NATIONAL WETLANDS INVENTORY

NOTES TO USERS

TULARE BASIN CALIFORNIA

1:100,000 SCALE MAPS

National Wetland Inventory

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INTRODUCTION:

The U.S. Fish and Wildlife Service, office of Habitat Resources, is conducting an inventory of the wetlands of the United States. The National Wetlands Inventory (NWI) is establishing a wetland data base in both map and computer forms for the entire country. The NWI information will serve to identify the current status of U.S. wetlands and can be used as a reference point from which future changes in wetlands can be evaluated.

PURPOSE:

The purpose of Notes to Users is to provide general information regarding the production of NWI maps and wetlands found within a relatively similar geographic area. Notes to Users are not intended to include complete description of all wetlands found in the area nor provide complete plant species information.

AREA COVERED:

The area covered is defined by the Fresno NW, SW and Bakersfield NW, SW intermediate scale USGS maps (1:100,000). The area falls within the San Joaquin Valley and the western slope of the Sierra Nevada range. Bailey's Ecoregion Classification (1978) identifies the San Joaquin Valley as the California Grassland Province (2610) and the Sierra Nevada as the Sierran Forest Province (M2610).

PHYSIOGRAPHY:

The topography of the area is characterized by the flat alluvial plain of the San Joaquin Valley and the Sierra Nevada range which forms a barrier on the eastern side of the valley. The eastern slope of the Sierra Nevada range has many deeply cut river canyons. The rivers are fed by many tributaries that are commonly separated by sharp crested interfluves adjacent to the streams. The dominant waterways include the San Joaquin, Kings, Kern, Tule, and Kaweah rivers. The San Joaquin flows southwesterly through the area and eventually drains into San Francisco Bay. The Kings, Kern, Tule, and Kaweah rivers originate in the Sierra Nevada and flow into the valley rather than through it. The Kings, Kern, and Kaweah rivers are pumped into various irrigation canals along the eastern edge of the San Joaquin Valley.

The San Joaquin Valley is mostly cultivated and supports a variety of crops under irrigation. The majority of farming takes place in the Tulare, Buena Vista, and Kern lake beds which have been drained and now support crops. Some natural vegetation remains on alluvial fans and terraces and in some areas of unreclaimed saline-alkali soils. In the foothills the vegetation ranges from annual grasses to dense cover of trees and shrubs. The principal trees in the woodlands are blue oak, interior live oak, and California buckeye. The trees at higher elevations are canyon live oak, black oak, ponderosa and sugar pines, incense-cedar, and white fir. Giant sequoias are found mostly on the north facing slopes at higher elevations.

CLIMATE:

The climate of the San Joaquin Valley is hot and dry in summer and cool and moist in winter. Most precipitation falls in December, January, and February. Annual rainfall ranges from approximately 6 inches in the San Joaquin Valley to 30 inches in higher elevations of the Sierra Nevada. Annual temperatures average 55°F to 60°F.

HYDROLOGY:

Due to the climatic and agricultural characteristics of the area water supply is very strictly managed. The natural source of water in the region is from rainfall and snowfall in the Sierra Nevada. This surface water flows into the area through the Kings, Kern, Kaweah and San Joaquin Rivers where it is collected and controlled by large dams. These dams protect from spring flooding and are storage facilities for summer irrigation. By diverting these headwaters many of the natural vast lake beds and adjacent marshes were drained. To restore wetlands and provide habitat for migratory birds along the Pacific flyway, Kern and Pixley wildlife refuges were established and are artifically flooded with surplus irrigation water. Many marshes and duck ponds are flooded on a seasonal basis using dikes, canals, and pumping stations. These wetlands are drained in the spring and reflooded in the fall. Flooding occurs along many stream courses throughout the area on a seasonal and temporary basis depending on fall and winter rainfall.

SOILS:

The soils of the San Joaquin Valley are Entisols, Aridisols, and Alfisols. The Entisol and Aridisols make up the valley floor with the Aridisols occurring in the more arid southern portions. The Alfisols occur at slightly higher elevations. The soils of this group consist of deposits washed from the Sierra Nevada and form alluvial fans on the valley floor. Soils of the Sierra Nevada are Ultisols which dominate the mountain slopes where the air is humid.

MAP PREPARATION:

Wetland classification for the NWI maps is in accordance with "Classification of Wetlands and Deep-Water Habitats of the United States" (Cowardin, et al, 1979), and mapping conventions developed for the purposes of the Inventory.

Wetland classification and delineations were produced by photointerpretation of high altitude aerial photography. The aerial photography used was 1984 and 1983 color infrared at a scale of 1:58,000. The area covered encompassed four flightlines photographed during the months of June, September, February and March.

Photographs were stereoscopically viewed under magnification and wetland boundaries were delineated directly on overlays and labelled according to the classification system. Delineations were enlarged to a scale of 1:24,000 using a zoom-transfer scope and fitted to USGS 7 1/2' topographic maps.

The Project Officer for production of the wetland maps was Dennis Peters, Regional Wetlands Coordinator, U.S. Fish and Wildlife Service, Region 1, Lloyd 500 Building, 500 NE Multnomah Street, Portland, Oregon 97232, telephone (503) 231-6154. Maps were prepared by Martel Laboratories, Inc., and the NWI National Team in St. Petersburg, Florida.

USER CAUTION:

The map documents were prepared primarily by stereoscopic analysis of high altitude aerial photographs. Wetlands were identified on the photographs based on vegetation, visible hydrology, and geography. The aerial photographs typically reflected conditions during the specific year and season when they were taken. In addition, there is a margin of error inherent in the use of aerial photographs. Thus a detailed on-the-ground and historical analysis of a single site may result in revision of the wetland boundaries established through photographic interpretation. In addition, some small wetlands and those obscured by dense forest cover may not be included in the map document.

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt in either the design or products of this inventory to define limits of proprietary jurisdiction of any federal, state, or local government or to establish the geographical scope of regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specific agency regulatory programs and proprietary jurisdictions that may affect such activities.

WETLAND COMMUNITIES AND DEEPWATER HABITATS:

Three wetland systems, Riverine, Lacustrine, and Palustrines are represented in the subject area. The majority of these wetlands are located within the San Joaquin Valley. A smaller portion is associated with the Sierra Nevada range and foothills.

Riverine deepwater habitats include unconsolidated bottom of the lower perennial (R2UBH) and upper perennial (R3UBH) subsystems. In the riverine system seasonally flooded unconsolidated shores are common and should be classified as R2USC. Also present in the riverine system are intermittent streambeds classified as R4SBC.

Lacustrine deepwater habitats are classified as unconsolidated bottom permanently flooded (L1UBH). The major Lacustrine unconsolidated bottom wetland types in the subject area are the Pine Flat, Millerton, and Terminus reservoirs. Lacustrine unconsolidated shore wetlands occur throughout the subject area as salt lakes or salt flats. Seasonal salt flats greater than 20 acres were classified as lacustrine unconsolidated shore (L2USC). Soda Lake, located in the Carrizo Plain, is Lacustrine unconsolidated shore with a seasonally flooded water regime (L2USC). The Tulare, Buena Vista, and Kern Lake beds are now drained and artifically controlled for farming practices. These basins are classified as Lacustrine with the farmed modifier (Lf). Percolation ponds also occur in the subject area and are primarily used for holding surplus irrigation water when they are not being farmed. These are also classified as Lacustrine farmed (Lf) if greater than 20 acres, Palustrine farmed (Pf) if less than 20 acres.

Palustrine system habitats cover five wetland communities; forested, scrub/shrub, emergent, aquatic bed, and unconsolidated bottom (open water). Forested and scrub/shrub wetlands commonly occur in riparian habitats. These floodplain wetland communities exist on small benches or terraces slightly raised above the channels. Species dominant in these areas are Freemont cottonwood (Populus fremontii) and willows (Salix spp.). Emergent wetlands occur in the high mountain meadows of the Sierra Nevada, Kern and Pixley wildlife Refuges, and as isolated marshes along streams and in salt flats throughout the valley. Wet meadow communities are very similar in appearance and species composition, with dominant species being sedge (Carex spp.). The less common species were dock (Rumex spp.) and spikerush (Eleocaris spp.) mixed with unidentified grasses. There were numerous springs in the Sierra Nevada range and foothills. Springheads exhibiting open water are classified as unconsolidated bottom semi- permanently flooded. Spring heads with emergent vegetation are classified as seasonally to temporarily flooded depending on photo signature.

Kern Wildlife Refuge is artifically flooded with surplus irrigation water. The majority of the emergent wetland vegetation is flooded seasonally; however some areas on slightly higher ground are temporarily flooded. Emergent species present at the Kern refuge include bulrush (Scripus spp.), cattail (Typha spp.), Swamp Timotny (Phleum spp.), wild millet (Sorghum spp), rush (Juncus spp.), smartweed (Polygonum spp.), and arrowhead (Sagittaria spp.). Pixley Wildlife Refuge supports emergent vegetation, but is not flooded as often as Kern. Pixley is sectioned off by dikes and parts are flooded seasonally to temporarily. The western part is flooded only in wet years. Species found in this area are saltgrass (Distichlis spp.), iodinebush (Allenrolfea spp.) and scattered willow (Salix spp.) shrubs. In the southern portion of the San Joaquin Valley large areas of emergents and salt flats were encountered. These areas are only flooded in wet years and were classified as intermittantly flooded. Species prevalent in these salt flat areas are saltgrass (Distichlis spp.), iodinebush (Allenrolfea spp.), and greasewood (Sarcobatus spp.). Aquatic bed wetland communities were rarely visible on the photography. Aquatic bed species identified in the field were duckweed (Lemna spp.), and pondweed (Potomageton spp.).

MODIFIERS

WATER REGIME MODIFIERS

Precise description of hydologic characteristics require knowledge of the duration and timing of surface inundation, both yearly and long-term, as well as an understanding of groundwater fluctuations. Because such information is seldom available, the water regimes that, in part, determine characteristic wetland and deepwater plant and animal communities are described here in only general terms. The following water regime modifiers were used in the subject area.

(J) Intermittently Flooded--Substrate is usually exposed, but surface water present for variable periods without detectable seasonal periodicity. Weeks, months or even years may intervene between periods of inundation. The dominant plant communities under this regime may change as soil moisture conditions change. Some areas exhibiting this regime do not fall within our definition of wetland because they do not have hydric soils or support hydrophytes.

(A) Temporarily Flooded--Surface water present for brief periods during growing season, but water table usually lies well below soil surface. Plants that grow both in uplands and wetlands are characteristic of this water regime.

(B) Saturated--The substrate is saturated to surface for extended periods during the growing season, but surface water is seldom present.

(C) Seasonally Flooded-- Surface water is present for extended periods especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is very variable, extending from saturated to a water table well below the ground surface.

(F) Semipermanently Flooded--Surface water persists throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land's surface.

(G) Intermittently Exposed--Surface water is present throughout the year except in years of extreme drought.

(H) Permanently Flooded--Water covers land surface throughout the year in all years.

(K) Artificially Flooded--The amount and duration of flooding is controlled by means of pumps or siphons in combination with dikes or dams. The vegetation growing on these areas cannot be considered a reliable indicator of water regime. Wetlands within or resulting from leakage from man-made impoundments, irrigated pasturelands supplied by diversion ditches and artesian wells are not included under this modifier.

SPECIAL MODIFIERS

The special modifiers are used to indicate wetlands and deep water habitats modified by man or beaver. When used in combination, the letters should be given in order of listing in the legend (e.g. POWHhs). There are no limitations on the number of special modifiers that can be used in a wetland label. The following are special modifiers that were used in the subject area.

(h) Diked/Impounded--Created or modified by a man-made barrier or dam which obstructs the inflow or outflow of water. Diked and Impounded are described as separate modifiers in the Classification Systems. They have been combined here due to photointerpretation limitations.

(x) Excavated--Lies within a basin or channel excavated by man. This includes all landcut canals, ditches, dugouts, stockponds, and farm ponds. Some of these categories may also be diked/impounded.

(f) Farmed--The soil surface has been mechanically or physically altered for production of crops, but hydrophytes will become reestablished if farming is discontinued. The farmed modifier is applied only to the following areas:

1. farmed prairie potholes and pothole type depressions
2. farmed intermittent lake bottoms (playa lakes)
3. cranberry bogs
4. diked former tidelands in California.

(d) Partly Drained--The water level has been artifically lowered, but the area is still classified as wetland because soil moisture is sufficient to support hydrophytes. This modifier is often used to indicate extensive ditch networks in wetlands where, due to the extreme number and narrow width of the ditches, individual delineation is impossible. Individual ditches shall be broken out as linears (with Excavated modifier) when they approximate the pen line width on the photography and if the area is not overly complex.

(r) Artificial--Substrates classified as Rock Bottom, Unconsolidated Bottom, Rocky Shore and Unconsolidated Shore (other than spoil) that were emplaced by man using natural or synthetic materials. Jetties and breakwaters are examples of Artificial Rocky Shores.

BIBLIOGRAPHY

The references listed below refer to literature cited in the text of this report as well as sources of additional information.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1977. Classification of wetlands and deepwater habitats of the United States (an operational draft). USDI. Fish and Wildl. Serv. Wash., D.C. 100 p.

Bailey, R.G. 1978. Description of the ecoregions of the United States. USDA For. Serv., Intermt. Reg., Ogden, UT. 77 p.

Wetland Communities

NWI CODE	NWI DESCRIPTION	COMMON DESCRIPTION	CHARACTERISTIC VEGETATION AND PHYSIOGRAPHIC FEATURES
R4SB	Riverine, Intermittent, Streambed	Creek, Streambed	Unvegetated. Sand to Cobble-Gravel
R2UB	Riverine, Lower Perennial Unconsolidated Bottom	River	Unvegetated. Mud to Sand, Cobble-Gravel
R2US	Riverine Lower Perennial. Unconsolidated Shore	River Flat	Unvegetated. Sand to Cobble-Gravel
L1UB	Lacustrine Limnetic Unconsolidated Bottom	Open Water Lake	Unvegetated. Sand to Mud
L2UB	Lacustrine Littoral Unconsolidated Bottom	Shallow Lake	Unvegetated. Sand to Mud
L1AB	Lacustrine Limnetic Aquatic Bed	Pond Weeds, Water Weeds	Duckweed (*Lemna* spp.) Pond weed (*Potomageton* spp.) Unvegetated. Sand to Mud
PUB	Palustrine Unconsolidated Bottom	Open water, Pond	Unvegetated. Sand to Mud
PAB	Palustrine Aquatic Bed	Pond Weeds, Water Weeds	Duckweed (*Lemna* spp.) Pondweed (*Potomageton* spp.)

NWI CODE	NWI DESCRIPTION	COMMON DESCRIPTION	CHARACTERISTIC VEGETATION AND PHYSIOGRAPHIC FEATURES
PEM	Palustrine Persistant Emergents	Marsh or Meadow	Cattail (Typha latifolia) Narrow-leaved cattail (Typha angustifolia Rush (Juncus spp.) Bulrushes (Scirpus spp.) Spike rush (Eleocharis spp.) Sedges (Carex spp.) Arrowhead (Sagittaria spp.) Smartweed (Polygonum spp.) Saltgrass (Distichlis stricta Iodinebush (Allenrolfea occidentalis) Greasewood (Sarcobatus vermiculatus)
PSS	Palustrine Scrub Shrub	Shrub Wetland	Willow (Salix spp.) Red Alder (Alnusrubra) Dogwood (Cornus spp.)
PFO	Palustrine Forested	Forested Wetland	Cottonwood (Populus fremontii) Willow (Salix spp.) Red Alder (Alnus rubra) Western Sycamore (Platanus raccmosa)

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