

University of Nebraska - Lincoln

DigitalCommons@University of Nebraska - Lincoln

Drought Mitigation Center Faculty Publications

Drought -- National Drought Mitigation Center

5-1-2014

Water-Use Restriction Information: Information Sharing Between Public Water Systems and State Government Offices

Christopher Carparelli

Follow this and additional works at: <https://digitalcommons.unl.edu/droughtfacpub>



Part of the [Climate Commons](#), [Environmental Indicators and Impact Assessment Commons](#), [Environmental Monitoring Commons](#), [Hydrology Commons](#), [Other Earth Sciences Commons](#), and the [Water Resource Management Commons](#)

This Article is brought to you for free and open access by the Drought -- National Drought Mitigation Center at DigitalCommons@University of Nebraska - Lincoln. It has been accepted for inclusion in Drought Mitigation Center Faculty Publications by an authorized administrator of DigitalCommons@University of Nebraska - Lincoln.

Water-Use Restriction Information

Information Sharing Between Public Water Systems and State Government Offices

Christopher Carparelli

5/1/2014

This research examines the interaction between the state and local levels regarding water-use restrictions for public water systems (PWSs). Officials from five state-level entities that collect and disseminate local water-use restriction information were interviewed about how and why their state collects and disseminates PWS water-use restriction information. The main goals of this research are gain insight into the successes and difficulties encountered by the states interviewed, and to recommend some best practices to other states based on that information

Introduction

In many states there is an absence of communication between the state and local levels about many aspects of water resource management. This research examines the interaction between the state and local levels regarding water-use restrictions for public water systems (PWSs). This information is useful for state-level drought planning and mitigation through the assessment of drought impacts on public water supplies. Officials from five state-level entities that collect and disseminate local water-use restriction information were interviewed over the phone for this research. Each official was asked eleven questions about how and why their state collects and disseminates PWS water-use restriction information. The main goals of this research are gain insight into the successes and difficulties encountered by the states interviewed, and to recommend some best practices to other states based on that information.

Background

The Drought Impact Reporter is an interactive web-based mapping tool designed to display drought impact information from across the United States as it happens. The information is compiled from a variety of sources such as media, government agencies, and reports from public. Launched in July 2005, this tool is the only nationwide, multi-source archive of drought impact information (NDMC). In 2013 NDMC staff were searching for sources of information on water-use restrictions for PWSs so the data could be entered into the Drought Impact Reporter. Staff began contacting several state government offices responsible for water resources, natural resources, and environment to see if these offices could provide comprehensive statewide water-use restriction data. Very few of the offices that were contacted actually did keep track of this information. The NDMC then began to compile a list of state offices that were known to collect

this information and sought to interview a sampling of them for this research about how and why state governments collect and disseminate PWS water-use restriction information.

Methods

Five states that collect and disseminate water-use restrictions for PWSs were identified. The five states included Alabama, California, Colorado, Nebraska, and North Carolina. One official from the office in charge of the information collection in each state was interviewed over the phone. Each official was asked the following eleven questions:

- 1) *What got [state] started collecting and publishing this information?*
- 2) *When did it start?*
- 3) *How is it collected? For example is it collected via the internet, email or phone?*
- 4) *How frequently is it collected?*
- 5) *Who makes use of the information?*
- 6) *What do they do with it?*
- 7) *Is this system working as anticipated?*
- 8) *Do you have any recommendations for other states on whether to implement a similar practice? Are there any specific pitfalls they should avoid? What can contribute to greater success?*
- 9) *Are water systems required to provide information, or is it voluntary?*
- 10) *What are the benefits of adopting this practice? Have there been any notable successes or problems averted?*

11) Is there a downside to adopting this practice? Have there been any unanticipated difficulties?

These questions were intended to shed light on the development process for the information sharing systems in each state and identify the benefits and challenges associated with these systems so that other states can develop their own systems or improve those already in existence.

Interview Summaries

Alabama

In 2002 the governor of Alabama issued an executive order establishing the state's first formal drought planning and response system. This was in response to ongoing drought during the previous three years. The state's first drought plan was published in 2004 and laid out the framework for the collection of drought information and the publication of state drought declarations. The first time the state drought plan was fully exercised was during the 2007 drought. The successful initial implementation and continued development of the state drought plan led to the 2014 Alabama Drought Planning and Response Act which was passed by the state legislature and signed into law by the governor. Section 7 of the act reads:

If a community public water system implements voluntary or mandatory restrictions or reductions in water use, the system shall report these actions to the [Alabama] Office of Water Resources [OWR]. The Office of Water Resources shall also have authority to require the reporting of other information, such as the status of local water supplies and sources. OWR shall maintain an information


clearinghouse for this and other drought-related information and make the information available via the Internet or other appropriate means.

Prior to the passage of this legislation it had been voluntary for PWSs to report the implementation of water-use restrictions to the OWR. The OWR had previously been collecting water supply and restriction information for drought declarations through phone conversations, email transactions, and physical surveys, with frequency dependent upon the severity of drought conditions. The OWR is currently in the process of developing an interactive web-based information collection system.


A key user of drought information is the Alabama Drought Assessment and Planning Team (ADAPT) which is task force that reports to the governor. The overall state drought planning process that encompasses PWS water-use restriction information reporting has been referenced by reservoir operators during relicensing processes with the Federal Energy Regulatory Commission. During a 2007 drought, water levels at Lake Martin were dropping and timely local information proved to be invaluable to maintaining continuity of service for several PWSs, as well as negotiations with the State of Georgia over water allocations.

The OWR official who was interviewed recommended to states that the governor take a central leadership role in implementing a formalized drought planning process that has defined goals and limits. Drought response and mitigation are heavily dependent on accurate and timely information because drought can evolve with a high degree of spatial and temporal variability. Therefore it is important to have effective communication and coordination within and between levels of government so that communities can respond

effectively to changing conditions. Population growth, economic development, and climate change will increase the importance of this adaptive capacity over time. A key challenge involved in developing an effective state drought planning process is educating decision makers and the public at large about the importance of committing human and financial resources to drought planning and mitigation.




Release Date: February 28, 2013



For Public Dissemination
Alabama Drought Declarations

In accordance with the Executive Order 19 and the Alabama Drought Management Plan, the ADECA Office of Water Resources (OWR), based on a review of current and anticipated conditions, has declared the following portions of the State of Alabama to be under the specified drought declaration levels.

Declaration Level	
Emergency	None
Warning	None
Watch	None
Advisory	None
None	<p>All 9 Regions the Alabama Drought Management Plan which includes the counties of: Autauga, Baldwin, Barbour, Bibb, Blount, Bullock, Butler, Calhoun, Chambers, Cherokee, Chilton, Choctaw, Clarke, Clay, Cleburne, Coffee, Colbert, Conecuh, Coosa, Covington, Crenshaw, Cullman, Dale, Dallas, DeKalb, Elmore, Escambia, Etowah, Fayette, Franklin, Geneva, Greene, Hale, Henry, Houston, Jackson, Jefferson, Lamar, Lauderdale, Lawrence, Lee, Limestone, Lowndes, Macon, Madison, Marengo, Marion, Marshall, Mobile, Monroe, Montgomery, Morgan, Perry, Pickens, Pike, Randolph, Russell, Shelby, St.Clair, Sumter, Talladega, Tallapoosa, Tuscaloosa, Walker, Washington, Wilcox, and Winston</p>



Legend

No Drought Declaration
Advisory
Watch
Warning
Emergency

Recent rains have continued to improve conditions in the state. However, public water systems and other non-public and private water users should continue to monitor water conditions and review plans as we head into the drier spring and summer seasons. The OWR will continue to provide updated notifications as needed.

For further information, please visit our web site at www.adeca.alabama.gov/water and follow the links to the Office of Water Resources. You may also reach our office by phone at (334) 242-5499, fax at (334) 242-0776, or e-mail at drought@adeca.alabama.gov.

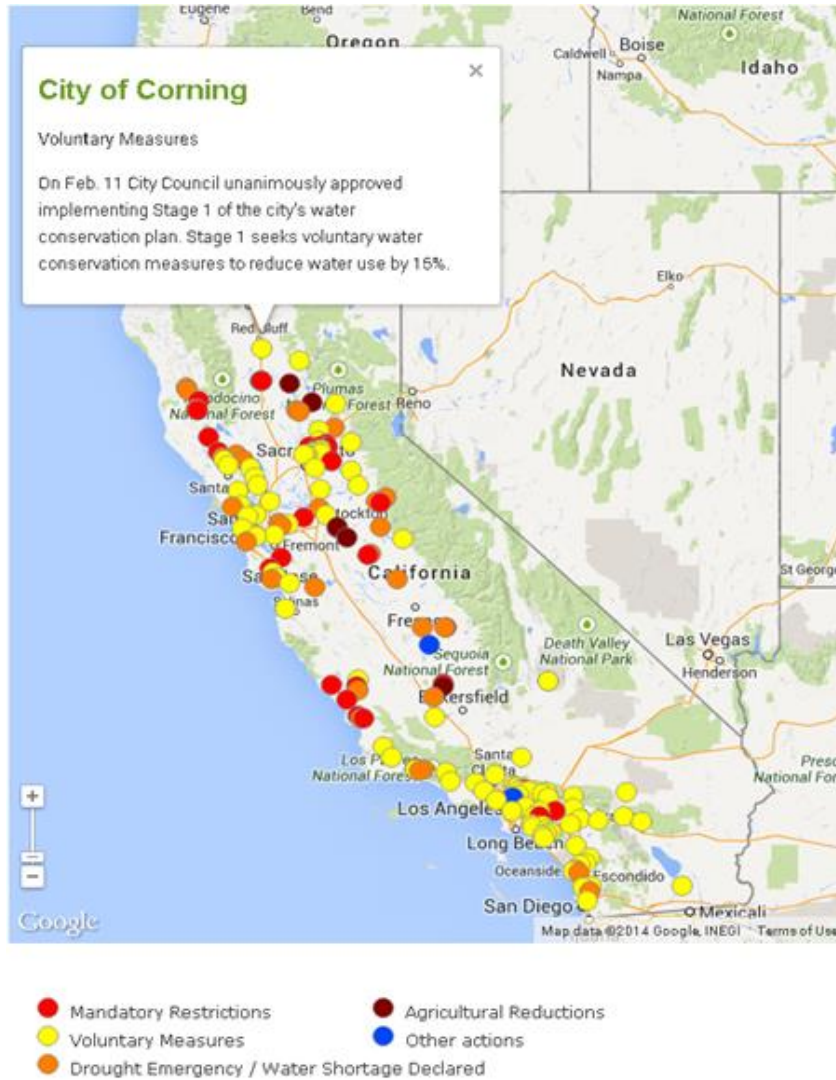
An example of an Alabama Drought Declaration.

California

The Association of California Water Agencies (ACWA) is an industry group that represents the interests of 440 PWSs which deliver water to roughly 90% of California's population. In response to severe drought in the State of California, ACWA began posting a map on its website that depicted PWS water-use restrictions in January 2014. The map uses a Google Maps interface with color-coded dots that when clicked upon convey local water-use restriction information at that location. ACWA only publishes the map during severe drought, and the only time it was published prior to 2014 was in 2008. Information for the map is collected in a variety of ways. ACWA staff monitor the news, contact member agencies by phone and email, and then update the map based the information they gather. Some member agencies will also proactively contact ACWA to send in data. The frequency of information collection and map updates is variable and it is voluntary for PWSs to provide information. The primary purpose of the map is to publicize the impacts of the drought to create public awareness. Member agencies are using it to communicate with their customers, and other entities including the California Department of Water Resources have embedded the map or provided links to it on their websites.

ACWA chose not to design an information collection system that would put the onus on PWSs to provide and maintain data because it felt that the data would be more accurate if ACWA was the holder of the data. This has led to a work-intensive system for the small ACWA communications staff in terms of collecting data from a large number of PWSs. There have been instances where the ACWA staff have inputted data that was

not accurate or not current which then prompted them to contact hundreds of PWSs to verify that the data depicted on the map was accurate.



The ACWA's Drought Map.

Colorado

The Colorado Water Conservation Board (CWCB) launched its coh2o.co website in the spring of 2013 in response to severe drought conditions that were affecting large portions of the state in 2012. The website offers a search feature which allows users to

search water restrictions by entering a city, county or zip code. Users are then redirected to the webpage of the PWS associated with the information they entered. The CWCB saw a need to create the website because there was confusion among the public as to what the specific water-use restrictions were for each area. The Denver metro area has several different water providers with service areas that are not necessarily easy to distinguish. Furthermore, the mainstream media in the state is largely focused on Denver, and so during drought other communities in the state may not have been able to get the restriction information for their location from the Denver-based television news stations or newspapers. The CWCB wanted to ensure that the state would not infringe upon local control over water-use restriction information and messaging, and therefore it chose to redirect users to PWS websites rather than collect the information from PWSs for dissemination by the state. The CWCB contacted most of the PWSs in the state and offered them the opportunity to opt into voluntary participation with the coh2o.co website. Not all PWSs opted in and so there have been website users who have notified CWCB that they were not able to locate the information that they were looking for.

The website also features the “Drought Meter” widget. The widget provides links to a Colorado drought newsletter, the Colorado page on the U.S. Drought Monitor, and state maps depicting reservoir storage and snowpack. The CWCB has made the widget available for use on other websites and so it likely has a broader audience than the water-use restriction search feature. Among the entities that have utilized the widget on their website are PWSs, government agencies, and universities.

The benefits of the website are that it works as part of a coordinated effort to inform the public about the status of PWS water-use restrictions, helps the public

understand the reasons for the restrictions, and provides information about the spatial variability of drought in the state. It may also help encourage PWSs to keep water-use restriction information on their websites current and up-to-date. There has been no notable downside to the coh2o.co website, although there was the afore mentioned difficulty of users not being able to find information for their area.



The CWCB's Drought Meter Widget.

Nebraska

The Nebraska Department of Health and Human Services (DHHS) began collecting and disseminating PWS water-use restriction information in 2001 in response to drought that was affecting the state at that time. PWSs in Nebraska are required by law to monitor groundwater levels but it is voluntary for them to report that information and water-use restriction information to the DHHS. The DHHS staff collects the restriction information once per week through phone calls and emails. The information is depicted in spreadsheets that list PWS name, restriction reason, water level readings, restrictions implemented, restriction date and stage, population affected by restrictions, county monthly average rainfall, county average year-to-date rainfall, and proposed improvements. Updated spreadsheets are posted each week during the summer and fall. Previous spreadsheets are archived and accessible to users.

The information is used by the Nebraska Climate Assessment and Response Committee (CARC) in assembling its drought reports to the governor. The natural resource districts (NRDs) use the information in conjunction with groundwater monitoring. The information can also be used by the public to find out information about water supply and restrictions. The benefits of Nebraska's PWS restriction information collection and dissemination system are that it keeps PWSs diligent in monitoring groundwater levels and maintaining records, and provides information to the general public and to government agencies that need it.

North Carolina

In 2002 the Public Water Supply Section of the North Carolina Division of Water Resources (DWR) was required to assist vulnerable water systems that were impacted by drought conditions. At that time the staff started collecting PWS water-use restriction data, water use data, water supply data, and other data that they deemed necessary on a weekly basis in order to monitor which water systems were most vulnerable to running out of water. Originally staff from the regional offices would call and email PWSs to gather the information and then forward it to the central office where it would be compiled in a spreadsheet. Now the state has a web-based system where PWS managers enter in their own water-use restriction information. In 2007 it became mandatory by state law that PWSs report water-use restriction information to the DWR when they implement mandatory restrictions or when drought in their area has been designated as D3 (extreme) or D4 (exceptional). It is voluntary for PWSs to report voluntary restrictions and restrictions occurring during D0 (abnormally dry), D1 (moderate), and D2 (severe) conditions. The frequency of reporting is therefore dependent upon the severity of drought conditions. This information is depicted on a DWR website using maps, tables, pie charts, and lists that are

sortable according to many criteria including location, date of implementation, and restriction status.

Several agencies make use of the information. The Drought Manager Advisory Council uses the information in weekly conference calls as a water supply drought indicator. The DWR uses the data to keep the public informed about the status of PWS restrictions. The Division of Environmental Assistance and Customer Service, which is a part of the North Carolina Department of Environment and Natural Resources, has an audit program that assists residential, commercial, and industrial water users in finding ways to become more water-efficient in order to comply with water-use restrictions. The Department of Commerce and others use the information to help assess how drought is impacting the economy. The Water Supply Planning Section of DWR uses the information to make sure that PWSs are enacting water supply response plans during drought as they are required to do by state law. The system was credited with helping to prevent one community from running out of water in 2002 when a fire truck was used as pumping station to deliver water to one PWS that was on the verge of running out of water from another nearby PWS.

The system has been a good indicator of water system supply and has been effective for communicating with the public about PWS restrictions. One issue with the system that was identified as a key oversight is that PWSs are not required by law to notify the state when they rescind water-use restrictions. This means that information on the DWR website becomes outdated and inaccurate when drought conditions abate and DWR staff must contact PWSs to verify the accuracy of information and correct it if necessary.

Recommendations for States

The five interviews conducted for this research reveal the diversity in the approaches to sharing information between PWSs and state entities. By observing the successes and challenges experienced by these five states we can make recommendations to other states on how to establish the most effective and useful information sharing system. The two primary recommendations made here are (1) states should pass legislation that makes it mandatory for PWSs to report to the state when there is a change in the status of water-use restrictions, and (2) states should develop interactive web-based reporting systems to collect and disseminate water-use restriction information. The following sections describe these recommendations in more detail.

Mandatory Reporting

Only two (Alabama and North Carolina) of the five states that were interviewed for this research have laws that make it mandatory for PWSs to report water-use restrictions to the state government. The 2014 Alabama Drought Planning and Response Act mandates that PWSs report to the Alabama Office of Water Resources (OWR) when any type of water-use restrictions are implemented. This legislation had strong support and leadership from the governor of Alabama which was instrumental in getting it passed. North Carolina state law requires PWSs to report to the Division of Water Resources (DWR) when mandatory restrictions are implemented, or when drought conditions are designated as D3 (extreme) or D4 (exceptional). Therefore it is not mandatory for PWSs to report the implementation of voluntary restrictions, or restrictions when drought conditions are less than D3. Recall that PWSs in North Carolina also are not

required to notify the state when they rescind a restriction, which has led to outdated information on the DWR website and has required time and effort by its staff to correct.

By making it mandatory for PWSs to report any changes in water-use restriction status, this corrects the oversight experienced by North Carolina. It also simplifies the criteria for which restrictions need to be reported by tying reporting to changes in restrictions rather than to specific stages of drought or severity of restrictions. Ignorance or confusion about reporting triggers will thus be eliminated. The simplified criteria for reporting will also have the benefit of providing indicators of municipal water supplies from the earliest stages of drought. Waiting to report restrictions until they are mandatory, or D3 or D4, reduces warning lead times that could be used for drought mitigation and response planning. This valuable planning time can be maximized by monitoring the development of water-use restrictions from their earliest stages. Mandatory reporting would also eliminate the issue of missing information from PWSs that choose not to report to the state – an issue that was encountered by Colorado. Complete information for the entirety of the state helps to ensure that all residents who get water from PWSs can get restriction information for their area, and state hazard planners won't overlook developing drought situations in any part of the state.

Interactive Web-Based Reporting System

There were many different approaches among the five states for both the collection and the dissemination of PWS restriction information. There are two basic ways to approach the collection of information: (1) state officials contact PWSs seeking the information, or (2) the PWS provide the information state officials. The former method puts the onus on one state office to contact many PWSs throughout the state. Some states have upwards of 400 PWSs. Executing

this method through individual phone calls and email correspondence has the potential to require a burdensome amount of man-hours in situations where state offices have limited staff available for the task, and when drought conditions become severe and rapidly developing. This challenge was encountered by the Association of California Water Agencies (ACWA). By requiring the PWS managers to report to state officials when there is a change in restriction status, this spreads the burden of the information collection process among a broader base of personnel and frees up staff in state offices for other tasks. The recommendation here is that states develop an interactive web-based system where PWS managers and staff log on and enter water-use restriction information. States can decide what kind of information is relevant and useful for their particular needs. The Nebraska Department of Health and Human Services demonstrated a basic yet thorough set of categories for information that they ask for from PWSs. This information included PWS name, restriction reason, groundwater level readings, restrictions implemented, restriction date and stage, population affected by restrictions, county monthly average rainfall, county average year-to-date rainfall, and proposed improvements. Once a PWS decides to implement or change a restriction, a staff member from that system would simply log onto the web-based system and enter in the information. This simple task would likely take no more than fifteen minutes.

Once the information is entered by a PWS staff member the information could be made to automatically display on a state website. There are a variety of outputs formats that would be useful for presenting the information. The following is a list of recommended features for websites and information output:

Maps - The clickable color-coded Google Map interface used by ACWA is highly recommended because it is very user-friendly. Maps help convey the spatial

variability of drought conditions. Maps can be very basic or they can incorporate GIS layers to convey more information like watershed boundaries, PWS boundaries, reservoir location and storage, groundwater data, or population density.

Lists - Lists of water-use restrictions were used by Nebraska and North Carolina and are also recommended. North Carolina uses both maps and a list.

Search Feature - It is helpful to have a searchable database so the public can find the restrictions for their specific location. The Colorado Water Conservation Board's (CWCB) coh2o.co website has a search feature that allows users to enter a city, county, or zip code.

Sorting Feature - North Carolina's list is sortable by various criteria including PWS name, restriction status, date of restriction update, river basin, and county.

Summaries - These lists could also be summarized into comprehensive descriptions for the state. Nebraska and North Carolina provide summaries of the total number of PWSs on voluntary and mandatory restrictions, as well as the populations affected by each type of restriction.

Archives – Nebraska archives its weekly PWS drought impact reports. Users can access data from previous weeks, months, and years. Drought planners may find the data from these archives useful for researching the development of previous droughts and drought responses in order to apply those lessons to future planning efforts.

Supplemental Information – Many states offered other information to supplement drought restriction information. Snowpack levels, stream flows, groundwater levels, reservoir storage, and drought stage maps all provide additional information to help the public understand the reasons behind PWS restrictions.

Simple Domain Names and/or Prominent Links – The public should be able to easily find these websites. The CWCB’s coh2o.co website is a good example of a simple and memorable domain name. The links to these webpages should be available on the front pages of the websites for state government offices related to natural resources, water resources, environment, etc. PWSs should also provide links to the state website on their webpages. The media will have an easier time reporting a multitude of water-use restrictions that are in effect by referring the public to a single website with comprehensive information.

The combination of the afore mentioned features will have multiple benefits. First, it will streamline the information collection and dissemination process. Second, it will display the information in a variety of ways in order to make it useful to various users including state officials, PWS staff, and the public at large. Third, it will enhance and facilitate communication within and between levels of government and between PWSs.

Conclusions

Currently many states lack an organized system for sharing information about water-use restrictions between public water systems and state government offices. The two primary recommendations made here are (1) states should pass legislation that makes it mandatory for PWSs to report to the state when there is a change in the status of water-use

restrictions, and (2) states should develop interactive web-based reporting systems to collect and disseminate water-use restriction information. Successful implementation of these recommendations has a greater likelihood with strong support and leadership from the highest levels of state government. The primary benefits include enhancing drought response and mitigation planning and increasing public awareness of drought conditions and impacts.

APPENDIX I: Officials Interviewed

Alabama – Tom Littlepage, Chief of the Water Management Branch, Alabama Department of Economic and Community Affairs, The Office of Water Resources Division

California – Matt Williams, Communications Specialist, Association of California Water Agencies

Colorado – Taryn Finnessy, Drought and Climate Change Technical Specialist, Colorado Water Conservation Board, Colorado Department of Natural Resources

Nebraska – Scott Sprague, Environmental Assistance Coordinator, Capacity Development Coordinator, Nebraska Department of Health and Human Services

North Carolina – Linwood Peele, Water Supply Planning Branch Supervisor, North Carolina Department of Environment and Natural Resources, Division of Water Resources

APPENDIX II: Websites

Alabama - <http://www.adeca.alabama.gov/Divisions/owr/Documents/DroughtDeclaration.pdf>

California - <http://www.acwa.com/content/drought-map>

Colorado - <http://coh2o.co/>

Nebraska - http://dhhs.ne.gov/publichealth/Pages/enh_pws_conindex.aspx

North Carolina - <http://www.ncwater.org/?page=44>