



Lead Scientist's Report

Summary: Lead Scientist John Callaway will discuss an article from the *Bulletin of the American Meteorological Society* on the characterization of the strength of atmospheric rivers, review the Interagency Ecological Program's report on aquatic vegetation, and summarize the recent Brown Bag Seminar. Dr. Callaway will also provide the By the Numbers Report.

A scale to characterize the strength and impacts of atmospheric rivers. Ralph, F. Martin; Rutz, Jonathan J.; Cordeira, Jason M.; Dettinger, Michael; Anderson, Michael; Reynolds, David; Schick, Lawrence J.; and Smallcomb, Chris. *Bulletin of the American Meteorological Society*. February 2019.

Atmospheric rivers (ARs) are large-scale channels of water vapor in the atmosphere that deliver precipitation, and ARs provide substantial environmental and societal benefits through the freshwater that they deliver. For example, roughly 30% to 50% of rain and snow in California come from ARs. These events are critical for filling reservoirs, sustaining wetlands, and affecting wildfire risks. Intense ARs, however, can also cause damage in the form of levee breaches, landslides, storm surge, and more. Similar potentially harmful storms, such as hurricanes and tornados, have characteristic scales that inform the public of impending risks, but no scale exists for ARs.

Scientists, weather forecasters, and users of weather information collaborated on this paper to create a categorization of the benefits and hazards from ARs. The categorical criteria to assess ARs incorporate the amount of water vapor in the AR and the duration of the AR in a given location. The five-step scale ranges from weak to exceptional; lower-ranked ARs are primarily beneficial and less hazardous, whereas stronger ARs are more hazardous. The categorization of ARs is a step toward preparing communities for potential weather-related disasters and providing better information for water planning. Improved understanding and forecasting of ARs relates directly to the implementation of Chapter 7 of the Delta Plan on reducing risk to people, property, and state interests in the Delta and to the Delta Levee Investment Strategy. The proposed AR scale will be useful for policymakers, emergency responders, and the public. State legislation passed in 2015 established a research, mitigation, and climate forecasting program to study the impacts of climate change on ARs and inform water resource management. The 2019-2020 State budget also provides \$9.25 million to study ARs and improve flood control efforts.

Interagency Ecological Program Aquatic Vegetation Report

Robust, long-term monitoring networks have been established for many components of the Delta ecosystem, including water quality, plankton, and fish. However, no regular monitoring exists for aquatic vegetation in the Delta. Aquatic vegetation provides many benefits, including fish habitat and carbon sequestration. However, aquatic vegetation can also have negative impacts, such as limiting boating activities and blocking water



intakes. The lack of regular data on aquatic vegetation prompted the Aquatic Vegetation Monitoring Group of the Interagency Ecological Program to develop the monitoring framework that is proposed in this report.

The report outlines the framework's objectives of:

1. Documenting trends in aquatic vegetation coverage and composition;
2. Supporting and guiding current management efforts; and
3. Integrating aquatic vegetation and environmental data sets to identify drivers of vegetation trends.

These objectives would be achieved through varying amounts of remote sensing technology and fieldwork, depending on funding availability. The report also outlines field sampling methods to ensure consistency of data collection. The monitoring program laid out in this document would provide data that can be used to inform current resource management decisions and improve predictions of future trends in aquatic vegetation. The management and reduction of invasive aquatic vegetation is addressed within Chapter 4 of the Delta Plan as part of the core strategies to achieve ecosystem goals in the Delta. Several Delta Science Program members contributed to the writing of this report.

Brown Bag Seminar

Managing Water Quality across Boundaries – Stephanie Fong, Interagency Ecological Program Coordinator Chair, California Department of Fish and Wildlife.

The Delta Science Program continued with the second of its three-part brown bag series focusing on Bay-Delta connections. The purpose of the series is to contribute to the on-going conversation about both Bay-Delta and Delta-watershed connections and how to strengthen those connections. Stephanie Fong spoke about managing water quality across boundaries in the Delta based on her 14 years of experience at the Central Valley Regional Water Quality Control Board and the State and Federal Contractors Water Agency, as well as her current position as the Coordinator Chair of the Interagency Ecological Program.

Ms. Fong identified three categories of boundaries in the Delta that can make managing water quality difficult: geographic boundaries, boundaries of responsibility, and interdisciplinary or technical boundaries. Within each of the categories, she also identified potential communication boundaries, ranging from not being able to communicate across different perspectives and people, to difficulty in reaching agreement on terminology or appropriate thresholds. Despite the multiple boundaries, Ms. Fong discussed that boundaries actually should be seen as opportunities, describing them as linkages or edges of a puzzle piece that can give guidance regarding how groups can work together.

Just as water quality issues are vast and complicated, the team working on them must have a deep and broad understanding of the issues, requiring multiple components or puzzle pieces. Interdisciplinary teams can better address multiple aspects of these



issues, while also working together to synthesize information and solve problems more efficiently. Ms. Fong also identified the importance of making small, singular steps to connect people or concepts, rather than attempting giant leaps that can increase the risk of misunderstanding.

Ms. Fong's talk concluded with several recommendations regarding how improved Delta linkages can be achieved. Recommendations included focusing on new efforts rather than re-evaluating typical approaches. Different approaches to water quality management may be tackled separately by multiple groups, but by no means should this be done in isolation, as improved communication and collaboration will save time and resources moving forward.

By the Numbers

Delta Science Program staff will provide a summary of current numbers related to Delta water and environmental management. The summary (Attachment 1) will inform the Council of recent counts, measurements, and monitoring figures driving water and environmental management issues.

List of Attachments

Attachment 1: By the Numbers Summary (report to be provided at the Council Meeting)

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