

DRAFT

A

BLM, WYOMING
FIELD SUMMARY REPORT

I. INTRODUCTION

The purpose of this field trip was to ground truth aerial photography of the study area so that photointerpretation could be facilitated with a high degree of accuracy.

A. 1:100,000

Lander SE
Casper SE
Casper SW

B. 7.5' Quadrangle Maps with Checksites

Seperation Rim
Lamont
Bucklin Reservoir
Dickie Springs
Picket Lake
Seminoe Dam SW

C. FIELD MEMBERS

C. Elliott USFWS/Region 6
K. Drake USFWS/Region 6
F. Stabler BLM
L. Ashby Geonex Martel Laboratories, Inc.
F. Schwartz Geonex Martel Laboratories, Inc.
B. Pearson Geonex Martel Laboratories, Inc.

D. FIELD DATES

August 22, 1988 - August 31, 1988

E. AERIAL PHOTOGRAPHY

Type: Color Infrared Transparencies
Scale: 1:58,000

| <u>DATE</u> | <u>% COVERAGE</u> | <u>DATE</u> | <u>% COVERAGE</u> |
|-------------|-------------------|-------------|-------------------|
| 07/21/80 | 6.25% | 09/26/80 | 8.30% |
| 07/22/80 | 4.20% | 09/08/81 | 4.20% |
| 07/27/80 | 4.20% | 09/17/81 | 4.20% |
| 07/28/80 | 6.25% | 08/14/82 | 8.30% |
| 07/31/80 | 4.20% | 09/01/82 | 15.50% |
| 08/28/80 | 6.25% | 09/02/82 | 3.10% |
| 09/04/80 | 8.30% | 09/10/83 | 3.10% |
| 09/05/80 | 10.50% | 09/13/83 | 1.00% |
| | | 08/30/84 | 2.15% |

climatic condition allows for a growing season fewer than 100 days. Precipitation is evenly distributed throughout the year, and ranges from 5 inches to 14 inches. The primary vegetation is sagebrush with a mixture of short grasses. Along streams in and near the mountains, where water is good, valley bottoms are lined by willows and sedges.

Farther from the mountains, moist alkaline flats support most of the vegetation as alkali-tolerant greasewood, and other alkali-tolerant plants. The soils in this province are alkaline Aridisols. The region is characterized by extensive alluvial deposits in stream floodplains and in fans at the foot of mountains. Dry lake beds are numerous, and there are extensive eolian deposits including both dune sand and loess.

III. BIOLOGICAL CHARACTERISTICS OF WETLAND HABITATS

- A. Marine: Not present
- B. Estuarine: Not present
- C. Riverine

The majority of the rivers that flow throughout the Wyoming Basin are characterized by a low gradient and slow water velocity. These types of rivers flow throughout the year, have a substrate composed of sand or mud, and display a well developed floodplain. This type of river will be classified as lower perennial, unconsolidated bottom, permanently flooded riverine system (R2UBH). The Sweetwater and Medicine Bow Rivers are examples of the R2UBH class. The stretch of the North Platte River between Seminoe Dam and the Pathfinder Reservoir will be classified as an upper perennial, unconsolidated bottom, permanently flooded riverine system (R3UBH). This riverine classification is characterized by a high gradient and fast water velocity. Water flows throughout the year with these rivers, and their substrate consists of rock, cobbles, or gravel with occasional patches of sand, and display very little floodplain development.

Smaller streams within the mapping area will be classified as an intermittent streambed, semi-permanently, seasonally or temporarily flooded riverine system (R4SBF/C/A).

All alluvium such as sand or cobble bars found along rivers and streams will be classified as upper or lower perennial, unconsolidated shore and seasonally flooded (R2/R3USC).

The USGS Water Resource Data-Wyoming reference will be used to determine the water regime on all rivers and streams. If the resource data is not available, photo signature and topology will determine water regime. Large irrigation canals will be classified as riverine, lower perennial, unconsolidated bottom, intermittently exposed (R2UBGx) or riverine, intermittent streambed, semi-permanently flooded (R4SBFx). These classifications will be made depending on the photo signature and other collateral information which describes water volume and duration of flow. When emergents are evident in canals, these will be classified in the Palustrine system. The excavated modifier (x) will be used on all canals. Small irrigation ditches within agricultural fields will not be delineated.

D. Lacustrine

Reservoirs and impoundments greater than 20 acres, such as Pathfinder and Seminoe Reservoirs will be classified as limnetic, unconsolidated bottom and permanently flooded (L1UBHh). The shoreline will be classified as littoral, unconsolidated shore and seasonally flooded (L2USCh). Persistent emergents associated with these reservoirs will be classified under the palustrine system. All wetlands and deepwater habitats associated with reservoirs will be classified using the impounded modifier (h).

During the field reconnaissance, Hay Reservoir was found to have been breeched and contained no water. This reservoir will however, be mapped according to the imagery. Soda Lake, located in Casper SE will be classified as littoral, unconsolidated bottom, semi-permanently flooded (L2UBF). This waterbody is encircled with littoral, unconsolidated shore, seasonally and temporarily flooded (L2USC and L2USA) zones. Circle Bar and Picket Lakes, in Lander SE were found to be holding a good water level, even though the area has been subjected to severe drought conditions. These lakes will be classified as littoral, aquatic bed, permanently flooded (L2ABH).

E. Palustrine

Palustrine emergent wetlands located in the Wyoming Basin Province occur along river floodplains, in swales, meadows, and associated with springs. Temporarily flooded emergent wetlands (PEMA) included baltic rush (Juncus arcticus), foxtail barley (Hordeum

lubatum), western wheat (Agropyron smithii), buffalo grass (Buchloe sp.), saltgrass (Distichlis sp.), and glasswort (Salicornia sp.). Seasonally flooded emergent wetlands (PEMC) included nebraska sedge (Carex nebrascensis), various sedges (Carex sp.), spikerush (Eleocharis macrostachya), baltic rush (Juncus articus), and glassworts (Salicornia sp.). Semi-permanently flooded wetlands (PEMF) includes alkali bulrush (Scirpus paludosus), hardstem bulrush (Scirpus acutus), and cattail (Typha latifolia). Palustrine scrub-shrub wetlands in the region occur in river floodplains, meadows, and springs. Willows (Salix sp.) and greasewood (Sarcobatus vermiculatus) were the only wetland species of scrub-shrub found in the study area. Temporarily flooded willows (PSSA) were found primarily in valleys, draws, and on floodplains. Temporarily flooded greasewood (PSSA) were found to be located in shallow basins and flats with an understory of unconsolidated shore. Greasewood found in these flats were lush and very healthy compared to the greasewood found in the upland areas surrounding these basins. The seasonally flooded willows (PSSC), were found in river floodplains, with some located in valleys and draws.

Open water bodies less than 20 acres in size, which support aquatic vegetation at some time during the growing season, will be classified as palustrine, aquatic bed, semi-permanently flooded (PABF). The aquatic vegetation included duckweed (Lemna sp.), and coontail (Myriophyllum sp.). Beaver ponds in the study area, were found to support aquatic vegetation, and as a result will be classified as palustrine, aquatic bed, intermittently exposed, with a beaver modifier (PABGb). Since the extent of beaver influence cannot be determined on vegetation around the dams, the beaver modifier will be used only on the water bodies created by the dams.

Impoundments holding good water and less than 20 acres in size were found to support aquatic vegetation some time during the growing season. These impoundments will be classified as palustrine, aquatic bed, semi-permanently flooded (PABFh).

Palustrine basins less than 20 acres in size will be classified as either palustrine, unconsolidated shore, temporarily or seasonally flooded (PUSA or PUSC respectively). The basins that show a strong clear white signature of sand with no signs of vegetaion will

be classed as PUSA. The PUSC's will be typed by the mottled blue to whitish signature. This signature is indicative of moister soil conditions and or some vegetation growth that would distinguish between PUSA and PUSC. If the basin is impounded it will carry the "h" modifier.

Excavated water bodies, such as sewage pits will be classed as palustrine, aquatic bed, semi-permanently flooded and excavated (PABFx). Pits associated with oil and gas will be classed as palustrine, unconsolidated bottom, semi-permanently flooded and excavated (PUBFx). Large gravel pits located in the eastern part of the work area will be typed as lacustrine, limnetic, unconsolidated bottom, intermittently exposed with an excavated modifier (LIUBGx). The smaller pits will be classed as PUBFx.

IV. SUMMARY

All photography was taken July 1980; August 1980, 1982, 1984;

September 1980, 1981, 1982, 1983. The field reconnaissance of the study area was conducted in August 1988. Photography of the work area was found to be fairly consistent with the field conditions, however, the study area was found to be drier than normal for this time of year.

COMMONLY FOUND SPECIES

PSSA

willows
greasewood

Salix sp.
Sarcobatus vermiculatus

PSSC and PSSB

willows

Salix sp.

PEMA

glassworts
baltic rush
foxtail barley
western wheat
buffalo grass
saltgrass

Salicornia sp.
Juncus arcticus
Hordeum jubatum
Agropyron smithii
Buchloe sp.
Distichlis sp.

PEMB

sedges

Carex sp.

PEMC

glassworts
nebraska sedge
sedges
spikerush
baltic rush
rushes

Salicornia sp.
Carex nebrascensis
Carex sp.
Eleocharis macrostachya
Juncus arcticus
Juncus sp.

PEMF

alkali bulrush
hardstem bulrush
cattail

Scirpus paludosus
Scirpus acutus
Typha latifolia

PABG

coontail
duckweed

myriophyllum sp.
Lemna sp.

PABF

duckweed

Lemna sp.

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USER REPORT CASPER SW and SE, WYOMING NATIONAL WETLANDS INVENTORY MAPS

A. INTRODUCTION

The U.S. Fish and Wildlife Services National Wetlands Inventory is producing maps showing the location and classification of wetlands and deepwater habitats of the United States. The Classification of Wetlands and Deepwater Habitats of the United States by Cowardin et al. is the classification system used to define and classify wetlands. Photo interpretation conventions, hydric soils lists and wetland plant lists are also available to enhance the use and application of the classification system.

B. PURPOSE

The purpose of the notes to users is threefold: (1) to provide localized information regarding the production of NWI maps, including specific imagery and interpretation discussion; (2) to provide a descriptive crosswalk from wetland codes on the map to common names and representative plant species; and (3) to explain local geography, climate, and wetland communities.

C. STUDY AREA

Geography:

The study area covered by Casper SW and SE base maps is located in south-central Wyoming. Bailey's Ecoregion Classification (1980) describes this area as the Wyoming Basin Province (Sagebrush-Wheatgrass Section). The Wyoming Basin Province consists of plains interrupted by isolated hills and low mountains. Elevations range from approximately 6,500 feet in the Great Divide Basin to 10,000 feet in the Ferris Mountain range.

The major rivers found in the study area include the Sweetwater, Little Medicine Bow, Medicine Bow, Sand Creek, and the North Platte River connecting Seminoe and Pathfinder Reservoirs.

CLIMATE:

The climate of the study area is characterized by short, hot summers, with cold winters. Annual temperatures range from 40° to 52° F. The average annual precipitation for the area ranges from 5 - 14 inches, fairly evenly distributed throughout the year.

VEGETATION:

Vegetation in the Wyoming Basin Province is dominated by sagebrush or shadscale, with a mixture of short grasses. Moist alkaline flats support such vegetation as alkali-tolerant greasewood, and other alkali tolerant plants. Where water is good, along streams and mountains, valley bottoms are lined by willows and sedges.

SOILS:

Within the study area, there are two major soil groups defined as Great Groups by the "Wyoming General Soil Map". The two groups are 1) Soils of the Mountains and Mountain Valleys, 2) Soils of the Intermountain Basins and Foothills. This classification is further broken into climatic zones and soil associations.

The mountainous area located in the central portion of Casper SW and SE, is dominated by the Soils of Mountains and Mountain Valley Great Group. They are dominantly dark colored soils that are usually moist in some parts during the summer. These soils are formed in a cool climate with moist summers. Within the study area, elevations range approximately 7,000 - 10,000 feet. The primary soil association is the Haploborolls-Agriborolls-Rock outcrop Association. This association is found on sloping to steep mountainous terrain, developing in residuum and transported materials from sedimentary bedrock.

The area surrounding the mountains are dominated by Soils of the Intermountain Basins and Foothills. These soils are light colored soils of basins, terraces, and fans which are dry or may be moist in some parts during the summer. These soils form in cool climates with spring moisture. The elevations of these soils range from 5,000 - 8,000 feet. The soil associations are formed by both transported and residual materials. Soil associations within the study area are: Torripsamments Association; Torriorthents, alkali Association; Torriorthents-Haplargids-Rock outcrop Association; Torriorthents-Haplargids-Natrargids Association; Torriorthents-Camborthids-Haplargids Association and Torriorthents, shallow-Torriorthents Association.

D. WETLAND CLASSIFICATION CODES AND WATER REGIME DESCRIPTIONS

TABLE 1: NWI CLASSIFICATION FOR CASPER SW and SE, WYOMING (1 of 2)

| NWI CODE WATER REGIME | NWI DESCRIPTION | COMMON DESCRIPTION | CHARACTERISTIC VEGETATION |
|--------------------------------|--|---|---|
| R2UB (G,H) | Riverine, lower perennial, unconsoli- dated bottom | Rivers | Unconsolidated bottoms |
| R3UB (G,H) | Riverine, upper perennial, unconsoli- dated bottom | Mountain rivers or streams | Cobble-Gravel substrate |
| R3US (C) | Riverine, upper perennial, unconsoli- dated shore | Flats | Sand, mud or cobble-gravel |
| R4SB (F,C,A) | Riverine, intermittent, stream bed | Streams or irrigation canals | Sand or mud |
| L1UB (H) | Lacustrine, limnetic, unconsolidated bottom | Lakes or reservoirs | Unconsolidated bottoms |
| L2AB (F) | Lacustrine, littoral, aquatic bed | Deep Marsh | Submerged and floating aquatics |
| L2US (C,A) | Lacustrine, littoral, unconsolidated shore | Lake flats, beach | Sand or mud |
| PUB (G) | Palustrine, unconsoli- dated bottom | Gravel pits | Unconsolidated bottoms |
| PAB (F,G) | Palustrine, aquatic bed | Vegetated ponds, beaver ponds or borrow pits | <u>Myriophyllum</u> sp. (coontail) <u>Lemna</u> sp. (duckweed) |

D. WETLAND CLASSIFICATION CODES AND WATER REGIME DESCRIPTIONS

TABLE 1: NWI CLASSIFICATION FOR CASPER SW and SE, WYOMING (2 of 2)

| NWI CODE WATER REGIME | NWI DESCRIPTION | COMMON DESCRIPTION | CHARACTERISTIC VEGETATION |
|--------------------------------|----------------------------|--|---|
| PEM (F,C,B,A) | Palustrine, emergent | Meadows, depressions, swales, floodplains or seeps | <u>Hordeum</u> <u>jubatum</u> (foxtail barley) <u>Poa pratensis</u> (Kentucky bluegrass) <u>Buchloe</u> sp. (buffalo grass) <u>Agropyron</u> <u>smithii</u> (Western wheat) <u>Distichlis</u> <u>spicata</u> (saltgrass) <u>Carex</u> sp. (sedges) <u>Typha latifolia</u> (cattail) <u>Juncus</u> sp. (rush) <u>Scirpus acutus</u> (hardstem bullrush) <u>Salicornia</u> sp. (glassworts) <u>Eleocharis</u> <u>macrostachya</u> (spikerush) <u>Scirpus</u> <u>paludosus</u> (alkali bullrush) |
| PSS (C,B,A) | Palustrine, scrub-shrub | Shrub wetlands | <u>Salix</u> sp. (willow) <u>Sarcobatus</u> <u>vermiculatus</u> (greasewood) |

E. 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 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 the 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 land surface throughout the year in all years.

(K) Artificially Flooded - The amount and duration of flooding is controlled by means of pumps or siphons in combination with dikes or dams.

(U) Unknown - The water regime is not known.

F. MAP PREPARATION

The wetland classification that appears on the Casper SW, SE National Wetlands Inventory (NWI) Base Map (Table 1) is in accordance with Cowardin et al. (1977). The delineations were produced through stereoscopic interpretation of 1:58,000 scale color infrared photography. The photography was taken during July 1980; August 1980; September 1980, 1981.

Field checks of areas found within Casper SW and SE photography 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 U.S.G.S. topographic maps, climate, vegetation, and ecoregional information. The user of the map is cautioned that, due to the limitation of mapping primarily through aerial photo interpretation, a small percentage of wetlands may have gone unidentified. Since the photography was taken during a particular time and season, there may be discrepancies between the map and current field conditions. Changes in landscape which occurred after the photography was taken would result in such discrepancies.

Aerial photo interpretation and drafting were completed by Martel Laboratories, Inc., St. Petersburg, Florida.

G. 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 VI
Denver Federal Center
Post Office Box 25486
Denver, CO 80225

To order maps only, please contact:

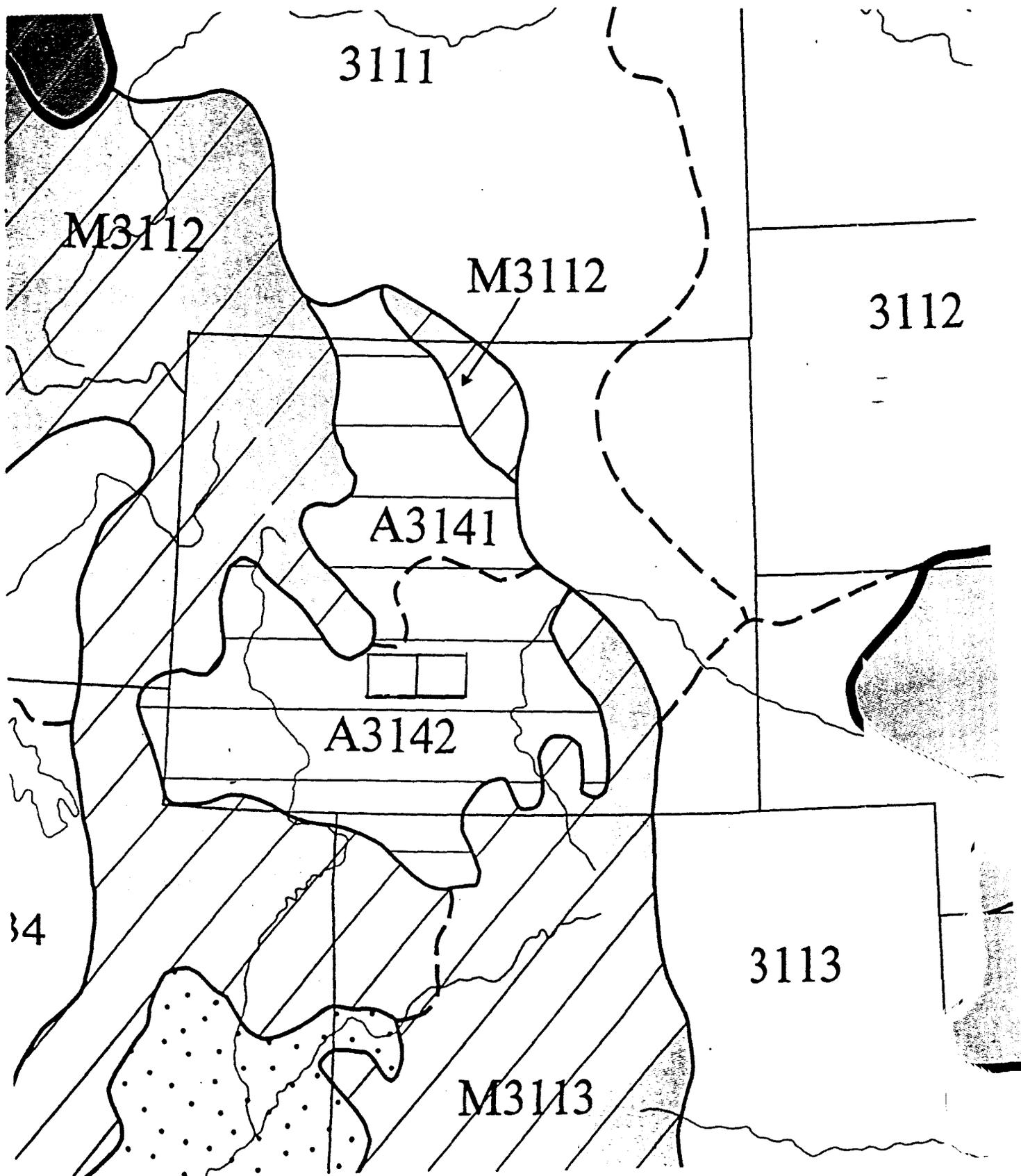
National Cartographic Information Center
U.S. Geological Survey
National Center
Reston, VA 22092

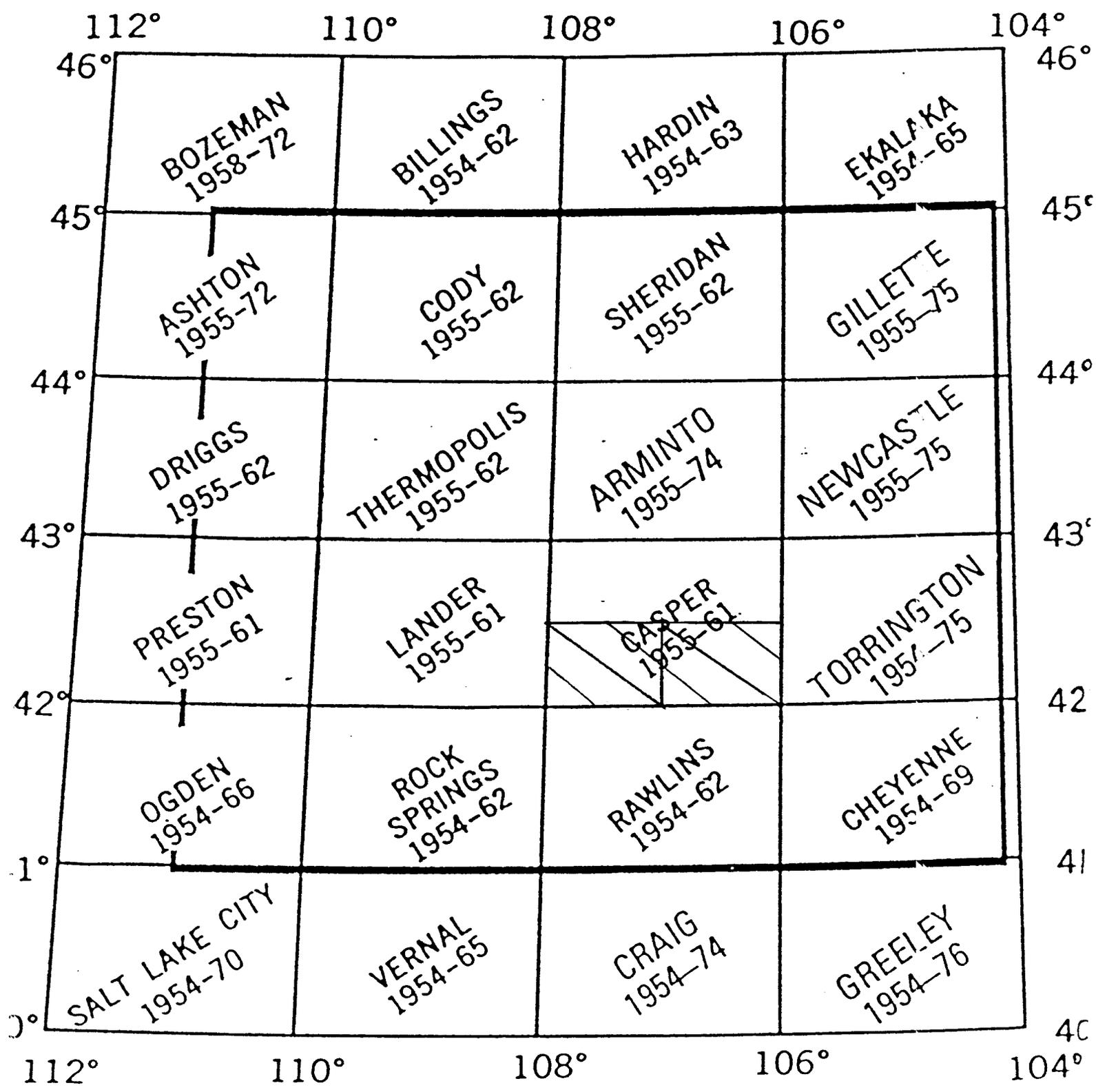
Maps are identified by the name of the corresponding U.S.G.S. 1:24,000 scale topographic quadrangle name. Topographic map indices are available from the U.S. Geological Survey.

LITERATURE CITED

- Bailey, Robert G. 1980. Description of the Ecoregions of the United States; United States Department of Agriculture Forest Service. Miscellaneous Publications No. 1391.
- Cowardin, L.M.; V. Carter; F.C. Golet and E.T. LaRoe; 1979. Classification of Wetlands and Deepwater Habitats of the United States. United States Department of the Interior, U.S. Fish and Wildlife Service.
- Denison, E.S.; J.R. Schuetz, and S.J. Rucker; 1982. Wyoming Water Resource Data, Water year 1982; United States Department of Agriculture, Soil Conservation Service.
- National Committee for Hydric Soils, 1985. Hydric Soils of the State of Wyoming; United States Department of Agriculture, Soil Conservation Service.
- Reed, Porter B. Jr., 1986. 1986 Wetland Plant List, Wyoming; United States Department of Interior, Fish and Wildlife Service.
- Wyoming General Soil Map; 1977. United States Department of Agriculture, Soil Conservation Service, Research Journal 117.

BAILEY'S ECOREGION MAP

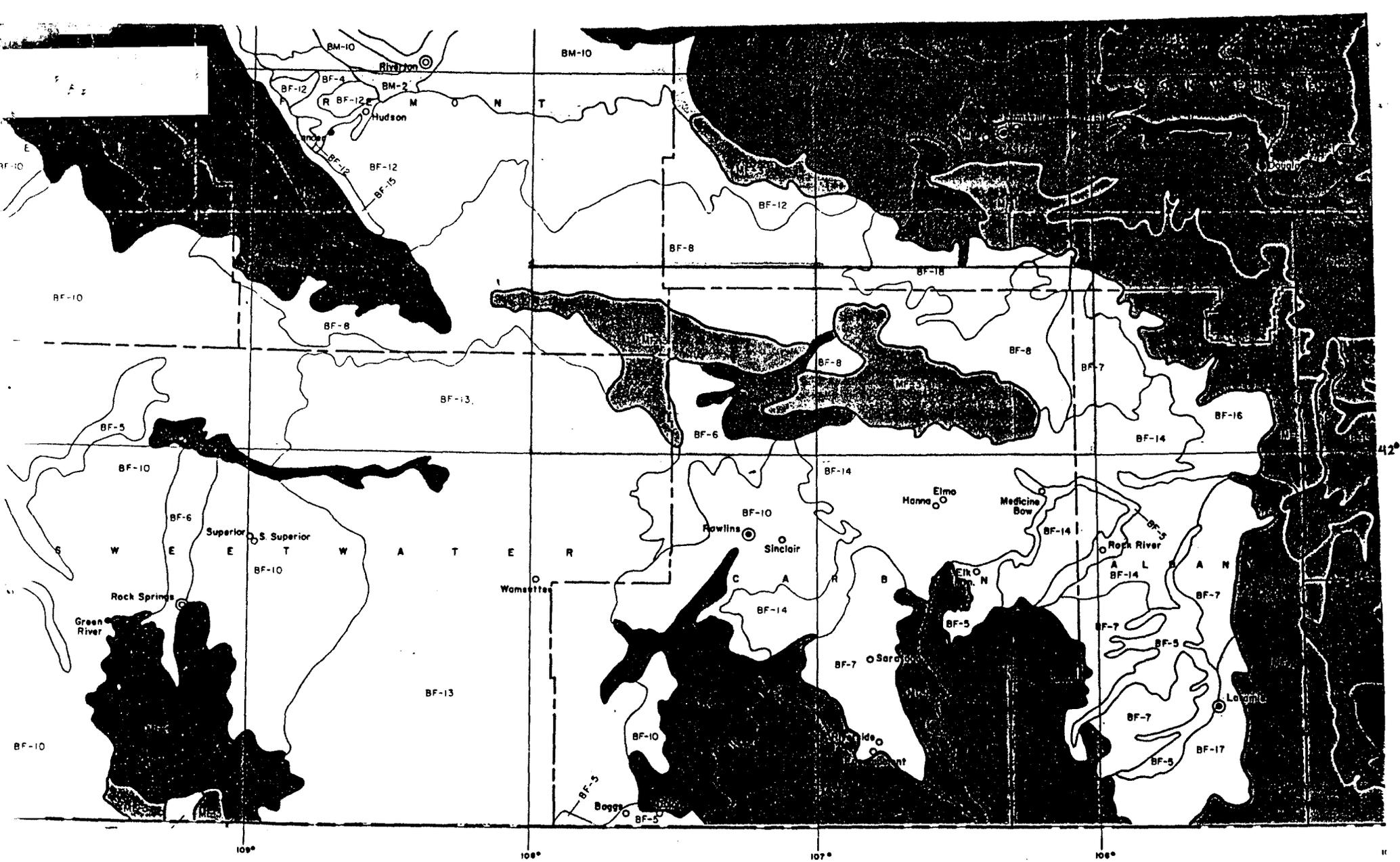




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|-------------------------------|----------------------------|---------------------------|-------------------------|------------------------------|--------------------------|----------------------------------|---------------------------|-------------------------------------|---------------------------|----------------------------|---------------------------|--------------------------------|---------------------------------------|----------------------------------|------------------------------|
| CROOKS MTK 1951 | JEFFREY CITY 1951-57 | SPLIT ROCK NW 1951 | SPLIT ROCK 1951 | BUCKLIN RESERVOIR 1951 | SAVAGE PEAK 1951 | IND- PENDENCE ROCK 1951 | FORT RIDGE 1951 | PATENDER NW RESERVOIR 1951 | PATENDER DAM 1951 | BEAR SPRING 1951 | BEAR MTN 1951 | HORSE PEAK 1951 | MUD SPRINGS 1951 | BATES CREEK RESERVOIR 1951 | SQUAW SPRING 1951 |
| BRENTON SPRINGS 1951 | CROOKS PEAK 1951 | SAGEBRUSH PARK 1951 | WHISKEY PEAK 1951 | MUDDY GAP 1952 | YOUNGS PASS 1952 | SPANISH MINE 1953 | BUZZARD RANCH 1953 | PATENDER RESERVOIR SW 1953 | LEO 1953 | FOURMILE RIDGE 1953 | FOURMILE POINT 1953 | WLD IRISH RESERVOIR 1953 | MEASEL SPRING RESERVOIR 1953 | MOSS AGATE RESERVOIR 1953 | CHALK HILLS 1959 |
| ANTELOPE RESERVOIR 1951 | OSBORNE WELL 1951 | HADSELL SPRING 1951 | BARROL 1951 | LAMONT 1951 | LAMONT NE 1951 | FERRIS 1953 | BRADLEY PEAK 1953 | SEMINOE DAM SW 1953 | SEMINOE DAM NE 1953 | BEAVER CREEK 1953 | THE O RANCH 1953 | PINE HILL 1953 | CAMERON CREEK 1953 | WALKER DRAW NW 1953 | RIG CHARLIE LAKES 1953 |
| BATTLE SPRING 1950 | SONER RESERVOIR 1950 | CHICKEN SPRING 1950 | BULL SPRING 1950 | SEPARATION RIM 1950 | BOGGY MEADOWS 1950 | RIDDLE CUT 1953 | WILD HORSE MTN 1953 | SEMINOE DAM SW 1953 | SEMINOE DAM SE 1953 | SCHNEIDER RIDGE 1953 | T E RANCH 1953 | DIFFICULTY 1953 | WINDY HILL 1953 | T B RANCH 1953 | WALTER DRAW SE 1953 |

CASPER SW

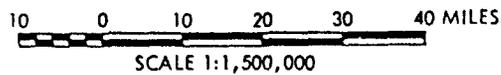
CASPER SE



GENERAL SOIL MAP

WYOMING

NOVEMBER 1975

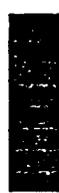


CASPER SW, SE, WY.

SOIL ASSOCIATIONS

M - Soils of the Mountains and Mountain Valleys

MC - Dark and light colored soils of the high mountains that are usually moist, have an AAP (1) of 45-100 cm. (18-40 in.), and a MSST (2) of less than 15°C. (59°F.).



Soils formed from residual materials:

- MC-1 Cryoboralfs-Cryoborolls association
- MC-2 Cryoborolls-Cryoboralfs association
- MC-3 Cryoborolls association
- MC-4 Rock Outcrop-Cryoboralfs-Cryoborolls association
- MC-5 Cryoborolls-Rock Outcrop association
- MC-6 Cryochrepts-Cryumbrepts association
- MC-7 Cryoboralfs-Cryoborolls-Rock Outcrop association
- MC-8 Cryoborolls-Cryorthents association



Soils formed from transported materials:

- MC-9 Cryoboralfs, stony-Cryoborolls, stony association
- MC-10 Cryoborolls-Cryaquents association
- MC-11 Cryoborolls-Cryaquolls association

MF - Dominantly dark colored soils of the mountains and mountain valleys that are usually moist in some parts during the summer, have an AAP of 35-60 cm. (14-24 in.), a MAST (3) of less than 8°C. (47°F.), and a MSST of more than 15°C. (59°F.).



Soils formed from residual materials:

- MF-1 Eutroboralfs-Haploborolls association
- MF-2 Argiborolls-Haploborolls association
- MF-3 Haploborolls-Argiborolls-Rock Outcrop association
- MF-4 Haploborolls, shallow association

MX - Dominantly dark colored soils of the mountains and mountain valleys that are usually dry during the summer and have an AAP of 35-55 cm. (14-22 in.), a MAST of less than 8°C. (47°F.), and a MSST of more than 15°C. (59°F.).



Soils formed from residual materials:

- MX-1 Calcixerolls-Calciorthids association
- MX-2 Haploxerolls association
- MX-3 Argixerolls association

B - Soils of the Intermountain Basins and Foothills

BF - Dominantly light colored soils of basins, terraces, and fans which are usually dry or may be moist in some parts during the summer, have an AAP of 20-35 cm. (8-14 in.), a MAST of less than 8°C. (47°F.), and a MSST of more than 15°C. (59°F.).



Soils formed from transported materials:

- BF-1 Torripsamments association
- BF-2 Argiborolls-Torriorthents association
- BF-3 Haplargids-Haploborolls association
- BF-4 Haplargids association
- BF-5 Torrifluvents-Fluvaquents-Halaquents association
- BF-6 Torriorthents, alkali association
- BF-7 Calciorthids-Haplargids association



Soils formed from residual materials:

- BF-8 Torriorthents-Haplargids-Rock Outcrop association
- BF-9 Torriorthents-Rock Outcrop association
- BF-10 Torriorthents-Haplargids-Hatlargids association
- BF-11 Torriorthents, shallow association
- BF-12 Haplargids-Torriorthents association
- BF-13 Torriorthents-Camborthids-Haplargids association
- BF-14 Torriorthents, shallow-Torriorthents association
- BF-15 Torriorthents association
- BF-16 Haploborolls-Rock Outcrop association
- BF-17 Torriorthents-Camborthids association
- BF-18 Torriorthents, shallow-Rock Outcrop association