



Water Audits and Drought Contingency Planning



Rural Community
Assistance Corporation
www.rcac.org

Mt. Shasta
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Drought Preparedness

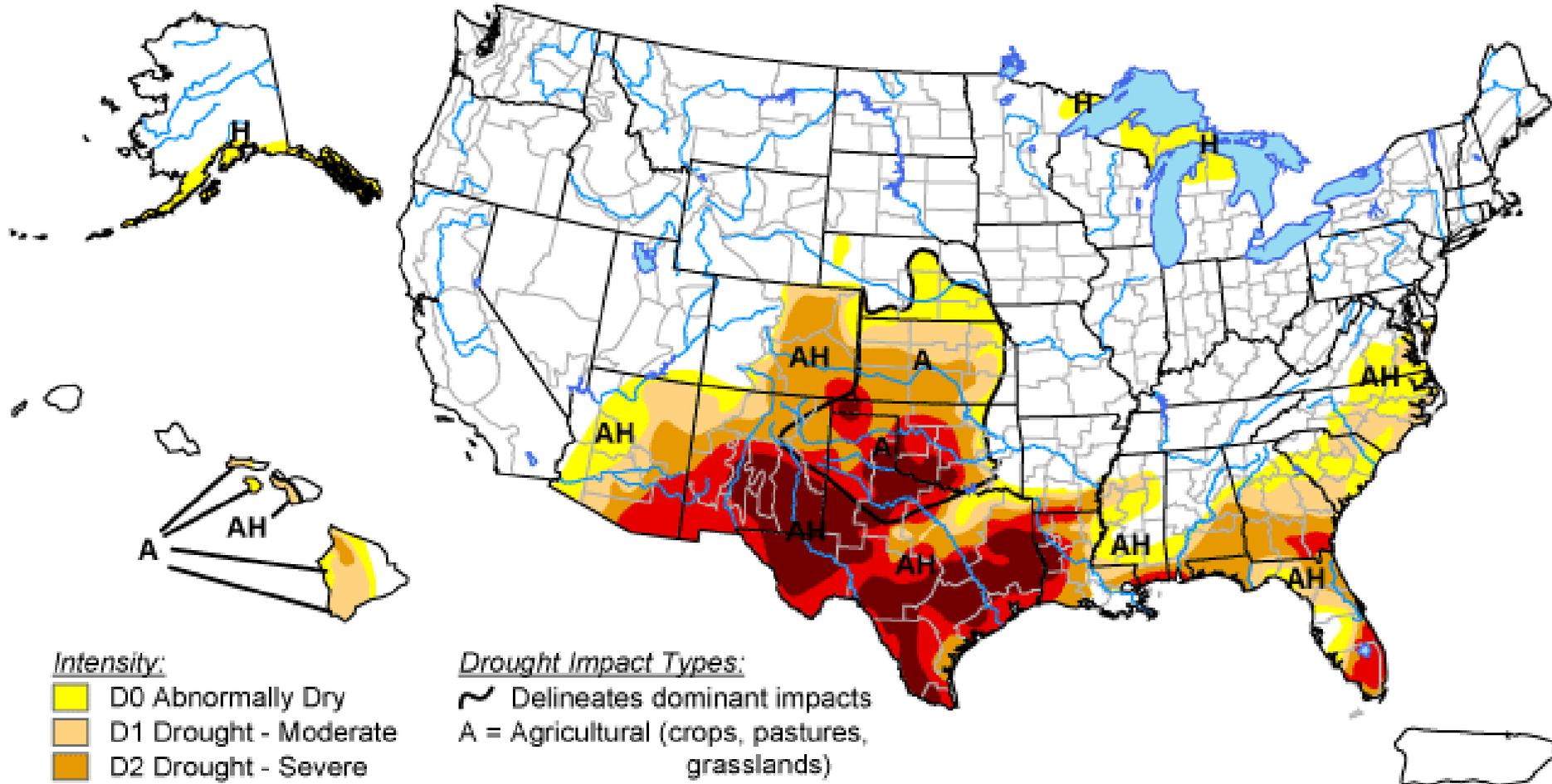
- ◆ Difference between conservation measures and drought measures
- ◆ Assessment of supply and demand
- ◆ Drought preparedness management plan



U.S. Drought Monitor

May 10, 2011

Valid 8 a.m. EDT



Intensity:

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

Drought Impact Types:

-  Delineates dominant impacts
- A = Agricultural (crops, pastures, grasslands)
- H = Hydrological (water)

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

<http://drought.unl.edu/dm>



Released Thursday, May 12, 2011
Author: Rich Tinker, NOAA/NWS/NCEP/CPC

Drought Preparedness

- ◆ Droughts are long-term
- ◆ Droughts occur slowly and recede slowly
- ◆ Drought conditions are directly relative to supply and demand



Drought Preparedness

- ◆ Conservation program measures should be implemented continually
- ◆ Drought measures are triggered by supply reduction
 - ▶ Depend on severity
 - ▶ Voluntary and enforced
- ◆ Possible drought impact mitigation measures should be considered

Drought Management Plan

◆ Seven steps

- ▶ 1. Obtain public input and involvement
- ▶ 2. Define goals and objectives
- ▶ 3. Assess water supply and demand conditions
- ▶ 4. Define drought indicators
- ▶ 5. Identify drought mitigation measures

Drought Management Plan

◆ Seven steps

- ▶ 6. Assess mitigation measures
- ▶ 7. Develop a drought index and management strategy



1. Public Involvement

- ◆ Need public “buy-in” for plan to be successful
- ◆ Create a task force or committee
- ◆ Major water users
- ◆ Other water agencies
- ◆ Civic groups
- ◆ Public agencies
 - ▶ Law Enforcement, Fire Dept., Parks Dept.

2. Define Goals and Objectives

- ◆ Which users can and should be restricted
- ◆ General or targeted restrictions
- ◆ Legal requirements
- ◆ Minimum flow requirements
- ◆ Reservoir conservation requirements
- ◆ Some users take priority over others (fire departments, hospitals)

3. Assess Supply and Demand

- ◆ Identify water supply sources
 - ▶ Who ultimately controls sources
 - ▶ Treatment infrastructure
- ◆ Determine the maximum yield of current sources

3. Assess Supply and Demand

- ◆ Determine total demand
 - ▶ Average and peak demand
 - ▶ Historic demand trends
 - ▶ Use by customer sector
 - ▶ Interior vs. Exterior use
 - ▶ Projected future demand
 - ▶ Environmental demand

3. Assess Supply and Demand

◆ Identify Local Conditions

- ▶ State Water Law
- ▶ Current Conservation Efforts
- ▶ Third-party effects on your groundwater

◆ Compare water demand with supply yield

◆ Forecast potential deficits



4. Define Drought Indicators

◆ Palmer Index

- ▶ Based on soil moisture supply and demand
- ▶ Long Term

◆ Reservoir Storage

- ▶ Reflects precipitation, surface runoff, and groundwater

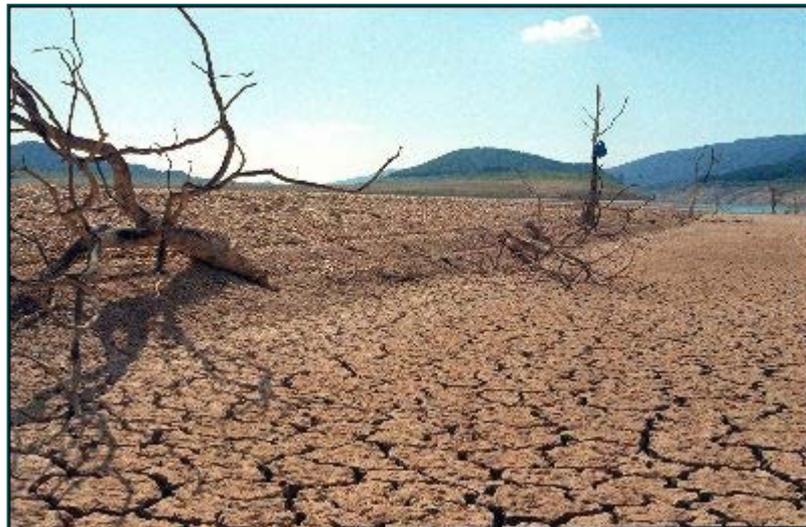
◆ Groundwater Levels

- ▶ Well drawdown resources for gauging groundwater levels

5. Identify Mitigation Measures

◆ Impact mitigation

- ▶ Water loss reduction (audit)
- ▶ Additional/alternative supply
- ▶ Additional storage (large scale)



5. Identify Mitigation Measures

- ◆ Public information and education
 - ▶ Bill stuffers/fliers
 - ▶ Advertisements
 - ▶ Press conferences
- ◆ Restrictions/bans on nonessential use
 - ▶ Ornamental use (fountains, ponds)
 - ▶ Pavement/street/car washing

5. Identify Mitigation Measures

◆ Pricing

- ▶ Excessive-use surcharges
- ▶ Drought surcharges

◆ Rationing (limit available supply)

◆ Local regulations/ordinances

- ▶ Excess-use penalties
- ▶ Criminal Penalties for noncompliance (fines)
- ▶ Interagency cooperation

6. Assess Mitigation Measures

- ◆ Anticipated water-use reduction
- ◆ Consumer acceptance
- ◆ Equity
- ◆ Cost
- ◆ Sustainability
- ◆ Legal/contractual issues
- ◆ History
- ◆ Ease of implementation

7. Develop Plan

- ◆ Adapt Drought Index and Management Strategy Template to suit your needs
- ◆ Use data and materials collected during assessment stages
 - ▶ Statistics
 - ▶ Maps
 - ▶ Graphics
 - ▶ Charts
 - ▶ Historical data

Table 1. Drought Preparedness Plan Summary

Water supply conditions	Drought stage	Objective	Response actions
Normal 0% Total Supply Reduction	Drought Stage Zero - Ongoing Conservation. Water waste prohibition in effect.	Public awareness	Normal actions
Slightly Restricted Water Supplies (below normal) Up to 15% Total Supply Reduction	Drought Stage 1 – Introductory Stage. Voluntary reductions in use	Initiate public awareness of predicted water shortage and encourage conservation	Encourage voluntary measures to decrease “normal” demand up to 15%
Moderately Restricted Water Supplies Up to 30% Total Supply Reduction	Drought Stage 2 – Voluntary Phase for water use reductions and potential subsequent Mandatory Phase with restrictions on use.	Increase public understanding of worsening water supply conditions, encourage voluntary conservation measures, and enforce some mandatory conservation measures	Encourage some voluntary measures and enforce mandatory measures and implement water rationing to decrease “normal” demand up to 30% Drought surcharge enacted (potential in-house trigger and board action)
Severely Restricted Water Supplies Up to 50% Total Supply Reduction	Drought Stage 3 – Mandatory restrictions (severe prohibitions) on use	Ensure that water use is limited to health and safety purposes	Enforce extensive restrictions on water use and implement water rationing to decrease demand up to 50% of “normal” demand

Implementing a Plan

◆ Formally adopt the Plan

- ▶ Approval of citizen/community task force
- ▶ Approval of local officials
- ▶ Approval of directors



Implementing a Plan

- ◆ Public information and education
 - ▶ Pick one person to deal with the media
 - ▶ Let water-users know where to ask questions
 - ▶ Staff booths at local events
 - ▶ Bill stuffers and fliers: drought fact sheet
 - ▶ Demonstrate conservation equipment
 - ▶ Provide updates

Implementing a Plan

- ◆ Enforce drought restrictions
 - ▶ City/County/State ordinances
 - ▶ Incentive Programs
 - Supply retrofit devices
 - Conservation kits
 - Provide rebates for water-saving appliances
 - ▶ Disincentive programs
 - Fees/penalties

Implementing a Plan

◆ Enforce drought restrictions

- ▶ Monitoring

◆ Reactive

- ▶ Respond to complaints made by other consumers

◆ Proactive

- ▶ Actively patrol and issue warnings/fines

Drought Preparedness

- ◆ Planning can help alleviate drought impact

