

## USER NOTES: WHITE SANDS, NEW MEXICO, NATIONAL WETLANDS INVENTORY MAP

### Map Preparation

The wetland classifications that appear on the White Sands National Wetlands Inventory (NWI) Base Map are in accordance with Cowardin et al. (1977). The delineations were produced through stereoscopic interpretation of 1:110,000-scale color infrared aerial photographs taken in 1971, and 1:80,000-scale black-and-white aerial photographs taken in 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 southwestern corner of the San Diego Mountain area 1:62,500-scale map, the northern portion of the Kaylor Mountain area 1:62,500-scale map, the southern one third of the Lake Lucero SW and Lake Lucero SE area 1:24,000-scale maps, and a narrow strip running east to west on the southern edge of the Point of Sands area 1:62,500-scale map, the northeastern edge of the Lake Lucero and northern edge of the Lake Lucero NE area 1:24,000-scale maps. These areas are, therefore, without wetland designations on the White Sands NWI Base Map.

Field checks of the delineated wetlands of the White Sands NWI Base Map were conducted in June, 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 White Sands NWI Base Map lies in the south central portion of New Mexico and is part of Otero, Dona Ana, and Sierra counties. Bailey's Ecoregion Classification (1978) identifies the area as Chihuahuan Desert Province, Grama Tobosa Section (3211).

The area is characterized by two multiple internally drained basins, the Jornada del Muerto averaging about 4440 feet in elevation, and the Tularosa at a somewhat lower 4000 feet elevation. Separating these two basins are the San Andres Mountains ranging from about 5000 to 8200 feet and oriented in a north-south direction, nearly bisecting the mapped area.

The basin topography is influenced by the character and structure of the rock formations and determined largely by erosive forces of surface

runoff on these exposed formations. Ancient stream benches and terraces are common features in the interior basin. Arroyos are also common, having been cut into alluvial fans at the base of the mountains (Meinzer and Hare 1915).

One of the most interesting features of the Tularosa Basin is the great quantity of gypsum, derived from the gypsum bearing strata known as the Yeso Formation (Hendrickson 1977). Alkali flats, sharply defined basins with nearly level floors, make up a large portion of the mapped area in the Tularosa Basin. They are formed by wind erosion that pile dunes of eolian material on the leeward side of the flats. The water table is just slightly below the surface of the flat and the level feature is caused by the table which limits the depth to which the wind can erode the surface (Meinzer and Hare 1915). A large alkali flat lies just east of the northern half of the San Andres Mountains but the most distinctive is Lake Lucero, the source of the gypsum sand dunes of White Sands National Monument.

Gypsum sinkholes are a common feature in both the Jornada del Muerto and Tularosa Basins. These sinkholes were once functional in receiving surface runoff and conducting it away through underground passages. Many have long since been clogged and the gentle depressions with no outlets have resulted and contribute to the undulating character of the basin topography (Meinzer and Hare 1915).

The soils are well drained in both basins (Bulloch and Neher 1980). Livestock grazing represents the predominant use in the Jornada del Muerto. The San Andres National Wildlife Refuge serves as essential habitat for the endangered desert bighorn (Ovis canadensis), while much of the Tularosa Basin is administered by the National Park Service and the Department of Defense and has been a site for the introduction of the gemsbok (Oryx gazella).

### Climate

The climate of the area is arid. Fall, winter, and spring are dry seasons. Precipitation occurs in July and continues through September usually as brief, isolated torrential storms. Average precipitation is 7-9 inches but may be as high as 19 inches in the mountains. The average annual temperature is from 50-65°F with recorded extremes of 112°F and -20°F. Snowfall is usually light and infrequent, generally occurring from November through March (Bulloch and Neher 1980).

### Wetland Communities

The most prominent wetland type that occurs in the area covered by the White Sands NWI Base Map is the Lacustrine Littoral Flat. These are alkali flats or playas. The water table periodically lies above the surface of the flat and they are typically unvegetated due to extreme saline conditions. The Palustrine Flat is a playa less than 20 ha. These playas represent Type 9 wetland - Inland Saline Flats (Shaw and Fredine 1971). The duration of standing water is variable and depends on the playa size and the amount of water. During periods of standing water, migratory waterfowl and shorebirds may use these wetlands. The vegetation associated with some of these playas typically follows a successional pattern as soil moisture conditions change. Cockleburs (Xanthium strumarium) which are associated with saturated soil

conditions may become well established on less saline sites but eventually give way to more drought resistant annuals as water stress increases. Hendrickson (1977) describes the vegetation of more saline habitats.

Smaller Palustrine Flats, either as small playas or livestock stock tanks, also occur in the Tularosa and Jornada del Muerto Basins. They are usually unvegetated and are only intermittently flooded with water of temporary duration. Some of these have been designated as Palustrine Open Water on the White Sands NWI Base Map but unless surface water is maintained by a windmill or other pumping device, they should be classified as Palustrine Flat.

Palustrine Open Water usually designate artificial impoundments creating ponds that serve as livestock tanks. They may be springs or are maintained by a windmill or other pumping device. Water from these springs and wells is usually alkaline. The algae Chara may be found growing in the waters of impoundments and at Garton Lake in the White Sands National Monument. Alkali bulrush (Scirpus maritimus) and common cattail (Typha latifolia) line the pond margin and create a Palustrine Emergent wetland area north of the pond. The ubiquitous saltcedar can usually be found in the vicinity of all impoundments.

A system of ponds and small lakes are situated southwest of Holloman Air Force Base in the eastern portion of the White Sands NWI Base Map. These constitute the most productive wetland sites in the mapped area and are artificial entities which serve as holding basins for water from the sewage treatment facility of Holloman Air Force Base. Lacustrine Littoral Open Water, Lacustrine Littoral Flat, Palustrine Open Water and Riverine Perennial Open Water represent these sewage basins and connecting ditches and canals. Cole et al. (1981) report that the waters support phytoplanktonic algae: the blue-green algae, Anabaena and Microcystis being the most abundant, and lesser amounts of green algae, cryptophytes, diatoms, Euglena and Cerium. The zooplankton was represented mostly by rotifers, copepods and ostracods while the zoobenthos were mostly Chironomidae (midges), Corixidae (Water boatmen) and Nematoda (roundworms), as well as some Hydrophilidae (water scavenger beetles), Certopogonidae (biting midges), Ephydriidae (shore flies), and Zygoptera (damselflies). Mosquito fish (Gambusia affinis) was the only fish found in these ponds. The area also supports abundant waterbirds particularly Wilson's phalaropes (Steganopus tricolor), ruddy ducks (Oxyura jamaicensis), northern shovelers (Anas clypeata), blue winged teal (Anas discors), American avocets (Recurvirostra americana), and American coots (Fulica americana). The Palustrine Scrub Shrub and Forested wetlands in the area consisted of saltcedar with common three-square (Scirpus americana) the dominant emergent along connecting ditches and pond margins.

Riverine Intermittent Streambeds occur as dry drainages of bedrock and boulders forming steep gullies and ravines through the mountains and ridges of the San Andres and as arroyos of sandy substrate through alluvial fans and basin floors. These can be subjected to flash flooding during the summer rains, and water availability is very brief. Characteristic vegetation associated with the gullies and ravines is comprised of gray oak (Quercus grisea), hackberry (Celtis laevigata),

Apache plume (Fallugia paradoxa), skunk-bush sumac (Rhus trilobata), and seepwillow (Baccharis glutinosa). At lower elevations, through bajadas and on basin floors, the vegetation associated with arroyos is characterized by four-winged saltbush (Atriplex canescens), mesquite (Prosopis glandulosa), whitethorn (Acacia constricta), desert willow (Chilopsis linearis), and saltcedar.

Springs are found in the San Andres Mountains usually as seeps and sometimes producing small rivulets, their permanence dependent on the level of the water table. Around these springs and along their flow are cottonwoods, coyote willow shrubs (Salix exigua), and rushes of various species. Many are designated as Palustrine Scrub Shrub but this designation may also refer to the more common vegetation associated with drainages and described earlier for the Riverine Intermittent Streambed classification. The waters of these springs support aquatic invertebrate fauna of Coleoptera (beetles), Ephemeroptera (mayflies), Trichoptera (caddis flies), Gastropoda (snails), and Nematoda (roundworms). They also serve as watering sites for native mammals such as the desert bighorn sheep and mule deer.

NW Code	Description	Common Name	Circular 39 Type	Characteristic Plant Species and Physiographic Features
L2OW	Lacustrine Littoral Open Water	lake, pond	11	Fine sediment bottom blue-green algae <u>Anabaena</u> and <u>Microcystis</u> green algae, cryptophytes, diatoms <u>Euglena</u> and <u>Certium</u>
L2FL	Lacustrine Littoral Flat	alkali flats playas	9	Unvegetated. Sand bottom
PFL	Palustrine Flat	playa, stock tank	9	Unvegetated. Sand to Mud bottom cockleburs ( <u>Xanthium strumarium</u> )
POW	Palustrine Open Water	stock tank	9	Unvegetated. Sand to Mud bottom
		stock tank	11	<u>Chara</u>
PEM	Palustrine Emergent	lake, pond stock tank	11	<u>Chara</u> , alkali bulrush ( <u>Scirpus maritimus</u> ), common three-square ( <u>Scirpus americana</u> ), common cattail ( <u>Typha latifolia</u> ).

## 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.

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