Current Status of Drought in NM

Dr. Dave DuBois
New Mexico State Climatologist

Presented at NM Drought Workshop: Drought Outlook and Management Considerations for Rangeland Livestock Production
May 29, 2013
Elephant Butte as of 5/27/13
Current Storage: 208,209 acre-ft
Capacity: 2,195,000 acre-ft
Storage in 4/22/57: 30,658 acre-ft

Photo from Feb. 16, 2013
How do the last 12-months stack up?

Last 12 months were the driest on record. 1924-25 was 2nd worse. 1956-57 ranked 4th worse.
What about the last 24-months?

2011-2013 was the driest on record.
1902-1904 2nd driest
2013 NM Precipitation Rankings

- Calendar Year 2013 was the 19\textsuperscript{th} driest year on record for New Mexico. (Statewide precipitation was just 56% of average)
- Water Year 2013 is the 12\textsuperscript{th} driest on record for New Mexico. (54% of ave) The driest was 1904

<table>
<thead>
<tr>
<th>Period</th>
<th>Amount</th>
<th>20\textsuperscript{th} Century Average</th>
<th>Departure</th>
<th>Rank (out of 119 years)</th>
<th>Record</th>
<th>Wettest/Driest Since</th>
</tr>
</thead>
<tbody>
<tr>
<td>Oct 2012 - Apr 2013 7-month period</td>
<td>2.70&quot; (68.58 mm)</td>
<td>4.98&quot; (126.49 mm)</td>
<td>-2.28&quot; (-57.91 mm)</td>
<td>12\textsuperscript{th} Driest</td>
<td>1904</td>
<td>Driest since: 2011</td>
</tr>
<tr>
<td>Jan - Apr 2013 Year-to-Date</td>
<td>1.44&quot; (36.58 mm)</td>
<td>2.55&quot; (64.77 mm)</td>
<td>-1.11&quot; (-28.19 mm)</td>
<td>19\textsuperscript{th} Driest</td>
<td>1972</td>
<td>Driest since: 2012</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td>101\textsuperscript{st} Wettest</td>
<td>1905</td>
<td>Wettest since: 2010</td>
</tr>
</tbody>
</table>
Comparing 1956 with 2012

Calendar year 1956 precipitation

Calendar year 2012 precipitation

Water Year up to end of April

Statewide precipitation was only 45 percent of normal

Northwest Plateau at 60% of normal

Central Valley 25%

Southern Desert at 25%

Source: NWS Albuquerque
Annual Statewide Temperatures since 1895

2012 clearly stands out as the highest

Source: National Climatic Data Center
US Drought Monitor

Drought classification puts drought in historical perspective

<table>
<thead>
<tr>
<th>DM Level</th>
<th>Name</th>
<th>Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>D0</td>
<td>Abnormally dry</td>
<td>3-5 years</td>
</tr>
<tr>
<td>D1</td>
<td>Moderate drought</td>
<td>5-10 yrs</td>
</tr>
<tr>
<td>D2</td>
<td>Severe drought</td>
<td>10-20 yrs</td>
</tr>
<tr>
<td>D3</td>
<td>Extreme drought</td>
<td>20-50 yrs</td>
</tr>
<tr>
<td>D4</td>
<td>Exceptional drought</td>
<td>50-100 yrs</td>
</tr>
</tbody>
</table>
Current Drought Status

100% of state is in drought

<1% in D4 last year compared to 45% now

The Drought Monitor focuses on broad-scale conditions. Local conditions may vary. See accompanying text summary for forecast statements.

http://droughtmonitor.unl.edu

May 21, 2013
Valid 7 a.m. EST

Released Thursday, May 23, 2013
Brad Rippey, U.S. Department of Agriculture
How unusual is this drought?

- Look at Drought Monitor in NM over past 12 years

In summer of 2011 almost 50% of state was D4

% D4 Exceptional Drought
State-wide Drought Monitor 2000 to the present.

The U.S. Drought Monitor is produced in partnership between the National Drought Mitigation Center at the University of Nebraska–Lincoln, the United States Department of Agriculture, and the National Oceanic and Atmospheric Administration. Maps courtesy of NDMC–UNL.

Source: Drought Monitor
Green line = 2012
Violet line = median
Highlighted blue = 2013

Green line = 2012
Violet line = median
Highlighted blue = 2013

Pecos River flow into Santa Rosa Lake

USGS 08382650 PECOS RIVER ABOVE SANTA ROSA LAKE, NM
(Drainage Area: 2340 square miles, Length of Record: 36 years)

7-day average discharge, in cubic feet per second

Explanation - Percentile classes

<table>
<thead>
<tr>
<th>Percentile Class</th>
<th>Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>lowest-10th</td>
<td>5</td>
</tr>
<tr>
<td>10-24</td>
<td>25-75</td>
</tr>
<tr>
<td>76-90</td>
<td>95</td>
</tr>
<tr>
<td>90th percentile</td>
<td>above normal</td>
</tr>
<tr>
<td>highest</td>
<td>much above normal</td>
</tr>
</tbody>
</table>

Last updated: 2013-05-27

Images from Google Earth

July 2011

October 2012

Governor’s Executive Order

May 11, 2012 executive order 2012-006 “Drought Declaration”

• Executive order directed the following
  – Assess continued severity of drought and effects on various sectors of state’s resources and economy
  – Make recommendations to Gov. for intermediate actions and long-term strategies to mitigate drought conditions and impacts in the state
  – Appoint such working groups to examine and recommend solutions regarding drought conditions to Drought Task Force
  – Provide information and guidance to Governor regarding conditions
Response: Drought Task Force

• Meet quarterly
• Communication Plan
• Focus on Impact and associated economic assessments
  – Agriculture
  – Wildlife
  – Wildland fires
  – Watersheds
  – Drinking water
  – Economics
  – Tourism
  – Recreation
Impacts Assessment

• Fires
  – Restrictions in US and NM Forests have been initiated
  – State is developing an emergency response protocol for public water systems before, during and after wild land fires

• Drinking water
  – Developing drought planning training for smaller communities
Impacts Assessment

• Tourism
  – Focus on non-water related activities

• Environmental
  – Assist in short term water transfers to critical habitat

• Legislative Response
  – Drought has become a constant topic
  – Special interim sessions on drought impacts
  – Funding for litigation
You know you’re in a drought when it’s common to see wind erosion on the Rio Grande River
CoCoRaHS

• Community Collaborative Rain Hail and Snow network
• Let’s work together to measure precipitation across NM. . . Be a volunteer!

Sign up: www.cocorahs.org
Dr. Dave DuBois
NMSU, Department of Plant & Environmental Sciences

dwdubois@nmsu.edu
weather.nmsu.edu
CoCoRaHS.org
@nmclimate
Facebook nmclimatem
Rio Grande Flow at Otowi Bridge

USGS 08313000 RIO GRANDE AT OTOWI BRIDGE, NM
(Drainage Area: 14300 square miles, Length of Record: 117 years)

7-day average discharge, in cubic feet per second

Explanation - Percentile classes

<table>
<thead>
<tr>
<th>Percentile Class</th>
<th>Flow</th>
</tr>
</thead>
<tbody>
<tr>
<td>Lowest 10th percentile</td>
<td>5</td>
</tr>
<tr>
<td>10th to 24th percentile</td>
<td>25-75</td>
</tr>
<tr>
<td>25th to 75th percentile</td>
<td>76-90</td>
</tr>
<tr>
<td>75th to 95th percentile</td>
<td>95</td>
</tr>
<tr>
<td>95th to 99th percentile</td>
<td>Highest</td>
</tr>
<tr>
<td>Much below Normal</td>
<td>Below normal</td>
</tr>
<tr>
<td>Below normal</td>
<td>Normal</td>
</tr>
<tr>
<td>Above normal</td>
<td>Much above normal</td>
</tr>
</tbody>
</table>

Last updated: 2013-05-28
Tree Ring Climate Reconstruction

Rio Grande at Otowi, NM (Natural Flows)

- Blue line is 10-year running mean
- Dashed line is 552 year mean flow

Meko et al. 2010

http://treeflow.info/riogr/riograndeotowinatural.html