

This presentation premiered at WaterSmart Innovations

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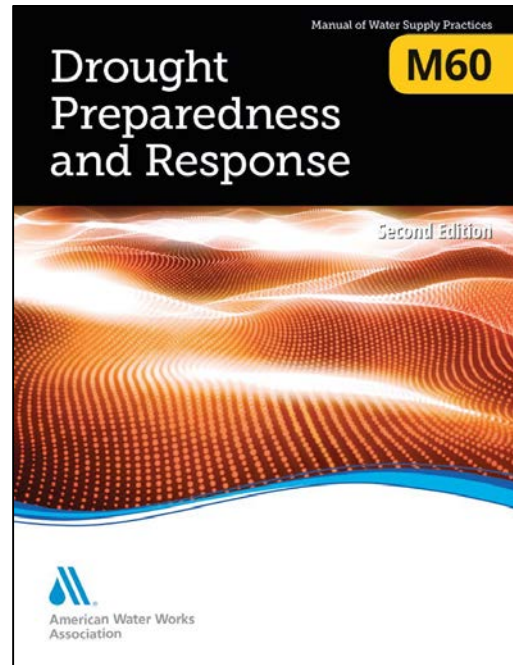
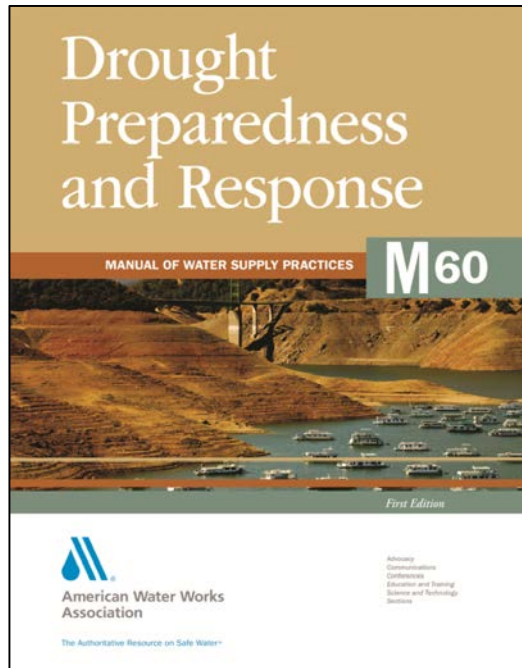
Preparing for Drought with AWWA's M60 Manual

WATERSMART INNOVATIONS CONFERENCE

OCTOBER 2, 2019

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EPA WaterSense

AWWA M60 Drought Preparedness and Response



- Version 1 released in 2011
- Since its release we have seen major droughts in Texas, the Midwest, and California
- Time was ripe to update and expand the manual
- Maintained basic 7 Step structure
- Version 2 released in June 2019

2nd Edition Primary Authors

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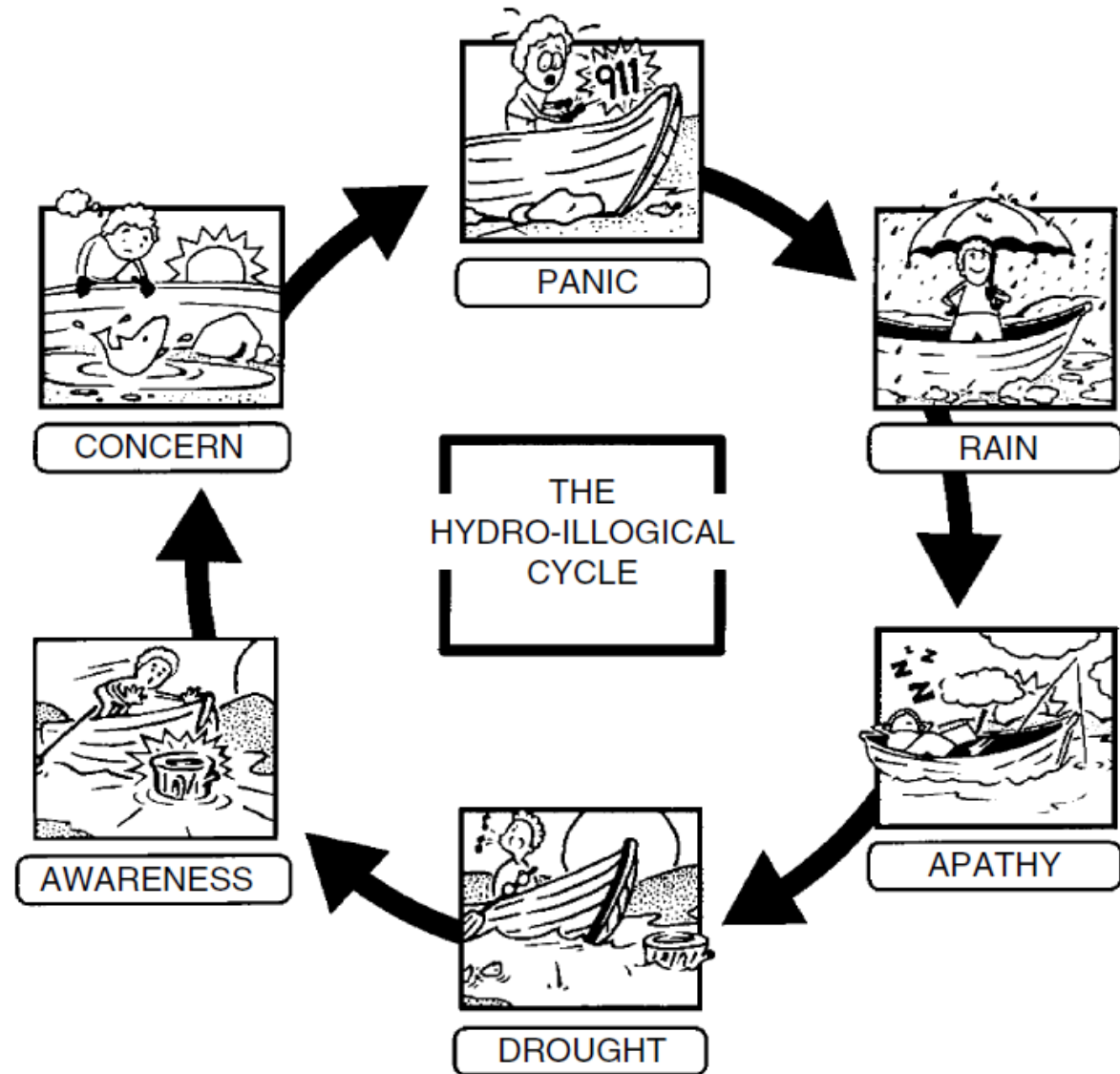
Today you'll hear an overview of the Manual

Get a plan in place before you need it

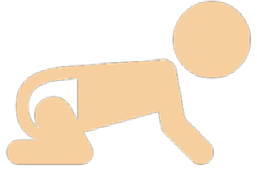
Understand your limitations

Set reductions realistically

Educate educate educate



How to think about the M60



Maybe you are new to your job or just getting started on developing a drought plan for the first time.

Use the manual as a way to help understand the work that goes into a plan. If you are small and the manual is daunting, there are additional resources you can use that will help you take baby steps (e.g., *EPA Drought Response and Recovery: A Basic Guide for Water Utilities*).



Maybe you have an established plan that you update annually or one that aged on the shelf for a few years because you've had plenty of rainfall.

Use the manual as a way to revisit your plan and confirm that you're doing the right things or to learn about things you might do to improve your plan.

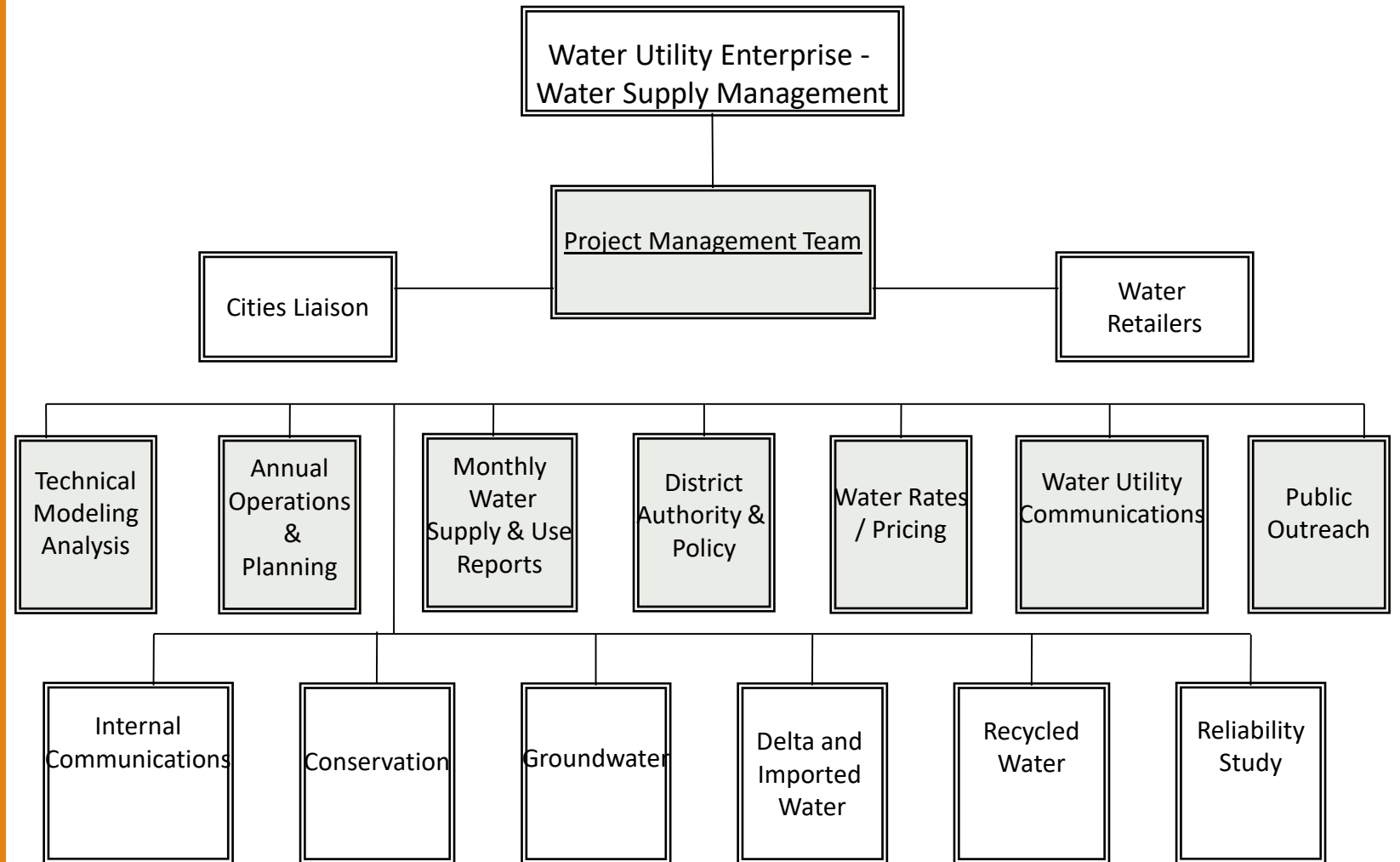
ONE	Form a Water Shortage Response Team
TWO	Forecast Supply in Relation to Demand
THREE	Balance Supply and Demand: Assess Mitigation Options
FOUR	Establish Triggering Levels
FIVE	Develop Staged Demand Reduction Program
SIX	Adopt the Plan
SEVEN	Implement the Plan

The Seven Steps

Form a Water Shortage Response Team

STEP 1

Contingency & Drought Management Team



2008 Example from
Santa Clara Valley Water

Set priorities



Avoid irretrievable
loss of natural
resources



Restrict less essential
uses before essential
uses



Affect individuals in
small groups before
affecting large groups
or the public as a
whole



Minimize adverse
financial effects



Implement extensive
public information
and media relations
programs

Example of Principles from
2016 Denver Water
Drought Response Plan



Maintain Momentum

- Appoint Leader and Team
- Start by December 1
- Public information campaign
- Prepare through winter/spring *regardless of precipitation*
- Supplemental supply agreements
- Plan for interconnections
- Modify and test computer programming and billing format
- New staff and equipment as needed

Coordinate, Cooperate, Communicate



WITHIN AGENCY



AMONG AGENCIES,
TRIBAL ENTITIES



REGIONALLY



COMMUNITY

Forecast Supply in Relation to Demand

STEP 2

Bottom Line

To be prepared, you need to know:

- How much water you can expect to have – weather/climate forecast
- How much water you have – supply availability
- How much water you expect to need – demand forecast

Carry out analyses of past data to answer the questions

- How does supply look? What are the sources? How is the infrastructure?
- How does demand in a normal year look? Demand in a dry year? Demand by customer type?
- Can you meet the demand *without supplemental supplies*?
- How does supply and demand look in a worst case scenario? Including disasters that could affect supply?

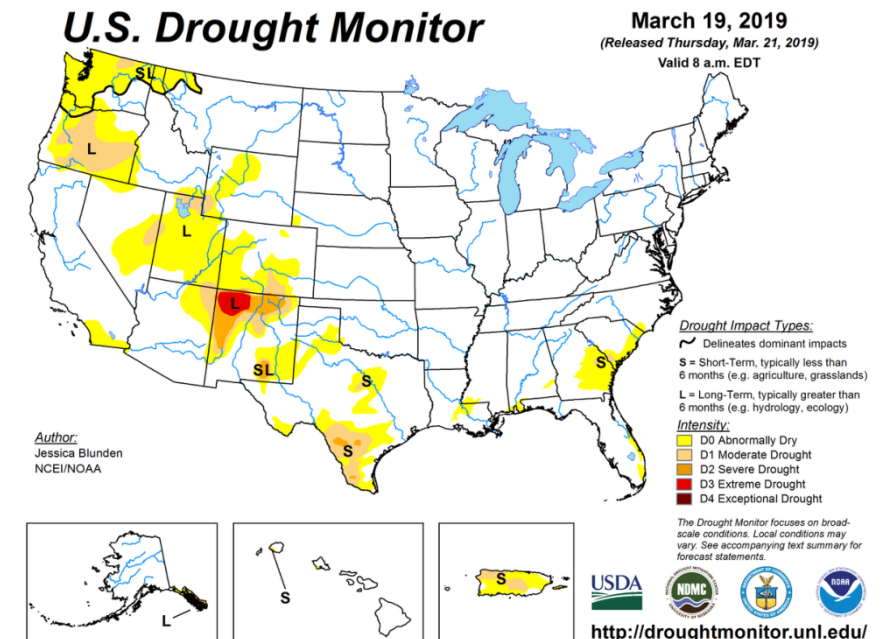
Weather/Climate Data

There are a wealth of tools available to help provide you with situational awareness on how weather will affect water availability

Many new tools and resources from federal agencies and states since Version 1– some aggregate data from multiple sources to provide ease of use

Drought.gov from the National Integrated Drought Information System (NIDIS) is the granddaddy

Weekly, monthly, seasonal forecasts and a range of other tools



Drought Early Warning Systems

Newer initiative of regional networks that collaborate on preparedness and response to build resilience to drought



*California-Nevada
Drought & Climate
Outlook Webinar*

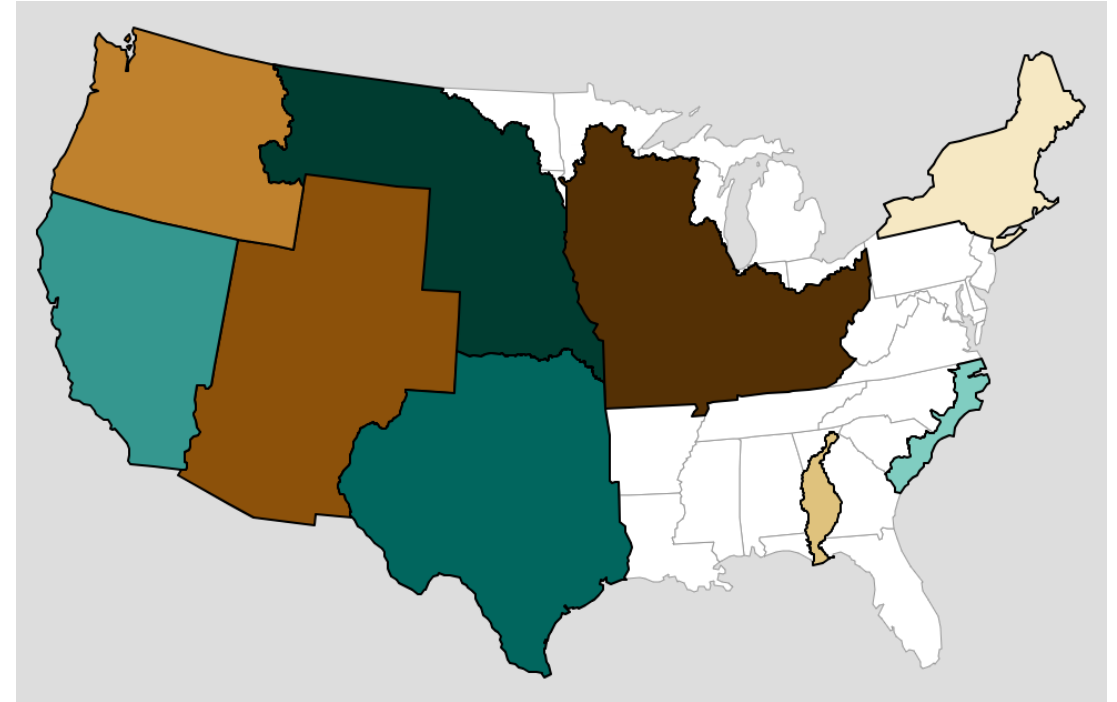
Monday, March 25, 2019 @ 11 am PT

Drought & Climate Update
Stephanie McAfee | UNR, NV Deputy State Climatologist

Drought & Climate Outlook
Peter Fickenschner | NOAA NWS CNRFC

The USDA Southwest Climate Hub
Caiti Steele | Coordinator, Southwest Climate Hub

    University of Nevada,
Reno  **Southwest Climate Hub**
U.S. DEPARTMENT OF AGRICULTURE



<https://www.drought.gov/drought/regions/dews>

Other groups have resources to help

NOAA RISA's – this is an example of a monthly product of the Southwest RISA – CLIMAS, which is out of the University of Arizona

Online Resources

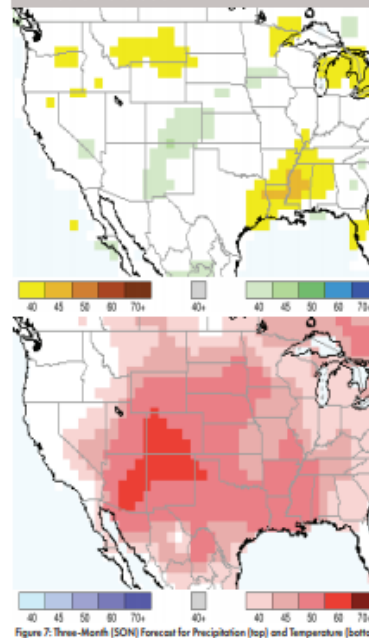
Figure 1
National Centers for Environmental Information
ncei.noaa.gov

Figures 2,6
Climate Assessment for the Southwest
climas.arizona.edu

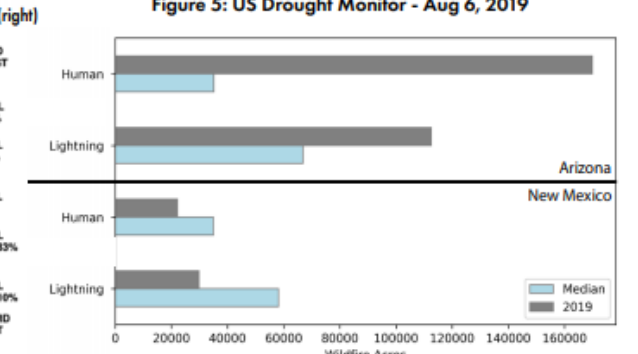
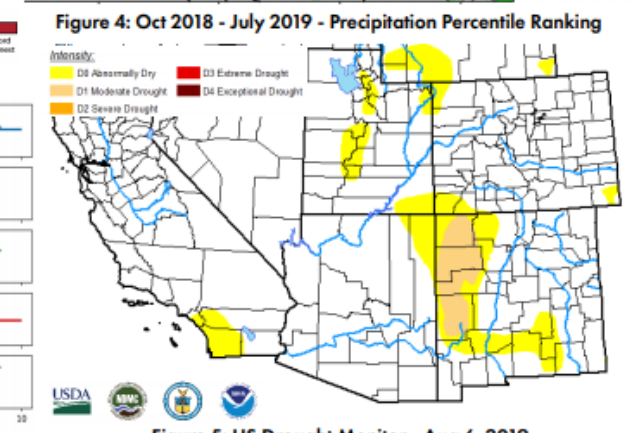
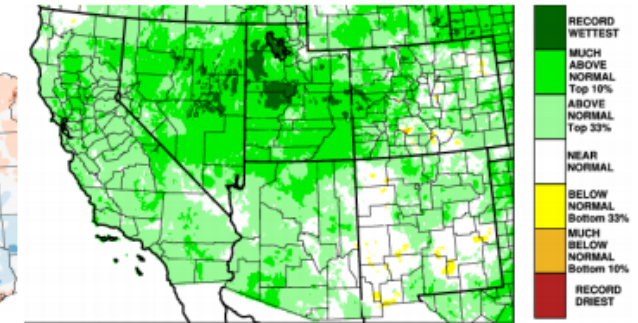
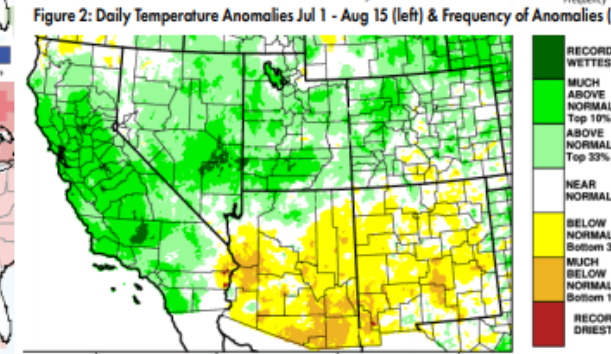
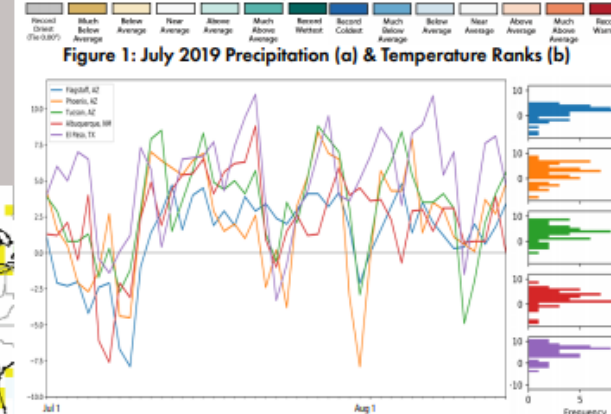
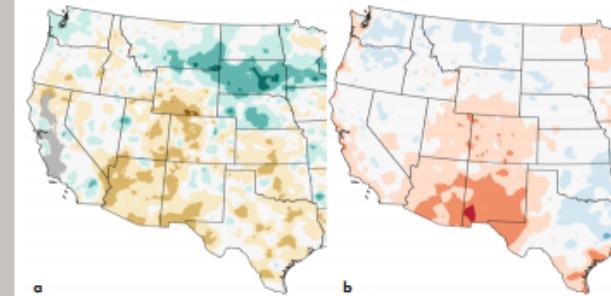
Figures 3,4
Western Regional Climate Center
wrcc.dri.edu

Figure 5
U.S. Drought Monitor
droughtmonitor.unl.edu

Figure 7
International Research Institute for Climate and Society
iri.columbia.edu



August 2019 SW Climate Outlook



Examples of Data to be Collected

Supply

- ⑩ Collect supply data (surface, groundwater, recycled, transfers, etc) for past five years or longer and for drought of record
- ⑩ Regularly review agreements that give the supplier the ability to provide or receive supplemental supplies during a shortage

Demand

- ⑩ Collect monthly data by customer class for last five years.
- ⑩ Consider changes in population or uses that might affect demand.

Examples of Data Analyses to be Conducted

Supply

- Develop a range of projections for next five years for all supplies
- Consider scenarios without augmentation, worst case, increased uncertainty & variability for all supplies

Water Quality

- Analyze impacts of changes in supply on water quality in supplier and customer distribution systems
- Consider need for additional treatment or infrastructure for blending
- Consider budget impacts

Demand

- Project dry-year demand w/o a demand reduction program in place
- ⑩ Evaluate monthly demand by customer class by month - inside use by low-use month(s)
- ⑩ Consider water demand of special needs customers

Catastrophic Supply Interruptions

Think about direct and indirect effects

Coordinate as needed with the utility Emergency Response Plan

EARTHQUAKES	FIRES	FLOODS
SYSTEM FAILURES	POWER OUTAGES	WATER CONTAMINATION

Balance Supply and Demand: Assess Mitigation Options

STEP 3

When there is a shortage, the options are to....

Augment Supply

- Leverage existing assets (via flexibility or infrastructure upgrades)
- Increase supplier side efficiency
- Expand portfolio with new sources
- Seek opportunities to collaborate with other agencies



Reduce Demand

- Provide public information and education
- Enact restrictions (e.g., water waste ordinance, landscape irrigation)
- Modify pricing
- Consider rationing and **allocation**

On the Demand Reduction Side –

If you need to go there, think through the Pros and Cons of different allocation methods

Allocation Method – Percent Reduction Allotment (*all account types*)

+	establish minimum/maximum amounts to limit extremes
+	easy to determine and administer
+	useful for non-residential <i>vary based on efficiency</i>
–	penalizes conservers
–	rewards "above average" users
–	promotes water use during non-shortage periods

Allocation Method – Per Capita Allotment (*residential*)

On the Demand Reduction Side –

*If you need to go there,
think through the Pros
and Cons of different
allocation methods*

+	suitable for extreme shortages
+	equitable <i>base allotment</i> , sewer charges on number of residents
–	must determine and update per account occupancy
–	water for essential inside use only
–	doesn't recognize historic use

On the Demand Reduction Side –

If you need to go there, think through the Pros and Cons of different allocation methods

Allocation Method – Hybrid Per Capita/Percentage (*residential*)

+	equitable <i>recognizes variety of uses</i>
+	flexibility <i>suitable to all stages</i>
+	provides customers greatest control
+	recognizes factors like lot size, historic use and economics
–	additional staff / computer work to determine allotments
–	requires more public education

Have a Plan to Enforce Requirements

Water Cops and Community

- Primarily educational
- Citations occur after first or second warning
- Community support

Fines *billing based*

- Repeat offenders require action
- Excess use charge

Flow Restrictors

- Repeat offenders undermine equity
- Provide health and safety flow



Landscape Ordinance Violations

Water Cop Visits

YEARLY	JAN	FEB	MAR	APR	MAY	JUN	TOTAL
No violation found	28	41	33	46	230	764	1124
Wasting water	6	11	11	18	47	98	191
Prohibited watering	2	4	2	8	126	67	219
Owner's leak	11	3	6	11	22	31	84
Charity car wash	0	1	7	2	4	2	16
TOTAL	47	60	59	95	429	962	1652

San Antonio, Texas

Establish Triggering Levels

STEP 4

Examples of Triggers

- Projected supply at a pre-defined level
- Water quality changes
- Supply interruption
- Environmental changes
- Regional agreements

Consider Triggers by Source

- Groundwater
- River Supplies
- Surface Water Storage
- Combined Sources of Supply

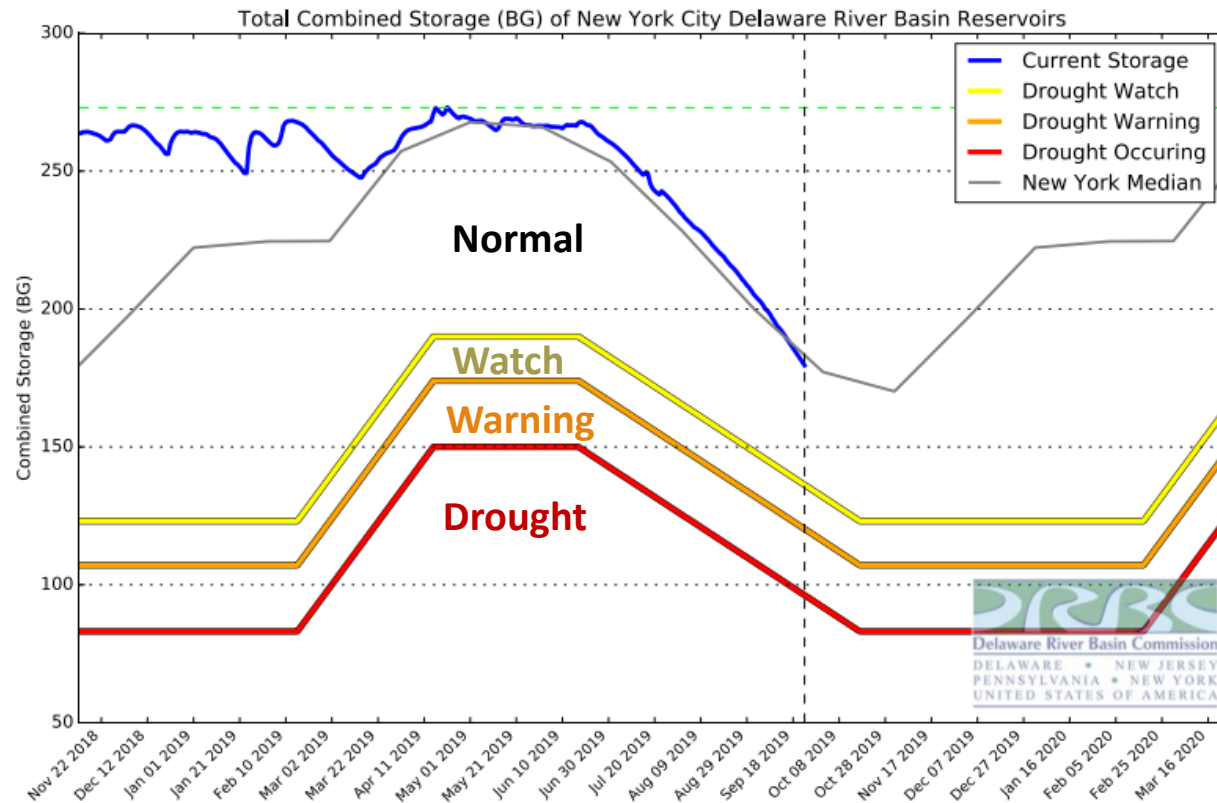
Supply based trigger

Example of triggers at a one-source agency

Reservoir storage less than	Drought Stage	Water Use Reduction Goal
80%	Stage 1	10-15%
65%	Stage 2	15-25%
40%	Stage 3	25-40%
25%	Stage 4	40%+

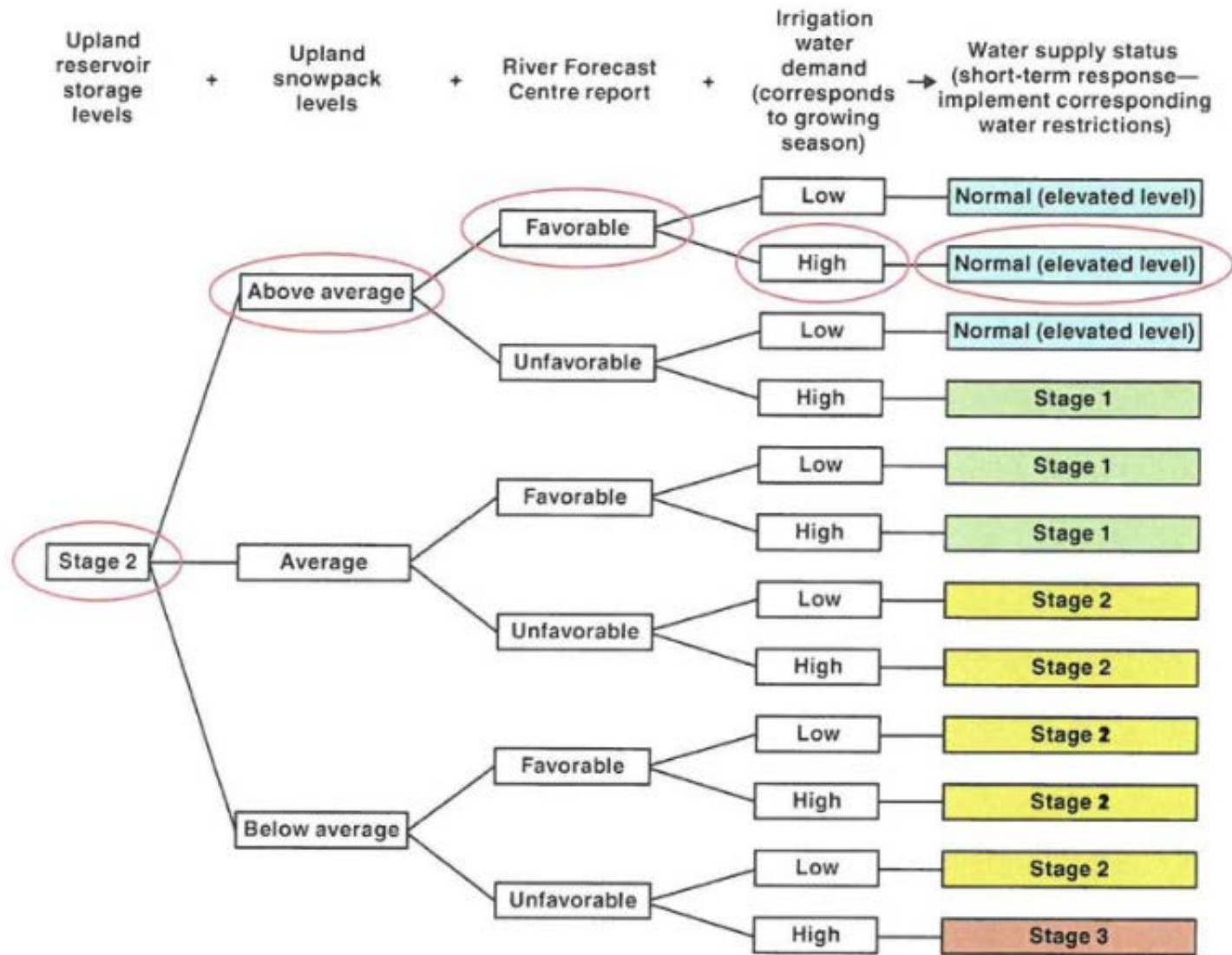
New York City Delaware River Basin Storage

9/23/2019



Usable Storage	Cannonsville	Pepacton	Neversink	Total	BG above drought watch = 43.4	BG below median = 3.7
BG	50.2	102.6	26.8	179.6	BG above drought warning = 59.4	BG below one year ago = 63.5
%	53.7	73.7	77.2	68.2	BG above drought = 83.4	

Seasonal rule curves tied to system storage and based on past droughts



Multiple Source Decision Tree

Trigger Mechanism Considerations

Causes of delays

- Pressure on Board often from business community, developers, agriculture
- Supplier is not ready
- Ill defined triggers

Include flexibility to:

- Move up or down two Stages
- Stay at a Stage and modify demand reduction program for smaller or greater reduction than needed
- Provide a consistent message with local agencies

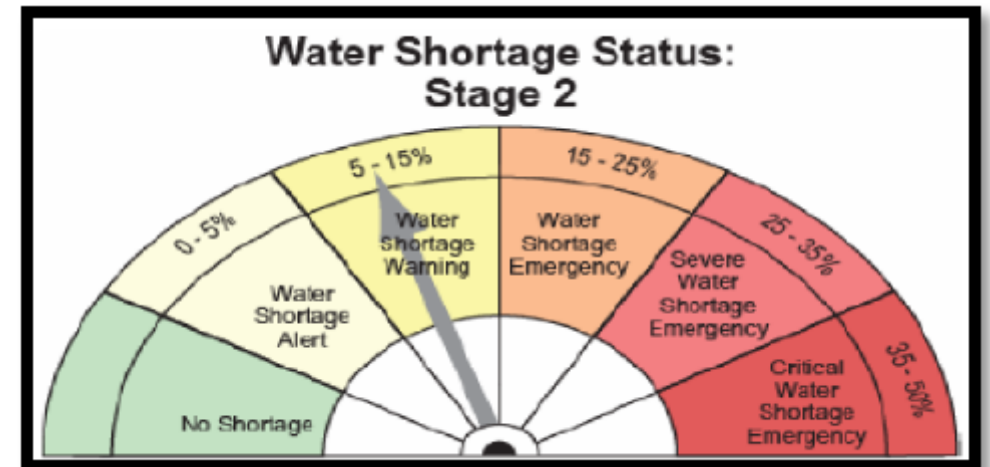
Develop a Staged Demand Reduction Program

STEP 5

Establish Stages

Example Stages with demand reduction goals

Stage	Water Shortage	Demand reduction goal
1	Minimum	10 - 15%
2	Moderate	15 - 25%
3	Severe	25 - 40%
4	Critical	40+%



Criteria for Demand Reduction During a Water Shortage



Timing: can the measures/actions produce results in time?



Magnitude of savings: Will enough water be saved?



Season: are the actions/measures relevant to the time of year?



Costs: How severe are the cost implications of the measures to the customer, relative to the need for action?

Evaluate Demand Reduction Measures



Methods that reduce demand:
supported by demand reduction actions

Public Information Campaign

Restrictions

Pricing

Allocations



Prioritize methods:

Water savings

Lead time required to activate measure

Direct and indirect costs

Legal or procedural requirements for
implementation

Example Actions



Stage 1 - Voluntary

Initiate public information campaign
Advertise toilet, appliance, equipment rebate programs
Request 20 gallon-a-day per person reduction
Suggest shorter showers, no hosing of hard surfaces



Stage 2 - Restrictions with enforcement

Intensify public information, assistance programs
Restrict irrigation to morning and evening
No run-off, three times per week watering
Water by request in restaurants
Increase rates

Example Actions



Stage 3 - Mandatory + Customer Outreach

- Limit days of irrigation
- Tiered pricing with significant price jumps
- Establish allocations
- Provide customer on-site assistance
- Provide multiple demand reduction programs
- Provide customer / business training programs



Stage 4 - Mandatory

- Mandatory/critical
- Intensify all efforts
- Manage consumption to stay within water allotments
- Landscape irrigation restrictions
- Fines

Things to think about

Estimating savings can be a challenge

- Savings may vary from month to month, difficult to predict
- Savings can be scaled to the normal year demand curve

Supplier may enter Stage before customers implement

Messaging

- Cooperate with local and regional water suppliers to avoid inconsistent drought messages

Beware of the “lag”

- Customer awareness reduced by bi-monthly billing
- Build lag time in triggers
- Leap-frog Stage if lag time is long or not recognized
- Lag time could result in draw down of next year's reserves and unnecessary economic losses

Adopt the Plan

STEP 6

Process



INVOLVE THE
COMMUNITY



PREPARE REVENUE
PLAN*



FORMALIZE
COOPERATION WITH
LOCAL AGENCIES

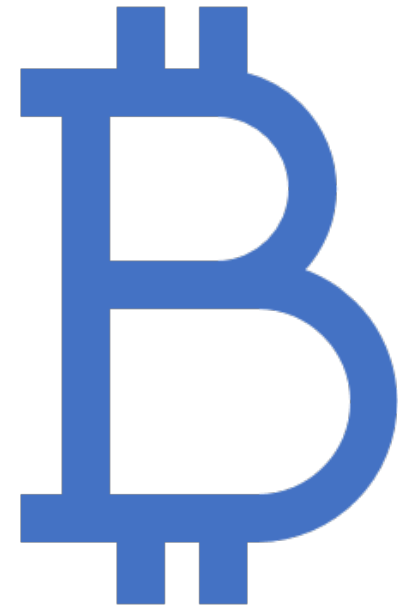


ADOPT THE PLAN

Prepare Revenue Plan

Evaluate Revenue by Water Shortage Stage

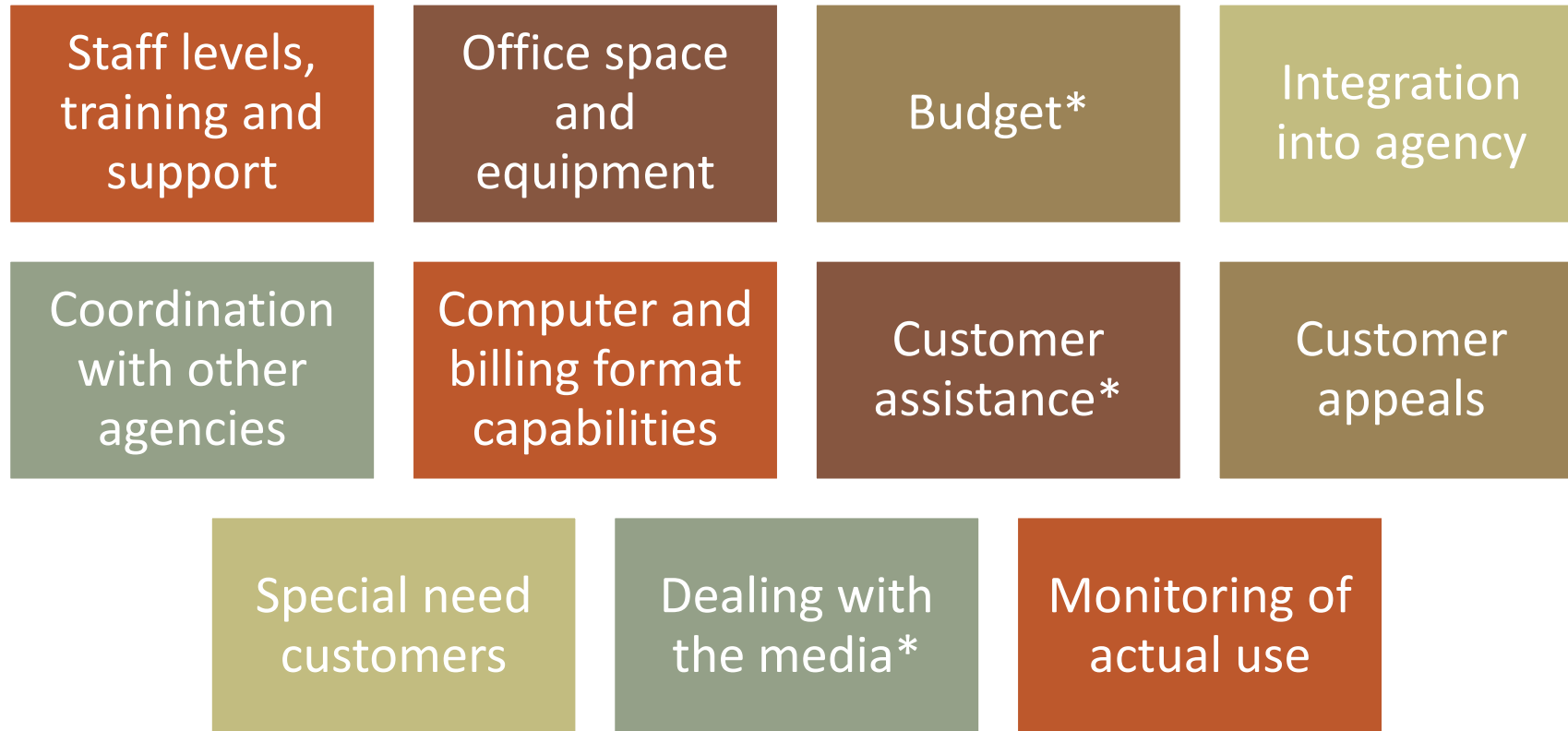
- Estimate the amount of water use reduction that will be achieved and the associated lost revenue
- Estimate revenue needs – include funds for new water supplies, increased water quality monitoring, and extended multi-year rationing
- Design a rate adjustment or water shortage surcharge that will cover the expected revenue deficit if reserves are not available
- Monitor actual revenue and compare with forecasted; adjust water shortage surcharges as needed, but not too often



Implement the Plan

STEP 7

Implement the Plan



Budget



Salaries

including overtime



Equipment

*cars, phones,
computers, audit
materials*



Training

*professional trainers for
customer contact, computer
databases, conservation audits
and assistance*



Materials

*program brochures,
conservation info, water
waste educational info
and door hangers*



Media

*TV, radio and print
advertising budget,
graphic and recording
studio support, events,
direct mail*



Programs

*rebates, hand-outs,
contests, awards,
training for customers
& green industry*

Customer assistance

- Phone hot-line, including evenings and weekends
- Email distribution list, blogs
- House calls, surveys
- Plumbing and landscaping referrals
- Irrigation system management training and assistance
- Plumbing fixture and appliance recommendations
- Assistance to excess-use customers
- Assistance to disadvantaged communities

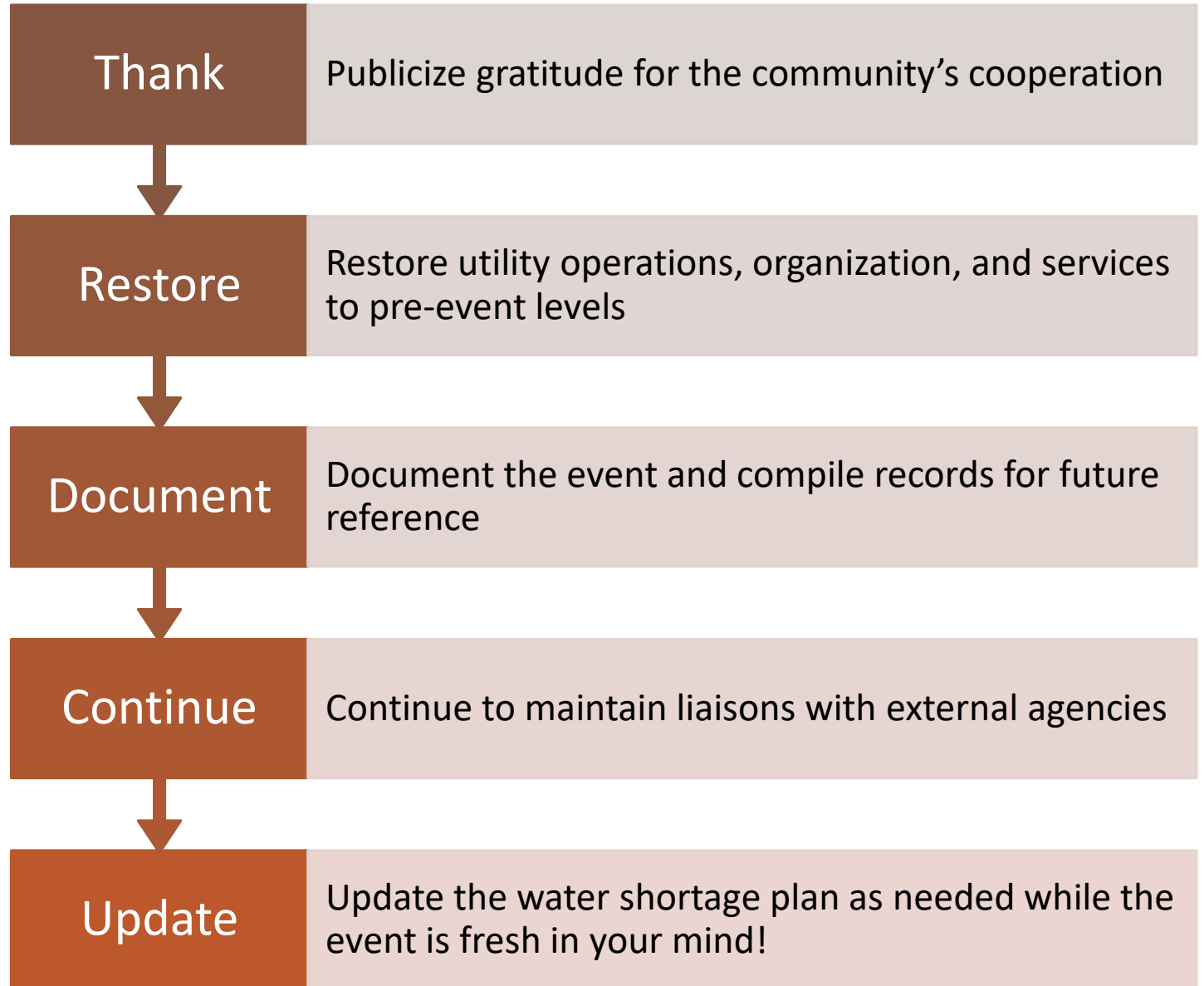




Dealing with the media

- Establish good relations with reporters *local print, radio and television*
- Rationing response manager available for questions and interviews
- Consistent message *talking points, sound bites*
- Free media and community support resources
- In response to possible negative media reports, demonstrate how the agency solves customers problems

When the Drought Ends!



Thank You!

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