

FINAL

# Gallup/NGWSP Water Commons Drought Contingency Plan

*Prepared for*

City of Gallup



October 2018



# Executive Summary

The City of Gallup (City) is entirely reliant on groundwater, supplying on average 3.37 million gallons a day (mgd) (12.24 acre-feet per year). Groundwater is mined at a higher rate than it recharges, and climate conditions will slow the recharge rate further. The City's groundwater levels have dropped approximately 200 feet over the past 10 years, and within the decade, the supply is not expected to meet current water demands. The City anticipates a 1-mgd shortage during peak periods as early as this year.

The City is a community of about 20,000 people located at the center of numerous low-income communities throughout McKinley County and the Zuni and Navajo Reservations. On the Navajo Nation, existing groundwater supplies are dwindling, have limited capacity, and are of poor quality. More than 40 percent of Navajo households rely on water hauling to meet daily water needs. Most of these communities have no businesses, schools, or hospitals, which makes the City the central economic and social hub for the area.

This Drought Contingency Plan (DCP) for the City of Gallup has been prepared following the outline and requirements of the Bureau of Reclamation's WaterSMART grant process. The DCP includes a drought monitoring framework, a vulnerability assessment, mitigation actions, response actions, operational and administrative frameworks, and a DCP update process. The City is planning to receive surface water from the San Juan River via the Navajo-Gallup Water Supply Project (NGWSP) by 2024. The DCP has been prepared in anticipation of that project, identifying the future monitoring framework and future vulnerabilities.

The DCP also includes a drought monitoring tool that uses drought stage indicators such as the U.S. Drought Monitor (Weekly Update), Drought Severity Index (Palmer), and the 6-month Standardized Precipitation Index to determine a site-specific calculated drought stage. Once water is provided under the NGWSP, San Juan River streamflow, snowpack, and Navajo Reservoir water levels will be added to the equation.

Five drought stages with possible impacts are identified in this DCP:

- Stage 0 – No Drought
- Stage 1 – Potential for Drought
- Stage 2 – Moderate Drought
- Stage 3 – Severe Drought
- Stage 4 – Extreme Drought

Based on the drought stage and duration, response actions will be taken to protect essential and secondary assets like fire protection, healthcare facilities, and indoor use over non-essential outdoor water use. Drought-stage-specific response actions include a public education campaign, voluntary water use restrictions, City-mandated water use restrictions, and emergency water rates for high water users.

Drought mitigation actions were identified to reduce the potential drought risks and impacts. Mitigation actions should be implemented during all stages of drought, including Stage 0. These mitigation actions include construction under the NGWSP, construction of additional wells, potable reuse, NGWSP surface water recharge, and many water conservation efforts (meter replacement, leak detection, rebates, rate structure, and new construction standards).

The DCP is proposed to be evaluated and updated after moderate, severe, and extreme drought events or at least on an annual basis.

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# Acronyms and Abbreviations

°F	degree(s) Fahrenheit
BLM	Bureau of Land Management
BOR	Bureau of Reclamation
City	City of Gallup
DCP	Drought Contingency Plan
DPR	direct potable reuse
DTF	Drought Planning Task Force
FY	fiscal year
gpcd	gallon(s) per capita per day
IPR	indirect potable reuse
LB	Lower Basin
mgd	million gallon(s) per day
NDMC	National Drought Mitigation Center
NGWSP	Navajo-Gallup Water Supply Project
NGWSP-PR	Navajo-Gallup Water Supply Project Planning Report
NOAA	National Oceanic and Atmospheric Administration
O&M	operation and maintenance
PDSI	Palmer Drought Severity Index
SPI	Standardized Precipitation Index
UB	Upper Basin





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# Introduction

The Navajo-Gallup Water Supply Project (NGWSP) is a major infrastructure initiative to supply water from the San Juan River Basin to a future population of approximately 250,000 people living in the Navajo Nation, Jicarilla Apache Nation, and City of Gallup (City) by the year 2040. In light of decreasing water supplies in these areas, this population could be impacted by drought conditions in the near future. The success of the NGWSP depends on managing water demand during a variety of minor and major drought situations.

Drought has two major impacts on a water system: (1) water supply is reduced (surface water and groundwater), and (2) water demand increases. NGWSP stakeholders, including the City, could experience widespread and severe economic and environmental impacts from a worst-case drought scenario in the future. In recent years, other cities and states have recognized the importance of improved water-supply planning and management, including drought preparedness.

To help ensure a reliable long-term water supply, the City and other NGWSP stakeholders need to have Drought Contingency Plans (DCPs) in place to evaluate the ability to meet water demands during all stages of a drought and provide adequate response actions to deal with water emergencies.

## 1.1 Scope and Purpose of the Drought Contingency Plan

In 2017, the City was awarded a grant to prepare a DCP within the Bureau of Reclamation's (BOR's) WaterSMART Drought Response Program (BOR, 2016). In accordance with the Drought Response Program Framework for implementation, this plan includes the required elements for a DCP: a drought monitoring framework, a vulnerability assessment, mitigation actions, response actions, operational and administrative frameworks, and an update process. The scope of work included overall coordination of planning activities related to developing the DCP, including:

- Establishing a Drought Planning Task Force (DTF)
- Developing a Detailed Work Plan
- Implementing the Detailed Work Plan
- Developing a DCP that is consistent with the Framework
  - Project Management
  - Data Collection and Analysis
  - Report Preparation
  - DTF and Public Meetings
  - DTF Formation
  - Communication and Outreach Plan

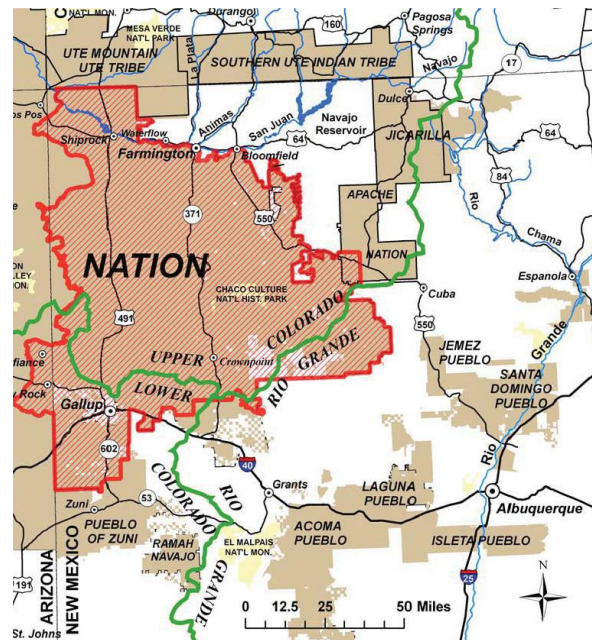


Figure 1-1. Navajo Nation, City of Gallup, and Surrounding Area

The WaterSMART Drought Response Program Contingency Planning program helps planners plan for, and mitigate, the effects of drought by answering three questions:

1. How will we recognize the next drought in the early stages?
2. How will drought affect us?
3. How can we protect ourselves from the next drought?

These questions and their alignment to the responses in the DCP are detailed in Table 1-1.

**Table 1-1. Drought Contingency Plan Section Alignment**

No.	Question	Sections
1	How will we recognize the next drought in the early stages?	<ul style="list-style-type: none"> <li>• Section 2, Drought Monitoring</li> </ul>
2	How will drought affect us?	<ul style="list-style-type: none"> <li>• Section 3, Vulnerability Assessment</li> </ul>
3	How can we protect ourselves from the next drought?	<ul style="list-style-type: none"> <li>• Section 4, Drought Mitigation Actions</li> <li>• Section 5, Drought Response Actions</li> <li>• Section 6, Operational and Administrative Framework</li> <li>• Section 7, Drought Contingency Plan Update Process</li> </ul>

## 1.2 Planning Area

The planning area of direct municipal jurisdiction will include the City of Gallup water system service area, as shown on Figure 1-2.

Even though the planning area includes the City of Gallup, other NGWSP stakeholders were part of the planning effort as described in Section 1.4 Drought Task Force. Other NGWSP stakeholders should develop DCPs with appropriate drought monitoring activities, operational framework, and mitigation and response actions that are most relevant in their jurisdiction. For example, the Navajo Nation already has a DCP and conducts their own drought monitoring.

## 1.3 Background

Northwestern New Mexico is in the Four Corners region, where Utah, Colorado, Arizona, and New Mexico meet, of the southwestern United States and is part of the Colorado Plateau and San Juan River Basin. This region is made up of the counties of San Juan, McKinley, and Cibola. The three-county region of northwestern New Mexico consists of approximately 15,500 square miles of rich cultural, natural, and ethnic diversity. Within this three-county area are six municipalities (Grants and Village of Milan in Cibola County, Gallup in McKinley County, and Farmington, Bloomfield, and Aztec in San Juan County), five Indian reservations, and two Land Grants. There are 69 rural, unincorporated communities, the majority of which are tribal communities.

Most of the lands in the tri-county region are non-taxable tribal trust, federal, and/or state lands. A majority of these federal lands are reservation; however, other federal lands include Bureau of Land Management (BLM) lands throughout eastern areas of San Juan and central Cibola Counties. U.S. Forest Service land is found in both Cibola and McKinley Counties (Cibola National Forest).

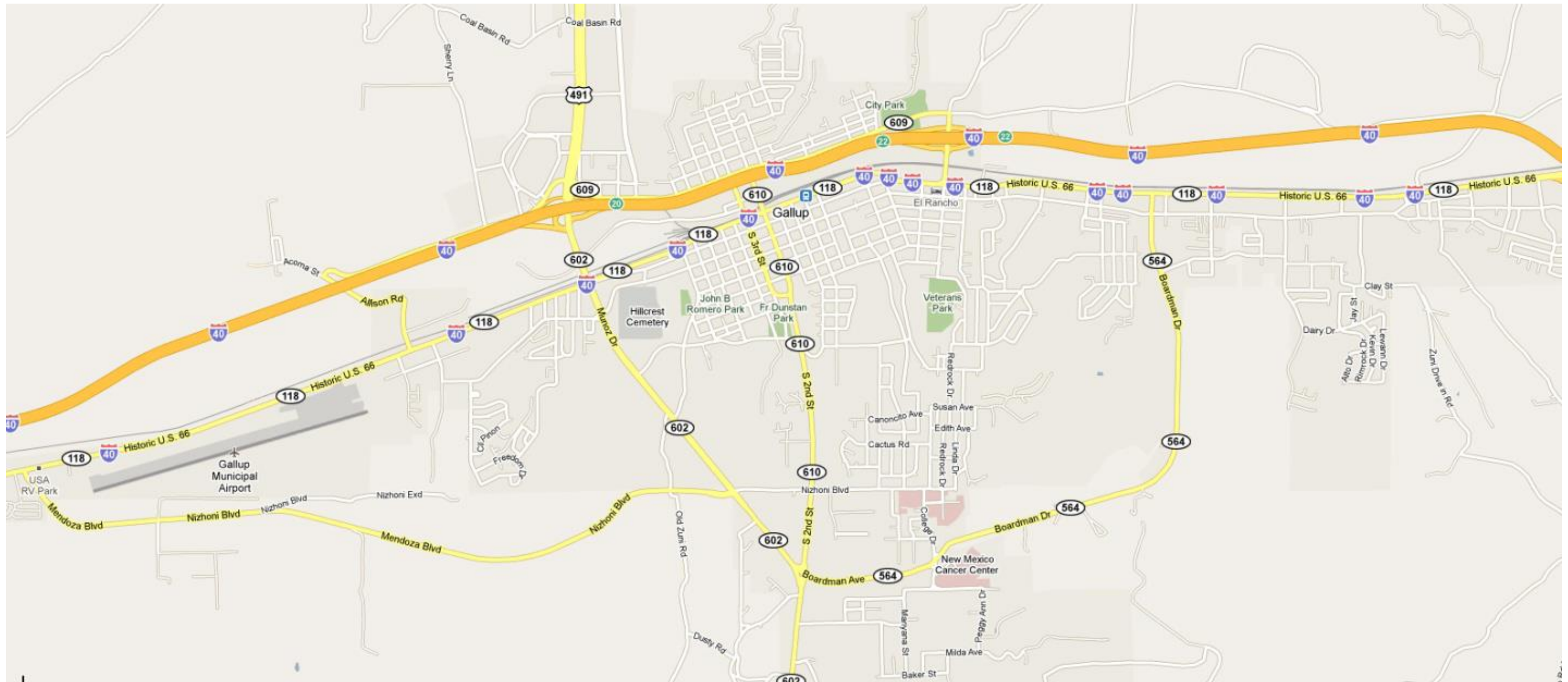


Figure 1-2. Planning Area – City of Gallup

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Northwestern New Mexico's terrain and climate are diverse. The terrain across the three-county region ranges from mountains and canyons to high mesa plateaus. The annual average temperature in the region is about 67 degrees Fahrenheit (°F). July is typically the warmest month, and temperatures in low valley areas can exceed 100°F. January is the coldest month, with average temperatures around 15°F. Precipitation in the region varies greatly and can depend on winter snowfall and the infrequent but intense and heavy summer thunderstorms. Snowfall in the region can occur from October through May, with averages between 10 inches and more than 30 inches in higher mountain areas. Spring winds increase from March through May. The eastern parts of the region experience greater wind speeds that can peak at 50 miles per hour or more.

The City is a community of about 22,000 people at the center of numerous low-income communities throughout McKinley County and the Zuni and Navajo Reservations. Most of these communities have no businesses, schools, or hospitals, which makes the City the central economic and social hub for the area. The county population is nearly 80 percent Native American.

The area that the City serves has a history of chronic poverty. According to the latest data available from the U.S. Census Bureau, in 2010, the average per capita income in the City was \$18,824, which is \$8,000 a year less than the national figures. Nearly 29 percent of families in Gallup live below the poverty level. The economic picture of the county and reservations shows even less prosperity. On the Navajo Reservation, the per capita income is \$13,794. Just over a third of the families in McKinley County live below the federal poverty level.

The low tax base stemming from this historically uneven and struggling economy has left the area's infrastructure needs unfulfilled. Therefore, many of the communities on the reservations and in McKinley County do not have basic water utilities, roads, or electricity. On the Navajo Nation, existing groundwater supplies are dwindling, have limited capacity, and are of poor quality. According to the BOR's 2007 Navajo-Gallup Water Supply Project Planning Report (NGWSP-PR) and Final Environmental Impact Statement (BOR, 2009), about 40 percent of Navajo households rely on water hauling to meet daily water needs. Many households depend on the City for their water supply. The local government maintains a water station for these residents, and it is common to see rural residents hauling water in plastic tanks mounted on the back of their pickup trucks.

The City relies primarily on a groundwater supply from several aquifers, which continue to be progressively mined with little recharge. Groundwater levels have dropped approximately 200 feet over the past 10 years. As reported in the NGWSP-PR (BOR, 2007), based on current projections, severe shortages in the groundwater supply are expected within the next decade. The City anticipates a 1-million-gallon-per-day (mgd) shortage during peak periods as early as this year. The City and neighboring Navajo communities could suffer severe social and economic impacts in the near future.

Due to these conditions, the City, the Navajo Nation, and Jicarilla Apache tribe formed a partnership to work on finding a long-term sustainable water source. With leadership and support from the BOR, Navajo Nation and City of Gallup, planning facilitation by the Northwest New Mexico Council of Governments, and negotiated settlements with the State of New Mexico and the US government, the NGWSP was planned and funded. The NGWSP is currently under construction, with the intent of completing the project by 2024. The City is pursuing surface water from the NGWSP to augment future supply needs and mitigate aquifer declines. The nearly \$1-billion investment in NGWSP should be protected through drought preparedness planning, with the collaboration of all stakeholders. Therefore, the City has a strong commitment to emergency drought planning with the NGWSP stakeholders, who depend on critical and vulnerable water supplies.

The City's DCP builds on experience, plans, and reports that were completed to support the NGWSP. In addition, the approved update to the Region 6 (northwestern New Mexico) Regional Water Plan will be a critical report to guide the City and connect to the larger regional efforts that were adopted by the State of New Mexico, Interstate Stream Commission, and the Office of the State Engineer.

Drought is acutely felt in short-term supply reduction or interruption in surface water systems. Likewise, demands often increase during drought, reflecting the increased needs of outdoor vegetation and cooling requirements. Systems that rely on deep aquifer groundwater are somewhat buffered from acute effects of drought. However, these systems may be impacted on a long-term basis if system recharge is reduced or if production is routinely increased during drought years.

For the City of Gallup, surface water supplies are being developed through the NGWSP to provide a sustainable supply and to reduce the strain on its overtaxed groundwater resources. It is anticipated that future drought and the impact of climate change will result in less than 100 percent reliability from the NGWSP. As such, it is imperative that the City of Gallup protect its groundwater resources for the inevitable reduction in surface water supply. Protection of this resource is important today to ensure that these supplies are still viable as backup supplies in the future and once the NGWSP is online to ensure supply for generations to come.

## 1.4 Plan Development

The Project Team followed its “Detailed Work Plan, Revision #3”, which was approved by US Bureau of Reclamation (BOR) in February 2018, including all milestones, tasks, activities, and timeline outlined in the plan. The Detailed Work Plan also included a very robust public involvement plan.

To highlight some of the key processes utilized to develop plan included:

- Drought Planning Task Force (DTF) - Establishing our DTF was a critical part of our process’s success, which started with targeting key stakeholders and grassroots representatives from key interest groups. Over the life of the process, our invite list grew to over 100+ people from Gallup, McKinley County, Navajo Nation, and Zuni Pueblo. The Drought Planning Task Force met four times throughout the process and agendas, notes, and presentations were posted on the project website. Meeting notes from the DTF meetings are included in this plan as Appendices A through D.
- Outreach - The Project Team used a multi-media approach including project website, emails, and phone calls to solicit involvement, comments, and participation. Outreach was also provided for Navajo language and interpretation.
- Technical Memorandums - Our consultants produced technical memorandums for each required BOR plan component. These memos were reviewed by the Project Team and then sent to the DTF members for their review and comment. Comments were received via email, website, in writing, or via phone call. Comments were discussed at each DTF meetings and consensus were sought before moving items forward.
- Plan Review - Similarly, the draft final plan was published for comment on the website and sent to DTF members for review. The comment period was open for 30 days. The Project Team facilitated a final Drought Contingency Plan workshop with the DTF and public to review and get consent recommendations on all comments, concerns, and questions. The City Council also received two presentations and provided comments on the plan at regular City Council meetings.
- Drought Awareness – Public awareness was significantly raised during our planning process, as the City of Gallup and its citizens participated and won the Wyland National Mayor’s Challenge for Water Conservation with over 30% of our citizens taking the challenge to reduce their use by 32 million gallons of water over the next year.

Outreach, public education, and involvement were keys in producing a successful Drought Contingency Plan. Also, consensus-building was a good ethic as every citizen has a stake in the water resiliency of the



community. Everyone's opinion and viewpoint were heard and taken into consideration as the DTF moved to consensus recommendations



# Drought Monitoring

Monitoring certain climatic and other physical factors can allow for the early detection of a potential drought, which in turn allows for time to plan and act. Several different indicators have been used by varying communities to represent their specific circumstances. Indicators could be metrics such as reservoir storage, groundwater levels, streamflow, or the Palmer Drought Severity Index (PDSI)<sup>1</sup>.

The following subsections present a proposed framework for monitoring for, and reporting on, drought conditions for the City.

## 2.1 Drought Monitoring Framework

According to the BOR's Drought Response Program Framework for the WaterSMART Program, a drought monitoring framework relies on the following items:

- Indicators – specific measures that can be used to assess drought conditions. Indicators are dependent on local climate and data availability. Indicators are used to establish triggers.
- Triggers – an indicator threshold value or range that can be used to define the drought stage or trigger a specific response or mitigation action.
- Indices – effectively integrate drought variables into a single index number.
- Drought stages – represent the severity of drought and are classified in several ways.

## 2.2 Gallup's Drought Monitoring Framework

Using BOR's drought monitoring framework, the City, in coordination with the DTF, developed a drought monitoring framework for the City, as shown in Table 2-1, *Template for Drought Conditions Monitoring Table*. This drought monitoring framework incorporates five stages of drought (Stage 0 through Stage 4), which were developed for this DCP. The table can be used to track current conditions and determine the corresponding calculated drought stage.

Due to water mining and naturally slow recharge rates, the water levels in the City's production wells are declining as discussed in Section 1.3 Background. Therefore, the water levels are not included in the framework, as they would artificially generate a worsening trend of drought, even when that may not be the case. Climate and weather indicators will provide the City with monthly update on drought conditions and possible changes in water demands (for example extra watering), while prolonged drought conditions could indicate decreasing aquifer recharge rates. The indicators in the current framework (Table 2-1) are the U.S. Drought Monitor (Weekly Update), PDSI, and 6-month Standardized Precipitation Index (SPI). The triggers for each indicator and drought stage are shown below the "Triggers" row. To determine the calculated drought stage, the City would fill out the data entry line based on information for each indicator and use the information populated in Table 2-1. Table 2-2 is an example of a completed Drought Conditions Monitoring Table with a calculated drought stage of 3.

The indicators selected for Table 2-1 are specific to the City's impacts to water demand and do not include indicators that will impact the NGWSP's supply. Section 2.4 provides examples of indicators that can be added to the drought monitoring framework once NGWSP is delivering water to the City.

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<sup>1</sup> Long-term droughts are quantified by the PDSI, calculated by National Oceanic and Atmospheric Administration (NOAA) from a combination of precipitation, temperature, and soil moisture data. The PDSI represents the accumulation or deficit of water over a long-term period, about 9 months.

Figures 2-1 through 2-3 show the information used to populate Table 2-2 for each indicator.

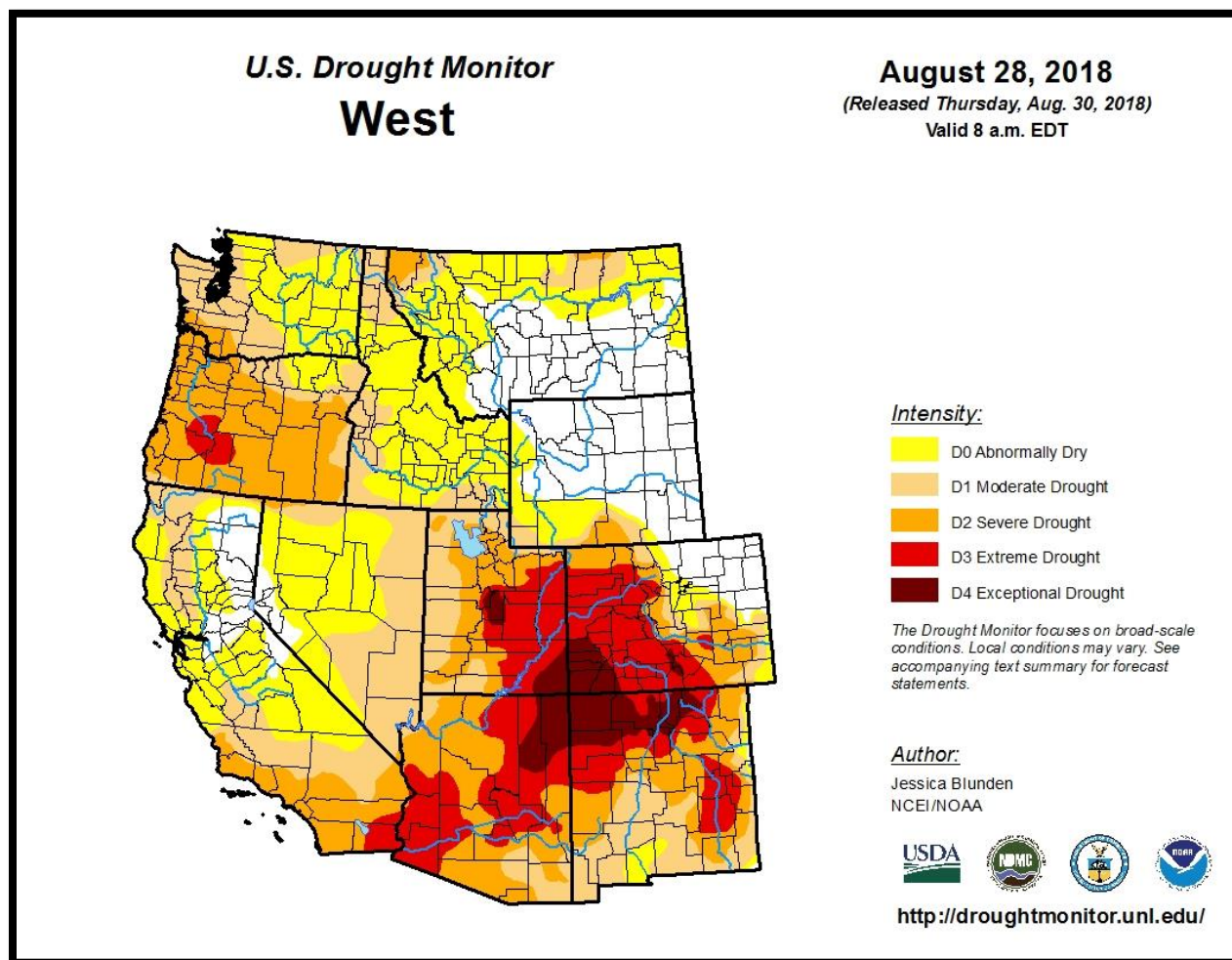
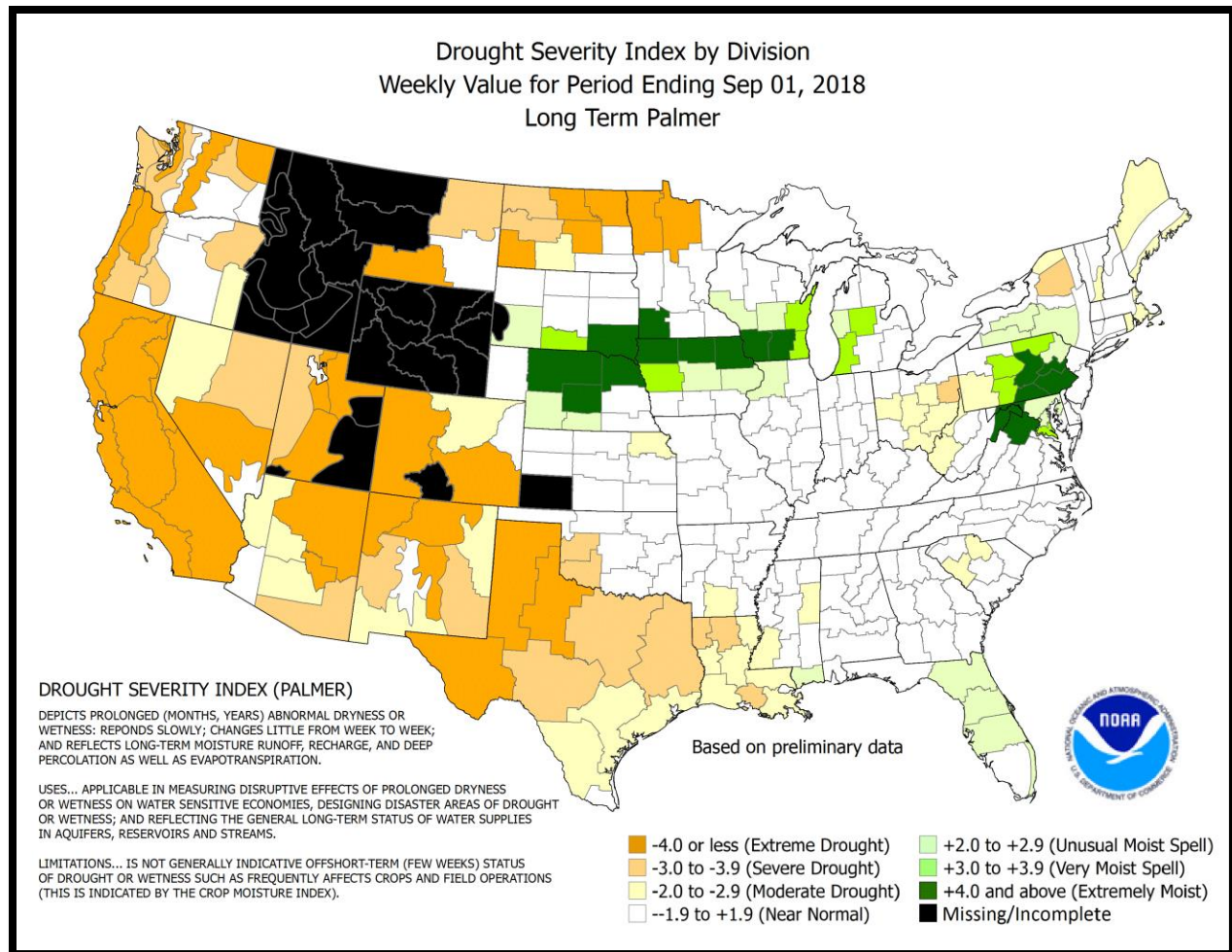


Figure 2-1. U.S. Drought Monitor  
Used in Table 2-2 Example



**Figure 2-2. Palmer Drought Severity Index**  
*Used in Table 2-2 Example*

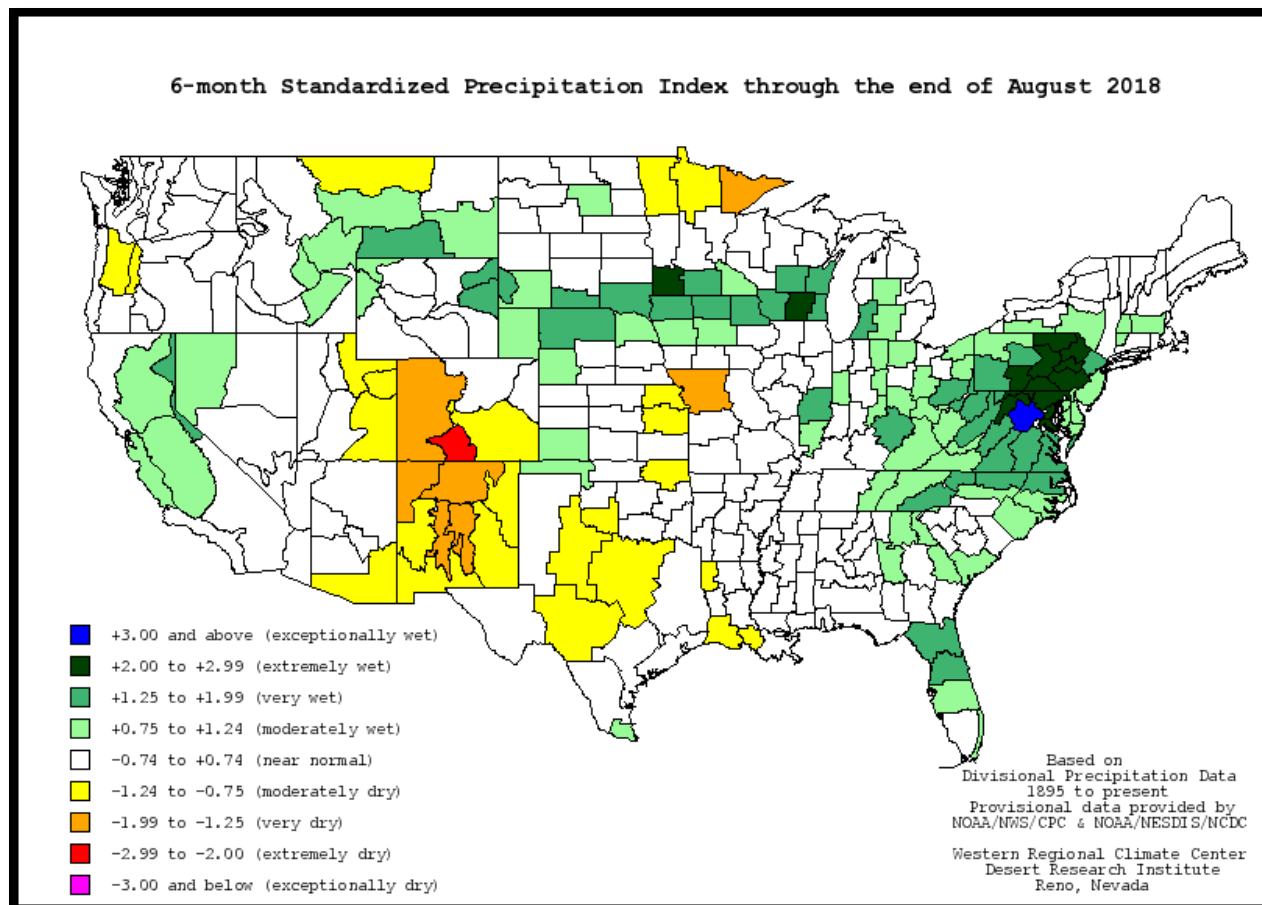


Figure 2-3. Standardized Precipitation Index  
Used in Table 2-2 Example

Table 2-1. Template for Drought Conditions Monitoring Table

Date completed:				
		Indicators		
Month/Year:		U.S. Drought Monitor (Weekly Update)	Palmer Drought Severity Index (PDSI)	West Region Climate Center Standardized Precipitation Index (SPI)
Website		<a href="http://droughtmonitor.unl.edu/">http://droughtmonitor.unl.edu/</a>	<a href="http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif">http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif</a>	<a href="https://wrcc.dri.edu/cgi-bin/spiFmap.pl?spi06">https://wrcc.dri.edu/cgi-bin/spiFmap.pl?spi06</a>
Input Determined Drought Stage from Information on Websites (in cells to right)				
Drought Stage	Possible Impacts	Triggers		
Stage 0 – No Drought	No Indicators showing a drought condition.	None	> 0	> -0.74
Stage 1 – Potential for Drought	Current conditions indicate the potential for upcoming drought conditions.	D0	-1.9 to 0	-1.24 to -0.75
Stage 2 – Moderate Drought	Streams, reservoirs, or wells low.  Some water shortages developing.  Voluntary water-use restrictions requested.	D1	-2.0 to -2.9	-1.99 to -1.25
Stage 3 – Severe Drought	Water shortage common.  Water restrictions imposed.	D2	-3.0 to -3.9	-2.99 to -2.00
Stage 4 – Extreme Drought	Shortages in reservoirs, streams, and wells creating water emergencies.	D3 or D4	< -4.0	-3.00 or below
Calculated Drought Stage				

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Table 2-2. Example of Drought Conditions Monitoring Table

Date completed:	9/4/18			
		Indicators		
Month/Year:	August-18	U.S. Drought Monitor (Weekly Update)	Palmer Drought Severity Index (PDSI)	West Region Climate Center Standardized Precipitation Index (SPI)
Website		<a href="http://droughtmonitor.unl.edu/">http://droughtmonitor.unl.edu/</a>	<a href="http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif">http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif</a>	<a href="https://wrcc.dri.edu/cgi-bin/spiFmap.pl?spi06">https://wrcc.dri.edu/cgi-bin/spiFmap.pl?spi06</a>
Input Determined Drought Stage from Information on Websites (in cells to right)		4	4	2
Drought Stage	Possible Impacts	Triggers		
Stage 0 – No Drought	No Indicators showing a drought condition.	None	> 0	> -0.74
Stage 1 – Potential for Drought	Current conditions indicate the potential for upcoming drought conditions.	D0	-1.9 to 0	-1.24 to -0.75
Stage 2 – Moderate Drought	Streams, reservoirs, or wells low.  Some water shortages developing.  Voluntary water-use restrictions requested.	D1	-2.0 to -2.9	-1.99 to -1.25
Stage 3 – Severe Drought	Water shortage common.  Water restrictions imposed.	D2	-3.0 to -3.9	-2.99 to -2.00
Stage 4 – Extreme Drought	Shortages in reservoirs, streams, and wells creating water emergencies.	D3 or D4	< -4.0	-3.00 or below
Calculated Drought Stage				3

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## 2.3 Calculated Drought Stages

The calculated drought stages will use information/data from Table 2-1 to produce a drought stage. Calculated drought stage is defined as an arithmetic average of data from Table 2-1, rounded up to the first integer.

Table 2-2 shows an example for developing the calculated drought stage based on the data in Table 2-1.

## 2.4 Additional and/or Future Indicators

Additional indicators may be developed as needed. Future indicators and triggers will need to be added to the drought monitoring framework once the NGWSP is delivering water to the City. Potential indicators to include are Navajo Reservoir levels, streamflow data, and snowpack. These indicators were chosen to help the City determine regional hydrologic drought and consequently the City's ability to divert water from the Navajo Reservoir.

During this period when the City is using local groundwater, the City may experience drought conditions, such as reduced local rainfall, high temperatures, and increased outdoor demands. These conditions primarily affect current supplies through increased demand, acute stress on groundwater wells, and a reduction in the lifespan of the resource.

In the future, as surface supplies are introduced, the experience of drought will take on several forms. The City will still experience localized drought, but its future surface water supply could be affected by regional hydrologic drought or by institutional reductions. Hydrologic drought will result when physical supply is not available for diversion by the NGWSP, when streamflow is reduced because of reduced snowfall in the upper San Juan, or when Navajo Reservoir levels decrease. Institutional drought will come if a compact call is made and the Upper Basin (UB) of the Colorado River is in curtailment. This circumstance occurs when UB deliveries to the Lower Basin (LB) are less than compact requirements. Curtailment is intended to ensure that LB deliveries occur. Note that curtailment is based on overall delivery of the UB and, therefore, could occur in circumstances where there is no hydrologic deficit on the San Juan system (i.e., Navajo Reservoir has sufficient supply and snowpack and streamflow are adequate to meet user demands).

The following indicators (with respective websites) could be added to the updated DCP framework when NGWSP is delivering water to the City:

- Streamflow data – 6-month average from USGS Gauge 09346400 San Juan River near Carracas, Colorado. The 6-month average was selected because the seasonally variability of streamflow at this gauge. This gauge station location was selected because it is the main tributary upstream of the Navajo Reservoir and will indicate the potential decreased levels in the Navajo Reservoir. The 10-year historic data was analyzed at this gauge station to develop the drought stages in Table 2-3. The 10-year average stream flow was calculated to be 578 cubic feet per second. Because there have been stages of drought over the past 10-years, the “Stage 0 – No Drought” indicator was set at 35% increase or greater streamflow over the 10-year average. The “Stage 4 – Extreme Drought” indicator was set at and 80% decrease or less in streamflow.  
<https://maps.waterdata.usgs.gov/mapper/index.html>
- Snowpack data for San Juan River Basin. A sliding scale of percent of median was determined for this indicator based on the available. This indicator may need to be adjusted in the future with post-drought evaluation.  
<https://www.wcc.nrcs.usda.gov/basin.html>
- Navajo Reservoir level data. The historic reservoir levels were analyzed over a 10-year period to develop the drought stages in Table 2-3. Based on the analysis of the historic reservoir levels over

the last 10-years, the maximum level was an elevation of 6,078; average elevation of 6,052 and minimum of 6,015. The spillway elevation (assumed maximum water surface elevation) is 6,085. Because there have been stages of drought over the past 10-years, the “Stage 0 – No Drought” indicator was set at 6,075 or greater (near the 10-year maximum). The “Stage 4 – Extreme Drought” indicator was set at 6,010 or below (slightly below the 10-year minimum).

<https://www.usbr.gov/rsvrWater/rsv40Day.html?siteid=920&reservoirtype=Reservoir>

An example of the drought conditions monitoring framework for future use is provided in Table 2-3. Beyond hydrologic and institutional drought, additional interruption in service may include natural disasters (i.e., wildfire upstream of Navajo Reservoir) or a man-made disaster (i.e., mine wastewater spill), which would impact surface water quality and/or surface water supply availability. These types of acute events affecting supply could be mitigated similarly to drought.

## 2.5 Drought Monitoring Reporting

The drought monitoring framework involves the following steps:

1. Fill out the “data entry” line of Table 2-1 based on the information for each indicator.
2. Use the information from the populated Table 2-1 and calculate drought stage.
3. Prepare a brief monitoring report noting the calculated drought stage and discuss any additional indicators.
4. Share results among the stakeholders consistent with the Operation and Administrative Framework (to be developed in a subsequent technical memorandum). Repeat per the schedule in Section 2.6.

## 2.6 Monitoring Schedule

Monitoring should occur monthly, since most of the available data for the indicators are updated monthly. The City will be responsible for updating the drought monitoring indices and should consider posting the indices on its website for public awareness.

It is recommended that on an annual basis the stakeholders should look at the monitoring data and determine if any adjustments to the framework are needed.

## 2.7 Historical Calculated Drought Stage

A historical calculated drought stage trend was developed based on the drought monitoring framework and monitoring schedule detailed in Section 2.6. The intention of the historical calculated drought stage is to determine the timeframe in which the City will be at certain stages of drought and help determine any needed adjustments to the drought monitoring framework. The historical calculated drought stage will also aid in determining the protocol for implementing response actions. Figure 2-4 depicts the calculated drought stage on a monthly basis for the past 10 years of available data. Over the past 10 years, there have been two instances of prolonged (over 6 months consecutive) Stage 3 drought and one Stage 2 drought.

Table 2-3. Template for Drought Conditions Monitoring Table with Additional Indicators

Date completed:							
		Indicators					
Month/Year		US Drought Monitor (Weekly Update)	Drought Severity Index (Palmer)	West Region Climate Center Standardized Precipitation Index	Streamflow Data for San Juan at USGS 09346400 Gage, 6-month average cfs	Snowpack in San Juan River Basin, % Median	Water Level in Navajo Reservoir, ft
Website		<a href="http://droughtmonitor.unl.edu/">http://droughtmonitor.unl.edu/</a>	<a href="http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif">http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif</a>	<a href="https://wrcc.dri.edu/cgi-bin/spiFmap.pl?spi06">https://wrcc.dri.edu/cgi-bin/spiFmap.pl?spi06</a>	<a href="https://maps.waterdata.usgs.gov/mapper/index.html">https://maps.waterdata.usgs.gov/mapper/index.html</a>	<a href="https://www.wcc.nrcs.usda.gov/basin.html">https://www.wcc.nrcs.usda.gov/basin.html</a>	<a href="https://www.usbr.gov/rsvrWater/HistoricalApp.html">https://www.usbr.gov/rsvrWater/HistoricalApp.html</a>
Monitoring Period		All Year	All Year	All Year	All Year	December 1 - May 1	All Year
Input Determined Drought Stage from Information on Websites (in cells to right)							
Drought Stage	Possible Impacts	Triggers					
Stage 0 – No Drought	No Indicators showing a drought condition.	None	> 0	> -0.74	> 800	> 70	> 6,075
Stage 1 – Potential for Drought	Current conditions indicate the potential for upcoming drought conditions.	D0	-1.9 to 0	-1.24 to -0.75	799-400	70 -61	6,053 – 6,074
Stage 2 – Moderate Drought	Streams, reservoirs, or wells low.  Some water shortages developing.  Voluntary water-use restrictions requested.	D1	-2.0 to -2.9	-1.99 to -1.25	399-200	60-51	6,032 – 6,052
Stage 3 – Severe Drought	Water shortage common.  Water restrictions imposed.	D2	-3.0 to -3.9	-2.99 to -2.00	199-100	50-21	6,011 – 6,031
Stage 4 – Extreme Drought	Shortages in reservoirs, streams, and wells creating water emergencies.	D3 or D4	-4.0 or below	-3.00 or below	> 100	20 or below	6,010 or below
Calculated Drought Stage							

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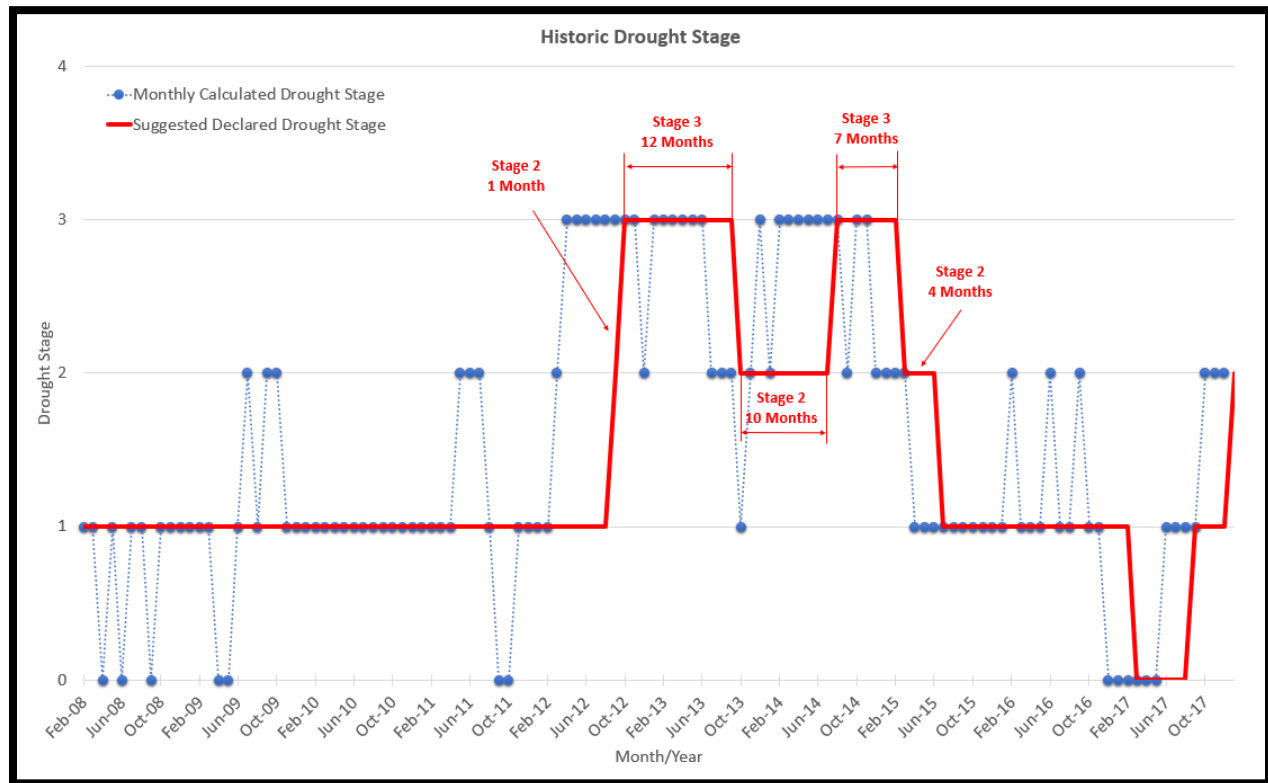


Figure 2-4. Historical Calculated Drought Stage and Corresponding Drought Stage (Past 10 Years)

## 2.8 Potential Challenges

The following are some potential challenges that the City and stakeholders should keep in mind when applying the drought monitoring framework:

- Indicators are based on percent of normal to historical conditions and these may become outdated, less valid, or more challenging to interpret with the impact of climate change.
- The framework relies solely on data provided by others, including federal and state agencies. If the data update frequency reduces or changes in format, the framework will need to be re-visited.
- Groundwater level data updates on a regular basis are lacking in the project area and groundwater may not provide a reliable metric for tracking drought.



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# Vulnerability Assessment

“How will drought affect us?” The vulnerability assessment provides information for future mitigation and response actions that will improve drought resiliency. The vulnerability of a system to drought depends on factors such as environmental, economic, and social impacts.

The City relies primarily on groundwater. The effects of climate on groundwater are long-term: a short drought will not immediately result in lower groundwater levels. One major future water supply source for the City is surface water from the NGWSP. The NGWSP will deliver a portion of New Mexico’s allotment of Colorado River water from the San Juan River to the City and portions of the Navajo Nation. The City’s allotment of water from the NGWSP totals 7,500 acre-feet per year. Unlike groundwater, surface water availability is directly related to annual climate conditions. Prolonged drought could reduce Gallup’s NGWSP deliveries, increasing reliance on groundwater. Because groundwater will become a backup supply, maintaining this resource in the near term, prior to the NGWSP coming online, and in the long term is critical to avoiding service interruption.

## 3.1 Asset Prioritization—Current

At DTF meeting No. 2 on January 31, 2018, assets were identified and prioritized based on qualitative assumptions of the environmental, economic, and social consequences of drought impacts. Prioritized assets, the associated underlying cause of the asset’s vulnerability, and the impact of drought to the asset are presented Table 3-1.

Table 3-1. Prioritized Assets

Priority	Asset	Underlying Causes of Vulnerability	Impact of Drought
Essential Assets	Fire Suppression	Economic	<ul style="list-style-type: none"> <li>• Interruptions in fire suppression, which could cause damage to infrastructure within the City of Gallup</li> </ul>
	Residential Indoor Water Use	Drought duration and severity and seasonal characteristics, social	<ul style="list-style-type: none"> <li>• Interruptions in service</li> <li>• Possible rate increases to add new supplies or infrastructure</li> <li>• Possible change in water quality with change in sources</li> </ul>
	Critical Healthcare Facilities	Drought duration and severity, economic	<ul style="list-style-type: none"> <li>• Interruptions in service, which will cause reduced emergency medical capacity in the area</li> </ul>
	Government/Institution Indoor Use	Drought duration and severity	<ul style="list-style-type: none"> <li>• Interruptions in service, which will cause shut down in government or school facilities</li> </ul>
Secondary Assets	Commercial/Industrial Indoor Use	Drought duration and severity, economic	<ul style="list-style-type: none"> <li>• Interruptions in service, which will cause economic impact to the businesses in the community; large water users include:               <ul style="list-style-type: none"> <li>– Laundry facilities</li> <li>– Truck stops</li> <li>– Hotels</li> </ul> </li> </ul>
Non-Essential Assets	Municipal/Institution Outdoor Use	Drought duration and severity	<ul style="list-style-type: none"> <li>• Interruptions in service, which will cause restricted watering to parks, sports fields at school facilities</li> </ul>
	Residential Outdoor Water Use	Drought duration and severity and seasonal characteristics, social	<ul style="list-style-type: none"> <li>• Interruptions in service, which will cause potential impacts to residential landscaping</li> </ul>
	Commercial/Industrial Outdoor Use	Drought duration and severity	<ul style="list-style-type: none"> <li>• Interruptions in service, which will cause potential impacts to residential landscaping</li> </ul>

## 3.2 Future Vulnerability

Factors that could impact future water availability include the following:

- Population growth
- Water use efficiency rates
- Climate change
- Institutional or Governance

It is likely that all the assets in Table 4-1 will become more vulnerable with impacts from the factors listed above. The relative vulnerability prioritization of the assets will likely remain unchanged because of increased impacts.

Population growth above or below the projected population growth will have an impact on the vulnerability of assets. For example, if the City has planned its future water supply based on a 5 percent population growth over the next 10 years, but the growth is actually 10 percent over the next 10 years, then all the assets see an increased vulnerability because of the increase in water demand.

Water use efficiency rates are the impacts from water conservation measures. If the City has planned a certain reduction in water demand based on water conservation over time and these reductions do not occur to the level assumed, assets will become more vulnerable. However, the opposite (water conservation reduces the water demand by more than planned) could reduce the vulnerability of assets.

Climate change poses a challenge to maintaining future surface water supply and reducing demand on the City of Gallup Water System. The Colorado River Basin mean-annual temperature is expected to increase by roughly 5 to 6°F during the 21st Century, while the mean-annual precipitation is expected to change only by a small amount during the same period (BOR, 2011). Over time, this potential for increased temperatures due to climate change will result in the potential for increased water demand beyond the current water planning for the City.

All assets listed in Section 3.1 relate to water demand. Additional assets should be considered in the future for water supply once the NGWSP is delivering water to the City. The surface water supply assets may be out of the City's control, but this DCP may provide a framework for communicating with the entities that control the assets, namely BOR.

## 3.3 Recommendations

The vulnerability assessment was completed to allow the identification of what vulnerabilities the City has, those that are worsened by drought, and those that are expected to worsened even more by climate change. With the information from the vulnerability assessment, several mitigation and response actions to curtail potential impacts. These mitigation and response actions are presented in the sections 4 and 5, respectively.

Because of the lack of certainty in future climate projections, there is the potential for a wide range of future conditions and impacts determining asset prioritization. The following recommendations are proposed for consideration in future amendments to the vulnerability assessment:

- Collect quantitative data to assess the impact of drought on things like economic losses, water supply management, or water quality.
- Consider future population growth forecasts and potential future economic development.
- Once NGWSP is delivering water, further study and analyze groundwater levels, projections of use, and monitoring for drought preparedness, and how reduced allocation from NGWSP in drought years may impact groundwater.

# Drought Mitigation Actions

Drought mitigation actions refer to actions taken in advance of a drought that reduce the risk of potential drought-related impacts when the event occurs. The consequence of drought is interruption in service due to the gap between supply and demand. That can be either due to increased demand, reduced supply, or both. Therefore, much of the mitigation planning prioritizes actions to conserve water (reduce demand) and improve long-term resiliency before a drought event occurs for assets identified during the vulnerability assessment. Mitigation actions that would increase the supply were also identified. Drought mitigation actions were refined based on input at the DTF meeting No. 3 on March 13, 2018.

## 4.1 Mitigation Action Goals

The following are the goals of the mitigation actions that were established by the DTF at meeting No. 3:

- Determine short-term and long-term activities for mitigation action.
- Reduce the potential drought risks and impacts, which will then decrease vulnerabilities and needed response actions.

## 4.2 Mitigation Actions

Mitigation actions were identified as measures that either increase supply or decrease demand. Actions were prioritized based on the amount of water supplied/conserved, therefore having the largest impact towards long-term resiliency to drought.

The mitigation action that will have the largest impact in reducing the potential drought risk for the City is the completion of NGWSP, followed by the development of additional wells/well fields, and the execution/enforcement of direct/indirect potable water use are prioritized as applied methods towards mitigating and sustaining the depletion of existing water wells. NGWSP is an imported supply that will increase the overall water supply and water security for the area and help maintain the groundwater resource as a backup supply for the City. Several other mitigation actions can be considered in addition to the NGWSP to ensure a reduced risk of potential drought. These include implementation of strategies and/or policies in which water users will be required to adopt sustainable activities, such as water conservation efforts by reducing overall use and /or harvesting water sources. Mitigation actions are summarized and prioritized in Table 4-1.

Table 4-1. Mitigation Actions

Priority	Mitigation Action	Positive	Negative
1	Construct NGWSP	<ul style="list-style-type: none"> <li>Long-term sustainable supply</li> </ul>	<ul style="list-style-type: none"> <li>Project completion not in control of City (BOR to construct water treatment plant and portion of conveyance system)</li> <li>Water allocation per year not in control of City</li> </ul>
2	Develop additional well fields/purchase ground water rights	<ul style="list-style-type: none"> <li>City has full control of asset</li> <li>Increases overall supply</li> </ul>	<ul style="list-style-type: none"> <li>Declining aquifer levels</li> <li>Sustainability</li> </ul>
3	Direct potable reuse (DPR)	<ul style="list-style-type: none"> <li>City has full control of asset</li> <li>Reduces use of groundwater supply</li> </ul>	<ul style="list-style-type: none"> <li>Long-term operation and maintenance (O&amp;M) cost</li> <li>Public perception</li> </ul>
4	Indirect potable reuse (IPR)	<ul style="list-style-type: none"> <li>City has full control of asset</li> <li>Reduces use of groundwater supply</li> </ul>	<ul style="list-style-type: none"> <li>Long-term O&amp;M cost</li> <li>Public perception</li> </ul>
5	Aquifer storage and recovery and/or above-ground storage of excess NGWSP allocation	<ul style="list-style-type: none"> <li>Increase supply in drought years</li> </ul>	<ul style="list-style-type: none"> <li>Regulation road blocks</li> </ul>
6	Water rate structure to encourage water conservation (i.e., inverted block rate structure)	<ul style="list-style-type: none"> <li>Reduces use of groundwater supply</li> </ul>	<ul style="list-style-type: none"> <li>Public perception</li> <li>Reduced revenue</li> </ul>
7	Meter condition assessment and replacement program	<ul style="list-style-type: none"> <li>Additional revenue, reduces non-revenue water use</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
8	Leak detection of existing distribution system	<ul style="list-style-type: none"> <li>Reduces use of groundwater supply</li> </ul>	<ul style="list-style-type: none"> <li></li> </ul>
9	Water conservation rebate programs (i.e., incentives to replace high use fixtures, reduce irrigated turf, etc.)	<ul style="list-style-type: none"> <li>Reduces use of groundwater supply</li> <li>If targeted, may reduce specific drought vulnerability</li> </ul>	<ul style="list-style-type: none"> <li>Reduced revenues</li> </ul>
10	Water Conservation Public Outreach/ Education	<ul style="list-style-type: none"> <li>Reduces use of groundwater supply</li> </ul>	<ul style="list-style-type: none"> <li>Reduced revenues</li> </ul>
11	New construction standards (grey water reuse, landscape restrictions, sprinkler layout, etc.)	<ul style="list-style-type: none"> <li>No cost to City</li> <li>Reduces use of groundwater supply</li> </ul>	<ul style="list-style-type: none"> <li>Added financial burden to residents/businesses</li> <li>Reduced revenues</li> </ul>
12	Rainwater Harvesting	<ul style="list-style-type: none"> <li>Reduces use of groundwater supply for outdoor watering</li> </ul>	<ul style="list-style-type: none"> <li>Reduced revenues</li> </ul>

Groundwater pressures (levels) could be tracked to determine the impacts of mitigation actions. Tracking the overall demand or gallons per capita per day (gpcd) of the City's system could also accomplish the same goal.

# Drought Response Actions

Drought response actions are actions taken in response to emerging and ongoing drought. Emergency drought response actions are actions taken in response to an unanticipated crisis. Actions were prioritized based on the amount of water conserved, therefore having the largest impact towards water shortage due to drought.

Response actions are different from mitigation actions. Response actions relate to specific stages of drought, as defined in Section 2, Drought Monitoring, and are intended to decrease impacts while a drought is ongoing. Table 5-1 lists the drought stages, respective goals, and response actions. Drought response actions were evaluated based on input at DTF meeting No. 3 on March 13, 2018. Evaluation and prioritization of response actions is based on the following criteria:

- Amount of water conserved
- Affected population
- Economic consequences, incl. unclaimed revenue or burden on businesses
- Ease of implementation and enforcement

Table 5-1. Response Action at Each Drought Stage

Drought Stage	Goal	Response Action
Stage 0 – No Drought	–	No response – continue to implement mitigation actions.
Stage 1 – Potential for Drought	Reduce water use by 5%	Increase public drought campaign per Section 6
Stage 2 – Moderate Drought	Reduce water use by 10%	Voluntary water-use restrictions requested (see Table 5-3 for details).
Stage 3 – Severe Drought	Reduce water use by 10% to 20%%	Action by City Council to impose water restrictions (see Table 5-3 for details). Increase water rates.
Stage 4 – Extreme Drought	Reduce water use by 20% to 50%, use limited to public health and safety	Action by City Council to impose additional water restrictions (see Table 5-3 for details). Increase water rates..

Enforcement of non-voluntary water use restrictions needs to be a collaboration of the public, local businesses, the government, and the law enforcement.

**Table 5-2 Detailed Response Action by Element***Information in table applies only to potable and raw water.*

Element	Stage 0 – No Drought	Stage 1 – Potential for Drought	Stage 2 – Moderate Drought	Stage 3 – Severe Drought	Stage 4 – Extreme Drought
Turf Grass	Voluntary 3 days per week	Voluntary 3 days per week	Voluntary 3 days per week	Restriction to 2 days per week	Not allowed
New seed and sod	Allowed	Allowed	Allowed	Not allowed	Not allowed
New plantings	Allowed	Allowed	Allowed	Not allowed	Not allowed
Athletic and playing fields	No water waste	No water waste	No water waste	Coordination with Parks Department, possibly restricted to 2 days per week	On council discretion
Swimming pools	Allowed	Allowed	No water waste	Single-family residential pools shall not be filled or refilled. Operation of other pools permitted.	No pools allowed to be refilled
Other water features (i.e., fountains)	Allowed	Allowed	Voluntary request to not operate	Not allowed	Not allowed
Cars – washing at home	Allowed	Allowed	Voluntary request to limit to once per month	Not allowed	Not allowed
Fleet vehicle washing	Allowed	Allowed	Voluntary request to limit to one time per week	Restriction to one time per month	Not allowed
Charity car wash events	Allowed	Allowed	Allowed	Approval needed	Not allowed
Restaurants	N/A	N/A	Voluntary – water served only on request	Restriction – water served only on request. Post signage about restriction.	Restriction – water served only on request. Post signage about restriction.
Lodging Restrictions	N/A	N/A	Laundry restrictions	Laundry restrictions	Laundry restrictions
Construction water	N/A	N/A	Voluntary best management practices	Restrictions – best management practices, no water waste or building permit rescinded for violations.	Restrictions – pre-approval of construction needed, best management practices, no water waste or building permit rescinded for violations.



## 5.1 Additional Incentives

Additional incentives could be incorporated beyond the incentive of a lower water bill based on the Emergency Water Rate Structure. The City could implement an online water waste report system on Gallup Connect to allow citizens to report customers that are watering outdoor beyond the allowed amount per drought stage. In addition, a system could be set in place to incentivize citizens with a credit on their bill that show reduced water use from a similar month the previous year.

## 5.2 Protocol for Implementing Response Actions

To minimize the public perception of constantly changing drought stages, response actions will not be implemented until a particular drought stage has occurred for 6 consecutive months. Six consecutive months were selected based on the historical calculated drought stage detailed in Section 2.7, Historical Calculated Drought Stage. For example, in a scenario where the drought stage index resulted in February – Stage 2, March – Stage 3, April – Stage 2, May – Stage 4, June – Stage 3, July – Stage 2, response actions would move to Stage 2 – Moderate Drought level. City staff will determine the drought stage based on the drought monitoring framework in Section 2, Drought Monitoring.

A calculated drought stage number will remain in place until a lower calculated drought stage has occurred for 3 consecutive months. Building on the example above, if the calculated drought stage resulted in August – Stage 1, September – Stage 1, and October – Stage 1, response actions would move to Stage 1 – Potential for Drought level.

The implementation response actions should be enforced by ordinance. Suggested revisions to the current City of Gallup City Code - Water Conservation is included in Appendix F. This ordinance would give the City the ability to enforce the response actions. The next step is to have City Staff present a proposed revision of the ordinance to City Council.



# Operational and Administrative Framework

The DTF was responsible for the decision-making and development process of the DCP. The DTF met four times during the development of the DCP to provide input and guidance on development of the DCP. The goal of the DCP Operational and Administrative Framework is to define the ongoing roles and responsibilities under the DCP, which will provide a structure for continuous monitoring and responses to changing conditions, as well as fast and efficient response to drought conditions.

The City's responsibilities include the following:

- Monthly drought monitoring
  - City conservation staff will use the framework from Section 2, Drought Monitoring.
- Monthly meeting with New Mexico Drought Task Force
  - City conservation staff to attend monthly meeting by phone (call in).
- Notification directly to water customers of current drought stage
  - Special page within City website
  - Include pamphlet in water bill or include directly on bill
- Notification of the potential for water shortage due to drought – “Public drought campaign”
  - Special page within City website
  - Include directly on bill
  - Radio and Television
  - Social Media
  - Temporary or permanent signage on main roads in and around City
  - Communication with civic groups
- Implementation of drought mitigation actions
  - City conservation staff to coordinate with City Manager
  - City Manager to coordinate with City Council to implement mitigation actions
- Implementation of drought response actions (see Figure 6-1 and written description below)
  - City conservation staff to coordinate with Parks Department and Fire Department
  - City conservation staff to coordinate with City Manager
  - City Manager to coordinate with City Council to implement response actions
  - Enforcement of the response actions will then revert back to the City conservation staff
  - Revisions to this implementation section will be required once the City Council approves revised ordinance (or similar) in Appendix F.

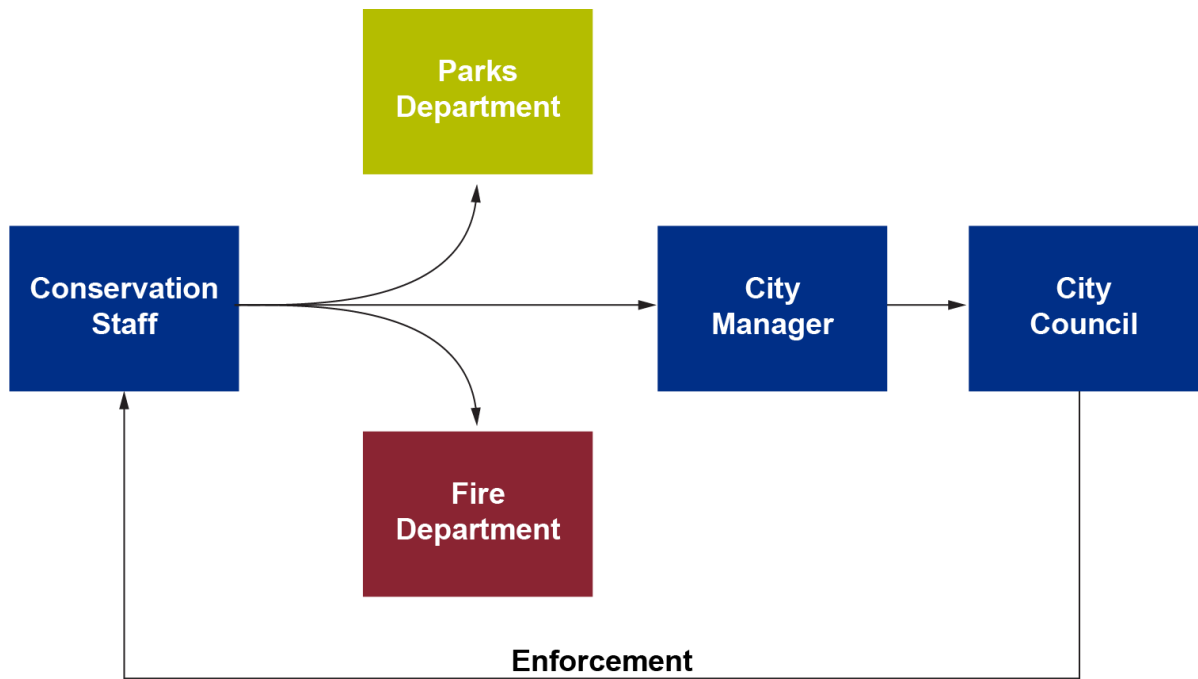


Figure 6-1. Implementation of Drought Response Action

- Request for State or National Disaster Declaration due to drought
  - City conservation staff to coordinate with City Manager
  - City Manager to coordinate with City Council to implement mitigation actions
- Provide annual update in coordination with the DTF
  - City conservation staff to provide annual report in coordination with the DTF and the process will begin each September, as detailed in Section 7.1.1

Once NGWSP is delivering surface water to the City, the City should consider revising the Operation and Administrative Framework to include other stakeholders like the BOR, Navajo Nation, and Navajo Tribal Utility Authority.

# Drought Contingency Plan Updates Process

The DCP should be viewed as a living document. The DCP mitigation and response actions should be evaluated on an annual basis to determine if any change is necessary, such as observing that criteria are triggering drought too frequently, in particular when supplies have not been affected. The National Drought Mitigation Center (NDMC) 10-step drought planning process (NDMC, 1999) provides guidance for the evaluation to test the effectiveness of the DCP.

<http://drought.unl.edu/portals/0/docs/10StepProcess.pdf>

## 7.1 Effectiveness of Drought Contingency Plan

The purpose of the DCP is to reduce the potential drought risk to the City. The effectiveness of the DCP will be measured and revised based on the following:

- Ongoing evaluation of progress on mitigation measures
- Post-drought evaluations

### 7.1.1 Ongoing Evaluation

As stated in guidance on the NDMC's 10-step drought planning process:

An ongoing or operational evaluation keeps track of how societal changes such as new technology, new research, new laws, and changes in political leadership may affect drought risk and the operational aspects of the drought plan. Drought risk may be evaluated quite frequently whereas the overall drought plan may be evaluated less often. We recommend an evaluation under simulated drought conditions (i.e., drought exercise) before the drought plan is implemented and periodically thereafter.

Remember that drought planning is a process, not a discrete event.

Table 7-1 presents the Annual Report process to foster an ongoing evaluation of the drought contingency planning process. Drought monitoring is to be completed on a monthly basis; data from the monitoring will be included as an appendix to the Annual Report.

**Table 7-1. Annual Report Process**

<b>Timeline</b>	<b>Responsible Group</b>	<b>Responsibilities</b>
Begin in September	City of Gallup Conservation Staff	Send an email to Drought Task Force (DTF) requesting annual review information
	Drought Task Force members (by email or meeting)	Communicate the following annual review information: <ul style="list-style-type: none"> <li>• Environmental, economic, and social impacts of drought within</li> <li>• New regulations and legislation, climate change data, and population growth data</li> <li>• New technology or research</li> </ul>
	City of Gallup Conservation Staff	Monitoring Assessment <ul style="list-style-type: none"> <li>• Evaluate indicators and triggers for each drought stage and revise as necessary</li> <li>• Evaluate process for data collection and monthly reporting to water customers</li> </ul>
	City of Gallup Conservation Staff	Vulnerability Assessment <ul style="list-style-type: none"> <li>• Gather and review annual review information from the DTF</li> <li>• Update the vulnerability assessment as needed, document findings to aid in following updates to mitigation and response actions</li> <li>• Evaluate DCP Update Process functionality</li> </ul>
	City of Gallup Conservation Staff	Mitigation Action Assessment <ul style="list-style-type: none"> <li>• Review vulnerability assessment report</li> <li>• Track status of mitigation actions</li> <li>• Evaluate mitigation actions and priority ranking</li> <li>• Propose new mitigation actions</li> </ul>
	City of Gallup Conservation Staff	Response Action Assessment <ul style="list-style-type: none"> <li>• Review vulnerability assessment report</li> <li>• Review any response actions that were taken and evaluate effectiveness</li> <li>• Propose revisions, new or removal of response actions</li> </ul>
	City of Gallup Conservation Staff	Evaluation of Operational and Administrative Framework and any proposed changes
Complete by December	City of Gallup Conservation Staff/DTF	<ul style="list-style-type: none"> <li>• Combine above sections into one annual report</li> <li>• Present annual report to DTF at an annual workshop</li> <li>• Present annual report to City Council</li> </ul>

## 7.1.2 Post-Drought Evaluation

In the NDMC’s guidance document regarding the 10-step drought planning process (NDMC, 1999), Step 10 is described as follows:

A post-drought evaluation or audit documents and analyzes the assessment and response actions of government, nongovernmental organizations, and others and provides a mechanism to implement recommendations for improving the system. Without post-drought evaluations, it is difficult to learn from past successes and mistakes, as institutional memory fades.

Post-drought evaluations should include an analysis of the climatic and environmental aspects of the drought; its economic and social consequences; the extent to which predrought planning was useful in mitigating impacts, in facilitating relief or assistance to stricken areas, and in post-recovery; and any other weaknesses or problems caused by or not covered by the plan. Attention must also be directed to situations in which drought-coping mechanisms worked and where societies exhibited resilience; evaluations should not focus only on those situations in which coping mechanisms failed. Evaluations of previous responses to severe drought are also a good planning aid.

To ensure an unbiased appraisal, governments may wish to place the responsibility for evaluating drought and societal response to it in the hands of nongovernmental organizations such as universities or specialized research institutes.

Table 7-2 presents the post-drought evaluation form that will be used by City conservation staff to document the findings in coordination with the City Manager and City Council.

**Table 7-2. Post-Drought Evaluation Form**

Question	Response
What was observed?	
What stage of drought was declared and what did the data show?	
Were the drought stage indicators appropriate? Do they need adjustments?	
What response actions were taken?	
What was the impact of the response actions implemented (% gpcd reduction)	
Given the outcome, in retrospect would the City have taken the same actions?	
If not, should there be a suggested change to future recommendations during drought?	

## 7.2 Update Frequency

Drought contingency planning is an evolving, ongoing process. At a minimum, the DCP should be updated every 5 years in coordination with the DTF. The annual reports prepared in subsequent years

will aid in the preparation of the DCP update. In addition, the DCP should be updated when a post-drought evaluation is triggered.



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# References

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Appendix A  
Drought Task Force Meeting No. 1  
Notes – 11/17/17



**Gallup Drought Plan  
TASK FORCE KICKOFF MEETING  
NOTES**

November 17, 2017

9:00 – 11:00AM

El Morro Events Center

210 South 2<sup>ND</sup> Street, Gallup, NM

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- (1) **Welcome & Introductions.** Jeff Kiely, Executive Director of the Northwest New Mexico Council of Governments, welcomed and thanked all the participants to the meeting and provided general context for the meeting. A round of introductions followed.
- (2) **Overview and Parameters of the Project.** Elizabeth Barriga, Water Conservation Coordinator for the City of Gallup, provided an overview on the grant application and its intent to create a Drought Contingency Plan for the Gallup area. This project is funded by the City of Gallup and through a grant from the US Bureau of Reclamation's WaterSmart program. Information on this program can be found at: <https://www.usbr.gov/drought/index.html>

She started the conversation by asking how long ago Gallup received rainfall, and County Manager Anthony Dimas, Jr. answered correctly – “41 days”. She challenged the group to assist and provide ideas into the planning process. She also mentioned that this plan could also cover and apply to natural disasters or other water disruptions that might take place in the future.

- (3) **Discuss Participation of the Drought Planning Task Force.** Evan Williams, Deputy Director of the Northwest NM Council of Governments (COG), provided an overview of the detailed work plan and public participation process, including stakeholders, timeline, and duties of Gallup Drought Task Force (DTF). A copy of his presentation will be available on the website to augment the notes in this section.
- (4) **Drought Impacts Overview.** Jim Honea, Project Manager from CH2M, provided an overview of the definition of droughts and drought management in general. A copy of his presentation will be available on the website to augment the notes in this section.
- (5) **General Discussion including additional members, data, and documents.** COG staff facilitated a general discussion to answer questions, add stakeholders or information sources, and get ideas on the table. The following are a list of recommendations that arose from this discussion:
- Pull in County planning documents including County Comprehensive Plan, Emergency Management Plan, All-Hazard Mitigation Plan, and Community Wildfire Protection Plan – all of which have sections on drought.
  - A lot of input on exploring and putting on the table new technologies that are being implemented internationally.
    - Managed Aquifer Recharge and Storage (MARS) – (a local example would be Rio Rancho)
    - Underground Storage Projects and Banking
    - Direct potable re-use
    - Creating a reservoir via damming

The City did respond that they have not delved too far into these topics, and while this plan may not be the appropriate venue for full exploration – it won't hurt to put them on the table. One outcome could be to recommend deeper drill downs into these options.

- Another good dialogue was around the defining of drought to ourselves and our stakeholder group members both in terms that layman could understand and also in terms of the spectrum of drought we find ourselves. Dennis Romero, City Water and Sanitation Director, provided some documents that might be helpful to track down. One on the different stages of drought written by a State Meteorologist and that appeared in the Albuquerque Journal some time ago, and one that reflected tree ring data and the historic effects of drought in our region, back to the Anasazi. Other comments were that we really need to monitor where we are at more effectively and that the high desert region is in a perpetual state of drought.
- A comment was made that the City and County needed to take a stand and create definitive policies regarding new water users and “abusers” in terms of negatively contributing to groundwater quality. This information could be available on a national map to indicate that the area takes these things seriously, especially as it relates to the Navajo-Gallup Water Supply Project investment that is being made.
- Another topic of discussion was around tapping into other efforts happening in the state, tribal, nation, and world, including feeding local information into these forums on an ongoing basis. There are some technology gaps that we need to overcome in terms of typing in comments and reporting into the system to provide real-time data. Examples are as follows:
  - [New Mexico Governor's Drought Task Force](#) and [Drought Monitoring Working Group](#)
  - [Western Climate Region](#)
  - [Southern Plains Drought Early Warning System](#)
  - [US Drought Monitor](#)
  - [North American Drought Monitor](#)
  - [NASA Earth Observation Data \(Navajo Nation\)](#)
  - [NASA's Navajo Nation Climate Project](#)
  - Drought Severity Assessment Tool 2.0 (DSAT 2.0)
  - Climate Hazards Group InfraRed Precipitation with Station data (CHIRPS)
- There was a lot of sharing around the Navajo Nation experiences with Drought Contingency Planning and its Navajo Nation Water Monitoring Program. The program creates drought reports and has an extensive rain can network around Gallup. The program utilizes Standard Precipitation Index (SPI) data, which it has about 20 years' worth and measures 3-month, 6-month, and 12-month periods to index conditions. They can map and drill down into agency level, Chapter level, and eco-regional level data sets.
- A final recommendation was a Drought Contingency Plan is only as good as it becomes a living document, is acted upon, and supported by policy or legal frameworks. There needs to be tie-in between the Plan and Policy. Examples given were the City of Prescott that mandates low-flow fixtures in residential and commercial units and the City of San Antonio that uses a tiered water rates structure to drive conservation. It was noted that the City of Gallup implemented a tiered water rate structure over 10 years ago.



- Jeff Kiely summarized that the perspective of this planning work should be to - think regionally as we are all people dependent on the water commons, but that the plan needs to guide us to act locally in terms of what the City has the authority to do.

**Other suggested stakeholders who need to be at the table:**

- New business community via Greater Gallup Economic Development Corporation. [*They were invited and did express that this date would not work with their schedule*]
- USDA Natural Resources Conservation Service, New Mexico, specifically Richard (Rick) Strait, State Soil Scientist, [richard.strait@nm.usda.gov](mailto:richard.strait@nm.usda.gov) – as they have monitoring stations throughout McKinley County that measure wind speed, moisture, etc. and it would be good to get data and figure out remote reading technology.

**Other Documents and Examples:** The following is a list of resources and reports that should be gathered, used, and where possible integrated as we move forward.

- Emergency Drought Contingency Planning in the Upper Colorado River Basin
- Navajo Nation Drought Contingency Plan – not sure if this is current?  
[http://drought.unl.edu/archive/plans/drought/tribal/NavajoNation\\_2003.pdf](http://drought.unl.edu/archive/plans/drought/tribal/NavajoNation_2003.pdf)
- Navajo Nation Drought Status Reports (example)
- Zuni Drought Contingency Plan
- Region 6 Water Plan, which discusses drought throughout the document
- Colfax County Drought Contingency Plan
- New Mexico Drought Plan
- Bureau of Geology (add this as an open file report)
- Water Commons Conjunctive Use Study
- Gallup Water Town Hall Background Paper and Report

**Communication Strategies:** The provided input on having this be a very interactive, learning group that moves things forward into action.

- Create an online forum to allow for interactive conversations
- Use multi-media for these meetings, including radio and video
- Provide all materials online including presentations, notes, and agendas
- Provide materials that could be used by Gallup Drought Task Force members to inform their constituents on drought and the project.
- Don't have meetings that only focus on bringing new people up to speed rather than moving the agenda and conservation forward.
- No meetings on Friday, as some agencies have gone to a four-tens schedule.

**(6) Review next steps, timeline, and responsibilities (Evan Williams)**

Evan Williams outlined that the immediate steps would be to send out notes, post up presentations and other informational documents, and send out stakeholder list for review. He asked that members submit any suggested members and their contact information, and any other documents or information they wanted shared with the group to his email: [ewilliams@nwnmcog.org](mailto:ewilliams@nwnmcog.org)

Next steps would be to update the schedule and lock in the rest of the Gallup Drought Task Force meetings, so folks have more notice.

After which, CH2M would be working on technical memo #1, which entails data collection and analysis, drought monitoring, and vulnerability assessment.

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The City of Gallup is implementing a grant through the WaterSMART Drought Response Program of the US Bureau of Reclamation to facilitate a drought contingency planning process. Reclamation offers this assistance to develop a drought contingency plan that meets the required elements described in the Drought Response Framework.

The drought contingency planning process is structured to address the three following questions:

- How will we recognize the next drought in the early stages?
- How will drought affect us?
- How can we protect ourselves from the next or current drought?

Appendix B  
Drought Task Force Meeting No. 2  
Notes – 1/31/18



**Gallup Drought Plan**  
**TASK FORCE MEETING #2**  
N O T E S  
January 31, 2018  
10:00 – 12:00PM  
El Morro Events Center  
210 South 2nd Street, Gallup, NM

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**Attendees:**

Jeff Kiely, COG	<a href="mailto:jkely@nwnmcog.org">jkely@nwnmcog.org</a>	505-722-4327
Angelina Grey, COG	<a href="mailto:agrey@nwnmcog.org">agrey@nwnmcog.org</a>	505-722-4327
Jim Honea, CH2M	<a href="mailto:Jim.Honea@ch2m.com">Jim.Honea@ch2m.com</a>	505-855-2218
Jesse Jim, NMSU	<a href="mailto:jesjim@nmsu.edu">jesjim@nmsu.edu</a>	505-863-3432
David White, NTUA	<a href="mailto:davidw@ntua.com">davidw@ntua.com</a>	928-729-6268
Elizabeth Barriga, City of Gallup	<a href="mailto:ebarriga@gallupnm.gov">ebarriga@gallupnm.gov</a>	505-863-1393
Dennis Romero, City of Gallup	<a href="mailto:dromero@gallupnm.gov">dromero@gallupnm.gov</a>	505-726-2050
Doug Decker, McKinley County	<a href="mailto:ddecker@co.mckinley.nm.us">ddecker@co.mckinley.nm.us</a>	505-722-3868
Carlee McClellan, NN Water Mgmt	<a href="mailto:cmcclellan@navajo-nsn.gov">cmcclellan@navajo-nsn.gov</a>	928-729-4125
Angela Bordegaray, ISC-OSE	(telephone)	

1. Welcome statement by Jeff Kiely, followed by general introductions.
2. David White commented that NTUA recently updated its mapping data for Navajo Nation (NN), and will provide needed information, as the project progresses.  
Mr. Kiely reminded participants of the ongoing progress of the GDP project and any other updates will be posted to the City of Gallup website at:  
  
<https://www.gallupnm.gov/662/Water-Commons-Drought-Contingency-Plan>
3. These meetings serve as workshops to gain input/information. Jim Honea began with three questions presented in Tech Memo #1 as waypoints for discussion:
  - a. How will we recognize the next drought in the early stages?
  - b. How will drought affect us?
  - c. How can we protect ourselves from the next drought?The first two questions were covered as an overview of the *Drought Monitoring Framework* and the *Vulnerability Assessment*. The third question will be assessed in future discussions surrounding mitigation and response actions. Graphics presented were developed from the National Drought Mitigation Center database to help track data.  
<http://droughtmonitor.unl.edu/>  
[http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/regional\\_monitoring/palmer.gif](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif)
4. Doug Decker inquired if the mapping data has the capacity to focus on specific regions, such as the City of Gallup. Such data is essential to current and future projects within the county. Mr. Honea stated that mapping data are based on widespread geographical regions only, as established by federal agencies: USDA, NOAA, NDMC. For example, the U.S Drought Contingency map, federal agencies analyzed large areas of land known as Western U.S., which covers several states: NM, CO, WY, MT, ID, UT, AZ, NV, CA, WA, and OR. Mr. Honea was uncertain if there is specific data for specific regions or geographies, such as the City of Gallup, but may extend to County-wide geographical data analysis. Moreover, NOAA analyzes the Colorado Basin, covering portions of ID, WY, UT, CO, CA, AZ and NM.
5. Mr. Honea went through the Primary Indicators data table. In total, there are 4 separate but interconnecting indicators: U.S. Drought Monitor, Palmer Index, Air Temperatures and Precipitation. *The first two data sets are for November 2017. The other are for December 2017.*

The U.S. Drought Monitor data sets: at **Stage 2: Moderate Drought** with a **D1** ranking.  
The PALMER Index data sets: at **Stage 2: Moderate Drought**, with indicators of **-2.0 to -2.9**.  
This tells us that we are experiencing an **“Unusual Moist Spell,”** based on broad-scale conditions of prolonged (months, years) abnormal dryness or wetness, an evaluation of short-term moisture conditions across regions.  
The Air Temperature (°F) data sets: at **Stage 4: Extreme Drought**, with indicators **>7**.  
The Precipitation data sets: at **Stage 4: Extreme Drought**, ranking below threshold of 40%.

*Note: The overall assessment of maps and data tables for the County is critical in determining where the region stands with respect to drought conditions. Data is not concrete but are presented for preliminary discussion purposes.*

Mr. Kiely noted the “perfect storm” of consequences experienced in 2013 in the Las Vegas, NM area [2013, in the Gallinas River Watershed feeding Storrie Lake, despite a well-crafted watershed natural resources plan], beginning with dry conditions and wildfires, followed by extreme rain and floods, overwhelming the basin. It reflected major drought-related issues, with depleted reservoir levels, flash floods, and debris flows that have impacted local agriculture, landscape and water supply.

6. Drought Indices: Weighing factors are keyed in, at **10 times the initial readings of 1**, as an overall/ accumulative assessment, including extraordinary climatic events (i.e. flash floods) that may impact the overall analysis. Key questions posed for these weighing factors include:
- **Should these numbers be adjusted to include unusual trends in air temperature and precipitation? How will such spikes/fluctuations impact the overall development of our study?**
  - **What do you all think about the Weighing Factors? Is everyone comfortable with the way the indicators are set up to be 10x the weight of the other two indicators?**

Mr. Honea noted that air temperatures and precipitation are already included in the Drought Monitors and Palmer Indices, so should there be separate indicators for air temperatures and precipitation included in final calculations?

Mr. Decker noted that our region is always in a constant state of drought. He expressed concerns with capturing local data with respect to our region, for current data sets being presented are relative to a larger geographical context, not our region. He posed the following questions for further discussion:

- **Do we need to include such data? Will it skew our data off-course, or will it enhance our data?**
- **If separate indicators are included, would it offset actual results that result in extreme case scenarios?**

Mr. McClellan affirmed that state forecast monitoring groups do discuss such factors and adjust data according to specific indicators. Mr. Romero verified such indicators are already factored in, and that these state agencies meet on a regular monthly basis to review and assess data. It is practical to pose these question, especially when combining indicators: **Will there be double-counting?** There is no definitive answer, except indicators for reservoir levels are adaptable to regional changes, based on past anecdotal experiences and trends for specified timeframes: 12-month, 24-month, 60-month moving averages. But to obtain the most accurate data, the 60-month moving averages often portray the best representation of regional outlook. Any timeframes less than that, other indicators (irrigation systems, monsoon trends) are factored considered.

Mr. Honea asked Mr. Romero if the City of Gallup monitors its well levels. Yes, the City

monitors well levels, submits monthly reports, and maintains a QA/QC database of readily accessible data. Mr. Kiely agreed that this specific data is important to future efforts towards monitoring and conservation initiatives.

Angela Bordegaray was asked if the Office of State Engineer (OSE) would like to have such data for accessibility. She was unsure if that type of data is needed or whether it could be housed for repository. She joined to ascertain if there is any information that could be deferred to OSE.

In summary, it was recommended that we start monitoring indicators (reservoir levels, trends) once the Navajo-Gallup Water goes operational, in conjunction with NN's water data on underground/surface water intensities, stream flows and snowpack data to indicate imminent drought. With respect to data repositories, perhaps we could extend invitation to the U.S. Geological Survey (USGS) and the Socorro Bureau of Geology for potential collaboration on working projects and the publication of open file reports. There is no problem in sharing data for it is all public information that helps agencies to determine drought conditions. There is room to add other indicators, such as monitoring the production factor for the demand-side, delta factors, or dual completion wells (sandstone vs shale formations). Perhaps, we could also investigate developing aquifer mapping data that is specific to our region, because no such data exists, especially with Socorro's database. Mr. White noted that NN is currently evaluating aquifer levels, especially in areas of high demand. Questions posed are as follows:

- Are well productions based on demand?
- Do you have actual aquifer levels?

Mr. Kiely noted that when the Navajo-Gallup Water Supply Project was being proposed in the 90s-2000s, the conversation at the time was about the *dropping of the water table*, and the prediction was that we would be out of water by now, based on collected data. So, **whatever data we can get seems relevant to our concerns, doesn't it?**

While suggestions and recommendations about developing data links with other state agencies and comprehensive plans are relevant, it is aside what we are intended to discuss today, because the question becomes, **what do we do with it?**

Mr. Kiely noted that data on city aquifer levels and accessibility could also be important, because in the past, hydrologists have stated that water tables have been dropping. If NN or NTUA has that data, it would be very helpful. Mr. Honea indicated that we look at rolling averages, especially within the past year or so. **Any thoughts on the weighing factors of drought stage in the indices? Are there any thoughts on any of the tables?**

7. Vulnerability Assessment: With prioritization in mind, Mr. Honea created data tables that ranks the prioritization of assets (Residential, Commercial, etc.) based on the intensity of drought impacts. Each asset category is will have subcategories based on use and demand. **Should both residential and commercial water use have indoor and outdoor water-use subcategories?**

*Keep in mind that this is just for preliminary discussions and are open to reorganization or expansion.* As the level of drought intensity increases (per Drought Stages), the City will begin to impose water restrictions.

Mr. White noted that there were no imposed penalties, with regards to permits or water hauling, included within this table. Mr. Honea responded that any changes or additions will feed into the next Technical Memo, *Mitigation Response Action Plan*, where City-imposed restrictions and restructuring of prioritization will be included. For example, in this table, fire suppression

will be interrupted, followed by municipal and commercial water-use subsequently.

Some questions posed are as follows:

- **Are these types of restrictions done on an average? Can you tell what is indoor and outdoor use, or are they based on months?**
- **Why don't we just do an average of winter months and subtract it from summer months?**

Mr. Decker noted that you can't cut back on commercial use, because there are other factors, besides indoor and outdoor uses, where you may have businesses who are extensive users, like your carwashes, laundromats, and hospitals. And there is also no indoor and outdoor use not distinguished within each asset category. Mr. Kiely suggested that there be a comment section, like for fire suppression, that says: *Although ranked 4th, fire suppression does not suggest levels of demand, however, our fire response will be based on priority.* Mr. Honea agreed. Like for essential services for commercial use where facilities are organized according to priority, as healthcare vs. hotels. Mr. Kiely asked if healthcare facilities could be organized as "public services" rather than "business"? Mr. Honea agreed. Mr. Decker further noted that within healthcare facilities, a subcategory of prioritization could be structured where hospitals have priority over specialty services like dental or optometry. Mr. Kiely forwarded that major healthcare facilities perhaps be moved under Municipal Use. Other questions posed are:

- **What about restrictions for Parks & Rec as being part of Municipal Use?**
- **With structuring priorities, could the City of Gallup impose restrictions on restaurants where water is only served upon request, as it is done in other major cities like Phoenix and San Diego?**

Mr. Honea noted that such vulnerabilities like that will feed into *Mitigation Plans*. Mr. Decker agreed to this type of prioritization. Mr. Honea proposed that facilities be broken down by indoor/outdoor use, under both Municipal and Commercial, such as Parks & Rec and laundry. Mr. Decker suggested that "Municipal" should be "Government Institution" type, partly because the City supplies water for all County facilities that are within city limits. But even under governmental facilities, you cannot shut down certain services, like jails.

Mr. Honea indicated that from these discussions evolved a To-Do-List. There is still plenty of opportunities to comment or change any of the contents. All the suggestions will roll into the next overall draft of the contingency plan and move forward with it. At the next task force meeting, we'll have a new set of data tables of ranking systems that easily fuses into the mitigation plan and response actions. Mr. Kiely agreed, and further noted that assets and responses are prioritized horizontally, and that subcategories should be organized as such too. Similar with a national government shutdown, where only certain essential services and people are left. So, maybe two or three subcategories would be helpful. Mr. Honea agreed. Mr. Decker suggested that there be a balance between residential and business use. Generally, you would want them to reduce as much as they can, but with higher imposed restrictions that result in a wide-scale shutdown, residential use will consequently increase. So, we cannot have a shutdown. We can only reduce demand for facilities and businesses.

8. **Population and Climate Change: For future tasks for vulnerability, how can we consider population and climate change that reflects population growth in the city? How can that be designed or calibrated?** The population for both the City and County have been historically steady, but in the event of a sizeable increase, there will be more people, more businesses, more use. There is hope for economic development and population growth.

Mr. Kiely recalled a survey conducted for City employees regarding population increases, and how each department will respond. Responses included increasing in the number of public services, like fire stations, schools and clinics. It was an echoing source factor. It would be



interesting as to how we analyze this. Lance from Water Utility often said that we have triple/quadruple the population in this part of the country than there should be, regarding water use.

Mr. Decker noted that on a given weekend, population doubles and even triples, because the City is a regional economic hub for surrounding communities, and that is not going to change anytime soon. **What will happen with impacts of drought restrictions?** Mr. Kiely noted that the City has been concerned with that for years. State and federal agencies outside of us know that we are a 20K-population city and have infrastructure tailored for that, but with peak episodes of 50K or more, it becomes almost unmanageable. This is important to consider. The City is impacted with these continuous but variable increases as a factor on demand. So, the planners need to provide for the “Dodge City phenomenon” of weekend trends.

- **What is the percentage of use per capita per day?**
- **Would a population growth impact essential and non-essential use?**
- **Should we restrict hotels more during these weekend surges?**

Mrs. Barriga noted that the number one essential need for people coming in is to fill up their water tanks from city water pumps. **How will a drought impact their water?**

Mr. White asked how different factors will be staged. Mr. Honea responded that Stage 1 will have “no action”, Stage 2 will have some voluntary water restrictions, and so forth. Mrs. Barriga further noted that the City does impose some water restrictions like Santa Fe does, and it also offer promotions for water conservation efforts too. Mr. Honea replied that it is very helpful that there’s conservation in place already, and it could be opening piece of preventive measures. So, with upcoming drafts, Mrs. Barriga can assess the conservation more, and we could look more into analyzing how we deal with emergencies (population and climate change).

Mr. McClellan recapped his suggestion at the last meeting to incorporate the updated NN Drought Contingency Plan (still a working progress) into ours. To further that idea, perhaps we could develop policies for our legislation that begins conversations around conservation practices for businesses, like low-water pressure, self-flushing urinals, or low-flow facilities. I’m sure it would be a huge impact on water usage. Like the City of Prescott has imposed.

9. The next meeting will be on **March 14, 2018 at 10AM** to review the next technical memo. Invitations will be sent out soon. Mr. White and Mr. McClellan will impart vital information and documents. Documents we currently have can be found on the Gallup website.

Mr. McClellan gave a quick review on the NN Emergency Commission revision project that reaffirms the drought declaration of 2014. At the time, NN acquired and invested **\$9 million** dollars from the **SiHasiin Fund** as a Drought Insurance Plan, based on drought conditions of the time. As of today, NN will be receiving **\$26 million** for Drought Contingency Funding, with \$9M going back to **SiHasiin**, leaving a balance of roughly **\$17M**. The amount of funding is based on the severity of drought. This funding will be used for different drought-related projects for agriculture, earthen dams, windmills, livestock reduction, removal of evasive species (Russian Olives), watershed restoration projects, tree-thinning, prescribed burn areas, reducing soil erosion, etc. Other projects include assessing data on snowpack averages and perennial streams. Monthly reports on precipitation and drought conditions on NN are also developed. We are more than willing to share this information.

Mr. McClellan provided a handout, which is a quick summary of December 2017 averages for NN. 2 of the agencies were 2% average. Eastern Agency-3% average. Fort Defiance Agency-4% average. Shiprock-5% average. And the numbers don’t look much better for January. The percentage averages are for a 20-year-period, a rolling data. The January data is still incomplete, but it is believed there won’t be much change. These documents and other data are available to be disclosed. Weather stations on NN are currently being upgraded and once

it is online, there will be more up-to-date data. Current SPI data is based on 20-year intervals that has been collected since the project's inception. But if you really want accurate data, we need to expand to 30+-years of continuous data. This was not initially considered at the beginning but will be implemented. NN will interpolate gaps to get a more concise picture of our drought situation. Mr. Honea noted that the data is somewhat consistent with what he has, within the 0 to 30% range.

Mr. Kiely inquired **where NN established the drought to have kicked in**. Mr. McClellan replied based on original data for the 2002 Drought Contingency Plan. NN uses a scale similar to the U.S. Drought Monitor. If the SPI is greater than zero, we consider that to be normal. We have a 6-month SPI value between 0 and 1.99, we call that an *alert* status. An SPI between -1 and -1.4, we called that a *warning*. Anything greater than 1.1 is an *emergency*.

Based on the December drought report, our 6-month SPI for NE Arizona was -1.69, a declared *emergency*. The 6-month SPI for NW NM was -1.14, a declared *warning*. The 6-month SPI for SE UT was -1.12, also a *warning*. And I'm still looking for new numbers to come through for January. I heard from other geologists' predictions, for both NM and AZ, that we are not going to have much prudence this upcoming season. Maybe by monsoon time we can get better results but that's still too far to determine that.

Mrs. Barriga noted this is important to gather data from different sources for comparison and consistency. We need to keep doing this because it effects both NM and AZ.

Mr. White questioned **how old some of our existing water and wastewater infrastructure are**. There should be discussions about upgrading infrastructure, especially our storage capacities, and evaluating groundwater levels. Mr. Kiely agreed. Going forward, let's continue collaborating and sharing ideas and commons that we all share. As those collaborations start to kick in, we can start working.

Mr. Kiely thanked all participants for their comments and suggestions. Meeting was adjourned.

Appendix C  
Drought Task Force Meeting No. 3  
Notes – 3/13/18



**Gallup Drought Plan  
TASK FORCE MEETING #3**

**NOTES**

March 13, 2018

10:00 – 12:00PM

El Morro Events Center

210 South 2<sup>nd</sup> Street, Gallup, NM

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**Attendees:**

Jeff Kiely, COG	<a href="mailto:jkiely@nwnmcog.org">jkiely@nwnmcog.org</a>	(505) 722-4327
Angelina Grey, COG	<a href="mailto:agrey@nwnmcog.org">agrey@nwnmcog.org</a>	(505) 722-4327
Evan Williams, COG	<a href="mailto:ewilliams@nwnmcog.org">ewilliams@nwnmcog.org</a>	(505) 722-4327
Jim Honea, CH2M	<a href="mailto:Jim.Honea@ch2m.com">Jim.Honea@ch2m.com</a>	(505) 855-2218
Elizabeth Barriga, City of Gallup	<a href="mailto:ebarriga@gallupnm.gov">ebarriga@gallupnm.gov</a>	(505) 863-1393
Carlee McClellan, NN Water Mgmt	<a href="mailto:cmcclellan@navajo-nsn.gov">cmcclellan@navajo-nsn.gov</a>	(928) 729-4125
Bill Bright, Sustainable Gallup	<a href="mailto:brightideas98@gmail.com">brightideas98@gmail.com</a>	(505) 722-0039
Max Bighorse, NN Water Mgmt	<a href="mailto:mbighorse@yahoo.com">mbighorse@yahoo.com</a>	(928) 729-4004
Karen Carlisle, City of Gallup		(505) 863-1220
Angela Bordegaray, ISC-Santa Fe	(telephone)	
Marc Miller, BOR-Durango	(telephone)	
Ruth Swickard, BOR-Durango	(telephone)	

<https://www.gallupnm.gov/662/Water-Commons-Drought-Contingency-Plan>

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

[http://www.cpc.ncep.noaa.gov/products/analysis\\_monitoring/regional\\_monitoring/palmer.gif](http://www.cpc.ncep.noaa.gov/products/analysis_monitoring/regional_monitoring/palmer.gif)

**Welcome & Introductions (Jeff Kiely).** Mr. Kiely recapped on the ongoing progress of the GDP project with more emphasis on the outcomes of Tech Memo #2, that has been forwarded to everyone on the DCP mailing list.

This document presented Drought Indices as a way to understand current drought conditions within the City in terms of trends and severity. Other components included: Vulnerability Assessment and Population and Climate Change as factors of measures in addressing response and mitigation of potential drought issues.

Going forward, we will assess: (a) ways of calculating each component as weighing factors in addressing drought severity, (b) how indices interact, and (c) how factors will be applied as bottom line measures.

**Tech Memo #1:**

Jim Honea gave summarized Tech Memo #1 as the launching framework in which the U.S. Drought Index and the Palmer Index serve as primary elements of Tech Memo #2. In addition to these elements, precipitation will be considered as a secondary element determining drought stages.

Any historical drought data will also be assessed in ascertaining intervals and severity of local drought trends. Discussion and input of previous meetings will be assessed as rolling data as it develops into final documentation of process.

**Tech Memo #2:**

Mr. Honea began his presentation with the three initial questions again as an overview of where our discussions began and where our data is leading us:

- **How will we recognize the next drought in the early stages?** *Tech Memo #1*
- **How will drought affect us?** *Tech Memo #1*
- **How can we protect ourselves from the next drought?** *Tech Memo #1*
- **How can we protect ourselves from the next drought?** *Tech Memo #2*

## 1. Mitigation and Response Actions: (See data table)

*Mitigation Actions* is recognized as an advantage to assessing approaches and techniques to reducing the risks of drought. In researching existing Drought Contingency Plans, other Drought Task Force groups have set standard goals for mitigation:

- a. Determine short-term and long-term measures for mitigation action, and
- b. Reduce potential drought risks and impacts that decreases/minimizes vulnerabilities and needed response actions.

These goals and the following data tables are presented as a guiding framework, a starting point that will help to refine our planning process.

Mr. Honea developed a Mitigation Actions catalog (below) of potential measures. Based on professional viewpoint, the mitigation actions are ranked by priorities.

For long-term rationale in addressing the potential negative impacts, the recognizable measure is to focus on practical sustainable measures. The top ranked mitigation actions are prioritized long-term intentions and estimations that are, at this point, still amenable to change.

To begin with, the *Navajo-Gallup Water Supply Project* (NGWSP), the *development of additional wells/well fields*, and the execution/enforcement of *direct/indirect potable water use* are prioritized as applied methods towards mitigating and sustaining the depletion of existing water wells. The NGWSP tops the list for it will become one of the primary water source for the City of Gallup. It may be contested but the idea is to ensure future use by sustaining and maintaining this water supply, which is slated to go online by 2024.<sup>2</sup>

The last set of listed priorities will also be kept at the forefront as we progress forward. These priorities could potentially implement strategies and/or policies in which water users will be required to adopt sustainable activities, such as water conservation efforts by reducing overall use and /or harvesting water sources. There are appended suggestions for outreach and reward programs as standardized measures for sustainability. Elizabeth Barriga was asked if any of the water conservation measures listed here were already in place, and if so, could they be enhanced to improve overall efforts. Ms. Barriga countered that there are some measures (did not specify) already in place and there certainly in room for improvement in those areas going forward.

## 2. Drought Stage and Response Actions:

The *Response Actions* somewhat comprehend with the *Mitigation Actions* in respect to emerging/ non-emerging drought. In the event of emergencies, which actions will be prioritized and imposed by the City. The *Stages of Drought* presented here are comparable to the *Drought Index* (TM #1).

As seen in this data catalog, response actions hinge on the severity of drought and/or emergency, where the level of reduction in water use is contingent to each increase in intensity/severity of drought/emergency. For example, in **Stage 1**, water use is reduced by 5% and the City will implement public outreach/education on drought; whereas in **Stage 4**, water use will be reduced by 50% in addition to unconditional restrictions and increased water rates for all users.

## 3. Response Actions by Drought Stage:

The next data catalog assesses City sanctions with respect to water use activities. Each activity is determined by the level/severity of drought/emergency by *stages of drought*. The idea is to begin public education on how drought impacts daily use, and as the level of drought severity increases, the City will begin to impose certain degrees of restrictions. For example, watering residential lawns will be freely limited to three times a week, but as the level of severity increases, watering activities will be restricted to either twice a week or completely contained. In the same manner, restaurants and lodging facilities will have elevated restrictions in advanced drought stages, where water will only be served upon

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<sup>2</sup> Bureau of Reclamation. Navajo-Gallup Water Supply Project. <https://www.usbr.gov/uc/rm/navajo/nav-gallup/>

request, in conjunction with posted water conservation signages. This particular response action has been imposed in other major urban cities that have been severely impacted by drought in recent years, such as San Diego and Phoenix.

**Stage 0:** All water use activities allowed across the board. No restrictions.

**Stage 1:** Water use activities are mostly permissible with some requests for water conservation measures for outdoor water use activities (i.e. golf courses and athletic playing fields). Here, the City will begin to inform the public/water users of the benefits and importance of water conservation efforts, and to be mindful of any probabilities of further water use restrictions and/or increased water rates in the event the drought stages continue to increase in severity. The public/water users will certainly have the option to voluntarily adopt water conservation measures.

**Stage 2:** At moderate drought stage, the City will begin to impose mild restrictions for recreation water users (i.e. athletics, pools, carwashes, etc.) and applied enforcement for the public/water users to seriously consider water conservation measures, like watering residential lawns certain days/times of the week. Voluntarily restricting and/or lessening water usage will be encouraged with certified water conservation programs. While this may prove difficult for the City to carry out, the importance of water conservation measures becomes substantial as the drought severity index increases, and the public/water users.

**Stage 3:** At severe drought stage, the City will begin a full launch on water restrictions across the board, with potential increase (doubled) on water rates [*5,000 cubic feet for residential and 100,000 cubic feet for commercial*]. Water conserving users will be fully supported and compensated for their conservation efforts on lessening water usage as well as on encouraging others to support City water conservation measures. Strict restrictions for certain water use activities will be enforced:

- outdoor activities, residential car-washing and planting new vegetation will not be allowed;
- residential lawns and athletic playing fields will be watered on certain days of the week;
- laundromats and carwashes will be required to recycle graywater;
- restaurants will be required to post signages and to serve water upon request only;
- fleet vehicles will be washed only once a month; and
- construction activities will be encouraged to adopt best management/conservation practices with required permits for wastewater. Any violation will void designated permits.

**Stage 4:** At extreme drought stage, no water use activities are allowed, with the exception of emergency services, per Task Force Meeting #2. All construction activities will be contingent upon review. Water rates could potentially be tripled for users [*5,000 cubic feet for residential and 100,000 cubic feet for commercial*].

In terms of incentives for drought stages 2 through 4, the public/water users could potentially earn rewards by reporting water waste or non-conservation activities (i.e. broken pipes, negligent users) via a city hotline. Compensation could be: \$30 for stage 2, \$50 for Stage 3 and \$75 for stage 4. Again, these are merely “proposed actions” that are still in the early stages of amendment and will not be finalized until final agreement and approval by the City. Any other comments or suggestions are fully welcomed to be submitted to Mr. Honea or to the COG at the above contact information.

#### 4. **Historic Drought Stage Index:** *included here as an appendix.*

Overall, this historic drought diagram allows us to assess a given timeframe for implementing response times for each stage of drought.

##### 1. **How do we distinguish or estimate a respectable timeframe for each given drought stage without “sounding the alarm” every time there is a peak?**

For instance, in the event there is a Stage 4 drought over a period of a month, it would be insensible for the City to respond by implementing restrictions for that one month, then decreasing restrictions as it drops and increasing restrictions as it peaks again. Because, we do not want to create a public

perception that the City is always sounding the alarm one month and removing them the next. This will essentially create a lot of public confusion.

The point of this illustration is to determine:

2. When are there times of prolonged drought?
3. How long should we sound the alarm?

Mr. Honea proposed that if there are 6-consecutive-months of prolonged drought, then the City would implement response actions with each respective drought stage. For example, the City experiences a Stage 3 drought for a few months and a Stage 4 for a month or two and dips back down to Stage 3, then the City will essentially *estimate* a 6-month period at **Stage 3** and implement restrictions/warnings for that drought stage. These restrictions/warnings will only be removed after a consecutive drought stage of no more than 3-months.

## 5. Next Steps:

The next tech memo will include:

- Operational and Administrative Framework (Technical Memo #3)
- Drought Contingency Plan Update Process (Technical Memo #3)
- Draft Drought Contingency Plan

## 6. Open Comments:

For this part of the discussion, participants were encouraged to refer to copies of the Tech Memo and the PowerPoint as a point of reference for specific topics or graphs.

Mr. Kiely open up the discussions about the Drought Stages and the frenetic patterns of raising and reducing the alarm: **Does it mean that we as a community need to adopt and stay at a higher vigilance in response to the varying drought stages?** Because the trend lines suggest that the City has been in various stages of drought within a certain time-period coming forward.

Bill Bright suggested that the City's needs to cultivate a new culture around the drought situation. The Gallup Sustainable Board is working towards similar efforts with city officials in developing long-term plans to change the culture towards conservation as a first step. Provisional measures of fines and restrictions is not the answer. If the City could create a culture of conservation, then the need of raising/reducing the alarm would not be necessary. Everyone knows we are in a long-term drought, use that knowledge as a base to build on in creating that culture.

Mr. Honea questioned if the response actions **are too restrictive?** Response actions are mostly intended to be short-term measures with 6-month proposed intervals per annual drought patterns. It can be prolonged based on drought data stating we have been at Stage 3 Drought for 12-consecutive-months twice within the past 10 years.

Mr. Bright noted a disconnect with the Historic Drought Stage Index. The City acquires water from deep aquifers that has not been replenished in the past 8 years, and this data is not included in response actions. Some people still believe there is enough water and wonder how a drought situation affects them. Mr. Honea confirmed aquifer recharge is not included.

Angela Bordegaray agreed with Mr. Bright. **How can this data be applied towards creating a culture of awareness?** Because the reality is that we are in a drought all the time. Elizabeth Barriga proposed to collect water data to assess drought stages. **What are the impacts if the wells become severely depleted?** We need to look at case studies and tie that information into the report. NN water supply come from both surface and underground resources. Ms. Bordegaray agreed on collecting all water data for assessment.

Mr. Honea questioned how data should tie into the plan. There is concerns with the supply source (groundwater) and the demand source (water index). There is potential for double-counting to happen. **How do we quantify ground level changes? How does calculations determine a certain drought stage?**

And the initial understanding is that the levels are continuously dropping. If certainly true, then **how do we determine when we are in a drought versus no drought, especially if there is a steady decline in water levels?**

In the realm of policy and action, Mr. Kiely noted this data could be considered as weighing factors, concerning the significance of drought and the continuous depletion of aquifers. These are more synonymous than anything. Mr. Honea noted discussions to monitor groundwater levels and see if any of the mitigation actions or response actions are benefiting or further impacting these sources over a period of time. For example, starting with a 20-foot level response that gradually decreases to 18-feet, it will be a definite determination that our mitigation actions are having an impact. Maybe a post-index will make more sense.

Ms. Barriga noted that if the life of a recharge is eliminated, **what are those levels going to have to be? What is the City's Plan B in the event the wells deplete without any recharge? What about adaptive water?** Another way to do this would be through keeping tabs or monitoring all supplies of water sources.

Evan Williams noted impacts of population increases and depleting water sources. They need to be monitored. **Who "sounds the alarm" on depletions? When do we take action?** Mr. Kiely agreed. The negotiations and development timeframe for the NGWSP had been long and arduous. Drought conditions of the Colorado River watershed was much more severe than originally anticipated. It is certain the water supply is much less than 20-30 years ago. The drought sharing agreements need to be implemented.

Mr. Honea is questioned when to implement the 6-consecutive-month response action. It would be imposed after 6 consecutive months of Stage 3 drought or higher. On averaging drought stages, Mr. Williams is concerned with how the public will respond in terms of knowing when and which stage the city is standing at. **How will this affect businesses like carwashes? Will they have enough time to respond?** The historical drought index could be helpful in gauging when certain stages are implemented. A proposal of 16-month Averages at Stage 2 Drought could be imposed. **Could cases of prevalent, unforeseen events of precipitation lower a drought stage? How is that calculated?** Mr. Honea replied that the historical drought index could be applied as a point of reference in determining/estimating when drought stages are raised or lowered. **How will businesses be forewarned about impending restrictions and so forth?**

Carlee McClellan disagreed. Waiting 6-months is too long. It should be 3-months. Dealing with leaks and contamination like the Gold King Mine, treatment plants are designed to only filter certain elements like arsenic. We need a Plan B. **What will the City do if it gets completely depleted?** Mr. McClellan agreed with creating a culture of higher vigilance and awareness. Perhaps the City should implement a higher stage alert for at least 2 years, and monitor water levels during that time.

Mr. Bright suggested on lessen public confusion when it comes to drought response actions. Delayed reactions will not be received well. **What do aquifer data tell us?** We need to agree on creating a public perception of a Stage 3 drought as the "new norm." The City promotes "Water and Energy Day." That program needs to be magnified and extended to help create a Stage 3 alertness as a cultural norm. This will eliminate having to determine what drought stage we are in and/or averaging drought stages across 3-, 6-, 12-, 18-month timeframes. Mr. Williams noted that people will think there is an endless supply of water once NGWSP goes online. The challenge here is how to get people on board with the idea of drought emergencies and water conservation measures. Mr. Bright further noted on issues surrounding endocrine disruptors that our treatment facilities are not designed to eliminate. We do not have solutions to address these.

Jeff reiterated Mr. McClellan's argument on worst case scenarios. **What happens in the event of a system failure, or an imminent future of no rain or precipitation, or complete depletions of water sources?** Hence, we need to incorporate this as part of our planning. **What are the options? Who will manage these systems?** Ms. Bordegaray asked if these questions and proposed solutions going to be incorporated into the plan. Mr. Honea responded with the question: **Is Emergency Response Planning part of Drought Planning? Is a water-line break, say NGWSP, the same as drought for the City?** Ms. Bordegaray said no, it



is not. Ms. Barriga suggested that the City should consider creating parallel plans that focuses on both impacts. Produce a better plan. That in itself is a worst-case scenario. Ms. Bordegaray agreed. Mr. Kiely also agreed and noted that there could potentially be a way to create such a plan. It reflects the understanding that we are in a region of constant drought. Increases in population and activities are impacts. We have a unique context of reality. Ms. Barriga also asked Marc Miller of the BOR if Emergency Response Planning can be included within a DCP? He said he would research this question. Emergency Drought Response planning was agreed with by Ms. Bordegaray.

Mr. McClellan noted that we should think of storing and conserving water supplies, in times of abundance, as a way of managing aquifer recharge and catchment. Mr. Honea asked: (a) per BOR agreements, **is it allowed to use NGWSP supply to recharge aquifers**, but no one had an answer; and (b) **should aquifers be reserved to allow time for recharge** and have the City rely on surface water during that time? Mr. Bright inquired: **what about in times of drought where there is little surface water?** The more logical action would be to encourage rain harvesting if people want to keep watering their lawns; just because it is not in place does not mean it cannot be done. There will be costs but everything has attached costs and it is not an impossible task.

Jeff noted the importance of developing the concept of a storage plan, especially in times of stressed water supplies. It should be part of our Drought Mitigation strategy. Mr. Williams noted that nature is beyond our control but that does not change what we need to do as a community. **What are the legal standards for drought stages that could potentially impact a business?** Need hard and substantial data that authenticates the drought mitigation and response plans. Mr. Bright and Mr. McClellan both agreed.

Ms. Barriga emphasized the comprehensive nature of data tables. **How do we simplify data calculations in layman terms?** It is important that the public fully understand the extend of drought stages what they really mean. The City will need to appoint an appointee to assess the data for public education. Mr. McClellan noted that is just the nature of how data is interpreted. Perhaps there needs to be a public version that interprets and simplifies the data as best as possible. The objectives of the *NN Drought Contingency Plan* are: (a)

- to provide an effective and systematic means of assessing drought conditions,
- to develop mitigation actions and programs to reduce the risk in advance of drought,
- to develop response options that minimize hardships during drought,
- to collect/analyze/disseminate drought-related information in a timely manner,
- to establish criteria for declaring drought and triggering mitigation and response activities,
- to describe organizational structure and responsibilities of programs with respect to drought,
- to prepare an inventory of state and federal programs and provide actions recommendations,
- to identify drought prone areas and vulnerable sectors,
- to identify mitigation actions, and
- to provide a mechanism to ensure a timely and accurate assessment of drought impacts.

Perhaps use this as background information for the DCP. Mr. McClellan also suggested to include (a) monthly drought tables, (b) response actions, and (c) monthly drought reports. Mr. Honea agreed. These elements will eventually be incorporated into the drought plan.

Mr. Honea wrapped up the comments section. Next steps will include BOR recommendations framework, operational and administrative actions.

Mr. Bright reiterated the idea of enacting a Stage 3 drought stage as a new cultural norm, essentially eliminating the idea of determining and calculating specific drought stages. Mr. Williams agreed. Gallup Solar practices a Stage 4 drought all the time. Perhaps we could collaborate with the COG for a public demonstration on smart solar and water, presented by Agua del Sol from Phoenix.

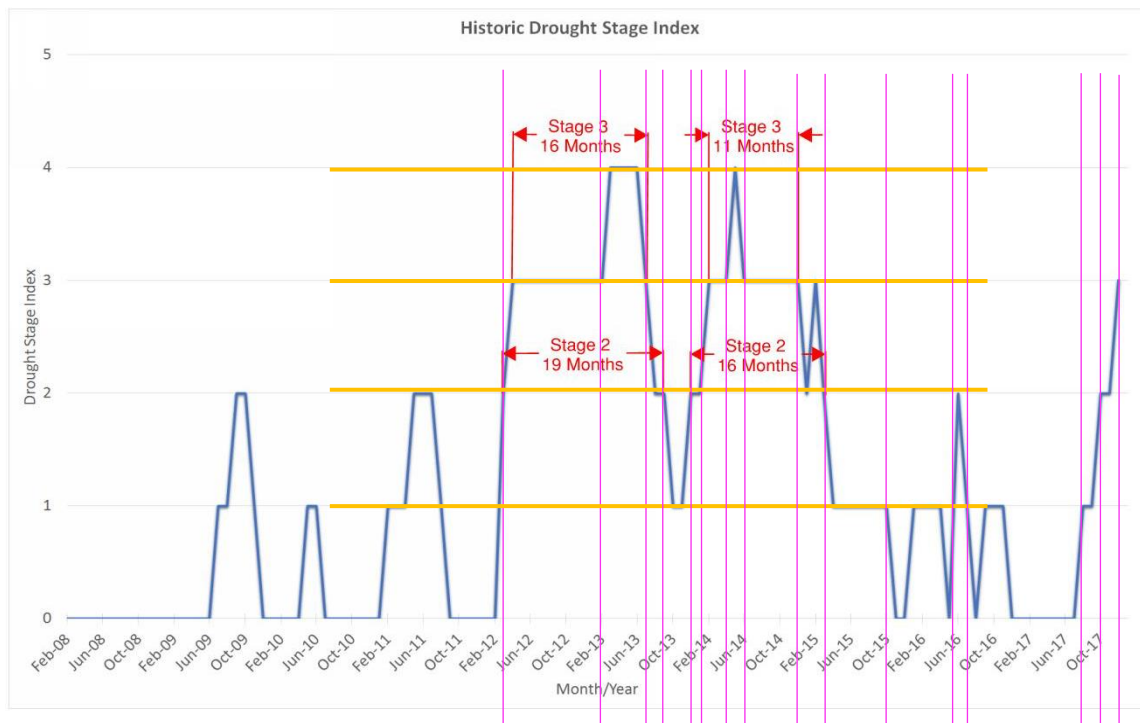
Max Bighorse noted that the NNEPA is structured by federal regulations for its water systems. There is a contingency plan in place. Tohajillee is limited to only one well for a community of 4,000, and other communities have a lot of water with minimal use. Ms. Bordegaray inquired: **Is the NNEPA Drought**

### Contingency Plan based on BOR standards? Are Drought Contingency Plans inter-related across agencies?

Marc Miller did not have an answer, but in terms of well storage, according to *Public Law 111.11 – Storage of Groundwater*, for the NGWSP, if the water does not meet water demands, any proposed work need to be approved by the State of NM, under state law provisions for aquifer storage and recovery. Mr. Miller will look into initial design phases for water treatment plans to see if the filtering of endocrine disruptors is included in the plans. Also suggested the book — *Let There Be Water: Israel's Solution to a Water Starved World* by Seth Siegel — about Israel water issues and changing the culture around water conservation with children, as a great source of reference for our DCP.

Mr. Williams briefly reviewed next steps. Next meeting is scheduled for Thursday, May 31<sup>st</sup>. There will be an opportunity to assess and discuss all the draft of technical memos and the final report.

Mr. Kiely adjourned the meeting at 12:04 pm.



From June 2012, the City of Gallup tentatively began experiencing increased drought:

- beginning with 10 consecutive months of **Stage 2** drought (May to March 2013), and
- increasing to **Stage 3** for another 5-months (April to August 2013), and
- decreasing to **Stage 2** for 4-months (September to November 2013), and
- further decreasing to **Stage 1** for 3-months (December to February 2014), and
- increasing to **Stage 2** for 3-months (March to June 2014), and
- peaking at **Stage 3 to 4** for 2-months (July and August 2014), then plateauing at **Stage 3** for 5-months (September to February 2015), and
- decreasing and peaking at **Stage 2** for 3-months (March to June 2015), and
- decreasing and plateauing at Stage 1 for 3-months (August to November 2015),
- erratically peaking/dipping at **Stage 0** for 7-months (December 2015 to July 2016), and
- peaking at **Stage 1** for 2-months (August and September 2016), and
- erratically peaking/dipping at **Stage 0** for 12-months (October 2016 to October 2017), and
- increasing at **Stage 1** for 2-months (November and December 2017), and
- increasing at **Stage 2** for 2-months (January to February 2018).

So, based on these numbers and the respective Historic Drought Stage Index diagram:

There were four (4) consecutive events of a 2-month drought;

There were four (4) consecutive events of a 3-month drought;

There were four (4) separate consecutive events of drought that lasted between 3 to 7 months; and

There were two (2) separate events either a 10-month or 12-month drought.



Appendix D  
Drought Task Force Meeting No. 4  
Notes – 6/7/18





**Gallup Drought Plan  
TASK FORCE MEETING #4**

**NOTES**

June 7, 2018

10:00 – 12:00PM

El Morro Events Center  
210 South 2<sup>nd</sup> Street, Gallup, NM

**Attendees:**

Name/Organization	Email	Phone
Jeff Kiely, NWNMCOG	<a href="mailto:jkiely@nwnmcog.org">jkiely@nwnmcog.org</a>	(505) 722-4327
Angelina Grey, NWNMCOG	<a href="mailto:agrey@nwnmcog.org">agrey@nwnmcog.org</a>	(505) 722-4327
Evan Williams, NWNMCOG	<a href="mailto:ewilliams@nwnmcog.org">ewilliams@nwnmcog.org</a>	(505) 722-4327
Jim Honea, CH2M	<a href="mailto:Jim.honea@ch2m.com">Jim.honea@ch2m.com</a>	(505) 855-2218
Elizabeth Barriga, City of Gallup	<a href="mailto:ebarriga@gallupnm.gov">ebarriga@gallupnm.gov</a>	(505) 863-1393
Dennis Romero, City of Gallup	<a href="mailto:dromero@gallupnm.gov">dromero@gallupnm.gov</a>	
Carlee McClellan, Navajo Nation Water Management	<a href="mailto:cmcclellan@navajo-nsn.gov">cmcclellan@navajo-nsn.gov</a>	(928) 729-4125
Dave Schoultz, NTUA	<a href="mailto:davids@ntua.com">davids@ntua.com</a>	
Jacob LaCroix, Gallup Fire	<a href="mailto:jlacroix@gallupnm.gov">jlacroix@gallupnm.gov</a>	(505) 722-4195
Rudy Keedah, BIA Natural Resources	<a href="mailto:Rudy.keedah@bia.gov">Rudy.keedah@bia.gov</a>	
Angela Bordegaray, OSE/Interstate Stream Commission		
Marc Miller, BOR-Durango		
Ruth Swickard, BOR-Durango		

- (1) **Welcome & Introductions.** Mr. Jeff Kiely, Northwest New Mexico Council of Governments provided the welcome and again provided background on this project. A quick round of introductions was completed to familiarize the group and members.
- (2) **Status Check-in.** Evan Williams, Northwest New Mexico Council of Governments provided a re-cap of progress to date including Technical Memos and Drought Task Force (DTF) meetings to date. He emphasized discussion items from DTF Meeting #2, which focused on Technical Memo #3 and Sections 4 and 5 (e.g. Vulnerability Assessment and Drought Mitigation Actions, respectively). Mr. Williams explained that Sections 6 and 7 (e.g. Operational and Administrative Framework and DCP Update Process, respectively) were not done by separate technical memo, but were added to the Draft DCP that would be discussed today. Mr. Williams highlighted two external events that occurred that bring attention to the ongoing drought that could be referenced and leveraged in the plan:
  - The City of Gallup competed in the Wyland National Mayor's Challenge for Water Conservation challenge and won 1<sup>st</sup> Place in the Nation. <https://www.gallupnm.gov/CivicAlerts.aspx?AID=588>
  - City Council approved a Proclamation declaring Severe Drought - <http://gallupnm.gov/DocumentCenter/View/2954/Proclamation-Declaring-Severe-Drought-Conditions-050818>
- (3) **Overview Presentation on Draft Drought Contingency Plan.** Jim Honea, CH2M, went through a powerpoint presentation that reviewed past sections and new sections. The review process included:
  - a. Presentation on what is in the Plan - topic-by-topic (or slide-by-slide)

- b. Discussion on each slide including suggested changes, past comments, and/or additions
- c. Reviewing final suggestions with the group for consensus.

<b>Content Title:</b>	<b>Drought Monitoring – Primary and Secondary Indicators</b> (Slides 4-14)
<b>Discussion Items:</b>	<p>The Drought Task Force (DTF) again discussed the validity and applicability of the indicators recommended in the plan. Comments included:</p> <ul style="list-style-type: none"> <li>• Standardizes this matrix with Navajo Nation process. Subsequently, review Navajo Nation Drought Contingency Plan to review indicators;</li> <li>• Eliminating air temperature and precipitation as they are already part of the calculations in US Drought Monitor and Drought Severity Index.</li> <li>• Adding the Western Climate Center’s 6-month Standardized Precipitation Index (SPI), focusing on the Northwest NM data set rather than all three like Navajo (which include Southeastern Utah and Northeastern Arizona)</li> <li>• While the Plan does list future indicators (once NGWSP is brought online) that would likely need to be considered and added – it would be nice to see an example now in this Plan and a similar tool that pulls available information/data.</li> <li>• There was some clearly discussion around which Basin – San Juan or Colorado?</li> </ul>
<b>Proposed Resolution:</b>	<p>It seemed we reached consensus around:</p> <ul style="list-style-type: none"> <li>• Adding the Western Climate Center’s 6-month Standardized Precipitation Index (SPI), focusing on the Northwest NM data set and weighing it the same as the US Drought and Palmer Indexes (10 points).</li> <li>• Eliminating air temperature and precipitation as indicators all together – thus only having 3 indicators to streamline the process.</li> <li>• Working on a sample matrix and tool for proposed NGWSP surface water indicators.</li> </ul>

<b>Content Title:</b>	<b>Vulnerability Assessment - Prioritization</b> (Slides 15-16)
<b>Discussion Items:</b>	The Drought Task Force (DTF) seemed to approve of the treatments made by CH2M on this section. There was healthy discussion in previous DTF meetings and strong recommendations that were incorporated.
<b>Proposed Resolution:</b>	No changes recommended.

<b>Content Title:</b>	<b>Mitigation Actions</b> (Slides 17-19)
<b>Discussion Items:</b>	<p>There was one comment that was submitted previous to this DTF meeting, which asked in G-22 needed to be referenced in this plan specifically or tangentially. It was felt that by calling out groundwater source(s) that G-22 would be covered as well as any other future groundwater sources, and this was preferred at this time.</p> <p>The Drought Task Force (DTF) seemed to approve of the treatments made by CH2M on this section. There was healthy discussion in previous DTF meetings and strong recommendations that were incorporated.</p>
<b>Proposed Resolution:</b>	No changes recommended.



Content Title:	Response Actions by Drought Stage Summary (Slides 20-21)
Discussion Items:	<p>The Drought Task Force (DTF) discussed this chart. Comments included:</p> <ul style="list-style-type: none"> <li>• Making sure that management actions are aligned are pre-scheduled prior to action points to avoid City Council actions with no prior knowledge that the City is moving towards or out of a Stage – this would be addressed in the Operations &amp; Administrative section.</li> <li>• Suggested making the goals in Stage 3 and 4 ranges up to the City Council discretion and based on staff recommendation.</li> <li>• Discussed adding another column for natural disasters or water emergencies including future issue of surface water contamination. It was discussed that this Plan would be an appendix to the City's Emergency Management Plan and that would be the guiding document for all emergencies.</li> </ul>
Proposed Resolution:	<p>It seemed we reached consensus around updating the goals to ranges as follows:</p> <ul style="list-style-type: none"> <li>• Stage 3 – Severe Drought: Reduce water use by 10%-20%</li> <li>• Stage 4 – Extreme Drought: Reduce water use by 20%-50%</li> </ul>

At this point, there was a good discussion on water supply sources that needs to be recorded:

- There is a difference depending on what source the City is relying and there might need to be a weighting towards the primary water supply. The City of Farmington was pulled out as example as they weight indicators such as Lake levels at Farmington Lake, which helps trigger actions.
- The DTF again discussed pumping levels of groundwater supply, and there are data gaps there that need to be pushed for future consideration, a plan to develop this data, and then possibly looking at weighting factors. It really needs to be done well like the USGS/Bureau of Geology groundwater atlas – whereby you could do some trend analysis.
- Maybe the Plan could develop some scenario's to help support the thinking around these concepts.
- Request made to BOR to see if they have information or could support co-developing a decision support system around a conjunctive use model and accounting side support.

Content Title:	Response Actions by Drought Stage Detail (Slides 22-23)
Discussion Items:	<p>This chart seemed to be fine with one overarching comment that we are really describing three water sources (re-used or recycled effluent, raw, and potable water) and restrictions should be focused on potable water. Along this line, it was mentioned that the City of Gallup does sell non-potable water at its Eastside Wastewater Plant for really inexpensive rates. There were also some minor but important refinements to reflect City values and priorities. Comments included:</p> <ul style="list-style-type: none"> <li>• Golf Courses should allow affluent re-use only in Stage 3 and 4</li> <li>• Turfing parks was mentioned</li> <li>• Athletic and playing fields <ul style="list-style-type: none"> <li>○ Watering times could be adjusted as operational discussion with Parks Department</li> <li>○ Overall coordination with Parks Department in Stage 3 &amp; 4 was recommended to avoid permanent damage of letting the grass die (e.g. Santa Fe circa 2003)</li> </ul> </li> <li>• Fire Department (testing, flushing, pumping, etc.) – again it was recommended that coordination of operations happen in Stages 3 &amp; 4</li> </ul>

<b>Proposed Resolution:</b>	A treatment would be done on the water source and supply item, and other recommendations would be re-evaluated and finalized. The coordination with the Parks Department and Fire Department would also be overarching recommendations in terms of operational planning and best water use options.
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<b>Content Title:</b>	<b>Response Actions – Emergency Water Rates</b> (Slides 24)
<b>Discussion Items:</b>	<p>Dennis Romero introduced the principle that utility rates need to be fair, just, and reasonable, and we need to think about how it impacts different user groups, especially those on fixed income.</p> <p>While the City’s water rates are calculated using cubic feet -- it was recommended to convert these to galloons for ease of information.</p> <p>There was a lot of discussion on creating a new rate structure from the suggested Stage 3 doubling and Stage 4 tripling in terms of a “water hog” rate. As well as, discussion around pushing up one tier in each Stage.</p>
<b>Proposed Resolution:</b>	<p>The rates will be converted to galloons and the Stages will be changed from doubling and tripling to:</p> <p>Stage 3 – issue warning in advance and use enacted by City Council increase 15% for the high-use residential and commercial only.</p> <p>Stage 4 – increase 25% for the high-use residential and commercial only.</p>

<b>Content Title:</b>	<b>Response Actions - Incentives</b> (Slides 25)
<b>Discussion Items:</b>	<p>The DTF really agreed that this should be changed to be positive incentives rather than a reward system for turning in your neighbor.</p> <p>Some ideas included:</p> <ul style="list-style-type: none"> <li>• Using Gallup Connect (See. Click. Fix) system to report water use issues rather than a hotline. No reward tied to this action.</li> <li>• Bill credit to meet restrictions be dropping year over year usage.</li> </ul>
<b>Proposed Resolution:</b>	A treatment would be done on this section to research and provide positive incentives for this section.

<b>Content Title:</b>	<b>Response Actions - Implementation</b> (Slides 27)
<b>Discussion Items:</b>	<p>The DTF had debated the number of consecutive month to heightened a drought stage (6 months) and reduce a drought stage (3 months) – and this seemed like the majority of folks could live with it and offered a good starting point with City Council. Again, the happy balance is not fluctuating to often that people loss interest (cry wolf scenario) and that you don’t wait to long to make a management decision.</p>
<b>Proposed Resolution:</b>	No changes recommended.

<b>Content Title:</b>	<b>Operational and Administrative Framework (Slides 28)</b>
<b>Discussion Items:</b>	<p>This was a new section and there was discussion already three main areas:</p> <ul style="list-style-type: none"> <li>• Marketing and Outreach methods: there were a lot of good ideas to effective and cheaply get the word out regarding Drought Stage and impacts. <ul style="list-style-type: none"> <li>○ Water billings as a thermometer or color coded;</li> <li>○ Website, Social Media</li> <li>○ Reports and notifications (Code Red)</li> <li>○ Radio spots and PSA's (multi-lingual)</li> <li>○ Civic Group email lists</li> <li>○ Road signs (Intelligent Transportation Signs) e.g. Durango, CO or US Forest Service</li> </ul> </li> <li>• Recommend the City of Gallup participate in monthly conference calls to NM Drought Monitoring Work Group.</li> <li>• Enforcement: <ul style="list-style-type: none"> <li>○ The City of Gallup has an ordinance in terms of a water wasting rule tied to fines.</li> <li>○ Prepare as part of the Plan a sample ordinance that could be discussed and approved after the Plan is adopted. Review the City of Farmington's plan and ordinance. Ask BOR for any other good examples of sample ordinances.</li> </ul> </li> </ul>
<b>Proposed Resolution:</b>	Include and work on recommendations from discussion above. Also, create a visual chart or graph to help timeline decision and management actions, so City staff, Manager, and City Council can follow this action/decision tree.

<b>Content Title:</b>	<b>Annual Report Process (Slides 29-30)</b>
<b>Discussion Items:</b>	This was a new section and there was discussion around eliminating dates and that the main actions are an annual review, 5-year updates, and post-drought reviews.
<b>Proposed Resolution:</b>	Include and work on recommendations from discussion above.

<b>Content Title:</b>	<b>Post Drought Evaluation (Slides 31)</b>
<b>Discussion Items:</b>	The main measurement that should be used is galloons per person per day (using the OSE calculator) rather than the water loss audit. Overall, these questions and evaluations are good and important especially for officials to make sure we are coordinating and following the Plan.
<b>Proposed Resolution:</b>	Include and work on recommendation from discussion above.

#### (4) Next Steps:

- Project Team will work on finalizing notes, comments/responses, and draft final DCP
- **Discuss approval process and strategy with City Manager (EW – 6/20/18); thence finalize the remaining bullets.**
- Send Draft DCP to crucial stakeholders, including City Council and staff, DTF members, BOR staff (make sure there aren't major changes), private sector, etc.
- Post Draft DCP for comments on City website

- Present to City Council as a Work Session item (either July 10 or 24) – with Executive Summary, Main FAQs, and a powerpoint streamlined from today's presentation.
- Present to City Council (July 24 or August 14) for submission to BOR, delegating the City Manager responsible for final adoption.
- Finalize with BOR staff and close-out by September 2018.

## Appendix E

### Example Ordinance (Tucson, AZ)

Tucson Water inspector personally delivers a notice to the site stating that water service will be discontinued in four days if the requirements are not met.

(c) A compliance fee of seventy-six dollars and fifty-one cents (\$76.51) will be assessed when the customer fails to meet the requirements imposed by this article and Tucson Water discontinues potable or reclaimed water service.

(d) A fee of sixteen dollars and fourteen cents (\$16.14) will be assessed to backflow prevention assembly testers:

(1) whenever registering or reregistering their backflow test equipment with Tucson Water, as required in Sec. 27-80(o); and

(2) whenever registering or reregistering their certification to perform backflow prevention assembly testing with Tucson Water, as required in Sec. 27-80(p).

(Ord. No. 9976, § 2, 5-24-04; Ord. No. 10359, § 3, 12-12-06, eff. 1-16-07; Ord. No. 10510, § 3, 3-18-08, eff. 7-1-08; Ord. No. 10897, § 3, 5-24-11, eff. 7-5-11; Ord. No. 11072, § 3, 5-21-13, eff. 7-1-13)

**Secs. 27-87--27-89. Reserved.**

## ARTICLE VI. EMERGENCY WATER CONSERVATION RESPONSE\*

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\* **Editors Note:** By Ordinance 8564, the mayor and council called a special election for November 7, 1995, at which public initiative petition 1994-1001 would be submitted to the city's qualified electors. By Ordinance 8574, the mayor and council approved the ballot label for that special election, which included the full text of the proposed Code amendment presented in the initiative petition. The proposed initiative was approved by the electorate and is now part of the Tucson Code.

The initiative as passed was denominated article VI of chapter 27 of the Tucson Code, containing sections 27-90 through 27-93. However, chapter 27 of the Tucson Code already contained an article VI (entitled "Emergency Water Conservation Response") consisting of sections 27-90--27-99. The existing article VI was enacted subsequent to the filing of the blank version of public initiative petition 1994-1001 but prior to its approval by the voters.

The city has determined that the initiative measure should be denominated as article VII of chapter 27, rather than article VI, and that its various sections should be numbered as sections 27-100 through 27-103, rather than as sections 27-90 through 27-93.

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**Sec. 27-90. Purpose.**

This article establishes a city emergency water conservation response plan.  
(Ord. No. 8461, § 1, 3-20-95)

**Sec. 27-91. Declaration of policy.**

It is hereby declared that, because of varying conditions related to water resource supply and  
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distribution system capabilities, it is necessary to establish and to enforce methods and procedures to ensure that, in time of emergency shortage of the local water supply, the water resources available to the city are put to the maximum beneficial use, that the unreasonable use, or unreasonable method of use is prevented, and that conservation of water is accomplished in the interests of the customers of the city water department and for the public health, safety, and welfare.

(Ord. No. 8461, § 1, 3-20-95)

**Sec. 27-92. Application.**

(a) This article applies to all departments of the city, and to all city water customers who own, occupy, or control water use on any premises as defined in section 27-10.

(b) No person shall make, cause, use, or permit the use of water received from the city water department for residential, commercial, industrial, governmental or any other purpose in any manner contrary to any provision in this article.

(c) Mandatory emergency conservation measures shall be implemented based upon the declaration of an emergency pursuant to section 27-93.

(Ord. No. 8461, § 1, 3-20-95)

**Sec. 27-93. Declaration of water emergency authorized.**

The mayor and council or, in the absence of a quorum, the mayor or the mayor's designate, upon the recommendation of the director of the city water department is hereby authorized to declare a water emergency and to implement mandatory conservation measures as set forth in this article.

(Ord. No. 8461, § 1, 3-20-95)

**Sec. 27-94. Implementation, termination.**

(a) The director of the water department shall develop guidelines which set forth general criteria to assist the mayor and council, or in the absence of a quorum, the mayor or the mayor's designate in determining when to declare a water emergency. Upon declaration of a water emergency, the city manager shall report in writing to the mayor and council providing the reasons for and expected duration of such emergency and describing implementation of emergency water conservation measures.

(b) Upon the cessation of the condition or conditions giving rise to the water emergency, or upon majority vote of the mayor and council, or in the absence of a quorum, the mayor or the mayor's designate shall declare the water emergency terminated. Upon such termination, the mandatory conservation measures shall no longer be in effect.

(Ord. No. 8461, § 1, 3-20-95)

**Sec. 27-95. Mandatory emergency water conservation measures.**

Upon declaration of a water emergency and notification to the public, the following mandatory restrictions upon nonessential uses shall be enforced:

(1) All outdoor irrigation, except for those areas irrigated with reclaimed water, is prohibited. If the city manager deems it appropriate, a schedule designating certain outdoor watering days may be implemented in place of the irrigation ban.

(2) Washing of sidewalks, driveways, parking areas, tennis courts, patios or other paved areas with water from any pressurized source, including garden hoses, except to alleviate immediate health or safety hazards, is prohibited.

(3) The outdoor use of any water-based play apparatus connected to a pressurized source is prohibited.

(4) Operation of water cooled space and equipment cooling systems below an operating efficiency level of two cycles of concentration is prohibited.

(5) Restaurants and other food service establishments are prohibited from serving water to their customers, unless water is specifically requested by the customer.

(6) Operation of outdoor misting systems used to cool public areas is prohibited.

(7) The filling of swimming pools, fountains, spas or other exterior water features is prohibited.

(8) The washing of automobiles, trucks, trailers and other types of mobile equipment is prohibited, except at facilities equipped with wash water recirculation systems, and for vehicles requiring frequent washing to protect public health, safety and welfare.

(Ord. No. 8461, § 1, 3-20-95)

**Sec. 27-96. Variances.**

The city manager, or the city manager's designate, is authorized to review hardship cases and special cases within which strict application of this chapter would result in serious hardship to a customer. A variance may be granted only for reasons involving health, safety or economic hardship. Application for variance from requirements of this chapter must be made on a form provided by the director.

(Ord. No. 8461, § 1, 3-20-95)

**Sec. 27-97. Violation.**

(a) In the event of any violation of this article, a written notice shall be placed on the property where the violation occurred and a duplicate mailed to the person who is regularly

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billed for the service where the violation occurs and to any person known to the department who is responsible for the violation or its correction. Such notice shall describe the violation and order that it be corrected, ceased or abated immediately or within such specified time as the department determines is reasonable under the circumstances and shall contain a description of the fees and penalties associated with such violation. If such order is not complied with, the department may forthwith disconnect the service where the violation occurs. A two hundred fifty dollar (\$250.00) fee shall be imposed for the reconnection of any service disconnected pursuant to noncompliance, which shall be in addition to other fees or charges imposed by this chapter for disconnection of service.

(b) In addition to being grounds for discontinuation of service, violation of any provision of this article shall be a civil infraction. An individual or corporation convicted of violating provisions of this section shall be assessed a civil penalty of not less than two hundred fifty dollars (\$250.00).

(Ord. No. 8461, § 1, 3-20-95)

#### **Sec. 27-98. Enforcement.**

The city manager is authorized to designate city employees to enforce the provisions of this article.

(Ord. No. 8461, § 1, 3-20-95)

#### **Sec. 27-99. Definitions.**

*Department* means the city water department.

*Director* means director of the city water department.

*Economic hardship* means a threat to an individual's or business' primary source of income.

*Notification to public* means notification through local media, including interviews and issuance of news releases.

*Outdoor watering day* means a specific day, as described in a specific outdoor watering plan, during which irrigation with sprinkler systems or otherwise may take place.

(Ord. No. 8461, § 1, 3-20-95)

## **ARTICLE VII. WATER CONSUMER PROTECTION ACT\***

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\* **Editors Note:** See note for Article VI.

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#### **Sec. 27-100. Method.**

(a) The city shall use only groundwater from unpolluted sources as its potable water supply for a five-year interim period beginning on the effective date of this article [November 13, 1995], except as specifically provided in section 27-101.

(b) The city shall take the necessary actions to ensure that it is in total compliance with its existing contract for Central Arizona Project (CAP) water.

(c) For five (5) years from the effective date of this article [November 13, 1995], CAP water delivered to the city shall be used only for one or more of the following purposes:

(1) For selling or exchanging water under the terms of the city's existing CAP subcontract.

(2) To preserve Tucson's groundwater for domestic use by replacing groundwater which would otherwise have been withdrawn for uses other than as potable water such as agriculture, mining or other industry.

(3) To prevent land subsidence and augment Tucson's groundwater supply by basin and stream bed recharge.

(4) To replace other water supplies currently being employed for industrial and landscape irrigation use including parks, golf courses and schools.

(5) For direct well injection if it is treated as described in section 27-101 and is free from disinfection by-products.

(Ord. No. 8564, § 1, 8-7-95)

#### **Sec. 27-101. Exception.**

Notwithstanding any other provision of this article, CAP water may be directly delivered as a potable water supply only if it is treated in a manner sufficient to ensure that the quality of the delivered water is equal to or better in salinity, hardness and dissolved organic material than the quality of the groundwater being delivered from Tucson's Avra Valley well field on the effective date of this article [November 13, 1995].

(Ord. No. 8564, § 1, 8-7-95; Ord. No. 8574, § 1, 9-5-95)

#### **Sec. 27-102. Recharge.**

(a) The city shall not recharge water in any area that contains or is adversely effected by toxic landfills.

(b) To prevent land subsidence within the city's central well field, all groundwater withdrawals shall be completely replenished, as measured over any five-year period, using recharge including recharge of CAP water treated as provided in section 27-100(c)(5).

(Ord. No. 8564, § 1, 8-7-95; Ord. No. 8574, § 1, 9-5-95)

#### **Sec. 27-103. Definitions.**

In this article, unless the context otherwise requires:

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(1) *Pollution* means the presence of an amount of any substance in groundwater which exceeds any standard prescribed by the laws of the state or the United States for potable water.

(2) *Disinfection by-products* are the chemical compounds formed when chlorine, ozone or chloramines are used to disinfect water containing dissolved organic material.

(Ord. No. 8564, § 1, 8-7-95; Ord. No. 8574, § 1, 9-5-95)

**Editors Note:** Section 27-100 through 27-103 added as the result of an Initiative Special Election held November 7, 1995, pursuant to a citizen-initiated measure--Initiative Petition No. 1994-1001. The amendment became effective on November 13, 1995.

**Secs. 27-104--27-109. Reserved.**

## ARTICLE VIII. DROUGHT PREPAREDNESS AND RESPONSE PLAN

### Sec. 27-110. Purpose.

This article establishes a city drought preparedness and response plan.

(Ord. No. 10380, § 1, 3-20-07)

### Sec. 27-111. Declaration of policy.

It is hereby declared that, because of varying conditions related to water resource supply and distribution system capabilities during drought, it is necessary to establish and to enforce drought response stages and drought response measures to ensure that the water resources available to the city are put to the maximum beneficial use; that unreasonable use, or unreasonable method of use is prevented; and that conservation of water is accomplished in the interests of the customers of the city and for the public health, safety, and welfare.

(Ord. No. 10380, § 1, 3-20-07)

### Sec. 27-112. Application.

(a) This article applies to all departments of the city, and to all city water customers who own, occupy, or control water use on any premises as defined in section 27-10.

(b) No person shall make, cause, use, or permit the use of water received from the department for residential, commercial, industrial, governmental or any other purpose in any manner contrary to any provision in this article.

(c) Mandatory drought response measures shall be implemented based upon the declaration of drought response stages pursuant to section 27-115.

(Ord. No. 10380, § 1, 3-20-07)

**Sec. 27-113. Declaration of drought response stages, implementation, termination.**

(a) Stage 1 or Stage 2 drought response will be declared by the city manager, or any designee, on the advice of the director. A Stage 3 or Stage 4 drought response will be declared by the mayor and council, or any designee, upon the recommendation of the city manager.

(b) The director shall develop guidelines which set forth general criteria to assist the city manager or mayor and council, or any designee, in determining drought response stages.

(c) Following the declaration of any drought response stage, the department will implement appropriate response actions, including but not limited to public notification and various drought response measures.

(d) The director will continually monitor drought conditions and promptly recommend that the drought stage level increase if conditions worsen. Similarly, the director will advise the city manager to rescind Stage 1 or 2, or to recommend termination of Stage 3 or 4, if warranted by lessened drought conditions.

(Ord. No. 10380, § 1, 3-20-07)

**Sec. 27-114. Triggers for each drought response stage.**

Each drought response stage will be triggered by specific conditions related to the availability of Colorado River water and/or local water system indicators, such as well and distribution system operating capacities:

(a) *Stage 1 trigger:* A severe and sustained drought on the Colorado River watershed and/or any declaration of drought status above normal in the Santa Cruz Watershed by the Arizona Drought Monitoring Technical Committee.

(b) *Stage 2 trigger:* A declaration by the Secretary of the Interior of a shortage on the Colorado River that results in a reduction in Central Arizona Project (CAP) water deliveries to agricultural, other non-municipal users, or to excess users, OR, a deterioration in local water system indicators in conjunction with a drought status above normal for the Santa Cruz Watershed.

(c) *Stage 3 trigger:* Continuing shortages on the Colorado River resulting in reductions in CAP deliveries to municipal subcontractors, including the city, OR, a further deterioration in local water system indicators in conjunction with a drought status above normal for the Santa Cruz Watershed.

(d) *Stage 4 trigger:* Additional reductions to CAP municipal deliveries, a further deterioration of local system indicators, and/or a failure to significantly reduce water demand in Stage 3.

(Ord. No. 10380, § 1, 3-20-07)

**Sec. 27-115. Response actions for each drought response stage.**

Upon declaration of a drought response stage the director shall be authorized to implement and enforce any or all of the drought response measures for a specific drought response stage included in the last-adopted Drought Preparedness and Response Plan on file with the city clerk's office.

(Ord. No. 10380, § 1, 3-20-07)

**Sec. 27-116. Variances.**

The director, or the director's designee, is authorized to review special cases within which strict application of this chapter would result in serious hardship to a customer. A variance may be granted only for reasons involving health, safety or economic hardship. Application for variance from requirements of this article must be made on a form provided by the director. The department may charge a fee to process a variance request.

(Ord. No. 10380, § 1, 3-20-07)

**Sec. 27-117. Violation.**

(a) Violations of this article will result in a written notice placed on the property where the violation occurred. A duplicate will be mailed to the person who is regularly billed for the service where the violation occurs and to any person known to the department who is responsible for the violation or its correction. The notice will describe the violation and order that it be corrected, ceased or abated immediately or within such specified time as the department determines is reasonable under the circumstances. The notice of violation will contain a description of the possible fees and penalties associated with said violation. If the order is not complied with, the department may disconnect the service where the violation occurs and the then current disconnection charge will be applied to the customer account. Reconnection of any service disconnected for non-compliance will require payment of the then current complete new service connection charge in addition to other fees or charges imposed by this ordinance for disconnection of service.

(b) In addition to being grounds for discontinuation of service, violation of any provision of this article shall be a civil infraction. An individual or corporation convicted of violating provisions of this section shall be assessed a civil penalty of not less than two hundred fifty dollars (\$250.00) or more than one thousand dollars (\$1,000.00) per violation.

(Ord. No. 10380, § 1, 3-20-07)

**Sec. 27-118. Enforcement.**

This article will be enforced by the department. The city manager, in consultation with the director, is authorized to designate additional city employees to assist in enforcement, should conditions warrant.

(Ord. No. 10380, § 1, 3-20-07)

**Sec. 27-119. Definitions.**

[The following words, terms and phrases, when used in this article, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:]

*Department* means the City of Tucson Water Department (Tucson Water).

*Director* means the Director of the City of Tucson Water Department.

*Economic hardship* means a threat to a primary source of income for an individual or business.

*Notification to public* means notification through local media, including interviews and issuance of news releases and/or department bill inserts.

(Ord. No. 10380, § 1, 3-20-07)

Appendix F  
City of Gallup City Code Water  
Conservation with Suggested  
Revisions

## **Chapter 2**

### **WATER CONSERVATION**

#### **8-2-1: WATER WASTE PROHIBITIONS:**

It is unlawful for any person to use water from the domestic supply in a nonbeneficial or wasteful manner. Nonbeneficial and/or wasteful uses shall include, but are not limited to:

- A. The use or application of water in such a manner, rate and/or quantity that it flows and/or sprays onto adjacent property or the public right of way sufficient to cause ponding or flow;
- B. The escape of water through breaks or leaks for any period of time within which such break or leak should reasonably have been discovered and corrected. It shall be deemed that a period of twenty four (24) hours after discovery of such a break or leak and/or notice from the city of Gallup is a reasonable time within which to correct such break or leak or, as a minimum, to stop the flow of water from the break or leak;
- C. The washing of any street, sidewalk, parking lot, driveway or other hard surfaced area, where excess water from such activity is not beneficially used and/or is wasted or when such excess water flows and/or sprays onto adjacent property or the public right of way sufficient to cause ponding or flow. Exceptions may be granted for reasons of public health or safety by the executive director of Gallup joint utilities or designee. All such exceptions shall be subject to restrictions as set forth by the director. Exceptions shall be granted in writing and be valid for only one application and location;
- D. The use of water for nonrecirculating decorative water fountains and/or ponds;
- E. Use of water for all new, replacement and/or renovated single pass or once through cooling systems installed and/or renovated after August 29, 2000. A relatively simple and inexpensive recirculation loop, or a more technically sophisticated ozonation treatment system can be installed to reuse this otherwise wasted water. All cooling and/or process water shall be metered and billed;
- F. The use of water for new nonrecirculating conveyor car wash systems;
- G. The use of water for construction activities, such as soil compaction, dust control, except when the water is used for the testing of domestic waterlines or as authorized by the Gallup joint utilities executive director or his designee for reasons of public health or safety. (Ord. C2006-08, 4-25-2006)

#### **8-2-2: FIRE HYDRANT USE RESTRICTED:**

It is unlawful for any person except an authorized agent of the city of Gallup to connect to, operate or use water from any city fire hydrant, except as authorized by the Gallup joint utilities executive director or their designee, for reasons of public health or safety. (Ord. C2006-08, 4-25-2006)

#### **8-2-3: PLUMBING EQUIPMENT REQUIREMENTS:**

Any new or replacement plumbing fixtures shall comply with standards contained in the uniform plumbing code as adopted by the city of Gallup and/or as modified herein.



- A. Leaking Plumbing Fixtures Prohibited: The continued use of leaky pipes and taps, leaking toilets or lavatories, or other appliances which waste water is prohibited.
- B. Minimum Standards For Plumbing Fixtures: Any new plumbing fixture or replacement plumbing fixture shall comply with the following standards of water use:
1. Water closet tank, whether flush tank, flushometer tank, or flushometer valve operated, shall have an average consumption of not more than 1.6 gallons (6.1 liters) per flush. Water closets that use a "quick closing" flapper to limit the flush to 1.6 gallons shall not be used to satisfy this requirement.
  2. Urinal flushometers, shall not exceed a maximum of 1.0 gallon (3.8 liters) per flush. If approved in writing by executive director of Gallup joint utilities or their designee, blowout urinals may be installed for public use in stadiums, fairgrounds and in other like structures, used for outdoor assembly and similar uses.
  3. Showerheads shall not exceed a maximum flow of 2.5 gallons (9.5 liters) per minute. Emergency safety showers are exempted from this provision.
  4. Lavatory and kitchen faucets shall be equipped with aerators and shall be designed and manufactured so that they will not exceed a water flow rate of 2.0 gallons (7.6 liters) per minute. Self-closing, metering, or self-closing faucets shall be installed on lavatories intended to serve the transient public, such as those in, but not limited to, service stations, train stations, airports, restaurants, and convention halls. These faucets shall deliver no more than a maximum flow of 0.25 gallons (1.0 liters) per use.
  5. Residential water softeners shall not use more than seventy five (75) gallons (295 liters) during the entire regeneration cycle and shall be sized to cycle no more than three (3) times per week.
  6. Water conserving fixtures shall be installed and maintained in strict accordance with the manufacturer's instructions to maintain their rated performance.
  7. For all new construction, all of the requirements regarding water conserving devices shall be certified by a certificate of compliance by a licensed mechanical contractor or plumbing permittee before or at the time of the final plumbing inspection. The city of Gallup is to receive a copy prior to issuance of certificate of occupancy. (Ord. C2006-08,4-25-2006)

#### **8-2-4: CAR WASHING:**

- A. All self-service car wash wand nozzles shall not use more than 3.0 gallons of water per minute and be equipped with a positive shutoff nozzle. Such nozzle shall stop the flow of water through the hose when released by the operator.
- B. For new construction of commercial car wash business issued building permits after the passage date hereof, certification shall be provided to a designated Gallup joint utilities official that the car wash uses no more than forty (40) gallons of water per vehicle washed. Absent such certification, no water service will be provided. New car wash fixtures shall not exceed the flow described below:
1. In-bay, handheld spray wash equipment, including a spray wand or foaming brush, shall not use more than 3.0 gallons of water a minute and have a trigger shutoff;
  2. Portable pressure wash equipment with a spray nozzle shall not use more than 3.5 gallons of water a minute and have a trigger shutoff;
  3. A conveyor friction system shall not use more than thirty (30) gallons for each vehicle, excluding reclaimed water;
  4. A conveyor touchless system shall not use more than forty (40) gallons for each vehicle, excluding reclaimed water;
  5. An in-bay automatic system shall not use more than forty (40) gallons for each vehicle, excluding reclaimed water;
  6. Each chamois wringer shall have self-closing valves on their faucets;

7. Systems using reverse osmosis rinse water shall use no more than forty (40) gallons for each vehicle and must reclaim and reuse the reject water. Reject water discharge shall be allowed only if no net increase of salinity enters the wastewater system;
8. The use of garden hoses of any type for vehicle washing at commercial facilities is not considered an approved method; and
9. Charity car washes are prohibited, except when in compliance with the provisions of section 8-2-1 of this chapter.

This section does not apply if washing the vehicle is necessary to protect the health, safety, or welfare of the public. (Ord. C2006-08, 4-25-2006)

#### **8-2-5: TIME AND DAY OF IRRIGATION:**

Residences, commercial and industrial properties, along with institutional and public residences and facilities will have irrigation restricted during the months of April, May, June, July, August and September:

- A. Days: Residences, commercial and industrial properties, along with institutional and public residences and facilities will be allowed to irrigate as follows:
  1. When the property has an odd numbered address, that property will irrigate on Tuesdays, Thursdays and Saturdays.
  2. When the property has an even numbered address, that property will irrigate on Wednesdays, Fridays, and Sundays.
  3. No one is to irrigate on Mondays.
- B. Hours: No irrigation will be allowed between the hours of ten o'clock (10:00) A.M. and four o'clock (4:00) P.M.
- C. Exceptions:
  1. Facilities irrigating with treated effluent.
  2. Upon petition to the city council, a majority of the council may provide a waiver to entities that prove the above poses a hardship.
  3. The odd/even irrigation restrictions including time and day do not apply to city parks or athletic fields.
  4. The water systems superintendent may issue site specific waivers to the irrigation restrictions to allow for irrigation of new sod/seed areas for a period not to exceed fourteen (14) calendar days. (Ord. C2006-08, 4-25-2006)

#### **8-2-6: EMERGENCY WATER USE RESTRICTIONS:**

For the reasons of public welfare, health, and safety, the city manager may, upon notification by the executive director of Gallup joint utilities of pending or probable water shortages due to the effects of drought, equipment failures or catastrophic events which decrease the availability and/or delivery capability or due to increased water use, may impose emergency water use restrictions. Emergency water use restrictions may include, but are not limited to, one or any combination of the following:

- A. Restrict irrigation of city facilities to certain days of the week and certain hours of the day;
- B. Prohibit all irrigation at city facilities;
- C. Impose water restrictions and surcharges;
- D. Impose a temporary moratorium on any or all new development, including lawn and garden installations;
- E. Impose laundry restrictions to lodging facilities.
- F. Prohibit filling of swimming pools or any other water features.
- G. Prohibit all irrigation and outdoor water use;

- H. Prohibit the washing of automobiles, trucks, trailers, boats, airplanes, or other mobile equipment at other than a commercial car wash.
- I. Restrict restaurants from serving water other than upon request.
- J. Impose emergency water rates.
- K. Other restrictions as deemed necessary by the executive director of Gallup joint utilities and approved by the city manager. (Ord. C2006-08, 4-25-2006)

#### **8-2-7: VIOLATION; ENFORCEMENT:**

Any act or omission by any person who knowingly, negligently or recklessly acts or omits to act in violation of the provision(s) or restrictions of this chapter can be penalized by: a) payment of administrative fees; b) discontinuance of water service as described below.

- A. Administrative Fees: Fees shall be assessed on the user's utility bill. Each day (24 hour period) of continued violation(s) shall constitute a separate offense at a given user address. The fines shall be added to the water user's account. Failure to pay any portion of a water user's account, including any fines imposed pursuant to this chapter, shall subject said account to termination of water service in accordance with the provisions of this chapter.
  - 1. First observed violation: The offender will receive a verbal and/or written warning, and then will be provided with a copy of the pertinent sections of this code relative to water conservation.
  - 2. Second observed violation: Twenty dollars (\$20.00).
  - 3. Third observed violation: Fifty dollars (\$50.00).
  - 4. Fourth observed violation: One hundred dollars (\$100.00).
  - 5. Fifth observed violation: At the same user address, the city shall impose a fine equal to twice the average monthly billing for the immediately preceding two (2) month period for the meter through which the wasted water was supplied or two hundred dollars (\$200.00), whichever is greater. The fine shall be added to the water user's account. Failure to pay any portion of a water user's account, including fines imposed pursuant to this chapter, shall subject said account to an installation of a flow restriction device at the meter at the user's expense.
- B. Discontinuance Of Water Service: When any further violation of this chapter occurs, and the executive director of Gallup joint utilities or his/her designee determines that the specific circumstances of the violation are of such a serious nature as to require immediate measures and abatement, the executive director of Gallup joint utilities or their designee may take steps to temporarily shut off the water source or discontinue the water service as a means of compelling compliance with this chapter. The city may effect such measures by entry upon private premises if the water service or city water meter is located on private premises. Any violation which depletes the water system during water emergency management shall be deemed to deplete water essential to the maintenance of fire flows and shall be cause for discontinuance of water service following a twenty four (24) hour notice. The city shall not restore service until the executive director of Gallup joint utilities or designee has determined that the water user has provided reasonable assurances that future violations of this chapter by such user will not occur.
- C. Appeal Of Administrative Fee: Any administrative fee assessed in subsection A of this section may be appealed by a customer to the executive director of Gallup joint utilities and then to the city manager whose decision will be final.
- D. Appeal Of Discontinuance Of Service: Any aggrieved customer whose water service is to be discontinued shall be given twenty four (24) hour notice and said customer may immediately appeal the decision of the executive director of Gallup joint utilities to the city manager, who may, in his/her sole discretion allow continued temporary service to the customer. If service is continued, it shall continue only until the next scheduled city council meeting, at which time the city council will hold a hearing to determine if service should be discontinued, or in the case where the city manager has upheld the decision that it be discontinued, determine if it should be restored. The city council may also decide on what conditions water service will be maintained to

a customer who is still receiving service or restored to a customer whose service has been discontinued. (Ord. C2006-08, 4-25-2006)