



State of Nevada Drought Response Committee

Nevada Drought Strategic Plan *A map for a more drought resilient Nevada*

July 2014

Prepared by: Bill Elliott
Planning Section Chief
Department of Public Safety
Division of Emergency Management

Nevada Drought Strategic Plan

Table of Contents

I.	Introduction	Page 1
II.	Scope	Page 1
III.	Situation	Page 1
IV.	Assumptions	Page 2
V.	Mission and Goals	Page 3
VI.	Goal 1	Page 3
VII.	Goal 2	Page 4
VIII.	Goal 3	Page 5
IX.	Goal 4	Page 6
X.	Goal 5	Page 7
XI.	Funding Strategies	Page 8
XII.	Conclusion	Page 9

I. Introduction

As Nevada entered into its third year of extreme to exceptional drought, Nevada water stakeholders met in Carson City in November of 2013, to discuss Nevada drought resilience in the face of drought. Representatives from agriculture, ranching, irrigation districts, municipal water systems, weather services, Nevada tribes, emergency management, state and federal agencies worked together to develop core concepts of a Nevada drought resiliency strategy.

Nevada is the driest state in the nation. For 150 years of statehood, Nevada has prospered in agriculture, tourism, mining, and western ways of life despite the climate challenges of both flood and drought that we often face. Even in the absence of climate change, drought is a common phenomenon in Nevada. “Average” precipitation is usually the result of one or two wet years followed by several dry years. As our water resources become more fully committed and utilized, water shortages could become more frequent and more severe. If our water supply is further reduced as a result of climate change, water shortages could become even more common.

Nevadans have been innovative in several areas of water resource management. Southern Nevada is a leader in water storage with its aquifer storage and recovery program. The ability to move water to where it is needed and employ innovative technologies to exploit the uses of water has enabled Nevada’s mining industry to progress and it’s farmers to make the desert bloom. In the future Nevada will need to support water conservation and efficient water use to maintain sustained growth while preserving an agricultural rural lifestyle.

II. Scope

The purpose of this document is to put forward proactive long-term strategies that will make Nevada more resilient to the impacts of prolonged drought, while continuing to support Nevada’s traditional agriculture, ranching, gaming and mining businesses. This strategic plan is intended to provide a path forward for promoting water conservation, technology and practices to achieve drought resilience that is consistent with diverse new business enterprises and communities that will sustain a viable Nevada for generations to come.

III. Current Meteorological Status and Drought Outlook

Overview

We are currently in a third consecutive year of drought; in water years (WY), which begin on 1 October and end the following year on 30 September, we have experienced significant drought conditions in WY 2012, WY 2013, and the current WY 2014. In this region of the country (primarily California and Nevada) we expect to receive the majority of our precipitation from October through March and rely on water stored in the snowpack, reservoirs, and groundwater aquifers for the primary period of water demand from April through September. During the last three WYs, we have received significantly less (record lows in some places) precipitation during

the winter periods and warmer than normal temperatures during the summer demand periods. As a result, we have had to rely on our longer-term storages of water to get us through higher than normal demand periods. In general, there have been no reports or forecasts of near term shortages of municipal supplies of water; however, the agricultural community has experienced significant shortages in water allocation for both farming and ranching. In addition, there have been numerous reports of drought related impacts to wildlife as well as extreme wildfire conditions.

The amount of the decreases in rainfall and the increases in summer temperatures has varied across the region. In general, for each of the last three WYs, the total precipitation for much of Nevada has been in the bottom 10-30% of the rankings of all years from 1850 to present. One clear exception has been North Eastern Nevada (near Elko and Upper Humboldt) where there has been near normal precipitation and snowpack this WY.

Climate “normals” are usually reported as statistical measures (i.e., min, max, mean, median, etc.) over 30-year periods that are updated every decade (e.g., 1970 to 2000, 1980 to 2010, etc.). It is interesting that the current 30-year normal period (1980 to 2010) is, for many parts of our region, dryer and warmer than the previous 30-year normal period (1970 to 2000). This has, in many cases, lowered the normal precipitation and raised the normal temperatures we expect to observe AND we are still seeing dryer and warmer than normal conditions.

Instrumental records of meteorological observations only date back to the 1850s in a few locations in the Western U.S., however, there are a significant number of research studies on tree rings, sediment and other natural evidence that extend our estimates of the climatic conditions back much further in time. Based on these studies, it is clear that, for the most part, the last 200 or more years have been mostly wet periods compared with the last 15 to 20 years. More importantly, there have been numerous “long-term” droughts of 10 to 20 years during the last 1,000 years and two “megadroughts” of 240 years and 180 years within the last 1,200 years. All of these long-term droughts occurred before the rapid human-caused increases in greenhouse gasses and, therefore, represent some aspect of the natural variability in drought conditions in our part of the world.

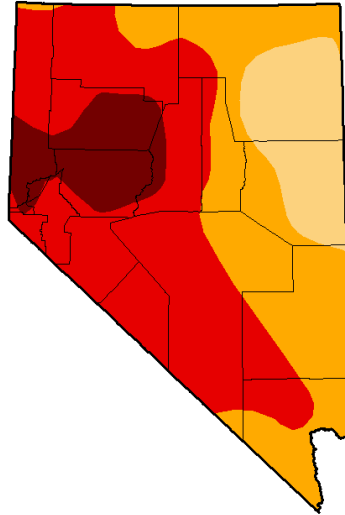
The Nevada State Climate Office (NSCO) has a number of research projects aimed at developing a better understanding of the frequency and magnitude of previous short- and long-term droughts, why they have occurred, and how our modern water resource infrastructure would respond to some of the longer-term megadrought conditions that we know happened in the past. A critical part of our mission is to conduct high caliber research that can be used to help answer practical and relevant questions related to our current water resources and climate change related issues in the state.

Current Status

The U.S. Drought Monitor released on 1 July 2014 (see below) continues to show most of Nevada in at least D2 – Severe Drought condition; with approximately 55% of the state experiencing D3 –

Extreme drought conditions and approximately 11% of the state experiencing D4 – Exceptional

**U.S. Drought Monitor
Nevada**



July 1, 2014
(Released Thursday, Jul. 3, 2014)
Valid 8 a.m. EDT

Drought Conditions (Percent Area)

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.00	100.00	100.00	86.92	54.99	11.08
Last Week 6/24/2014	0.00	100.00	100.00	86.92	40.84	11.08
3 Months Ago 4/5/2014	0.00	100.00	100.00	82.21	33.54	8.24
Start of Calendar Year 1/1/2014	0.39	99.61	96.81	77.66	28.55	5.37
Start of Water Year 7/1/2013	0.39	99.61	96.79	79.11	28.55	5.37
One Year Ago 7/2/2013	0.00	100.00	99.61	86.38	28.37	5.37

Intensity:

- D0 Abnormally Dry
- D1 Moderate Drought
- D2 Severe Drought
- D3 Extreme Drought
- D4 Exceptional Drought

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

Author:

Anthony Artusa
NOAA/NWS/NCEP/CPC

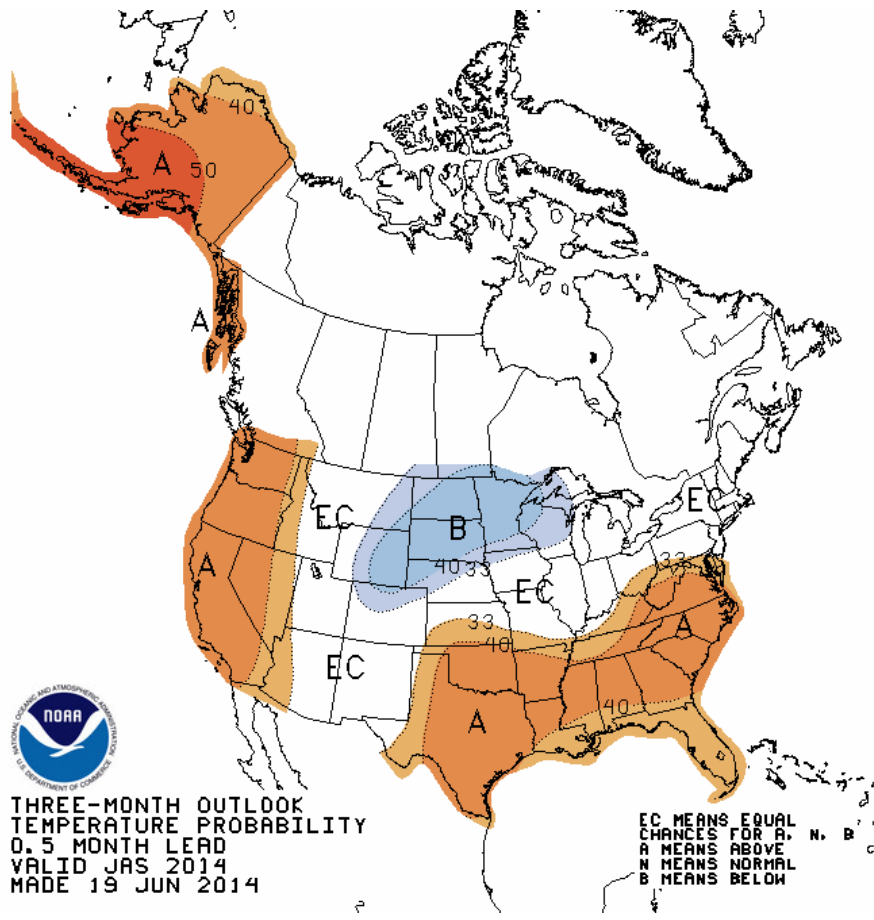


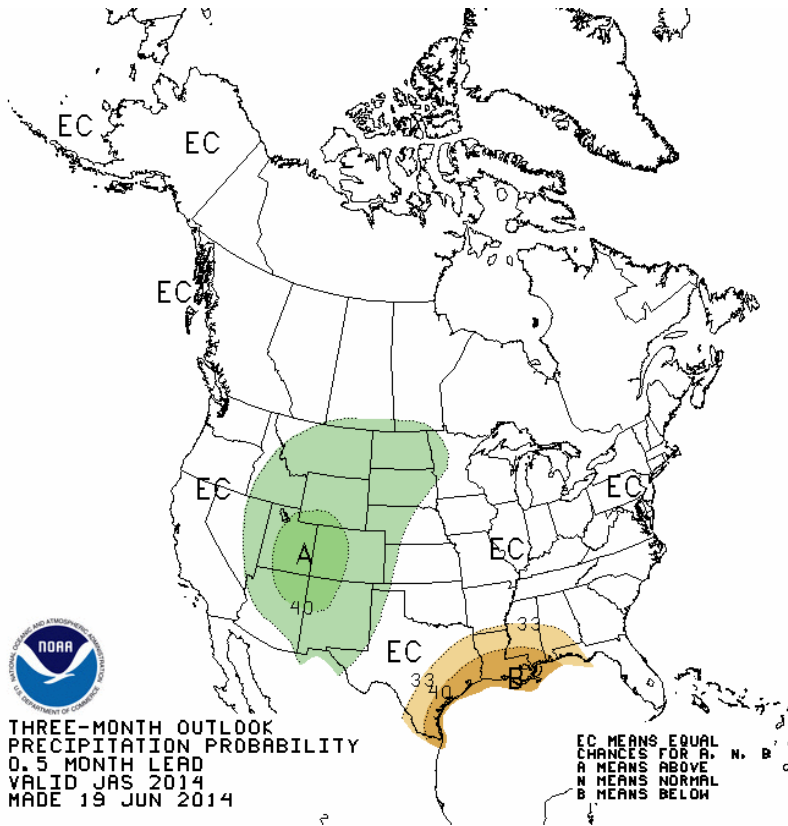
<http://droughtmonitor.unl.edu/>

drought conditions.

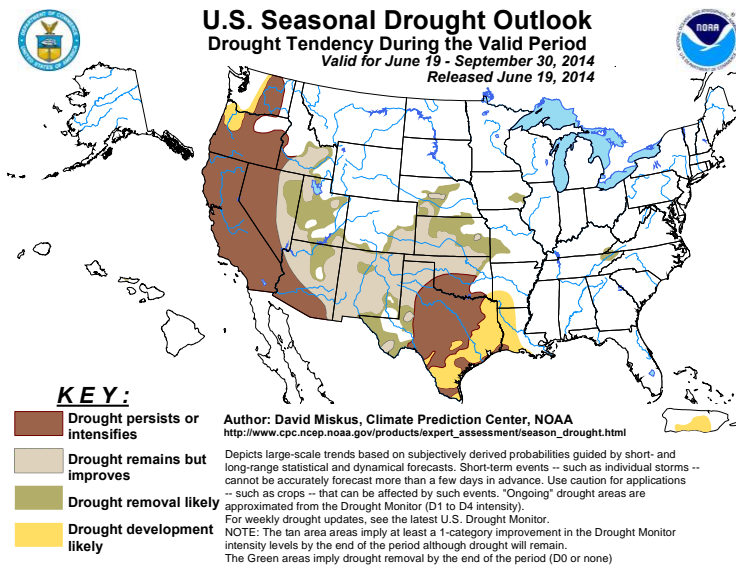
Long Term Outlook

Based on the U.S. Climate Prediction Center (CPC) forecasts made in mid-June 2014, the outlook for July through September is for warmer than normal conditions throughout the state. Precipitation is expected to be near normal, with the exception of Eastern Nevada where precipitation is forecast to be above normal due to expected monsoonal moisture during this period.





Based on the existing conditions and the forecasted temperature and precipitation by the CPC, the drought is expected to persist or intensify throughout most of the state with some relief possible in eastern Nevada due to expected monsoonal moisture.



IV. Assumptions

- Nevada is the driest state in the nation.
- Multi-year droughts are common in Nevada.
- Long-term drought is one that lasts greater than 5 years.
- Periods have existed in Nevada where drought has persisted for greater than 10 years and these drought periods will likely occur again in the future.
- Although Nevada has recently seen a slower population growth due economic recession, the population in Nevada will continue to grow.
- Populations will continue to encroach into wild land areas.
- The longer drought conditions persist, the greater the risk of wildfires and the destruction resulting from them.
- Water supply is not expected to increase.
- Water demand will increase.

V. Mission and Goals

1. **Create a multidisciplinary water resource monitoring, advisory and response committee with representation from five leading State agencies: Division of Emergency Management, Division of Water Resources, State Climate Office, Department of Agriculture, and University of Nevada Cooperative Extension.**

The goals of this committee are suggested as follows:

2. **Provide public education and information to assist municipalities, industries and others in Nevada in understanding resources available to address long-term drought.**
3. **Provide information and possible recommendations that will result in more drought resilient communities in light of growing Nevada populations.**
4. **Provide agricultural and ranching information and possible recommendations to strengthen the industry's drought resilience.**
5. **Provide information and possible recommendations that will result in more drought resilient rangelands that will better meet the shared needs of livestock and wildlife, and decrease the risk of urban / wild land interface fires.**

VI. Goal 1:

Goal: Create a multidisciplinary water resource monitoring, advisory and response committee with representation from five leading State agencies: Division of Emergency Management, Division of Water Resources, State Climate Office, Department of Agriculture and University of Nevada Cooperative Extension

Rationale:

The current Drought Response Committee (DRC) is an ad hoc committee made up of representatives from the Nevada Division of Water Resources (DWR), the Nevada Division of Emergency Management (NDEM) and the State Climate Office. The DRC in its current form is not formally organized, does not have a mandate from the state, and has no authority or funding to act.

The Drought Response Committee could be formalized through a Governor's executive order, which expands the committee to include other state agencies, while keeping the core group relatively small. Public input is important to the process envisioned and input would be sought from local and tribal government representatives, federal agency stakeholders, municipal water purveyors, irrigation districts, representatives from the agriculture and ranching communities, and other stakeholders determined necessary, however the Drought Response Committee believes that the core executive committee must be kept to a workable size.

Objectives:

1. Formalize the Drought Response Committee at the request of the Governor, through the issuance of an executive order.
2. Within one month from the date of the executive order, the Drought Response Committee representatives will have been specifically identified in accordance with the executive order.
3. Within three months from the date of the executive order, the Drought Response Committee shall develop committee taskforces to address the various goals of the strategic plan
4. Within three months from the date of the executive order, the Drought Response Committee will identify funding sources that may be utilized to carry out the tasks proposed.
5. Twice a year the Drought Response Committee will report to the Governor the status of the implementation of suggested goals.

VII. Goal 2:

Goal: Provide public education and information to assist municipalities, industries and others in Nevada in understanding resources available to address long-term drought.

Rationale:

To better educate Nevada citizens on the importance of planning for water resource limitations and drought resilience, the Drought Response Committee will need to collaborate with others to ensure our citizens are receiving a consistent message. Strategies include providing information so that municipalities, industries, agriculture and ranching sectors, and others in Nevada will have the latest information regarding drought impact and available assistance from state and federal agencies.

Objectives:

1. Within three months from the date of the executive order, the Drought Response Committee will develop an Information Management Taskforce.
2. The Information Management Taskforce will develop an information management strategy which may include but is not be limited to, county specific information meetings, situation reports, traditional media campaigns, social media campaigns, industry specific messaging and a state drought specific website.
3. Within one year from the date of the executive order, the Information Management Taskforce will fully implement the information management strategy.

VIII. Goal 3:

Goal: Provide information and possible recommendations that will result in more drought resilient communities in light of growing Nevada populations.

Rationale:

Most Nevada communities are resilient to short term and medium term severe drought with most metropolitan water systems planning for droughts that last up to 7 years. Other, mostly rural municipal water systems may be vulnerable to severe multi-year drought. As the Nevada population grows in the metropolitan and rural areas, there will be an increased demand for water.

Objectives:

1. Within three months from the date of the executive order, the Drought Response Committee will develop a Municipal Water System Resiliency Taskforce.
2. Within six months from the date of the executive order, the Municipal Water System Resiliency Taskforce will complete a survey of drought impacts to municipal water systems.
3. Within one year from the date of the executive order, the Municipal Water System Resiliency Taskforce will conduct an assessment of vulnerability of water systems to long-term drought.
4. Within one year from the date of the executive order, the Municipal Water system Resiliency Taskforce may provide recommendations for water system drought resiliency standards, which may include recommendations for population based water usage goals and recommendations for modernization based on the most vulnerable systems.
5. Within one year from the date of the executive order, the Municipal Water system Resiliency Taskforce and the Information Management Taskforce will develop an information and education strategy to improve municipal water system resiliency.

IX. Goal 4:

Goal: Provide agricultural and ranching information and possible recommendations which will strengthen the industry's drought resilience.

Rationale:

The agricultural and ranching industry has a long and venerated history in Nevada. It also is quite vulnerable to moderate- to long-term drought. Some agricultural products grown in Nevada are some of the least drought resistant in the industry. Exploration of whether irrigation and water storage techniques used in Nevada can be modernized so as to conserve water and reduce waste may be of value to these industries.

Objectives:

1. Within three months from the date of the executive order, the Drought Response Committee will develop an Agriculture and Ranching Resiliency Taskforce.

2. Within six months from the date of the executive order, the Agriculture and Ranching Resiliency Taskforce will survey current impact of the drought on the agriculture/ranching industry, including a summary of the loss of gross agricultural product, and estimate impact if the drought continues for a period of 5 years.
3. Within one year from the date of the executive order, the Agriculture and Ranching Resiliency Taskforce will develop recommendations for drought resilient crops, agricultural and ranching practices, and drought resilient irrigation techniques.
4. Within one year from the date of the executive order, the Agriculture and Ranching Taskforce and the Information Management Taskforce will develop an information and education strategy to distribute drought resilient crop and irrigation techniques to the agricultural and ranching communities.

X. Goal 5:

Goal: Provide information and possible recommendations that will result in more drought resilient rangelands that will better meet the shared needs of livestock and wildlife, and decrease the risk of urban / wild land interface fires.

Rationale:

Nevada has vast rangelands where wildlife, livestock and many other uses coexist. Rangeland is a limited commodity and is considered vulnerable to drought. Wildlife, cattle and others compete for existing and enhanced water resources. Competition for grazing by cattle and feral animals on drought impacted rangeland may place already threatened natural species at even further risks. The encroachment of urban areas into traditional fire prone wilderness areas creates a situation where habitat, properties and lives may become threatened due to wildfire, which is exacerbated by drought conditions.

Objectives:

1. Within three months from the date of the executive order, the Drought Response Committee will develop a Rangeland Drought Resiliency Taskforce.
2. Within six months from the date of the executive order, the Rangeland Drought Resiliency Taskforce will survey the status of Nevada rangeland as it pertains to drought

impact, wildlife habitat, grazing conditions for livestock, feral animals and wildlife, and potential fire impact if the drought continues.

3. Within one year from the date of the executive order, the Rangeland Drought Resiliency Taskforce may provide recommendations to increase drought resiliency on Nevada rangelands and to decrease the threat of urban/wild land fire dangers.
4. Within one year from the date of the executive order, the Rangeland Drought Resiliency Taskforce and the Information Management Taskforce will develop an information and education strategy to promote rangeland drought resiliency.

XI. Funding Strategies

The work proposed under this Nevada Drought Strategic Plan requires personnel and activity funding. It is recognized that currently most State agency workforces and funding have been significantly reduced due to recent economic conditions. Most State agencies will not have available staff to pull from other work assignments to perform the tasks proposed. The objectives set forth under this plan will not be possible without additional staffing and/or funding for information collection, analysis, reporting and dissemination.

The Drought Response Committee (DRC) will work with primary state agencies, federal agencies and stakeholders on an “in kind” basis. State agency personnel assigned to work with the (DRC) will do so based on the drought’s impact to their agencies’ respective missions. Meetings will be conducted via teleconference or videoconference to ensure travel costs are kept to a minimum. Even with these measures employed, there may be costs associated with each goal ranging from the development of scientific reports to public service announcements. The funding strategy will have a 3 prong approach:

1. Investigate and apply for federal grant funding.
2. Reallocate state funding.
3. Request specific funding through the 2015 legislative session.

XII. Conclusion

In conclusion, Nevada will always face lean water years. Whether any one year is considered to be an exceptional drought year or whether any five moderate to severe drought years are considered to be an exceptional drought, the elements in this strategic plan will help Nevadans to better manage the impact of drought in Nevada. A lot of work, time and effort will go into the execution of this strategic plan, but in the end it is hoped that it will make Nevada better prepared and more resilient to drought.