NATIONAL WETLANDS INVENTORY

Map Report of Western Montana
for the 1:100,000 Map Units of:
Kalispell NW, SW; Wallace NW, SW;
Hamilton NE, SE; Elk City NE;
Dillon NW, NE, SW, SE;
Butte NW, NE, SE, SW;
Bozeman NW, NE, SW, SE.
Dubois NW

U.S. Fish and Wildlife Service
Denver, Colorado
September, 1994

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I. INTRODUCTION

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

The purpose of this map report is to: (1) provide information on the production of NWI maps, including narrative on imagery and interpretation; (2) provide a descriptive cross reference 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 to aid in consistent photo-interpretation across map units. 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 Western Montana study area is located in the Columbia Forest Province and the Rocky Mountain Forest Province (Bailey, 1980). Field reconnaissance covered the area of 1:100,000 map units: Kalispell NW, Kalispell SW, Dillon NW, Dillon NE, Dillon SE, Butte NW, Butte NE, Butte SW, Butte SE, Bozeman NW, Bozeman NE; and partial 1:100,000 map units: Wallace NW, Wallace SW, Hamilton NE, Hamilton SE, Elk City NE, Dillon SW, Bozeman SW, Bozeman SE, Dubois NW. (Appendix A).

Field Personnel

Bill Pearson	-	USFWS, Asst. Wetland Coordinator, Region VI
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Eugene Beckwith	-	SDSU, National Wetland Inventory team
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Field Dates

22 August - 1 September 1994

Aerial Photography

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

Dates of photography:

Bozeman NE: 8-8-84, 8-10-84, 8-22-84, 9-17-84, 9-18-84, 9-30-88
Bozeman NW: 7-11-84, 8-21-84, 9-14-84, 9-18-84, 9-3-88, 9-30-88, 10-2-88
Bozeman SE: 8-8-84, 8-22-84, 9-17-84, 9-18-84, 9-30-88
Bozeman SW: 9-14-84, 9-18-84, 9-3-88, 9-30-88, 10-2-88
Butte NE: 8-9-84, 8-21-84, 8-24-84, 9-1-87, 9-22-87
Butte NW: 8-9-84, 8-12-84, 8-14-84, 8-21-84, 8-10-86, 8-31-87
Butte SE: 8-9-84, 8-21-84, 8-24-84, 9-1-87, 9-12-87, 9-3-88
Butte SW: 8-9-84, 8-12-84, 8-21-84, 8-17-85, 9-20-85, 8-10-86, 8-31-87, 9-14-87
Dillon NE: 8-9-84, 8-24-84, 9-1-87, 9-5-87, 9-3-88
Dillon NW: 8-9-84, 8-21-84, 8-26-84, 8-17-85, 9-20-85, 8-10-86, 8-31-87, 9-14-87
Dillon SE: 8-24-82, 8-9-84, 8-24-84, 9-5-87, 9-12-87, 9-14-87, 9-22-87, 9-3-88
Dillon SW: 8-21-84, 9-13-84, 8-17-85, 8-10-86, 9-22-86, 8-31-87
Dubois NW: 8-26-84, 9-13-84, 8-17-85, 8-10-86, 9-22-86, 9-6-87, 9-24-87
Elk City NE: 8-21-84, 8-29-84, 9-2-84, 9-11-87, 9-24-87
Hamilton NE: 7-26-82, 7-27-82, 8-24-82, 8-5-83, 8-6-83
Hamilton SE: 7-26-82, 8-13-82, 8-24-82
Kalispell NW: 7-26-82, 7-27-82, 8-19-82, 8-24-82, 8-5-83
Kalispell SW: 7-26-82, 7-27-82, 8-19-82, 8-24-82
Wallace NW: 7-26-82, 7-27-82, 8-19-82, 8-24-82, 8-5-83, 8-6-83
Wallace SW: 7-26-82, 7-27-82, 8-19-82, 8-24-82, 8-5-83, 8-6-83

Percent Coverage: All 550 USGS 7.5' quadrangles were covered by 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, USGA

III. PHYSICAL DESCRIPTION OF PROJECT AREA

Geography

Bailey (1980), describes the Western Montana project area as portions of the Cedar-Hemlock-Douglas-Fir forest region of the Columbia Forest Province and the Ponderosa Pine-Douglas-Fir region of the Rocky Mountain Forest Province. 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 several Rocky Mountain trenches, there are flat or nearly flat valleys, some of which are several miles wide.

Climate

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 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 red cedar 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 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

When possible, rivers are classified with the aid of Water Resource Data. Classification of rivers which are not in the Water Resource Data are discussed in section VI, subsection Conventions for Linear Wetlands. The Kootenai, Clark Fork, Bitteroot, Thompson, Jefferson, Gallatin, Madison, Missouri, Yellowstone, lower reaches of Boulder (tributary to Yellowstone) near Big Timber, lower reaches of Stillwater near Nye, Tobacco, Yaak, Clearwater, Blackfoot, lower reaches of Big Hole near

Melrose, Little Blackfoot, Ruby, Beaverhead, Shields, and Clarks Fork rivers are classified permanent. Boulder Creek, Lake Creek, Flower Creek, Prospect Creek, Rock Creek, Hyalite Creek, West Rosebud Creek and lower reaches of Flint Creek near Maxville are classified permanent. Nevada Creek, Warm Springs Creek, Red Lodge Creek, Willow Creek, upper reaches of Flint Creek near Maxville and upper reaches of Boulder River (tributary to Jefferson River) are classified intermittently exposed. Ten Mile Creek and upper reaches of Big Hole River near Wisdom are classified semipermanent. These rivers and creeks will be classified R2 and/or R3 depending on their characteristics. See subsection Conventions for Linear Wetlands for a description of these characteristics. The rock bottom class classification will be used on rivers where the photosignature or a field site supports the classification.

Many intermittent streams exist on the study area. Intermittent streams are classified as R4SBA or R4SBC depending on the photosignature. See subsection Conventions for Linear Wetlands for a description of the differences between R4SBA and 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. Mountain lakes with all or part of the shoreline composed of bedrock or a wave formed feature are classified as L1UBH or are classified as L2UBF if the photo-signature indicates shallow water.

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. Mountain lakes under 20 acres with little or no exposed bedrock shorelines and visible shoreline vegetation (upland or wetland) are classified as PABG.

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) cover types. Many saturated wetlands were observed on isolated portions of the study area (PEMB, PSSB, PFOB). Field checksites were documented for problem areas due to inconsistent wetland photosignatures and for general wetland sites. Vegetation observed in these wetland habitats were grouped according to class and water regime. Plant species listed in Tables 1 and 2 were identified on check sites or field sites and represent only a fraction of all wetland plant species occurring on the project area. Table 2 describes the Cowardin et al. classification system and common plants within each classification.

Table 1. Plant species observed in 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
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 montana,	mare's-tail, mountain
Hippuris vulgaris,	mare's-tail, common
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, common hornwort
Lemna spp.,	duckweed
Nuphar luteum,	water lily
Potamogeton spp.,	pondweed

Table 1. Cont.

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	
Populus spp.,	cottonwood
Salix spp.,	willow
Elaeagnus angustifolia	russian-olive
Palustrine Temporary Forested: PFOA	
Acer negundo,	boxelder
Fraxinus spp.,	ash
Populus spp.,	cottonwood

Table 2. Cowardin classification and wetland species observed.

A. EMERGENT	
Agropyron 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 montana	mare's-tail, mountain
Hippuris vulgaris	mare's-tail, common
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
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; hornwort, common
Lemna spp.	duckweed
Nuphar luteum	water lily
Potamogeton spp.	pondweed
C. SCRUB-SHRUB	
Populus spp.	cottonwood
Salix spp.	willow
D. FORESTED	
Acer negundo	boxelder
Fraxinus spp.	ash
Populus spp.	cottonwood

Table 3. 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	Nonpersistent pioneers
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	Nonpersistent pioneers
PUB (F,G,H)	Palustrine, unconsolidated bottom	Open water	Unconsolidated bottom
PAB (F,G,K)	Palustrine, aquatic bed	Deep basins, impoundments, excavations, or sewage treatment settling ponds	Hippuris vulgaris (marestail) Lemna spp. (duckweed)

Table 3. NWI WETLAND CLASSIFICATION CODES, COWARDIN DESCRIPTION AND COMMON TERMINOLOGY

NWI CODE WATER REGIME	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
PEM (A,B,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 3. 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) Elaeangus angustifolia (russian-olive) Populus spp. (cottonwood)
PFO (A,B,C)	Palustrine, forested	Cottonwood, river banks, floodplains, or drainage areas	Populus spp. (cottonwood) Fraxinus spp. (ash) Acer negundo (boxelder)
PUS (A,C)	Palustrine, unconsolidated shore	Salt or alkaline flats	Distichlis spicata (sparse) (saltgrass)

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 AND CONVENTIONS

Most of the NHAP Color Infra-Red Emulsion is good quality. The exception is the 3 September 1988 photography which is pale with "washed out" colors. Photo dates with poor emulsion require extended photointerpretation times to accurately delineate and classify wetlands. The photo dates are July and August of 1982, August 1983, July through September 1984, August and September 1985, August and September 1986, August and September 1987, and September 1988. Wetland photosignatures correlated well with in field wetland classifications with the exception of the 3 September 1988 photography. This date is discussed under special mapping problems (section VIII).

Ground truthing revealed that wetland water conditions were normal for the season. Some river levels were below normal due to below normal snowpack. Most wetland basins contained normal vegetation and/or water for late summer.

Field reconnaissance provided the following mapping conventions for all the imagery based on seasonal and climatic conditions. These 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 $PABF_h$ if less than 20 acres unless field reconnaissance and/or collateral data suggests an $PUBG_h$ classification.

- All open water dugouts, except for waste water treatment facilities, are classified $PUBF_x$ and occasionally $PUBG_x$ if they are very large. Excavations exhibiting an aquatic bed photosignature are classified as $PABF_x$ or $PABG_x$.

- 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, but were used to help determine course in forested areas.

- All open water beaver ponds are classified $PABG_b$.

CONVENTIONS FOR BASIN WETLANDS

Temporary Wetlands

Temporary emergent wetlands are distinguished by their indistinct edges. However, these borders are often quite distinct within agricultural areas of crops and haying. Depending on the date of photography, photosignatures for temporary wetlands exhibit a variety of tan-olive, red, gray, light red, red with orange tint, reddish-brown, and brownish-gray tones.

All dates of 1982-1983 photography are normal for the season. Temporary wetlands are various shades or combinations of tan-olive with red edges, light reddish-brown, red, gray, and light red.

The 1984-1986 photography is normal for the season. Temporary wetlands exhibit differing shades of tan-olive intermixed with red, gray, reddish-brown, red with grays, brownish gray, mottled red and browns,

and red-orange. Some temporary wetlands in hay fields were red with heavy mottling of grays.

All dates of the 1987 and 1988 photography are normal for the season. Temporary wetlands exhibit light tan-olive intermixed with white and red, red-tan intermixed, faded light red mixed with gray, and dark red photosignatures.

Temporary oxbows are common along riverine and palustrine drainages. These areas exhibit light red emergent photosignatures and have the characteristic crescent shape.

Seasonal Wetlands

Seasonal emergent wetlands on the 1982 imagery exhibit deep reds and browns with shades of purple and gray. The 1983 imagery displays a dark red mixed with black and gray with more distinct tones than PEMA basins.

The 1984 photography exhibits a variety of dark reds, browns, tans, and grays, with the characteristic blotching and clumping associated with cattails.

The 20 September 1985 seasonal emergent wetlands are densely vegetated and display gray mottling with various tones of brown and red.

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

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

Seasonal oxbow basins are common along riverine and palustrine drainages. Photosignatures are black and dark blue open water, with dark red, dark gray, reddish-brown, reddish-pink and gray, or red/purple emergent photosignatures with distinct borders and the characteristic crescent shape.

Semipermanent Wetlands

Most natural palustrine emergent semipermanent basins exhibit a dark blue signature with some emergent clumping within the basin or on the periphery of the wetland. Even the late season dates of photography have the characteristic clumped vegetation signature intermixed with open water. Semipermanent vegetation is predominantly Typha sp. and Scirpus sp. The photosignature is the typical emergent clumping with mottled tones of black, tan-olive, purple-tan-olive, bright red-tan, gray, reddish-brown, and brown.

Semipermanent oxbows are associated with major river systems. These oxbows exhibit dark blue or a red-tan "puffed" with black signature.

CONVENTIONS FOR LINEAR WETLANDS

Palustrine temporary linear wetlands have similar photosignatures on all dates of photography. Temporary emergent linears are bright red, tan-olive, tan-red, red with brown channel, or red with a slate gray channel. Photointerpretation of these areas took into account relative

strength of the photosignature coupled with other collateral data such as watershed size and gradient.

Temporary palustrine linear wetlands with scrub-shrub and/or forested subclasses appear red to light red with a gray understory. Linear wetlands in the study area have very limited floodplains. Most forested wetlands are confined to the linear channel and do not extend into the surrounding area, except for floodplains associated with major lower perennial river systems.

Seasonal palustrine emergent wetlands have a very distinct channel. Most seasonal emergent linears are blue-tan, dark reddish-gray, tan-olive, red mixed with blue, brownish-orange, dark gray, or bright red with a slate gray vegetated channel.

Semipermanent palustrine linear photosignatures are a pink aquatic bed, clumped dark brownish red, light gray-almost white, or tan-purple white mottled signature indicative of senescent cattails. These semipermanent areas are usually 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 a discernible 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 a dark blue open water, or gray/blue unvegetated, streambed signature. Linears with a white substrate signature are classified R4SBA. 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, G, or H. Water regimes are determined by photosignature, the USGS Water Resources Data and other collateral data. Riverine sandbars with non-persistent vegetation are classified R2USA or R3USA (white signatures) and seasonal sandbars are classifies R2USC or R3USC (gray signatures).

The following is a list of guidelines for rivers that are not listed in the Water Resource Data. These guidelines aid in differentiating between intermittent rivers and upper and lower perennial rivers. The determinations between upper (R3) and lower (R2) perennial rivers can be accomplished by definition (i.e. floodplain development, gradient, etc.). For a complete definition, see Cowardin et al.

- -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
- -Oxbow scars along the channel indicating old meander channels
- -The extent of woody vegetation growth associated with the riparian/wetland areas

SATURATED

Saturated wetlands (emergent, scrub-shrub, and forested) are located within the study area. Saturated determinations are supported by field reconnaissance, topo maps, and soil surveys of the areas. The majority of saturated wetlands are located on hillsides, at the head of drainages, or below irrigation canals. Photosignatures include dark red intermixed with gray, dark reddish-brown, dark gray with a purple tint, tan-purple to tan-olive, and may have the streaked appearance indicative of most saturated wetlands. Some saturated wetlands, such as those associated with springs, will be tear-drop shaped and polygon sized with a PEMA/C linear draining downstream.

MISCELLANEOUS

This section addresses photosignatures that are uncommon throughout the work area.

Some vegetated and/or forested drainages 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. Delineation follows the topo course if the linear can not be followed on the photo.

VII. SPECIAL MAPPING PROBLEMS

The photosignatures generally correlate well with the wetlands observed. Most dates of photography show normal water conditions for the season. Listed below is a list of problem areas observed.

Bozeman SW: The 3 September 1988 photography is pale with "washed out" colors. Additional photointerpretation time was required to avoid omission errors.

Hamilton NE: Light reddish photosignatures on the 26 July 1982 photography, and light grayish red photosignatures on the 6 August 1983 photography which are similar to temporary wetland signatures were determined to be upland. Temporary wetlands are in defined basins with brighter shades of red, sometimes mixed with tan and/or olive signatures.

Dillon SE: Upland linears on the 24 August 1984 and 5 September 1987 photography are similar to R4SBA's. R4SBA linears have a solid white signature while the upland linears had faint gray signatures. These faint gray signatures were found to be upland grasses. On the 24 August 1984 photography reddish-brown areas have similar signatures to temporary basins, however the colors are not as dark and the borders are not as distinct as those observed for temporary basins.

For all photography: Areas in irrigated fields sometimes exhibit signatures similar to wetlands. The signature usually fans out from an irrigation ditch. But these areas were determined to be upland in the field. The signatures are from recently released water.

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.

VIII. 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 the fall of 1988.

Field check sites were evaluated within the Dubois NW; Kalispell NW, SW; Wallace NW, SW; Hamilton NE, SE; Elk City NE; Dillon NE, NW, SE, SW; Butte NE, NW, SE, SW; and Bozeman NE, NW, SE, 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, wetland plant species list, streamflow information, climate, and other miscellaneous regional 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 the 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 USFWS.

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 AND COLLATERAL DATA

Bailey, R.G., 1980. Description of The Ecoregions of The United States. United States Department of Agriculture, Forest Service.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRue, 1979. Classification of Wetlands and Deepwater Habitats of The United States. United States Department of Interior, Fish and Wildlife Service, FWS/PBS-81.

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National List of Plant Species That Occur in Wetlands: Northwest. 1988. United States Department of Interior, Fish and Wildlife Service.

Soil Survey of Broadwater County Area, Montana, 1977. U.S. Department of Agriculture, Soil Conservation Service in cooperation with Montana Agricultural Experiment Station.

Soil Survey of Stillwater County Area Montana, 1980. U.S. Department of Agriculture, Soil Conservation Service; in cooperation with Montana Agricultural Experiment Station.

Water Resource Data Montana, 1992. U.S. Department of Interior, Geological Survey. Prepared in cooperation with the state of Montana and with other agencies.

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

Appendix A: Locator Map

WESTERN MONTANA