

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

INTRODUCTION

In 1974, the U. S. Fish and Wildlife Service directed its Office of Biological Services to complete an inventory of the Nation's wetlands. 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 NE quadrangle but also representative details of its wetland habitat.

MAP PREPARATION

Contractor for this wetland inventory was Colorado Division of Wildlife, 317 West Prosepect, P. O. Box 2287, Fort Collins, Colorado 80526. Richard Hopper was the contract officer. Photointerpretation was done by the subcontractor, Colorado State Forest Service, Foothills Campus, Colorado State University, Fort Collins, Colorado 80523. Photointerpreters were Thomas Owens 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 NE 1:100,000 quadrangle was done on 1:80,000 black and white aerial photographs taken in June, July, and September 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 photointerpretation. Field checking for the quadrangle was done February 1, 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 that was used on this project was photographed for purposes other than wetland mapping. The small scale precludes delineating very small wetlands (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.

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: those with wetland emergent species and those without emergents. Depressions with wetland species (usually) have a lighter toned ring in them which shows the extent of inundation after rain. Depressions without emergents (non-wetland) are often dark in tone and conspicuous on the imagery, this is due to slightly more moisture and lush vegetation than surrounding areas, but have no lighter toned ring. Wetland 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 NE 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 hierarchical system based upon bioclimatic, geologic, and geomorphic 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 NE falls into two Hammond Land-Surface Forms which systematically characterizes United State's topography (Ecoregions and Land-Surface Form Map, 1975). Both forms are in the Interior Division (III). The first form is in the High Plains Subdivision (14) and is Irregular Plains (III-14B2c) which has 50 to 80 percent of area gently sloping, local relief 100 to 300 feet, 50 to 75 percent of gentle slope on upland, and covers 32 percent of the quadrangle on the northern edge. The second form is in the Rocky Mountain Piedmont Subdivision (13) and is Irregular Plains (III-13B2b) which has 50 to 80 percent of area gently sloping, local relief 100 to 300 feet, 50 to 70 percent of gentle slope in lowland, and covers 68 percent of the quadrangle.

Hydrologic Mapping Units

Eight hydrologic mapping units are found in Greeley NE (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 NE are in the Missouri Region (10). 10190007 covers 16 percent of the western edge, 10190008 covers 19 percent in the western portion of the quadrangle, 10190009 covers 46 percent in the center of the quadrangle. 10190003 covers 6 percent in the southeast, 10190012 covers 1 percent in the southeastern corner, and 10190014 covers 7 percent on the eastern edge. 10190017 covers 4 percent in the quadrangle's northeastern corner and 10190015 covers 1 percent in the northeast.

Geography

All of Greeley NE is covered by plains which have level to rolling topography and mesas scattered through the quadrangle's northern portion. Elevations are from 4,700 to 6,200 feet and vegetation is short grass prairie with cottonwoods and willows along streams. The Cache la Poudre River cuts through the quadrangle's extreme southeastern corner. It supplies water to several large reservoirs which store water for agricultural irrigation.

This quadrangle is sparsely settled, although there are a number of small towns on the eastern edge near the Front Range. Agriculture is the quadrangle's main economic activity. There is extensive irrigated agriculture in the southeastern corner, with dryland farming and ranching in the north and east which are away from water sources.

Geology

Greeley NE is covered with sedimentary deposits of different ages washed down from the mountains. The oldest are late Cretaceous (70 to 135 million years ago) and Tertiary (3 to 70 million years ago) sandstone, shale, mudstone, conglomerate, and local coal beds which lie in the western and southern portions of the quadrangle.

Ash from volcanoes during the Laramide Orogeny drifted east from the mountains and blanketed the plains, burying many animals and plants forming the White River Formation. The formation of sandstone and ashy claystone is more resistant to erosion than the sedimentary rocks to the south and is higher. The southern limits of the White River Formation are known as the Chalk Cliffs and many fossils have been found here. Large areas of Greeley NE 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 and silt are in scattered areas. Broad areas along streams 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 wetland. "The substrate of wetlands is predominately 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 NE: 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, and in permeability from excessively drained to impermeable. In the western portion of the quadrangle where streams have a more 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 in low pockets cattails. Further east, 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.).

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 (Heil, et al.).

Climate

Greeley NE's climate is semi-arid and continental, with cold, dry winters and cool, relatively dry summers. Grover receives 14.2 inches of precipitation annually, 37 inches of this coming as snow. January's average maximum temperature is 42.1⁰F., Average minimum is 14.4⁰F. July's average maximum temperature is 87.9⁰F., average minimum is 54.8⁰F (Benci and McKee, 1977). The growing season is 145 days (SCS data, 1978).

WETLANDS

Community Description

Lacustrine System

One lake type is found within Greeley NE which is reservoir (L10WKZ) (information in this section comes from field notes taken February 1, 1979). Reservoirs are found in the southwestern corner of the quadrangle. 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 the 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 (R20WZ). 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 (R20WKZ, R20WKY, R4SBKY). Canals that are 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 are not cultivated and vegetation is natural. 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 seasonal 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. The 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 areas (PFLW, PEMW) 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 stricta, Sporobolus airoides, forbs, and grasses.

Intermittent depressions are also delineated on the plains (PEMW) 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 hay meadow production of hay for cattle (information in values section is from Hopper, 1980). Flood-irrigated hay meadows produce hay at a much higher rate than dryland meadows do. Wildlife also benefit from wet hay meadows as ducks nest in them and shorebirds use them for forage and cover.

Reservoirs in the southwestern corner 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.

Reservoirs were built to store water for industrial, municipal, and agricultural uses. They are also used for fishing, camping, and boating. Black Hollow Reservoir is rated as a major fishing resource (Stream and Lake Evaluation Map, Colorado 1979).

Over 36,000 acre-feet per year of water is diverted from streams in other basins into the Cache la Poudre River. Some of this water is taken out before the Poudre reaches Greeley NE, but these diversions increase the flow of water in the river and its water supply to reservoirs and users (League of Women Voters of Colorado, 1975).

Forested wetlands along streams are important wildlife habitat. Whitetail deer and bobwhite quail use these areas. Semi-permanently flooded cattail stands provide critical habitat for pheasants.

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

Wetland Loss and Vulnerability

Wetland loss has not been a major problem in the past in Greeley NE. This quadrangle is sparsely populated and urban growth has not been large.

Increased population in the Front Range to the west could have an effect on wetlands in this quadrangle. Urban water users can afford higher water costs than agricultural users can, and so financially pressed ranchers and farmers are selling their water rights to Front Range cities. 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 to 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 water supplies to wetlands, reducing their benefits for wildlife.

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