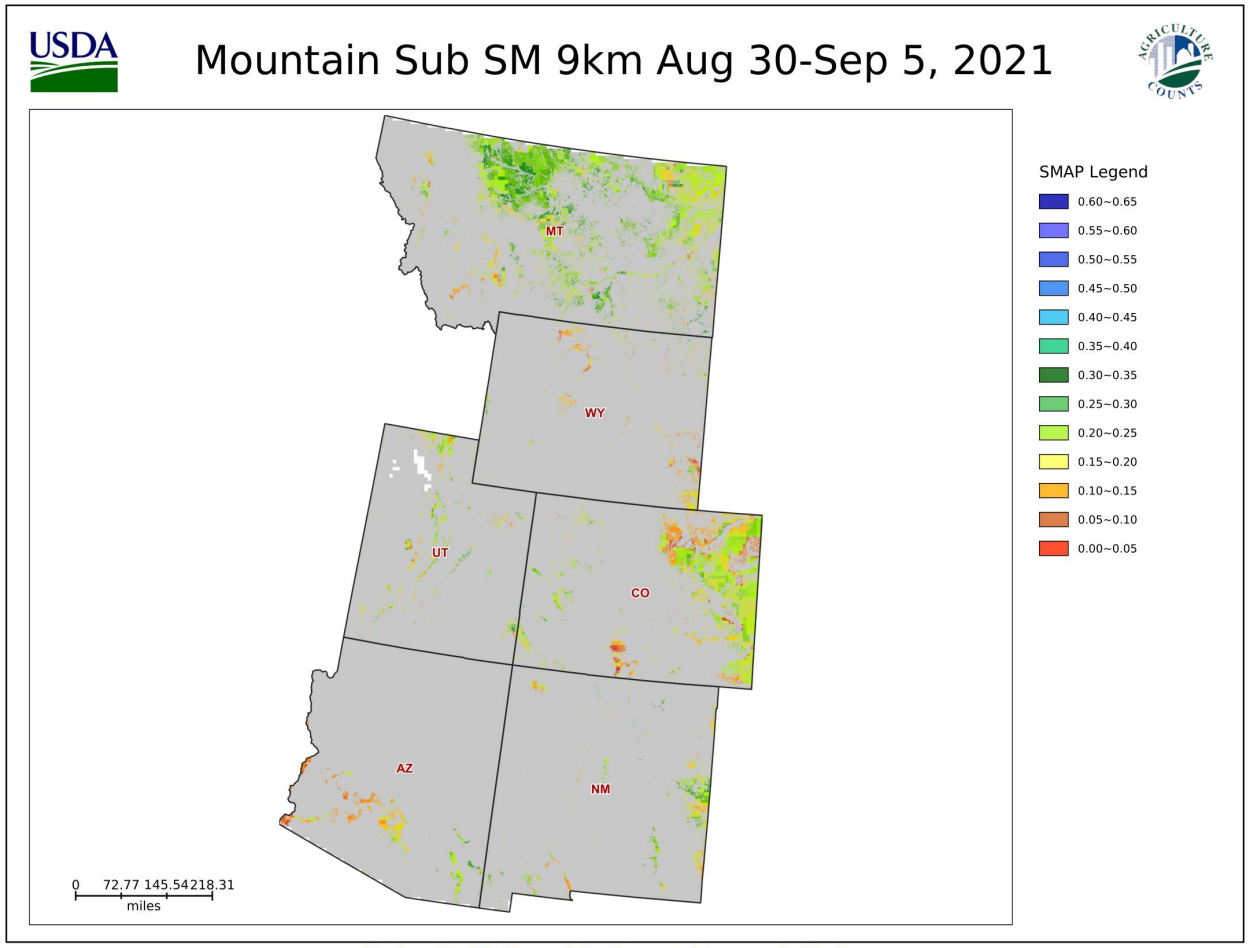
Sub Soil Moisture Categorical (9km, Aug 30-Sep 5, 2021)			
Categorical Soil Moisture	Pacific Region Percentage of Total Cropland	California Percentage of Total Cropland	Nevada Percentage of Total Cropland
Very Short	56.03%	56.30%	49.39%
Short	19.47%	19.55%	17.92%
Adequate	23.89%	23.68%	28.84%
Surplus	0.16%	0.01%	3.85%
No Data	0.45%	0.47%	0.00%
Total	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Mountain Region
Sub Soil Moisture 9km
Aug 30-Sep 5, 2021

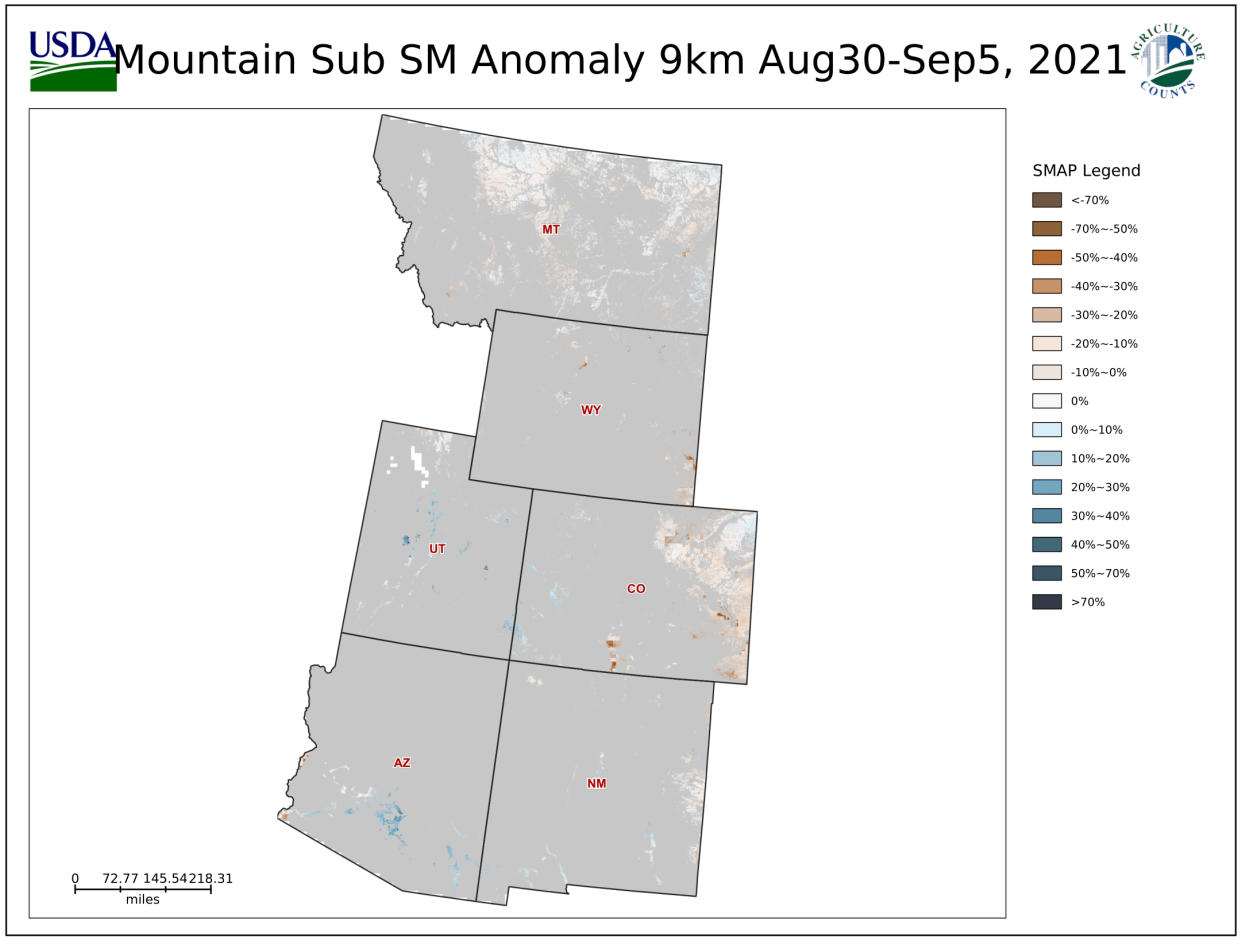
Sub Soil Moisture (9km, Aug 30-Sep 5, 2021)							
Volumetric Soil Moisture (cm3/cm3)	Mountain Region	Arizona	Colorado	Montana	New Mexico	Utah	Wyoming
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
0.0-0.05	1.75%	4.52%	3.58%	0.15%	0.04%	1.37%	7.12%
0.05-0.1	5.94%	29.53%	9.58%	1.14%	5.07%	2.83%	11.60%
0.1-0.15	10.21%	19.57%	13.39%	3.37%	14.91%	17.15%	40.56%
0.15-0.2	29.94%	25.43%	36.88%	25.55%	33.41%	35.11%	27.63%
0.2-0.25	37.80%	17.01%	35.38%	44.94%	31.32%	35.27%	10.45%
0.25-0.3	13.84%	3.19%	1.19%	24.01%	15.14%	7.46%	2.28%
0.3-0.35	0.52%	0.76%	0.00%	0.85%	0.11%	0.82%	0.36%
0.35-0.4	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.4-0.45	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.45-0.5	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.5-0.55	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.55-0.6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
0.6-0.65	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
> 0.65	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Mountain Region
Sub Soil Moisture Anomaly 9km
Aug 30-Sep 5, 2021

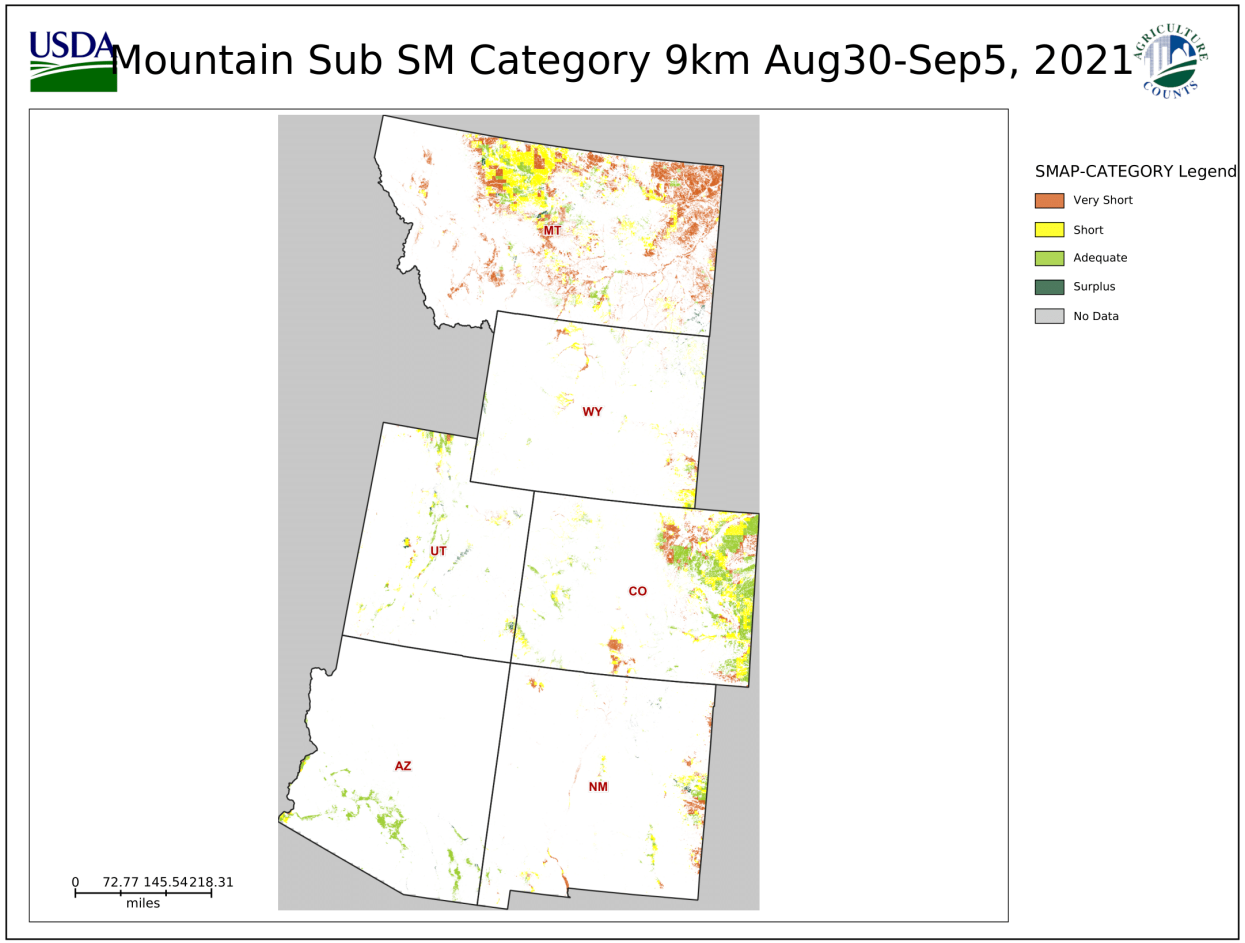
Sub Soil Moisture Anomaly (9km, Aug 30-Sep 5, 2021)							
Soil Moisture Anomaly	Mountain Region	Arizona	Colorado	Montana	New Mexico	Utah	Wyoming
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
<-70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
-70%~-50%	0.01%	0.00%	0.00%	0.00%	0.00%	0.00%	0.31%
-50%~-40%	0.32%	0.20%	0.97%	0.00%	0.00%	0.01%	0.49%
-40%~-30%	0.63%	0.92%	0.95%	0.03%	0.00%	0.07%	6.38%
-30%~-20%	1.39%	1.77%	3.46%	0.14%	0.34%	0.13%	4.14%
-20%~-10%	13.11%	4.47%	30.24%	3.31%	8.32%	1.33%	39.88%
-10%~0%	54.91%	9.04%	48.04%	69.50%	50.95%	17.69%	39.47%
0%~-10%	21.64%	15.45%	12.38%	26.87%	30.49%	32.31%	8.77%
10%~20%	5.59%	41.35%	3.73%	0.15%	9.71%	31.04%	0.56%
20%~30%	2.06%	23.43%	0.23%	0.00%	0.19%	14.09%	0.00%
30%~40%	0.26%	3.37%	0.00%	0.00%	0.00%	1.62%	0.00%
40%~50%	0.07%	0.00%	0.00%	0.00%	0.00%	1.41%	0.00%
50%~70%	0.01%	0.00%	0.00%	0.00%	0.00%	0.30%	0.00%
>70%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Mountain Region
Sub Soil Moisture Categorical 9km
Aug 30-Sep 5, 2021

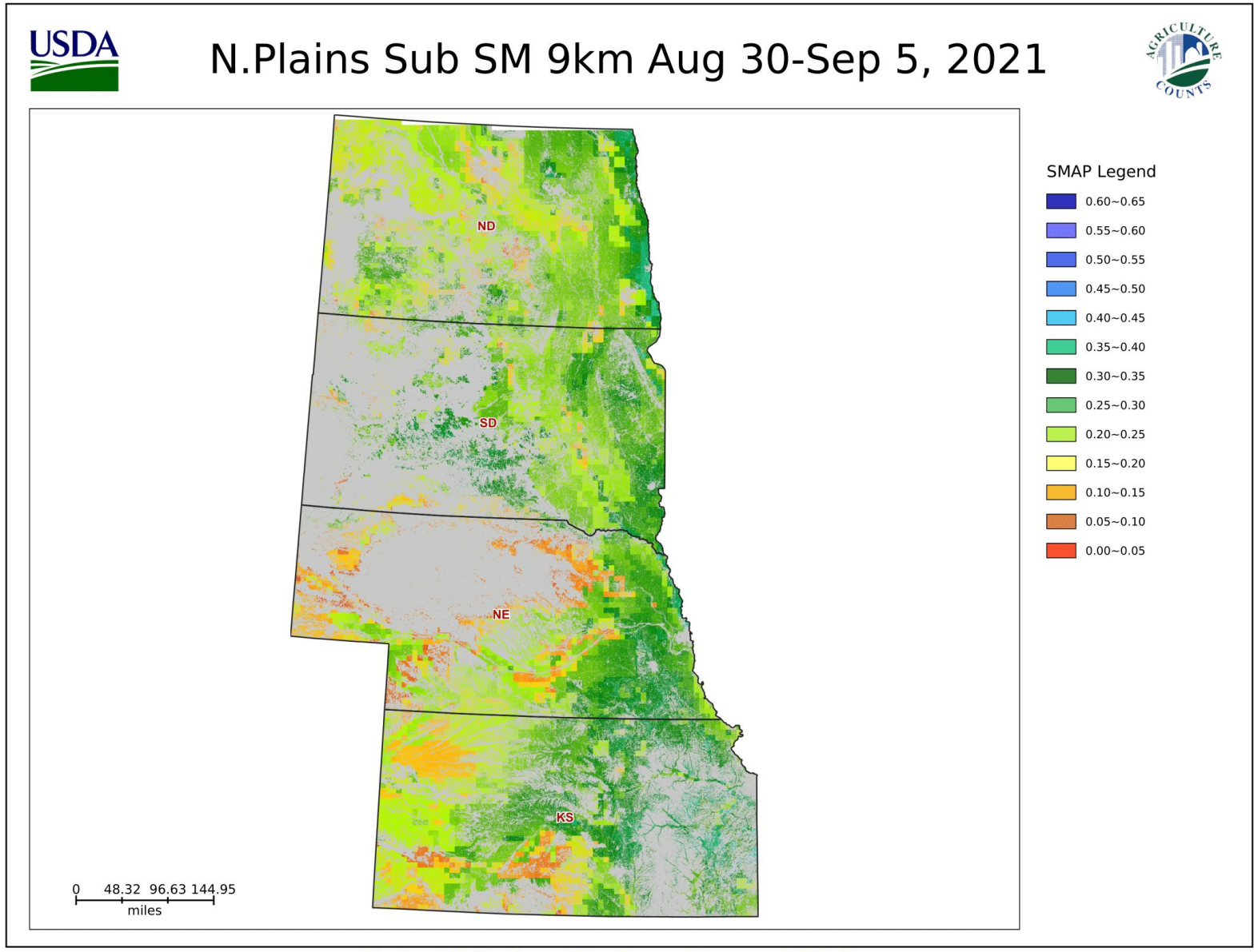
Sub Soil Moisture Categorical (9km, Aug 30-Sep 5, 2021)							
Categorical Soil Moisture	Mountain Region	Arizona	Colorado	Montana	New Mexico	Utah	Wyoming
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
Very Short	38.32%	0.00%	19.37%	56.98%	41.76%	9.91%	25.91%
Short	30.78%	4.53%	31.86%	30.15%	32.70%	37.00%	52.55%
Adequate	28.85%	94.16%	48.77%	10.27%	22.92%	44.75%	18.95%
Surplus	1.25%	1.29%	0.00%	1.01%	2.62%	8.27%	2.58%
No Data	0.80%	0.02%	0.00%	1.59%	0.01%	0.06%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Northern Plains Region
Sub Soil Moisture 9km
Aug 30-Sep 5, 2021

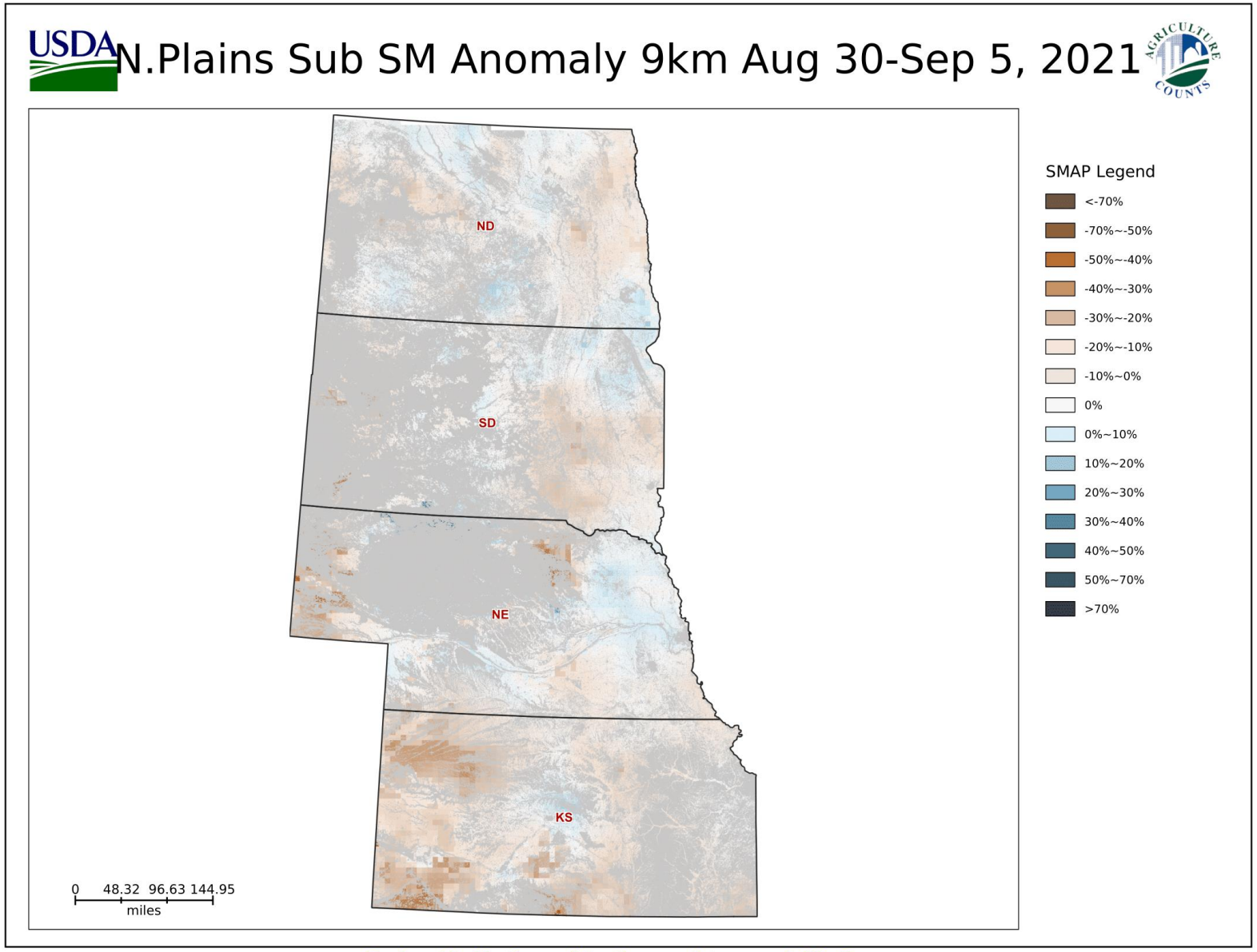
Sub Soil Moisture (9km, Aug 30-Sep 5, 2021)					
Volumetric Soil Moisture (cm3/cm3)	Northern Plains Region	Kansas	Nebraska	North Dakota	South Dakota
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
0.0-0.05	0.18%	0.02%	0.71%	0.00%	0.04%
0.05-0.1	3.43%	3.39%	9.91%	0.42%	0.30%
0.1-0.15	6.88%	11.28%	10.61%	2.18%	2.74%
0.15-0.2	19.36%	24.08%	10.85%	30.91%	6.36%
0.2-0.25	32.85%	19.69%	30.01%	42.95%	41.11%
0.25-0.3	28.78%	28.89%	29.38%	18.18%	42.52%
0.3-0.35	8.35%	12.54%	8.36%	4.99%	6.93%
0.35-0.4	0.18%	0.13%	0.17%	0.37%	0.00%
0.4-0.45	0.00%	0.00%	0.00%	0.00%	0.00%
0.45-0.5	0.00%	0.00%	0.00%	0.00%	0.00%
0.5-0.55	0.00%	0.00%	0.00%	0.00%	0.00%
0.55-0.6	0.00%	0.00%	0.00%	0.00%	0.00%
0.6-0.65	0.00%	0.00%	0.00%	0.00%	0.00%
> 0.65	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Northern Plains Region
Sub Soil Moisture Anomaly 9km
Aug 30-Sep 5, 2021

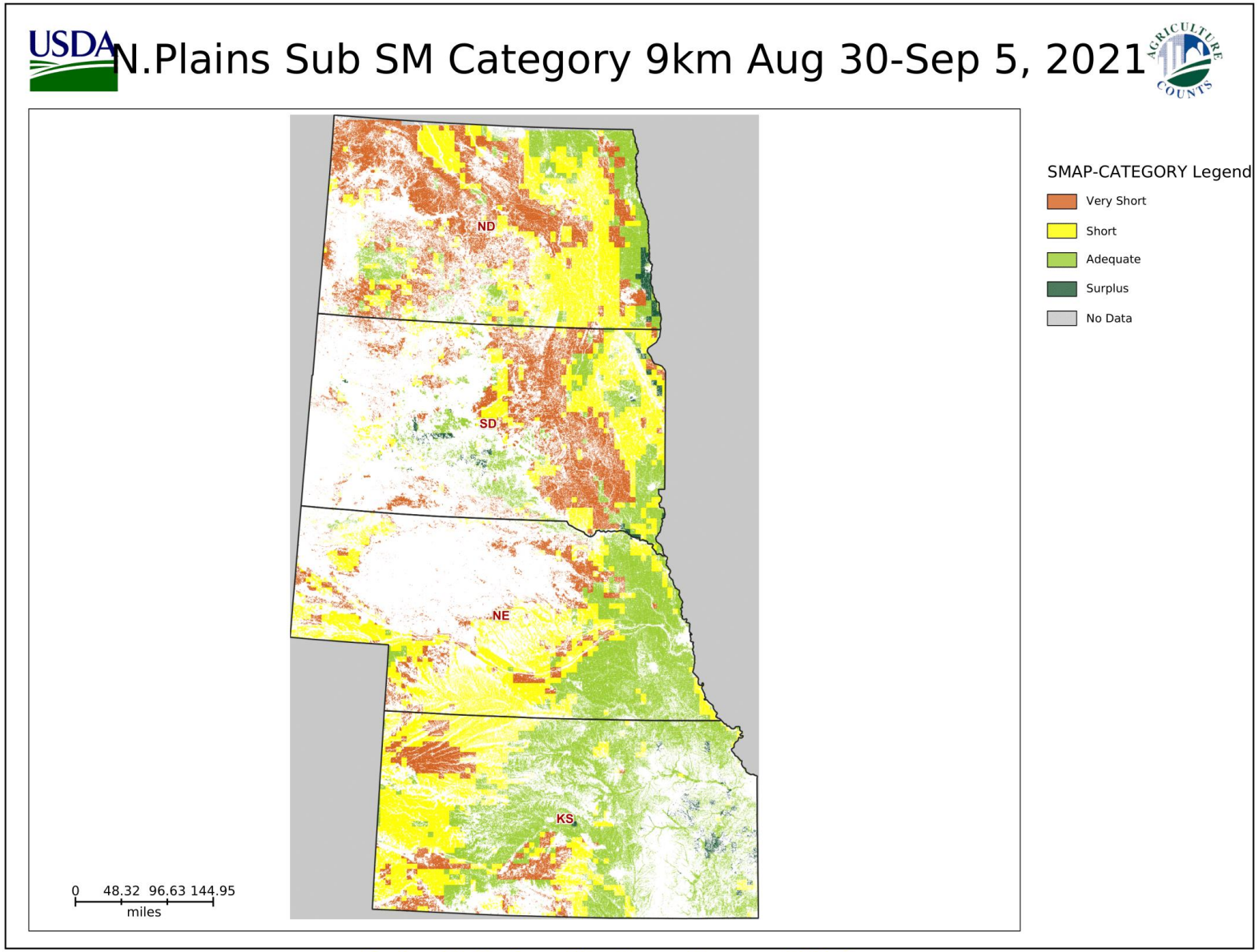
Sub Soil Moisture Anomaly (9km, Aug 30-Sep 5, 2021)					
Soil Moisture Anomaly	Northern Plains Region	Kansas	Nebraska	North Dakota	South Dakota
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
<-70%	0.00%	0.00%	0.00%	0.00%	0.00%
-70%~-50%	0.00%	0.00%	0.00%	0.00%	0.00%
-50%~-40%	0.02%	0.05%	0.04%	0.00%	0.00%
-40%~-30%	0.22%	0.30%	0.46%	0.00%	0.12%
-30%~-20%	2.90%	8.03%	2.08%	0.03%	0.39%
-20%~-10%	18.90%	39.03%	7.68%	6.83%	19.51%
-10%~0%	51.16%	46.44%	47.97%	58.67%	51.30%
0%~-10%	25.90%	5.72%	40.53%	32.99%	28.27%
10%~20%	0.82%	0.43%	0.95%	1.47%	0.33%
20%~30%	0.04%	0.00%	0.15%	0.00%	0.00%
30%~40%	0.03%	0.00%	0.08%	0.00%	0.08%
40%~50%	0.01%	0.00%	0.06%	0.00%	0.00%
50%~70%	0.00%	0.00%	0.00%	0.00%	0.00%
>70%	0.00%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Northern Plains Region
Sub Soil Moisture Categorical 9km
Aug 30-Sep 5, 2021

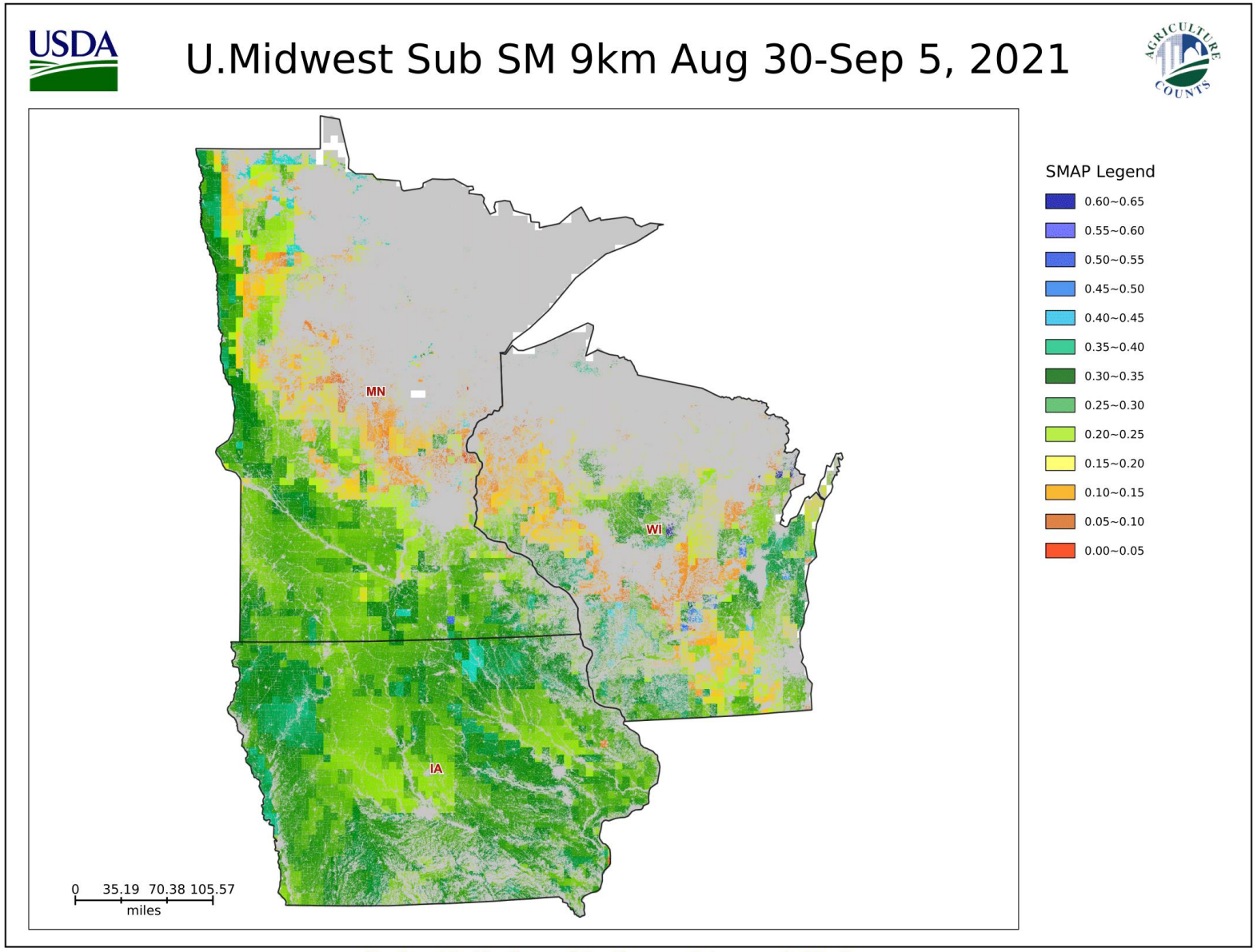
Sub Soil Moisture Categorical (9km, Aug 30-Sep 5, 2021)					
Categorical Soil Moisture	Northern Plains Region	Kansas	Nebraska	North Dakota	South Dakota
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
Very Short	27.06%	12.69%	14.46%	41.32%	42.66%
Short	35.85%	33.64%	41.06%	36.02%	32.62%
Adequate	35.54%	52.09%	44.48%	20.15%	22.81%
Surplus	1.27%	1.58%	0.00%	1.52%	1.91%
No Data	0.28%	0.00%	0.00%	0.99%	0.00%
Total	100.00%	100.00%	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Upper Midwest Region Sub Soil Moisture 9km Aug 30-Sep 5, 2021

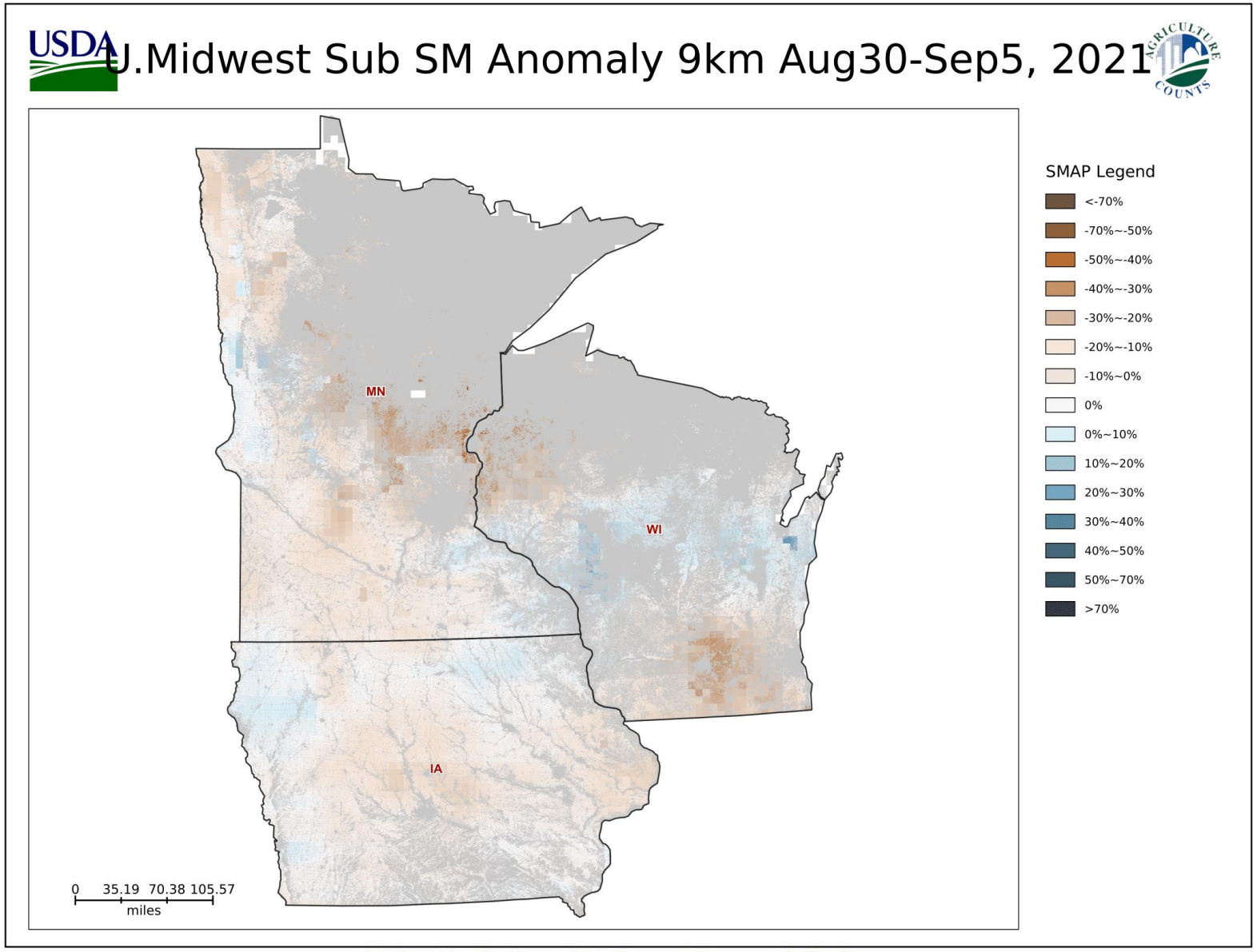
Sub Soil Moisture (9km, Aug 30-Sep 5, 2021)				
Volumetric Soil Moisture (cm3/cm3)	Upper Midwest Region	Iowa	Minnesota	Wisconsin
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
0.0-0.05	0.06%	0.00%	0.12%	0.08%
0.05-0.1	2.46%	0.05%	2.95%	7.74%
0.1-0.15	5.43%	0.00%	7.40%	15.36%
0.15-0.2	6.84%	0.00%	11.19%	15.32%
0.2-0.25	23.45%	20.90%	27.48%	21.46%
0.25-0.3	46.53%	58.93%	41.60%	24.34%
0.3-0.35	13.74%	19.26%	7.53%	13.11%
0.35-0.4	1.12%	0.87%	1.52%	0.90%
0.4-0.45	0.08%	0.00%	0.13%	0.18%
0.45-0.5	0.11%	0.00%	0.08%	0.44%
0.5-0.55	0.07%	0.00%	0.00%	0.42%
0.55-0.6	0.07%	0.00%	0.00%	0.40%
0.6-0.65	0.02%	0.00%	0.00%	0.11%
> 0.65	0.02%	0.00%	0.00%	0.14%
Total	100.00%	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Upper Midwest Region
Sub Soil Moisture Anomaly 9km
Aug 30-Sep 5, 2021

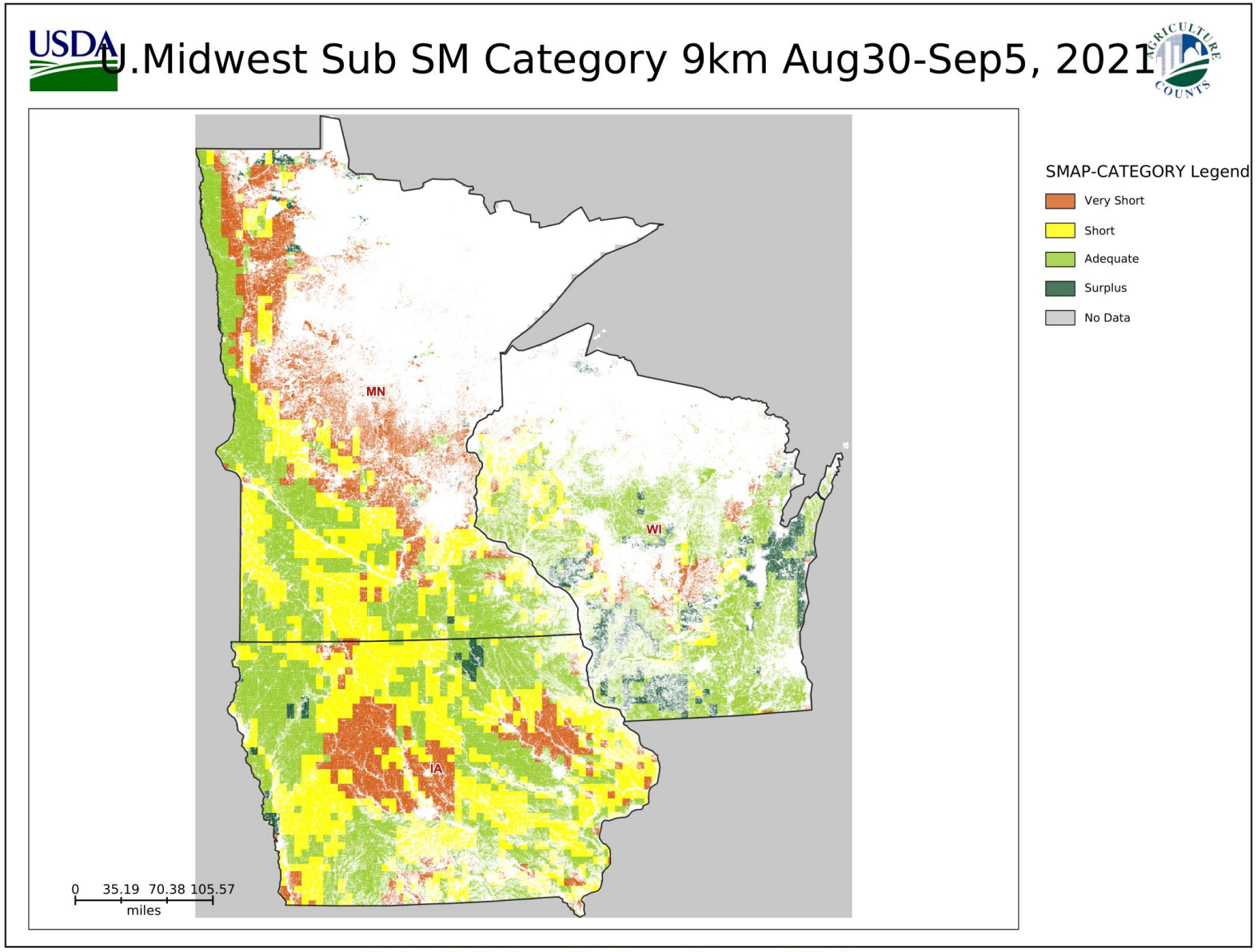
Sub Soil Moisture Anomaly (9km, Aug 30-Sep 5, 2021)				
Soil Moisture Anomaly	Upper Midwest Region	Iowa	Minnesota	Wisconsin
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
<-70%	0.00%	0.00%	0.00%	0.00%
-70%~-50%	0.00%	0.00%	0.00%	0.00%
-50%~-40%	0.02%	0.00%	0.02%	0.07%
-40%~-30%	0.16%	0.00%	0.31%	0.22%
-30%~-20%	2.49%	0.00%	3.25%	7.36%
-20%~-10%	12.15%	5.31%	15.22%	23.58%
-10%~0%	62.99%	73.32%	67.06%	26.91%
0%~-10%	20.74%	21.38%	13.43%	34.96%
10%~20%	1.31%	0.00%	0.69%	6.13%
20%~30%	0.11%	0.00%	0.00%	0.62%
30%~40%	0.03%	0.00%	0.00%	0.15%
40%~50%	0.00%	0.00%	0.00%	0.00%
50%~70%	0.00%	0.00%	0.00%	0.00%
>70%	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/

Upper Midwest Region
Sub Soil Moisture Categorical 9km
Aug 30-Sep 5, 2021

Sub Soil Moisture Categorical (9km, Aug 30-Sep 5, 2021)				
Categorical Soil Moisture	Upper Midwest Region	Iowa	Minnesota	Wisconsin
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
Very Short	19.33%	17.50%	27.75%	5.83%
Short	31.83%	41.34%	30.18%	10.43%
Adequate	44.98%	39.70%	41.00%	67.45%
Surplus	3.78%	1.46%	1.00%	15.98%
No Data	0.08%	0.00%	0.07%	0.31%
Total	100.00%	100.00%	100.00%	100.00%



Crop-CASMA: https://nassgeo.csiss.gmu.edu/CropCASMA/