



# **DROUGHT TASK FORCE**

**2007 - 2008**

# DROUGHT TASK FORCE



- TDEC
- Agriculture
- TWRA
- ECD
- TEMA
- Tennessee Association of Utility Districts
- Tennessee Farm Bureau
- TVA
- NOAA National Weather Service
- U.S. Corps of Engineers
- U.S. Fish and Wildlife Service
- U.S. EPA

# MISSION

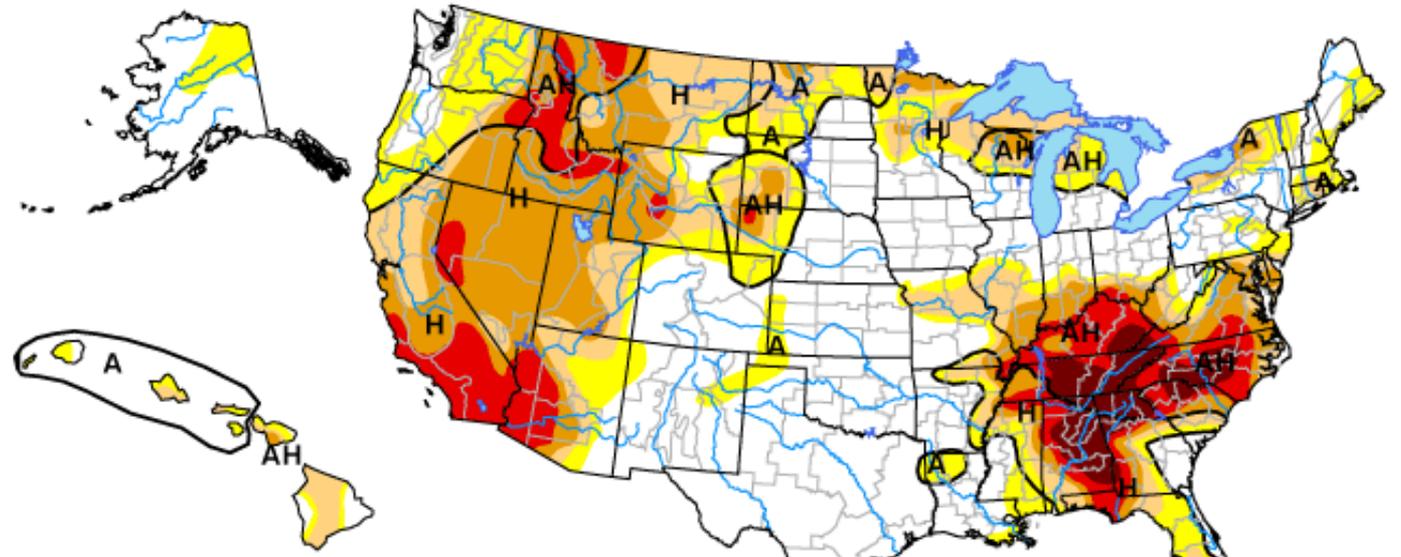
- **MAINTAIN SITUATIONAL AWARENESS — NO SURPRISES**
- **FACILITATE INFORMATION FLOW**
- **ANTICIPATE FUTURE DEVELOPMENTS**
- **DISCUSS TACTICAL ACTIONS BY TEMA AND OTHER AGENCIES**
- **MEET WEEKLY AT TEMA HQ**
- **WEEKLY SITREP ON TEMA'S WEBSITE**





# U.S. Drought Monitor

October 2, 2007  
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.*



**Released Thursday, October 4, 2007**

**Author: Jay Lawrimore/Liz Love-Brotak, NOAA/NESDIS/NCDC**

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



# U.S. Drought Monitor

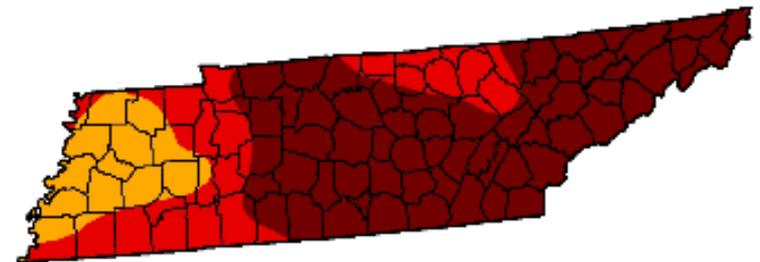
## Tennessee

October 9, 2007

Valid 7 a.m. EST

*Drought Conditions (Percent Area)*

	None	D0-D4	D1-D4	D2-D4	D3-D4	D4
Current	0.0	100.0	100.0	100.0	85.7	61.3
Last Week (10/02/2007 map)	0.0	100.0	100.0	100.0	85.7	61.3
3 Months Ago (07/17/2007 map)	0.0	100.0	99.2	93.9	56.6	5.7
Start of Calendar Year (01/02/2007 map)	37.7	62.3	0.0	0.0	0.0	0.0
Start of Water Year (10/02/2007 map)	0.0	100.0	100.0	100.0	85.7	61.3
One Year Ago (10/10/2006 map)	34.7	65.3	0.0	0.0	0.0	0.0



Intensity:



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

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



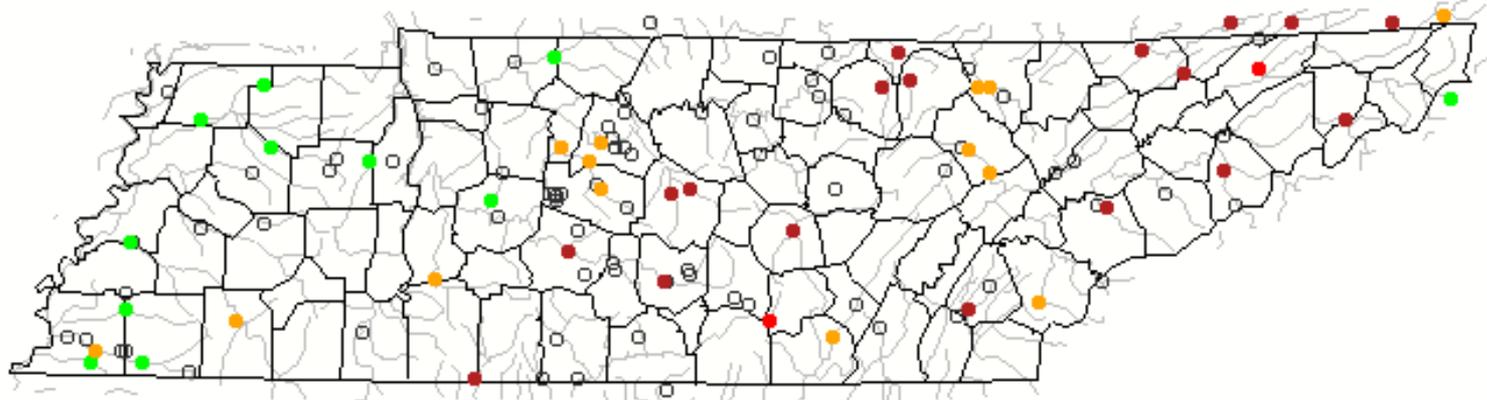
Released Thursday, October 11, 2007

Author: J. Lawrimore/L. Love-Brotak, NOAA/NESDIS/NCDC

# DAILY STREAM FLOW MONITORING



Tuesday, January 22, 2008 09:30ET



## Explanation - Percentile classes

Low	<10 Much below normal	10-24 Below normal	25-75 Normal	76-90 Above normal	>90 Much above normal	High	Not ranked

# Weekly List of Drought Impacted CWSs

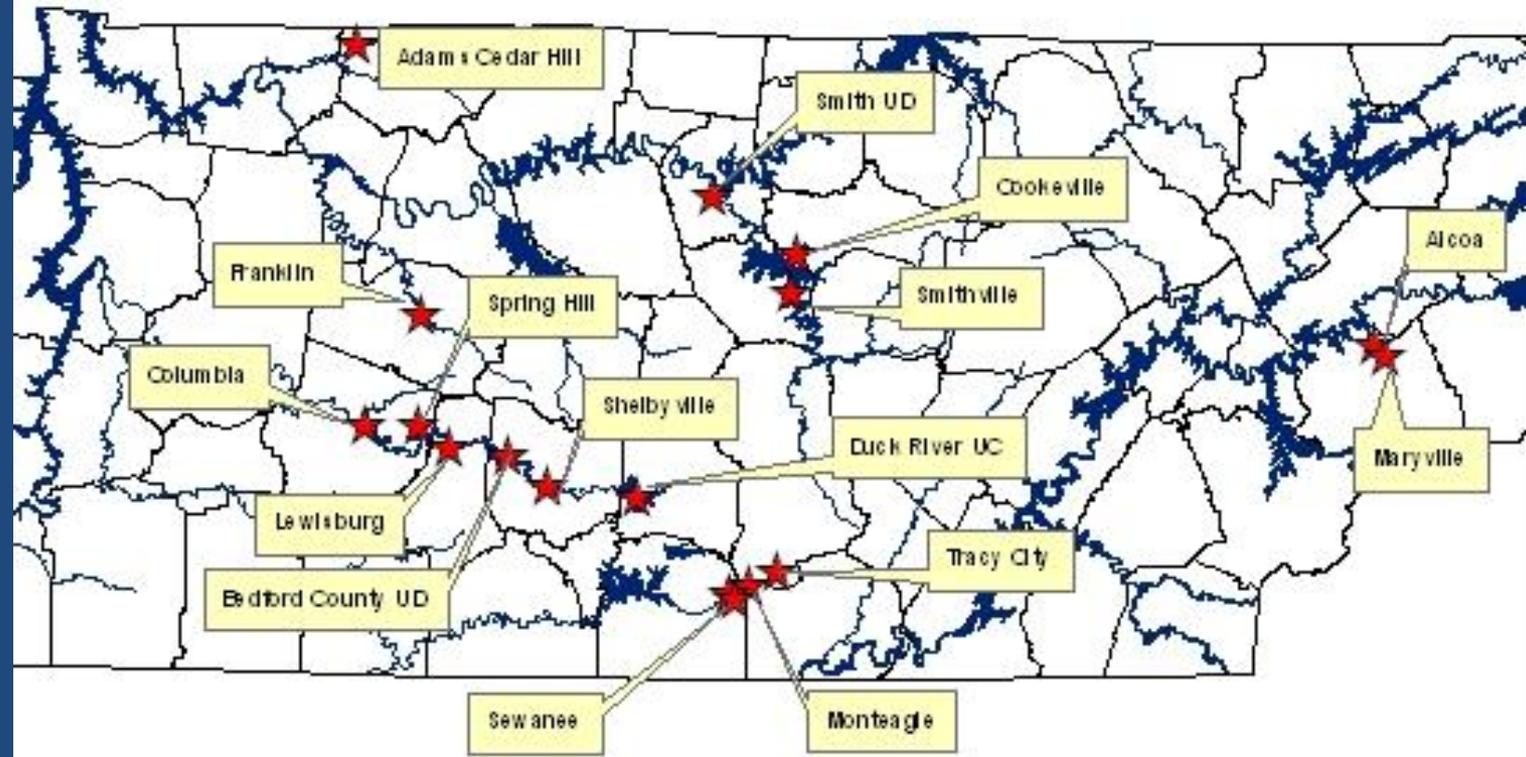


## TDEC's Weekly Report TEMA's Situation Report

SYSTEM NAME	COUNTY	WATER SOURCE	Prob-lem	Mea-sures	Population Served
Bedford Co UDs		Shelbyville WS	D	V	18,008
Shelbyville WS			D	V	21,932
Pikeville	Bledsoe	Wells	FN4	M	3,358
Alcoa	Blount	Little River	S	M	25,001
	Blount	Little River	S	M	34,064
Ocoee UD	Bradley	Spring (Nearby sinkhole development)			14,863
Jellico		Strip Mine	D	M	4,458
Woodbury WS	Cannon		S	V	8,612



# Drought Impact Issues



# NORMANDY STAKEHOLDERS



# LITTLE RIVER BLOUNT CO.





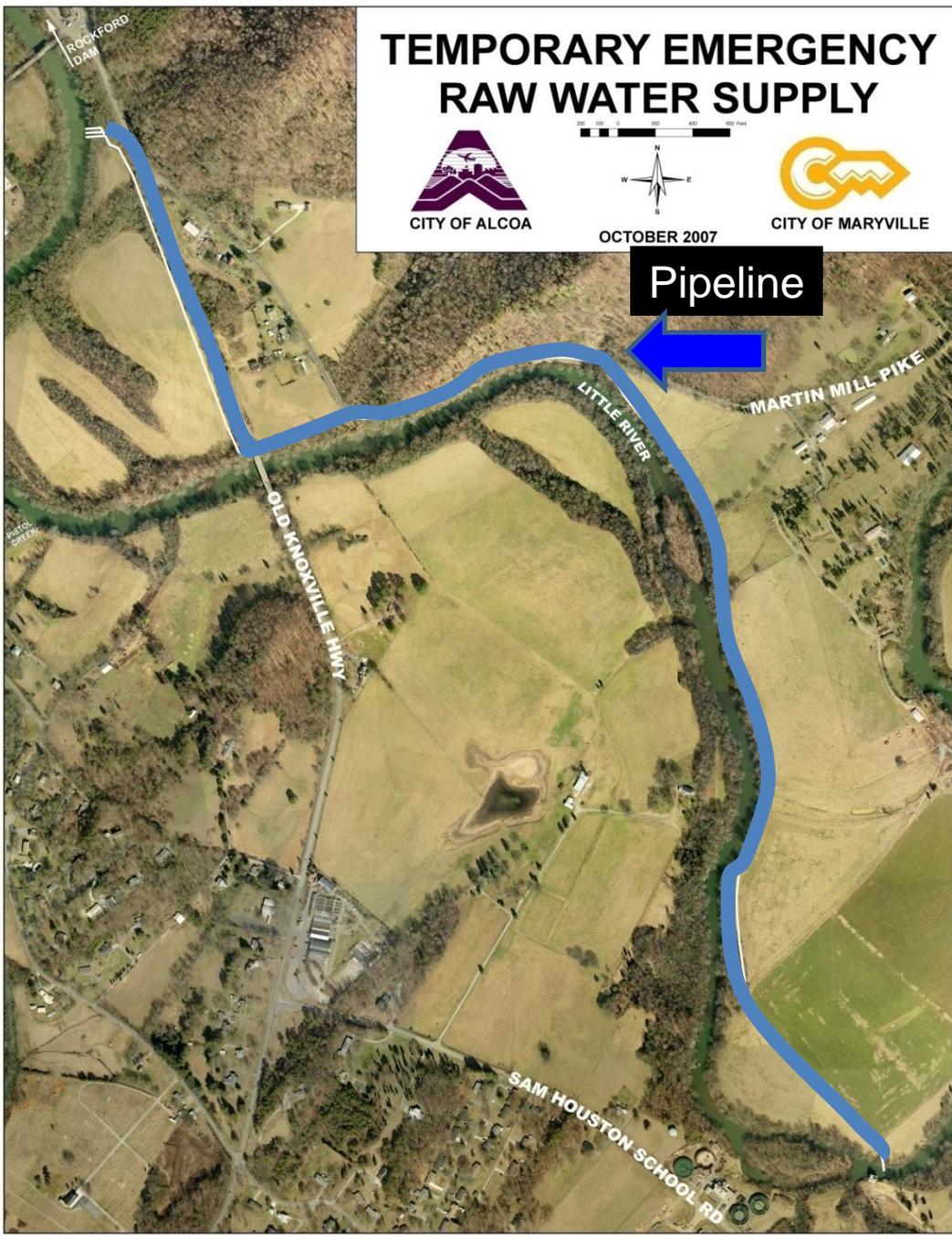
# TEMPORARY EMERGENCY RAW WATER SUPPLY



CITY OF ALCOA

OCTOBER 2007

CITY OF MARYVILLE



Pipeline

MARTIN MILL PIKE

LITTLE RIVER

OLD KNOXVILLE HWY

SAM HOUSTON SCHOOL RD

PISTOL CREEK

ROCKFORD DAM

# MONTEAGLE WATER SUPPLY



# PORTABLE MEMBRANE UNIT



# ORME WATER SUPPLY

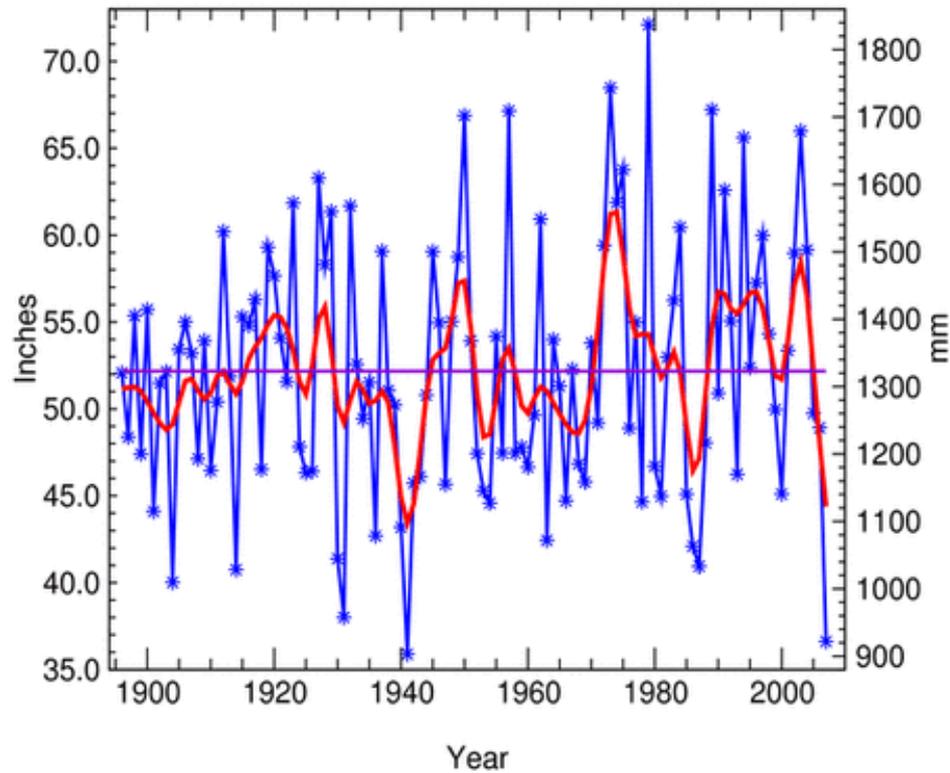
## Marion County



# Worst in 60 Years...

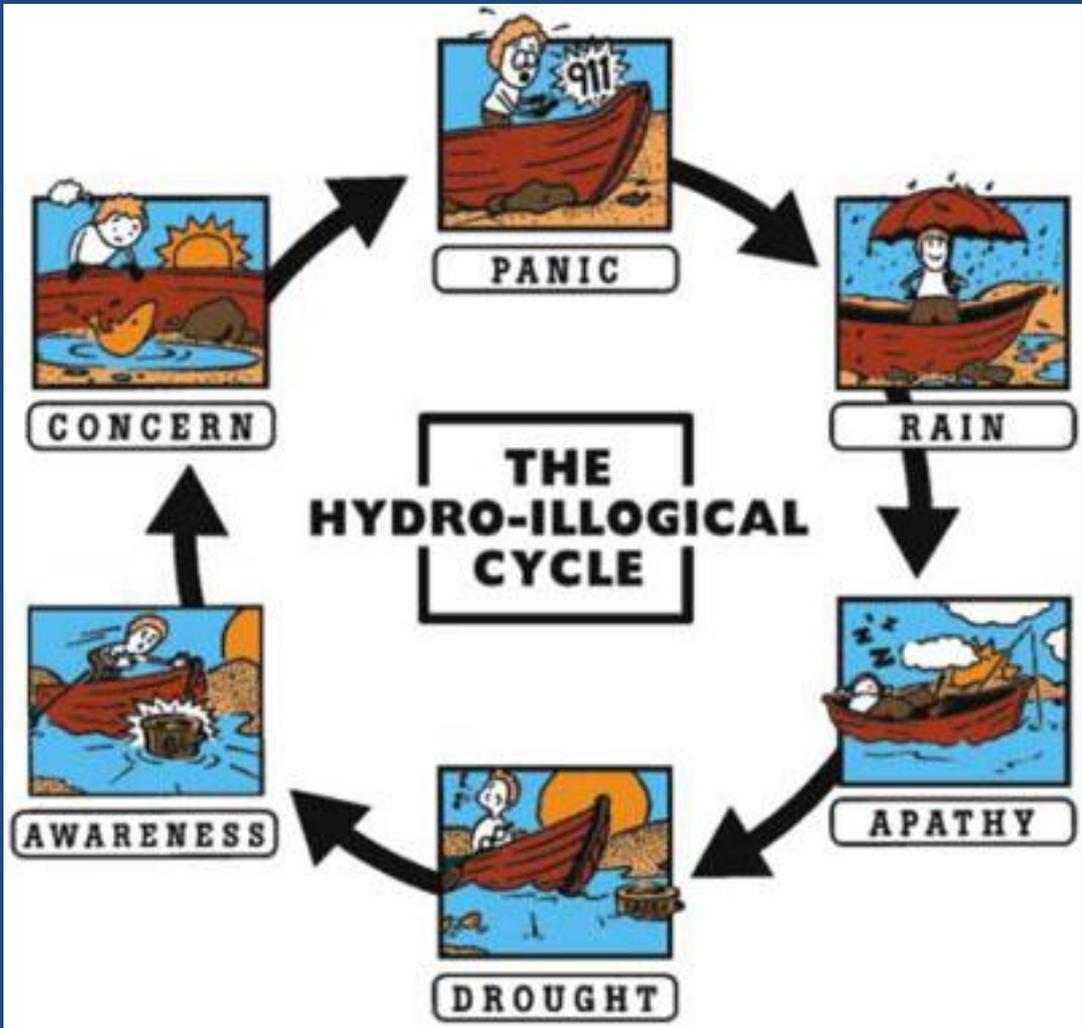


Tennessee Statewide Precipitation  
December - November, 1895 - 2007



- Yearly Values
- Filtered Values
- Long-Term Mean

National Climatic Data Center / NESDIS / NOAA



from I.R. Tannehill, *Drought: Its Causes and Effects*, Princeton University Press, Princeton, New Jersey, 1947



**HOPING FOR RAIN IS  
NOT A GOOD PLAN**

# TDEC Drought Management Plan



Normandy Lake  
Fall of 2007  
John Hall, TAUD



# Drought Management Plans

**1988 Plan in response to 1987 drought**

**2007-08 was the drought of record for parts of  
Tennessee - 28 TN Counties declared disaster  
areas**

**February 2009 – Tennessee Drought Management Plan**

# Overall Goals and Objectives of the Plan

**Maximize the ability of our water resources to support all of their uses during a drought**

**Minimize the effect of drought through effective management, proper planning and responsiveness**

- 1) Outline TDEC's role during drought**
- 2) Facilitate planning**
- 3) Provide a framework for response among local, state and federal agencies**





# **TDEC's Role in Drought Management**

- (1) Determine Drought Intensity**
- (2) Communicate Drought Information Drought Management Plans**
- (3) Require development of Community Water Systems' Drought Management Plans**
- (4) Provide Guidance on Community Water Systems' Drought Management Plans**
- (5) Manage wastewater discharges**



# **TDEC's Role in Drought Management (Cont'd)**

- (6) Encourage Regional Water Resources Management Planning**
- (7) Provide technical assistance**
- (8) Provide regulatory oversight**
- (9) Communicate with other agencies**

# Key Organizations

**Community Water Systems**

**County and Municipal Government**

**Tennessee Emergency Management Agency**

**Department of Agriculture**

**Tennessee Wildlife Resources Agency**

**Department of Transportation**

**Tennessee Advisory Commission on Intergovernmental Relations**

**NOAA National Weather Service**

**Tennessee Valley Authority**

**Army Corps of Engineers**



# Community Water Systems - Role



**Develop local drought management plans**

**Assess available resources**

**Identify planned responses**

**Identify risks, priority customers**

**Address All uses**

**Communicate with the public**

**Report conflicts**

# County and Municipal Government - Role



**Assist with Planning**

**Implement Drought Responses**

**Inform the Public**

# Tennessee Emergency Management Agency - Role



**Facilitate the Drought Task Force**

**Manage Emergency Drought Situations**



# Tennessee Department of Agriculture - Role

**Emergency Designations**

**Participate in WRTAC**

**Assistance to the Public**

**Preventing Fire during Drought Periods**

**Communication**



# **Tennessee Wildlife Resources Agency - Role**

**Work with TDEC to Monitor Aquatic Life**

**Work with TDEC to Enforce Protection  
of Aquatic Life**

**Provide Data on Conditions**

**Inform TDEC of Impacts and Responses**

**Exchange Information**

**Assist with Communication Plans**



# Tennessee Department of Transportation - Role

**Provide Data on Conditions**

**Inform TDEC of Impacts and Responses**

**Exchange Information on Drought Responses**

**Assist with Communications Plans**

# TN Advisory Commission on Intergovernmental Relations - Role



**Participate in WRTAC**

**Assist with Communication Plans**



# **Federal Agencies - Role**

**Participate in WRTAC**

**Provide Data on Conditions**

**Assist with Communication Plans**

**Assist with the Implementation of Plans**

# **Tennessee Valley Authority & Army Corps of Engineers**



**Manage the Reservoirs**

**Participate in WRTAC**

**Share Information on Observed Impacts**

**Exchange Information**

**Communicate with the Public**

**Implement Drought Responses  
(Manage the Reservoirs)**



# **Nongovernment Organizations - Role**

**Participate in WRTAC**

**Share Information on Observed Impacts**

**Provide Data and Technical Assistance**

**Assist with Communication Plans**



# **TDEC Drought Management Plan**

**Framework for Action and Coordination**

## **Guidance for Local Community Water System Drought Management Plans**

**Management Strategies for Individual Suppliers**

# Guidance for Developing Community Water System Drought Management Plans



# Drought Mitigating Rules



**1200-5-1-.05(9) – Interconnections between systems**

**1200-5-1-.05(10) – Expansion at 80% of design capacity**

**1200-5-1-.17(7) – EOP (Emergency Operations Plan)  
requirement**

**1200-5-1-.17(9) - Minimum 20 psi pressure**

**1200-5-1-.17(14) – 24 hours of storage**

# What Was Missing?

## What Is Needed?

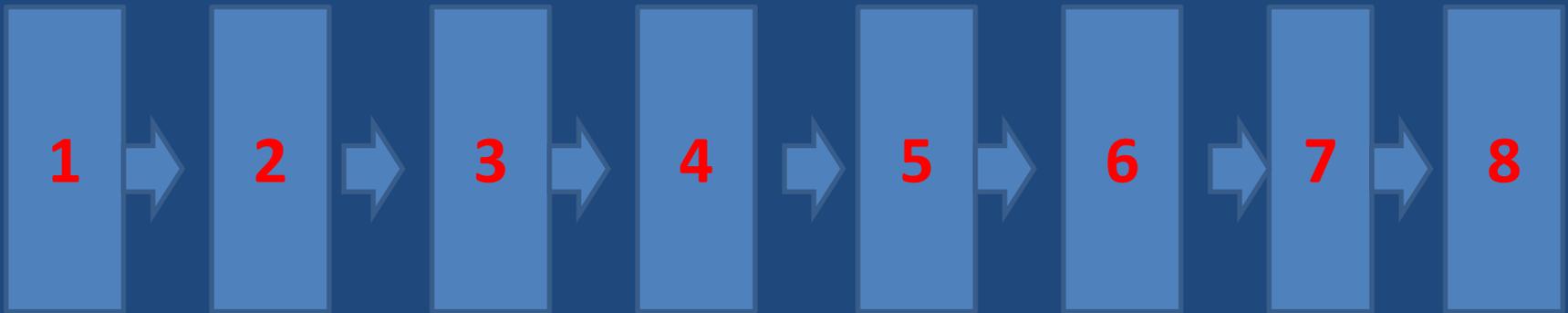
- **State Mandated Plans – Guidance, Rules, Policy, Evaluative Tools**
- **Updated Drought Management Plans - Current drought management plans are not evaluated according to established minimum requirements**
- 
- **Drought Plans That Lead to Proactive Planning and & Capital Improvements Budgets - Storage, Pump Stations, Line Sizes, *etc***

# A Drought Management Planning Guide that...



- Provides clear steps to developing a reasonable and workable plan
- Provides illustrative examples
- Establishes minimum standards or criteria

# 8 Steps in Developing a Management Plan



# The 8 Steps



Step	Action
1	Preplanning
2	Organize the Process
3	Identify Existing Plans, Partnerships, Policies and Procedures
4	Coordinate with State and Regional Agencies
5	Plan the Management Phase Responses
6	Plan for Implementation – Monitoring, Detection and Triggerpoints
7	Identify the Management Team
8	Review, Evaluate and Up-date the Management Plan

# The 8 Steps



## Step 1 – Preplanning

- \* **Authority and Status to Plan (Municipal Charter, UD By-laws)**
- \* **System Characteristics and Risks (Sources, Customers and Water Usage Patterns, Water Treatment Facilities, Tanks, Reservoirs, Line Sizes, etc.)**

# The 8 Steps



## Step 2 – Organizing Planning Process

- \* Determine who will lead the process  
(Committee, Task Force, System Manager)
- \* Establish goals and priorities
- \* Establish specific steps and timetable for the process
- \* Establish how public input and feedback will be obtained

# The 8 Steps



## Step 3 – Identify Existing Plans, Partnerships, Policies, and Procedures

- \* Review existing Emergency Operations Plan (EOP), current issues and unmet needs
- \* Identify current interconnections, mutual aid agreements and backup sources
- \* Identify and review existing ordinances, policies and legal agreement which place constraints or demands on the system

# The 8 Steps



## Step 4 – Coordinate with State and Regional Agencies (Resource Agencies)

- \* **Identify Regional Considerations and Stakeholders (Non-potable users such as agricultural , Aquatic Habitat, Temperature such as thermoelectric power generation, Navigation, Water Quality concerns, etc.)**
- \* **TVA, ACOE, USFWS, DAG, TDEC, etc.**
- \* **Clarify and Resolve any Limiting Factors (Reservoir operating curves, NPDES permits, etc.)**

# The 8 Steps



## **Step 5 – Plan Management Phases - trigger points and responses (Alert, Voluntary Reductions, Mandatory Restrictions, Emergency Management)**

- \* Identify Water Uses (Essential Uses, Fire, Economically Important, Non-essential)**
- \* Identify Management Phases and Measures that will accomplish water use reductions**
- \* Identify Management Phase trigger points (Consider source characteristics, contract limitations, Hydraulic limitations, Water Quality Issues)**
- \* Balance Supply and Demand for each phase**

# Community Water System Drought Phases (an example)



Program Phase and Conditions	Goal	Triggerpoints	CWS Actions
		Public Water Suppliers	
<b>Normal Conditions</b> <ul style="list-style-type: none"> <li>Water supply is adequate; water quality is acceptable under normal management</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>Develop Emergency Water Management Plans</li> <li>Develop additional storage and treatment facilities; evaluate distribution system</li> <li>Adopt standby rates, other necessary ordinances and codes and establish mutual aid agreement, interconnections, conservation education, etc.</li> </ul>
<b>Drought Alert</b> <ul style="list-style-type: none"> <li>Lower than normal precipitation, declining streamflows and lower groundwater levels; greater than normal demand</li> </ul>	<ul style="list-style-type: none"> <li>None</li> </ul>	<ul style="list-style-type: none"> <li>D0 or D1 US Drought Monitor Classification (Abnormally Dry or Moderate Drought)</li> </ul>	<ul style="list-style-type: none"> <li>Monitor water sources and daily water use for specific purposes and anticipate user demand</li> </ul>
<b>Voluntary Reductions</b> <ul style="list-style-type: none"> <li>Water suppliers/water quality deteriorating or conflicts among users</li> </ul>	<ul style="list-style-type: none"> <li>7 percent reduction</li> </ul>	<ul style="list-style-type: none"> <li>90-day supply (reservoir)</li> </ul>	<ul style="list-style-type: none"> <li>Implement "Reductions" phase at plan triggering point(s). Potential water use reduction measures include curtailment of outside uses, education and pricing</li> <li>If reduction goal is not obtained, implement mandatory restrictions</li> <li>Notify TDEC of source conflicts</li> </ul>

# Community Water System Drought Phases (an example)



<p><b>Mandatory Restrictions</b></p> <ul style="list-style-type: none"> <li>Continued decline in water supply and/or water quality</li> </ul>	<ul style="list-style-type: none"> <li>17 percent reduction</li> </ul>	<ul style="list-style-type: none"> <li>60-day supply (reservoir)</li> </ul>	<ul style="list-style-type: none"> <li>Implement "Mandatory Restrictions" phase at plan triggerpoints; restrictions could include banning of some outdoor water uses, per capita quotas and percent reductions of non-residential users</li> <li>Notify TDEC of source conflicts</li> </ul>
<p><b>Emergency Management</b></p> <ul style="list-style-type: none"> <li>Severe water supply or water quality problems due to very limited resource availability</li> </ul>	<ul style="list-style-type: none"> <li>30 percent reduction</li> </ul>	<ul style="list-style-type: none"> <li>7-day supply (reservoir)</li> </ul>	<ul style="list-style-type: none"> <li>Notify TEMA and request emergency declaration</li> <li>Provide bottled water and sanitation suppliers to users</li> <li>Make hospitals, firefighting, etc. priority</li> <li>Initiate hauling of water</li> <li>Comply with Commissioner's Orders</li> </ul>

# The 8 Steps

## Step 6 – Plan for Implementation (Monitoring, Plan Activation, Compliance, etc.)

- \* Determine how the plan will be activated and implemented
- \* How will system monitor supply (trigger points)
- \* How will system monitor demand (water use category, geographic area, time of day)
- \* Public Notification (Plan Activation)
- \* How will system achieve compliance and what enforcement measures will it use
- \* Adopt the plan - formally adoption of the plan by the governing body so that it is enforceable



# The 8 Steps



## Step 7 – Identify Management Team and Their Functions

- \* Establish a Management Team (who provides overall management and who makes decisions)
- \* What is the structure of team (PR, Monitoring, acquisition of equipment, etc.)
- \* What are their roles and functions
- \* When and how is the team activated
- \* Records and Documentation
- \* Deactivation

# The 8 Steps



## Step 8 – Review, Evaluate and Update Plan

- \* Evaluation after implementation
- \* Update the plan (at least every 3 years)



# Systems of Concern by Environmental Field Office

**14 – Johnson City EFO**

**11 – Knoxville EFO**

**15 – Chattanooga EFO**

**27 – Cookeville EFO**

**18 – Nashville EFO**

**22 – Columbia EFO**

**3 – Jackson EFO**