Potential Flood Risk Reduction and Ecosystem Benefits of Managed Groundwater Recharge

November 8, 2017

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Managing for Different Hydrologic Conditions



Because river flows vary over days, seasons and years, actions to manage flows differ





Benefits of Using Flood Water to Recharge

FLOOD RISK REDUCTION BENEFITS

ECOSYSTEM BENEFITS

- Reduced Subsidence
- Reduced Intensification
- Reduced Flow/Stage

- Groundwater Recharge
- Increased Inundation
- Increased Ecosystem Output





Subsidence in Upper San Joaquin Valley



Urbanization Along the San Joaquin River



Approx. Levee Breach, Feb 2017

Approx. Levee Breach, Feb 2017

San Joaquin River

REDUCED INTENSIFICATION BENEFITS FLOOD





Typical Levee Cross-Section







Typical Levee Forces with High Water Elevation



Typical Levee Forces with Lower Water Elevation

Typical Levee Forces with Lowest Water Elevation

Needed Reduction of Stage and Flow

- All failure modes are not eliminated by reduction in river stage and flow
- However, magnitude of leveraging forces and failure modes can be greatly decreased

REDUCED STAGE/FLOW BENEFITS FLOOD

Opportunities of Using Flood Water to Recharge

POTENTIAL FLOOD ACTIONS

POTENTIAL ECOSYSTEM SOLUTIONS

- Flood control reservoirs
- Off-stream reservoirs
- Setback levees
- Shallow recharge, such as transitory and floodplain storage
- 2016 CVFPP Conservation Strategy identified opportunities and solutions

Opportunities of Using Flood Water to Recharge

POTENTIAL FLOOD ACTIONS

POTENTIAL ACTIONS

Opportunities of Using Flood Water to Recharge

POTENTIAL ECOSYSTEM SOLUTIONS

Summary Points

- Any time water is **above the toe of a levee**, the movement of that water is slowly working to **compromise that levee**.
- It is not just in the interest of the people protected by the levee to maintain it, but everybody else who relies on **delivery of water** through levee protected areas are **benefiting for levee maintenance**.
- Reducing the height of water in a floodway will help reduce the consequences associated with a potential levee failure.
- Many different potential opportunities exist within the California, justifying that a **portfolio** of future projects **be explored**. There is no silver bullet or single type of project.

