



# EXPERIENCES WITH DROUGHT AND THE LIVESTOCK FORAGE PROGRAM IN ARIZONA

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# INTRODUCTION

The 2008 Farm Act introduced the Livestock Forage Disaster Program (LFP)<sup>1</sup>, one of three disaster assistance programs for livestock producers impacted by climate hazards administered through the Farm Service Agency. The LFP program provides payments to offset additional feed costs when drought or wildfires affect grazing conditions. The presence and severity of drought and corresponding payment amounts are determined by the United States Drought Monitor (USDM)<sup>2</sup>. The USDM is a map produced weekly by meteorologists and climatologists from the National Drought Mitigation Center, the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Department of Agriculture (USDA) that depicts the location and intensity of drought across the United States. The USDM estimates drought conditions by blending a combination of data sources, such as precipitation, streamflow, temperature, soil moisture, and vegetation health, in conjunction with interpretation and reports by local experts. The USDM categorizes drought severity according to 5 categories: abnormally dry (D0), moderate drought (D1), severe drought (D2), extreme drought (D3), and exceptional drought (D4).

Linking LFP payments to the USDM drought designations establishes a delicate relationship between livestock producers and drought monitoring teams authoring the USDM. Both groups define and monitor drought differently. Livestock producers experience drought through the local impacts on the availability and quality of the forage on their grazing lands. The USDM contributing authors identify drought using environmental data averaged over a large land area. The USDM uses a broader drought definition that considers the multiple ways drought can impact the environment and society. Since the USDM is not tailored to monitor drought impacts on forage, there is a potential for a mismatch between drought impacts on rangelands and USDM drought designations.

Mismatches between the USDM and local forage conditions can create mistrust between drought monitor authors and livestock producers. Livestock producers are frustrated when the USDM does not reflect local drought conditions, making them ineligible for LFP payments. USDM contributors are also wary of integrating some local reports of drought into the USDM since there are financial incentives for drought designations. USDM authors primarily rely on measurements of precipitation and temperature and are reluctant to change drought classifications in weekly updates if local reports deviate substantially from these objective metrics.

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<sup>1</sup> <https://www.fsa.usda.gov/resources/programs/livestock-forage-disaster-program-lfp>

<sup>2</sup> <https://droughtmonitor.unl.edu>

The purpose of this report is to better understand the relationship between the LFP and the USDM in the Arizona context. Interviews with livestock producers and federal and state-level rangeland managers identify perceptions and experiences with the LFP and USDM drought monitoring. Through these interviews, we identify some themes in evaluating how the current use of the USDM in the LFP addresses drought risk in Arizona.

## BACKGROUND

### LFP PROGRAM DESCRIPTION

The LFP is a federal assistance program administered by the Farm Service Agency (FSA) of the U.S. Department of Agriculture designed to provide financial aid to livestock producers who have suffered grazing losses due to drought or fire. Grazing losses due to drought and payment eligibility are determined on a county-by-county basis through ongoing, weekly updates to the U.S. Drought Monitor. Payment levels are triggered by the duration of different drought intensities in a county as indicated by the U.S. Drought Monitor.

These triggers are:

- D2 (severe drought) for eight consecutive weeks: 1 monthly payment
- D3 (extreme drought) for any duration: 3 monthly payments
- D3 (extreme drought) for at least four weeks or D4 (exceptional drought) for any duration: 4 monthly payments
- D4 (exceptional drought) for four weeks (not necessarily consecutive): 5 monthly payments

Payments for eligible livestock producers are calculated based on the monthly feed cost for all covered livestock owned or leased by the producer or on the normal carrying capacity of the grazing land available to the producer. The LFP monthly payment rate is then 60 percent of the lesser monthly feed cost based on either method.

The 2018 Farm Bill established payment limitations to the LFP. Starting in 2019, no person or legal entity may receive more than \$125,000 total in LFP payments. Persons or legal entities with an adjusted gross income that exceeds \$900,000 are not eligible to receive LFP payments.

### DROUGHT IN ARIZONA

Drought is a common feature of Arizona's semi-arid to arid climate (Figure 1, Sheppard et al., 2002). Precipitation is seasonal with mid-latitude frontal storms occurring in the winter season and convective storms occurring during the summer monsoon. Winter precipitation

is critical to replenishing water resources through upper elevation snowpack and low elevation soil moisture. Thunderstorms during the summer monsoon put an end to the spring fire season and are an important moisture source for warm season grasses that provide forage for wildlife and livestock.

This seasonal hydroclimate is subject to large amounts of interannual climate variability, especially with the winter season. The El Niño-Southern Oscillation strongly modulates winter climate across the southwest U.S. with La Niña events often driving below-average seasonal precipitation and El Niño events the opposite. Multi-year droughts are often associated with persistent La Niña conditions that drive multiple below-average winter seasons in a row (Cook et al., 2016).

The connection to ENSO is much weaker during the summer monsoon, so winter droughts are not necessarily followed by dry (or wet) summertime conditions. This disconnection between winter and summer precipitation variability can lead to situations where long-term drought impacts driven by multiple years of below-average winter precipitation are present in sectors like water management, but average to above-average summer precipitation lessens or ameliorates short-term drought conditions related to fire risk and forage production (Weiss et al., 2009).

The interaction between seasonal precipitation variability and drought conditions at long and short timescales makes it challenging to characterize drought in a single uniform way across Arizona. Livestock operations are sensitive to multiple forms of drought including water availability which is tied to winter precipitation and longer-term precipitation variability as well as summer precipitation. The timing and frequency of monsoon precipitation on shorter timescales can govern forage conditions and drought impacts.

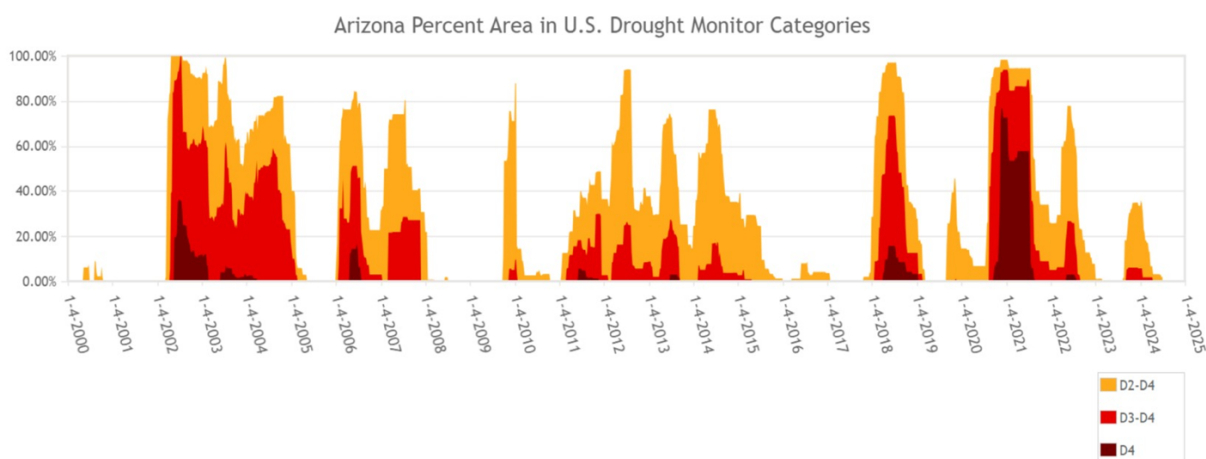


Figure 1. Percent Area of Arizona under USDM Drought Categories 2000-2024

## HOW WAS THE STUDY CONDUCTED?

We interviewed 7 rangeland managers or climate specialists working for state or federal land management agencies who are familiar with the LFP and rangeland issues. We also interviewed 7 livestock producers with extensive ranching experience in Arizona. Interview questions covered drought monitoring and experiences with the LFP. The interview transcripts were analyzed to identify and summarize experiences with drought monitoring and perceptions of the LFP and the USDM.

## STUDY RESULTS

### EXPERIENCES WITH DROUGHT AND RANCHING IN ARIZONA

Livestock producers and rangeland managers provided important context for understanding the challenges that droughts pose to cattle ranching in Arizona.

***Droughts can have a devastating impact on ranching.*** Severe droughts decrease the availability of forage and drinking water for cattle. The increased costs of additional feed or hauling water can drive ranchers to sell off their cattle. One rancher explained the multiple ways in which selling cattle in response to drought impacts a ranch:

*When you sell off an acclimated herd and have to replace it, you have cows that are not used to the area or the forage or know where to go get water. An acclimated herd is extremely valuable for their knowledge of what to eat and what not to eat...So you're selling cows at a time when everybody else is selling cows, which exacerbates the problem because then the cow prices are low because there are quite a few on the market. And then when you buy your cattle back, you have to pay a premium for them, because everybody's buying cattle at the same time you are.*

The combination of income loss and the loss of a “core herd” can drive many small and mid-sized ranchers out of ranching. Ranchers also mentioned that increased wildfires during drought also contribute to the impacts of drought on ranching.

***Arizona producers are continually adapting to drought conditions.*** When asked about drought management, one rancher stated “*That is all we've done is manage for drought. 24/7. 365 days a year.*” Ranchers and rangeland managers described the many ways in which ranchers are constantly planning and adapting to drought conditions. Ranchers must plan for and respond to forage losses from lack of winter rains or monsoon rains. Drought

can also affect the availability of drinking water from streams and wells. Drought management includes developing water infrastructure, developing a network of pastures to move cattle around, and keeping smaller herds. As a rancher described,

*I reduced my herd size by 30%. Not that I don't have the feed, but I don't have the water this year. And a couple of years ago I had the water and didn't have the feed. So in order to make sure that I have the ability to run cattle and do it well without creating a lot of problems, I reduced the herd size. I don't like taking the economic hit, but it's more important I take care of the land than it is put money into the bank.*

Programs like the Livestock Forage Disaster Program and drought insurance are some of the many ways in which producers manage and respond to drought.

## PERCEPTIONS OF THE LFP

The LFP is one of many programs that offer drought recovery assistance for ranchers. In our conversations with ranchers and natural resource managers, discussions covered the benefits of using the LFP and the reasons why some ranchers choose not to apply for LFP payments.

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### WHY RANCHERS APPLY FOR THE LFP

**LFP provides needed disaster assistance during drought.** Several ranchers explained that the LFP payments were critical for their ranching operations during droughts. One rancher said that LFP payments have “*made the difference between us staying in business and not.*” Another rancher described that despite his qualms about accepting government assistance, “*I am willing to take it because I know some of the positions we’ve been in where we need it so desperately in dry years.*” For some ranchers, the LFP payments provide critical assistance in offsetting the costs of extra feed when native forage is affected by drought.

**LFP payments are seen as accessible for ranchers with smaller operations.** The LFP was described as a no-risk program compared to existing drought insurance programs. One natural resource manager described the LFP program as “*more attainable for even lower income, mid-level people. It doesn’t bite into them upfront*” (02). Drought insurance programs can be costly and complicated, and ranchers appreciated the simplicity of the LFP. One rancher described the risk with drought insurance, “*Some people are quite leery of it because of the amount of premium that you have to pay, and it is a bit of a gamble.*” Another rancher appreciated LFP as he compared drought insurance to gambling, stating “*I just don't want to play that game, and I'm not big enough to where it's a major deal. If I were running 400 or 500 head over a bigger, maybe I'd feel differently about it. But I don't feel it's necessarily targeted at smaller ranchers.*” For ranchers with smaller operations, the LFP is a more accessible relief program during drought disasters.

## WHY RANCHERS DO NOT APPLY FOR THE LFP

**Some ranchers are averse to receiving government assistance.** Some ranchers are critical of welfare programs and government assistance for ranching operations. One rancher stated, *“We’re not tied to the federal government in any way, shape, or form other than we have to pay taxes on it.”* Some ranchers are wary of any involvement with state or federal authorities and do not want to disclose cattle information to apply for the LFP. One rancher stated, *“I’ve had ranchers tell me, “I’m not going to tell them how many cows I have.”*

The reluctance to become involved with a federal government program can also extend to tribal ranchers. One extension agent explained that as LFP payments are taxed, some tribal ranchers do not want to submit 1099 tax forms or be counted in a federal government system.

**Some ranchers prefer drought insurance over the LFP program.** While purchasing drought insurance doesn’t preclude you from applying for LFP payments, some ranchers prefer to use only drought insurance. Drought insurance can provide larger payments and ranchers appreciate the opportunity to invest these funds back into the ranch. One rancher explained that drought insurance *“pays a lot more and you can do something with that... whether it’s removing pinyon and juniper or cleaning a stock tank.”* An extension agent also highlighted that LFP payments are *“unpredictable. Disaster payments are hard to budget for. So, the insurance is their option to do that. Those are more predictable.”*

## PERCEPTIONS OF USDM TRIGGERS FOR THE LFP

Discussions with ranchers and natural resource managers covered their experiences and perspectives on relying on the USDM for payment triggers.

**USDM maps do not always match local drought experiences.** Both natural resource managers and ranchers recalled times when local drought conditions were not reflected in the USDM map and therefore did not trigger LFP payments. One rancher explained,

*The drought monitor is where we have a problem, and we were reporting to the drought monitor. The university was asking all the ranchers to report once a month. And that didn’t seem to trigger anything more. It was like, “Okay, we’re wasting our time filling out this paperwork that is informing the drought monitor. We’re in a drought!”*

Conversations around the drought monitor also identified occasions when the USDM triggered payments when ranchers were not experiencing drought. One natural resource manager described that sometimes *“We get some good spring rains, and it rains in the summer. And we’ll announce that we’ve got the LFP program. The ranchers will go, “I’ve got feed. I’ve got water. What are you doing that for?”* The discrepancies between local drought experiences and the USDM map have consequences for the disbursement of LFP payments and what drought assistance is made available for ranchers.

**There are challenges in collecting climate data in Arizona that affect the USDM’s depiction of drought.** Both natural resource managers and ranchers identified several

challenges with collecting and evaluating drought data for the USDM. Arizona counties are vast and can have significant changes in topography, translating into significant climate variation within a county. A rangeland manager explained,

*I've been all over the state. All over the hills and valleys. I understand what we face and how our elevations changed so much in a given county and how large our counties are. You could have heavy rain in Northern Maricopa and then barely anything in Southern Maricopa County. It's so hard to get it right here in Arizona. It's so hard to get it right because of that vast difference in climate and elevation.*

Given the density of weather stations across the western U.S. it is difficult to provide spatially accurate depictions of drought, especially across the large counties in Arizona. Several interviewees also expressed concern with the lack of weather stations across the state, leading to gaps in climate data for drought monitoring. This problem is particularly significant for tribal lands, with consequences for the disbursement of LFP payments for Tribal ranchers. The lack of availability of soil moisture data across the state was also identified as a gap for monitoring drought on rangelands.

***The USDM is a general drought monitoring tool and is not tailored to monitor forage conditions.***

The suitability of the USDM for triggering LFP payments was brought into question in discussion with ranchers and rangeland managers. As one rangeland manager pointed out, *“The Drought Monitor is going to end up trying to do everything from long-term drought to short-term drought, so sometimes it will sync up really well with rangeland impacts and sometimes it won't. And it could go either way. It could suggest that it's worse on a rangeland than it actually is and vice versa.”* Some of the discrepancies between the USDM and local rangeland drought conditions are not only because of the lack of local climate data, but because the USDM takes into account so many other dimensions of drought and is not singularly focused on rangeland forage conditions.



Some interviewees expressed that some of the USDM authors were not familiar with the nuances of the relationship between climate and forage production in Arizona. Native forage in the state is dependent on winter rains for some species and summer monsoon rains for others. Lack of rain during these times can impact native forage production. One rancher described how the USDM sometimes overlooks the importance of the timing of rains, *“we got three-quarters of an inch here in September, and just because we got no rain from September clear to March, that didn't*



*mean anything to them. We did not receive a payment. And everybody knows your winter rains are what sets you up for your spring.”*

***Suggestions for improving drought triggers for the LFP included increasing engagement with ranchers or replacing USDM with another drought monitoring tool.***

Ranchers and rangeland managers made several suggestions for improving the drought monitoring of rangelands for the LFP. As the USDM includes on-the-ground observations in assessing drought conditions, one suggestion is to increase the USDM engagement with ranchers and increase the local reporting of drought conditions. However, it has proven difficult to sustain such a level of engagement over time. One rangeland manager describes the challenge: *“But I think the regularity of the reports and over a wider-ranging area would be important to us to get a more accurate depiction of drought from the livestock producers. But they’re busy, too. We’re busy.”* Additionally, some ranchers don’t feel comfortable working with existing digital tools for reporting local drought conditions. Another suggestion made was to increase the awareness of the USDM authors of the climate and forage relationship in the Southwest.

On the other hand, some interviewees suggested that a drought monitoring tool focused on rangeland forage production would be a better fit for triggering LFP payments. One rangeland manager recommended that *“something that would show just what the current year forage production is based on the rainfall would probably be a better tool for the LFP.”* Another rangeland manager noted that the Forest Service in the region uses the Standardized Precipitation Index (SPI) as a trigger to determine when cattle should be removed from Forest Service land during drought conditions. They recommended aligning LFP triggers with the management of public lands during severe drought.

## CONCLUSION

The experiences and perceptions of producers and land managers who use the LFP during drought disasters can provide valuable insight into the effectiveness of the LFP in addressing drought risk in Arizona. The relationship between the LFP and drought monitoring through the USDM has implications for access to LFP assistance during drought events. Conversations with producers and land managers can provide insight into ways to strengthen rangeland drought monitoring.

Engagement with ranchers and rangeland managers in Arizona demonstrates a range of experiences with using the LFP during drought disasters. Producers largely perceive the LFP payments as a helpful program that offsets some of the feed costs during droughts. The LFP is especially helpful for smaller producers who cannot afford drought insurance. While producers largely shared positive experiences with the LFP, many identified instances when the USDM map did not match local rangeland conditions. This mismatch was often explained due to the lack of weather stations, the diversity of weather and climate conditions

across the state, and the lack of experience of USDM authors with the importance of winter and monsoon rains for forage production. Ranchers also pointed out that drought in Arizona affects both forage conditions and the availability of drinking water for cattle, though the fees for hauling water or tracking water availability are not accounted for in the LFP assistance or the USDM.

The USDM provides a broad, generalized approach to monitoring drought that is not specifically tailored to monitor the impacts of drought on rangeland forage. The USDM has largely worked for LFP in Arizona for the past few years because of the prevalence of drought conditions. In the past five years all fifteen counties in Arizona experienced LFP-triggering drought conditions (at least D2 conditions for eight weeks)<sup>3</sup>. Fourteen counties observed D4 for at least four non-consecutive weeks as well. However, if drought conditions become more sporadic in Arizona, there are possibilities for more mismatches between USDM classifications of drought and local experiences of drought, potentially reducing the LFP's assistance during a drought.

Conversations with producers and land managers identified two pathways to increase the LFP's responsiveness to the drought experiences of livestock producers. The first recommendation is to explore linking LFP payment triggers to a remote-sensing based forage estimation system. As the LFP is designed to assist ranchers with feed costs during drought, linking the LFP program to a system tailored to monitoring forage conditions can potentially address some of the mismatches between local drought conditions and USDM drought designations. This approach was utilized by the USDA-RMA Vegetation Index Pasture, Rangeland, Forage Insurance Policy<sup>4</sup> program in the 2010s using remote sensing imagery and the Normalized Difference Vegetation Index as an estimate of forage amount. The program now uses a rainfall index to measure deviations in rainfall from the normal experience of an area. While the remote sensing approach did have problems in implementation, it more directly reflected actual forage conditions as opposed to a precipitation index alone (Turvey and McLaurin, 2012).

There are current remote sensing-based forage monitoring systems that use new methodologies to track rangeland forage conditions. The Rangeland Production Monitoring System<sup>5</sup> estimates forage production, however it only provides end-of-growing season forage amount estimates. The Rangeland Analysis Platform (RAP)<sup>6</sup> provides rangeland monitoring, though there is a high level of uncertainty in forage estimates. Any forage monitoring system for the LFP would also need to have a system that allows for local input on mismatches with local conditions and remote sensing products.

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<sup>3</sup> <https://droughtmonitor.unl.edu/FSA/FsaEligibilityStateCurrent.aspx>

<sup>4</sup> <https://legacy.rma.usda.gov/policies/pasturerangeforage/faq-vi.html>.

<sup>5</sup> <https://fuelcast.net/home>

<sup>6</sup> <https://rangelands.app>

The second pathway is to strengthen the USDM's capacity to monitor forage conditions through improved drought data collection and fostering greater dialogue between USDM authors and the rangeland community. As pointed out by ranchers and rangeland managers, gaps in local climate data affect the USDM's monitoring of drought conditions. Programs such as CoCORaHS<sup>7</sup>, myRAINge Log<sup>8</sup>, and Condition Monitoring Observer Reports (CMOR)<sup>9</sup> allow producers and rangeland managers to install rain gauges and self-report climate data or drought conditions.

Engagement with the broader rangeland community on drought reporting can improve drought monitoring inputs into the USDM, though there are challenges with these efforts. Volunteer fatigue and the complexities of online tools hinder consistent reporting of local drought conditions (Meadow et al., 2013). USDM authors are cautious with self-reported data given the financial implications of the LFP (Smith et al., 2021). Trust-building between USDM authors and the rangeland community can improve trust in the USDM drought monitoring and encourage self-reporting on local drought conditions.



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<sup>7</sup> <https://www.cocorahs.org>

<sup>8</sup> <https://myraingelog.arizona.edu>

<sup>9</sup> <https://droughtimpacts.unl.edu/Tools/ConditionMonitoringObservations.aspx>

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