DRAFT

NATIONAL WETLAND INVENTORY MAP REPORT FOR: SIERRA NEVADAS; CHICO, NE; CHICO SE; AND SACREMENTO NE

I. INTRODUCTION

The U.S. Fish & Wildlife Service's National Wetlands Inventory is producing maps showing the location and classification of wetlands and deepwater habitats of the United States. The Classification of Wetlands and Deepwater Habitats of the United States by Cowardin et al. is the classification system used to define and classify wetlands. Photo interpretation conventions, hydric soils lists and wetland plant lists are also available to enhance the use and application of the classification system.

The purpose of the report to users is threefold: (1) to provide localized information regarding the production of NWI maps, including field reconnaissance and a discussion of imagery and interpretation; (2) to provide a descriptive crosswalk from wetland codes on the map to common names and representative plant species; and (3) to explain local geography, climate, and wetland communities.

II. FIELD RECCONAISSANCE

Field reconnaissance of the work area is an integral part for the accurate interpretation of aerial photography. Photographic signatures are compared to the actual wetland's appearance in the field by observing vegetation, soil and topography. This information is weighted with seasonality and conditions at both dates of photography and ground truthing.

Project Area

The project study area was located in northern California's Sierra Nevada Mountains. Ground truthing covered the area of each 1:100,000: Chico NE, Chico SE, and Sacramento NE (See Appendix A, Locator map).

Field Personnel

Barbara Schuster	Geonex Martel Inc.
Dennis Peters	U.S. Fish and Wildlife Svc.

Field Dates

27 July - 2 August 1988

Aerial Photography

Type: Color Infrared transparencies
Scale: 1:58,000 NHAP.
Dates: Chico NE 6/84, 8/84, 9/84
Chico SE 6/84, 8/84, 9/84
Sacramento NE 6/84, 8/84, 9/84

Percent coverage: All 96 U.S.G.S. quadrangles were covered with the existing 1984 NHAP photography.

Collateral Data

U.S. Geological Survey Quadrangles
Soil Conservation Service soil surveys
Bailey's description of the Ecoregions of the U.S.
U.S. Fish and Wildlife Service Wetland Plant Keys.
Sierra Club literature.

III. PHYSICAL DESCRIPTION OF PROJECT AREA

Geography:

The study area is in the northern extension of the majestic Sierra Nevadas and includes the Eldorado National Forest, the Tahoe National Forest, the southern part of the Plumas National Forest, the very northern edge of the Stanislaus National Forest and the very western edge of the Toiyabe National Forest. Lake Tahoe lies on the eastern boundary and the foothill cities such as Placerville and Colfax are located on the western boundary of the work area. Many counties are part of the work area: Placer, El Dorado, Sierra, Plumas, Amador, Alpine, Nevada and Lassen.

The wide physical diversity of the Sierra Nevadas are represented on these maps from the steep slopes in the east to the gradual foothills in the west. The major uplift which tilted the granitic mountains was caused by faulting along the eastern mountains' side about 10 million years ago and much of the older volcanic ridges were defined, shaping the large valleys. Lake Tahoe was originally a sunken basin within two of the uplifted fault blocks: the Sierra and the Carson Range, and was created when the Truckee River was dammed with enough glacial debris. The Tahoe Basin area and Sierra Valley were once continuous but became separated by the volcanic flows.

The higher peaks of the range are found in the south and Mokelumne Peak at 9332 is one of the highest elevations in the study area. This is part of the eastern edge where the mountains rise abruptly from the valley floor.

Bailey describes this area as falling into two major classifications. The Sierran Forest Province covers all but 4 of the 96 topographical quadrangles of this project. Most of the area is steeply sloping to precipitous mountains crossed by many valleys having steep gradients. The long west slopes rise from approximately 2,000 feet. Much of the region was shaped by glaciation.

The small portion of the Intermountain Sagebrush Province is in the very north eastern edge of the study area and is characterized by the Great Basin physiography. The land is covered by numerous playas which collect alkaline and saline salts. Mountains here rise abruptly from the semi-arid, sagebrush-covered plains.

Climate

The climate in the higher elevations is characterized by short dry summers and cold wet winters and affected here by the strong flows of marine air from the Pacific Ocean in winter. This produces heavy precipitation in the winter falling mostly as snow in the higher elevations. The intermediate mountain zones receive the highest precipitation particularly on the west slopes, which are much wetter than the east slopes. While the base of the western slopes receive less rainfall than the higher elevations it also has lower temperatures and typically a long, dry summer. The entire study area experiences freezing temperatures and summer temperatures typically fall in the 100°'s to the 90°'s (°F).

Vegetation:

Upland vegetation zones are very distinctive in the Sierra Nevadas. Rising from the eastern edge of the Central Valley to about 4,000 feet are the Sierra foothills. The foothills are characterized by plants which have the driest climate during the hottest time of the year compared to any others in the range. There are four major plant communities in the foothills: valley grassland, foothill woodland, riparian woodland, and chaparral. Valley grassland extends from the lower gently-rolling foothills to beneath the higher woodlands. Grasses are dominant here since soil moisture is inadequate to support woody vegetation. Most common is wild oats, soft chess, red brome, and foxtail fescue. These are all alien annual grasses that have replaced the native perennials due to overabundant grazing and a decade of drought in the 1800's. Wildflowers are diverse throughout the grassland including gilias, paintbrush, and meadowform.

The most characteristic and widespread foothill vegetation is the woodland community. Two species dominate here and are constantly associated throughout their range: the deciduous Blue oak and the digger pine. Valley oaks are found in scattered stands in the lower, drier foothills. Live oaks can be found growing with the Blue oak-digger pine stands and between these stands and the ponderosa pine forest of higher elevations. A north slope phase of California buckeye forms a dense association with other woody plants such as California laurel, toyon, and red bud.

The riparian woodland extends along stream courses and is composed mostly of willows, poplars, and white alder, among other species such as buttonbush, coyote brush, and spice bush. This community is reduced as the elevation increases since streams have steeper banks that do not provide the moist soil substrate necessary for these plants. The chaparral is a shrub community forming dense thickets throughout the foothills on hot dry slopes with thin rocky soils. A dominant plant of the hottest, driest slopes is greasewood, or chamise. Other stands may be dominated by manzanita or caenothus. While moister slopes may support dominants such as shrub oak and interior live oak.

The foothills give way to the conifer forest at about 2,000 feet where precipitation reaches sufficient amounts. Temperature limits its growth upslope at approximately 8,000 to 10,000 feet. A wide range of tree variety and stature is a characteristic of the Sierra Nevadas. Diverse climate and topography seem to account for this trend. An understory of young saplings and shrubs is less common than open stands. The Sierra forest is characterized by four communities determined by elevation and having boundaries which tend to merge together. The mixed coniferous forest, found in the lower montane zone at 2,000 to 6,000 feet, is composed of 3 separate subtypes: ponderosa pine forest, white fir forest, and Jeffrey pine forest. The red fir forest is found in the upper montane zone from 6,000 feet to 7,000 feet. The lodgepole pine forest is found in the subalpine zone at 6,000 to 8,000 feet. The subalpine forest, found above 8,000 feet is composed of whitebark pine, mountain hemlock.

The upper limits of the forest copmmunity give way to the Sierran alpine zone which reaches up to the highest peaks of the range. Sparse vegetation here consists of dwarf perennial herbs which can tolerate the cold and windy climate. Penstemon, pussypaws, cinquefoil, and alpine prickly currant are just a few species found on these rocky habitats.

Descending the steep eastern edge of the Sierra Nevada down to the Great Basin is the desert face of the pinyon-sagebrush plant community. This is represented only in a small area on the eastern border of the study area. Great Basin sagebrush is the domninant species of this zone while low sagebrush and alpine sagebrush can also be found here. Bitterbrush, Idaho fescue and desert needlegrass can also be found in association with the sagebrush. Singleleaf pinyon also grows along with these shrubs.

Land usage today is primarily to produce hay and grain for livestock and for supplemented pasture. The short growing season prohibits a wide variety of crops, however some hardy plants can grow such as barley, wheat, and rye. Soils which cannot be utilized for cropland can be managed for range. Heavy grazing has resulted in a different plant community than the native vegetation. Timber is also a product of this area, therefore some of the woodland is managed to promote tree growth, limit erosion, and protect from fires. The economy is also dependent on the wildlife and fish population. Hunting and fishing takes advantage of the diversity of wildlife habitats.

Soils:

Soils are composed mainly of Ultisols which are extensive on mountain slopes where air is humid. On the lower elevations and basins, the Alfisols dominate. Entisols are typical of narrow floodplains and alluvial fans of the valleys.

The valley bottoms of most of the Sierra Valley and portions in the northern and southern end of the Long Valley have hydric soils which are nearly level or gently sloping, high in organics, and variably textured. The most extensive of the two hydric soil associations found in these basins is Ramelli-Balman-Pasquett. Dominating the central Sierra Valley, it is characterized as very poorly to moderately well drained, mucky silty clays, and loams. The valley bottom here is marked by a network of slightly entrenched drainages. The major drainages which flow from the surrounding mountains also support these soils. The valley soils are used for native pasture, meadow pasture, irrigated pasture, small grain and hay.

The other hydric soil association found is in the Basin of the Sierra Valley and on stream levees and fingers of Long Valley is Beckworth-Loyalton-Ormsby. This association is described as poorly to moderately well drained, loamy, coarse sands, coarse sandy loams, fine sandy loams, silt loams, and somewhat lummocky. These soils are also associated with the present drainage network of Last Chance Creek in the Sierra Valley. The soils are forming in alluvian, predominantly from mixed rock sources. These soils are used for cereal rye, alfalfa, irrigated pasture, small grains, annual pasture, and range.

The hydric soil association found in the Tahoe Basin area is loamy alluvial land-Elmira, wet variant-Celio characterized as nearly level to gently sloping, somewhat poorly drained to poorly drained gravelly loamy coarse sands and loamy coarse sands to silt loams. The soils, which are found along streams such as the Upper Truckee River, on out-wash fans, and in meadows are subject to some flooding and ponding. They formed in material derived from different kinds of rock. Water table depth is 12 inches or greater, therefore some of these soils are manipulated for urban land use.

IV. DESCRIPTION OF WETLAND HABITATS IN PROJECT AREA

A comprehensive wetland plant list and a table of wetland classification codes and water regimes is included in this section for reference.

Paulstrine

Paulstrine areas include forested, scrub-shrub, emergent, aquatic bed, uncolidated shore, and unconsolidated bottom. Excavated ponds and borrow pits are considered unconsolidated bottom and labelled PUBHx. Naturally occuring ponds are identified as PUBH. Ponds which are impounded are labelled PUBHh.

Unconsolidated shore is restricted to areas which indicate water is still remaining in deep pockets or shorelines. These are identified as PUSCx or PUSCh. Intermittent ponds may be identified as PUSC and wetter ponds as PUBF.

This system is the majority of the vegetated wetlands including meadows, valleys, floodplains, marshy areas, playas, drainages, springs, excavations, impoundments, beaver ponds, and natural ponds. Most of the wetlands are vegetated. Some playas are not 30% vegetated and may be due to a higher alkaline soil than plants can tolerate.

Temporary emergent wetland plant communities (PEMA) are diminated by grasses (Deschampsia spp and Calamagrostis spp.). Seasonal emergent wetland species are sedges (Carex spp.), rushes (Juncus sp.) and various grasses. These plant communities (PEMC) can be found extensively in the Sierra Valley and Long Valley. Irrigation ditches were often vegetated with various plant such as cattail (Typha spp.). These ditches often become dry during the year. Cattail and bulruch (Scirpus spp.) are found in both seasonally and semi-permanently flooded wetlands (PEMC or PEMF). Seasonal emergent valleys are typically fed by additional runoff from irrigation. Seasonal pockets of emergents are also found around springs. The spring itself is classified as a saturated wetland (PEMB). Numerous beaver ponds are found within the study area and can be mapped as semipermanent or permanent (PEMFb or PEMHb). These are often still vegetated or may contain dead shrubs.

The scrub shrub species that populates floodplains, springs, and drainages is predominantly willow (Salix sp.). This coimmunity is identified as PSSA or PSSC along drainages and PSSB at springheads. Alder (Alnus rubra) seeps which are abundant in the mountains are identified as PSSC. Emergents were also observed mixed in with the willows. Deciduous riparian wetlands seemed to be dominated by cottonwoods (Populus spp). These communities can be flooded on a temporary or seasonal basis (PFOA or PFOC), however only the trees immediately adjacent to the river are typically wet.

Lodgepole pine (Pinus contorta) is an evergreen also found bordering streems and in addition it is commonly seen bordering meadows. This pine is tolerant of seasonal flooding conditions (PFOC). No developed understory is typically associated with this pine community. Ponderosa pine or western yellow pine (Pinus ponderosa) is found in a variety of forest communities and can be found in temporarily flooded wetlands (PFOA). It often is associated with other vegetation including trees and shrubs such as willows, currants and gooseberries (Ribes spp.).

Shrub communities of the basins on the eastern side of the mountain range includ heavy sage brush or silver sage (Artemisia _ cana) and are flooded no more than temporarily (PSSA).

Aquatic vegetation observed in the field was predominantly waterweed (Elodea spp.) and spatterdock (Nuphar luteum). These are identified as PABF or PABH.

Lacustrine

Lacustrine areas, which are greater than 20 areas, include both limnetic and littoral subsystems. Numerous lakes and reservoirs exist within the study area. The major water bodies include Lake Tahoe, Donner Lake, Davis Lake, Little Grass Valley Lake, Frenchman Lake, and Union Valley Reservoir.

Unvegetated lakes are labelled L1UBH and reservoirs are given the impounded modifier (L1UBHh). Perimeters of unconsolidated shore are sometimes temporarily (L2USA) or seasonally (L2USC) flooded.

Aquatic bed species may be found in some of the lake systems; for example, spatterdock (L2ABF or L2ABH).

Riverine

The abundant, permanent rivers of this study are predominantly classified as upper perennial (R3UBH) since even in flatlands flow is rapid due to the many drainages from the steep mountains. Most have an unconsolidated bottom and shore. The unvegetated shores and islands are temporarily or seasonally flooded (R3USA or R2USC). Major rivers include the Truckee River, North Fork American River, Middle Fork American River, and Middle Fork Feather River. Many of the floodplains in the valleys contain old river scars which can be mapped as temporarily or seasonally flooded unconsolidated shore when they are not vegetated, which they often are. In most of the Sierra Valley the riverine system here is considered lower perennial (R2UBH or R2ABH) due to the aquatic bed and emergent vegetation associated with these permenent rivers.

Intermittent streams are abundant and can flood temporarily, seasonally, or on a semi-permanent basis (R4SBA, R4SBC,or R4SBF). Many irrigation ditches are present and labeled either seasonal or semi-permanent with the excavated modifier (R4SBCx or R4SBFx). Many of the ditches and drainages are vegetated and will therefore be considered to be palustrine.

OBSERVED WETLAND VEGETATION

A. EMERGENT

Allium spp.	onion
Alopecurus aequalis	foxtail
Calamagrostis spp.	reedgrass
Castilleja spp.	indian paintbrush
Carex spp.	sedge
Cirsium spp.	thistle
Deschampsia spp.	hairgrass
Eleocharis spp.	spikerushes
Epilobium spp.	fireweed
Equisetum spp.	horsetail
Juncus spp.	rush
Lilium spp.	lily
Mimulus guttatus	monkey flower
Penstemon spp.	penstemon
Perideridia bolanderii	yampah
Polygonum spp.	smartweed
Polypogon spp.	rabbitsfoot grass
Potentilla spp.	cinquefoil
Rumex spp.	dock
Scirpus spp.	bulrush
Scripus acutus	hardstem bulrush
Senecio spp.	groundsel
Sphenosciadium capitellatum	swamp white heads
Typha spp.	cattail
Veratrum californicum	false hellebore
Wyethia helenioides	whitehead wyethia

B. AQUATIC BED

Elodea spp.	waterweed
Nuphar luteum	spatterdock

C. SCRUB SHRUB

Artemisia cana	silver sage
Alnus rubra	red alder
Potentilla fruiticosa	shrubby cinquefoil
Rubus ursinus	blackberry
Salix spp.	willow

D. FORESTED

Acer spp.	maple
Alnus rubra	red alder
Pinus contorta	lodgepole pine
Pinus ponderosa	ponderosa pine
Populus balsamifera trichocarpa	black cottonwood
Populus tremula tremuloides	quaking aspen
Populus fremontii	fremont cottonwood
Quercus spp.	oak

WETLAND CLASSIFICATION CODES AND WATER REGIME DESCRIPTIONS

Table - Cowardin Classification Codes and Descriptions

NWI CODE WATER REGIME	NWI DESCRIPTION	COMMON DESCRIPTION	CHARACTERISTIC VEGETATION
R2UB (H)	Riverine, lower perennial, unconsolidated bottom	Rivers or drainage ditches	Unconsolidated bottoms
R2AB (H)	Riverine, lower perennial, aquatic bed	Rivers	Elodea spp (waterweed)
L1UB (H)	Lacustrine, limnetic, unconsolidated bottom	Lakes	Unconsolidated bottoms
L2AB (F,H)	Lacustrine, littoral, aquatic bed	Lake Marshes	Nuphar luteum (spatterdock)
PUB (F,G,H)	Palustrine, unconsolidated bottom	Ponds, borrow pits, or impoundments	Unconsolidated bottoms
PAB (C,F,H)	Palustrine, aquatic bed	Ponds or deep marshes	Nuphar luteum (spatterdock)
PEM (A,B,C,F,G)	Palustrine, emergent	Meadows, marshes, depressions, springs, seeps or drainage areas	Carex spp. (sedges) Juncus spp. (rushes) Calamagrostis spp. (reedgrasses) Polypogon sp. (rabbit's foot grass) Scirpus acutus (hardstem bulrush) Typha spp. (cattails) Mimulus guttatus (monkey flower)
PSS (A,C)	Palustrine, scrub shrub	Willow thicket, river banks or seeps	Salix spp. (willow) Alnus rubra (red alder) Rubus ursinus (blackberry) Artenusia cana (silver sage)
PFO (A,B,C)	Palustrine, forested	Floodplains, springs, depressions or meadow rims	Alnus rubra (red alder) Populus balsamifera trichocarpa (black cottonwood) P. tremula tremuloides (quaking aspen) P. tremontii (Fremont cottonwood) Pinus contorta (lodgepole pine) P. ponderosa (ponderosa pine)

V. Water Regime Description

(J) Intermittently Flooded -- Substrate is usually exposed, but surface water present for variable periods without detectable seasonal periodicity. Weeks or 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) Seasonably 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 extremely 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.

(U) Unknown -- The water regime is not known.

VI. IMAGERY

Overall imagery for the Sierra Nevadas study area is of good quality. The resolution is good and tones are easily differentiated within the wetlands. Wetlands in the field appeared to be similar to their condition on the photos which were dated the fall of 1984. The exception to this was the heavily manipulated areas such as the Sierra Valley where the natural conditions have been so altered as to make photointerpretation difficult. Heavy grazing by livestock can change the photo's wetland signature and hay farming gives wetlands and uplands a mono-signature. Therefore, the soil survey will be followed closely in determinigng wetland boundaries in the Sierra Valley. Field checking was usually restricted to the lower elevations.

VII. MAP PREPARATION

The wetland classification that appears on the National Wetlands Inventory (NWI) Base Map (Figure 1) is in accordance with Cowardin et al. (1977). The delineations were produced through stereoscopic interpretation of 1:58,000 scale color infrared photography. The majority of the photography was taken during the fall of 1984.

Field checks of areas found within Chico NE, SE and Sacremento NE photography were made prior to the actual delineation of wetlands. Field check sites were selected to clarify varying signatures found on the photography. These photographic signatures were then identified in the field using vegetation types and soil types, as well as additional input from field personnel. See Appendix B for a list of check sites visited.

Collateral data included USGS topographic maps, SCS soil surveys, climate, vegetation, and ecoregional information.

The user of the map is cautioned that, due to the limitation of mapping primarily through aerial photointerpretation, a small percentage of wetlands may have gone unidentified. Since the photography was taken during a particular time and season, there may be discrepancies between the map and current field conditions. Changes in landscape which occurred after the photography was taken would result in such discrepancies.

Aerial photointerpretation and drafting were completed by Martel Laboratories, Inc., St. Petersburg, Florida.

VIII. SPECIAL MAPPING PROBLEMS

None.

IX. MAP ACQUISITION

To discuss any questions concerning these maps or to place a map order, please contact:

Dennis Peters
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Portland, OR 97232

To order maps only, contact:

National Cartographic Information Center
U.S. Geological Survey
National Center
Reston, VA 22092

Maps are identified by the name of the corresponding USGS 1:24,000 scale topographic quadrangle name. Topographic map indices are available from the U.S. Geological Survey.

X. LITERATURE CITED

U.S. Geological Survey Quadrangles

Soil Survey of El Dorado Area, California, 1974. U.S. Department of Agriculture, Soil Conservation Service and Forest Service.

Soil Survey of Nevada County Area, California, 1975. U.S. Department of Agriculture, Soil Conservation Service and Forest Service.

Soil Survey of Sierra Valley Area, California, Parts of Sierra, Plumas, and Lassen Counties, 1975. U.S. Department of Agriculture, Soil Conservation Service and Forest Service.

Soil Survey - Tahoe Basin Area, California and Nevada, 1974. U.S. Department of Agriculture, Soil Conservation Service and Forest Service.

Soil Survey - Amador Area, California, 1965. U.S. Department of Agriculture, Soil Conservation Service.

Wetland Plants of the State of California, 1986. U.S. Department of the Interior, Fish and Wildlife Service.

Description of the Ecoregions of the U.S., 1980. Bailey, Robert G., U.S. Department of Agriculture.

A Sierra Club Naturalist's Guide, The Sierra Nevada, Whitney, Stephen, Sierra Club Books, San Francisco, 1979.

APPENDIX A
LOCATOR MAP

MC/ted.nwi.89