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INFORMATION ITEM

Watermaster Quarterly Update: Delta Consumptive Water Use Comparative Study

Summary: Delta Watermaster Michael Patrick George will present a quarterly report as required by the Delta Reform Act (Water Code §85230(d)). This report will focus on the recently completed Delta Consumptive Water Use Comparative Study.

Background

The Delta is both a transfer point for water stored in reservoirs on upstream tributaries and a source of otherwise free-flowing water for in-Delta water-rights holders. While the amount of water diverted from the Delta by the State and federal water projects is well known, less is known about the amount of water taken and consumptively used (not otherwise returned to the Delta in forms such as waste flow or runoff) by local in-Delta diverters.

Given the State's system of cascading water rights, in which upstream return flows are factored into downstream water rights, measuring and understanding consumptive use within the Delta is important not only to farmers but also to water facility managers, water rights regulators, and to those seeking to protect the Delta's human and natural ecosystem.

The State Water Resources Control Board (Water Board), as the State's principal water resources regulatory agency, has statutory authority to implement and enforce many types of regulatory policies and recommendations that help to implement the Delta Plan's policies and recommendations. Water Code section 85230(d) directs the State's Delta Watermaster to submit regular reports to the Water Board and to the Council on water issues.

At today's meeting, Mr. George will discuss the recently completed the Delta Consumptive Water Use Comparative Study: *A Comparative Study for Estimating Crop Evapotranspiration in the Delta*. He will be joined by one of the study's principal investigators, Dr. Josué Medellín-Azuara, Associate Professor in Civil and Environmental Engineering, UC Merced, and by Jesse Jankowski, Graduate Research Assistant, Center for Watershed Sciences, UC Davis.

Consumptive Use Study

In the most recent drought (2012-2016), lack of accurate and timely insight about crop water use in the complex setting of the Delta hampered both water resource management and water use regulation. In response, several State agencies, including

the Delta Stewardship Council, organized the first rigorous scientific effort to compare and improve seven emerging methods for estimating crop water use in the Delta. The study was organized by the Office of the Delta Watermaster and convened by the Center for Watershed Sciences at UC Davis to develop a better understanding of consumptive water use in the Delta by calibrating modeling, measurement, and other information from a variety of independent research and estimation efforts.

The two-year study is now complete and has been submitted for publication in the peer-reviewed online science journal, *San Francisco Estuary and Watershed Science*. A brief summary of the study, prepared by its authors, is available here. The summary includes links to the complete study and its technical appendices. The study—along with technical appendices and the publicly accessible supporting data—points the way toward significant improvement in understanding of agricultural practices and in how the Delta functioned under extreme drought conditions.

Among the major findings:

- The consumptive use of water by crops in the Delta was estimated at 1.45 million acre feet in 2015 (a severe drought year), and 1.38 million acre feet in 2016 (a year with average precipitation).
- The three major crops--alfalfa, corn and pasture--averaged nearly half of all crop consumptive use in the Delta in both study years.
- Agricultural land use in the Delta changed from 2015 to 2016, including more fallowed land, decreases in the three major crops and increases in young orchards. The changes in crop patterns account for the reduced water consumption from 2015 to 2016, notwithstanding the increased precipitation in 2016.

As a part of the process of calibrating the various methods, the study also resulted in refinements and improvements for each of the methodologies. Overall, the study indicates that emerging remote sensing technologies promise accurate consumptive use estimates at lower cost, greater frequency, improved comparability, and reduced intrusion. Application of this research promises to improve the water community's response to and ability to manage through future droughts.

The study brought together research teams from the University of California, Davis, the University of California, Merced, Cal Poly San Luis Obispo, California State University at Monterey Bay, the California Department of Water Resources, and the United States Department of Agriculture and NASA Ames Research Center. Council staff have been involved in reviewing and commenting on the study methods and results.

The study was supported by grants from the State Water Resources Control Board, the Delta Stewardship Council, the Delta Protection Commission, the Delta Conservancy, the North, Central and South Delta Water Agencies and UC Water. There were significant in-kind contributions from the Department of Water Resources, the

Agricultural Extension Service, The Nature Conservancy, The Environmental Defense Fund and many Delta farming organizations. Critical land use surveys were provided by Land IQ under an innovative contract with the Department of Water Resources.

Fiscal Information

Not applicable.

List of Attachments

Attachment 1: Online Summary of the Study. The Complete Study and Technical Appendices can be found in the Summary under “Project Documents and Datasets". [Available online only]

Attachment 2: PowerPoint presentation (to be provided at the Council meeting).

Contact

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