

# Section 1

## Introduction

Many people consider drought to be a rare and random event; however, it is a normal, recurrent, and insidious climatic event. Although it has many different definitions, a drought usually originates from a deficiency of precipitation over a season or more. Drought is not solely a physical phenomenon; it affects society's water supply and water demand associated with agricultural, urban, and environmental uses.

The Butte County Department of Water and Resource Conservation (DW&RC) is developing the Butte County Drought Preparedness and Mitigation Plan (Drought Plan) to protect the County from the effects of a drought. The Drought Plan includes:

- Butte County's drought background (Section 1);
- An institutional framework to approach drought (Section 2);
- A monitoring plan (Section 3);
- A response and mitigation plan (Section 4); and
- A discussion of water transfers during a drought (Section 5).

### 1.1 Purpose

The DW&RC developed an Integrated Water Resources Program (Program) that will recommend actions for consideration by the Butte County Water Commission and Board of Supervisors. Development of the Program focuses on actions that lead to a long-term sustainable supply of water during all hydrologic conditions. To facilitate water resource planning, it is necessary to understand the effects of and prepare for drought.

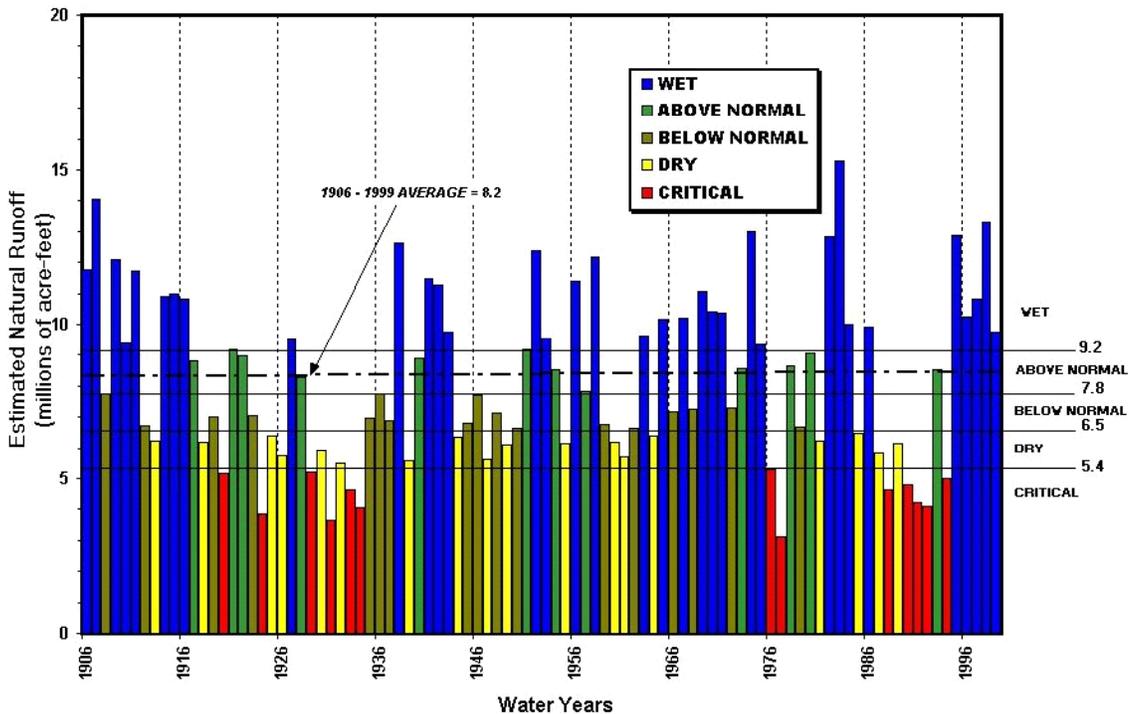
The purpose of the Drought Plan is to provide an efficient and systematic process for Butte County that results in a short- and long-term reduction in drought impacts to the citizens, economy, and environment in Butte County. In addition, the Drought Plan will identify mitigation that can help with the reliability of water supply for other California communities when resources are available.

### 1.2 Background

Drought conditions in Butte County have reoccurred numerous times throughout history. Table 1-1 summarizes the time and duration of droughts in Butte County during the twentieth century.

<b>Drought Years</b>	<b>Duration (Years)</b>
1912-1913	1
1918-1920	2
1923-1924	1
1929-1934	5
1947-1950	3
1959-1961	3
1976-1977	1
1987-1992	5
1993-1994	1

Droughts exceeding three years occurred two times during the 1900s. Figure 1-1 presents hydrologic year types from 1906 through 2000 based on the Sacramento 40-40-30 Water Supply Index. Severe droughts in Butte County occurred during periods of extended dry and critical years.



(Source: Department of Water Resources)

**Figure 1-1  
Sacramento River 40-40-30 Water Supply Index**

Because of the minimal data available for hydrologic conditions prior to 1900, it is difficult to determine prior drought occurrences. However, scientists have used various other methods to document severe droughts in early California history. Scientific evidence shows the reoccurrence of drought throughout history and confirms the possibility for a future drought. For example, trees appear to have grown 6000 years ago in areas now submerged under Lake Tahoe, suggesting a drier climate. Other tree ring dating studies suggest a sustained drought during the mid-1500s.

Another early drought indicator is the presence and disappearance of civilization. For example, the Anasazi civilization flourished (in what is called the Medieval Warm Period from 900-1300) when monsoonal rains supported its irrigations systems. In contrast, the Anasazi culture declined and disappeared during the Little Ice Age (1300-1800), which is attributed in part to drought conditions that made irrigated agriculture infeasible.

Given the limited knowledge of the fairly recent past, it is difficult to understand the full ramifications of drought conditions. The County should plan for a worst-case scenario based on a 1987 to 1994 drought, which would have occurred if not for an above normal water year in 1993.

### **1.3 Drought Impacts**

Drought is not initially recognized as a problem because it normally originates in what is considered good weather, which typically includes a dry late spring and summer in Mediterranean climates, such as in California. This is particularly true in Northern California where drought impacts are delayed for most of the population by the wealth of stored surface and ground water.

The drought complications normally appear more than a year after a drought begins. In most areas of California, ranchers that rely on rainfall to support forage for their livestock are the earliest and most affected by drought. Even below normal water years could affect ranchers depending on the timing and duration of precipitation events. In fact, the earliest indicator of drought in Butte County has been a "State of Emergency" declared for economic impact on livestock industries.

It is difficult to quantitatively assess drought impacts to Butte County because not many county-specific studies have been conducted. Some factors to consider include: the impacts of fallowed agricultural land, habitat loss and associated effects on wildlife, and the drawdown of the groundwater table. The most direct and likely most difficult drought impact to quantify is to local economies, especially agricultural economies. The State has conducted some empirical studies on the economic effects of fallowed lands with regard to water purchased by the State's Water Bank; but these studies do not quantitatively address the situation in Butte County. It can be assumed,

however, that the loss of production in one sector of the economy would affect other sectors.

The drawdown of the groundwater table is one factor that has been recognized to occur during repeated dry years. Lowering of groundwater levels results in the need to deepen wells, which subsequently lead to increased pumping costs. These costs are a major consideration for residents relying on domestic wells and agricultural producers that irrigate with groundwater and/or use it for frost protection.

## **1.4 Drought Water Supply**

Northern Sacramento Valley counties, including Butte County, generally have sufficient groundwater and surface water supplies to mitigate even the severest droughts of the past century. Many other areas of the State, however, also place demands on these water resources during severe drought. For example, Northern California agencies, including those from Butte County, were major participants in the Governor's Drought Water Bank of 1991, 1992 and 1994.