



## **INFORMATION ITEM**

### Lead Scientist's Report

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**Summary:** Delta Lead Scientist Dr. Laurel Larsen will discuss a recently published paper by Cravens et al. that introduces a drought management typology. This typology, an in-depth framework derived from a synthesis of 10 different case studies, lists four key facets to guide collaborative drought decision-making.

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#### **A TYPOLOGY OF DROUGHT DECISION MAKING: SYNTHESIZING ACROSS CASES TO UNDERSTAND DROUGHT PREPAREDNESS AND RESPONSE ACTIONS. CRAVENS ET AL., WEATHER AND CLIMATE EXTREMES, 2021**

Drought has an inextricable human dimension. Furthermore, the drought itself is most often defined relative to human needs for water. For these reasons, drought management is as much a human challenge as a scientific one. One need only listen to recent public comments at State Water Resources Control Board meetings to understand that drought decisions disproportionately impact certain human and ecological communities and that those impacts might be long-lasting. Thus, there have been many calls issued to understand those decision-making processes and their repercussions. For example, Action 1 of the 2017-2021 Science Action Agenda focuses on assessing the human dimensions of natural resources management decisions.

A major challenge in studying drought decision-making processes is that each drought is different, and different locations experience drought in very different contexts. The article by Cravens et al. addresses that challenge by creating a typology. A typology (**Attachment 1**) is a classification of variables that help investigators break down the complexity of the diverse contexts in which drought decision-making is conducted and think about the elements of that context discretely. It provides a lens through which drought responses in different places and times can be compared, facilitating lessons learned.

Building on two drought-focused workshops, Cravens et al. analyzed 10 case studies of drought decision-making across the western United States (not including California) to create their typology. The authors adopted a broad definition of "actors" and "decisions" in drought management, including not only groups with formal decision-making authority (such as government resource managers and certain private landowners and businesses like ranchers) but also groups with

informal authority (such as non-governmental organizations and watershed groups).

The typology comprises four defining elements that distinguish drought decision-making processes across the 10 cases, encapsulated in the questions:

- 1) How is the drought problem framed?
- 2) Who makes decisions about the droughts?
- 3) What are the decisions or actions taken in response to drought? and
- 4) What are the dynamic interactions among actors, decisions, and/or problem framings?

Taking these key aspects of drought decision-making into consideration not only answers how drought problems are framed, addressed, and by whom, but also contextualizes the reasoning behind those decisions. In unraveling the complex web of drought management, the typology can assist decision-makers in assessing a drought problem and identify both opportunities and barriers for action across a diverse set of actors.

Chapter 2 of the Delta Science Plan is all about identifying “mechanisms and tools to support regular and effective interactions among decision-makers, scientists, and stakeholders to provide a holistic understanding of the shared needs within the Delta system.” A typology that serves a wide range of actors and decisions in drought management is an example of a tool that supports collective action within the Delta. For example, the typology can help funding agencies identify questions and knowledge gaps and can help guide planning for drought-focused workshops. Additionally, the typology can help scientists consider human and societal elements not yet included in present research frameworks. Overall, the collaborative and learning implications of this typology suggest that it is an important new addition to the drought management toolbox.

## DELTA SCIENCE PROGRAM ACTIVITIES

### *DSC-JVS Data Science Internship Report-out*

Luis Lechuga is one of the two data science interns placed within the Council through a partnership with Jewish Vocational Services (JVS). Mr. Lechuga has been working with Dr. Sam Bashevkin to produce publicly viewable, interactive visualizations of a long-term record of zooplankton data collected across the Estuary. Zooplankton, an important food source for fish, have undergone a massive decline in population since the late 1970s. Synthesis and visualization of long-term data records such as this one can help communicate the nature of the problem and aid investigators in detecting patterns and potential associations with drivers of the decline.

As part of this month's LSR, Mr. Lechuga will provide an overview of his work with the Council and hit the highlights of his visualizations. Council members can view and interact with the visualizations at <https://public.tableau.com/app/profile/luis.lechuga/viz/SACZOOOP/Presentation>.

### *Delta Lead Scientist "Ask-Me-Anything" (AMA) Series*

The September and November episodes of the Delta Lead Scientist AMA series on Instagram Live constitute a two-part series focused on fellowship opportunities with the Council. On September 27, Dr. Larsen co-hosted a session with Council fellows Dr. Emily Ryznar and Jennica Moffat to discuss the California Sea Grant state policy fellowship. At the upcoming AMA on November 1 (12-12:30 PM), Dr. Larsen and co-host Dr. Denise Colombano (UC Berkeley postdoctoral scholar) will discuss the California Sea Grant Delta Science Fellow Program in preparation for the call for the 2022 class of Delta Science fellows. The fellowship is available to students at the masters through the postdoctoral level. To view the upcoming AMA or archives of past sessions, visit the Council's Instagram site, [@deltastewardshipcouncil](https://www.instagram.com/deltastewardshipcouncil).

### *Science Action Agenda Update*

Following the Science Action Agenda (SAA) Science Actions workshop in July 2021, the Science Program circulated a survey to those who attended the workshop. Participants were asked to comment on the draft top 25 Science Actions proposed for the 2022-2026 SAA and reviewed an additional 66 Science Actions that were not

selected to be in the top priority list. The list of nearly 100 Science Actions included in the survey was created following the workshop when Science Program staff reviewed and merged the 178 Science Actions that workshop participants drafted, then prioritized the set of Science Actions based on criteria vetted by workshop participants. Science Program staff are incorporating feedback from the 45 survey responses and drafting the SAA. The full draft 2022-2026 SAA will be circulated for public review in November 2021.

To learn more, please visit <https://scienceactionagenda.deltacouncil.ca.gov/> or email [SAA@deltacouncil.ca.gov](mailto:SAA@deltacouncil.ca.gov)

## ON YOUR RADAR

### *Environmental Justice Brownbag Series*

After a successful first talk about the implementation of the Human Right to Water by Laurel Firestone and Dr. Kristin Dobbin, the environmental justice brown bag series continued with a newly added talk on environmental justice reforms in government by Dr. Jill Harrison of the University of Colorado, Boulder. She presented on Wednesday, October 20, from 12-1 PM. Two additional talks are scheduled for November. On November 3, Kyle Whyte (University of Michigan) will speak on the topic of racialized disparities in flood risk and sea level rise risk in Stockton. Then, on December 8<sup>th</sup>, Raoul Lievanos (University of Oregon) will present on the topic of racialized disparities in flood risk and sea level rise risk in Stockton. As a reminder, all the series' talks are open to the public, will feature a Q&A segment, and are available through zoom registration.

To view the first talk of the series: <https://bit.ly/3ESSpfx>.

For more information on the rest of the series:

<https://caseagrants.ucsd.edu/events/webinar-environmental-justice-reforms-in-government>.

### *Workshop on Salinity Management Actions*

The Delta Science Program will be hosting a workshop on Salinity Management Actions in early 2022. The workshop aims to better understand the range of management solutions that can be used to address saltwater intrusion, which is more likely to occur when Delta freshwater outflow is low, as in a drought. This issue is both timely and urgent, particularly as climate change increases the likelihood and severity of drought conditions in the region. Participants in this workshop will identify and explore some of the impacts and trade-offs associated

with different salinity management scenarios and landscape planning alternatives. Participants will also work to identify the knowledge gaps that must be filled to complete a robust evaluation of the socioeconomic and ecological costs and benefits of management scenarios, in efforts to catalyze subsequent science activities that fill these gaps. The intent is that this workshop will lay the foundation for building a collaborative adaptive management framework for decision-making regarding salinity management actions in the face of prolonged and recurring droughts, through a process of co-production with diverse regional stakeholders. The workshop will be held virtually. Registration is free and open to the public. More information about the workshop date and registration will follow in the coming months.

*Adapting Restoration for a Changing Climate*

Adapting Restoration for a Changing Climate will be a two-day symposium held February 2-3, 2022. The symposium, a Delta Science Program initiative, was inspired by Delta Adapts and the need to support Delta Plan covered actions in the requirement or taking climate change into consideration in project planning. The symposium will include presentations and panel discussions on restoration and management across time in a changing climate. Sessions will highlight on-the-ground restoration projects that incorporate climate change into their planning and implementation, discussions of how to cultivate successful partnerships in these efforts, and visioning future permitting and planning processes that support climate-adaptive restoration. Presentations and discussions will be rooted in considerations of time horizons and integration across the estuary and its watershed. It is being planned in coordination with partners from the San Francisco Estuary Institute, the San Francisco Bay Conservation and Development Commission, Point Blue, the Solano Resource Conservation District, the Department of Water Resources, the California Department of Fish and Wildlife, California State University, Sacramento, San Francisco State University, and the University of California, Davis. More information on registration, which will be open to the public, will be available soon.

**BY THE NUMBERS**

Delta Science Program staff will provide a summary of current numbers related to Delta water and environmental management. The summary (**Attachment 2**) will inform the Council of recent counts, measurements, and monitoring figures driving water and environmental management issues.

**LIST OF ATTACHMENTS**

Attachment 1: Visual Abstract of Article Summary

Attachment 2: By the Numbers Summary (provided at the Council Meeting)

**CONTACT**

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