NATIONAL WETLANDS INVENTORY
1:100,000 MAP NARRATIVE

FREMONT, SW
LINCOLN, NW, SW
BROKEN BOW SW, SE
GRAND ISLAND NW, NE, SW, SE

## INTRODUCTION

The U.S. Fish and Wildlife Service, Office of Habitat Resources, is conducting an inventory of the wetlands of the United States. The National Wetlands Inventory (NWI) is establishing a wetland data base in both map and computer forms for the entire country. The NWI information will serve to identify the current status of U.S. wetlands and can be used as a reference point from which future changes in wetlands can be evaluated.

## PURPOSE

The purpose of Notes to Users is to provide general information regarding the production of NWI maps and wetlands found within the same physiographic area. Notes to Users are not intended to include a complete description of all wetlands found in the area nor provide complete plant species information.

## MAP PRODUCTION

The wetland classifications that appear on these National Wetland Inventory Base Maps are in accordance with Cowardin, et. al. (1977). The delineations were produced through stereoscopic interpretation of 1:58,000 scale color infrared photographs taken on various dates from May to November of 1981. These delineations were enlarged using a zoom transfer scope to overlays of 1:24,000 scale.

Limited initial field checking and ground truthing was conducted in April, 1985 to determine the general biologic and hydrologic systems of the area, and the degree of accuracy that could be portrayed by the condition and date of photography relative to those observed at that time.

The user of the map is cautioned that, due to the limitations of mapping primarily through aerial photointerpretation, a small percentage of wetlands may have gone unidentified. Changes in landscape could have occurred since the time of photography; therefore, some discrepancies between map and current field conditons may exist. Any discrepancies encountered in the use of the maps should be brought to the attention of Chuck Elliott, Regional Wetlands Coordinator; U.S. Fish and Wildlife Service, Region 6, P.O. Box 24586, Denver, Colorado, 80225. Aerial photointerpretation was completed by Martel Laboratories, Inc., St. Petersburg, Florida. Maps were prepared by Martel for the NWI National Team in St. Petersburg, Florida.

## GEOGRAPHY

The area covered by this report is between 97°W and 100° longitude and 40°00'N and 41°30'N latitude, roughly southeast to south central Nebraska (See Diagram 1). Bailey's Ecoregion Classification identifies this area as wholly contained within the Tall-Grass Prairie Province and, divided among its three sections: Bluestem Prairie (2531L), Wheatgrass-Bluestem-Needlegrass Prairie (2532L), and Bluestem-Grama Prairie (2533L) (See Diagram 2). Dominant climax vegetation includes porcupine grass, prairie dropseed, little bluestem, side oats grama, Junegrass, western wheat grass, needlegrass, panic grasses and sedges. Woody vegetation is rare, except on the cottonwood floodplains. Because of the generally favorable conditions of climate and soil, most of the area is cultivated and little of the original vegetation remains (Bailey, 1978).

The land forms of the region are characterized by flat and rolling plains with relief of less than 300 feet. Elevations range from approximately 3,000 feet in the west to 1,300 feet in the east. Loess and sand deposits cover this area, the northwestern part of which is contained within a region commonly referred to as the "Sand Hills".

Major drainage systems dominate the landscape of the area. The Platte River bisects the area with its broad, braided floodplain. Parallel and directly to the north on the Platte, the waters of the South Loup, Middle Loup, and North Loup converge into the Loup River and eventually feed the Platte. Along the southern boundary, the Republican River supplies the Harlan County Reservoir and emerges flowing southeasterly into Kansas, as do the smaller Little Blue and the Big Blue Rivers. Other significant geographic features are the "Rainwater Basins" formed by the internal drainage of rainwater into depressions lined by impervious claypan soils. These are most common in the southern half of the study area.

## CLIMATE

The region is under the influence of a continental climate with hot summers and cold winters. Changes in weather conditions are frequent and extreme. Precipitation varies from 20 inches in the west to 30 inches in the east. Normally, more than three-fourths of the average annual precipitation falls during the growing season, April through September. Slow steady rains characterize the early spring precipitation while most of the summer precipitation occurs as showers or thunderstorms. Because the humidity is generally low much of the water is lost to evaporation. Extremes in temperature range from 100°F or more in the summer to -20°F in winter.

## WETLAND COMMUNITIES

Riverine communities comprise the major percentage of wetland acreage in the mapped area. The Platte River is characterized by a wide shallow channel with low banks and numerous vegetated and unvegetated sandbars and river islands. The North Platte, which runs parallel to the Platte, has a somewhat deeper and narrower channel (Currier, 1981). It has been estimated that before the Platte reaches central Nebraska, approximately 70% of the annual flow has been diverted or withdrawn for various uses, predominantly irrigation or power generation. Consequently, it is not uncommon for portions of the river to be without flow for several weeks during the year. This has had a profound impact on the wetland ecology of the river and the adjacent wetland meadows. (USFWS-Jamestown, 1981). The Platte River is one of the prime feeding grounds in the Central Flyway and is particularly important habitat for 80% of the worlds population of sandhill cranes. However, the invasion of agriculture in the grasslands and riparian communities along the once scoured flats severely reduced the cranes' roosting area. An estimated 72% of the traditional crane habitat along the Platte has been destroyed (Farrar, 1985).

In response to this loss, the plant communities of the Platte River floodplain have been studied and documented. In applying a vegetational analysis conducted by Paul Currier in 1981, approximately 50% of the forested vegetation along the river can be classified as wetland. The wetland forest community is dominated by widely spaced cottonwood (Populus deltoides) with green ash (Fraxinus pennsylvania), hackberry (Celtis oxidentalis), and American elm (Ulmus americanum) also common. The understory is comprised of various shrub species, predominantly willows (Salix spp.), rough-leaf dogwood (Cornus dummondii), indigo bush (Amorpha fruticosa), and a variety of grasses and forbs. The presence of red cedar (Juniperus virginiana) helps distinguish the upland forest transition. Red cedar is said to be larger and more abundant along the Platte than other rivers of the plains. (Currier, 1981).

The river banks and thousands of river islands of the Platte are predominantly wetland shrub-scrub communities of willow and indigo bush, with small cottonwoods. Wetland emergent species such as sedges (Carex spp.), spikerush (Eleocharis spp.), and prairie cordgrass (Spartina pectinacea) serve as understory indicator species. Along the recently exposed mudflats and sandbars, emergents predominate if vegetated. Lovegrass (Aragrostis pectinacea), nutsedge (Cyperus spp.), barnyard grass (Echinochloa crus-galli) as well as other annuals are the most common. Cocklebur (Xanthium strumarium) and white clover (Melilotus albus) occupy the more upland sandbars. (Currier, 1981).

Extensive sub-irrigated wet meadows are located on the river terraces adjacent to the Platte floodplain, particularly between the river and its tributaries. These undulating "washboard" grasslands are often used for grazing, hay, or farming if leveled or sufficiently drained. The lowest lying areas are dominated by many emergent species, particularly three square (Scirpus spp.), sedge and spikerush. The higher wet grasslands include prairie cordgrass, saltgrass (Distiahlis spicata), foxtail (Hordium jubatum) and other more transitional species. Often the higher ground will be dominated by upland species restricting the wetlands to finger-like drainages.

In addition to the Platte, other major river systems of this area, the Loup Rivers, the Republican River, and the Blue Rivers, have very similar wetland communities. All are dominated by cottonwood and willow floodplains with similar emergent understories. However, unlike the Platte, the rivers are much more entrenched and have fewer sandbars and flats and the wetlands are more restricted to the areas directly adjacent to or in the river bed. All are considered lower perennial streams and have flow for the entire year in most years.

Sinklike depressions, known as Rainwater Basins, comprise the other most important wetland community in south-central Nebraska and cover an area of approximately 4,200 square miles. These basin wetlands are formed by the collection of rainwater or surface runoff in depressions underlain by hydric, nonpervious soils. The clay subsoil can have a thickness of only inches to six feet or more. It has been estimated that only 20% of the original rainwater basin wetland acreage remains. Ninety percent of the total number of historic basins have been destroyed by drainage (either deep pits or road ditches) or filled for agricultural uses (Nebraska Game and Parks, 1972). Of the remaining wetlands, 43% are managed by U.S. Fish and Wildlife Service or Nebraska Game and Fish as Waterfowl Production Areas (WPA). They are a major component of the Central Flyway, and function as annual breeding and wintering habitat for some 5-7 million ducks and geese (Nebraska Game and Parks).

Dependence upon natural rainfall and agricultural runoff for a water source makes the wetland ecology of the basins very dynamic. Changes in rainfall or irrigation practices can have pronounced effects on the water regime and vegetation. For example, a wetland that is dry in the fall, can either be dry in the spring and supporting upland plant species, or wet and populated with any variety of wetland species from aquatic bed to transitional temporary indicators.

The wettest, less altered, or better managed wetlands (for example, WPA's) often support lush stands of cattail (Typha latifolia) and several species of bullrush (Scirpus spp.). These occur in central zones or areas where water is more permanent and abundant throughout the growing season. In rare undisturbed basins, aquatics such as coontail (Ceratophyllum demersum) and pondweeds (Potomegeton spp.) can thrive and coexist with these emergents. The next zone emergent wetlands indicate a more seasonally flooded situation. Prairie cordgrass, reed canary grass (Phalaris arundinacea), several rushes (Juncus spp), and spike rushes have adapted to this degree of wetland development. The outer most reaches of the basins, or basins that are the most actively drained, are commonly used as agricultural lands. These are often characterized by a stressed crop condition, sheetwater, or an invasion of smartweed (Polygonum spp.). (Smartweed, however, is observed in a variety of situations.) Occasionally, a ring of forested or shrub vegetation, predominantly willows or cottonwoods, can establish itself along the basin periphery or filled areas.

In conjunction with these basin wetland communities, hundreds of miles of cattail, bullrush, and other emergents have become established in the road ditches and in ditches used to drain the basins or carry irrigation water. Basins are also drained by the use of excavated pits. This practice concentrates the water which can then be continuously circulated for crop irrigation. Consequently, wetland vegetation cannot be supported. It can also be noted, that if the pit has punctured the underlying clay pan it is much more effective in draining the wetland and thus more of the basin can be cultivated and is lost as productive wetland habitat.

In addition to the natural wetland communities, three major lakes and thousands of small ponds have been formed through impoundments on rivers and streams throughout south-central Nebraska. The largest, Harlan County Reservoir, was formed on the Republican River and covers an average area of 13,000 acres. Three other smaller but noteworthy reservoirs within this region are the Sherman County Reservoir on the Loup River and Johnson Lake and Elwood Reservoir fed by the Platte River. All are maintained by a series of large diversion canals and dam systems. The water levels of the reservoirs are managed to maintain high water in late spring and summer for irrigation season and drawn down in the fall and winter, recharging with the spring rains and snow melt.

Because of the fluctuating water levels, the exposed shorelines become vegetated with pioneering plants such as cocklebur. and upland transitional grasses. The shallow waters support aquatics and emegent species similar to those found in the basins. Willow and cottonwood line the upper shoreline and overflow areas least affected by the change in water levels.

| NWI CODE | NWI DESCRIPTION | COMMON DESCRIPTION | CHARACTERISTIC VEGETATION AND PHYSIOGRAPHIC FEATURES |
|---|---|---|---|
| R2UB | Riverine - Lower Perennial Unconsolidated Bottom | River | Unvegetated: Sand, mud, gravel |
| R2US | Riverine - Lower Perennial Unconsolidated Shore | River bank<br>River bar<br>Sand bar<br>River island | Unvegetated: Sand, mud, gravel |
| R4SB | Riverine - Intermittent Stream Bed | Creek<br>Stream<br>Canal | Unvegetated: Sand, mud, gravel organic<br>Vegetated: Pioneering species (non-emergent) |
| PFO | Palustrine - Forested | Forest<br>Riparian<br>Swamp | Vegetated: Cottonwood (Populus deltoides) Green Ash (Fraxinus pennsylvanica) Hackberry (Celtis oxidentalis) American Elm (Ulmus americanum) Willow (Salix spp) |
| PSS | Palustrine - Scrub shrub | River island<br>Scrub<br>Shrub thicket | Vegetated: Willow (Salix spp) Dogwood (Cornus drummondii) Indigo bush (Amorpha fructosa) |
| PEM | Palustrine - Emergent | Sand bar/flat<br>River bank<br>Grass streambed<br>Wet basin<br>Marsh<br>Subirrigated meadow<br>Wet meadows | Vegetated: Hardstem bullrush (Scirpus acutus) River bullrush (Scirpus fluviatilis) Slender bullrush (Scirpus heterochaetus) Cattail (Typha latifolia) Lovegrass (Eragrostis pectinacea |

| NWI CODE | NWI DESCRIPTION | COMMON DESCRIPTION | CHARACTERISTIC VEGETATION AND PHYSIOGRAPHIC FEATURES |
|---|---|---|---|
| PEM | Palustrine - Cont'd Emergent | | Nutsedge (*Cyperus* spp.)<br>Barnyard grass (*Echinochloa crus-galli*)<br>Spikerush (*Eleocharis palustris*)<br>Smartweed (*Polygonum* spp.)<br>Reed canary grass (*Phalaris arundinacea*)<br>Prairie cordgrass (*Spartina pectinata*)<br>Common Reed (*Phragmites* spp.)<br>Saltgrass (*Distichlis spicata*)<br>Foxtail (*Hordium jubatum*)<br>Sedge (*Carex* spp.)<br>Threesquare bullrush (*Scirpus americanus*) |
| PAB | Palustrine - Aquatic Bed | Pond<br>Impoundment<br>Slough | Vegetated:<br>Pondweed (*Potomegeton* spp.)<br>Duckweed (*Lemna* spp.)<br>Bladdewort (*Utricularian* spp.)<br>Coontail (*Ceratophyllum demersum*) |
| PUB | Palustrine - Unconsolidated Bottom | Reuse pit<br>Gravel pit<br>Tailwater pond | Unvegetated:<br>Gravel, sand, mud<br>Vegetated:<br>Pioneering species |

| NWI CODE | NWI DESCRIPTION | COMMON DESCRIPTION | CHARACTERISTIC VEGETATION AND PHYSIOGRAPHIC FEATURES |
|---|---|---|---|
| PUS | Palustrine - Unconsolidated Shore | Sand flat<br>Mud flat<br>Dry pond | Unvegetated:<br>Sand, mud, gravel, organic<br>Vegetated:<br>Pioneering species |
| LIUB | Lacustrine - Limmetic Unconsolidated Bottom | Lake<br>Reservoir | Unvegetated.<br>Sand, gravel, mud |
| L2UB | Lacustrine - Littoral Unconsolidated Bottom | Lake shore<br>Lake shallows | Unvegetated:<br>Sand, gravel, mud, organic |
| L2AB | Lacustrine - Littoral Aquatic Bed | Lake Shallows | Vegetated:<br>Pondweed (*Potomegeton* spp.)<br>Duckweed (*Lemna* sp.)<br>Bladdewort (*Utricularia vulgaris*)<br>Coontail (*Ceratophyllum dersum*) |
| L2US | Lacustrine - Littoral Unconsolidated Shore | Shore line<br>Lake flat<br>Beach<br>Drawdown<br>Overflow area | Unvegetated:<br>Gravel, sand, mud, organic<br>Vegetated:<br>Pioneering species |

## SOILS

Soils of the tall-grass prairie are primarily Mollisols and within the counties of this region have formed under grass vegetation. Their parent materials are loess, alluvium, a mixture of loess and alluvium, and eolian. The soils vary widely in texture, color, consistency, and organic matter content. However, practically all the soils have surface horizons of medium or coarser texture and are well-drained to moderately well-drained. The soils with clayey surface horizons are on the bottom lands or in local areas where erosion has removed the original surface soils (Hall County Soil Survey, 1962).

Soil is an important element of hydric conditions and is one of the criteria used to define wetlands. The hydric soils and soils with potential wetland conditions found in the study area are associated with three basic wetland communities riverbed or adajacent floodplain. bottomlands and wet meadows, or basin oriented wetlands. A fourth category, saline associations, is given special attention because of its capacity to retain water and support wetlands in otherwise dry conditions.

### River/Floodplain Associated Soils

* Barney Series (Mollic Fluvaquent) (V-VIIIw)
* Platte Series (Mollic Haplaquent) (VIw)
* Loup Series (Typic Haplaquolls) (Vw)
* Gothenburg Series (Tupic Psammaquents) (Vw)
* Tryon Series (Typic Psammaquents) (Vw)
* Els Series (Mollic Psammaquents) (IVw)
* Rusco Series (Aquic Arqiustolls) (IIw)

Munjor Series - slightly wet variant (Typic Ustifluvents) (IIIw)
Cass Series - frequently flooded (Fluventic Haplustolls) (IVw)
Boel Series - channelized (Fluvaquentic Huplustolls) (Vw)
Hobbs Series - frequently flooded, channelized (Mollic Ustifluvents) (IVw)
Alluvial Land (VIw)
Wet Alluvial Complex (Vw)
Silty Alluvial Complex (VIw)
Sandy Alluvial Complex (VIIw)
Broken Alluvial Complex - frequently flooded (VIw)
Riverwash (VIIIw)

## Bottomland/Subirrigated Meadow Associated Soils

* Rauville Series (Cumulic Haplaquolls) (Vw)
* Gannett Series (Typic Haplaquolls) (Vw)
* Lamoure Series (Culmic Haplaquolls) (IIIw)
* Lamo Series (Culmic Haplaquolls) (IIw)
* Lawet Series (Typic Haplaquolls) (IVs)
  (Typic Calciaquolls)

Lex Series (Typic Haplaquolls) (IIIw)
Gibbon Series (Fluvaquentic Haplaquolls) (IIw)
Leshara Series (Typic Haplaquolls) (IIw)
Silver Creek Series (Typic Haplaquolls) (IIIw)
Platte - Sarpy Complex (IVw)
Platte - Wann Complex (VIw)
Platte - Gothenburg Complex (IVw)
Platte - Alda Complex (IVw)
Platte - McCook Complex (IVw)
Platte - Boel Complex (IVw)
Lex - Alda Complex (IIw)

## Basin Associated Soils

* Marlake Series (Mollic Fluraquents) (VIIIw)
* Massie Series (Typic Argialbolls) (VIIIw)
* Scott Series (Typic Argialbolls) (IVw)
* Fillmore Series (Typic Argialbolls) (IIIw)

Butler Series (Abruptic Argiaquolls, Mollic Fluvaquents) (IIw)
Marsh Complex (VIIIw)

## Saline/Slickspot Associated Soils

Butler-Slickspot Complex
Hall-Slickspot Complex
Lamour-Slickspot Complex
Silver Creed - Saline Complex
Gibbon - Saline Complex
Lex - Saline Complex
Wood River - Saline Complex
Larvet - Alkali Complex
Larvet Series Variant
Gayville Series Variant
Gayville - Carruso Complex
Gosper Series - Saline/Alkali
Elsmere Series - Saline/Alkali
Saline - Alkali Complex

* Denotes inclusion of soil series in the 1985 SCS Hydric Soils List.

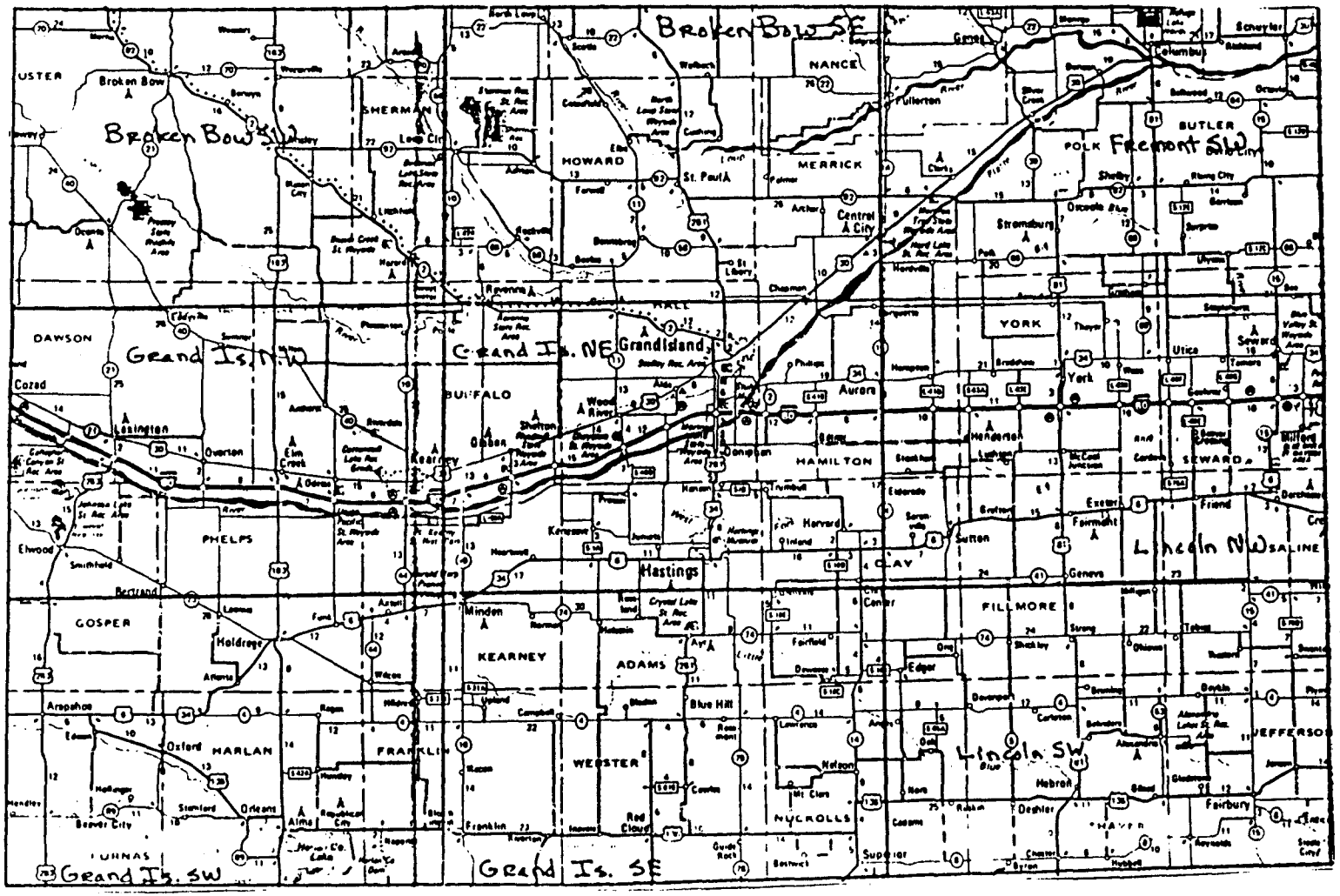


DIAGRAM 1

GENERAL LOCATION OF

STUDY AREA

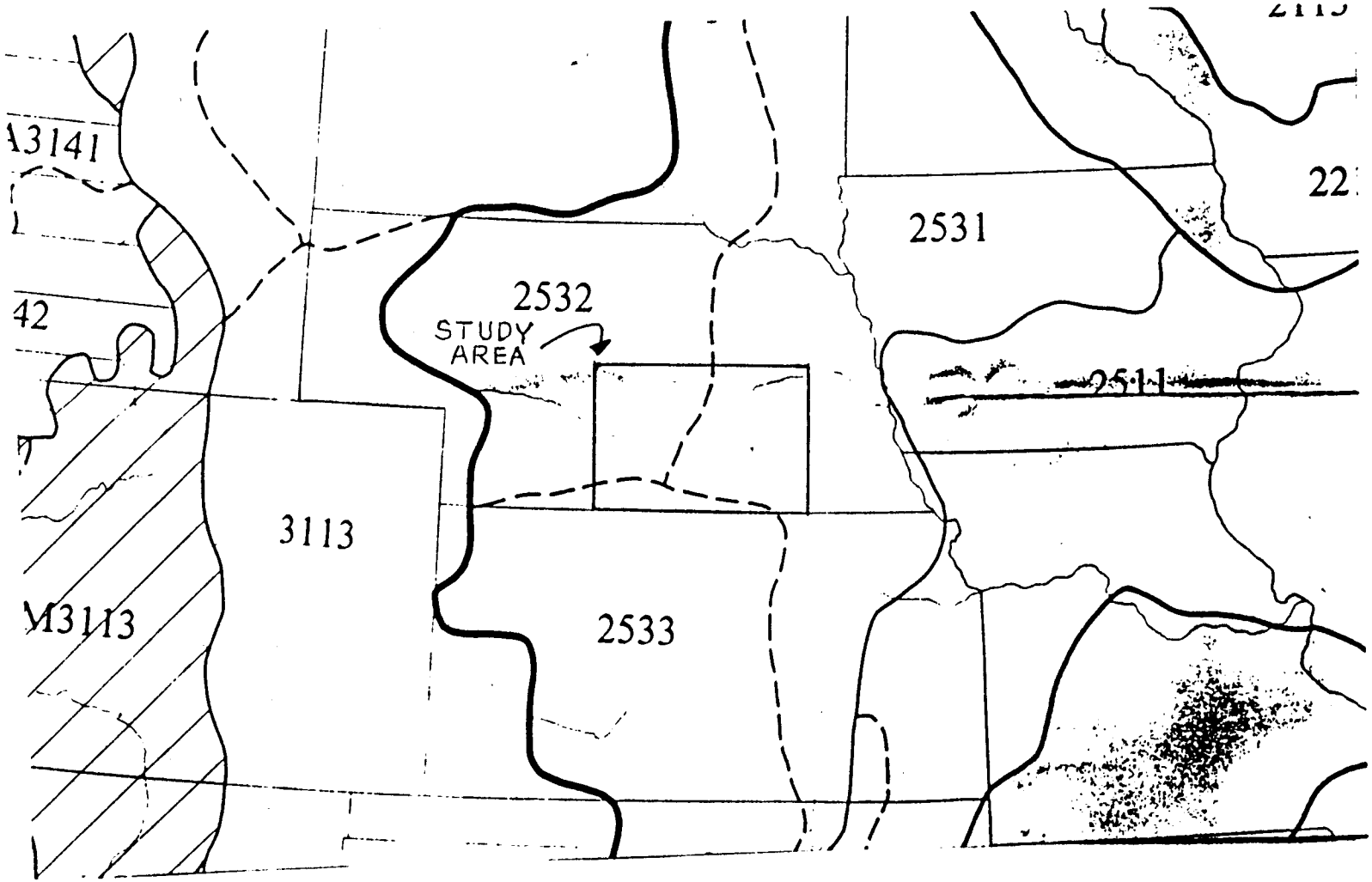


DIAGRAM 2

PHYSIOGRAPHIC LOCATION OF

STUDY AREA

## REFERENCES


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| | | | |
|---|---|---|---|
| Adams | Furnas | Nance | Webster |
| Buffalo | Gosper | Nuckolls | York |
| Butler | Greeley | Phelps | |
| Clay | Hall | Polk | |
| Colfax | Harlan | Saline | |
| Custer | Howard | Saunders | |
| Dawson | Jefferson | Seward | |
| Franklin | Kearney | Sherman | |
| Frontier | Merrick | Thayer | |

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USFWS, National Wetlands Inventory. 1982 Revised. "Wetland Plant List," Computer Data Base. Department of Interior.

## Special Interpretation Considerations

Soils were used as a primary tool for the delineation of wetlands, particularly forested, along most major river systems. Signatures were used as a secondary tool as no distinct conclusions could be drawn from gound truth investigations. In addition, a basic rule of delineating within one contour of the streambed was also considered.

The drained modifier was used if the presence of ditches or pits was detected in or directly adjacent to basins. However, during photointerpretation, it is difficult to tell the effectiveness or purpose of the structure. Therefore, the use of the 'd' modifier may be questionable in some areas, particularly those basins being managed as Wildlife Production Areas.

The change in the classification of the Platte River from R2UBH to R2UBF was made directly south of Cozad with the introduction of the Dawson County Diversion Canal. The Platte resumes its permanent flow with influx of the Loup River at Columbus.

Within the subirrigated meadows of the Platte River, emergent wetlands were delineated by signature and soil information. Because of the agricultural nature of these areas, many delineatons were squared off at fence lines or where land-use changes made the wetland signature no longer apparent.

The large diversion canals throughout the project area were classified as semipermanently flooded because of the nature of irrigation. Subsequently the smaller canals were classified as seasonally flooded.

Drawdown areas around larger reserviors were classified as unconsolidated shore regardless of signature. It was determined that this return was the result of pioneering vegetation and was not considered wetland for the NWI purposes. In addition, on the smaller impoundments, no attempt was made to separate the drawdown area.

Saline soils were delineated if signature and situation dictated and especially if the basic soil series was one being considered as hydric or potentially hydric. Land-use, particularly the absence of plowing, was also a major interpretive clue.

Small intermittent drainage ways and stream beds were classified primarily as palustrine emergent when signature supported. It was determined these areas support a variety of emergent species by the end of the growing season. These are however, not to be confused with grass waterways which were not considered as wetland.

It was determined most smaller open water areas would support aquatic bed by the end of the growing season unless manipulated or without organic substrate. Consequently, all impounded water bodies were classified as aquatic bed if supported by a water signature.