

# Section 4

## Drought Response and Mitigation

The primary reason for establishing an ongoing Drought Task Force (DTF) and monitoring program is to prepare for timely response and mitigation to a drought. The Interagency Coordination Group (ICG) is the lead agency for drought response and mitigation. Fortunately, there have been some statewide initiatives in certain areas that require drought contingency planning. For example, compliance with the Urban Water Management Planning Act is voluntary, but the drought contingency planning requirements are necessary to apply for loan and grant programs related to drought emergencies. This section focuses on response and mitigation efforts for urban, agricultural, environmental water uses, the specialized needs of remote communities, and potential help with statewide drought supply.

### 4.1 General Response

The ICG will initiate general responses to specific drought impacts. These efforts would begin in Phase 2, or the moderate stage, of a drought. The ICG will:

- Respond to drought impacts, in accordance with local needs, report unmet needs, and request assistance through appropriate local departments and agencies (to include working groups);
- Request assistance from appropriate State and federal agencies, when needs cannot be met locally;
- Address drought-related problems through normally established program activities and cooperate with lead response agencies upon their designation;
- Act as lead drought response agency when activated, and take action within assigned sectors of responsibility;
- Consider and recommend water conservation practices to lead agencies;
- Provide direction and integration of effort to all agencies concerned with drought response within assigned sector or responsibility, utilizing normal programs and resources available; and
- Develop, coordinate, and recommend solutions to drought-related impact problems involving:
  - Interdepartmental or outside support (possible State and federal Declaration of Emergency). This could also include recommending the appointment of an ICG member to a regional or State coordination group; and
  - Contacts with local State legislators regarding the need for State legislative actions, to include requests for funding.

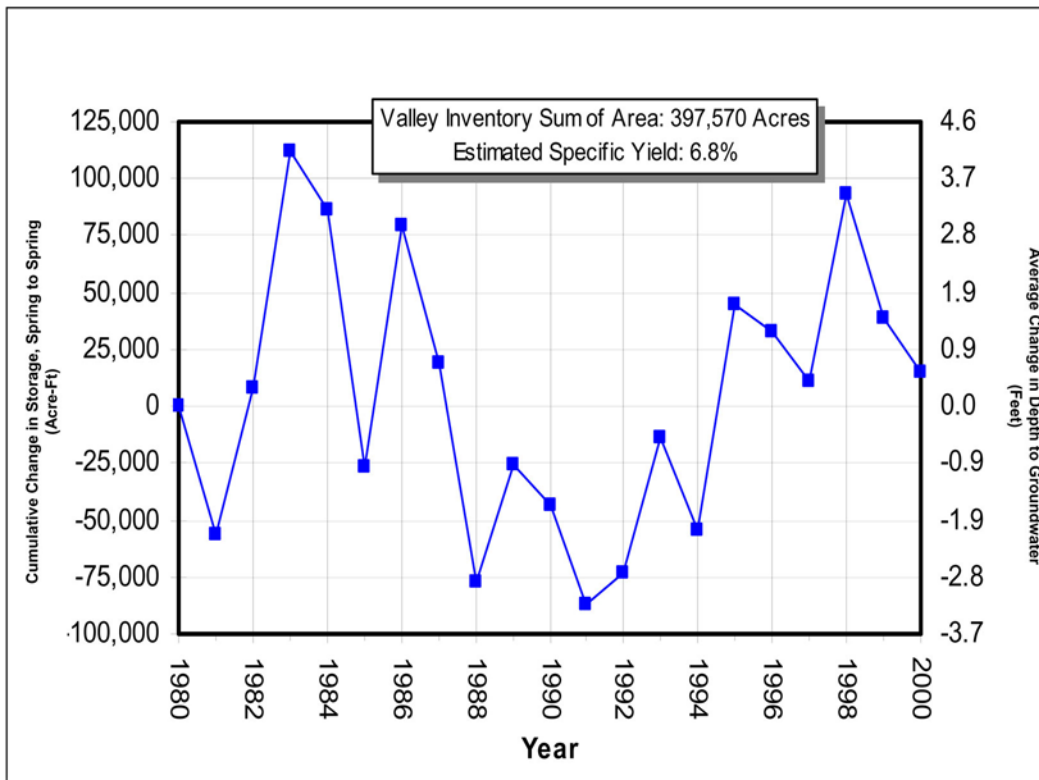
The ICG will form specific working groups as necessary in Phase 3, or the severe stage, of a drought.

## **4.2 Agricultural Response and Mitigation**

To respond to agricultural drought impacts, the ICG itself or through its working groups will:

- Provide coordination and liaison with U.S. Department of Agriculture agencies, State agencies, local government, and agricultural industry groups;
- Review guidelines and procedures;
- Collect and evaluate impact data;
- Assess current and potential severity of impacts;
- Make projections for various scenarios;
- Analyze barriers and needs to meet projected threats;
- Identify sources of assistance;
- Recommend response levels and activities;
- Estimate and report on costs of needed augmentation activities;
- Maintain supporting data and records of activities;
- Review drought reporting in relationship to current and /or potential threats;
- Inventory additional or special resource availability, costs, and procedures for utilization;
- Identify key contact points with support service agencies and agricultural industries;
- Identify and describe response actions that are available;
- Project impacts of drought to the agricultural economy;
- Recommend response to drought impacts;
- Identify procedure for coordination between working groups; and
- Make requests and recommendations regarding needs to the Governor.

Many impacts on irrigated agriculture are mitigated by the strong surface water rights held by Butte County agricultural water purveyors. Almost all have pre-1914 water rights that are stronger than the more recent rights. For example, the Joint Districts in the south County have a contractual agreement with the California Department of Water Resources (DWR), wherein they can only be cut back to 50 percent of their normal deliveries once in a seven-year period. In most areas of the county, there are sufficient groundwater supplies to mitigate losses of surface water during even a severe drought period. The year to year average *change* in depth to groundwater and change in storage between 1980 and 2000 are shown in Figure 4-1.



Sources: Department of Water Resources

**Figure 4-1**  
**Changes in Groundwater Storage**

The Butte County Inventory and Analysis showed that certain agricultural areas, particularly in the southwest portion of the county, lacked sufficient infrastructure to effectively use groundwater resources. The primary reason is there are not enough wells to produce the required amount of groundwater. Table 4-1 summarizes drought year water shortages.

<b>Table 4-1 Drought Year Water Shortages</b>			
<b>Inventory Unit</b>	<b>Sub-Unit</b>	<b>Shortage (TAF)</b>	<b>Total Demand (TAF)</b>
East Butte	Biggs-West Gridley	37.4	208.2
	Butte	13.5	111.5
	Butte Sink	3.1	52.2
	Cherokee	3.2	31.9
	Richvale	33.6	252.9
	<b>Total</b>	<b>90.8</b>	<b>655.7</b>
Foothill	Cohasset	0.1	0.5
	Ridge	1.2	13.1
	<b>Total</b>	<b>1.3</b>	<b>13.6</b>
<b>Total</b>		<b>92.1</b>	<b>669.3</b>

It is important to note that the drought scenario described in the Butte County Inventory and Analysis was for a single drought year that was more severe than 1977. The severity was increased by assuming higher evapotranspiration rates because 1977 had a cooler than normal spring and summer. For a seven-year drought scenario, as described in Section 1, the situation would be much worse. In addition, there were many rangelands that suffered losses early on.

During the drought of the late 1980s and early 1990s, and even more recently, there were initial impacts to agriculture. A State of Emergency was declared to deal with losses to dry-land farms and ranches. Having an effective drought plan in place can help manage even severe drought conditions. Local landowners can now work with the newly formed Butte County Resource Conservation District (RCD), and the local office of the federal Natural Resource Conservation Service (NRCS) to develop a conservation plan. The plan should also include a drought contingency element, which is keyed to the County's monitoring effort.

The NRCS and the RCD can suggest mitigation measures that may be included in a drought contingency plan. Table 4-2 illustrates potential measures. Another, readily available source of drought management information is the office of the Butte County Farm Advisor. The University of California Cooperative Extension developed a number of drought tips in cooperation with the NRCS and DWR. Table 4-3 lists available drought tips.

<b>Table 4-2 Drought Planning Mitigation Measures</b>	
<b>Management Category</b>	<b>Mitigation Measure</b>
Water	Evaluate appropriate irrigation system types that will help reduce evaporation, percolation, and runoff
	Examine ways to make the existing irrigation system more efficient and easy to maintain
	Build an emergency water storage system
	Build a tail-water return system
	Store water in water supply and drainage ditches
	Install water measurement devices to track water use
	Drill wells or deepen existing ones to tap deeper groundwater aquifers
Land	Use conservation tillage to increase soil moisture and reduce evaporation
	Use conservation practices that reduce runoff and increase infiltration
	Closely monitor soil moisture using the “feel” method at a minimum
	Contract early for supplemental feed and examine alternate feed sources
Crop	Examine and revise schedules for culling herds
	Consider more drought tolerant crops if feasible
	Consider new crop rotations if feasible
	Evaluate other cropping systems that require less water if feasible
	Practice stress management of orchards or remove older, less productive trees if possible

<b>Table 4-3 Drought Tips Publications*</b>	
1.	Drought Related Toxicoses in Cattle
2.	Leaching of Salts
3.	Water Quality Guidelines for Vegetable and Row Crops
4.	Water Quality Guidelines for Trees and Vines
5.	Water Balance Irrigation Scheduling Using CIMIS ET
6.	Furrow Irrigation
7.	Sprinkler Irrigation
8.	Irrigation Water Management Made Simple
9.	Assessing Water Quality for Livestock Under Drought Conditions
10.	Reclaiming Sodic and Saline/Sodic Soils
11.	Citrus Irrigation Scheduling During a Drought
12.	Field Use of Tensiometers
13.	Deciding How Much to Plant During a Drought
14.	Irrigating Crops Efficiently With Sprinklers
15.	How Much Water Are You Applying With Your Low Volume Irrigation System?

\*Should be available from DWR District Offices, local Farm Advisor’s, and NRCS offices.

In addition, Appendix A includes two of the better drought mitigation articles on range management from the Animal and Range Sciences, Extension Service of Montana State University and Texas A&M.

### **4.3 Urban Response and Mitigation**

The local urban water supplier manages most residential, commercial, and industrial drought responses. Local urban water suppliers that deliver over 3,000 acre-feet of water, or who have over 3,000 connections, are required to prepare urban water management plans under Section 10610 et seq. of the California Water Code (CWC). This CWC section, however, does not cover individuals and businesses that supply their own groundwater. Further, Butte County is not required to develop an urban water management plan, because the County delivers only 1,200 acre-feet of water to retail agencies. Section 10632 of the CWC states:

*The plan shall provide an urban water shortage contingency analysis, which includes each of the following elements which are within the authority of the urban water supplier:*

- a) Stages of actions to be undertaken;*
- b) An estimate of water requirements;*
- c) Actions to be undertaken;*
- d) Additional mandatory prohibitions;*
- e) Consumption reduction methods;*
- f) Penalties or charges for excessive use;*
- g) Analysis of the impacts;*
- h) A draft water shortage contingency resolution; and*
- i) A mechanism for determining actual reductions.*

Appendix B includes the entire text of the urban water management sections of the CWC.

DWR has developed water demand reduction goals in its model urban water management plan (new Albion 2000 Urban Water Management Plan, January 21, 2000). Appendix C includes the sections of the model plan relating to drought contingency planning. The model plan suggests four action stages that can be adapted to the three-phase approach outlined in this plan. Table 4-4 relates the DWR water shortage stages to the Drought Plan phases.

<b>Table 4-4 Water Shortage Stages and Reduction Goals</b>				
<b>Shortage Condition</b>	<b>Stage</b>	<b>Phase</b>	<b>Customer Reduction Goal</b>	<b>Type of Demand Reduction</b>
Less than 15%	I	2	15%	Voluntary
15 – 25%	II	2	25%	Voluntary
25 – 35%	III	3	35%	Mandatory
35 – 50%	IV	3	50%	Mandatory

The various stages will be implemented in cooperation with the DTF and ICG as the monitoring information is evaluated. The normally considered order of priority for potable water use is as follows:

1. Minimum health and safety standards for interior water use in residential and commercial facilities (hospitals, rest homes, etc.), fire, and public safety;
2. Commercial, industrial, and governmental facility operations where to maintain jobs and economic base (does not include landscapes);
3. Existing landscaping; and
4. New customers.

Chapter 19, Section 20, of the Butte County Code specifies that “gray water” may be used for on-site plant irrigation where the Board of Supervisors finds by resolution that 1) a critical water shortage exists in a specified year, and 2) strict conservation measures are necessary in said areas. “Gray water” is liquid household waste associated with the kitchen sink, laundry, bathtub, shower and wash basin. “Gray water” excludes toilet and urinal waters.

## **4.4 Environmental Response and Mitigation**

The National Drought Policy Commission’s report of March 2000 highlighted the devastating impacts drought can have on aquatic and terrestrial environmental resources. Aquatic ecosystems are exceptionally vulnerable to drought-induced reductions in stream flows. Drought conditions also place stress on terrestrial wildlife populations. Habitat quality and quantity gradually decline from lack of moisture, increasing the competition for limited resources. Wildlife species eventually suffer from lack of drinking water, forage, and cover resulting in heat stress.

The biotic impacts of drought are particularly acute for threatened, endangered, and sensitive species of fish and wildlife that are characteristically found in low population densities. In many cases, such species have already encountered damage to or destruction of their natural environments because of factors such as suburban sprawl, conversion of land to agricultural or industrial uses, and construction of large dams or other impoundments. During a Phase 2 drought emergency the ICG can activate an environmental working group or work with a regional group to:

- Assess short- and long-term impacts to public land;
- Recommend/estimate costs of implementing program;
- Determine reporting needs;
- Evaluate impact on water rights/water releases;
- Assess alternatives to in-stream flow;
- Assess fish/fishery resources;
- Assess fish and wildlife needs;
- Determine susceptibility to dewatering;
- Establish intergovernmental dialogue regarding wildlife;
- Identify major vulnerable areas of concern; and
- Monitor water quality to determine effects on fish and wildlife.

The environmental working group will also consider the response actions in cooperation with resource agencies to:

- Evaluate in-stream rights/programs to allow in-stream flow;
- Cooperate with State and federal drought assistance programs;
- Identify appropriate grant and loan programs;
- Evaluate deprivation of forage and water quality;
- Encourage use of water diversions that will be more compatible with wildlife;
- Recommend the installation of temporary gauges to monitor stream flow;
- Evaluate hatchery water delivery system to solve water quality problems;
- Provide food and water for drought-stressed wildlife; and
- Evaluate priorities/new compliance dates for environmental regulations.

The environmental working group can suggest various mitigation programs as follows:

- Help develop policy to increase/protect in-stream flows/wetlands;



- Help develop plans to minimize fish and wildlife impacts;
- Identify critical facilities and habitats;
- Cost-share improvements in fisheries/habitat;
- Develop alternative water supplies for critical habitats where feasible;
- Investigate effects of alternative hunting seasons;
- Monitor stream dewatering/fish habitats and effects of stream flow; and
- Cooperate with regional drought action reporting system if available.

Appendix D includes a Utah Division of Wildlife Resources paper discussing drought needs for the environment. Butte County's response to environmental degradation during a drought will be significant because of the abundance of wildlife and wildlife habitat that exists naturally and in association with agriculture.

## **4.5 Rural Communities Response and Mitigation**

In November 1987, DWR Northern District Office in Red Bluff, identified some specific drought issues for the communities of Berry Creek, Cherokee, Cohasset, and within the Lime Saddle Community Services District. Currently, the DWR Drought Preparedness Office has provided workshops for assisting individual well owners and small communities develop options for enhancing water supplies.

### **Berry Creek**

Berry Creek dried up during the one-year drought of 1976-1977. An alternative water supply was available by using water from Brown Creek.

### **Cherokee**

There were over 60 groundwater wells in the Cherokee community. The number of wells had already stressed the sustainable supply of groundwater in 1987 at the time of the report. There had been instances of water hauling during periods of drought conditions.

### **Cohasset**

Water shortages during drought conditions have been experienced in the past. However, there is the ability to use part of one of the 15,000-gallon storage tanks as an emergency source of water.

### **Lime Saddle**

There are landowners in the Lime Saddle area existing on marginal groundwater supplies. However, this situation will be improving in the near future, as the Del Oro Water Company is now in the environmental review and design phase of a Lime

Saddle pipeline. The project will pump water from Lake Oroville to an intertie with Paradise Irrigation District.

The Governor's Drought Advisory Panel produced recommendations in the Critical Water Shortage Contingency Plan (December 2000). Past droughts have demonstrated that those most impacted early in a drought were remote communities (like those noted above) and individuals relying on marginal groundwater resources. The report made recommendations relating to assistance to small water systems and homeowners in rural counties. The recommendations focused largely on technical assistance and information programs to be carried out by DWR. However, the panel did recognize that many problems were related to the variability in groundwater supply reliability in fractured rock aquifers. The panel did recommend that legislation was necessary to ensure that sellers of single-family homes served by private wells describe the water source and potentials for shortages in drought years.