

# Pasture, Rangeland and Forage Insurance as a Risk Management Tool

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**F**orage constitutes the primary feedstuff for many cattle, sheep, goat and equine operations in the United States. Most livestock producers utilize a combination of pasture and harvested forage (i.e., dry hay, baleage) to meet animal feed needs. Thus, dependence on forage as the primary feed source can expose livestock producers to production and financial risk when weather events prevent adequate forage production.

Similarly, hay producers are also exposed to production and financial risk associated with forage production. Many hay producers are also livestock producers, but there are some hay producers who harvest hay for sale. Reduced hay production may pose different management challenges for a person using hay as an input for livestock production versus someone using hay as an output through hay sales. Risks are present in both types of operations and should



be managed accordingly. Livestock producers face the risk of having to locate and purchase additional feed resources, which increases cost, or they may be forced to market livestock at a premature time. Alternatively, hay producers face the risk of not generating sufficient income, which can lead to delayed debt payments or not making payments at all.

Forage production risks are largely influenced by weather and, more specifically, quantity of precipitation. Low quantities of precipitation prior to or during the active growing season of a forage generally results in below-average yields for both pasture and hay ground. To combat forage production risk, producers may use several strategies including diversification of forage species, use of annuals and perennials, improved soil fertility, and grazing management techniques such as rotational grazing.

These management strategies are all part of a forage risk management plan and should be considered when developing such plans. Additionally, an insurance tool is also available to assist in managing risk associated with forage production. The purpose of this publication is to explain what the Pasture, Rangeland and Forage (PRF) Insurance Program is, how it works, and how it can be utilized in a forage risk management system.

## What Is PRF?

PRF is a single peril (lack of precipitation), area-based insurance program that is part of the broader federal crop insurance program. PRF is available in the 48 contiguous states

and is administered by the U.S. Department of Agriculture's (USDA) Risk Management Agency (RMA). It is designed to protect producers against losses of perennial pasture, rangeland and forage produced for grazing or harvested for hay when such losses could result in increased feed costs, destocking/depopulating, emergency livestock sales or other actions. Thus, the program is designed to provide livestock producers the ability to cover replacement feed costs when forage production is reduced due to below-average precipitation in their area. It is important to note that PRF insurance is not directly linked to livestock. It is directly related to the quantity of precipitation, which largely impacts forage production.

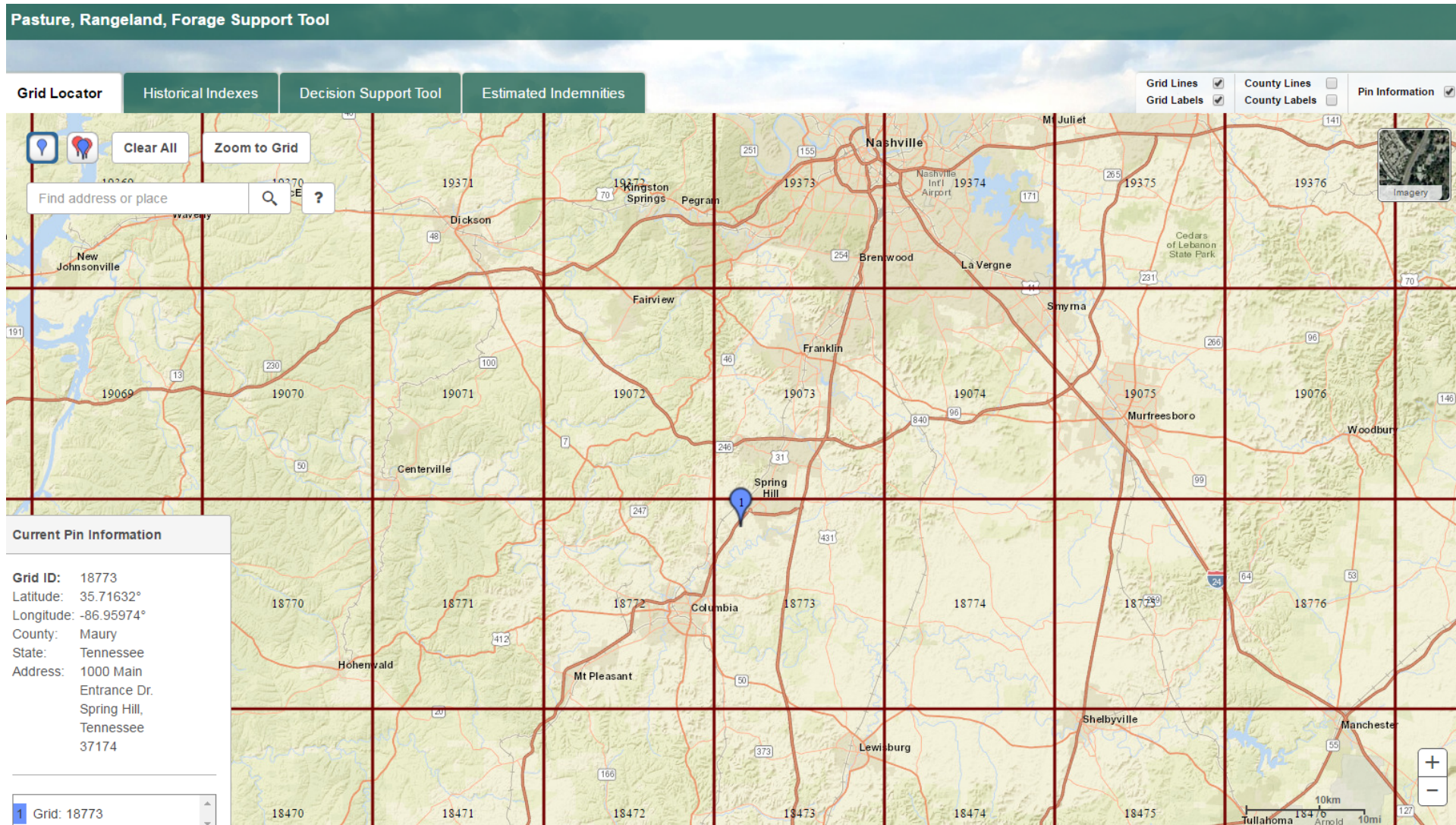
## How PRF Works

### Grid System

Unlike other area insurance products that use county boundaries, PRF uses a numbered grid system created by the National Oceanic and Atmospheric Administration Climate Prediction Center (NOAA CPC). Each grid covers an area the size of 0.25 degrees in latitude by 0.25 degrees in longitude (approximately 17.2 miles x 14.0 miles in Tennessee). Insurance for a pasture or hay field is based on the grid in which it lies. Figure 1 provides an example of the grid with a pin for the UT Institute of Agriculture's Middle Tennessee AgResearch and Education Center (Grid ID: 18773) in Spring Hill, Tennessee.

***PRF is designed to provide livestock producers the ability to cover replacement feed costs when forage production is reduced due to below-average precipitation in their area.***





**Figure 1.** Sample grid of NOAA CPC with a pin for the UT Institute of Agriculture’s Middle Tennessee AgResearch and Education Center in Spring Hill, Tennessee (Grid ID: 18773), <https://prodwebnlb.rma.usda.gov/apps/prf>.

## *Index Interval and Rainfall Index (Actual Index Value)*

Gridded, precipitation data are collected for 11 two-month periods known as index intervals. The 11 index intervals are January/February, February/March, March/April, April/May, May/June, June/July, July/August, August/September, September/October, October/November and November/December.

Historical NOAA CPC precipitation data from 1948 to the present are used to create an Expected Grid Index value for each grid and index interval. The Expected Grid Index is the average precipitation for the specific grid ID during an index interval. Similarly, a Rainfall Index is calculated for each index interval and grid. The Rainfall Index Value (Actual Index Value) for each PRF policy is then compared to the Expected Grid Index to determine if precipitation was below average, average or above average for the index interval. Thus, if precipitation during an insured index interval is below average and below a selected coverage level, then a payment will be received by the producer.

Precipitation data for each grid are collected daily from the four closest NOAA CPC weather reporting stations. The Actual Index Value is for the entire grid and not always representative of each individual farm in the grid. Thus, actual precipitation on a farm may differ from the precipitation totals used to calculate the Actual Index Value for the grid in which the farm is located.

## **PRF in Managing Risk**

Prior to incorporating PRF into a forage risk management program, it is imperative to understand the decisions a producer will have to make during the purchasing process and the tools available to assist decision making. This information can improve the effective use of PRF and, thus, producer satisfaction with the program.

### *Producer Decisions*

As with most insurance products, insurance purchasers must make several decisions related to the coverage level. Decisions related to coverage level generally impact policy

premiums as well as asset value covered, which directly influences the magnitude of an indemnity payment if conditions warrant a payment. Thus, when purchasing PRF, producers must make the following decisions:

- *Determine the intended use of the forage (grazing, haying).* In the case of intended use, producers must choose between grazing or haying. Land intended for grazing has a lower premium cost than land for haying, but grazing land also results in a smaller indemnity payment when precipitation is below the trigger level. It would be appropriate for the intended use to align with the producer's primary use of the land.
- *Determine the desired coverage level (70 percent, 75 percent, 80 percent, 85 percent or 90 percent).* Producers can choose coverage levels ranging from 70 percent to 90 percent, in 5 percent increments. The coverage level refers to the percentage of the Expected Grid Index a producer wants to cover. Thus, if a producer selects the 90 percent coverage level and the Actual Index Value for precipitation during an insured index interval falls below 90 percent of the Expected Grid Index for the specific grid, then an indemnity payment is triggered. Producer premiums increase as coverage level increases, but higher coverage levels have a higher probability of triggering an indemnity payment. Alternatively, insurance premium subsidy rates decrease as coverage level increases.
- *Determine the productivity factor of the land (60 percent to 150 percent).* The productivity factor ranges from 60 percent to 150 percent with 100 percent representing the county base value. Thus, a producer can choose a productivity factor that best represents the productivity of his/her acreage. Land with good soils, a good stand of perennial grass, or high-quality forages such as alfalfa may warrant using a higher productivity level than land with average soils and poor stands of perennial forage. Producer premiums increase as the productivity factor increases. Similarly, higher productivity factors result in larger indemnity payments when a payment is triggered.



- *Determine the number of acres to insure.* A producer can insure as little as one acre up to as many acres as are used for forage production in the operation. A producer does not have to insure all acreage used for forage, but has the flexibility to do so if desired. Producers would be encouraged to insure what they think is necessary to meet the forage needs of their livestock or the goals of a hay operation.
  - *Determine the desired index intervals (two to six two-month periods must be selected).* Index intervals are the two-month periods in which insurance coverage is available. There are 11 index intervals, and a producer must select a minimum of two and a maximum of six index intervals. A producer cannot select two index intervals that overlap, such as March/April and April/May. Producers should consider when forage production is important to their operations when selecting index intervals. Producers still face risks due to the potential of a heavy rainfall event during an index interval. One extreme rainfall event with no other rainfall during an index interval may result in the Actual Index Value for the index interval exceeding the long-run average precipitation. The one rainfall event could prevent an indemnity payment from being triggered even though producers are battling drought conditions.
  - *Determine the percent of value to cover in each index interval (must sum to 100 percent).* After selecting the desired index intervals, a producer must determine the percentage of forage value to cover in the specific index interval. Many producers have forage production throughout the year and this aspect provides the producer flexibility in covering forage value across index intervals based on a forage production schedule. Percentage of coverage cannot exceed 60 percent in a single index interval. Some producers may find it advantageous to choose a balanced approach (six index intervals, 12 months) in managing risk, while others may find a more targeted approach (two index intervals, four months) beneficial. Indemnity payments are more likely to be triggered in a balanced approach as compared to a targeted approach due to coverage across more months. The balanced approach is most likely to result in small payments. Alternatively, the targeted approach can be feast or famine. Risk is only being covered in a few selected months. If an indemnity payment is triggered during the selected months, the producer will receive a large return on his/her investment in the insurance. However, the likelihood of a payment being triggered is lower. Thus, the likelihood of a producer receiving no return on the investment in the insurance is higher.
  - *Insurance premium subsidies.* The USDA subsidizes PRF insurance, and the subsidy rate depends on the selected coverage levels. The 70 percent and 75 percent coverage levels have a 59 percent subsidy rate, while the 80 percent and 85 percent coverage levels have a 55 percent subsidy rate. The 90 percent coverage level has the lowest subsidy rate at 51 percent.
  - *Producer insurance premiums.* As with all insurance products, producers must pay a premium to secure insurance coverage. PRF insurance premiums depend on intended use (haying, grazing), coverage level (70 percent, 75 percent, 80 percent, 85 percent, 90 percent), and the productivity factor (60 percent to 150 percent). Land for haying has a higher premium than land for grazing. Similarly, higher coverage levels and productivity factors result in higher insurance premiums. However, insurance policies with higher premiums generally have larger payouts when an indemnity payment is triggered. Insurance premiums are not due until September 1 of the actual year of coverage.
- There is a wide range of premiums depending on the intended use, coverage level and productivity factor. Producer insurance premiums (Total Premium minus Premium Subsidy) for haying range from about \$2 per acre for the 70 percent coverage level and 60 percent productivity factor to \$18 per acre for 90 percent coverage and the 150 percent productivity factor. Similarly, producer premiums for grazing range from about \$0.50 per acre to \$5 per acre.

- *Understanding what triggers an indemnity payment.* Indemnity payments do not depend on actual precipitation on a producer's insured pasture or field. Indemnity payments are only triggered when precipitation levels for the grid in which the insured acreage is located fall below the coverage level chosen by the producer. Thus, given local variation in rainfall, there is a possibility a producer may not receive a payment even though the farm experiences drought. Alternatively, a producer might receive an indemnity payment when precipitation on the farm exceeds the chosen coverage level.

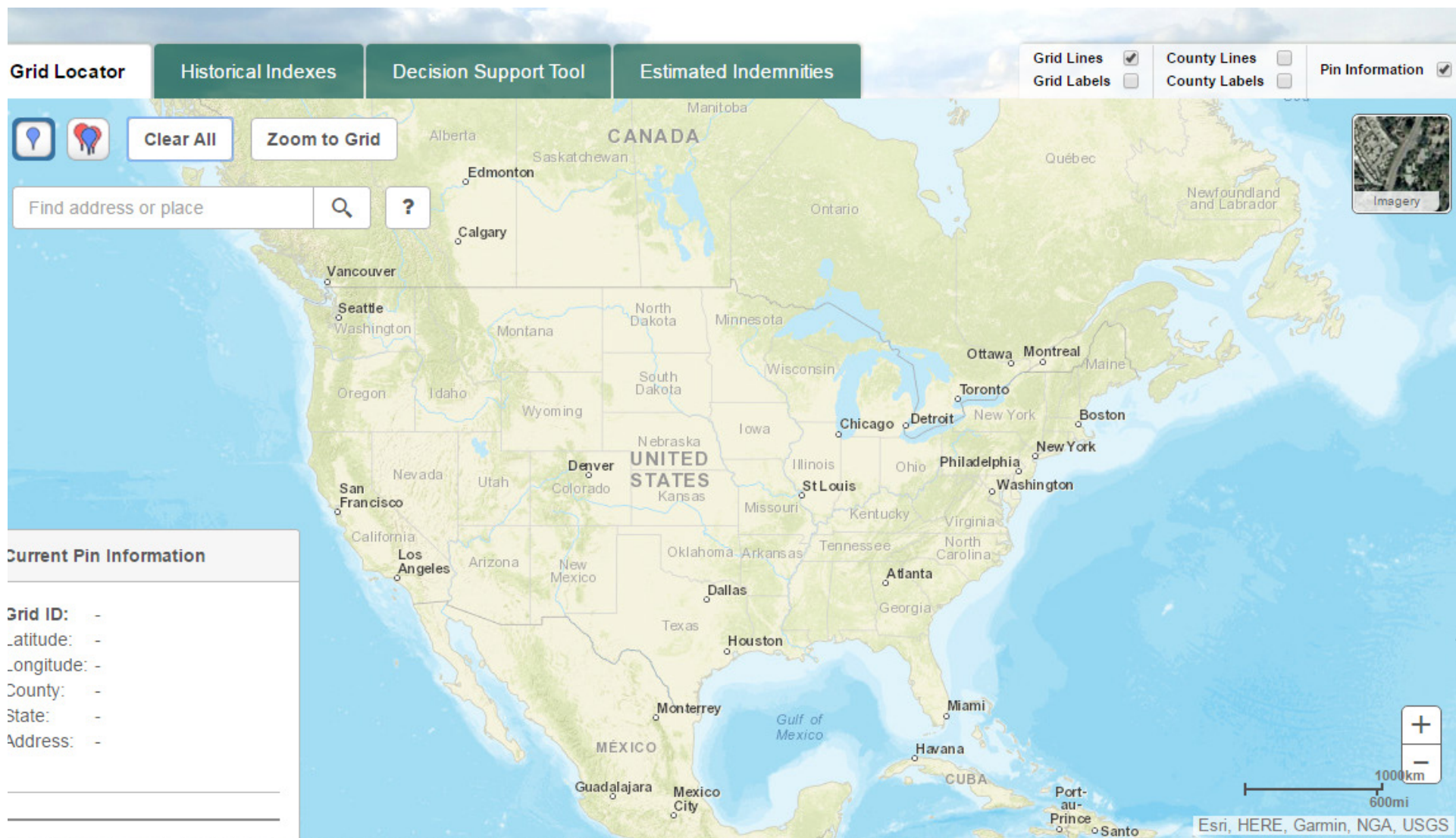
### *Decision Support Tool Website with Example*

Recognizing that there are several decisions to make when considering PRF, USDA-RMA hosts a decision support tool website for the program at <https://prodwebnlb.rma.usda.gov/apps/prf#>. This website helps potential PRF participants identify the grid or grids in which their land is located, provides historical index values for precipitation for each index interval dating back to 1948, hosts the decision support tool, and provides estimated indemnities for each index interval dating back to 1948.

To use the decision support tool, a producer must first identify the grid(s) in which his/her land is located. This step can be accomplished using the "Grid Locator" tab (Figure 2). A producer can either enter an address into the system or use the map tools to find the grid in which his/her land is located. Figure 1 provides a closer look at the grid system and has a pin for the grid in which the UT Institute of Agriculture's Middle Tennessee AgResearch and Education Center (MTREC) is located. The following example uses that grid.







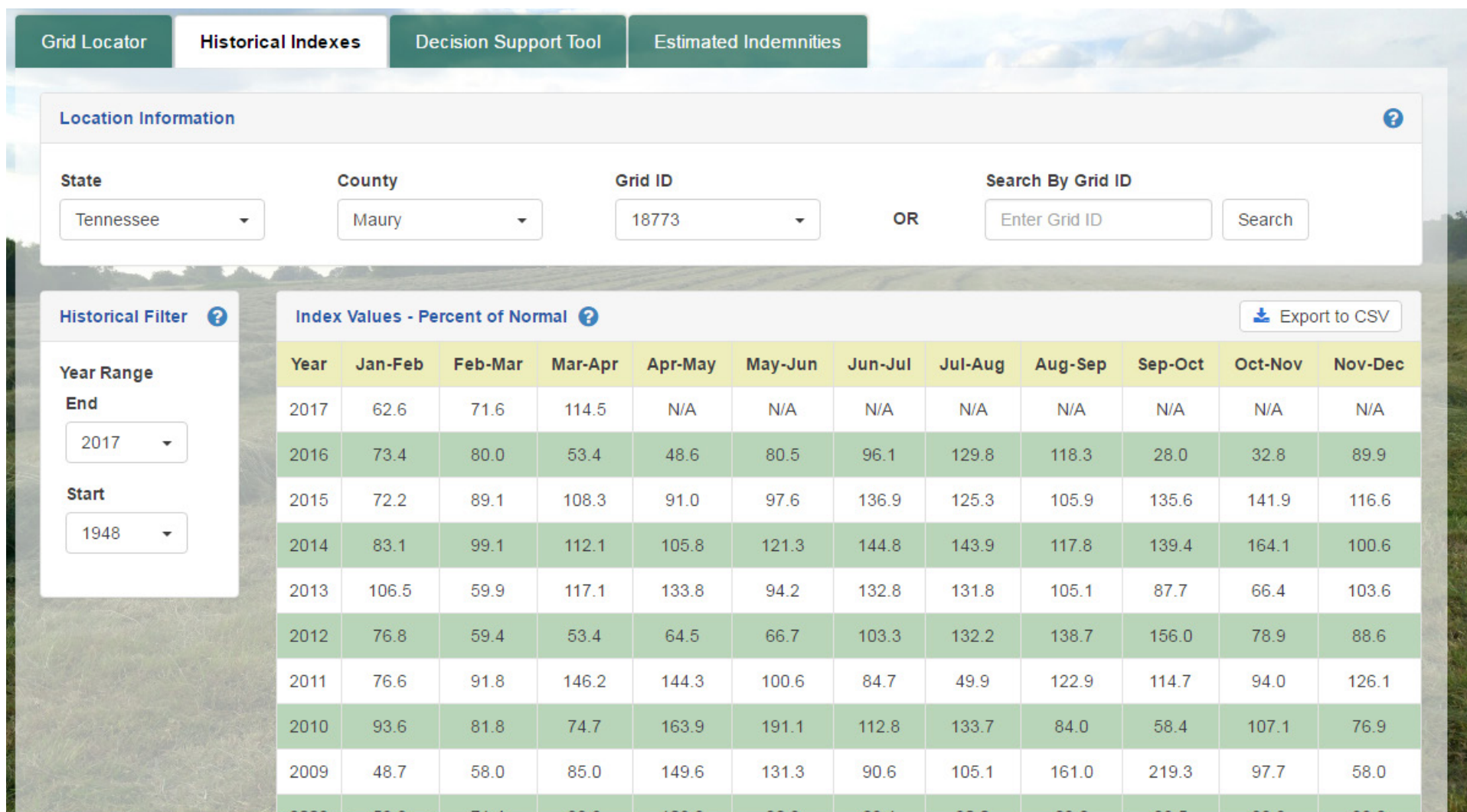
**Figure 2.** Grid locator for PRF insurance program.



Once the grid is identified, a producer can use the “Historical Indexes” tab to view precipitation index values (Figure 3). These values can be used to assist in selection of index intervals, percent of value to cover in a given index interval and coverage level. Using Figure 3, seven out of nine years (every year except 2010 and 2013) the January/February index interval fell below the 90 percent level. This means an indemnity payment would have been triggered seven out of nine years if the producer carried a 90 percent coverage level for the index interval. A 75 percent coverage level would have resulted in indemnity payments being triggered in three years (2015-2017). When an indemnity payment is triggered, the indemnity payment is first applied to the producer premium. Thus, a producer does not receive any money until the indemnity exceeds the premium.







**Figure 3.** Historical PRF Index Values for the UT Institute of Agriculture’s Middle Tennessee AgResearch and Education Center in Spring Hill, Tennessee (Grid ID: 18773).

The “Decision Support Tool” allows producers the opportunity to evaluate the impact of changing intended use, coverage level, productivity factor, percent of value and insured acres. Figure 4 contains information from 2016 in which 100 acres of hay land was insured at a 90 percent coverage level with a 100 percent productivity factor. Percent of value is spread fairly equally across six index intervals starting with January/February and ending with November/December. In this particular example, the insurance premium totaled \$2,396 (\$23.96 per acre), but the producer only paid \$1,175 (\$11.75 per acre) because the remaining balance of \$1,222 (\$12.22 per acre, 51 percent subsidy) was paid through the government subsidy. In 2016, the indemnity payment for this example totaled \$4,314 (\$43.14 per acre) returning the producer \$3,139 dollars ( $\$4,314 - \$1,175 = \$3,139$ ).

The indemnity payment totaled \$6,471 (\$64.71 per acre), resulting in a net payment of \$4,710 (\$47.10 per acre) to the producer, following payment of the insurance premium. A producer with high-yielding forages may choose a higher productivity factor to insure adequate hay production compared to a producer with low-yielding forages.

Returning to the initial example, lowering the coverage level would have changed premium and indemnity payments. Using a 70 percent coverage level and 100 percent productivity factor for 100 acres of hay would have resulted in a total premium of \$799 (\$326 producer premium, \$471 subsidy premium). Additionally, the total indemnity payment would have totaled \$2,006, resulting in the producer receiving a net payment of \$1,680 following payment of premium.



Changing any one aspect of the insurance would have changed premium and indemnity payments for the insurance. For instance, changing the productivity factor to 150 percent would have resulted in a total premium of \$3,594 (\$35.94 per acre) of which \$1,761 (\$17.61 per acre) was producer premium and \$1,833 (\$18.33 per acre) was subsidized premium.



|                     |               |                |                      |                            |                        |               |                 |                  |                    |                     |
|---------------------|---------------|----------------|----------------------|----------------------------|------------------------|---------------|-----------------|------------------|--------------------|---------------------|
| Intended Use        | Haying        | Index Interval | Percent of Value (%) | Policy Protection Per Unit | Premium Rate Per \$100 | Total Premium | Premium Subsidy | Producer Premium | Actual Index Value | Estimated Indemnity |
| Irrigation Practice | Non-Irrigated | Jan-Feb        | 16                   | \$3,082                    | 12.48                  | \$385         | \$196           | \$189            | 73.4               | \$568               |
| Coverage Level      | 90%           | Feb-Mar        | N/A                  | \$0                        | 10.53                  | \$0           | \$0             | \$0              | 80.0               | \$0                 |
| Productivity Factor | 100%          | Mar-Apr        | 16                   | \$3,082                    | 10.74                  | \$331         | \$169           | \$162            | 53.4               | \$1,253             |
| Insurable Interest  | 100%          | Apr-May        | N/A                  | \$0                        | 11.74                  | \$0           | \$0             | \$0              | 48.6               | \$0                 |
| Insured Acres       | 100           | May-Jun        | 18                   | \$3,467                    | 12.42                  | \$431         | \$220           | \$211            | 80.5               | \$366               |
| Sample Year         | 2016          | Jun-Jul        | N/A                  | \$0                        | 11.07                  | \$0           | \$0             | \$0              | 96.1               | \$0                 |
|                     |               | Jul-Aug        | 18                   | \$3,467                    | 10.54                  | \$365         | \$186           | \$179            | 129.8              | \$0                 |
|                     |               | Aug-Sep        | N/A                  | \$0                        | 12.18                  | \$0           | \$0             | \$0              | 118.3              | \$0                 |
|                     |               | Sep-Oct        | 16                   | \$3,082                    | 15.73                  | \$485         | \$247           | \$238            | 28.0               | \$2,123             |
|                     |               | Oct-Nov        | N/A                  | \$0                        | 14.03                  | \$0           | \$0             | \$0              | 32.8               | \$0                 |
|                     |               | Nov-Dec        | 16                   | \$3,082                    | 12.97                  | \$400         | \$204           | \$196            | 89.9               | \$3                 |
|                     |               | Per Acre       | N/A                  | N/A                        | N/A                    | \$23.96       | \$12.22         | \$11.75          | N/A                | \$43.14             |
|                     |               | Total          | 100                  | \$19,260                   | N/A                    | \$2,396       | \$1,222         | \$1,175          | N/A                | \$4,314             |

**Figure 4.** 2016 PRF estimated premiums and indemnity payments for the UT Institute of Agriculture's Middle Tennessee AgResearch and Education Center in Spring Hill, Tennessee (Grid ID: 18773).

The final tab, labeled “Estimated Indemnities,” displays indemnities that would have been realized in previous years given the information input in the “Decision Support Tool.” This information can also be used to assist a producer in selecting a coverage level, index intervals and percent of value for index intervals. Figure 5 displays the results given the previous information discussed. Assuming the producer premium would have been \$1,175 each year when covering 100 acres of hay land with a 90 percent coverage level, 100 percent productivity factor, and when the percent of value is spread fairly equally across six index intervals, a producer would have received payments exceeding the premium eight out of 13 years from 2004 through 2016.

One last aspect of the program is identifying a crop insurance agent. PRF must be purchased through a crop insurance agent. USDA-RMA hosts an agent locator tool that can be found at the following website: <https://www.rma.usda.gov/tools/agent.html>. This tool allows individuals to enter their address and then provides a list of crop insurance agents that sell USDA-RMA insurance products in the area.







**Figure 5.** Historical PRF estimated indemnity payments for the UT Institute of Agriculture’s Middle Tennessee AgResearch and Education Center in Spring Hill, Tennessee (Grid ID: 18773).

## Conclusion

PRF is one tool livestock and hay producers can use to manage forage risk. PRF does not constitute a complete forage risk management program, and it is most effective when used in conjunction with best management practices for forage production to effectively manage forage risk. PRF provides risk protection in the form of a payment when precipitation is below average. At the same time, cultural practices such as forage species diversification, use of annuals and perennials, improved soil fertility, and grazing management techniques such as rotational grazing can result in increased forage production and improved efficiency. Livestock

and hay producers are encouraged to evaluate PRF and its use in their operation. PRF may be a beneficial tool when managing forage risk.

## Useful Links and Additional Information

Several additional resources can be found at the following website: <https://www.rma.usda.gov/policies/pasturerangeforage/>. The website contains information related to frequently asked questions, general overview of the program, policy provisions and much more. For further assistance, please contact Andrew P. Griffith at [agriff14@utk.edu](mailto:agriff14@utk.edu).

## References

United States Department of Agriculture-Risk Management Agency. 2017. Agent Locator. Online: <https://prodwebnlb.rma.usda.gov/apps/AgentLocator/#/>.

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