LOS ALAMOS

USER NOTES: LOS ALAMOS, NEW MEXICO, NATIONAL WETLANDS INVENTORY MAP

Map Preparation

The wetland classifications that appear on the Los Alamos National Wetlands Inventory (NWI) Base Map are in accordance with Cowardin et al. (1977). The delineations were produced through stereoscopic interpretation of 1:80,000-scale black-and-white aerial photographs taken in 1975-1976. The delineations were enlarged using a zoom transferscope to overlays of 1:24,000-scale and 1:62,500-scale. These overlays were then transferred to 1:100,000-scale to produce the Base Map.

Aerial photographs were unavailable for the San Pablo area 1:24,000-scale map in the northwestern corner of the Los Alamos NWI Base Map. This area is therefore without wetland designations.

Limited field checks of the delineated wetlands of the Los Alamos NWI Base Map were conducted in July, 1981 to determine the accuracy of the aerial photointerpretation and to provide qualifying descriptions of mapped wetland designations.

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. Changes in the landscape could have occurred since the time of photography, therefore some discrepancies between the map and current field conditions may exist. Any discrepancies that are encountered in the use of this map should be brought to the attention of Warren Hagenbuck, Regional Wetlands Coordinator, U. S. Fish and Wildlife Service, Region 2, P. O. Box 1306, Albuquerque, New Mexico, 87103.

Geography

The area covered by the Los Alamos NWI Base Map is mountainous and lies in northcentral New Mexico within Los Alamos, Sandoval and Santa Fe Counties. Bailey's Ecoregion Classification (1978) identifies the extreme eastern and southeastern portion of the mapped area as Colorado Plateau Province, Grama-Galleta Steppe and Juniper-Pinyon Woodland Mosaic Section (3132P). This was mislabeled as 3142P on the Base Map and should be corrected. The remaining portions of the map fall within the Rocky Mountain Forest Province, Ponderosa Pine-Douglas fir Forest Section (3113M), and represent the majority of the land covered by this map.

The Jemez Mountains, derived from igneous activity, are the dominant physical features. Their slopes were formed by alluvial material and more importantly by later pyroclastic eruptions that deposited tuffaceous material in a wide area (Nyhan et al. 1978). At the top of the Jemez Mountains is Valles Caldera. Several volcanic cones are found within the caldera, the largest and highest is Redondo Peak at 11,254 feet above mean sea level. The Jemez Mountains are steep, and range in height from 6000 to 10,541 feet, the highest point on the caldera rim in the area covered by the Base Map. They are deeply dissected by stream erosion, forming a series of mesas and steep canyons that run radially from the caldera over what is primarily

the Pajarito Plateau. Most of the canyons contain intermittent streams which flow during the rainy season. Frijoles Creek south of Los Alamos flows through Cañon de Frijoles and is the only perennial stream of the plateau (Nyhan et al. 1978). Like the intermittent streams of the Pajarito Plateau, Frijoles Creek also flows east into the Rio Grande.

The Rio Grande flows south from Española Valley through White Rock Canyon at the base of the Pajarito Plateau. North of Pueblo de Cochiti, the river is dammed by the Cochiti Diversion Dam, creating Cochiti Lake behind the structure, which, along with associated levees were designed for flood control and irrigation water storage.

East of the river, the volcanically derived substratum continues and merges with a piedmont plain that extends east to the city of Santa Fe (Folks 1975). It is dissected by stream erosion and is partially drained by the Santa Fe River, an intermittent stream that is confluent with the Rio Grande south of the Cochiti Diversion Dam.

West of the Jemez Mountains rise the Sierra Nacimiento, uplifted granite lying over limestone and sandstone, and oriented in a north-south direction (Darton 1928). These mountains form, in part, the western portion of the Jemez River drainage. The river flows south between the Sierra Nacimiento and the Jemez Mountains with its headwaters within Valles Caldera and confluent with the Guadalupe River in the Cañon de San Diego, north of Jemez Pueblo.

The upland vegetation in the area covered by the Base Map follows an elevational gradient. Lower elevations from about 5500 feet are characterized by vegetation common to the Grama-Galleta and Pinyon-Juniper Woodland Mosaic section of the Colorado Plateau Province. It consists primarily of galleta (Hilaria jamesii), black grama (Bouteloua eriopoda), dropseeds (Sporobolus spp.), and other grasses. From about 6300 to 7800 feet woodlands of widely spaced pinyon (Pinus edulis) and juniper (Juniperus spp.) trees form a transition zone between the Grama-Galleta Steppe and the Ponderosa pine-Douglas fir Forests of the Nacimiento and Jemez Mountains. At elevations above 8300 feet, aspen (Populus tremuloides) and mixed conifers, including subalpine fir (Abies lasiocarpa) of the Canadian Life Zone, occur. North facing slopes, at a given elevation, typically are vegetated with communities associated with slightly higher elevations than south facing counterparts.

Climate

The climate in the area reflects the elevational gradient that ranges from about 5100 feet along the Rio Grande floodplain to 11,254 on Robledo Peak in the Jemez Mountains. The climate along the Rio Grande is arid continental. Fall, winter, and spring are dry seasons. Rainfall occurs primarily during the summer as brief isolated thundershowers. Average annual precipitation is from 7-9 inches (Folks 1975). The remaining mountainous areas have a semi-arid climate with an average annual rainfall of about 20 inches but this may be as high as 35 inches in the highest mountain elevations. Most of the precipitation falls during the months of May through October with peaks in August. Winter

precipitation occurs as snow with as much as 50 inches falling during an average winter. July is the hottest month with an average maximum temperature of 90°F and January is the coldest month with an average minimum temperature of 2°F (Nyhan et al. 1978).

Wetland Communities

The Rio Grande is classified as Riverine Lower Perennial Open Water. Its highest channel flow is attained in the spring when runoff from snow melt occurs, and during the summer in periods of high rainfall. The river flows over a substratum composed of Sand throughout its course. Its waters are turbid and the sediment load is high. Consequently, it has relatively low productivity.

Below Cochiti Dam, irrigation and drainage canals and ditches account for a considerable amount of wetlands. These are classified as Riverine systems. The bottoms are composed of Sand or Mud. Water is manipulated for agricultural use. The user of the map will find that Open Water and Intermittent Streambed designations are dependent on utilization for irrigation purposes. These excavated systems should have the Artificial modifier added to their designations.

Below Cochiti Dam, the Rio Grande's channel is braided. Riverine Intermittent Beach Bars occur within the channel and may be vegetated. Those that have established vegetation are usually labeled as Palustrine Forested or Scrub Shrub depending on the development of the community. Species that commonly occur on these islands in the river, and along the rivers course as riparian growths, are cottonwood (Populus angustifolia), Russian olive (Elaeagnus angustifolia), and to a lesser degree, willows (Salix sp.) and saltcedar (Tamarix chinensis).

Oxbows and some flooded pastures also occur below the dam. Those labeled as Palustrine Emergent usually are vegetated by cattails (Typha domingensis and T. latifolia), hardstem bulrush (Scirpus acutus), spikerushes (Eleocharis spp.), horsetail (Equisetum fluviatile), and a variety of rushes (Juncus spp.) and grasses such as rabbitsfoot (Polypogon monspeliensis), and squirrel-tail (Sitanion hystrix). Oxbows and flooded pastures represent Type 3 wetlands - Shallow Fresh Marshes (Shaw and Fredine 1971). The mosaics of different wetland types provide favorable habitat for a variety of wildlife species including members of the Anatidae and many passerine species.

Behind Cochiti Dam, Cochiti Lake provides navigable waters for recreation as far up the Rio Grande as Alamo Canyon. It is labeled as Lacustrine Limnetic Open Water and represents a Type 5 wetland - Open Fresh Water (Shaw and Fredine 1971). Cole et al. (1980), report that bottom sediments are comprised of clay and silt. Mean depths ranged from about 20-50 feet. For a description of the biotic community of Cochiti Lake their report should be consulted.

The Pojoaque River is labeled as Riverine Lower Perennial Streambed. It should be labeled as Riverine Lower Perennial Unconsolidated Bottom.

The bottom is composed of Sand, the channel creating Beach Bars in some segments of the river. Phreatophytes similar to those along the Rio Grande may occur as riparian growths.

Through the Rio Grande's course in White Rock Canyon, Riverine Intermittent Streambeds occur in canyon bottoms running east to west and draining part of the Jemez Mountains and the Pajarito Plateau. Substrates range from Sand to Boulders depending primarily on elevation. Riverine Perennial Open Water designations also occur in these canyons but their surface occurrence is dependent on rainfall patterns and water table fluctuations. The vegetation associated with these canyons is primarily upland types, however if surface or subsurface water is available for extended periods, cottonwoods, Russian olive and saltcedar may occur.

Arroyos are present throughout the lower elevation mesas and piedmonts. The substrate is Sand, and those leading into the Rio Salado and Jemez River are typically unvegetated.

The Rio Salado, Santa Fe, and Galisteo Rivers are labeled, in part, as Riverine Intermittent Streambeds. These have Sand substrates. Surface flows of temporary duration occur during the spring and summer but perennial subsurface flows are suspected since they all maintain growths of phreatophytes throughout most of their courses.

Throughout the rangelands, on mesas and piedmont areas, are stock tanks labeled as Palustrine Open Water or Palustrine Flat depending on the relative permanence of the water. They have Mud bottoms that may support emergent vegetation such as arrowweed (Pulchea sericea), bulrushes (Scirpus sp.), or rushes (Juncus sp.) along their margins. Many, however, are unvegetated. Almost all have turbid water and correspond to Type 1 wetlands - Seasonally Flooded Flats (Shaw and Fredine 1971). The Jemez River and its tributaries are classified as Riverine Upper Perennial Open Water. Substrates vary from Bedrock and Boulders, at high elevations in the Jemez Mountains, to Cobble-Gravel at lower elevations and along tributaries such as San Antonio, Sulphur Creek, and Redondo Creeks that flow through Valle Caldera. Waters are typically clear and flow at a fast rate. Aquatic invertebrates such as broad-shouldered water striders (Veliidae), biting flies (Tabanidae), the subaquatic Ptilodactylids, mayflies (Leptophlebidae), and saddle case making Tricopterans (Glossomatidae) have been found on the water surface and substratum. Vertebrate fauna found in and along the streams include trout (Salmo sp.), sculpins (Cottidae), and the dipper (Cinclus mexicanus).

The overstory vegetation associated with these streams typically follows an elevational gradient. Large cottonwoods and Russian olive trees occur below 6500 feet along the course of the Jemez River. The vegetation then grades into communities made up of Douglas fir (Pseudotsuga menzesii), ponderosa pine (Pinus ponderosa), Gambel Oak (Quercus gambelii), New Mexico locust (Robinia neomexicana), and junipers (Juniperus communis, and J. scopulorum) at slightly higher elevations. At about 7000 feet, Engelmann's spruce (Picea engelmanii), and blue spruce (Picea pungens) begin to appear along the streams, along with Rocky Mountain maple (Acer glabrum), Oregon grape (Berberis repens), alder (Alnus tenuifolia), and aspen (Populus tremuloides).

Streams may pass through mountain meadows within Valle Caldera. These meadows are labeled as Palustrine Emergent wetlands. Flavill and Whitford (1978) describe the vegetation along the margin of Redondo Creek as composed of sedges (Carex rostrata, C. lanuginosa, C. festivella), hairgrass (Dechampsia caespitosa), clover (Trifolium sp.), manna grass (Glyceria striata), and various species of rushes, bulrushes, and spikerushes. These meadows represent Type 2 wetlands - Fresh Meadow (Shaw and Fredine 1971).

Palustrine Open Water of Lacustrine Littoral Open Water were occasionally encountered in the Jemez Mountains during the field survey. The waters supported growths of elodea, mud midget (Wolffiella lingulata), filamentous algae and duckweed (Lemna sp.), with emergents such as cattails (Typha sp.), and sedges occurring along the pond or lake margins. The bottoms were usually Mud and the water, fed by streams was clear. Kingfishers (Megaceryle alcyon) and waterfowl were observed using these wetlands which are considered as Type 5 wetlands - Open Fresh Water (Shaw and Fredine 1971).

Loss and Vulnerability

Past flood control and irrigation storage measures such as channelization and damming of the Rio Grande have reduced the amount of area suitable for wildlife along the river. Existing wetland sites have thus become more valuable and efforts should be encouraged for their conservation and improvement to enhance their value to wildlife.

NWI Code	Description	Common Name	Circular 39 Type	Representative Plant Species and Physiographic Features
R2OW	Riverine Lower Perennial Open Water	river, ditch, canal	--	Unvegetated, Sand to Mud bottoms
R2SB Should be R2UB	Riverine Lower Perennial Unconsolidated Bottom	river	--	Unvegetated, Sand
R4BB	Riverine Intermittent Beach Bars	river bar	--	Unvegetated, Sand
R4SB	Riverine Intermittent Streambed	ditch, canal	--	Unvegetated, Sand to Mud bottoms
L1OW	Lacustrine Limnetic Open Water	reservoir, lake	5	Unvegetated, clay and silt sediments elodea (Elodea sp.)
L2OW	Lacustrine Littoral Open Water	reservoir, lake	5	Unvegetated, clay and silt sediments; elodea
PFO,PSS	Palustrine Forested Scrub Shrub	bosque riparian	--	Cottonwoods (Populus angustifolia), Russian olive (Elaeagnus angustifolia), willow (Salix sp.), saltcedar (Tamarix chinensis)
PEM	Palustrine Emergent	oxbows ponds pastures	3	Cattail (Typha domingensis, T. latifolia), hardstem bulrush (Scirpus acutus), spikerush (Eleocharis sp.), horsetail (Equisetum fluviatile), rush (Juncus sp.), rabbitsfoot grass (Polypogon monsepiliensis), squirrel-tail (Sitanion hystrix)

NWI Code	Description	Common Name	Circular 39 Type	Representative Plant Species and Physiographic Features
PEM	Palustrine Emergent	meadows	2	Sedges (*Carex sp.*), hairgrass (*Dechampsia caespitosa*), clover (*Trifolium sp.*), manna grass (*Glyceria striata*), rushes, bulrushes (*Scirpus sp.*), spikerushes (Flavill and Whitford (1978)
POW	Palustrine Open Water	pond, lake	5	Elodea (*Elodea sp.*), mud-midget (*Wolffiella lingulata*), filamentous algae, duckweed (*Lemna sp.*), cattails, sedges

BIBLIOGRAPHY

The purpose of this report is to provide general information about wetland classifications found within the area covered by the Base Map. There has been no attempt to describe all wetlands occurring in the area nor provide complete faunal and floral lists of those wetlands discussed. The references listed below refer to literature cited in the text of this report as well as sources of additional information.

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

Cole, R., D. Weigmann, R. Tafanelli and P. Turner. 1980. Trophic model development for reservoirs in New Mexico. Fed. Aid Project F-53-R-1, New Mexico Game and Fish. Santa Fe, NM. 85 p.

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

Darton, N. H. 1928. "Red Beds" and associated formations in New Mexico, with an outline of the geology of the state. USDI. Geol. Surv. Bull. 794. 356 p.

Flavill, P. and W. G. Whitford. 1978. The biota of Redondo Creek - Union Baca geothermal exploration site - Sandoval County, New Mexico. Unpubl. Whitford Ecological Consultants. Las Cruces, NM. 63 p.

Folks, J. J. 1975. Soil survey of Santa Fe Area, New Mexico (Santa Fe County and Part of Rio Arriba County). USDA Soil. Conserv. Serv. 114 p.

Hubbard, J. P. 1978. Revised check-list of the birds of New Mexico. New Mexico Ornithol. Soc. Publ. No. 6. McLeod Print. Co., Albuquerque, NM. 110 p.

Hubbard, J. P., M. C. Conway, G. Campbell, G. Schmitt, and M. D. Hatch. 1979. Handbook of species endangered in New Mexico. New Mexico Dept. Game and Fish. 187 p.

Johnson, R. R. and D. A. Jones (eds.). 1977. Importance, preservation and management of riparian habitat: A symposium. USDA For. Serv., Rocky Mt. For. and Range Exp. Stn. Gen. Tech. Rep. RM-43. 217 p.

Nyhan, J. W., L. W. Hacker, T. E. Calhoun, and D. L. Young. 1978. Soil survey of Los Alamos County, New Mexico. Los Alamos Sci. Lab Univ. of Calif., Los Alamos, NM. 102 p.

Shaw, S. P. and C. G. Fredine. 1971. Wetlands of the United States, their extent and their value to waterfowl and other wildlife. USDI Fish and Wildl. Serv. Circ. 39. 67 p.

U. S. Bureau of Reclamation. 1977. Operation and maintenance program for the Rio Grande, Velarde to Caballo Dam, Rio Grande and Middle Rio Grande Projects, New Mexico, Final Environ. Statement. Amarillo, TX. Vol. 1. 398 p.

U. S. Fish and Wildlife Service. 1954. Wetlands inventory - New Mexico. Off. River Basin Studies. Field Work and Rep. 16 p.