

Central Valley Flood Protection Plan Climate Change Threshold Analysis Work Group Meeting #1

Worksheet 1: Critical Components

While the entire SPFC will be impacted by climate change, it may be useful to identify critical components within the flood system that require extensive or urgent analysis. Three potential options for describing critical system components have been identified:

- **Uncontrolled reservoir release.** Reservoir operations are a key for managing flood reserve space and downstream flows given changes to the pattern of inflows. Changing flow regimes may result in reservoir encroachment, with no physical space within the flood system to remove the encroached conditions. This would result in a decrease of the regulating ability of the reservoir and result in uncontrolled release. The threshold analysis can focus on critical reservoirs and identify thresholds that would lead to encroachment and subsequent loss of flood-regulating capacity associated with changes to flow regimes attributable to climate change.
- **Levee failure.** DWR currently has several efforts underway to identify areas where levees are likely to fail. The Threshold Analysis can focus on levees that are vulnerable and identify thresholds where the probability of failure would increase past an unacceptable level.
- **Chokepoint identification.** The Threshold Analysis could focus on key “chokepoints” within the flood system, such as the confluence of two rivers with upstream flood control reservoirs, where operations of one piece of flood control infrastructure may be constrained by operations of another. These downstream control points are codified in the objective releases of flood management reservoirs, such as the flow restriction at Ord Ferry that influences the operation of Shasta Reservoir. The Threshold Analysis can focus on these points that impact both reservoir operations and levee failure, or uncontrolled reservoir release.

Question 1

Which method for identifying critical system components should be used?

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Worksheet 2: Sampling Extreme Events

DWR currently uses two primary approaches for analysis of climate change.

In the 2009 Climate Action Team (CAT) report process, six different GCM runs for two different IPCC emission scenarios were considered. DWR has used these scenarios in its CAT reporting activities.

Another approach for future climate projection scenario selection used in DWR planning studies is the informed ensemble approach. In this approach, a collection of five ensemble projections are used for planning simulation studies. These five ensemble projections are built focusing on different areas of the range of the projection space for precipitation and temperature. The range of the projection space for precipitation and temperature is divided into quadrants along with a fifth region that represents the central tendency of the projection space.

The CVFPP Thresholds Approach is the first planning study to focus on flood analyses rather than water supply or water quality analyses. Within this broader context, sampling of extreme events from climate projections will likely require unique methodology.

Question 1

Looking at an entire future projection

- (1) What elements would you sample?
- (2) Would you sample from a subset of current GCMs, or using the informed ensemble approach? Pros and cons.

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Worksheet 3: Hydrologic and Operations Modeling Tools

The DWR Division of Flood Management, Hydrology and Flood Operations Office (HAFOO) has an existing methodology and a set of tools for assessing hydrologic conditions in a forecasting and project planning capacity. Current model capabilities include the National Weather Service River Forecasting System, the USACE HEC-HMS modeling system, and the USGS watershed model PRMS. Investment is currently being made in the further development of these tools and models to accommodate a greater range of simulation capabilities including climate change impacts assessments. The current and future versions of the CVFPP will rely on these modeling capabilities to simulate hydrologic metrics and the impacts of climate change upon those metrics to provide information to assess the community metrics.

Question 1

Does the work group recommend any specifications of capability that CVFPP needs to have to successfully implement the Threshold Analysis approach?

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Worksheet 4: Definition of Threshold Analysis

Here is an initial definition for consideration, taken from the Climate Change Scope Definition Work Group:

The Threshold Analysis will describe critical components of the existing flood management system and modes of operation that are vulnerable to climate change impacts, and associated threshold indicators for such vulnerability. The analysis will define associated action thresholds for planners.

Question 1

How can we improve on this definition? How would you write it?