NATIONAL WETLANDS INVENTORY

Map Report of West Central Montana for the 1:100,000 Map Units of:
Shelby SW, SE;
Great Falls NW, SW, NE, SE;
Choteau NE, SE;
White Sulphur Springs NW, NE, SE, SW;

U.S. Fish and Wildlife Service
Denver, Colorado
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Appendix A. Locator Map

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 crossreference 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 Central Montana study area is located in the Great Plains-Shortgrass Prairie Province, the Rocky Mountain Forest Province, and the Columbia Forest Province (Bailey, 1980). Field reconnaissance covered the area of each 1:100,000 quad: Shelby SW, Shelby SE, Great Falls NE, Great Falls NW, Great Falls SE, Great Falls SW, Choteau NE, Choteau SE, White Sulphur Springs NE, White Sulphur Springs NW, White Sulphur Springs SE, White Sulphur Springs SW (Appendix A).

Field Personnel

Bill Pearson	-	USFWS, Asst. Wetland Coordinator, Region VI
Eugene Beckwith	-	SDSU, National Wetland Inventory team
Todd Hoernemann	-	SDSU, National Wetland Inventory team
Mike Estey	-	SDSU, National Wetland Inventory team
Kevin Hop	-	SDSU, National Wetland Inventory team
Dennis Hanson	-	SDSU, National Wetland Inventory team
Michael Kjellsen	-	SDSU, Leader, National Wetland Inventory team

Field Dates

19-25 April 1994

Aerial Photography

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

Choteau NE: 8/9/84, 8/21/84, 8/24/84, 9/1/87, 10/1/88
Choteau SE: 8/9/84, 8/21/84, 8/24/84, 9/1/87
Great Falls NE: 8/8/84, 8/10/84, 8/22/84, 9/15/88
Great Falls NW: 7/11/84, 7/16/84, 8/12/84, 8/21/84, 8/22/84, 9/1/87
Great Falls SE: 8/8/84, 8/10/84, 8/22/84, 7/15/87, 9/15/88
Great Falls SW: 7/11/84, 7/16/84, 8/21/84, 9/14/84, 9/1/87
Shelby SW: 7/11/84, 7/16/84, 8/12/84, 8/13/84, 8/21/84
Shelby SE: 8/8/84, 8/10/84, 8/12/84, 8/22/84, 9/11/87
White Sulphur Springs NE: 8/8/84, 8/22/84, 9/15/88
White Sulphur Springs NW: 7/11/84, 7/16/84, 8/21/84, 9/14/84, 10/10/88
White Sulphur Springs SE: 8/8/84, 8/22/84, 9/18/84
White Sulphur Springs SW: 7/11/84, 8/21/84, 8/22/84, 9/14/84, 9/3/88, 10/10/88

Percent Coverage: All 288 USGS 7.5′ quadrangles were covered with the NHAP photography.

Collateral Data

United States Geological Survey (USGS) Quadrangles
United States Soil Conservation Service (USSCS) Soil Surveys
Bailey's Description of the Ecoregions of the United States (1980)
Water Resource Data, Montana, Water Year 1992
National List of Plant Species That Occur In Wetlands: Northwest (Region IX)
Hydric Soils of the United States
Water Resources Investigative Report, USGS

III. PHYSICAL DESCRIPTION OF PROJECT AREA

Geography

Bailey, Description of the Ecoregions of the United States (1980), describes the Western Montana project area as the Wheatgrass-Needlegrass and Grama-Needlegrass-Wheatgrass sections of the Great Plains-Shortgrass Prairie Province, the Douglas-Fir Forest section of the Rocky Mountain Forest Province, and the Cedar-Hemlock-Douglas-Fir Forest section of the Columbia Forest Province. The Great Plains-Shortgrass Prairie Province 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. The Rocky Mountain Forest Province is characterized by rugged glaciated mountains as high as 14,000 feet (4,300 m.). Local relief is between 3,000 feet (900 m.) and 7,000 feet (2,100 m.). Several sections have inter-montane depressions of "parks" that have floors less than 6,000 feet (1,800 m.) in altitude. The Columbia Forest Province is characterized by high, rugged mountains, rising to more than 9,000 feet (2,700 m.) with local relief in excess of 3,000 feet (900 m.). Most of the region has been glaciated. In the several Rocky Mountain trenches, there are flat or nearly flat valleys, some of which are several miles wide.

Climate

The climate of the Great Plains-Shortgrass Prairie Province is a semiarid continental regime in which maximum rainfall occurs in summer, but the total supply of moisture is low. Ninety-five percent (95%) of basin collected run-off comes from the spring snowmelt. Evaporation usually exceeds runoff. The frost-free season is usually fewer than one-hundred (100) days and the precipitation is approximately ten (10) inches (250 mm). 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 Rocky Mountain Forest Province climate is a semiarid steppe regime. Most precipitation falls in winter. Precipitation ranges from 10 in. (250 mm) at the base of the mountains to 40 in. (1000 mm) in the higher and colder elevations. East slopes are drier than west slopes. Average annual temperatures are 35°-45°F (2°-7°C).

The Columbia Forest Province receives most precipitation in the fall, winter, and spring. Precipitation averages 20-40 in. (500-1000 mm) per year. Winters produce heavy snowfall but permanent snowfields and glaciers cover only small areas. Average temperatures range from 32°F (0°C) in the winter to 72°F (22°C) in the summer. Summers are dry with hot days and cool nights.

Vegetation

The vegetation of the Great Plains-Shortgrass Prairie Province is characteristic of steppe, sometimes called shortgrass prairie. This is a formation class of short grasses usually bunched and sparsely distributed. 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.

The Rocky Mountain Forest Province is characterized by well marked vegetational zones. Their distribution is controlled mostly by a combination of altitude, latitude, direction of prevailing winds, and slope exposure. Zones in descending altitude include: alpine, where trees are absent; subalpine, dominated by Engelmann spruce and subalpine fir; montane, dominated by ponderosa pine and Douglas-fir; foothill (woodland), dominated by shrubs such as mahogany and scrub oak. After fire in the subalpine and upper portions of the montane zones, the original forests are usually replaced by aspen or lodgepole pine. Grasses and sagebrush are commonly present under open ponderosa pine forests. Unforested parks are a conspicuous feature of this province. Many are dominated by grasses, but some are covered largely by sagebrush and other shrubs.

Mixed coniferous-deciduous forest predominates in the Columbia Forest Province. Douglas-fir forest and cedar-hemlock-Douglas-fir forest are the two major types. Well marked life belts are a striking feature. The belts in descending altitude include: alpine, where trees are absent; subalpine dominated in most places by Engelmann spruce and subalpine fir; montane, dominated by western redcedar and western hemlock. At the lower edge of the montane belt, depending on latitude, there may be a belt of grass and sagebrush.

Soils

In the semiarid continental 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. Mollisols are typical. Humus content is small because vegetation is sparse.

In the Rocky Mountain Forest Province, soil orders occur in zones corresponding to the vegetation zones. These range from Mollisols and Alfisols in the montane zone to Aridisols in the foothill zone. In addition, because of steep slopes and recent glaciation, there are areas of Inceptisols.

Soils of the Columbia Forest Province are mostly cool, moist Inceptisols. A variety of igneous, sedimentary, and metamorphic rocks forms mountain masses. In the foothills of the Rockies and to the south

of the glacial border, loess and volcanic ash have been deposited on the slopes and have helped to form excellent soils.

IV. DESCRIPTION OF WETLAND HABITATS IN PROJECT AREA

Riverine

Water Resource Data, Montana (water year 1992), was used as collateral data to classify some study area rivers. The major river drainages of the Marias River, Sun River, Missouri River, Muddy Creek, Smith River, Prickly Pear Creek, and Shields River are classified R2UBH. Boxelder Creek, Teton River, and Boulder River are classified R2UBG. The Musselshell River and Tenmile Creek are classified R2UBF. Classification of rivers which are not in the Resource Data are discussed in section VI, subsection Conventions for Linear Wetlands.

Many intermittent streams exist on the study area. Intermittent streams are classified as R4SBA or R4SBC.

Lacustrine

Many of the lakes on the project area are impounded. The classifications are $L1UBH_h$, $L1UBG_h$, $L2ABF_h$, or a combination of these classifications on larger impoundments. Many of these lakes are bordered by persistent emergent vegetation. Natural lakes, in non-mountainous areas, 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 agricultural purposes, but most wetlands are located on untilled prairie or in mountainous areas.

Emergents (PEMA, PEMC, PEMF) and aquatic bed (PABF) are the dominant cover types with smaller areas of scrub-shrub (PSSA, PSSC) and forested (PFOA, PFOC). Many saturated wetlands were observed on isolated portions of the study area (PEMB, PSSB, PFOB). Field checksites were documented where problem 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 on the project area.

Palustrine Temporary Emergents: PEMA
Agropyron smithii, western wheatgrass
Aster spp., aster
Deschampsia spp., hairgrass
Distichlis spp., salt grass
Eleocharis spp., spikerush
Equisetum spp., horsetail
Helianthus spp., sunflower
Hordeum jubatum, foxtail barley
Kochia spp., fireweed
Mimulus guttatus, common yellow monkey-flower
Phleum pratense, Timothy
Phragmites australis, giant reedgrass
Polygonum spp., smartweed
Ranunculus spp., buttercup
Rumex, spp., dock
Sium suave, water parsnip
Solidago spp., goldenrod
Sonchus arvensis, sow thistle
Spartina pectinata, prairie cord grass

Palustrine Seasonal Emergents: PEMC
Carex spp., sedge
Eleocharis spp., spikerush
Hippuris vulgaris, mare's-tail
Juncus spp., rush
Mentha spp., mint
Phalaris arundinacea, reed canary grass
Polygonum, smartweed
Potentilla rivalis, brook cinquefoil
Rumex spp., dock
Sagittaria spp., arrowhead
Scirpus spp., bulrush
Scolochloa festucacea, whitetop
Sium suave, water parsnip
Spartina pectinata, prairie cord grass
Triglochin spp., arrowgrass
Typha spp., cattail

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

Palustrine Semi-permanent Aquatic Bed: PABF
Callitriche spp., water starwort
Ceratophyllum spp., coontail
Lemna spp., duckweed
Nuphar luteum, water lily
Potamogeton spp., pondweed

Palustrine Saturated Emergent: PEMB
Carex spp., sedge
Epilobium ciliatum, willow herb
Typha spp., cattail

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

Palustrine Temporary Scrub-shrub: PSSA
Cornus stolonifera, red osier dogwood
Populus spp., cottonwood
Salix spp., willow

Palustrine Temporary Forested: PFOA
Acer negundo, boxelder
Fraxinus spp., ash
Populus spp., cottonwood

OBSERVED WETLAND VEGETATION TABLE

A. EMERGENT	
Angropyron smithii	western wheatgrass
Alisma spp.	water plantain
Aster spp.	aster
Carex spp.	sedge
Deschampsia spp.	hairgrass
Distichlis spp.	salt grass
Eleocharis spp.	spikerush
Epilobium ciliatum	willow herb
Equisetum spp.	horsetail
Helianthus spp.	sunflower
Hippuris vulgaris	mare's-tail
Hordeum jubatum	foxtail barley
Juncus spp.	rush
Kochia spp.	fireweed
Mentha spp.	mint
Mimulus guttatus	common yellow monkey-flower
Phalaris arundinacea	reed canary grass
Phleum pratense	Timothy
Phragmites australis	giant reedgrass
Polygonum spp.	smartweed
Potentilla rivalis	brook cinquefoil
Ranunculus spp.	buttercup
Rumex spp.	dock
Sagittaria spp.	arrowhead
Scirpus spp.	bulrush
Scolochloa festicacea	whitetop
Sium suave	water parsnip
Solidago spp.	goldenrod
Sonchos arvensis	sow thistle
Spartina pectinata	prairie cord grass
Triglochin spp.	arrowgrass
Typha spp.	cattail
B. AQUATIC BED	
Callitriche spp.	water starwort
Ceratophyllum spp.	coontail
Lemna spp.	duckweed
Nuphar luteum	water lily
Potamogeton spp.	pondweed
C. SCRUB-SHRUB	
Populus spp.	cottonwood
Salix spp.	willow
Cornus stolonifera	red osier dogwood
D. FORESTED	
Acer negundo	boxelder
Fraxinus spp.	ash
Populus spp.	cottonwood

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

NWI CODE WATER REGIME	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
R2UB (F,G,H)	Riverine, lower perennial, unconsolidated bottom	Meandering rivers, low gradient	Unconsolidated bottom
R2US (A,C)	Riverine, lower perennial, unconsolidated shore	Mud, sand, or gravel bars	Unconsolidated shore
R3UB (F,G,H)	Riverine, upper perennial unconsolidated bottom	Mountain streams, major drainage areas	Unconsolidated bottom
R4SB (A,C)	Riverine, intermittent, streambed	Small streams, creeks, or irrigation ditches	Streambed
L1UB (G,H)	Lacustrine, limnetic unconsolidated bottom	Deep lake marshes	Unconsolidated bottom
L2AB (F,G)	Lacustrine, littoral aquatic bed	Shallow lake marshes	Hippuris vulgaris (marestail) Lemna spp. (duckweed)
L2US (A,C)	Lacustrine, littoral, unconsolidated shore	Dry alkaline lake beds	Unconsolidated shore
PUB (F,G,H)	Palustrine, unconsolidated bottom	Open water	Unconsolidated bottom
PAB (F,G,K)	Palustrine, aquatic bed	Deep basins, impoundments, excavated tanks, or sewage treatment settling ponds	Hippuris vulgaris (marestail) Lemna spp. (duckweed)

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

CODE ER REGIME	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
3,C,F)	Palustrine, emergent	Basins, depressions, marshes, meadows, springs, seeps, or drainage areas	Agropyron smithii (western wheat) Beckmania syzigachne (American sloughgrass) Carex spp. (sedges) Distichlis spicata (inland saltgrass) Eleocharis spp. (spikerush) Equisetum spp. (horsetail) Hordeum jubatum (foxtail barley) Juncus spp. (rush) Phalaris arundinacea (reed canary grass) Phleum pratense (timothy) Poa pratensis (Kentucky bluegrass) Polygonum spp. (smartweed) Rumex spp. (dock) Sagittaria spp. (arrowhead) Spartina pectinata (prairie cord grass) Nasturtium officinale (water cress)

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

NWI CODE WATER REGIME	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
PEM (continued) (A,B,C,F)			*Scirpus americanus* (common threesquare) *Scirpus validus* (softstem bulrush) *Typha* spp. (cattail)
PSS (A,B,C)	Palustrine, scrub-shrub	Willow thicket, river banks or drainage areas	*Salix* spp. (willow) *Rosa* spp. (rose) *Ribes* spp. (currant)
PFO (A,B,C)	Palustrine, forested	Cottonwood, river banks, floodplains, or drainage areas	*Populus deltoides* (eastern cottonwood) *Salix* spp. (willow) *Fraxinus* spp. (ash) *Acer negundo* (boxelder)
PUS (A,C)	Palustrine, unconsolidated shore	Salt flats	Unconsolidated shore

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

Most of the NHAP Color Infra-Red Emulsion is good quality. The exceptions are the 15 September 1988 and the 15 July 1987 photography which are very light and have poor clarity. The 9 August 1984 and 1 September 1987 photography are extremely dark (blue) emulsion. Photo dates with poor emulsion require extended photointerpretation times to accurately delineate and classify wetland areas. The photodates ranged from July through September 1984, July through September 1987, and September through October 1988. The 1984, and 1987 photography are normal water conditions. The 1988 photography is drier than normal. Ground truthing revealed that wetland water conditions were normal for the season. Most wetland basins contained normal vegetation and/or water for the season. Wetland photosignatures correlated well with in field wetland classifications although fall photosignatures were drier than conditions observed on the early spring field trip.

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 CENTRAL MONTANA WETLANDS

- All open water impoundments are classified ABF_h unless field reconnaissance and/or collateral data justifies an ABG_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.

- Aquatic bed photosignatures are classified ABF, ABG, or ABH.

- 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.

- Beaver ponds are classified $PABG_b$.

CONVENTIONS FOR BASIN WETLANDS

Temporary Basins

Temporary emergent basins can often be distinguished by their indistinct edges. However, these borders are often quite distinct within agricultural areas of crops and haying. Depending on date of photography, temporary photosignatures exhibit a variety of gray, red, tan, and olive tones.

All dates of 1984 photography are normal for the season. Temporary basins are various shades or combinations of red, tan, olive, and/or gray with indistinct edges. Some basins appear red with scattered areas of white signatures. Basins in agricultural fields are either slightly darker or lighter than surrounding areas and occasionally contain light red emergents.

The 1987 photography is normal for the season. Agricultural basins have gray signatures which are slightly darker or lighter than the surrounding soils and sometimes contain small areas of red. Vegetated temporary basins have differing shades and degrees of red, tan, gray, olive, and purple with indistinct edges. The July photography has a very washed out emulsion.

All dates of 1988 photography are drier than normal. Vegetated temporary basins have shades of gray, tan, olive, and/or red within basins. Agricultural temporary basins are slightly darker or lighter shades of gray than the surrounding soils and sometimes contain red tones.

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

Unconsolidated shore temporary wetlands are a white basin with well defined edges. These wetlands are similar to blowout areas. However, blowout areas have diffuse and convoluted peripheries. Topographic maps and soil surveys provide valuable collateral data in these areas.

Seasonal Basins

Seasonal emergent wetlands on the 1984 imagery are densely vegetated and mostly dark or bright red with slate gray. Some basins also exhibit shades of tan, green, white, and brown mottling. Seasonal basins on the July photography sometimes have black or dark blue pockets. These basins have more distinct borders than temporary basins.

On the July 1987 photography, seasonal emergent wetlands have mottled dark red, slate gray and gray signatures. On the fall 1987 photography, (September) seasonal emergent wetlands are mottled shades of gray to slate gray, light and dark blue, red, white, tan, brown, and/or black. These basins also have more distinct borders than temporary basins.

The 1988 imagery displays seasonal emergent wetlands as mottled red, tan, white, and gray tones with very distinct borders.

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

Palustrine unconsolidated shore seasonal wetlands have a dark gray photosignature with a distinct light gray to white border.

Seasonal oxbow basins are common along riverine and palustrine drainages. Photosignatures are open water, dark red, dark gray or red/purple with distinct borders and the characteristic crescent shape.

Semipermanent Water Regimes

Natural semipermanent basins are relatively uncommon in this area. The majority of semipermanent wetlands are impounded. Most unvegetated semipermanent impoundments are in the aquatic bed class. However, the periphery of some impoundments and in some cases the entire impoundment contain semipermanent emergent vegetation. Semipermanent vegetation is predominantly *Typha* sp. and *Scirpus* sp. The photosignature is the typical emergent clumping with mottled tones of white/gray to red/gray.

Most natural palustrine emergent semipermanent wetlands exhibit an open water signature with some emergent clumping within the basin or on the periphery of the wetland. Even the dryer dates of photography have the characteristic clumped vegetation intermixed with open water. 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 are associated with major river systems. These oxbows exhibit open water or a gray/white clumped signature and are classified semipermanent with an aquatic bed and/or emergent class.

CONVENTIONS FOR LINEAR WETLANDS

Linear palustrine wetlands are common. Classification was determined by open water and/or emergents within the channel. Temporary palustrine linear wetlands with scrub-shrub and/or forested subclasses appear red to light red with a gray understory. Linear wetlands on the study area have a very limited floodplain. Most forested wetlands are confined to the linear channel and do not extend into the surrounding riparian area, except for floodplains associated with major river systems. Temporary emergent linears are red/gray to light red, red and tan, or white with faint red tones and have a distinct channel on all dates of photography. Photointerpretation of these areas took into account relative strength of the photosignature coupled with other collateral data such as watershed size and gradient.

Palustrine seasonal linear wetlands have similar photosignatures on all dates of photography. Seasonal emergent linears have a very distinct channel. Most seasonal emergent linears are slate gray with red mottling. Some seasonal emergent linears are slate gray and/or red with pockets of white or white, tan, and brown mottling.

Semipermanent palustrine linears are uncommon on this study area. Photosignatures are aquatic bed or a clumped gray/red mottled signature

indicative of cattails. The semipermanent areas are usually polygon size and located within seasonal linear channels. Some large irrigation ditches contain semipermanent vegetation in the excavated channel.

Waterways and runoff areas can be distinguished as upland by their pink photosignature and lack of discernable channel. These areas are often associated with agricultural land use.

Linear intermittent riverine systems are classified by signature and watershed size. R4SBC linears generally exhibit an open water, or gray unvegetated, streambed signature. Linears with a white substrate signature are classified R4SBA. Some R4SBA linears have small intermittent pools of water in the channel. Close examination of check sites and field sites aided in determining proper classifications of linear riverine wetlands.

Perennial rivers are classified lower perennial or upper perennial with water regimes of F through H. Water regimes are determined by photosignature coupled with the USGS Water Resources Data. Riverine sandbars with non-persistent vegetation are classified R2USA and braided channels associated with the main river channel are classified R2USC.

The following is a list of guidelines for West Central Montana rivers which are not listed in the Montana Water Resource Data. The main point that needs to be addressed is the differentiation of R4 versus R2 or R3. The R2:R3 determination can be accomplished by definition (i.e. floodplain development, gradient etc.).

-The total watershed size, can be compared to known river classifications

-Type of water source, glacial melt versus lowland runoff

-The number of secondary tributaries associated with the main river

-Continuous water in the channel or on the dry photo dates water pools associated with faint linears

-Oxbow scars along the linear indicating old meander channels

-The extent of shrub or woody vegetation growth associated with the riparian/wetland areas adjacent of the river

-Other collateral data:

Estimates of Monthly Streamflow Characteristics at Selected Sites in the Upper Missouri River Basin, Montana, Base Period Water Years 1937-86. USGS, Water Resources Investigations Report 89-4082.

Instream Flow Requests. Montana Department of Fisheries, Wildlife and Parks.

SATURATED

Saturated areas are usually polygon size and located on slopes. They are common, but not restricted to, below springs or along the sides of irrigation ditches. Signatures are similar to those of temporary or seasonal wetlands and include red, brown, gray, slate gray, and white tones. Most saturated wetlands have a streaked appearance with indistinct boundaries indicative of seep areas.

MISCELLANEOUS

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

Many vegetated and/or forested linears have a red photosignature similar to a temporary wetland signature. During field reconnaissance these areas were determined to be upland. Subtle differences in tone, watershed size, gradient of the linear, and in-field data were used to help distinguish these areas as upland.

Some small linear wetlands in the mountain areas are difficult to follow when they are forested or under a tree canopy. Their courses are determined by course data from the USGS quads.

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 summer and fall of 1984, and 1987, and fall of 1988.

Field check sites were evaluated within Shelby SW, Shelby SE, Great Falls NE, Great Falls NW, Great Falls SE, Great Falls SW, Choteau NE, Choteau SE, White Sulphur Springs NE, White Sulphur Springs NW, White Sulphur Springs SE, White Sulphur Springs 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.

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

VIII. SPECIAL MAPPING PROBLEMS

The photosignatures generally correlated well with the wetlands observed. The 1984 and 1987 photography showed normal water conditions for the season. The 1988 photography was drier than normal. The majority of these dates were fall photography. Aggressive photointerpretation and extensive use of collateral data were used on the fall photography, especially in identifying temporary emergent basins in agricultural fields. The emulsion of the 15 July 1987 and 15 September 1988 photography were very light with poor clarity. The 9 August 1984 and 1 September 1987 photos were a very dark (blue) emulsion. Soil surveys (when available) 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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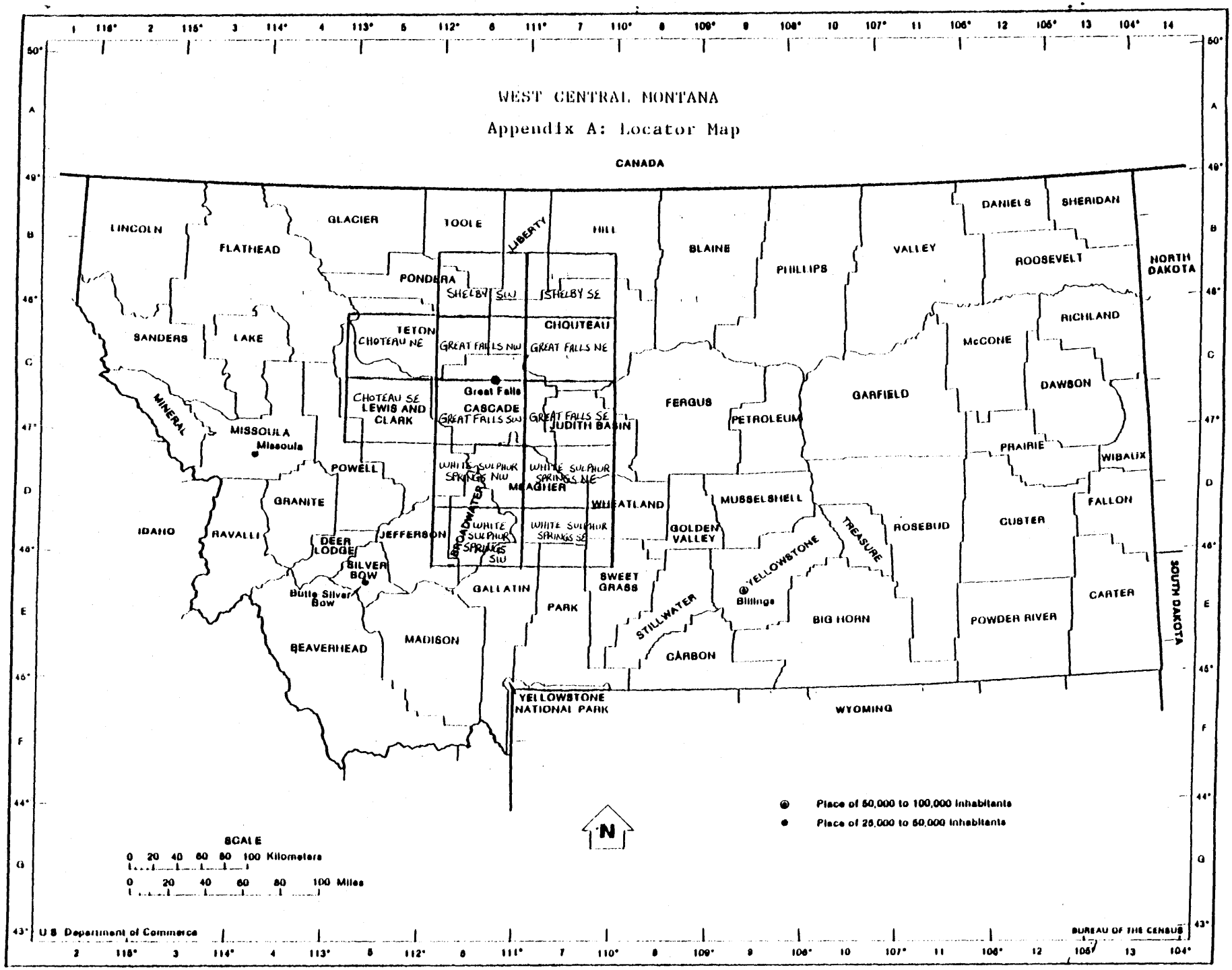
7.5 Minute, 7.5 X 15 Minute, and 1:250,000 USGS Topographic Maps.

WEST CENTRAL MONTANA

Appendix A: Locator Map