# 3 ENVIRONMENTAL SETTING

This chapter summarizes the existing land uses, resource values, and local and regional plans that influence the management, operations, and visitor experiences at the Yolo Bypass Wildlife Area. The environmental setting chapter provides the baseline data for developing goals and tasks (Chapter 5) in this land management plan (LMP). It also constitutes the baseline conditions to compare with the proposed project (i.e., Chapter 5 goals and tasks) in accordance with State California Environmental Quality Act (CEQA) Guidelines Section 15125.

The chapter is divided into seven main sections. Section 3.1 discusses planning influences and considerations. Sections 3.2 through 3.7 address the six primary resource topics discussed in this LMP: Agricultural Land and Land Uses; Climate, Geology, Topography, and Soils; Geomorphology, Hydrology, and Water Resources; Biological Resources; Cultural Resources; and Recreation and Public Access.

One objective of this chapter is to briefly describe what is known about the historical setting and principal natural and human-caused changes in the Basin and Bypass that have occurred over time. A second objective is to describe the key physical, chemical, and biological conditions of the Yolo Bypass that define the Yolo Bypass Wildlife Area's existing characteristics as they relate to existing beneficial uses and potential restoration opportunities.

## HISTORICAL CONTEXT

The historic setting of the Yolo Bypass Wildlife Area can be generally divided into two distinct conditions: 1) natural predisturbance conditions and 2) conditions and processes that have been affected by historic changes in the landscape.

### Natural Predisturbance Conditions

The historic Yolo Basin was formed on the western floodplain of the Sacramento River. It was a vast floodplain influenced by seasonal high flows sustaining a diverse mosaic of natural communities. These communities provided habitat and stop-over areas to numerous species of fish and wildlife. Arguably, the most important ecological features were the wetlands and riparian ecosystems, which covered huge areas, supported high seasonal concentrations of wildlife and fish, and contained many endemic species. Before European colonization, the Yolo Basin intermittently received water, sediment, nutrients, other dissolved and suspended constituents, wood, organisms, and other debris from the Sacramento River and its many tributaries which then passed through to the Sacramento-San Joaquin Delta, the Suisun, San Pablo, and San Francisco Bays and ultimately to the Pacific Ocean. Hundreds of species of plants, wildlife, and fish evolved to take advantage of the hydrologic and geomorphic characteristics of this system and the Delta (CALFED Bay-Delta Authority 2000a).

The Mediterranean climate of the region ensures that the aquatic and riparian systems are highly dynamic, driven by strong annual patterns of wet winters and dry summers and longer multi-year periods of extreme wet and drought conditions. The high peaks of the Sierra Nevada intercept much of the moisture coming off the ocean and stores it as snow and ice that melts gradually, generating cold rivers that flow throughout the dry summers. During periods of high snowfall and rainfall prior to large scale changes, much of the Central Valley, including the Yolo Basin, became inundated, forming an extensive shallow lake that took months to drain through the narrows of the Bay-Delta system. In periods of drought, the Basin would be reduced to shallow pools and other seasonal wetland features (CALFED Bay-Delta Authority 2000a). The decreased outflow of the Sacramento San Joaquin Delta resulted in increased salinity due to the magnified influence of the San Francisco Bay system tides. Saline conditions were reported well into the Yolo Basin prior to the construction of Shasta Dam.

The productive floodplain marshlands and seasonal intervening waterways were extremely attractive to waterbirds. The abundant and diverse resident populations of ducks, geese, shorebirds, herons, and other birds were augmented by millions of ducks, geese, shorebirds, and cranes migrating south in fall and winter from

summer breeding grounds in the north. The migratory birds would take advantage of the expanded wetlands that were the result of the winter rains and floods. Arguably, the Pacific Flyway, one of the major migratory routes for birds in North America, owes its existence to the Great Central Valley and its wetlands. No matter how severe the drought, there would be wetlands somewhere in the valley (CALFED Bay-Delta Authority 2000a).

Anadromous fish also found the region to be very favorable habitat when innundated. Chinook salmon (*Oncorhynchus tshawytscha*) migrated through or reared in the system, along with steelhead (*O. mykiss*), sturgeon (*Acipensier* spp.), and lamprey (*Lampetra* spp.) (CALFED Bay-Delta Authority 2000a).

The once abundant and migratory (i.e., semi-anadromous) delta smelt (*Hypomesus transpacificus*) could move up and down with the seasons, seeking favorable seasonal conditions for spawning and rearing of young. The short, 1- to 2-year life cycles of these fish suggests that appropriate spawning and rearing habitat conditions were consistently available at one or another location within the Delta system in most years, regardless of the prevailing climatic patterns. In contrast, the resident fishes were largely stream or floodplain spawners that did not necessarily find appropriate conditions for spawning and rearing of young every season. As a consequence, they adopted a life history strategy of living 5 or more years, enabling these species to spawn and exploit floodplains on those inconsistent occasions when the rivers flooded. Middens near Native American village sites throughout the Central Valley and Delta indicate that many of these fishes (e.g., thicktail chub [*Gila crassicauda*], Sacramento perch [*Archoplites interruptus*], Sacramento splittail [*Pogonichthys macrolepidotus*], hitch [*Lavinia exilicauda*], and Sacramento blackfish [*Orthodon microlepidotus*]) were extremely abundant and easy to harvest (CALFED Bay-Delta Authority 2000a).

### How Historic Changes to the Landscape and Processes Have Affected Habitat and Species

The Yolo Basin ecosystem has been profoundly altered over time by human activity. The most considerable alteration of the ecosystem and loss of wetlands began with hydraulic gold mining operations in the mid-1800s that led to downstream deposition of sediments in the Delta and Bay, including the mineral byproducts of the mining operations. Shortly thereafter, levee building in the Central Valley began disconnecting the main rivers from their floodplains. In the 20$^{th}$ century, the construction of dams and reservoirs on the Sacramento, Feather, and American rivers dramatically changed the hydrology of the Yolo Bypass. Additionally, construction of Monticello Dam on Putah Creek in 1955 significantly altered the flooding patterns of this sometimes very powerful stream. Vast amounts of water was stored in these newly constructed reservoirs, and gradually released throughout the year. The operation of these reservoirs became the primary factor controlling flooding in the Yolo Bypass as the area was transformed into the primary flood control feature of the Sacramento Valley, the Yolo Bypass. Today, the Yolo Bypass provides flood protection for hundreds of thousands of acres of highly productive agricultural lands and for millions of people in surrounding urbanized and rural areas.

In more recent times, the lands within the Bypass have been used for farming and grazing with limited wetland management taking place on private waterfowl hunting club lands. The creation of the Yolo Bypass Wildlife Area has resulted in restoration and management of wetland, riparian, and grassland communities that provide habitat for a diverse assortment of plant, wildlife, and fish species and the creation of educational and interpretive programs, and partnerships to serve the public. The notable traditions of agriculture have also been maintained throughout the Yolo Bypass Wildlife Area, employing innovative wildlife friendly management strategies to achieve multiple resource objectives.