

A Conceptual Model for Floodplains in the Sacramento–San Joaquin Delta

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ABSTRACT

Floodplains are among the most biologically productive and diverse ecosystems on Earth and they provide significant benefits to society such as attenuation of floodwaters, groundwater recharge, filtration of nutrients and sediments, carbon sequestration, fisheries productivity and recreation. However, floodplains are also among the most converted and threatened ecosystems. Floodplain habitats in the Sacramento–San Joaquin Delta (the Delta), and throughout California's Central Valley, have been greatly reduced from their historic extent and key processes that create and maintain floodplains, such as flood flows and meander migration, have been greatly altered. These widespread alterations to habitats and processes have led to declines in many species' populations in the Delta and Central Valley, creating challenges for both environmental and water management. To address these challenges numerous entities and programs are now focused on restoring floodplains and other Delta habitats. This paper provides a conceptual model for floodplains that characterizes the key features and identifies the critical processes, drivers, and linkages that allow floodplains to produce a variety of functional outputs important

to management. These outputs include: (1) the floodplain habitat mosaic, including riparian vegetation and its associated wildlife; (2) spawning and rearing habitat for native fish; and (3) food-web productivity that can support native fish on the floodplain as well as be exported to downstream ecosystems. The model emphasizes that the production of these outputs requires hydrological connectivity between river and floodplain across a broad range of flow conditions. For example, long-duration flooding in the spring promotes native fish spawning and food-web productivity that benefits native species.

KEY WORDS

Floodplain, riparian forest, floodplain food web, Chinook salmon, Sacramento splittail, Delta Regional Ecosystem Restoration Implementation Plan (DRERIP).

INTRODUCTION

The Sacramento–San Joaquin Delta, within California's Central Valley (Figure 1), encompasses a broad suite of habitat types including open water, tidal marsh, agricultural fields, and river-floodplain ecosystems (TBI 1998). The Delta's ecosystem has declined, with numerous species listed as threatened or endangered, and faces numerous ongoing threats (Sommer and others 1997; Lund and others 2007;

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