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Flood Managed Aquifer Recharge (Flood-MAR)

Background

California's statewide water system comprises many local, state, and federal projects. These projects include dams and reservoirs, hydropower plants, canals, and water diversion structures. Many of these facilities were developed in the early to mid-20th century, and were not designed, constructed, or operated as an integrated water supply and flood management system. Over time, operations of the two largest water supply projects, the State Water Project (SWP), operated by Department of Water Resources (DWR), and the Central Valley Project (CVP), operated by the U.S. Department of the Interior's Bureau of Reclamation (Reclamation), have started operating the systems in coordination.

In 2008, the Legislature directed DWR to identify options for the reoperation of the state's existing flood protection and water supply systems. DWR is conducting the System Reoperation Study (SRS) in cooperation with other state and federal agencies, local water districts, groundwater managers, and other stakeholders. The SRS will identify opportunities for enhanced systems efficiencies through coordinated operations between the SWP and CVP and between water supply and flood management infrastructure. California can do more with its existing water infrastructure by taking advantage of the physical interconnections (and enhancing them) while also operating the system in a coordinated manner to optimize the benefits.

The SRS includes several phases

- Phase I Report: <u>Plan of Study</u> (completed March 2011)
- Phase II Report: <u>Strategy Formulation and Refinement</u> (completed February 2014)
- Phase III Report: Assessment of Reoperation Strategies (completed August 2017)

The Phase III Report, which DWR <u>presented</u> to the Commission in September 2017, assessed the potential for integrated operations and recommended several strategies for improving water supply reliability, ecosystem restoration and protection, and flood protection.

Phase IV of the SRS will evaluate the strategies, including Flood-Managed Aquifer Recharge, or Flood-MAR. DWR is evaluating the use of high flows and planned reservoir releases for

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managed aquifer recharge on farmland, working landscapes, and managed natural lands to replenish groundwater, improve water supply reliability, reduce flood risk, and enhance ecosystems. DWR released a <u>Flood-MAR White Paper</u> in 2018 that described the Flood-MAR concept and identified barriers and challenges to implementation. DWR is evaluating Flood-MAR opportunities in the Merced River Basin as a watershed-scale pilot study (published findings expected in Fall 2019) and providing technical assistance to local landowners and water agencies interested in implementing Flood-MAR projects. Through a Research Advisory Committee (RAC), DWR is working with State and federal agencies, local/regional flood and water managers, nongovernmental organizations, and academia to identify opportunities and barriers to implementing Flood-MAR projects.

Other organizations are also investigating the potential for Flood-MAR to replenish aquifers by conducting pilot projects on agricultural lands. For example, in partnership with the Almond Board and University of California Davis, the Modesto Irrigation District <u>flooded almond</u> <u>orchards</u> southwest of Modesto with stormwater in three consecutive winters, with no resulting harm to the almond trees.

The Commission will hear presentations from a panel of individuals involved in Flood-MAR projects, including:

Kamyar Guivetchi, DWR's Manager of Statewide Integrated Water Management, will present DWR's Flood-MAR initiative and describe the status of research efforts.

Don Cameron, President of the State Board of Food and Agriculture and General Manager of Terranova Ranch in Helm, California, has been working toward on-farm water recharge for over 25 years. In 2011, Terranova applied flood water to farm fields. In 2012 the Kings River Conservation District (KRCD) was granted \$5 million from DWR, along with \$2 million in matching funds from Terranova Ranch, to build infrastructure in order to capture and distribute floodwater to Terranova and nearby farmland for on-farm recharge. Sustainable Conservation and UC Davis have been partners in this project. Work is progressing to implement this project which, at full capacity, will be able to recharge up to 1,000 acre feet of floodwater per day.

Laura Foglia is a senior Engineer with Larry Walker Associates and adjunct associate Professor at University of California Davis. She holds a Master in Physics from University of Milan, Italy, and a PhD in Environmental Engineering from ETH Zurich, Switzerland. Her research focuses on understanding integrated groundwater/surface water systems at local and macro-scales. She is supporting several Groundwater Sustainability Agencies throughout the State in the development of their Groundwater Sustainability Plans for SGMA. She will describe one of these efforts, a partnership with the Omochumne-Hartnell Water District, to divert 4,000 to Agenda Item: 10 Meeting Date: March 20, 2019 Page 3

6,000 acre-feet per year onto two vineyards located between the Cosumnes River and Deer Creek in Wilton.

Helen E. Dahlke is an Associate Professor in Integrated Hydrologic Sciences at the University of California, Davis. Helen Dahlke obtained a PhD degree in Environmental Engineering from Cornell University. Helen's current research interests include surface water – groundwater interaction, water resources management, vadose zone transport processes, and applications of DNA nanotechnology in hydrology. One of her main research efforts focuses on testing the feasibility of using agricultural fields as recharge sites for groundwater banking.

Josh Viers, UC Merced, and/or Carson Jeffres, UC Davis, will present an overview of the Oneto-Denier Floodplain restoration located west of the Cosumnes Preserve. The Commission will visit this site upon conclusion of the regular business agenda. Dr. Viers is a watershed scientist with expertise in resource management and environmental decision making. His watershed research includes agroecology and conservation agriculture planning and implementation. Dr. Jeffres research interest is how native fish utilize and benefit from restored habitats. His research focuses on how physical processes within a watershed create ecologically important conditions favorable to a productive food web and include sampling water quality, hydrologic conditions, primary producers (plants), invertebrates, and fish.

Site Visit to the Oneto-Denier Floodplain Restoration

After the Commission concludes its regular business agenda, it will either adjourn or recess, and reconvene the meeting or hold a workshop at the Cosumnes Preserve Visitor Center in Galt, California. At the Preserve, the Commission will receive an overview and take a tour of the Oneto-Denier Floodplain restoration project. The project is a joint effort of the UC Center for Watershed Sciences and the Nature Conservancy to restore riparian and floodplain functions, including recharging of groundwater.

This is an informational item.

Contact Jennifer Ruffolo Assistant Executive Officer California Water Commission (916) 653-7937