In my last post, I outlined actions the State Water Resources Control Board (Board) can take to improve its future drought response capabilities.

Our core recommendation is for the Board to bring greater predictability, timeliness, and effectiveness to water rights administration and oversight during droughts by proactively developing a contingency-based framework to support its drought decision making. In other words, we argue that the Board should build a toolbox of well-thought-out response strategies it can deploy as needed. These strategies should be organized within a framework that guides decisions about whether, when, and how to implement each one.

Building the framework will involve a number of interrelated tasks and considerations. We summarize these below in *Table 1*, and I'll describe them briefly here:

For each important decision the Board might need to make during a drought, the Board would identify essential context, such as the appropriate spatial scales and timeframes for useful decision making. Next, defining clear objectives and performance measures will help the Board assess the likely impacts and acceptability of potential drought response actions. To make sure it considers taking specific actions at useful times, the Board would identify appropriate triggers (for example, based on hydrologic conditions). The Board would also lay out the overall process and specific procedures it will follow to decide on and implement each action, so it can respond swiftly and efficiently during a drought emergency. To identify critical data needs and gaps, the Board would characterize what information would help it decide whether to take, and how to effectively implement, each action. A critical step in organizing the framework will be mapping out the relationships between different decisions, objectives, measures, potential actions, triggers, processes, procedures, and information needs. Finally, to ensure that the framework improves over time, the Board would establish mechanisms for learning and making adjustments—both during and between droughts—in response to new information, legal developments, and experience gained from using the framework during droughts.

Embedded in this simple description is a lot of complexity. Therefore, our report details key aspects of, as well as important considerations for, framework development.

TASKS AND CONSIDERATIONS ASSOCIATED WITH DEVELOPING A CONTINGENCY-BASED FRAMEWORK TO SUPPORT DROUGHT DECISION MAKING

Identify decisions the Board might need to make during a drought. For each decision:

1 DECISION CONTEXT

Describe the context for the decision.

- What is the appropriate spatial scale (e.g., statewide, watershed, sub-watershed)?
- What is the appropriate temporal scope of the decision?
- How is the decision related to other decisions in time and space?

2 OBJECTIVES & MEASURES

Define objectives and performance measures for evaluating potential actions.

- What legal requirements and policy preferences help define objectives?
- What critical underlying decisions would help define objectives?
- What short-term and long-term substantive outcomes are intended?
- What process objectives are associated with the decision?
- How will substantive and procedural success be tracked and confirmed?

3 ACTIONS

Identify acceptable actions.

- What are the possible / likely consequences of an action for each objective?
- What are the possible / likely tradeoffs of an action for different objectives?
- What is the acceptable level of risk?

For each acceptable action:

4 TRIGGERS

Select appropriate triggers for considering (or presumptively taking) the action.

- What circumstances should cause the Board to consider taking the action?
- Under what circumstances, if any, would it be useful and appropriate for the action to be implemented as a default or presumptive action?

5 PROCESS & PROCEDURES

Detail the overall process and specific procedures related to each action.

- What is the presumptive implementation process?
- What variance procedures would be useful and appropriate?
- What communication and engagement protocols are needed for the public at large, marginalized communities, and other stakeholder subgroups?
- What coordination with other state, local, and federal actors is needed?

Overarching tasks and considerations:

6 INFORMATION NEEDS

Identify decision-relevant information.

- What information is already available and how will it be accessed and used?
- What information improvements would aid the decision-making process?
- What information improvements would enable better outcomes?

7 RELATIONSHIPS

Map relationships and interdependencies between framework components.

- How are decisions, objectives, measures, actions, triggers, processes and procedures, and information needs related?

8 LEARNING & ADJUSTMENT

Establish mechanisms for learning and making adjustments.

- How will the Board gauge the effectiveness of its actions during in-drought implementation?
- How will the Board make in-drought adjustments?
- What kind of post-drought retrospective analysis would be most useful?
- How will the Board make between drought adjustments?
- What proactive, non-emergency work would make particular decisions more straightforward or particular actions more effective?

Table 1. Outline of tasks and considerations associated with developing a contingency-based framework to support drought decision making

Regardless of how well it does or does not prepare, the Board's decisions during future droughts will have far-reaching consequences for California water users and ecosystems.

Developing a useful framework will not be easy, but by bringing an organized toolbox of well-thought out strategies to the next drought, the Board can provide more timely, effective, fair, and comprehensive water rights administration and oversight that reflect reasoned policy choices about how best to reconcile competing priorities and needs. Developing this toolbox in advance—with robust public input and feedback—will have many benefits. These include helping water users understand where the Board is coming from when it takes a drought action, making it easier for water managers to plan in the face of rising hydrologic uncertainty, and achieving better outcomes for vulnerable communities and ecosystems.

As I mentioned in my last post, some in-drought innovation and improvisation will always be necessary, and even desirable. But the Board can set the stage for more timely and effective decision making under pressure by identifying strategies and developing tools and protocols to address foreseeable drought scenarios. If the Board prepares well, and defensibly, it can minimize unnecessary ad hoc decision making and increase California's drought resilience.

In my next post, I'll illustrate how the Board might approach fleshing out a contingency-based framework for decisions related to curtailment.

This post is part of a series that draws on a pair of recent reports published as part of California's Fourth Climate Change Assessment. In the first report, my colleagues and I analyze how the State Water Resources Control Board—a key water decision maker whose actions affect how scarce water resources are allocated among different human and environmental uses during droughts—has carried out its water rights responsibilities during past droughts. In the second report, we offer recommendations for improving the agency's future drought response capabilities. You can find both reports here.

FEATURED IMAGE: Water levels in Folsom Lake prior to (in 2011) and during (in 2014) California's most recent major statewide drought (by California Department of Water Resources, *available at https://www.noaa.gov/explainers/drought-in-america-slow-moving-far-reaching*).