MAP REPORT: NEVADA P.I. TASK ORDER (ELY, MILLETT, TONOPAH, GOLDFIELD, MARIPOSA NE, DEATH VALLEY, KINGMAN)

I. INTRODUCTION

The U.S. Fish and Wildlife Service's National Wetland 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 classifications system.

The purpose of the map report is threefold: (1) to provide localized information regarding the production of NWI maps, including specific imagery and interpretation discussion; (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 RECONNAISSANCE

A. Project Area (1:100K Maps):

Ely NW, Ely SW, Ely NE, Millett NW, Millett NE, Millett SE, Millett SW, Tonopah NW, Tonopah Sw, Tonopah NE, Tonopah SE, Goldfield NW, Goldfield SW, Goldfield NE, Goldfield SE, Mariposa NE, Death Valley NW, Death Valley NE, Death Valley SE, Kingman NW, Kingman NE, Kingman SE, Kingman SW

1. General Description: The project area consists of U.S.G.S. 1:24,000 quads selected by U.S.F.W.S. for portions of Eastern, Central, and Southern Nevada.

2. 1:100,000 Work Areas:

1:100K	Number of Quads
Ely NE	All Quads
Ely SW	All Quads
Ely NW	All Quads
Millet NE	All Quads
Millet SE	All Quads
Millet SW	All Quads
Millet NW	All Quads
Tonopah NE	All Quads
Tonopah SE	All Quads
Tonopah SW	All Quads
Tonopah NW	All Quads
Goldfield NW	All Quads
Goldfield SE	All Quads

The following 1:100K maps are not being mapped in their entirety. These maps extended beyond the border of Nevada into California and/or Arizona. All quads which contain any of the state of Nevada will be mapped fully. None of the quads which cover only California or Arizona will be mapped.

1:100K	Number of Quads
Mariposa NE	12
Death Valley NE	29
Death Valley SE	12
Death Valley NW	3
Kingman NE	12
Kingman SE	14
Kingman SW	3
Kingman NW	23
Goldfield SW	23
Goldfield NE	17

B. Personnel:

Howard Browers	-	U.S. Fish and Wildlife Service
Toni Alese	-	Geonex, Inc.
Vicki Calligan	-	Geonex, Inc. (weeks of 9/9/91 and 11/17/91)
Dave Geddis	-	Geonex, Inc. (weeks of 9/9/91 and 3/30/92)
Barbara Johnson	-	Geonex, Inc. (weeks of 9/9/91 and 11/17/91)
Charles Attardo	-	Geonex, Inc. (week of 11/17/91)

C. **Field Trips:**

September 9-13, 1991
November 17-21, 1991
March 30-April 2, 1992

D. **Aerial Photography**

Type: Color Infrared Transparencies

Scale	Date of Photography	Percent of Coverage
HAP 1:58K	06/11/80	.16
HAP 1:58K	07/15/80	1.00
HAP 1:58K	07/16/80	.49
HAP 1:58K	07/24/80	1.84
HAP 1:58K	07/25/80	.67
HAP 1:58K	08/09/80	3.34
HAP 1:58K	08/13/80	1.83
HAP 1:58K	08/14/80	3.85
HAP 1:58K	09/30/80	1.16
HAP 1:58K	10/04/80	.83
HAP 1:58K	10/05/80	2.71
HAP 1:58K	10/14/80	.67
HAP 1:58K	06/03/81	.33
HAP 1:58K	06/09/81	1.17
HAP 1:58K	06/21/81	.83
HAP 1:58K	07/11/81	.50
HAP 1:58K	07/17/81	.67
HAP 1:58K	08/04/82	.83
HAP 1:58K	09/05/82	.33
HAP 1:58K	06/19/83	2.01
HAP 1:58K	06/22/83	.50
HAP 1:58K	06/25/83	3.84
HAP 1:58K	06/26/83	.65
HAP 1:58K	07/03/83	1.67
HAP 1:58K	08/24/83	.50
HAP 1:58K	08/25/83	2.34
HAP 1:58K	09/03/83	.50
HAP 1:58K	09/10/83	1.17
HAP 1:58K	06/02/84	.67
HAP 1:58K	08/11/85	.16
HAP 1:58K	08/18/85	.33
HAP 1:58K	08/16/86	.16

Scale	Date of Photography	Percent of Coverage
NASA 1:65K	06/12/81	8.19
NASA 1:65K	06/15/81	10.37
NASA 1:65K	09/19/81	17.91
NASA 1:65K	06/20/81	10.55
NASA 1:65K	06/23/81	10.37
NASA 1:65K	06/24/81	3.18
TOTAL HAP PHOTOGRAPHY IN PERCENTAGE		37.71
TOTAL NASA PHOTOGRAPHY IN PERCENTAGE		60.57
TOTAL HAP & NASA PHOTO COVERAGE		98.28
Miscellaneous NHAP PHOTOGRAPHY		1.72
07/17/80	07/04/83	
06/11/81	07/10/83	100.00%
09/04/82	09/09/83	

E. Collateral Data

1. U.S.G.S. 1:24,000 Topographic Quads and 1:100,000 BLM Maps, 1:250K Topos.

2. U.S.G.S. Water Resource Data 1989

3. U.S. Dept. of Agriculture Hydric Soils of the State of Nevada 1985.

4. U.S. Dept. of Interior Wetland Plants of the State Nevada 1986.

5. Baileys, Robert G. Descriptions of the Ecoregions of the United States. U.S. Dept. of Agriculture, Forest Service 1980.

II. PHYSICAL DESCRIPTION OF THE PROJECT AREA

A. Geography

According to Minshall, Jensen, and Platts Biological report 85(7.24) 1989. The Great Basin lies in the Sierra Nevada Mountains. Topography of the Great Basin is characterized by numerous North to South trending ranges separated by broad nearly level basins. The topography is the result of block faulting of folded and thrust faulted overlapping geosynclines of Paleozoic and early Mesozoic ages. Sather & Low (publication 90.4 1986 pg 15). The Great Basin includes more than 75 isolated, north-south oriented horst ranges separated by broad, nearly level graben valleys. The ranges are commonly 50 to 75 miles long, 6 to 15 miles wide and from 7,000 to 10,000 feet in elevation. The slopes of ranges are rocky and commonly dissected by sharp erosional ravines. The flanks of the basins and undulating plains are often slightly sloping coalesced alluvial fans (bajadas). The central portions of the basins are often dominated by extensive deranged alluvial flats and playas, some lacking exterior drainage.

B. Climate

The Great Basin lies in the rain shadow of the Sierra Nevada Mountains. The region is semiarid to arid. High mountains to the west capture most of the moisture associated with the generally eastward-moving air masses from the Pacific Ocean (Morrison 1965). Rain shadow effects also are produced by the numerous ranges oriented transverse to prevailing winds within the Great Basin.

Mean annual precipitation in the Great Basin ranges from less than 10 cm in the lower basins to more than 76 cm on the higher mountain summits; a difference of more than 51 cm over a distance of a few kilometers is common. Most of the winter precipitation falls as snow, while most of the summer precipitation occurs as infrequent torrential showers. Patterns and amounts of precipitation are extremely variable from year to year, while annual temperatures are more consistent. In general, relative humidity is very low.

The highest temperature ever recorded in the United States was 134°F in 1913 in Death Valley. Summers are long and high temperatures prevail (Bailey's 1980). Average temperature for the northern basin boundary is 32°F (0°C) for the month of January and 72°F (22°C) for the average July temperature. Temperatures for the southern latitudes of the basin average 45°F (7°C) in January and 86°F (30°C) in July (Minshall, Jensen, Platts 1989). The average annual temperature is 60°F to 75°F (15°C to 24°C) (Baileys 1980). Mean annual temperature for a given altitude generally differs by about 6.1°C between southern and northern boundaries of the Great Basin.

Due to the closed drainage configuration characteristic of the Great Basin hydrographic region, all loss of precipitation is through evapotranspiration. In the northern portion of the region, precipitation generally equals or exceeds evapotranspiration and permanent lakes are maintained at the terminal sinks of larger rivers. In the southeast, potential evapotranspiration exceeds precipitation by a considerable amount and there are no permanent natural lakes. (Minshall, Jensen, Platts 1989, page 9).

C. Vegetation

Vegetation in Nevada is zonational and frequently sparse. Only specialized plants with low evaporation rates, capable of thriving in ochric alkali soils and tolerating a water deficient hot climate, are able to adapt to this environment. (Bailey's 1980).

Bailey (1978) includes the Great Basin in the Intermountain Sagebrush and American Desert Provinces. The Intermountain Sagebrush Province is characterized by sagebrush (Artemisia spp.) and salt-tolerant plants on lower elevations and forested habitat at higher elevations. Bailey (1978) suggested that sagebrush habitats may be a disclimax resulting from overgrazing. The American Desert Province is characterized by sparse vegetation inclusive of cacti and thorny shrubs. Bailey further identifies five sections within the provinces: Sagebrush-Wheatgrass Section for the Snake River Plain, Owyhee Desert, and Northern Subdivision; Lahontan Sagebrush-Greasewood Section in the Lahontan Subdivision; Great Basin Sagebrush Section for the Central Subdivision; Bonneville saltbrush-Greasewood Section in the Bonneville Subdivision; and Creosote Bush Section for the Southern Subdivision.

A more detailed survey of vegetation types in the Great Basin was prepared by Kuchler (1964). Kuchler identified fourteen major vegetation types in the Great Basin physiographic section and several additional vegetation types within the high mountain areas bordering the Great Basin physiographic section on the east and west.

Along the crests of high ranges in the Central Subdivision, Spruce-Fir-Douglas Fir (Picea-Abies-Pseudotsuga) forests are prevalent. Juniper-pinyon (Juniperus Pinua) woodland is common at lower elevations in the mountains and foothills throughout the Great Basin. Other vegetation types common in the northern subdivision mountains include juniper steppe woodlands (Juniperus, Artemisia, Agropyron), mahogany-oak scrub (Cercocarpus-Quercus) and blackbrush (Coleogyne).

Shrub dominated communities are common on alluvial deposits. Great Basin sagebrush (Artemisia) type is common on deep, well drained soil throughout the central subdivision and, less extensively, in the Bonneville subdivision. The sagebrush steppe (Artemisia-Agropyron) type is extensive in the northern subdivision. In lower portions of the Bonneville and Lahontan subdivision with saline-alkali soil and impaired drainage, saltbrush-greasewood (Atriplex-Sarcobatus) vegetation type is common. The alelopathic Creosote bush (Larrea spp.) vegetation type is extensive south of 37°N Latitude. (Minshall, Jensen, Platts September 1989).

Vegetation is largely absent on saline lake beds in the northwestern portion of the Bonneville subdivision and the Black Rock Desert in northwestern Nevada. Less extensive, nonvegetated areas correspond with playas and lake beds distributed throughout the Great Basin. (Minsell, Jensen, Platts September 1989).

D. Soils

Soils of the Great Basin are mostly aridisols, entisols and mollisols (U.S. Soil Conservation Service (SCS) 1975). Salt and mud flats (i.e., nonsoil) are also extensive in the Bonneville and Lahontan subdivisions. The distribution of contrasting soils generally corresponds with the geomorphic characteristics of the Great Basin landscape.

Entisol soils are the youngest of the soils and contain no B Horizon. Entisols located on alluvial fans and bajadas are generally skeletal near the foot of mountain slopes and grade to a finer texture towards the medial axes of basins. Desert pavement, characterized by a smooth surface of tightly fitting pebbles, is believed to be a result of wind deflation and is a common feature in the southern Great Basin. Lime and silica cemented hardpans are common at variable depths of the alluvial fans and bajadas (U.S. Air Force 1980). While surface runoff is typically moderate to slow, subsurface lateral flow along cemented horizons may be sustained following precipitation.

Lower portions of the basins are commonly smooth to gently undulating with deep soil. The texture of surface horizons ranges from loam to silty clay loam. Subsoils are generally a finer texture. These soils are mostly saline, sodic, or salin-sodic. Permeability ranges from very slow to moderate and drainage often is impaired.

Playas and lake beds typically consist of light colored sediment with high salinity. Runoff usually ponds on the surface and salt crusts may form during dry periods. The depletion of ponded water occurs through evaporation and infiltration into underlying strata. Playas generally are devoid of vegetation. (Minshall, Jensen, Platts September 1989).

IV. DESCRIPTION OF WETLAND HABITATS IN THE PROJECT AREA

A. Palustrine System

Definition. The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5%. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of the basin less than 2 m at low water; and (4) salinity due to ocean-derived salts less than 0.5%. (Cowardin 1979.)

B. Lacustrine System

Definition. The Lacustrine System includes wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30% areal coverage; and (3) total area exceeds 8 ha (20 acres). Similar wetland and deepwater habitats totaling less than 8 ha are also included in the Lacustrine System if an active wave-formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin exceeds 2 m (6.6 feet) at low water. Lacustrine waters may be tidal or nontidal, but ocean-derived salinity is always less than 0.5%. (Cowardin 1979.)

Subsystems.

1. **Limnetic** - All deepwater habitats within the Lacustrine System; many small Lacustrine Systems have no Limnetic Subsystem.

2. **Littoral** - All wetland habitats in the Lacustrine System. Extends from the shoreward boundary of the system to a depth of 2 m (6.6 feet) below low water or to the maximum extent of nonpersistent emergents, if these grow at depths greater than 2m. (Cowardin 1979.)

C. Riverine System

Definition. The Riverine System includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean-derived salts in excess of 0.5%. A channel is "an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which forms a connecting link between two bodies of standing water" (Langbein and Iseri 1960:5).

1. **Intermittent** - In this Subsystem, the channel contains flowing water for only part of the year. When the water is not flowing, it may remain in isolated pools or surface water may be absent.

2. **Upper Perennial - The gradient is high and velocity of the water is fast. There is no tidal influence,** and some water flows throughout the year. The substrate consists of rock, cobbles, or gravel with occasional patches of sand. The natural dissolved oxygen concentrate is normally near saturation. The fauna is characteristic of running water and there are few or no planktonic forms. The gradient is high compared with that of the Lower Perennial Subsystem and the floodplain is very little floodplain developed.

3. **Lower Perennial** - The gradient is low and water velocity is slow. There is no tidal influence, and some water flows throughout the year. The substrate consists mainly of sand and mud. Oxygen deficits may sometimes occur, the fauna is composed mostly of species that reach their maximum abundance in still water, and true planktonic organisms are common. The gradient is lower than that of the Upper Perennial Subsystem and the floodplain is well developed.

D. Estuarine System

Not present in work area.

E. Marine System

Not present in work area.

F. WETLAND CLASSIFICATION CODES

NWI CODE WATER REGIME	NWI DESCRIPTION	COMMON DESCRIPTION	CHARACTERISTIC VEGETATION
PSS (F,C,B,A)	Palustrine, scrub-shrub	Seeps, springs, vegetated streams, thickets	Salix spp. (willow) Ribes aureum (golden currant) Alnus sp. (alder) Crataqus douglasii (douglas hawthorn) Cornus stolonifera (red osier dogwood) Betula purnila (bog birch) Sarcobatus vermiculatus (greasewood) Chrysothamous spp. (rabbitbrush)
PSS (J)	Palustrine, scrub-shrub	Vegetated alkali flats	Artemisia spp. (sagebrush) Sarcobatus vermiculatus (greasewood)
PFO (C,B,A)	Palustrine, forested	Forested streams, floodplains, depressions, seeps and springs	Pinus contorta (lodgepole pine) Populus sp. (cottonwood) Alnus rubra (red alder) Alnus sinuata (sitka alder) Populus tremuloides (quaking aspen) Betula sp. (river birch) Pinus ponderosa (Ponderosa pine)
PAB (H,F,K)	Palustrine, aquatic bed	Ponds, stock ponds,	Potamogeton sp. (pondweed) Lemna sp. (duckweed)

NWI CODE WATER REGIME	NWI DESCRIPTION	COMMON DESCRIPTION	CHARACTERISTIC VEGETATION
PEM (H,F,C,B,A,K)	Palustrine, persistent emergents	Seeps, springs, vegetated streams and canals, wet meadows, marshes	Juncus spp. (rushes) Carex spp. (sedges) Scirpus spp. (bulrushes) Elocharis spp. (spikerush) Rumex spp. (dock) Elymus spp. (wild rye) Typha sp. (cattail) Epilobium sp. (willow herb) Potentilla spp. (cinquefoil) Veratrum californicum (corn lily) Iris spp. Phalaris arundinacea (reed canary grass) Distichlis sp. (saltgrass) Dipsacus sylvestris (teasel)
PEM (J)	Palustrine, persistent emergents	Vegetated alkali flats	Distichlis sp. (saltgrass)
PUB (H,F,K)	Palustrine, unconsolidated bottom	Ponds, stock ponds, borrow pits, sewage tanks	Unconsolidated bottom
PUS (C,A,J)	Palustrine, unconsolidated shore	Pond beds, unvegetated depressions, alkali flats	Unvegetated mud, sand or gravel

NWI CODE WATER REGIME	NWI DESCRIPTION	COMMON DESCRIPTION	CHARACTERISTIC VEGETATION
L1UB (H)	Lacustrine, limnetic, unconsolidated bottom	Lakes	Unconsolidated bottoms
L2US (C,A,J)	Lacustrine, littoral, unconsolidated shore	Lake shores, reservoir draw-down, alkali flats	Unconsolidated shore
R4SB (F,C,A,J)	Riverine, intermittent, stream bed	Creeks, streams, canals	Unvegetated, sand, mud or gravel
R3UB (H)	Riverine, upper perennial, unconsolidated bottom	Rivers	Unconsolidated bottom
R3US (C,A)	Riverine, upper perennial, unconsolidated shore	Riverbanks	Unconsolidated shore
R2UB (H)	Riverine, lower perennial, unconsolidated bottom	Rivers	Unconsolidated bottom
R2US (C,A)	Riverine, lower perennial, unconsolidated shore	Riverbanks	Unconsolidated shore

V. WATER REGIME DESCRIPTIONS

(J) Intermittently Flooded - Substrate is usually exposed, but surface water is 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) 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 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.

(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.

Special Modifiers

(x) Excavated - Water lies in or flows through a basin or channel dug by man.

(h) Impounded - The normal flow of water is impeded by a manmade dike or barrier.

VI. IMAGERY

The color infrared photography used on the Nevada project was mixture of NHAP (1:58,000) and NASA (1:65,000). The color tones on the photography were balanced and allowed the differentiation of vegetation types. Bleaching was not a problem in most cases. Resolution and clarity were consistent with only a few exceptions. Deviations of normal water level and water level differences of adjacent strips of photos were limited.

VII. MAP PREPARATION

Field checksites and routing for the Nevada project were made prior to the actual delineation of wetlands. Aerial photography and topographic maps were used to navigate through the area. These field checksites were selected to compare the various signatures and contrasts found on the photography. These photographic signatures were then identified in the field using vegetation and soil types, as well as the expertise of field personnel.

Collateral data included USGS topographic maps, Munsells soil chart, Water Resources Data of Nevada, local climate, vegetation, and ecological 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 Geonex, Inc., St. Petersburg, Florida.

VIII. SPECIAL MAPPING PROBLEMS

Light reflection from alkali soil often made it difficult to distinguish between the unconsolidated shore and the emergent vegetation (distichlis spp.) photo signtures.

Nevada has large expanses of alkali soil, some of which are wetlands and some of which are not. Alkali flats containing only greasewood with sagevbrush and rabbitbrush will be classified as uplands. Although these areas tend to have virtually the same photo signatures we will use the topographic map to determine whethre or not there is a large amount of run-off into these areas and to determine if there is an intermittent lake bed associated with these areas. Where both of these appear to be true we will assume the signture is indicative of an exclusive greasewood area and delineate it as an intermittent wetland.

IX. MAP ACQUISITION

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

Dennis Peters
Regional Wetland Coordinator
U.S. Fish and Wildlife Service - Region 1
Eastside Federal Complex
911 NE 11th Avenue
Portland, Oregon 97232-4181

To order maps only, contact:

Earth Science Information Center (ESIC)
National Cartographic Information Center
U.S. Geological Survey
507 National Center
Reston, VA 22092

1-(800)-USA-MAPS

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

IX. REFERENCES

Bailey, Robert G., 1980. Description of the Ecoregions of the United States; United States Department of Agriculture Forest Service. Miscellaneous Publications No. 1391.

Cowardin, L.M., V. Carter, F.C. Golet and E.T. LaRoe, 1979. The Classification of Wetlands and Deepwater Habitats of the United States. United States Department of the Interior, United States Fish and Wildlife Service. Biological Services Program, Washington, D.C.

Minshall, Wayne G., Sheiman E. Jensen, William S. Platts. The Ecology of Stream and Riparian Habitats of the Great Basin Region. September 1989. Biological Report 85 (7.24).

Sather, J. Henry, Jessup Low. Great Basin/Desert and Montane Regional Wetland Functions, 1986. Publication 90-4.

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APPENDIX A