COLORADO WETLAND INVENTORY
U. S. FISH AND WILDLIFE SERVICE
1:100,000 MAP NARRATIVE REPORT
-GREELEY SE-

INTRODUCTION

In 1974, the U. S. Fish and Wildlife Service directed its Office of Biological Services to complete an inventory of the Nation's wetlards. As part of this overall objective, an effort began in September, 1978, to delineate and classify photointerpretable wetlands within the eastern five-sevenths of Colorado.

Wetland maps at 1:100,000 scale and wetland overlay maps at 1:24,000 scale are produced at National Wetland Inventory headquarters in St. Petersburg, Florida. Final Colorado wetland maps are available at the U. S. Fish and Wildlife Service's Regional Office located in Denver, Colorado. An integral part of all final wetland maps is the completion of narrative reports for each 1:100,000 quadrangle inventoried. The following narrative report provides both basic and specific data which aids the user in understanding not only the general area of the Greeley SE quadrangle but also representative details of its wetland habitat.

MAP PREPARATION

Contractor for this wetland inventory was Colorado Division of Wildlife, 317 West Prospect, P. O. Box 2287, Fort Collins, Colorado 80526. Richard Hopper was the contract officer. Photo interpretation was done by the subcontractor, Colorado State Forest Service, Foothills Campus, Colorado State University, Fort Collins, Colorado 80523. Photo interpreters were Thomas Owens, Charles Storrs, and Alexander Kosinski. Preparation of this narrative report was completed by Thomas Owens. Regional Wetland Coordinator was Charles Elliott, U. S. Fish and Wildlife Service, Denver Federal Center, P. O. Box 25486, Denver Colorado 80225.

Wetland delineation and classification for Greeley SE 1:100,000 quadrangle was done on 1:80,000 black and white aerial photographs taken in June and July 1975. Photography covered 100 percent of the quadrangle. Wetland classification was done in accordance with Cowardin, et al., December 1979. Specific mapping conventions developed at National Wetland Inventory headquarters were used to assist in photo-interpretation. Field checking for the quadrangle was done February 13, 1979.

Map users are cautioned that mapping with aerial photography has limitations. Wetlands are identified and classified through stereoscopic examination of photography on the basis of tone, texture, pattern, site, size, local ecology, and cultural patterns. Aerial photographs reflect conditions during the year and season they are taken. In addition, the 1:80,000 black and white photography used on this project was photographed for purposes other than wetland mapping. The small scale precludes delineating very small wetland (less than 1/4 acre) and narrow linear wetlands (less than 15 feet wide). Black and white emulsion makes distinguishing between classes of vegetation (and non-vegetation) difficult. Some imagery was not photographed during the best season for wetland delineation and classification. If photographed too early or too late in the season, moist (dark) tones are not evident. The photography was four to five years old when it was interpreted and land use changes have occurred, especially in the rapidly growing Front Range area.

Any discrepancies noticed regarding wetland omissions, inclusions, or errors should be given to the U. S. Fish and Wildlife Service Regional Wetland Coordinator who is located in Denver, Colorado, and whose address is on the previous page.

Special Mapping Problems

This quadrangle has many small depressions scattered across the plains. There are two types of depressions: wetlands with emergent species and non-wetlands without emergents. Non-wetland depressions without emergents are often dark in tone and conspicuous on the imagery, which is due to slightly more moisture and lusher vegetation than surrounding areas, but have no lighter toned ring. Depressions with wetland species (usually) have a lighter toned ring in them which shows the extent of inundation after rain. Depressions receive water from local summer thunderstorms, are dry most of the time, and are not part of drainage systems. These wetlands are locally important, but are often difficult to see on the imagery, unless flooded after a thunderstorm.

AREA DESCRIPTION

Bailey's Ecoregions

Greeley SE 1:100,000 quadrangle falls into one province in Bailey's Description of the Ecoregions of the United States, 1978, which classifies land into a hierarchal system based upon bioclimatic, geologic, and geomorpnic criteria. The province is Great Plains-Shortgrass, Grama-Buffalo Grass Section (3113L) and is characterized by bunched short grasses, with scattered trees.

Hammond's Land-Surface Forms

Greeley SE falls into one Hammond's Land-Surface Form which systematically characterizes United States' topography (Ecoregions and Land-Surface Form Map, 1975). This Land-Surface Form is in the Interior Division (III) and Rocky Mountain Piedmont Subdivision (13) and is Irregular Plains (III-13B2b) which is characterized by 50 to 80 percent of area gently sloping, local relief 100 to 300 feet, and 50 to 75 percent of gentle slope on lowland.

Hydrologic Mapping Units

Eight hydrologic mapping units are found in Greeley SE (Hydrologic Unit Map of Colorado, 1974). Hydrologic units are part of an effort by the United States Geological Survey to provide a series of uniform, Nationally consistent maps which accurately delineate hydrographic boundaries for Federal and State water resource agencies. Units are designated by eight-digit numbers tied to a computer file (Catalog of Information on Water Data) which contains information on water data activities (Langford and Kapinas, 1979). All units in Greeley SE are in the Missouri Region (10). 10190011 covers 4 percent in the southeastern corner, 10190010 covers 8 percent in the southeast, and 10190009 covers 2 percent on the northern edge. 1019008 covers 1 percent on the northern edge, 10190007 covers 6 percent on the northwestern corner, while 10190006 covers 6 percent on the western edge. 10190005 covers 6 percent in the southwestern corner and 10190003 covers 67 percent in the quadrangle's center.

Geography

Greeley SE is covered by plains which have level to rolling topography. Elevations are from 4,500 to 5,000 feet and vegetation is short grass prairie with cottonwoods and willows along streams.

The South Platte is the quadrangle's major river. It flows from the southwestern corner to the northeast to Greeley, and then flows east. There are several large reservoirs associated with the South Platte that store water for agricultural irrigation, as well as serving as wildlife areas and focal points for recreation.

The main economic activity in this quadrangle is agriculture. Extensive irrigated agriculture is found along the South Platte and near reservoirs, with dryland farming and ranching away from water sources.

Geology

Greeley SE is covered with sedimentary deposits of different ages washed down from the mountains. The oldest are Cretaceous (70 to 135

million years ago) shale, claystone, sandstone, and major coal beds found over the quadrangle. Late Cretaceous and early Tertiary (3 to 70 million years ago) deposits of sandstone, mudstone, shale, and local coal beds are also scattered over the quadrangle.

Most of Greeley SE is covered by Quaternary (present to 3 million years ago) deposits of gravel and sand which were washed down from the mountains during glacial melting. Quaternary eolian deposits consisting of dune sand, silt, and loess are extensive. Broad areas along streams, including the South Platte, consisting of modern alluvium were deposited by the rivers (Chronic and Chronic, 1972; Tweto, 1979).

Soils

Soil is an important element of wetlands; it is one criterion used to define wetlands. "The substrate of wetlands is predominantly undrained hydric soil" (Cowardin, et al.). The National Wetland Inventory, in cooperation with the U. S. Soil Conservation Service is preparing a list of hydric soils to accompany the Cowardin, et al., wetland classification system.

Two major wetland soil types are found in Greeley SE, soils associated with drainages and soils associated with flood-irrigated meadows.

Wetland soils in drainages vary greatly. These soils range in texture from gravels and sands to loamy clays, in permeability from excessively drained to impermeable. Along the South Platte, which has a continuous flow of water insured by reservoirs, wetland soils in drainages are generally flooded every year, have textures ranging from sandy to loamy, and have water tables less than 3 feet from the surface. They are used for pastures where possible. Native vegetation includes willows, cottonwoods, grasses, sedges, rushes, and low pockets cattails. Away from the South Platte, where streams are intermittent, wetland soils are sandy and gravelly, unstable, excessively drained, subject to occasional flooding, and have low water tables. Native vegetation includes cottonwoods and annual forbs (Heil, et al., no date; Spears, et al., 1968).

Flood-irrigated soils are found near streams or reservoirs where there is a ready supply of water. These soils may not have been wetland soils originally, but since they have been flooded the water table is less than 3 feet from the surface and they support tall grasses, sedges, rushes, and cattails in low pockets. Their texture ranges from clay (impermeable clay may produce saline soils) to sand (Heil, et al.; Spears, et al.).

Climate

Greeley SE's climate is semi-arid and continental, with cold, dry winters and cool, relatively dry summers. Greeley receives 11.7 inches of precipitation annually, 27 inches of this coming as snow. January's average maximum temperature is 39.0°F., average minimum is 8.8°F. July's average maximum temperature is 89.9°F, average minimum is 57.3°F (Benci and McKee, 1977). The growing season is 140 to 155 days (SCS data, 1978).

WETLANDS

Community Description

Lacustrine System

One lake type is found within Greeley SE which is reservoir (L1OWKZ) (information in this section comes from field notes taken February 13, 1979). Reservoirs are found along the South Platte River. Water levels fluctuate as much as 30 feet and the areal extent of the open water changes significantly during the year because of filling in spring with snowmelt and drawing down during summer for agricultural irrigation. The exposed shoreline is composed of rocks, gravel, sand, and mud. Reservoirs normally retain some water throughout the year.

Riverine System

On the plains permanent streams are called lower perennial rivers (R2OWZ). Lower perennial streams are characterized by slow-moving water, sand or mud bottoms, well-developed flood plains, and low dissolved oxygen concentrations.

Another type of river delineated is irrigation canal (R2OWKZ, R2OWKY, R4SBKY). Canals large enough to be delineated (over 15 feet across) are feeder canals; that is, those that carry water to and from reservoirs and to irrigation ditches. Canals occasionally flow year round; their peak flow is during the growing season to get water to irrigated fields.

A final stream type delineated is intermittent stream (R4SBW). This stream type is the most common stream type on the eastern plains where there is no permanent water source to supply moisture. Intermittent streams have a sandy substrate that is very well drained. They flow after snowmelt and after local summer thunderstorms.

Palustrine System

An important palustrine type is flood-irrigated meadow (PEMKC). Flood-irrigated meadows are found along streams and below springs. Ditches were built along the meadows' upper edges to allow water to flow from upper sources and spill out over the meadows. Standing water can be found for short periods early in the growing season; soil remains moist for extended periods through the growing season. Flood-irrigated meadows have not been cultivated and vegetation is native. Meadows are hayed or grazed by cattle. Vegetation includes Juncus arcticus, Eleocharis acicularis (species identification was according to Harrington, 1955; Fassett, 1957; Weber, 1976; Nelson, 1977), along with grasses and forbs. Many flood-irrigated fields are cultivated; these were not delineated.

Scrub/shrub and scrub/shrub-emergent areas are found along streams in this quadrangle (PSSW, PSSY, PSS/EMW, PSS/EMY). The water regime is dependent upon the amount of water flowing in the stream. In the western portion, where water is relatively plentiful, the water regime tends towards the seasonl regime. In the east, where moisture is scarce, water regimes are drier. Shrub species are Salix spp.; understory emergents include Juncus arcticus, Carex spp., Eleocharis acicularis, as well as grasses and forbs.

Forested wetlands (PFOW, PFOY, PFO/EMW, PFO/EMY, PFO/SSW, PFO/SSY) are found throughout the quadrangle along streams. Their water regime situation is the same as that of scrub/shrub areas. Tree species include Populus sargentii and Salix spp. Understory species are the same as those mentioned with scrub/shrub-emergent areas.

On the plains numerous flats (PFLW) are delineated which are small dugouts or impoundments constructed to supply water to livestock. These flats are dependent upon local precipitation for their water supply and do not receive enough moisture to remain wet year round. They often have saline soils. Vegetation consists of sparse stands of Distichilis spicata, Sporobolus airoides, forbs, and grasses.

Intermittent depressions (PEMW) are also delineated on the plains that are the result of: wind deflation or blowouts, solution-subsidence (leaching water removes limestone and subsequent deflation), or differential compaction of Tertiary sediments of the plains (Thornbury, 1965). Delineated depressions are generally a few feet in depth and from one hundred to several hundred feet across. There is not sufficient moisture in spring after snowmelt to supply them with moisture; they are filled with water after local summer thunderstorms and hold water for a few days. They are dry most of the time, but do receive enough moisture to support stands of Eleocharis spp., as well as upland vegetation.

Wetland Values

An important wetland value is flood-irrigated meadow production of hay for cattle (information in values section is from Hopper, 1980). Flood-irrigated meadows produce hay at a much higher rate than dry-land meadows do. Wildlife also benefit from wet-hay meadows: ducks nest in them and shorebirds use them for forage and cover.

Reservoirs are part of a major winter concentration area for 50,000 to 70,000 Canada geese. These wetlands are part of wintering mallard range as well as being stopovers on a migratory route and summer habitat for many species of waterfowl and shorebirds. White pelicans nest on Riverside Reservoir.

Reservoirs were built to store water for agricultural uses. They are also used for fishing, camping, and boating; Jackson Lake is rated as a major fishing resource (Stream and Lake Evaluation Map, Colorado, 1979). Over 327,000 acre-feet per year of water is diverted from western slope streams into the South Platte River. Much of this water is taken out of the South Platte before it reaches Greeley SE, but these diversions increase the flow of water in the South Platte and its water supply to reservoirs and users (League of Women Voters of Colorado, 1975).

Forested wetlands along streams provide important wildlife habitat. Animals such as the whitetailed deer and bobwhite quail are found here. Semi-permanently flooded stands of cattail provide critical habitat for pheasants.

On the eastern plains intermittent depressions, streams, and windmills are important for wildlife, such as antelope, and livestock as the only water sources in this semi-arid region.

Wetland Loss and Vulnerability

The Front Range urban area is growing at a tremendous rate. Rural land is being developed for residences, businesses, and industry. Wetlands are being lost in this urbanization.

Increased population in the Front Range will have an effect on wetlands in other quadrangles. Urban water users can afford higher water costs than agricultural users can, and so financially pressed ranchers are selling their water rights to Front Range citites. Water is being diverted from flood irrigation for agriculture, especially in South Park. Loss of water from irrigated fields reduces wet meadow and scrub/shrub habitat, diminishing its productivity for agriculture and wildlife.

Interbasin water diversion has both beneficial and detrimental effects. Recipients of diverted water have increased stream flow and increased water supply for urban and agricultural users, with attendant benefits for wetlands and wildlife. On the other hand, basins that lose water incur decreased stream flow and decreased water supplies for urban and agricultural users, decreasing supplies to wetland, reducing their benefits for wildlife.

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