

# Nevada Drought Update - DECEMBER 2021

Drafted December 6, 9-11, 2021

Prepared by S. McAfee, State Climatologist

**It's time to watch and wait. Whether drought continues will depend on the amount of rain and snowing in the coming months.**

## Current drought conditions in Nevada and across the West

Nevada remains entirely in drought (Fig. 1 & Table 1). As in previous months, drought conditions are more severe to the south.

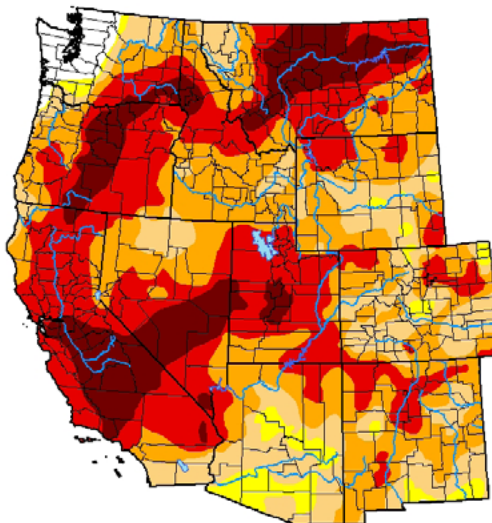
Almost all of the western US is still in drought. Extreme (D3) and Exceptional (D4) drought are present over more than 40% of the region (Fig. 1). Only far western Washington and the northwest corner Oregon are entirely free of drought or dry conditions. There are scattered regions of Abnormally Dry (D0) conditions remaining, mostly in Arizona where this summer's monsoon was exceedingly wet.

There were additional improvements in northern Nevada and California as conditions continued to be evaluated following the late October storm (Fig. 2). Drought conditions improved in parts of the inland Pacific Northwest, as a series storms impacted the region (Fig. 2). Further east, conditions deteriorated with drought expanding or deepening in Colorado and New Mexico.

Date	8/31	11/2	11/30
None	0	0	0
Abornmally Dry-D0	0	0	0
Moderate Drought-D1	4.8	4.8	10.0
Severe Drought-D2	27.4	38.4	33.7
Extreme Drought-D3	41.5	31.8	31.3
Exceptional Drought-D4	26.3	25.0	25.0

Table 1. Percent of Nevada in each drought class from the [US Drought Monitor](https://droughtmonitor.unl.edu/).

### U.S. Drought Monitor Western U.S.



**November 30, 2021**  
(Released Thursday, Dec. 2, 2021)  
Valid 7 a.m. EST

	Drought Conditions (Percent Area)					
	None	D0	D1	D2	D3	D4
Current	2.11	3.90	18.07	31.85	30.57	13.50
Last Week 11-23-2021	2.11	5.43	18.93	30.89	29.14	13.50
3 Months Ago 08-31-2021	5.74	4.33	13.81	22.36	34.47	19.27
Start of Calendar Year 01-01-2021	11.57	9.00	13.45	18.69	24.32	22.16
Start of Water Year 09-28-2020	2.21	8.19	14.22	22.92	34.05	18.40
One Year Ago 11-30-2020	12.01	12.44	14.66	16.22	22.56	22.10

**Intensity**  
None D2 Severe Drought  
D0 Abnormally Dry D3 Extreme Drought  
D1 Moderate Drought D4 Exceptional Drought

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. For more information on the Drought Monitor, go to <https://droughtmonitor.unl.edu/About.aspx>

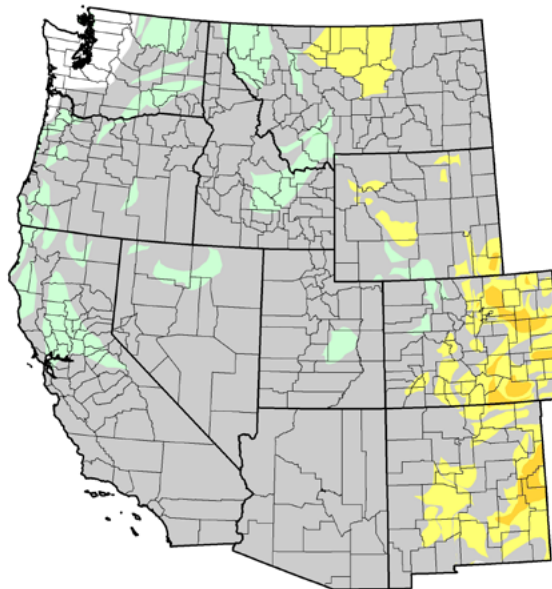
Author:  
Richard Heim  
NCEI/NOAA



[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)


Fig. 1. Drought Monitor map for the western US, released on December 2, 2021, reflecting conditions as of November 30, 2021.

### U.S. Drought Monitor Class Change - Western U.S. 4 Week



November 30, 2021  
compared to  
November 2, 2021

[droughtmonitor.unl.edu](https://droughtmonitor.unl.edu)



Dark Brown	5 Class Degradation
Brown	4 Class Degradation
Orange	3 Class Degradation
Yellow-Orange	2 Class Degradation
Yellow	1 Class Degradation
Light Green	No Change
Green	1 Class Improvement
Dark Green	2 Class Improvement
Teal	3 Class Improvement
Blue-Teal	4 Class Improvement
Dark Blue	5 Class Improvement

Fig. 2. Drought Monitor change map showing places where drought conditions improved (green) or worsened (yellow to brown) between early and late November 2021.

## November Temperature, Precipitation & Snowpack

After a cool and wet October, November was dry and relatively warm. November temperatures were 1°F to 7°F degrees above average (Fig. 3). The biggest differences from normal were mostly in southern Nevada. At the McCarran Airport in Las Vegas, daytime highs hit 80°F or above on five days in November. Many stations across the state broke daily high temperature records (as in, it was the warmest it had ever been there on that day of the year, not the warmest it had ever been -- that would be ridiculous for November).

It was also quite dry. Much of the state had less than a quarter of its expected November rain and snow (Fig. 4). As of November 30, 20 stations had reported no precipitation in the last 30 days, and another eight had received only a trace (less than 0.01", the smallest mark on many precipitation gages) over that time.

After the late October storm, the statewide average snowpack (as measured at SNOTEL stations in the mountains) jumped from around zero to near-record high (Fig. 5). While the warm, sunny November was great for finishing up fall yard work and getting in a few last hikes, it did a number on the snowpack. By mid-November the snowpack had dropped below the 1991 - 2020 normal. As of November 30, snowpack across Nevada and the eastern Sierra was 37% of normal, a value that falls below the 10<sup>th</sup> percentile for late November.

Snowpack in the Upper Colorado Basin, the main water source for Lake Mead, didn't get as much of a boost in October as the Sierra. The Upper Colorado Basin also had a relatively warm, dry November, so the snowpack there hasn't grown the way it normally would in November. The Upper Colorado ended November with 55% of the normal snowpack, also below the 10<sup>th</sup> percentile for late November.

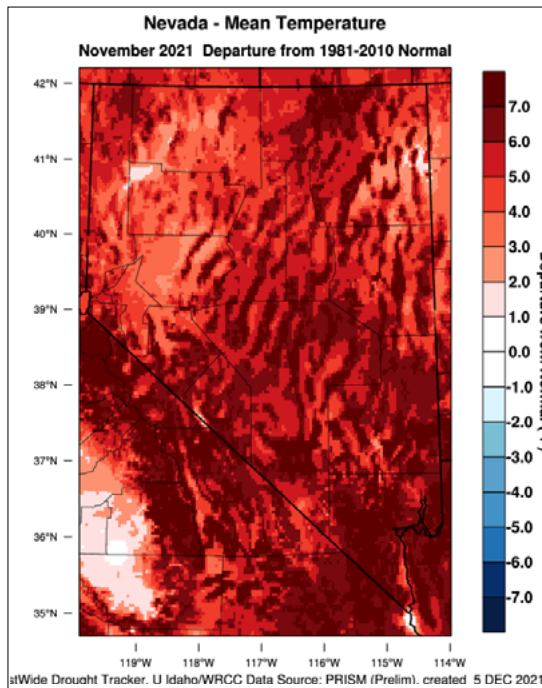


Fig. 3. Difference from average (1981-2010) November temperature (°F) in November 2021. PRISM from [WestWide Drought Tracker](#).

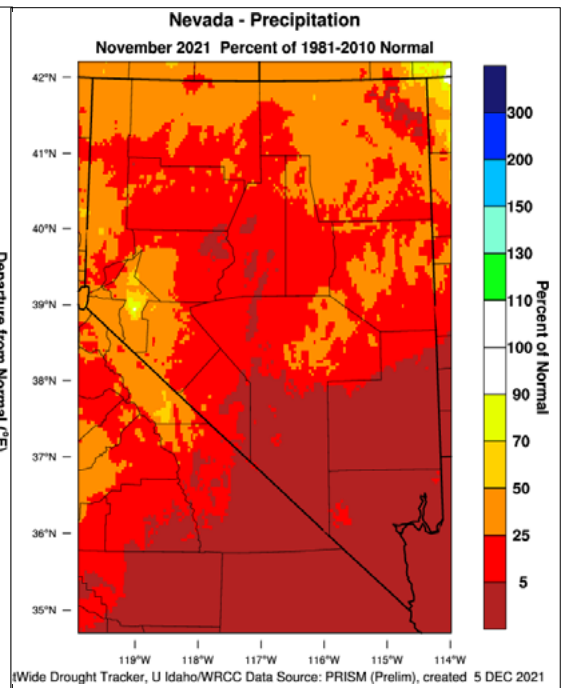
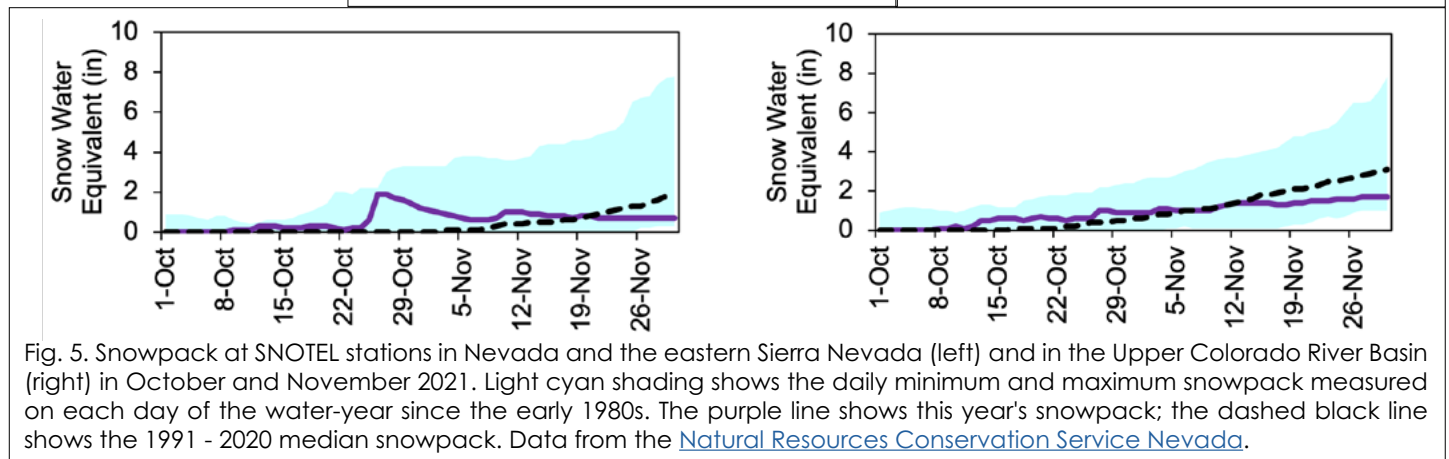
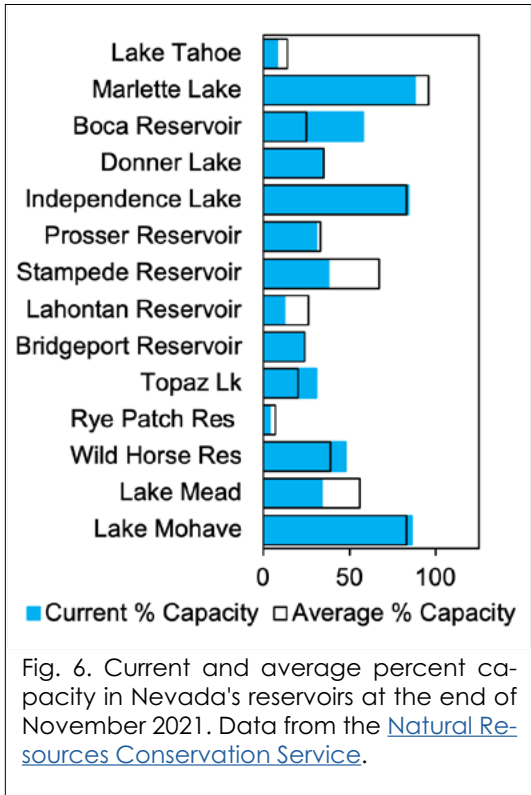


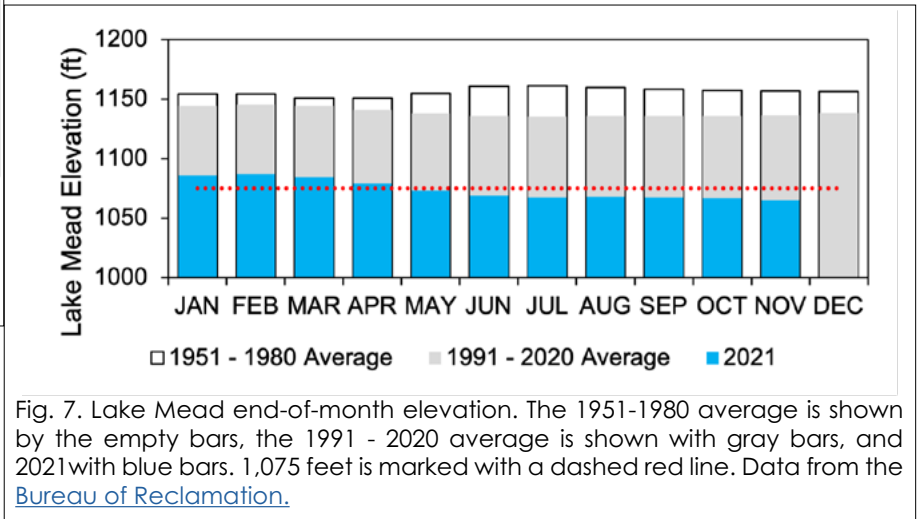
Fig. 4. Percent of average (1981-2010) November precipitation in November 2021. PRISM from [WestWide Drought Tracker](#).



# Water Resources

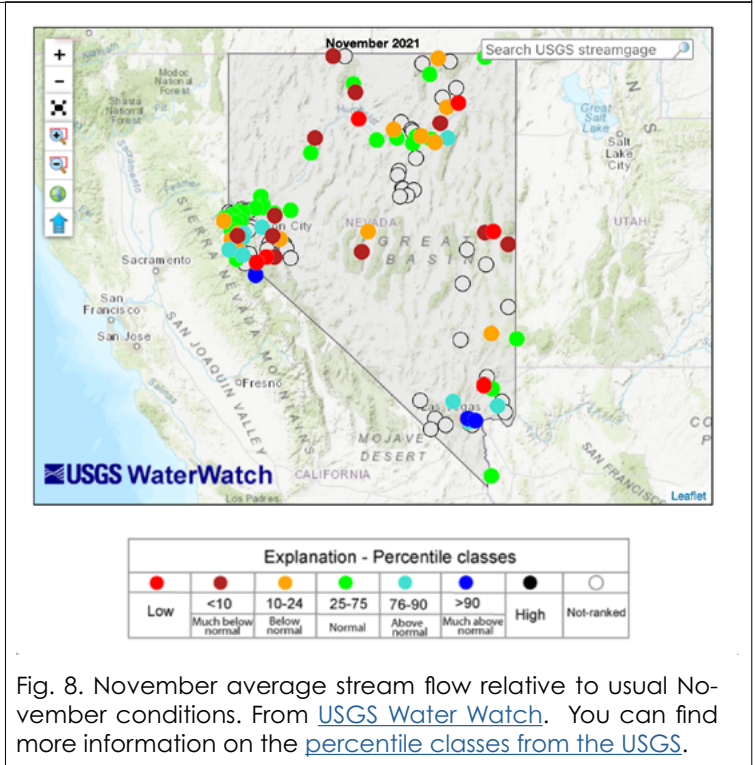


Many of Nevada's reservoirs were near or even above their usual end-of-November capacity (Fig. 6). Boca Reservoir and Topaz Lake are particularly high for the time of year, at 229% and 160% of normal capacity, respectively. Normally those reservoirs are still low in late November, so they don't need to have that much water to be fuller than normal. Rye Patch Reservoir is at 4% of capacity, though normal for this time of year is only 7%. Lahontan Reservoir, at 12% of capacity, and the reservoir portion of Lake Tahoe, at 8% of capacity, are also low for this time of year. Reservoir levels fluctuate in response to water supply but also management decisions.



Lake Mead's elevation continued to drop, from 1,066.77 feet at the end of October to 1,064.97 feet at the end of November (Fig. 7). Current water levels are well below average over the most recent 30-year period (1991 - 2020). Averages over that recent period are lower than for the 1951 - 1980 average, which captures the [well-known 1950s drought](#). The current elevation is below the 1,075' Tier 1 shortage trigger. According to the [November 24-month](#) study from the US Bureau of Reclamation, Lake Mead's surface elevation is most likely to remain below 1,075 feet through September 2023 and could fall below 1,050 feet in summer of 2023.

Gaged streams across the state are displaying from much below normal to much above normal flow (Fig. 8). Below to much below normal stream flow was observed at gages in all parts of the state. Much above normal stream flow was observed in southern Nevada and at one gage in western Nevada. In eastern and north-central Nevada flow at most gages was normal or below normal, with only one stream showing above normal flow.



## Soils, Vegetation & Wildfire

October storms soaked soils, particularly in the northern part of the state, and regional average soil moisture at SNOTEL stations approached the maximum recorded over the last decade and a half (Fig. 9). Despite dry and relatively warm conditions in November, regional average soil moisture stayed high. This is likely a result of melting snow continuing to moisten soils and overall low evapotranspiration, since even above average November temperatures are fairly cool at elevation where most SNOTEL stations are located. Remotely sensed surface soil moisture is now below normal over almost all of the state, with wetter than normal conditions limited to parts of northwest Nevada (Fig. 10). Surface

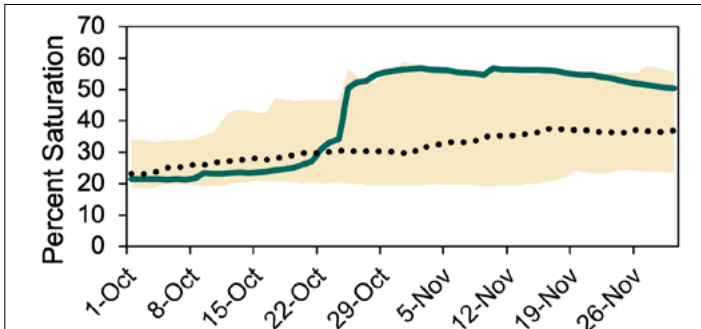


Fig. 9. Soil moisture at SNOTEL stations in Nevada and the eastern Sierra Nevada in October - November 2021. Tan shading marks the period of record (WY2006-2021) minimum and maximum. The green line shows 2021 and the dashed black line the median. From the [Natural Resources Conservation Service Nevada](#).

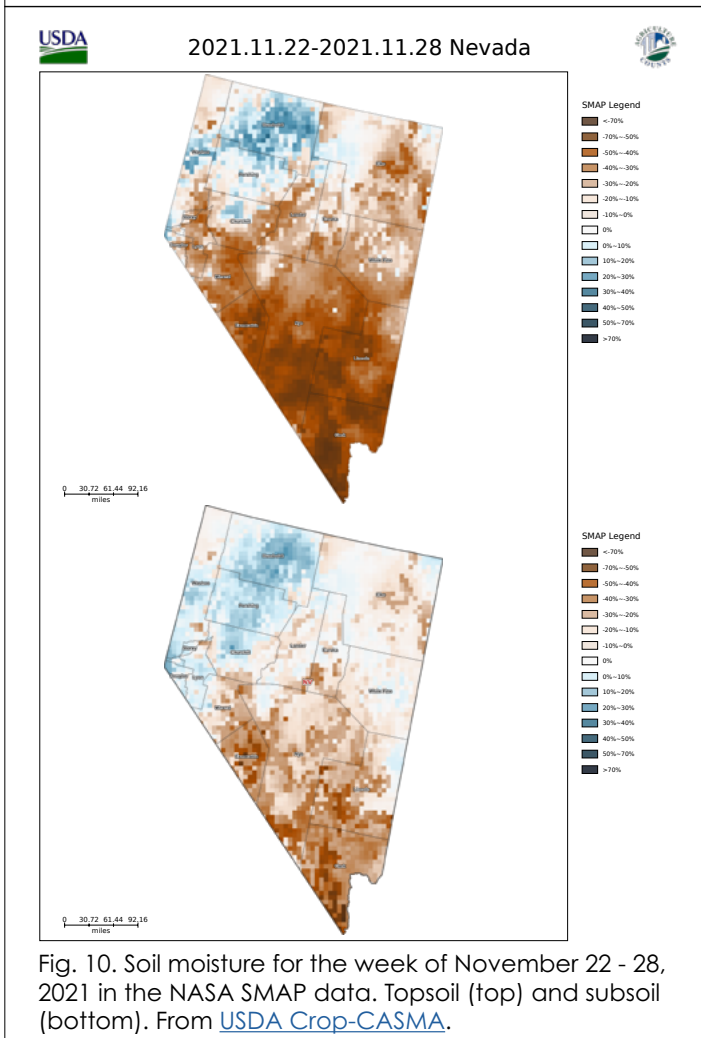


Fig. 10. Soil moisture for the week of November 22 - 28, 2021 in the NASA SMAP data. Topsoil (top) and subsoil (bottom). From [USDA Crop-CASMA](#).

soil moisture is particularly low in southern Nevada. Subsoils remained wet over northern Nevada and dry in southern Nevada. There are also indications that subsoils are drying in parts of Elko County.

The Mean Condition Vegetation Index, which tracks vegetation health, shows above normal vegetation growth in the north and below in the south (Fig. 11). Some of the apparently above normal growth in the north could just be lack of snow showing up as healthier vegetation. However, there have been anecdotal reports of some plants -- including cheat grass and California poppy -- greening up in recent weeks. Vegetation growth is normal to below normal in southern Nevada and parts of southeastern Elko County.

While wildfire can occur during the fall and winter, fire risk in Nevada is generally much lower. As of December 11, both the national and Great Basin Preparedness Levels were 1, indicating that resources are not strained. The [Great Basin Coordination Center](#) is not currently reporting Fire Potential Impacts and will not until the 2022 fire season starts.

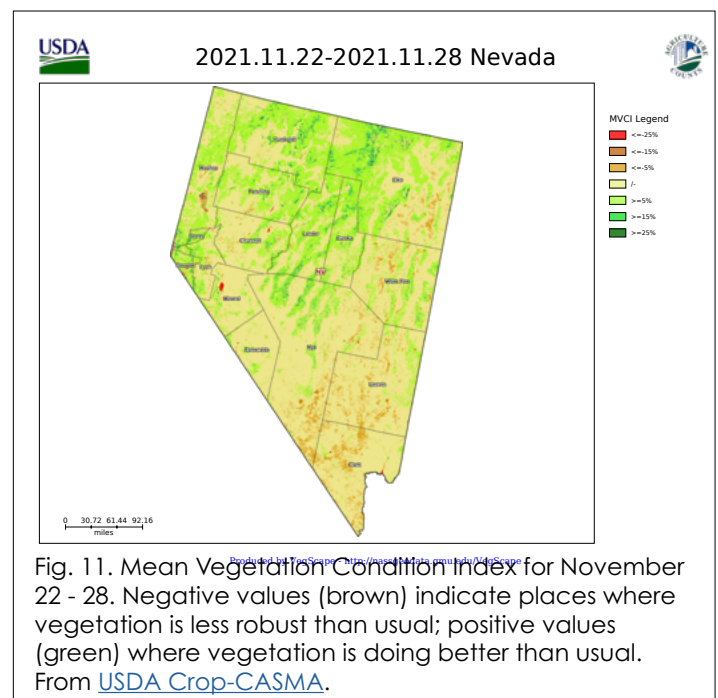


Fig. 11. Mean Vegetation Condition Index for November 22 - 28. Negative values (brown) indicate places where vegetation is less robust than usual; positive values (green) where vegetation is doing better than usual. From [USDA Crop-CASMA](#).