Flooding in Delta Region, June 2021

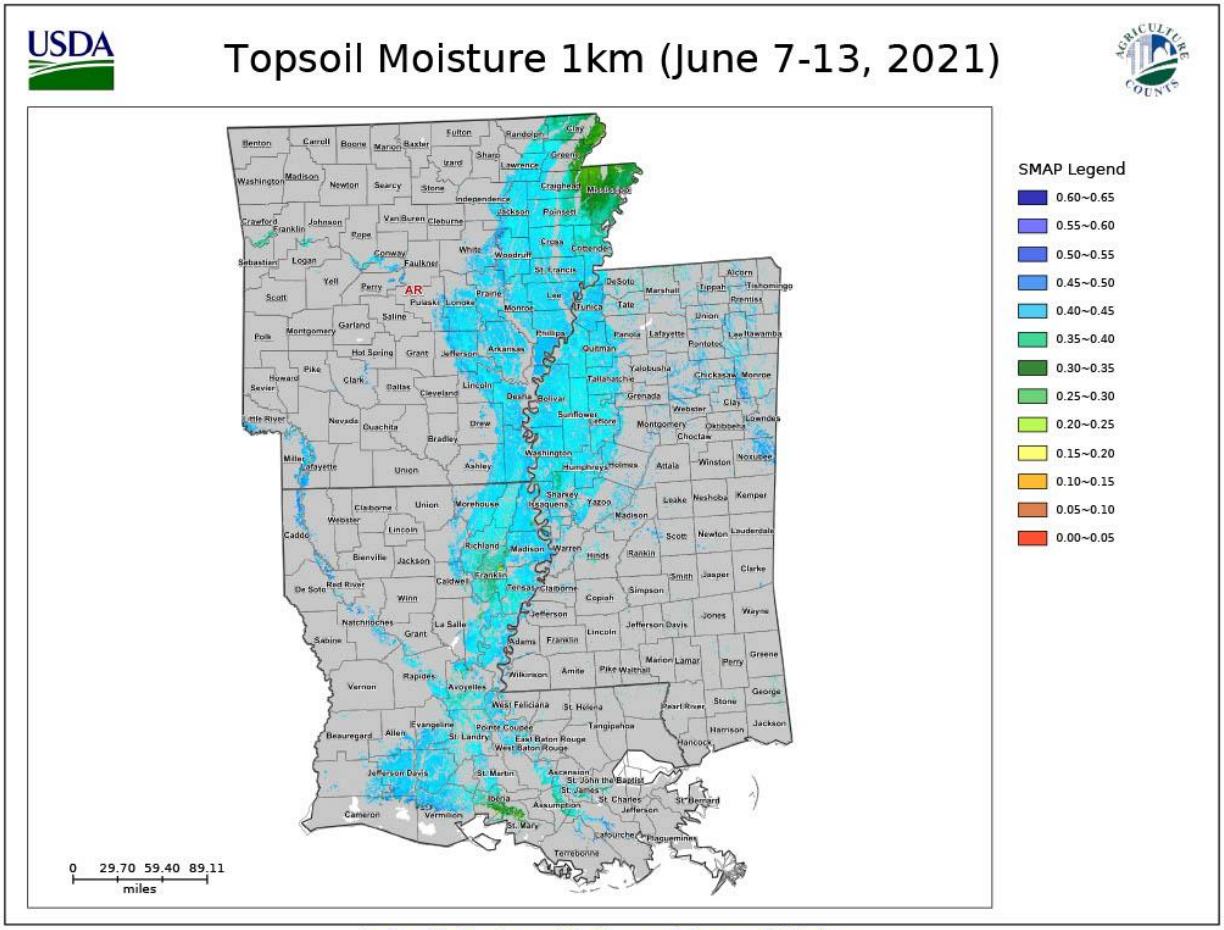
U.S. Department of Agriculture, National Agricultural Statistics Service

Topsoil Moisture

NASA Remotely Sensed Surface Soil (topsoil) is defined as the top 2 inches (approximately 5 centimeters). The NASA SMAP 1km 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.

Topsoil moisture above 0.4 cm3/cm3 (40% water content) could be considered very wet.

Figure 1



The percentage of total cropland which is above 40% in the Delta Region and the states individually are highlighted in pink in Table 1.

Table 1

Topsoil Moisture (1km, June 7-13, 2021)				
Volumetric Soil Moisture (cm3/cm3)	Delta Region	Arkansas	Louisiana	Mississippi
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
0.0-0.05	0.00%	0.00%	0.00%	0.00%
0.05-0.1	0.00%	0.00%	0.01%	0.00%
0.1-0.15	0.01%	0.00%	0.03%	0.00%
0.15-0.2	0.02%	0.00%	0.07%	0.00%
0.2-0.25	0.03%	0.00%	0.10%	0.00%
0.25-0.3	2.70%	5.68%	0.79%	0.00%
0.3-0.35	4.14%	6.79%	3.18%	0.95%
0.35-0.4	16.03%	11.95%	22.59%	15.31%
0.4-0.45	73.93%	74.04%	69.02%	79.31%
0.45-0.5	2.93%	1.54%	3.50%	4.42%
0.5-0.55	0.10%	0.00%	0.34%	0.00%
0.55-0.6	0.09%	0.00%	0.29%	0.00%
0.6-0.65	0.02%	0.00%	0.07%	0.00%
> 0.65	0.00%	0.00%	0.00%	0.00%
Total	100.00%	100.00%	100.00%	100.00%

**Total Cropland derived by 2020 Cultivated Layer hosted on Crop-CASMA.

Table 2 identifies the specific crops (2020 Cropland Data Layer) that are planted in soils with greater than 40% topsoil moisture

Table 2

Topsoil Moisture (1km, June 7-13, 2021)						
Crop Type	Arkansas		Louisiana		Mississippi	
	Total Acreage (Official 2020 NASS Estimate)	Percentage of crop type > 0.4 Volumetric Soil Moisture	Total Acreage (Official 2020 NASS Estimate)	Percentage of crop type > 0.4 Volumetric Soil Moisture	Total Acreage (Official 2020 NASS Estimate)	Percentage of crop type > 0.4 Volumetric Soil Moisture
Corn	620,000	74.38%	500,000	57.04%	510,000	74.80%
Soybeans	2,820,000	74.27%	1,050,000	76.61%	2,090,000	86.00%
Cotton	525,000	49.67%	170,000	68.78%	530,000	77.59%
Rice	1,461,000	79.55%	480,000	94.76%	166,000	94.07%

**Total Acreage by state determined by official 2020 NASS estimates. Crop type percentages determined by 2020 Cropland Data Layer.

Topsoil 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 SM_m denote current soil moisture value and the historical average soil moisture value of a given location.

Soil moisture anomaly above 30% could be considered very abnormal, which means there is 30% more soil moisture than normal conditions.

Figure 2

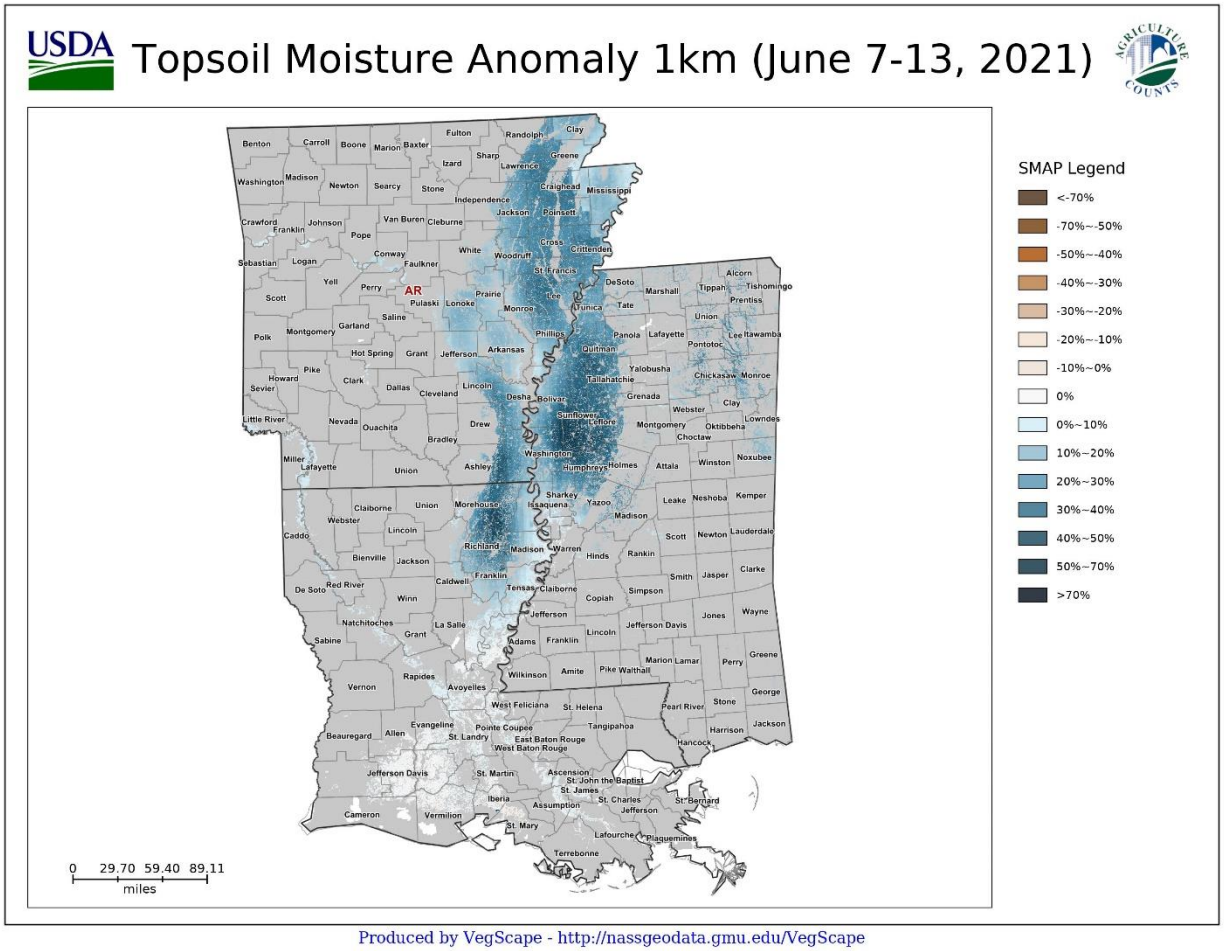


Table 3 identifies the percentage of total cropland in the Delta Region as well as in the individual states at different levels of soil moisture anomaly. The percentages of total cropland with greater than 30% more soil moisture than normal are highlighted in pink.

Table 3

Topsoil Moisture Anomaly (1km, June 7-13, 2021)				
Soil Moisture Anomaly	Delta Region	Arkansas	Louisiana	Mississippi
	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%	0.00%	0.00%	0.00%	0.00%
-40%~-30%	0.00%	0.00%	0.00%	0.00%
-30%~-20%	0.00%	0.00%	0.00%	0.00%
-20%~-10%	0.00%	0.00%	0.00%	0.00%
-10%~0%	1.52%	0.00%	5.22%	0.00%
0%~-10%	20.44%	3.51%	60.91%	4.16%
10%~20%	21.02%	30.60%	13.94%	13.34%
20%~30%	22.37%	28.90%	7.27%	28.03%
30%~40%	25.97%	35.94%	7.07%	30.29%
40%~50%	7.66%	1.04%	5.43%	20.57%
50%~70%	1.03%	0.00%	0.14%	3.60%
>70%	0.00%	0.00%	0.01%	0.00%
Total	100.00%	100.00%	100.00%	100.00%

**Total Cropland derived by 2020 Cultivated Layer hosted on Crop-CASMA.

Table 4 identifies the specific crops (2020 Cropland Data Layer) in soils with greater than 30% greater soil moisture than normal conditions during the period from June 7 – 13, 2021.

Table 4

Topsoil Moisture Anomaly (1km, June 7-13, 2021)						
Crop Type	Arkansas		Louisiana		Mississippi	
	Total Acreage (Official 2020 NASS Estimate)	Percentage of crop type > 30% Soil Moisture Anomaly	Total Acreage (Official 2020 NASS Estimate)	Percentage of crop type > 30% Soil Moisture Anomaly	Total Acreage (Official 2020 NASS Estimate)	Percentage of crop type > 30% Soil Moisture Anomaly
Corn	620,000	35.64%	500,000	23.52%	510,000	52.04%
Soybeans	2,820,000	37.22%	1,050,000	13.58%	2,090,000	59.31%
Cotton	525,000	37.38%	170,000	22.86%	530,000	50.14%
Rice	1,461,000	42.06%	480,000	8.42%	166,000	68.39%

**Total Acreage by state determined by official 2020 NASS estimates. Crop type percentages determined by 2020 Cropland Data Layer.

Topsoil 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.

Figure 3

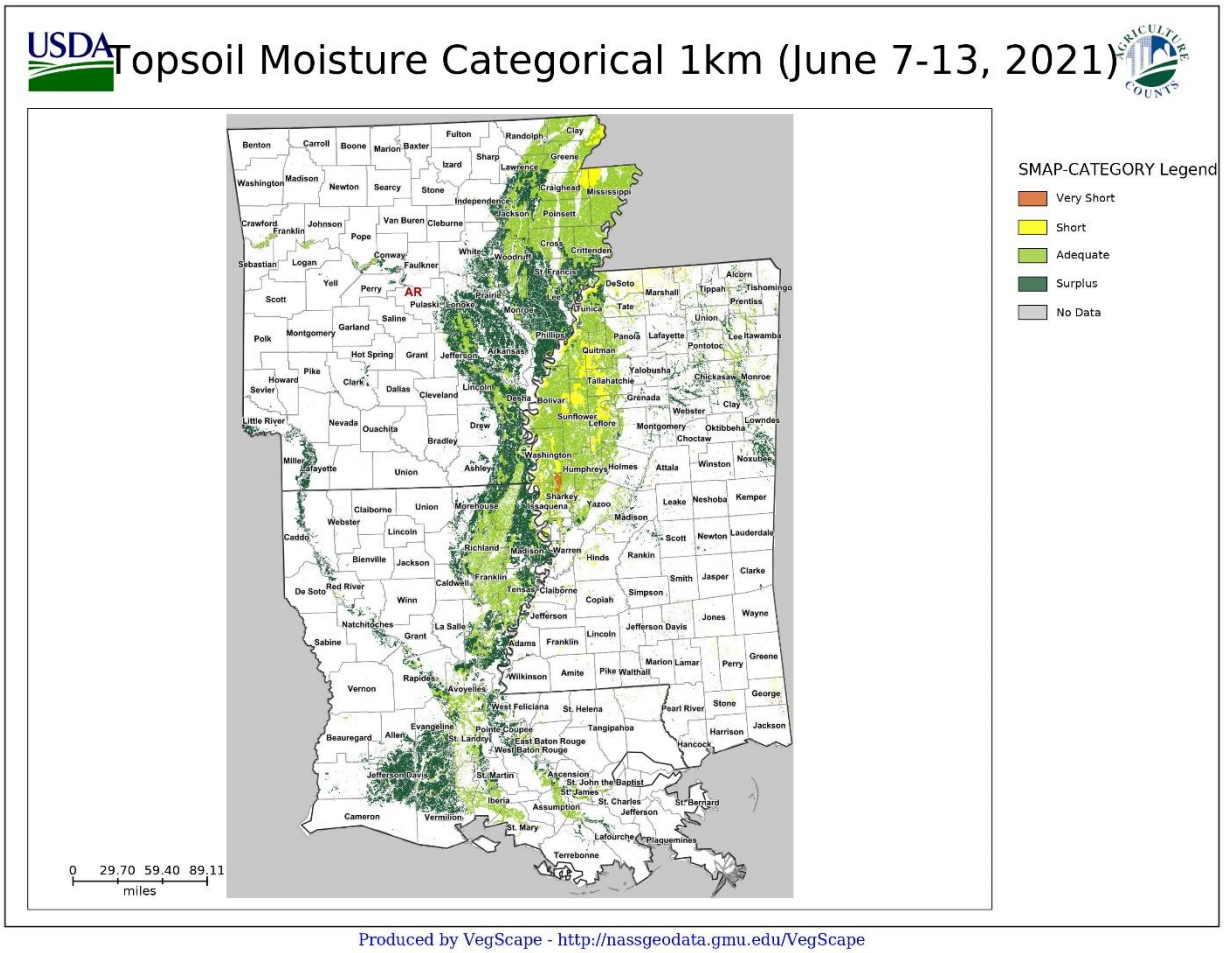


Table 5 identifies total cropland in soils with surplus soil moisture during the period from June 7 – 13, 2021.

Table 5

Topsoil Moisture Categorical (1km, June 7-13, 2021)				
Categorical Soil Moisture	Delta Region	Arkansas	Louisiana	Mississippi
	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland	Percentage of Total Cropland
Very Short	0.52%	0.00%	0.01%	1.86%
Short	5.01%	2.22%	0.00%	14.56%
Adequate	51.00%	46.16%	41.42%	69.11%
Surplus	43.47%	51.62%	58.56%	14.47%
Total	100.00%	100.00%	100.00%	100.00%

**Total Cropland derived by 2020 Cultivated Layer hosted on Crop-CASMA.

Table 6 identifies crops (2020 Cropland Data Layer) in soils with surplus soil moisture during the period from June 7 – 13, 2021.

Table 6

Topsoil Moisture Categorical (1km, June 7-13, 2021)						
Crop Type	Arkansas		Louisiana		Mississippi	
	Total Acreage (Official 2020 NASS Estimate)	Percentage of crop type with Surplus Soil Moisture	Total Acreage (Official 2020 NASS Estimate)	Percentage of crop type with Surplus Soil Moisture	Total Acreage (Official 2020 NASS Estimate)	Percentage of crop type with Surplus Soil Moisture
Corn	620,000	50.26%	500,000	40.00%	510,000	19.28%
Soybeans	2,820,000	51.63%	1,050,000	58.67%	2,090,000	12.24%
Cotton	525,000	30.60%	170,000	49.17%	530,000	20.89%
Rice	1,461,000	50.76%	480,000	86.43%	166,000	5.92%

**Total Acreage by state determined by official 2020 NASS estimates. Crop type percentages determined by 2020 Cropland Data Layer.