

**NATIONAL WETLANDS INVENTORY**

**MAP REPORT**

**THERMOPOLIS NE**

**CODY NE, CODY SE**

**BIG HORN, WYOMING**

**FISH & WILDLIFE  
ENHANCEMENT  
SEP -4 91**

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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. Photo interpretation conventions, hydric soils lists and wetland plant lists are also used to implement the Cowardin classification system.

The purpose of the 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 Big Horn study area is located in the Wyoming Basin Province in north central Wyoming. Field reconnaissance covered the area of each 1:100,000: Thermopolis NE, Cody NE and Cody SE (Appendix A, Locator Map).

Note: The Cody NE 1:100,000 was included in the Black Hills mapping project but due to its geographical location was not included in the Black Hills Map Report. The description of its climate, soils, etc. are included in this report.

### Field Personnel

Bill Pearson - U.S. Fish and Wildlife Service  
Renee Whitehead - U.S. Fish and Wildlife Service  
Lynn Ashby - Geonex, Inc.  
Carolina Perea - Geonex, Inc.  
Dan Jones - Geonex, Inc.

### Field Dates

July 29, 1990 - August 8, 1990

### Aerial Photography

Data Source (100%)

Type: NHAP Color Infra-Red High Altitude

Scale: 1:58,000

Cody NE: 7/15/81, 8/24/81, 8/25/81, 8/26/81

Cody SE: 7/15/81, 8/24/81, 8/25/81, 8/26/81

Thermopolis NE: 7/15/81, 8/24/81, 8/25/81, 8/26/81

Percent Coverage: All 96 USGS quadrangles were covered with the NHAP photography.

### Collateral Data

United States Geological Survey (USGS) Quadrangles

Cowardin's Classification of Wetlands and Deepwater Habitats of the United States

Bailey's Description of the Ecoregions of the United States

Wyoming General Soil Map

United States Fish and Wildlife Service Wetland Plant Keys

Water Resources Data Wyoming, WY-84

National List of Plant Species That Occur In Wetlands: Northwest (Region IX)

Wetland Plants of the State Of Wyoming

Peterson's Fieldguide to Rocky Mountain Wildflowers

A Handbook of Wetland plants of the Rocky Mountain Region

### III. PHYSICAL DESCRIPTION OF PROJECT AREA

#### Geography

Cody NE, Cody SE, and Thermopolis NE are located in north central Wyoming. According to Bailey's Description of the Ecoregions of the United States this study area falls into the Wheatgrass-Needlegrass Section of the Wyoming Basin Province. The Wyoming Basin consists of plains interrupted by isolated hills and low mountains, and area of hot springs are located in Thermopolis NE.

#### Climate

^  
(A) "an" or "a"

The overall high elevations of this basin gives it a climate characterized by cold winters. Summers are short and hot. Annual temperatures average from 40°F to 52° F. The average growing season is fewer than 100 days in the south and fewer than 140 days in the north and east. Average precipitation ranges from 5 to 14 inches and is fairly evenly distributed throughout the year.

#### Vegetation

The chief vegetation is sagebrush with a mixture of short grasses. Valley bottoms are lined by willows and sedges, but farther from the mountains this vegetation gives way to greasewood and other alkali-tolerant plants.

#### Soils

Soils within the study area fall into one group, defined as a Great Group by the "Wyoming General Soil Map", Soils of the High Plains of Eastern Wyoming. This classification is further broken into climate zones and soil associations.

Soils of two of the ten soil orders are represented in the Wyoming Basin area. These are the Entisols and Aridisols. The Entisols are represented by the Torriorthents, Torrifluvents and Torripsamments. The Aridisols are represented by Haplargids and Calciorthids.

#### IV. DESCRIPTION OF WETLAND HABITATS IN PROJECT AREA

##### Riverine

The major drainage systems for Cody SE and Cody NE are the Big Horn and the Greybull Rivers. The Big Horn River is classified lower perennial, unconsolidated bottom, permanently flooded (R2UBH) in Cody SE and Cody NE and flows north into Big Horn Lake found in Cody NE. The Greybull River in Cody SE was field checked as a lower perennial, unconsolidated bottom, intermittently exposed (R2UBG) river in the west. As this river flows east towards Burlington water is diverted through Bench Canal for irrigation. The flow of the Greybull River east of this point is reduced and is reclassified as a intermittent streambed, semipermanently flooded (R4SBF).

The Wind River enters the study area from Thermopolis NE as an upper perennial, unconsolidated bottom, permanently flooded (R3UBH). South of Thermopolis, at the boundary of the Indian Reservation, the Wind River has been renamed and becomes the Big Horn River as it flows into town. The classification also changes to a lower perennial (R2). This system is the principal drainage for Thermopolis NE. Sand and mud flats along upper and lower perennial rivers will be classified as unconsolidated shore, seasonally flooded (R3/R2USC).

Smaller streams in the study area will be classified as riverine, intermittent, streambed, semipermanently, seasonally, or temporarily flooded (R4SBF/C/A). Classifications will be determined by photo signature and collateral data when available. The excavated (x) modifier will be used on all canals.

##### Lacustrine

Reservoirs and impoundments greater than 20 acres are classified as limnetic, unconsolidated bottom, permanently flooded (L1UBHh). Any exposed shoreline will be classified as littoral, unconsolidated shore, seasonally or temporarily flooded (L2USC/Ah). Aquatic bed found along these large reservoirs, as well as shallow impoundments over 20 acres are classified as littoral, aquatic bed, intermittently exposed (L2ABGh). Persistent emergents associated with these reservoirs are classified under the palustrine system. All wetlands and deepwater habitats associated with reservoirs are classified using the impounded modifier (h).

The Big Horn Lake located in Cody NE is the largest reservoir in the study area. This reservoir is identified as littoral, aquatic bed, intermittently exposed (L2ABGh). The dam that impounds this lake is not visible in the study area, but is located further north in Montana.

Natural, shallow lakes, in excess of 20 acres, with or without the aquatic bed signature are classified as littoral, aquatic bed, intermittently exposed (L2ABG).

Dry basins, in excess of 20 acres, are classified as unconsolidated shore, seasonally or temporarily flooded (L2USC/A).

Large mining pits are classified as limnetic, unconsolidated bottom, permanently flooded with an excavated modifier (L1UBHx).

### Palustrine

Palustrine wetlands are found along streams and rivers in flood plains and oxbows, in fields, in and around impounded areas and in drainages.

Temporarily flooded emergent (PEMA), seasonally flooded emergent (PEMC) semipermanently flooded emergent (PEMF) and semipermanently flooded aquatic bed (PABF) comprised the dominant wetland types observed. Areas of temporarily flooded, scrub-shrub, (PSSA) and temporarily flooded, forested (PFOA), were observed with less frequency. Also occasionally observed were mountain springs which create saturated emergent (PEMB) and saturated shrub-scrub (PSSB) wetlands. Wetlands classified with the saturated (B) water regime are located on slopes. Beaver ponds are found within the study area are mapped as aquatic bed, intermittently exposed, beaver modifier (PABGb). Vegetation affected by these beaver dams will carry the beaver modifier (b). Alkali salt flats found within the study area are classified as palustrine, unconsolidated shore, temporarily flooded (PUSA). Field check sites were documented where problems existed; i.e., wetland areas that were not readily recognizable on the photography. Impoundments and excavated areas such as dugouts or clay mining pits, less than 20 acres in size, are classified in the palustrine system as aquatic bed, semipermanently flooded, excavated (PABFx) and unconsolidated shore, seasonally or temporarily flooded, excavated (PUSC/Ax) according to their photo signature. Mining pits associated with oil and gas are classified as unconsolidated bottom, semipermanently flooded, excavated (PUBFx). Dry basins and unvegetated shore areas are classified unconsolidated shore, seasonally or temporarily flooded (PUSC/A). The impounded (h) and excavated (x) modifiers will be applied where appropriate. Vegetation observed in these wetland habitats were grouped according to class and water regime. Table I lists plant species that were identified on check sites and represent only a fraction of all wetland plant species occurring in the study area. Table II lists characteristic vegetation for each water regime.

**TABLE I**  
**OBSERVED WETLAND VEGETATION**  
 (grouped by wetland class)

**Palustrine Temporary Unconsolidated Shore: PUSA**

|                             |                   |
|-----------------------------|-------------------|
| <u>Suaeda</u> sp.           | sea blight        |
| <u>Distichlis spicata</u>   | inland saltgrass  |
| <u>Salicornia europaeae</u> | slender glasswort |

**Palustrine Temporary Emergents: PEMA**

|                             |                   |
|-----------------------------|-------------------|
| <u>Amaranthus</u> sp.       | redroot           |
| <u>Agropyron smithii</u>    | western wheat     |
| <u>Andropogon gerardii</u>  | big blue stem     |
| <u>Distichlis spicata</u>   | inland saltgrass  |
| <u>Hordeum jubatum</u>      | foxtail barley    |
| <u>Salicornia europaeae</u> | slender glasswort |
| <u>Triglochin maritima</u>  | arrowgrass        |
| <u>Phalaris arundinacea</u> | reed canary grass |
| <u>Phragmites communis</u>  | phragmites        |

**Palustrine Seasonal Emergents: PEMC**

|                           |                       |
|---------------------------|-----------------------|
| <u>Eleocharis</u> sp.     | spikerush             |
| <u>Rumex</u> sp.          | dock                  |
| <u>Juncus</u> sp.         | rush                  |
| <u>Scirpus americanus</u> | American three square |
| <u>Carex</u> sp.          | sedge                 |
| <u>Polygonum</u> sp.      | smartweed             |

**Palustrine Semipermanent Emergents: PEMF**

|                            |                  |
|----------------------------|------------------|
| <u>Typha</u> sp.           | cattail          |
| <u>Scirpus acutus</u>      | hardstem bulrush |
| <u>Scirpus fluviatilis</u> | river bulrush    |

### Palustrine Semipermanent Aquatic Bed: PABF

|                       |           |
|-----------------------|-----------|
| <u>Sagittaria</u> sp. | arrowhead |
| <u>Lemna minor</u>    | duckweed  |

### Palustrine Temporary Scrub-shrub: PSSA

|                               |                    |
|-------------------------------|--------------------|
| <u>Elaeagnus angustifolia</u> | Russian-olive      |
| <u>Salix discolor</u>         | pussy willow       |
| <u>Salix</u> sp.              | willow             |
| <u>Potentilla fruticosa</u>   | shrubby cinquefoil |
| <u>Tamarix pentandra</u>      | salt cedar         |

### Palustrine Seasonal Scrub-shrub: PSSC

|                  |        |
|------------------|--------|
| <u>Salix</u> sp. | willow |
|------------------|--------|

### Palustrine Temporary Forested: PFOA

|                          |                    |
|--------------------------|--------------------|
| <u>Acer negundo</u>      | box elder          |
| <u>Fraxinus anomale</u>  | single leaf ash    |
| <u>Populus deltoides</u> | eastern cottonwood |

**TABLE II**  
**OBSERVED WETLAND VEGETATION TABLE**  
 (grouped by sub-class)

**A. EMERGENT**

|                             |                       |
|-----------------------------|-----------------------|
| <u>Agropyron smithii</u>    | western wheat         |
| <u>Amaranthus</u> sp.       | redroot               |
| <u>Andropogon gerardii</u>  | big blue stem         |
| <u>Carex</u> sp.            | sedge                 |
| <u>Distichlis spicata</u>   | inland saltgrass      |
| <u>Eleocharis</u> sp.       | spikerush             |
| <u>Hordeum jubatum</u>      | foxtail barley        |
| <u>Juncus</u> sp.           | rush                  |
| <u>Phalaris arundinacea</u> | reed canary grass     |
| <u>Phragmites communis</u>  | phragmites            |
| <u>Polygonum</u> sp.        | smartweed             |
| <u>Rumex</u> sp.            | dock                  |
| <u>Salicornia europaeae</u> | slender glasswort     |
| <u>Scirpus acutus</u>       | hardstem bulrush      |
| <u>Scirpus americanus</u>   | American three square |
| <u>Scirpus fluviatilis</u>  | river bulrush         |
| <u>Suaeda</u> sp.           | sea blight            |
| <u>Triglochin maritima</u>  | arrowgrass            |
| <u>Typha</u> sp.            | cattail               |

**B. AQUATIC BED**

|                       |           |
|-----------------------|-----------|
| <u>Lemna minor</u>    | duckweed  |
| <u>Sagittaria</u> sp. | arrowhead |

**C. SCRUB-SHRUB**

|                               |                    |
|-------------------------------|--------------------|
| <u>Elaeagnus angustifolia</u> | Russian-olive      |
| <u>Potentilla fruticosa</u>   | shrubby cinquefoil |
| <u>Salix discolor</u>         | pussy willow       |
| <u>Salix</u> sp.              | willow             |
| <u>Tamarix pentandra</u>      | salt cedar         |

D. UNCONSOLIDATED SHORE

Distichlis spicata

Salicornia europeae

Suaeda sp.

inland saltgrass

slender glasswort

sea blight

E. FORESTED

Acer negundo

Fraxinus anomale

Populus deltoides

box elder

single leaf ash

eastern cottonwood

TABLE III

WETLAND CLASSIFICATION CODES AND WATER REGIME DESCRIPTIONS

NWI CLASSIFICATION FOR WYOMING (1 of 3)

| NWI<br>CODE<br>WATER<br>REGIME | NWI DESCRIPTION                                     | COMMON<br>DESCRIPTION                                | CHARACTERISTIC<br>VEGETATION                                     |
|--------------------------------|---|--|--|
| R2UB<br>(G,H)                  | Riverine, lower perennial,<br>unconsolidated bottom | Rivers, irrigation<br>canals                         | Unconsolidated<br>bottom   |
| R3UB<br>(G,H)                  | Riverine, upper perennial,<br>unconsolidated bottom | Mountain rivers<br>or streams                        | Unconsolidated<br>bottom   |
| R2US<br>(C)                    | Riverine, lower perennial,<br>unconsolidated shore  | Flats  | Sand or mud  |
| R4SB<br>(F,C,A)                | Riverine, intermittent,<br>stream bed               | Streams or<br>irrigation canals                      | Sand or mud  |
| L1UB<br>(H)                    | Lacustrine, limnetic,<br>unconsolidated bottom      | Lakes, reservoirs<br>mining pits                     | Unconsolidated<br>bottom   |
| L2AB<br>(G,F)                  | Lacustrine, littoral,<br>aquatic bed                | Deep Marsh, lakes,<br>or reservoirs                  | Submerged and<br>floating aquatics                               |
| L2US<br>(C,A)                  | Lacustrine, littoral,<br>unconsolidated shore       | Lake flats, beach                                    | Sand or mud  |
| PUB<br>(F)                     | Palustrine, unconsolidated<br>bottom                | Gravel pits, oil<br>and gas pits                     | Unconsolidated bottom  |
| PUB<br>(H)                     | Palustrine, unconsolidated<br>bottom                | Hot springs  | Unconsolidated bottom  |
| PAB<br>(F,G)                   | Palustrine, aquatic bed                             | Vegetated ponds,<br>beaver ponds, or<br>sewage ponds | <u>Lemna</u> sp. (duckweed)<br><u>Sagittaria</u> sp. (arrowhead) |

TABLE III

WETLAND CLASSIFICATION CODES AND WATER REGIME DESCRIPTIONS

NWI CLASSIFICATION FOR WYOMING (2 of 3)

| NWI<br>CODE<br>WATER<br>REGIME | NWI DESCRIPTION      | COMMON<br>DESCRIPTION   | CHARACTERISTIC<br>VEGETATION   |
|--------------------------------|----------------------|---|--|
| PEM<br>(F,C,B,A)               | Palustrine, emergent | Meadows,<br>depressions, swales,<br>floodplains, seeps,<br>oxbows, or springs | <u>Suaeda</u> sp. (sea blight)<br><u>Distichlis spicata</u><br>(inland saltgrass)<br><u>Salicornia europeae</u><br>(slender glasswort)<br><u>Amaranthus</u> sp.<br>(redroot)<br><u>Agropyron smithii</u><br>(western wheat)<br><u>Andropogon gerardii</u><br>(big blue stem)<br><u>Distichlis spicata</u><br>(inland saltgrass)<br><u>Hordeum jubatum</u><br>(foxtail barley)<br><u>Salicornia europeae</u><br>(slender glasswort)<br><u>Triglochin maritima</u><br>(arrowgrass)<br><u>Phalaris arundinacea</u><br>(reed canary grass)<br><u>Phragmites communis</u><br>(phragmites)<br><u>Eleocharis</u> sp.<br>(spikerush)<br><u>Rumex</u> sp. (dock)<br><u>Juncus</u> sp. (rush)<br><u>Scirpus americanus</u><br>(American three square)<br><u>Carex</u> sp. (sedge)<br><u>Polygonum</u> sp.<br>(smartweed)<br><u>Typha</u> sp. (cattail)<br><u>Scirpus acutus</u><br>(hardstem bulrush)<br><u>Scirpus fluviatilis</u><br>(river bulrush) |

TABLE III

WETLAND CLASSIFICATION CODES AND WATER REGIME DESCRIPTIONS

NWI CLASSIFICATION FOR WYOMING (3 of 3)

| NWI<br>CODE<br>WATER<br>REGIME | NWI DESCRIPTION         | COMMON<br>DESCRIPTION | CHARACTERISTIC<br>VEGETATION  |
|--------------------------------|-------------------------|-----------------------|---|
| PSS<br>(C,B,A)                 | Palustrine, scrub-shrub | Shrub wetlands        | <u>Elaeagnus angustifolia</u><br>(Russian-olive)<br><u>Salix discolor</u><br>(pussy willow)<br><u>Salix</u> sp. (willow)<br><u>Potentilla fruticosa</u><br>(shrubby cinquefoil)<br><u>Tamarix pentandra</u><br>(salt cedar) |
| PFO<br>(B,A)                   | Palustrine, forested    | Forested wetlands     | <u>Acer negundo</u><br>(box elder)<br><u>Fraxinus anomale</u><br>(single leaf ash)<br><u>Populus deltoides</u><br>(eastern cottonwood)  |

## V. WATER REGIME DESCRIPTION

- (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 persists 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

Overall the emulsion of the NHAP color infra-red photography is of high quality. The only problem found while ground truthing was with flight line 129, flown on August 26, 1981 in Thermopolis NE. This emulsion consists of deep red, blue and black returns. Signatures usually found to be wet on other emulsions was not the case here. Close attentions to field notes should be used while working with this emulsion.

Ground truthing revealed that water levels were below normal, information gathered from local sources indicated that the area was four years into a drought. Water levels were significantly lower than portrayed by the imagery.

## **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. The majority of the photography was taken during the late summer and fall of 1981.

Field checks of areas within Cody NE, Cody SE, and Thermopolis NE were made prior to the actual delineation of wetlands. Field check sites were selected to clarify varying signatures found on the photography. These photographic signatures were then identified in the field using vegetation types and soil types, as well as additional input from field personnel.

Collateral data included USGS topographic maps, 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 and drafting were completed by Geonex, Inc., St. Petersburg, Florida with quality control conducted by the United States Fish and Wildlife Service.

## **VIII. SPECIAL MAPPING PROBLEMS**

No special mapping problems were found in this study area with the exception of emulsion on flight line 129, Thermopolis NE, that was mentioned under the "Imagery" section of this report.

## **IX. MAP ACQUISITION**

To discuss any questions concerning these maps or to place a map order, please contact:

Regional Wetland Coordinator  
U.S. Fish and Wildlife Service - Region 6  
Denver Federal Center  
P.O. Box 25468  
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.

## LITERATURE CITED

Bailey, R.G., 1978. Description of the Ecoregions of the United States. United States Department of Agriculture, Forest Service.

Cooper, D.J., A Handbook of Wetland Plants of the Rocky Mountain Region. 1989 United States Environmental Protection Agency, Region VIII.

Cowardin, L.M., V. Carter, F.C. Golet and E.T. LaRue, 1979. Classification of Wetlands and Deepwater Habitats of the United States.

Craighead, J.J., F.C. Craighead, Jr., R.J. Davis Peterson Field Guide to Rocky Mountain Wildflowers. 1963. Houghton Mifflin Company.

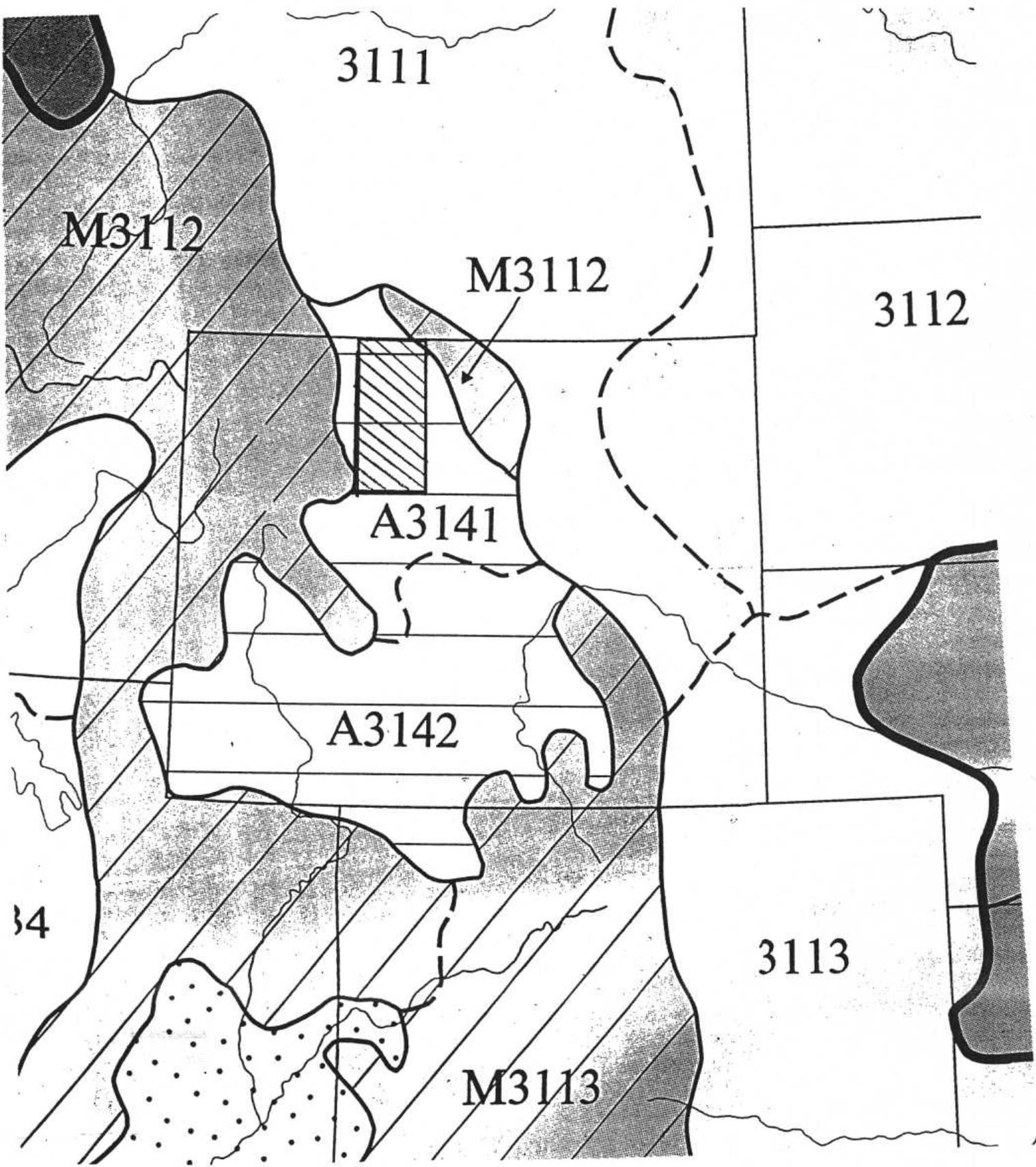
Wetland Plants of the State Wyoming, United States Department of the Interior, Fish and Wildlife Service.

National List of Plant Species That Occur In Wetlands: Northwest (Region IX), United States Department of the Interior, Fish and Wildlife Service.

Wyoming General Soil Map, Research Journal 117, University of Wyoming.

Water Resources Data Wyoming, WY-84, 1984, United States Department of the Interior, Geological Survey.

Locator Map (A)



LOCATOR MAP (B)

