NE

COLORADO WETLAND INVENTORY
U. S. FISH AND WILDLIFE SERVICE
1:100,000 MAP NARRATIVE REPORT
-STERLING 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 photo-interpretable 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 Sterling NE 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 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 Sterling NE 1:100,000 quadrangle was done on 1:80,000 black and white aerial photographs taken in June and September 1975 and August 1976. 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. Although no field checking was specifically done for Sterling NE, similar habitat was ground-truthed in other quadrangles.

Map users are cautioned that mapping with aerial photography has its 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 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: 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.

The August 1976 imagery was poor quality: it had low contrast for distinguishing dark signatures and details were obscured.

AREA DESCRIPTION

Bailey's Ecoregions

Sterling 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 hierarchal 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 and shrubs.

Hammond's Land-Surface Forms

Sterling NE falls into three Hammond Land-Surface Forms which systematically characterizes United States topography (Ecoregions and Land-Surface Form Map, 1975). All forms are in the Interior Division (III). The first form is in the Rocky Mountain Piedmont Subdivision (13) and is Irregular Plains (III-13B2b) and has 50-80 percent of area gently sloping, local relief 100-300 feet, 50-75 percent of gentle slope in lowland, and covers 40 percent of the quadrangle on the western edge. The other two land-surface forms are in the High Plains Subdivision (14). On the northern edge, covering 6 percent, is Irregular Plains (III-14B2c) which is characterized by 50-80 percent of area gently sloping, local relief 100-300 feet, and 50-75 percent of gentle slope on upland. Covering 54 percent on the quadrangle's eastern half is Smooth Plains (III-14A2c) which has more than 80 percent of area gently sloping, local relief 100-300 feet, and 50-75 percent of gentle slope on upland.

Hydrologic Mapping Units

Six hydrologic mapping units are found in Sterling 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 Sterling NE are in the Missouri Region (10). 10190012 covers 30 percent in the northwestern corner, 10190016 covers 1 percent on the northern edge, and 10190018 covers 8 percent in the northeastern corner. 10250006 covers 21 percent in the quadrangle's eastern portion, 10250005 covers 32 percent in the southeastern corner, and 10250004 covers 8 percent on the southern edge.

Geography

Sterling NE is covered by plains which have level to rolling topography and mesas scattered through the quadrangle's extreme northern edge. Elevations are from 3,600-4,300 feet and vegetation is short grass prairie with cottonwoods and willows along streams.

The South Platte is the quadrangle's major river. It flows through the northwestern quarter of the quadrangle and supplies water to Julesburg Reservoir, a large irrigation reservoir. Julesburg Reservoir also serves as fish and wildlife habitat, as well as a focal point for recreation.

Extensive sand hills are found southeast of the South Platte.

Julesburg, Holyoke and Haxton are the quadrangle's largest towns, and are supported by agriculture, which is Sterling NE's major economic activity. Intensive irrigated agriculture is found near the South Platte and Julesburg Reservoir. Dryland farming and ranching are practiced away from water sources.

The eastern edge, a strip 3 miles wide, is in Nebraska.

Geology

Volcanic ash drifted east from the mountains during the Laramide Orogeny in the Tertiary Period (3-70 million years ago) and blanketed the plains burying plants and animals. This mixed with sedimentary rocks already deposited and formed ashy clay stone and sandstone in northwestern Sterling NE. Most of the quadrangle is composed of Tertiary sand and gravel that is loose to well cemented and is part of the Ogallala aquifer. The Ogallala aquifer is an important water bearing formation that supplies well water to center pivot irrigation systems. Along the southeastern shores of the South Platte, extensive Quaternary (present-3 million years ago) eolian deposits are found composed of dune sand, silt, and loess. Quaternary alluviums are found along streams flowing into the South Platte from the north. The South Platte flood plain is composed of modern alluvium (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 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 Sterling 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, in permeability from excessively drained to impermeable. Wetland soils along the South Platte are generally flooded every year, have textures ranging from sandy to loamy, are moderately saline, and have water tables less than 3 feet from the surface. They are used for pastures where possible. Native vegetation includes willows, cottonwoods, alkali sacaton, salt grass, switch grass, western wheat grass, 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 (Amen, et al., 1977; Brubacher and Moore, 1969; Brubacher, et al., 1971).

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 irrigated the water table is less than 3 feet from the surface. These soils are deep, level, range in texture from sandy loam to clay loam, and are often saline. Vegetation includes salt grass, alkali sacaton, tall grasses, sedges, rushes and cattails in low pockets (Amen, et al., Brubacher and Moore, Brubacher and Anderson).

Climate

Sterling NE's climate is semi-arid and continental, with cold dry winters and cool, relatively dry, summers. Holyoke receives 17.6 inches of precipitation annually, 35 inches of this coming as snow. January's average maximum temperature is 42.7°F., average minimum is 13.8°F. July's average maximum temperature is 91.1°F., average minimum is 59.2°F. (Benci and McKee, 1977). The growing season is 140 days (SCS data, 1978).

WETLANDS

Community Description

Lacustrine System

One lake type is found within Sterling NE which is reservoir (L1OWKZ) (information in this section comes from field notes taken from other quadrangles). Reservoirs are found along the South Platte. 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 snow melt 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 (R2OOKZ, R2OWKF, R4SKBC). 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 transport 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, which is often scoured by flash floods. These streams flow after snow melt 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; Fasset, 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 toward 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 (PEMJ) that are the result of: wind deflation of 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 100 to several hundred feet across. There is not sufficient moisture in spring after snow melt 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.

Many palustrine wetlands are cultivated, but remain wetlands. These are called Palustrine Farmed (PF).

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: flood-irrigated meadow will produce up to 4,500 pounds per acre per year of air-dried herbage, while the best upland site will produce up to 2,500 pounds (Amen, et al.). Wildlife also benefit from wet hay meadows: ducks nest in them and shore birds use them for forage and cover.

The South Platte River and reservoirs along it are part of a wintering mallard range as well as being stopovers on a migratory route and summer habitat for many species of waterfowl and shore birds.

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

Over 240,000 acre-feet per year of water is diverted from streams in other basins into the South Platte River. Most of the water is taken out before the South Platte reaches Sterling NE, but these diversions increase the flow of water in the river and its water to reservoirs and users (League of Women Voters of Colorado, 1975).

Forested wetlands along streams are important wildlife habitat. White-tailed 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 windmills are important water sources for wildlife, such as antelope, and livestock in this semi-arid region.

Wetland Loss and Vulnerability

Wetland loss is not a major problem in Sterling 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 affect 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.

Inter-basin water diversion has both beneficial and detrimental effects. Recipients of diverted water have increased stream flow and increased water supply of 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 and reducing their benefits for wildlife.

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