DROUGHT

PUBLIC FACT SHEET

NATIONAL WEATHER SERVICE — AUGUST 2006

What is Drought?

Drought is a deficiency in precipitation over an extended period, usually a season or more, resulting in a water shortage causing adverse impacts on vegetation, animals, and/or people. It is a normal, recurrent feature of climate that occurs in virtually all climate zones, from very wet to very dry. Drought is a temporary aberration from normal climatic conditions, thus it can vary significantly from one region to another. Drought is different than aridity, which is a permanent feature of climate in regions where low precipitation is the norm, as in a desert.

Human factors, such as water demand and water management, can exacerbate the impact that drought has on a region. Because of the interplay between a natural drought event and various human factors, drought means different things to different people. In practice, drought is defined in a number of ways that reflect various perspectives and interests. Below are three commonly used definitions:

Meteorological Drought

Meteorological drought is usually defined based on the degree of dryness (in comparison to some "normal" or average) and the duration of the dry period. Drought onset generally occurs with a meteorological drought.

Agricultural Drought

Agricultural drought links various characteristics of meteorological (or hydrological) drought to agricultural impacts, focusing on precipitation shortages, soil water deficits, reduced ground water or reservoir levels needed for irrigation, and so forth.

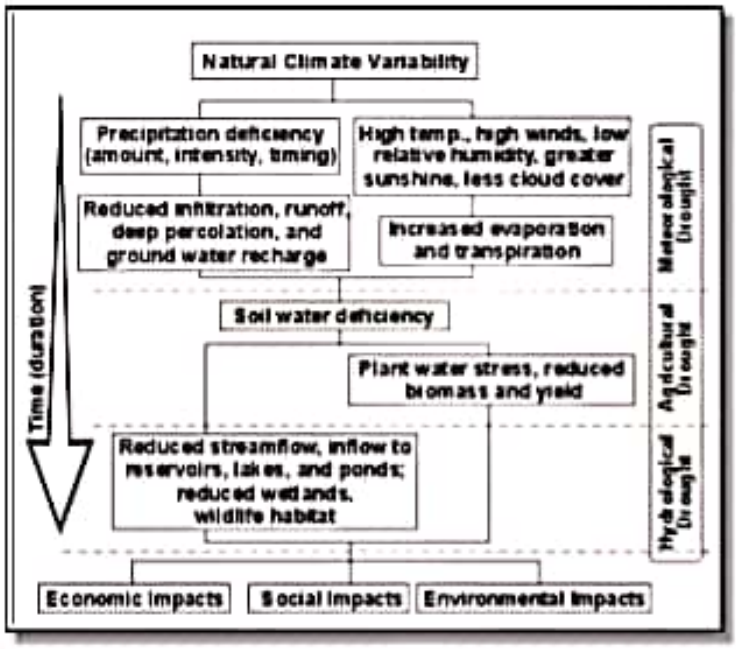
Hydrological Drought

Hydrological drought usually occurs following periods of extended precipitation shortfalls that impact water supply (i.e., streamflow, reservoir and lake levels, ground water), potentially resulting in significant societal impacts. Because regions are interconnected by hydrologic systems, the impact of meteorological drought may extend well beyond the borders of the precipitation-deficient area.

Why is Drought Important?

The U.S. is vulnerable to the social, economic, and environmental impacts of drought. The over 100-year weather record of the U.S. indicates that there were three or four major drought events during that period. Two of these, the 1930's Dust Bowl drought and the 1950's drought, each lasted five to seven years and covered large areas of the continental U.S.

Droughts are among the most costly weather-related events, in terms of economics and loss of life. During the 25-year period from 1980 to 2005,



Flow chart illustrating the progression of drought, and the relationship between Meteorological, Agricultural, and Hydrological Drought. Economic, social and environmental impacts are shown at the bottom of the chart, independent of the time scale, indicating that such impacts can occur at any stage during a drought. (National Drought Mitigation Center, http://www.drought.unl.edu/whatis/concept.htm)

Before a Drought

Strategies for drought preparedness focus mainly on water conservation. Make these practices a part of your daily life and help preserve this essential resource.

Indoor Water Conservation Tips Prior to a Drought

GENERAL

- Never pour water down the drain when there may be another use for it. For example, use it to water your indoor plants or garden.
- Repair dripping faucets by replacing washers. One drop per second wastes 2,700 gallons of water per year.
- Check all plumbing for leaks and have any leaks repaired by a plumber.
- Retrofit all household faucets by installing aerators with flow restrictors.
- Install an instant hot water heater on your sink.
- Insulate your water pipes to reduce heat loss and prevent them from breaking.
- Install a water-softening system only when the minerals in the water would damage your pipes. Turn the softener off while on vacation.
- Choose appliances that are more energy and water efficient.

BATHROOM

- Consider purchasing a low-volume toilet that uses less than half the water of older models. Note: In many areas, low-volume units are required by law.
- Install a toilet displacement device to cut down on the amount of water needed to flush. Place a one-gallon plastic jug of water into the tank to displace toilet flow (do not use a brick, it may dissolve and loose pieces may cause damage to the internal parts). Be sure installation does not interfere with the operating parts.
- Replace your showerhead with an ultra-low-flow version.

KITCHEN

- Start a compost pile as an alternate method of disposing of food waste or simply dispose of food in the garbage. (Kitchen sink disposals require a lot of water to operate properly).

Outdoor Water Conservation Tips

TYPES OF DROUGHT IMPACTS

Drought affects all parts of our environment and our communities. The many different drought impacts are often grouped as “economic,” “environmental,” and “social” impacts. All of these impacts must be considered in planning for and responding to drought conditions.

Let's take a closer look at all kinds of drought impacts.

Economic Impacts

Economic impacts are those impacts of drought that cost people (or businesses) money. Here are just a few different examples of economic impacts:

- Farmers may lose money if a drought destroys their crops.
- If a farmer's water supply is too low, the farmer may have to spend more money on irrigation or to drill new wells.
- Ranchers may have to spend more money on feed and water for their animals.
- Businesses that depend on farmi

Environmental Impacts

Drought also affects the environment in many different ways. Plants and animals depend on water, just like people. When a drought occurs, their food supply can shrink and their habitat can be damaged. Sometimes the damage is only temporary and their habitat and food supply return to normal when the drought is over. But sometimes drought's impact on the environment can last a long time, maybe forever. Examples of environmental impacts include:

- Losses or destruction of fish and wildlife habitat
- Lack of food and drinking water for wild animals
- Increase in disease in wild animals, because of reduced food and water supplies
- Migration of wildlife
- Increased stress on endangered species or even extinction
- Lower water levels in reservoirs, lakes, and ponds
- Loss of wetlands
- More wildfires
- Wind and water erosion of soils
- Poor soil quality

Social Impacts

Social impacts of drought are ways that drought affects people's health and safety. Social impacts include public safety, health, conflicts between people when there isn't enough water to go around, and changes in lifestyle. Examples of social impacts include:

- Anxiety or depression about economic losses caused by drought
- Health problems related to low water flows and poor water quality
- Health problems related to dust
- Loss of human life
- Threat to public safety from an increased number of forest and range fires
- Reduced incomes
- People may have to move from farms into cities, or from one city to another
- Fewer recreational activities

Outdoor Water Conservation Tips Prior to a Drought

GENERAL

- Check your well pump periodically. If the automatic pump turns on and off while water is not being used, you have a leak.
- Plant native and/or drought-tolerant grasses, ground covers, shrubs, and trees. Once established, plants adapted to your local climate do not need water as frequently and usually will survive a dry period without watering. Small plants require less water to become established. Group plants together based on similar water needs.
- Install irrigation devices that are the most water efficient for each use, such as micro and drip irrigation, and soaker hoses.
- Use mulch to retain moisture in the soil. Mulch also helps control weeds that compete with landscape plants for water.
- Avoid purchasing recreational water toys that require a constant stream of water.
- Avoid installing ornamental water features (such as fountains) unless they use re-circulated water.
- Consider rainwater harvesting where practical.
- Contact your local water provider for information and assistance.

During a Drought

Always observe state and local restrictions on water use during a drought. If restricted, for example, do not water your lawn, wash your car, or other non-essential uses, to help ensure there is enough water for essential uses. Contact your state or local government for current information and suggestions.

Indoor Water Conservation Tips While in a Drought

BATHROOM

- Avoid flushing the toilet unnecessarily. Dispose of tissues, insects, and other similar waste in the trash rather than the toilet.
- Avoid taking baths—take short showers—turn on water only to get wet and lather and then again to rinse off.
- Avoid letting the water run while brushing your teeth, washing your face or shaving.
- Place a bucket in the shower to catch excess water for watering plants.

KITCHEN

- Operate automatic dishwashers only when they are fully loaded. Use the "light wash" feature, if available, to use less water.
- Hand wash dishes by filling two containers—one with soapy water and the other with rinse water containing a small amount of chlorine bleach.
- Clean vegetables in a pan filled with water rather than running water from the tap.
- Store drinking water in the refrigerator. Do not let the tap run while you are waiting for water to cool.
- Avoid wasting water waiting for it to get hot. Capture it for other uses such as plant watering or heat it on the stove or in a microwave.
- Avoid rinsing dishes before placing them in the dishwasher; just remove large particles of food. (Most dishwashers can clean soiled dishes very well, so dishes do not have to be rinsed before washing)
- Avoid using running water to thaw meat or other frozen foods. Defrost food overnight in the refrigerator or use the defrost setting on your microwave oven.

LAUNDRY

- Operate automatic clothes washers only when they are fully loaded or set the water level for the size of your load.

When we have a drought, it can affect our communities and our environment in many different ways. Everything in the environment is connected, just like everything in our communities is connected. Each different way that drought affects us is what we call an impact of drought.

Drought affects our lives in many different ways because water is such an important part of so many of our activities. We need water to live, and animals and plants do too. We need water to grow the food we eat. We also use water for many different things in our lives, like washing dishes, cooking, bathing, and swimming or river rafting. Water is also used to help make the electricity we use to run the lights in our houses and the video games you may like to play. When we don't have enough water for these activities because of a drought, many people and many different things w affected in many different ways.

4. DROUGHT MITIGATION

Drought is a natural hazard, it has a slow onset, and it evolves over months or even years. It may affect a large region and causes little structural damage. The impacts of drought can be reduced through preparedness and mitigation.

The components of a drought preparedness and mitigation plan are the following:

- Prediction
- Monitoring
- Impact assessment
- Response.

Prediction can benefit from climate studies which use coupled ocean/atmosphere models, survey of snow packs, anomalous circulation patterns in the ocean and atmosphere, soil moisture, assimilation of remotely sensed data into numerical prediction models, and knowledge of stored water available for domestic, stock, and irrigation uses.

Monitoring exists in countries which use ground-based information such as rainfall, weather, crop conditions and water availability. Satellite observations complement data collected by ground systems. Satellites are necessary for the provision of synoptic, wide-area coverage.

Impact assessment is carried out on the basis of land-use type, persistence of stressed conditions, demographics and existing infrastructure, intensity and areal extent, and its effect on agricultural yield, public health, water quantity and quality, and building subsidence.

Response includes improved drought monitoring, better water and crop management, augmentation of water supplies with groundwater, increased public awareness and education, intensified watershed and local planning, reduction in water demand, and water conservation.

Drought preparedness and mitigation can be accomplished with the following practices: (1) soil and water conservation, and (2) herd management.

4.1 Soil and Water Conservation

Conservation practices minimize the disruption of the soil's structure, composition and natural biodiversity, thereby reducing erosion and soil degradation, surface runoff, and water pollution. The following are established practices of soil and water conservation:

- Crop rotation
- Contoured rowcrops
- Terracing
- Tillage practices
- Erosion-control structures
- Water retention and detention structures
- Windbreaks and shelterbelts
- Litter management
- Reclamation of salt-affected soil.

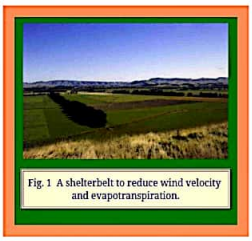


Fig. 1 A shelterbelt to reduce wind velocity and evapotranspiration.

Soil and water conservation can be approached through agronomic and engineering measures. Agronomic measures include contour farming, off-season tillage, deep tillage, mulching and providing vegetative barriers on the contour. These measures prevent soil erosion and increase soil moisture.

Engineering measures differ with location, slope of the land, soil type, and amount and intensity of rainfall. Measures commonly used are the following:

- **Contour bunds, trenches and stone walls**

  These features prevent soil erosion and obstruct the flow of runoff. The retained water increases soil moisture and recharges the groundwater.

- **Check dams and other gully-plugging structures**

  Check dams are temporary structures constructed with locally available materials. Types of check dams are the brush-wood dam (Fig. 2 a), the loose-rock dam (Fig. 2 b) and the woven-wire dam.

- **Percolation ponds**

  These features store water for livestock and recharge the groundwater. They are constructed by excavating a depression to form a small reservoir, or by constructing an embankment in a natural ravine or gully to form an impoundment.