NATIONAL WETLANDS INVENTORY

Map Report for West River South Dakota
for the 1:100,000 Map Units of:
McIntosh NW, SW; Pierre NW, SW
Martin NE, SE, NW, SW

U.S. Fish and Wildlife Service
Denver, Colorado
September, 1991

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I. INTRODUCTION

The United States Fish and Wildlife Service's National Wetlands Inventory (NWI) is producing maps showing the location and classification of wetlands and deepwater habitats of the United States. Classification of Wetlands and Deepwater Habitats of the United States by Cowardin et al. (1979) is the document used by the NWI to define and classify wetlands. Photointerpretation conventions, hydric soils lists and wetland plant lists are also used to implement the Cowardin Classification system.

The purpose of this map report is to: (1) provide information on the production of NWI maps, including narrative on imagery and interpretation; (2) provide a descriptive crosswalk from NWI wetland codes on the map to common terminology and to representative plant species found on specific wetland sites; and (3) describe local geography, climate, and wetland communities.

II. FIELD RECONNAISSANCE

Field reconnaissance is a necessary procedure in order to accurately interpret aerial photography. Photographic signatures are correlated to the wetland habitat in the field. Collateral information including vegetative communities, soil types and topographic setting are further evaluated to aid in the photointerpretation process. This information is evaluated for seasonality and conditions existing at the time of photography and at ground truthing.

Project Area

The West River South Dakota study area is located in the Great Plains-Shortgrass Prairie Province (Bailey, 1980). Field reconnaissance covered the area of each 1:100,000: McIntosh NW, McIntosh SW, Pierre NW Pierre SW, Martin NW, Martin SW, Martin NE, and Martin SE (Appendix A).

Field Personnel

Bill Pearson	-	U.S. Fish and Wildlife Service
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Field Dates

1-6 August 1991

Aerial Photography

Primary Source Data (100%)
Type: NHAP Color Infra-Red High Altitude
Scale: 1:58,000

Martin NW: 6/29/84, 10/25/84, 5/31/85, 10/1/85
Martin SW: 10/25/84, 5/31/85, 6/22/85, 6/29/85, 10/1/85
Martin NE: 4/19/84, 10/26/84, 10/30/84, 11/5/85
Martin SE: 4/19/84, 10/26/84, 10/30/84, 11/5/84, 6/223/85
McIntosh SW: 6/29/84, 5/31/85, 6/22/85, 6/23/85, 6/22/86
McIntosh NW: 6/29/84, 5/31/85, 6/22/85, 6/23/85, 10/1/85, 6/22/86
Pierre NW: 6/29/84, 5/31/85, 6/22/85, 6/23/85, 10/1/85, 6/22/86
Pierre SW: 6/29/84, 5/31/85, 6/22/85, 6/23/85, 10/1/85

Percent Coverage: All 256 USGS quadrangles were covered with the NHAP photography.

Collateral Data

United States Geological Survey (USGS) Quadrangles
Soil Conservation Service (SCS) Soil Surveys
Bailey's Description of the Ecoregions of the United States
Water Resource Data South Dakota 1990
National List of Plant Species That Occur In Wetlands: North Plains (Region IV)
Hydric Soil of the State of South Dakota
Wetland Plants of the State of South Dakota

Additional Information

A meeting was held with the SDSU National Wetlands Inventory team and the personnel at the state SCS Office in Huron regarding the SCS Wetlands Inventory, soil types, and wetland vegetation dynamics.

III. PHYSICAL DESCRIPTION OF PROJECT AREA

Geography

Bailey, Description of the Ecoregions of the United States (1980), describes the west-central South Dakota project area as the Wheatgrass--Needlegrass Section of the Great Plains-Shortgrass Prairie Province. This region is characterized by rolling plains and tablelands of moderate relief. They are in a broad belt that slopes gradually eastward down from an altitude of 5,500 feet (1,520 m.) near the foot of the Rocky Mountains to 2,500 feet (760 m.) in the Central States. The plains are notably flat, but there are occasional valleys, canyons, and buttes.

Climate

The climate is a semiarid continental regime in which maximum rainfall comes in summer, but the total supply of moisture is low. Ninety-five (95%) of basin collected run-off comes from the spring snowmelt. Evaporation usually exceeds runoff. The average annual temperature is 45°F (8°C) throughout most of the region. Winters are cold and dry; the summers warm to hot. The frost-free season is usually fewer than one-hundred (100) days and the precipitation is approximately ten (10) inches (200 mm).

Vegetation

Steppe, sometimes called shortgrass prairie, is a formation class of short grasses usually bunched and sparsely distributed, and is characteristic of this province. Scattered shrubs and trees occasionally appear in the steppe, and exist as all gradations of cover from semidesert to woodland formations. Since ground cover is scarce, much soil is exposed. Many species of grasses and herbs grow in this province.

Soils

In this climate regime, the dominant pedogenic process is calcification; salinization is dominant in poorly drained sites. Soils contain a large excess of precipitated calcium carbonate and are rich in bases. Molisols are typical. Humus content is small because vegetation is sparse.

IV. DESCRIPTION OF WETLAND HABITATS IN PROJECT AREA

Riverine

The major river drainages of the Little White River, the Grand River and the Cheyenne River are classified R2UBG. The Moreau, the Bad, and the White Rivers are classified as R2UBF.

Intermittent streams are classified as R4SBA or R4SBC.

Lacustrine

Most of the lakes on the project area are impounded. The classifications are L1UBGh, L2ABFh or a combination of these classifications on larger impoundments. The predominant aquatic bed vegetation is *Lemna* spp.. Many of these lakes are bordered by persistent emergent vegetation. Natural lakes on the study area are usually shallow basins which are classified L2ABF, L2USC, or L2USA.

Palustrine

The majority of wetlands on the study area are palustrine. Palustrine wetlands are located in basins, river floodplains, and many drainages. Some wetlands have been drained or tilled for agricultual purposes, but most wetlands are located on untilled prairie.

Emergents (PEMA, PEMC, PEMF) and aquatic bed (PABF) are the dominant cover types with smaller areas of scrub-shrub (PSSA) and forested (PFOA). Field checksites were documented where problems areas existed due to inconsistent wetland photosignatures. Vegetation observed in these wetland habitats were grouped according to class and water regime. The following plant species were identified on check sites or field sites and represent only a fraction of all wetland plant species occurring in the project area.

Palustrine Temporary Emergents: PEMA
Hordeum jubatum, foxtail barley
Agropyron smithii, western wheatgrass
Eleocharis spp., spikerush
Spartina pectinata, prairie cord grass
Kochia spp., fireweed
Helianthus spp., sunflower
Solidago spp., goldenrod
Melilotus spp., sweetclover
Stipa spp., needlegrass

Palustrine Saturated Scrub-shrub: PSSB
Salix spp., willow

Palustrine Saturated Emergent: PEMB
Scirpus spp., bulrush
Typha spp., cattail

Palustrine Seasonal Emergents: PEMC
Scirpus spp., bulrush
Typha spp., cattail
Eleocharis spp., spikerush
Phalaris arundinacea, reed canary grass
Mentha spp., mint
Sagittaria spp., arrowhead
Rumex spp., dock
Spartina pectinata, prairie cord grass
Juncus spp., rush
Polygonum, smartweed
Carex spp., sedge
Kochia spp., fireweed

Palustrine Semi-permanent Emergents: PEMF
Typha spp., cattail
Scirpus spp., bulrush

Palustrine Semi-permanent Aquatic Bed: PABF
Lemna spp., duckweed

Palustrine Temporary Scrub-shrub: PSSA
Populus spp., cottonwood
Salix spp., willow

Palustrine Temporary Forested: PFOA
Fraxinus spp., ash
Populus spp., cottonwood
Acer negundo, boxelder
Elaeagnus angustifolia, Russian Olive

OBSERVED WETLAND VEGETATION TABLE

A. EMERGENT

Angropyron smithii	western wheatgrass
Carex spp.	sedge
Eleocharis spp.	spikerush
Equisetum spp.	horsetail
Helianthus spp.	sunflower
Hordeum jubatum	foxtail barley
Juncus spp.	rush
Kochia spp.	fireweed
Melilotus spp.	sweetclover
Mentha spp.	mint
Phalaris arundinacea	reed canary grass
Polygonum spp.	smartweed
Rumex spp.	dock
Sagittaria spp.	arrowhead
Scirpus spp.	bulrush
Solidago spp.	goldenrod
Spartina pectinata	prairie cord grass
Stipa spp.	needlegrass
Typha spp.	cattail

B. AQUATIC BED

Lemna spp.	duckweed

C. SCRUB-SHRUB

Populus spp.	cottonwood
Rosa spp.	rose
Salix spp.	willow

D. FORESTED

Acer negundo	boxelder
Elaeagnus angustifolia	Russian Olive
Fraxinus spp.	ash
Populus spp.	cottonwood

Table 1. NWI WETLAND CLASSIFICATION CODES, COWARDIN DESCRIPTION AND COMMON TERMINOLOGY

CODE ER REGIME	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
B	Riverine, lower perennial, unconsolidated bottom	Meandering rivers, low gradient	Unconsolidated bottom
S C)	Riverine, lower perennial, unconsolidated shore	Mud, sand, or gravel bars	Unconsolidated shore
B ,H)	Riverine, upper perennial unconsolidated bottom	Mountain streams, major drainage areas	Unconsolidated bottom
B C,F)	Riverine, intermittent, streambed	Small streams, creeks, or irrigation ditches	Streambed
B	Lacustrine, littoral aquatic bed	Shallow lake marshes	Hippuris vulgaris (marestail) Lemna spp. (duckweed)
S C)	Lacustrine, littoral, unconsolidated shore	Dry alkaline lake beds	Unconsolidated shore
G,H)	Palustrine, unconsolidated bottom	Open water	Unconsolidated bottom
B G)	Palustrine, aquatic bed	Deep basins, impoundments, excavated tanks, or sewage treatment settling ponds	Hippuris vulgaris (marestail) Lemna spp. (duckweed)

NWI CODE WATER REGIME	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
PEM	Palustrine,	Basins, depressions, marshes,	Agropyron smithii (western wheat)

Table 1. NWI WETLAND CLASSIFICATION CODES, COWARDIN DESCRIPTION AND COMMON TERMINOLOGY

			Eleocharis spp. (spikerush) Equisetum spp. (horsetail) Hordeum jubatum (foxtail barley) Juncus spp. (rush)
(A,B,C,F)	emergent	meadows, springs, seeps, or drainage areas	Beckmania syzigachne (American sloughgrass) Carex spp. (sedges) Distichlis spicata (inland saltgrass) Eleocharis spp. (timothy) Poa pratensis (Kentucky bluegrass) Phalaris arundinacea (reed canary grass) Phleum pratense (rush)
			Polygonum coccineum (marsh smartweed) Rumex spp. (dock) Sagittaria spp. (arrowhead) Spartina pectinata (prairie cord grass)

NWI CODE WATER REGIME	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
PEM (continued)			Scirpus americanus

Table 1. NWI WETLAND CLASSIFICATION CODES, COWARDIN DESCRIPTION AND COMMON TERMINOLOGY

(A,C)	Scrub-shrub	or drainage areas	(willow) Rosa spp. (rose) Ribes spp. (currant)
PFO (A) (A,C,F)	Palustrine, forested	Cottonwood, river banks, floodplains, or drainage areas	Populus deltoides (eastern cottonwood) (common threesquare) Scirpus validus (softstem bulrush) Typha spp. (cattail)
PSS (A,C)	Palustrine, scrub-shrub	Willow thicket, river banks or drainage areas	Salix spp. (willow) (ash) Acer negundo (boxelder)
(A)	forested	floodplains, or drainage areas	(eastern cottonwood) Salix spp. (willow) Fraxinus spp.
PUS (A,C)	Palustrine, unconsolidated shore	Salt flats	Unconsolidated shore

V. WATER REGIME DESRIPTION

(A) Temporarily Flooded- Surface water present for brief periods during growing season, but water table usually lies well below soil surface. Plants that grow both in uplands and wetlands are characteristic of this water regime.

(B) Saturated- The substrate is saturated to the surface for extended periods during the growing season, but surface water is seldom present.

(C) Seasonally Flooded- Surface water is present for extended periods, especially early in the growing season, but is absent by the end of the growing season in most years. The water table after flooding ceases is extremely variable, extending from saturated to a water table well below ground surface.

(F) Semipermanently Flooded- Surface water persist throughout the growing season in most years. When surface water is absent, the water table is usually at or very near the land's surface.

(G) Intermittently Exposed- Surface water is present throughout the year except in years of extreme drought.

(H) Permanently Flooded- Water covers the land surface throughout the year in all years.

VI. IMAGERY

The NHAP Color Infra-Red Emulsion is good quality. The dates imagery were flown ranged from early spring to late fall. The spring (April) through mid-summer (June) 1984 and 1986 photography shows normal to high water conditions. However, the fall (October-November) photography of 1984 and all the 1985 photography showed extremely dry conditions.

Ground truthing revealed that wetland water conditions were above normal for early August. Most wetland basins were vegetated and many basin still contained surface water. Wet field conditions required a conservative approach be used when determining wetland water regimes.

Field reconnaissance provided the following mapping conventions for all the imagery based on seasonal and climactic conditions. These conventions will cover general conventions, wetland basins, riverine and vegetated linears, oxbows, impoundments, and miscellaneous signatures.

GENERAL CONVENTIONS FOR WEST RIVER SOUTH DAKOTA WETLANDS

- All open water impoundments are classified ABF_h unless they are 15-19 acres in size and the water signature justifies UBG_h classification.

- All open water dugouts, except for waste water treatment facilities, are classified UBF_x and occasionally G_x if they are very large. Excavations exhibiting a AB photosignature are classified as such.

- All open water L2 basins are classified ABF unless a G water regime was indicated on a field site.

- Intermittent versus perennial riverine classifications were determined by photosignature coupled with other collateral data and in field observations. USGS quads had no bearing on riverine system classification.

- R2/3G versus R2/3H were determined by the South Dakota water resource data.

PHOTOGRAPHIC CONVENTIONS FOR BASIN WETLANDS

Temporary water Regimes

Temporary emergent basins can often be distinguished by their indistinct edges. However, these borders are quite distinct within agricultural areas of crops and haying. Depending on date of photography, temporary photosignatures exhibit a variety of gray, red, pinks, and brownish green tones, although some basins show open water on spring photography.

On late-May and mid-June 1985 imagery (which is dryer than normal water conditions) temporary emergent basins often exhibit a vegetated photosignature of dark grays, light grays, and a variety of reddish tones. Most have a mixture or a mottle of these tones, with others having a single tone photosignature. Some of the temporary basins on 1985 photography have

extremely weak signatures which are difficult to distinguish from upland unless different land use methods are being employed.

Temporary wetlands on October 1985 photography have a gray, gray/white, or gray/red mottled signature with indistinct wetland borders.

Some temporary basins exhibit an open water signature on the June 1986 photography. This imagery presents wetter than normal water conditions. Some red emergent tones are associated with these open water basins, whereas, other basins are totally choked with these same emergent tones. Other tones are grays and tans. Brownish green tones are common in non-circular type basins. Open water temporary wetlands can be distinguished by their indistinct upland/wetland boundaries and by using the adjacent 1984 imagery as collateral data.

Gray, red, pink, purple, and white photosignatures, often mottled together, are common of emergent temporary wetlands on the June 1984 photos. This photography is slightly above normal water conditions. Open water basins are less common on this date of imagery. Most open water basins will have diffuse upland/wetland boundaries.

Temporary oxbow basins are common along riverine and palustrine drainages. These areas exhibit pink, gray, white, and red signatures and have the characteristic "oxbow" shape.

Seasonal Basins

On late-May and Mid-June 1985 imagery seasonal emergent basins often exhibit open water with a red emergent signature intermixed with or bordering it, all within a temporary basin. Some seasonal wetlands show distinct brown and red tones, again, within temporary basins. Open water and emergent seasonal wetland signatures have very distinct boundaries.

June 1986 dated photography exhibits red, gray, brown, and combinations of these emergent tones in mottled patterns. Open water seasonal have a very strong signature due to the wet conditions at the time of photography. Some pink tones can be distinguished on this imagery as aquatic bed.

June 1984 dated imagery exhibits seasonals as red with dark gray mottled tones, many are within light gray and white temporary basins. Seasonals are also depicted by deep red tones within lighter red toned temporary basins.

Seasonal lacustrine littoral basins, which often show light blue open water on the photography, are classified with the unconsolidated shore class.

Seasonal oxbow basins are common along riverine and palustrine drainages. Photosignatures are open water, dark red or dark gray with distinct borders.

Semipermanent Water Regimes

Natural semipermanent basins are uncommon in this area. On June, 1984 dated imagery, palustrine emergent semipermanent wetlands exhibit open water with

some emergent clumping within and are associated with temporary and seasonal basins. Even the dryer dates of photography have a white or white/gray clumped appearance characteristic of semipermanent wetlands. Some larger (> 20 acres) playa type lakes, which show open water on the photography, are classified as lacustrine littoral with the aquatic bed class, unless seen differently in the field.

Semipermanent oxbows along major rivers are also uncommon. These oxbows exhibit open water or a gray/white clumped signature and will be classified semipermanent with an aquatic bed or emergent class.

CONVENTIONS FOR LINEAR WETLANDS

Linear wetlands are common. Delineation is determined by open water and/or emergents within the channel. On spring photography palustrine linear wetlands, with scrub-shrub, and/or forested subclasses, appear light pink with a gray understory. Upland trees appear bright red. Scrub-shrub and/or forested linears appear gray on the fall photography. Semipermanent palustrine linears are uncommon. Seasonal emergent linears usually have an open water or a lush red photosignature within the channel. Temporary emergent linears show weaker red/pink signatures on the spring photography and gray/white signatures on the fall photography. Watershed size and streambed gradient will aid in determining these water regimes. Waterways and runoff areas can be distinguished on the photography as upland by their bright red, pink, and/or light red with grays. These areas are often associated with agricultural land use.

Excavated linear wetlands are located within roadside ditches, particularly along roads which divide playa basins. These areas will usually be classified seasonal, however, some areas have a temporary or semipermanent water regime.

Linear intermittent riverine systems are classified upon their signature and watershed size. R4C linears generally exhibit a open water streambed signature. Some R4 linears appear as a white channel. In the field these channels were wetlands and classified R4SBC. Close examination of check sites and field sites will aid in determining proper classifications of linear wetlands.

Perennial rivers will be classified R2F thru H. Riverine sandbars will be classified R2USA and braided channels associated with the main channel classified R2USC.

SATURATED

Saturated areas are uncommon and restricted to the southwest portion of the Martin SW quad. Saturated wetlands are located on hillsides and exhibit a dark gray clumped signature. These areas have indistinct boundaries indicative of seep areas.

MISCELLANEOUS

This section addresses obscure conventions that are uncommon throughout the work area.

Some brown-gray toned emergent temporary looking basins located on the NW 1/4 of the McIntosh NW are upland. These areas were devoid of wetland vegetation. Soil survey for the area will be available at a later date.

Some small temporary unconsolidated shore basins can be identified as a bright white (to some extent, glare) signature on the June, 1985 dated photography. These basins can be further identified using soil types from soil surveys (when available).

VII. MAP PREPARATION

Wetland delineation and classification is in accordance with Cowardin et al (1979). Further wetland mapping guidance is provided by NWI photographic and cartographic conventions in concert with National consistency. Delineations are produced through stereoscopic interpretation of 1:58,000 scale color infrared photography. NHAP photography was taken spring and fall of 1984, 1985, and 1986.

Field check sites were evaluated within Martin NW, Martin SW, Martin SE, Martin NE, Pierre SW, Pierre NW, McIntosh NW, and McIntosh SW project areas prior to the actual classification and delineation of wetlands. Field check sites were selected to clarify varying photosignatures. Wetland photosignatures were identified in the field using vegetation types, soil types, and additional input from field personnel. Checksite wetlands have an asterick (*) preceding the alphanumeric label. Wetlands visited but not checksited have the water regime in the alphanumeric label underlined.

Collateral data included USGS topographic maps, SCS soil surveys, USGS water resources data, vegetation, climate, and ecoregional information.

The user of the map is cautioned that, due to the limitation of mapping primarily through aerial photointerpretation, a small percentage of wetlands may be unidentified. Since the photography was taken during a particular time and season, there may be discrepancies between the maps and current field conditions. Changes in landscape which occurred after the photography was taken would result in such discrepancies.

Aerial photointerpretation was completed by the South Dakota Cooperative Fish and Wildlife Research Unit, SDSU, Brookings, S.D. with quality control conducted by the FWS.

VIII. SPECIAL MAPPING PROBLEMS

The photosignatures generally correlated well with the wetlands observed. Spring 1984 (April-June) and 1986 (June) were photographed subsequent to above normal rainfall and required a conservative approach when determining water regimes. Conversely, the 1985 (dry) imagery presents temporary

emergent signatures which are barely discernable. Alternative photography was used as collateral data for these dry and indistinguishable signatures. Soil surveys and USGS topographic maps were used extensively in all aspects of delineation. Overall, the consistency of tones and breaks in the imagery promote accurate photographic interpretation.

XI. MAP ACQUISITION

To discuss any questions concerning these maps, please contact:

Regional Wetland Coordinator
U.S. Fish and Wildlife Service - Region 6
Denver Federal Center
P.O. Box 25486
Denver, CO 80225

To order maps call 1-800-USA-MAPS.

Maps are identified by the name of the corresponding USGS 1:24,000 scale topographic quadrangle name. Topographic map indices are available from the USGS.

X. LITERATURE CITED

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7.5 Minute, 7.5 X 15 Minute, and 1:250,000 USGS Topographic Maps.