

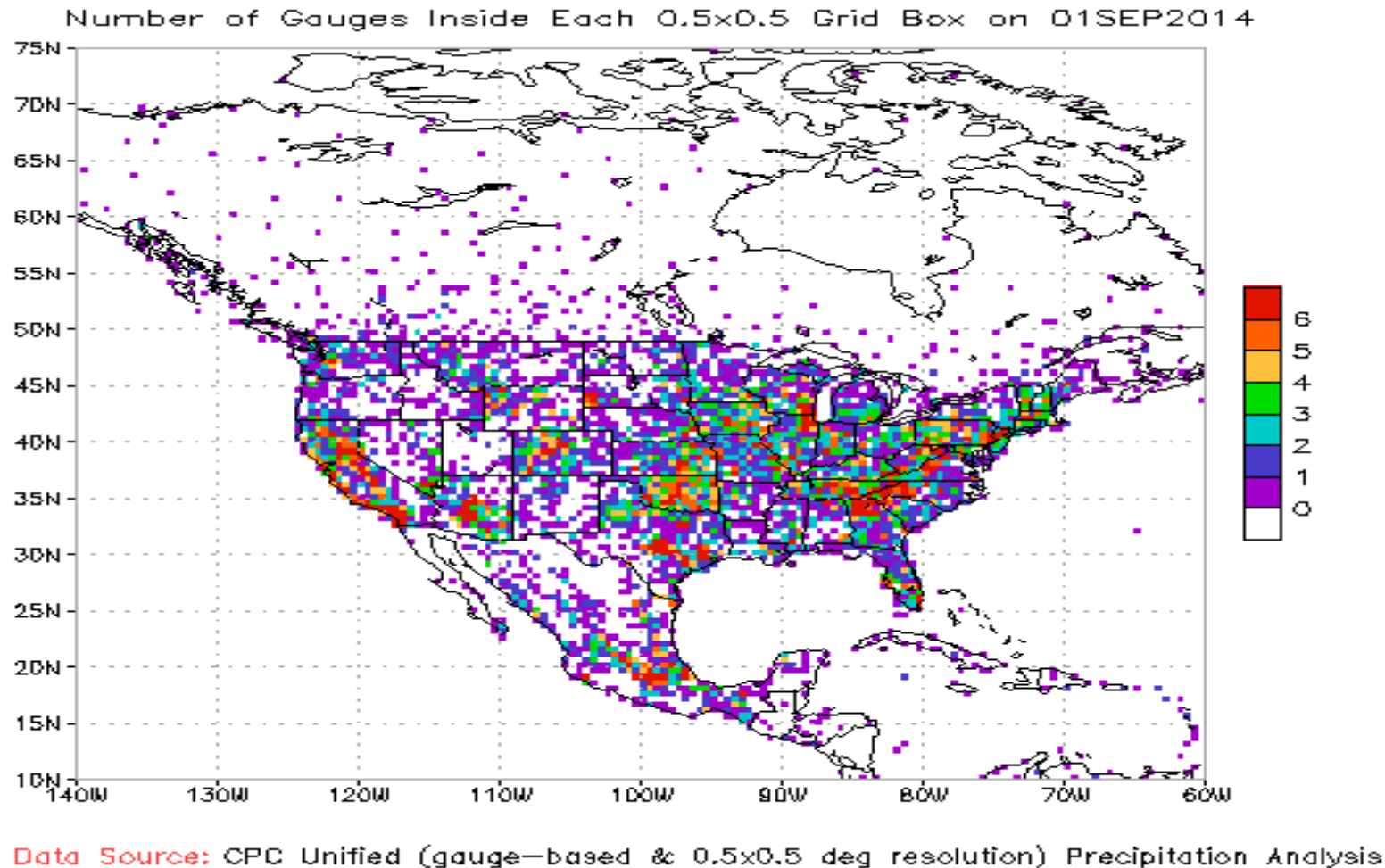


# Rainfall and Vegetation Index Pasture, Rangeland and Forage

Rainfall Index (RI) Pasture, Rangeland,  
and Forage (PRF) Technology

August 2017

This information is provided for training only. Any discrepancy between the training material and the policy is not intended. The information provided in this training does not supersede policy and procedure. Any changes to the policy and procedures may make this training material obsolete. *If you use this training material check to assure it is still relevant.*



[www.cpc.ncep.noaa.gov/products/Precip\\_Monitoring/Figures/NAMS/NAMS\\_curr.p.num.gif](http://www.cpc.ncep.noaa.gov/products/Precip_Monitoring/Figures/NAMS/NAMS_curr.p.num.gif)

## Single Peril:

- Decline in interpolated precipitation from historical normal;
- Historical normal, since 1948;
- By grid ID and index interval;
- Precipitation received in prior index interval has no effect; and
- Actual production is not measured.

## Precipitation Data:

- Data obtained from National Oceanic and Atmospheric Administration Climate Prediction Center (NOAA CPC);
- Data collected daily from a minimum of 4 weather reporting stations closest to the center of the grid that report data for that day prior to CPC cutoff time; and
  - Precipitation reported weekly or monthly the data is not used.
- The policy is based on deviation from normal precipitation during the 2-month index interval.

## Precipitation Data:

- Each reporting station may not report data every day, so data is not always obtained from the same stations each day;
- Reporting station(s) will likely be located outside of grid; and
  - Each grid does not have a weather station.
  - Precipitation is interpolated to each grid daily using a scan of the closest weather stations that reported for that given day.
- The scan size will depend on the number of reporting stations in the area and may vary daily.

## Precipitation Data:

- Is a composite value for entire grid;
- Cannot be traced to single point or reporting station;
- Will not match precipitation received by any single producer in the grid in most cases;
- Conclusively presumed to be accurate;
- Results are not modified by the Federal Crop Insurance Corporation or RMA; and
- Lack of zero reports can impact results.

## Precipitation Data:

- NOAA CPC precipitation data is expressed as a percentage.
  - 100 represents average precipitation received as compared to historical data for grid and index interval.
  - Below 100 represents below average precipitation received as compared to historical data for grid and index interval.
  - Above 100 represents above average precipitation received as compared to historical data for grid and index interval.



## Precipitation Data:

- RMA does not receive actual precipitation amount received daily or by index interval;
- Which reporting station's data used is not provided to RMA; and
- Precipitation data received/recorded by producer or other sources are not considered or used.

- NOAA uses the best data available for their programs.
- NOAA precipitation data based on the Optimal Interpolation methodology:
  - Historical data (1948 to 2006) is accessed at:  
[ftp://ftp.cpc.ncep.noaa.gov/precip/CPC\\_UNI\\_PRCP/GAUGE\\_CONUS/V1.0/](ftp://ftp.cpc.ncep.noaa.gov/precip/CPC_UNI_PRCP/GAUGE_CONUS/V1.0/);  
 and
  - Near real-time data (2006 to present) is accessed at:  
[ftp://ftp.cpc.ncep.noaa.gov/precip/CPC\\_UNI\\_PRCP/GAUGE\\_CONUS/RT/](ftp://ftp.cpc.ncep.noaa.gov/precip/CPC_UNI_PRCP/GAUGE_CONUS/RT/).

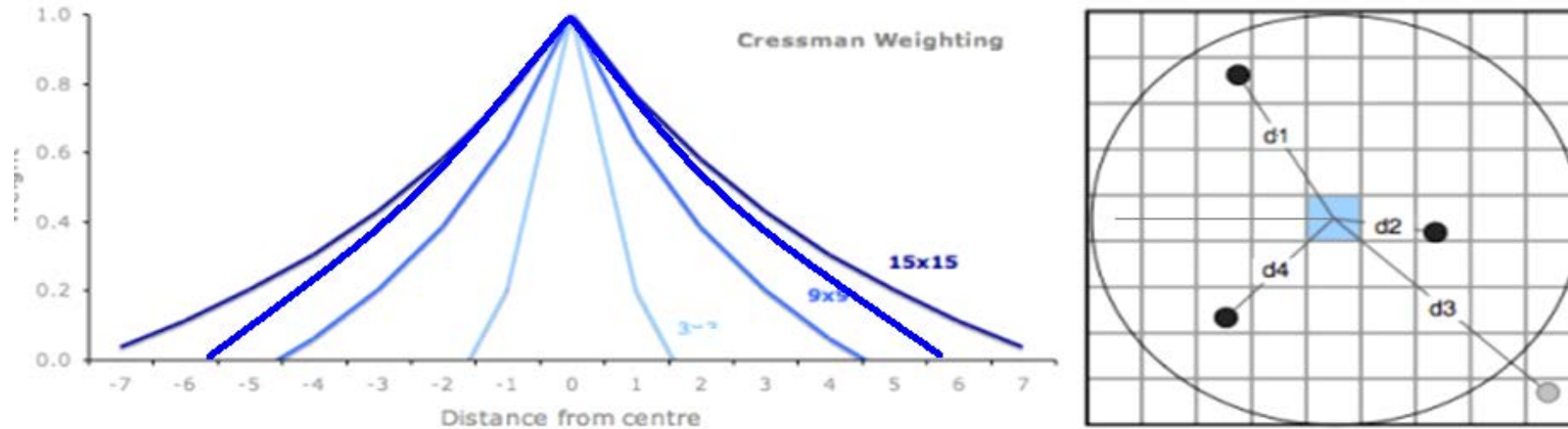
- For 2017 results the historical period for calculating the long term average is Jan.1, 1948 through Dec. 31, 2015.
- Precipitation is interpolated to the grid, meaning that data from outside the grid are used, and not measured within a grid:
  - Must understand that even if there is a reporting station that reports daily to NOAA CPC inside a grid, the results will not equal that reporting station's data.
- Similar to National Agricultural Statistics Service (NASS) data used for Area Risk Protection crop policies:
  - Producers reporting to NASS - unknown; and
  - Surveys that NASS eliminates in their quality control - unknown.

- Interpolation is based on the idea that things closer together in space are generally more similar than those farther apart.
- Estimates precipitation for a grid using reporting stations within a search radius around the grid:
  - Search radius varies regionally by season and density of the available reporting stations; and
  - Impact of an individual reporting station on the grid's precipitation decreases with increasing distance between the reporting station and the grid.

## Optimal Interpolation methodology:

- The historical precipitation for the grid is estimated from historical precipitation data (7,000 to 14,000 stations);
- Optimal interpolation is used to estimate the current day's precipitation for the grid by using the statistical relationship between the precipitation amounts in surrounding reporting stations, the distance of the reporting stations from the grid, and the historical precipitation; and
- Optimal Interpolation better captures the spatial distribution of precipitation, especially in the mountainous regions of the United States.

# Optimal Analysis: Weighted Averaging Method



- 4 closest reporting stations to center of grid.
- Reporting station closest to center has most effect.
- Reporting station furthest from center of grid has least effect.
- Data from all 4 reporting stations used.

\* The interpolations process uses a minimum of 4 reporting stations \*

## Standard NOAA-CPC Quality Control Steps:

- A “duplicate station check” that eliminates duplicates and key punch errors from the rain-gauge reports;
- A “buddy check” to eliminate extreme values from the dataset;
  - The absolute value of the difference between the current station and all stations within a one-degree grid box are examined and if more than 50% exceed a specified threshold, then the current station is tossed.
- A standard deviation check, which compares the daily rain-gauge data against a gridded daily climatology; and
  - Observations are compared to the nearest grid point value from the long term climatology. The current observation must be within 5 standard deviations (10 for hurricane events) of the daily climatology.
- NEXRAD radar check for spurious zeros removing incorrect reports of zero rain from mostly Cooperative Observer Program (COOP )stations.



# Other Current Strategic Uses of the NOAA CPC Precipitation Data

The data source is an integral part of many other critical strategic US Government functions of NOAA including:

- U.S. Drought Assessment (co-funded by USDA)  
[www.cpc.ncep.noaa.gov/products/expert\\_assessment/drought\\_assessment.html](http://www.cpc.ncep.noaa.gov/products/expert_assessment/drought_assessment.html);
- The U.S. National Threats Assessment  
[www.cpc.ncep.noaa.gov/products/expert\\_assessment/threats.shtml](http://www.cpc.ncep.noaa.gov/products/expert_assessment/threats.shtml);
- The Palmer Drought Index  
[www.cpc.ncep.noaa.gov/products/monitoring\\_and\\_data/drought.shtml](http://www.cpc.ncep.noaa.gov/products/monitoring_and_data/drought.shtml); and
- The CPC Soil Moisture Forecast Project  
[www.cpc.ncep.noaa.gov/soilmst/forecasts.shtml](http://www.cpc.ncep.noaa.gov/soilmst/forecasts.shtml).



# Will This Work In My Region?

- All first order weather stations reporting to NOAA-CPC by their daily cutoff time are used if they pass the NOAA-CPC quality control steps:
  - NOAA-CPC does not release which stations report; and
  - Reviewing National Weather Service (NWS), National Climatic Data Center (NCDC), Weather Forecast Offices (WFO), producer gauge, or other data to calculate or estimate results is not appropriate and does not provide useful comparisons.
- Must review Historical Indices Tool on the RMA website at: [www.rma.usda.gov/policies/pasturerangeforage/](http://www.rma.usda.gov/policies/pasturerangeforage/) to determine whether or not product correlates to past production.



Questions?

Email: [rma.kcviri@rma.usda.gov](mailto:rma.kcviri@rma.usda.gov)