



CALFED Progress Report
California Sea Grant College Program

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Project Information

ProjectNo_2C R/SF-39 StartDate_3a 9/1/2008 (rev.) EndDate_3b 8/31/2010 (rev.)
ProjectTitle_4 Scenarios for Restoring Ecologically Functional Floodplains and Providing Flood Control Services in the Sacramento-San Joaquin Delta

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Additional Research Mentors and Community Mentors

Additional Research Mentors_8

Form with 6 horizontal lines for entering additional research mentors.

Additional Community Mentors_9

Form with 6 horizontal lines for entering additional community mentors.

Project Objectives: Please type your responses, and answer the questions in a style appropriate for laymen.

ProjectObjectives_10

The main goal of this project is to develop a spatially explicit model of potential floodplain restoration sites using a new indicator for quantifying floodplain function that can provide ecological, water supply, and public safety benefits. There are two primary components to developing this idea: 1) a coarse level evaluation of spatial data and 2) a fine scale analysis of site functional floodplain potential. The Year 1 objectives/tasks below describe initial steps in this process.

Year 1 Tasks

- Task 1: Scoping, interviews, and identification of analysis watersheds.
- Task 2: Data collection (aerial LIDAR, ground-based LIDAR, field visits, and hydrologic data).
- Task 3: Testing of initial GIS and hydrological analysis methodology.
- Task 4: Preparation of year 1 results (statistics, maps).

Summary of progress in meeting each of these goals and objectives

ProgressSummary_11

Task 1. Scoping, interviews, and identification of analysis watersheds: Through collaboration with my community mentor, John Cain of American Rivers, I scoped out floodplain restoration site ideas in the Central Valley (CV) and Delta. Depending on the goal or potential for a floodplain site, different locations were emphasized. We explored the following basic strategies for expanding floodway capacity: 1) bypasses, 2) overflow basins, and 3) levee setbacks. We identified 14 potential floodway expansion options in the CV system, but only 6 are Delta specific. In the Delta, the Yolo Bypass expansion, New Ship Channel Bypass, Fabian Union Attenuation Marsh, Old River set back levee, New South Delta bypass, and Vernalis backwater bypass are sites that I plan to examine further. Specifically, I will focus on the San Joaquin River South Delta/Vernalis region and the Yolo Bypass.

I also attended the Central Valley Flood Management Planning Program Environmental Stewardship Scope Definition Work Group meetings in fall of 2009. We discussed the following: 1) Major environmental challenges, 2) Major opportunities, 3) Key principles, 4) Environmental goals, and 5) Measures of success for environmental stewardship for Central Valley flood management. In May of 2010, I went on the Water Education Foundation's Flood Management Tour and interacted with experts on the flood threats and flood management programs related to the South Delta and the lower San Joaquin River.

Task 2. Data collection: I compiled 1m and 2m aerial LIDAR data for the Delta, but did not collect ground-based LIDAR yet. I collected hydrologic data for gages of interest, as well as the USGS Cascade model daily flow data for 2000-2099 climate change scenarios. I began a literature review to support calculations of the aquatic ecosystem productivity benefits associated with the area, timing, frequency, and duration of inundation generated under different flow scenarios.

Task 3. Testing of initial GIS and hydrological analysis methodology: I conducted a screening level GIS analysis to identify potential sites and develop methodology for floodway expansion scenarios. This task included organization of data layers for hydrography, soils, aerial LIDAR topography, infrastructure, land use, and available parcel maps. I identified promising opportunities for each restoration tool in light of combinations of best professional judgment and available spatial data. I also tested the U.S. Army Corps of Engineers HEC-EFM Ecosystem Functions Model to define hydrologic criteria for floodplain activation flows at specific sites, with functional stage specified by flood frequency, duration, and seasonality.

Task 4. Preparation of year 1 results: I prepared maps of incremental coarse scale suitability analysis results and used hydrologic data analysis with gage data to explore potential functional floodplain events.

PROJECT MODIFICATIONS: Please explain any substantial modifications in research plans, including new directions pursued. Describe major problems encountered, especially problems with experimental protocols and how they were resolved. Describe any ancillary research topics developed.

Modifications_12

A feature of this work that was added is attention to potential for water supply benefits from expanding the floodway in appropriate watersheds. The general idea is to model increased capacity of the floodway associated with a particular combination of floodway expansion opportunities, calculate adjustments of flood reservation rules in upstream reservoirs designed to maintain an equal level of flood protection (i.e. 50 year or 100 year) relative to baseline conditions, and then evaluate changes in flow routing and water storage using a screening level spread sheet model.

BENEFITS AND APPLICATIONS: Suggest the relevance of these new findings to management. Describe any accomplishment, that is significant effects your project has had on resource management or user group behavior. CALFED is looking for "management cue" (see <http://science.calwater.ca.gov/pdf/soemgmtcues.pdf>).

BenefitsApplic_13

The Central Valley Flood Management Planning Program aims to improve integrated flood management in the Sacramento and San Joaquin Valleys. Defining and quantifying functional floodplains might help managers to specify floodplain restoration goals and measures of success in achieving them.

