NATIONAL WETLANDS INVENTORY

Map Report of Western Utah
for the 1:100,000 Map Units of:
Brigham City NW, SW;
Tooele NW, SW, SE;
Delta NW, SW, NE, SE;
Richfield NW, SW, NE, SE;
Cedar City NW, SW, NE, SE.

U.S. Fish and Wildlife Service
Denver, Colorado
April 1999

Table of Contents

I. Introduction..... 1
II. Field Reconnaissance..... 1
III. Physical Description of Project Area..... 2
IV. Descriptions of Wetland Habitats in the Project Area..... 3
V. Water Regime Description.....11
VI. Imagery and Conventions.....11
VII. Special Mapping Problems.....14
VIII. Map Preparation.....14
IX. Map Acquisition.....15
X. Literature Cited.....16
XI. Collateral Resource Data.....16

Appendix A. Locator Map: Western Utah

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. Collateral information including vegetative communities, soil types, and topographic settings 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 Utah project area is located primarly in the Intermountain Semidesert and Desert Province with small portions in the Intermountain Semidesert and Colorado Plateau Semidesert Provinces (Bailey, 1995). Field reconnaissance covered the area of each 1:100,000 quad: Brigham City NW, Brigham City SW, Tooele NW, Tooele SW, Tooele SE, Delta NW, Delta SW, Delta NE, Delta SE, Richfield NW, Richfield SW, Richfield NE, Richfield SE, Cedar City NW, Cedar City SW, Cedar City NE, and Cedar City SE. (Appendix A).

Field Personnel

Charles Elliott - USFWS, Regional Wetland Coordinator, Region VI
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Robert Freeman - USFWS, Salt Lake City, Utah

Field Dates

June 21-28, 1998

Aerial Photography

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

Brigham City NW: 8\9\84, 9\9\84, 9\3\84, 8\4\85, 8\27\86, 9\18\87.
Brigham City SW: 9\3\84, 9\8\84, 8\4\85, 9\1\86.
Tooele NW: 9\9\84, 8\4\85, 9\1\86, 9\20\87.
Tooele SW: 9\9\84, 9\1\86, 9\20\87.
Tooele SE: 9\3\84, 7\25\85, 8\3\85, 8\17\86, 9\4\86, 9\5\86, 9\20\87.
Delta NW: 8\24\83, 8\26\83, 9\6\83, 9\11\83.
Delta SW: 8\24\83, 8\26\83, 9\6\83.
Delta NE: 8\12\84, 9\2\84, 9\3\84, 7\25\85, 8\17\86, 9\4\86.
Delta SE: 8\12\84, 9\2\84, 9\3\84, 7\25\85, 8\17\86, 9\3\86, 9\4\86.
Richfield NW: 8\24\83, 8\26\83, 8\27\83, 9\6\83.
Richfield SW: 8\24\83, 8\26\83, 8\27\83.
Richfield NE: 9\2\84, 9\3\84, 7\25\85, 8\12\85, 8\17\86, 9\3\86, 9\4\86.
Richfield SE: 9\3\84, 8\12\85. 8\17\86, 9\3\86.
Cedar City NW: 9\7\84, 8\12\85, 7\27\86.
Cedar City SW: 9\7\84, 8\12\85, 7\27\86.
Cedar City NE: 9\2\84, 9\3\84, 8\12\85, 7\27\86, 8\17\86.
Cedar City SE: 9\2\84, 9\3\84, 812\85, 7\27\86, 8\17\86.

Percent Coverage: All 528 7.5' and 4 15' USGS topographic maps are covered by the NHAP photography.

Collateral Data

United States Geological Survey (USGS) Topographic Maps
United States Soil Conservation Service (USSCS) Soil Surveys
Bailey's Description of the Ecoregions of the United States (1995)
Water Resources Data, Utah, Water Year 1997
National List of Plant Species That Occur In Wetlands: Intermountain (Region 8)
Hydric Soils of the United States

III. PHYSICAL DESCRIPTION OF PROJECT AREA

Geography

The Western Utah project area is located primarily in the Intermountain Semidesert and Desert Province (Bailey 1995). Physiographically this area is referred to as the Great Basin and the northern Colorado Plateau in Utah. It is characterized by semiarid sagebrush covered plains in numerous separate interior basins. Many mountain ranges rise steeply from these plains. There is a heavy accumulation of alkaline and saline salts in the lower parts of the basins. There are few perennial streams located in the area.

Climate

Summers are hot and the winters only moderately cold in the Inermountain region. Average annual temperature is 4 ° to 13°C (40° to 50°F). Total annual precipitation averages 125 to 500 mm (5 to 20 in) with almost no rain during the summer except in the mountains.

Vegetation

The dominant vegetation of the lower elevations of this province is sagebrush (Artemisia spp.). Other important plants found in this area are shadscale (Atriplex confertifolia) and rabbitbrush (Chrysothamnus spp.). All these shrubs tolerate alkali conditions to varying degrees. In areas where salt concentraion is very high, the vegetative community is dominated by greasewood (Sarcobatus vermiculatus) and saltgrass (Distichlis spicata). The dominant vegetation in the mountainous areas are ponderosa pine (Pinus ponderosa) and Douglas-fir (Pseudotsuga menziesii).

Soils

All basin and lowland areas are dominated by Aridisols while Mollisols are found at higher elevations. Narrow bands of Entisols are located along stream flood plains. Extensive areas of salt flats and playas without soils are found in the lower parts of the basins that have interior drainage.

IV. DESCRIPTION OF WETLAND HABITATS IN PROJECT AREA

Riverine

Water Resources Data, Utah (Water Year 1997), is used as collateral data to classify some project area rivers. Mammoth Creek, East Fork Sevier River, Kanab Creek, East Fork Virgin River, and North Fork Virgin River are classified as R3UBH. The Sevier River is classified as R3UBH above Piute Dam near Marysvale, UT. Below Piute Dam the Sevier River is classified as R3UBG. Beaver River is classified as R3UBH until it flows into Minersville Reservoir near Minersville, UT. Below Minersville Reservoir, Beaver River is classified as R3UBG. The Virgin River is classified as R3UBH until it intersects with the Santa Clara River near St. George, UT, below which the Virgin River is classified as R3UBG. Clear Creek and Coal Creek are classified as R3UBG. Above Windsor Dam the Santa Clara River is classified as R3UBG. The Santa Clara River below Windsor Dam is classified as R3UBF.

Many intermittent streams exist on the project area. Intermittent streams are classified as R4SBJ, R4SBA, or R4SBC. Refer to the section CONVENTIONS FOR LINEAR WETLANDS for photo signature information.

Lacustrine

Lakes are not common on the project area but there are extensive areas of lacustrine unconsolidated shore. The major portion of Great Salt Lake is to the east of the project area. However, the more shallow shoreline areas

associated with Great Salt Lake extend into the study area. These unconsolidated shore wetlands are classified L2USC, L2USA, or L2USJ. Lakes with water are classified L2UBF and associatd unconsolidated shore are classified L2USC or L2USA. Several impounded lakes are present and are classified $L1UBH_h$, $L1UBG_h$, or $L2UBF_h$. Extensive areas of salt flats and mud flats are classified L2USJ. Mountain lakes with all or part of the shoreline composed of bedrock or a wave formed feature are classified as L1UBH or L2UBF if photo signature indicates shallow water.

Palustrine

Palustrine wetlands are found along river and stream floodplains, bordering lakes, in high-elevation meadows, in many drainages, in association with springs, and in areas impounded for waterfowl management purposes. Mountain lakes under 8 ha (20 acres) with no exposed bedrock shorelines and visible shoreline vegetation (upland or wetland) are classified as PABG. Open water pools associated with springs are classified PUBG.

Emergents (PEMJ, PEMA, PEMC, PEMF) are the dominant cover types associated with palustrine wetlands. Some aquatic bed (PABF, PABG) are also present. Many saturated wetlands are present on the project area (PEMB, PSSB, PFOB) which are associated with springs or located on slopes. A few small areas of scrub-shrub (PSSA, PSSC) and forested(PFOA, PFOC) cover types are found in Western Utah. Unconsolidated shore palustrine wetlands are classified either PUSJ, PUSA, or PUSC. Field check sites were documented for problem areas due to inconsistent wetland photosignature 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 are identified on check sites or field sites and represent only a fraction of all wetland plant species occurring in the project area. Table 3 describes the Cowardin et al. classification system and common plants within each classification.

Table 1. Plant Species Observed in Project Area

Palustrine Intermittently Flooded: PEMJ
Distichlis spicata, salt grass
Allenrolfea occidentalis, pickleweed

Palustrine Temporary Emergents: PEMA
Phleum pratense, timothy
Eleocharis spp., spikerush
Distichlis spicata, inland salt grass
Sporobulus airoides, alkali sacaton
Hordeum jubatum, foxtail barley
Verbena hastata, blue vervain
Polygonum spp., smartweed
Rumex spp., dock
Calystegia sepium, hedge bindweed
Asclepias speciosa, showy milkweed
Spartina gracilis, alkali cord grass
Phragmites australis, common reed
Allenrolfea occidentalis, pickleweed

Palustrine Saturated Emergents: PEMB
Eleocharis spp., spikerush
Carex spp., sedge
Typha spp., cattail
Iris missouriensis, wild iris

Palustrine Seasonal Emergents: PEMC
Carex spp., sedge
Eleocharis spp., spikerush
Juncus spp., rush
Juncus balticus, saltrush
Asclepias incarnata, marsh milkweed
Polygonum spp., smartweed
Scirpus spp., bulrush
Puccinellia airoides, Nuttall alkali grass
Spartina gracilis, alkali cord grass
Typha spp., cattail
Sueda spp., seepweed
Triglochin maritimum, arrowgrass
Iris missouriensis, wild iris

Palustrine Semi-permanent Emergents: PEMF
Scirpus americanus, threesquare bulrush
Scirpus spp., bulrush
Typha spp., cattail

Palustrine Semi-permanent Aquatic Bed: PABF
Ceratophyllum spp., coontail
Ruppia maritima, widgeon grass

Table 1. (cont.) Plant Species Observed in Project Area

Palustrine Temporary Scrub-shrub: PSSA

Tamarix ramosissima, saltcedar
Tamarix chinensis, Chinese tamarisk
Atriplex nuttalli, Nuttall saltbush
Populus spp., cottonwood
Salix spp., willow

Palustrine Temporary Forested: PFOA

Acer negundo, boxelder
Populus spp., cottonwood

Table 2. Observed wetland vegetation table

A. EMERGENT	
Distichlis spicata	inland salt grass
Carex spp.	sedge
Eleocharis spp.	spikerush
Iris missouriensis	wild iris
Allenrolfea occidentalis	pickleweed
Hordeum jubatum	foxtail barley
Juncus spp.	rush
Juncus balticus	salt rush
Verbena hastata	blue vervain
Calystegia sepium	hedge bindweed
Phragmites australis	common reed
Polygonum spp.	smartweed
Rumex spp.	dock
Scirpus spp.	bulrush
Scirpus americanus	threesquare bulrush
Asclepias speciosa	showy milkweed
Asclepias incarnata	marsh milkweed
Spartina gracilis	alkali cord grass
Typha spp.	cattail
Sporobulus airoides	alkali sacaton
Puccinellia airoides	Nuttall alkali grass
Sueda spp.	seepweed
Triglochin maritimum	arrowgrass
B. AQUATIC BED	
Ceratophyllum spp.	coontail
Ruppia maritima	widgeon grass
C. SCRUB-SHRUB	
Tamarix ramosissima	saltcedar
Tamarix chinensi	Chinese tamarisk
Populus spp.	cottonwood
Salix spp.	willow
Atriplex nuttalli	Nuttall saltbush
D. FORESTED	
Acer negundo	boxelder
Populus spp.	cottonwood

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

NWI CODE WATER REGIME	COWARDIN DESCRIPTION	COMMON DESCRIPTION	REPRESENTATIVE 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,J)	Riverine, intermittent, streambed	Small streams, creeks, or irrigation ditches	Streambed
L1UB (G,H)	Lacustrine, limnetic unconsolidated bottom	Deep lakes	Unconsolidated bottom
L2AB (F,G)	Lacustrine, littoral aquatic bed	Shallow lake marshes	*Ruppia maritima* (widgeon grass) *Ceratophyllum* spp. (coontail)
L2US (A,C,J)	Lacustrine, littoral, unconsolidated shore	Dry alkaline lake beds	Unconsolidated shore
PUB (F,G,H)	Palustrine, unconsolidated bottom	Open water, gravel pits	Unconsolidated bottom
PAB (F,G,K)	Palustrine, aquatic bed	Deep basins, impoundments, sewage treatment ponds, beaver ponds	*Ruppia maritima* (widgeon grass) *Ceratophyllum* spp. (coontail)

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

NWI CODE WATER REGIME	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
PEM (A,B,C,J,F)	Palustrine, emergent	Basins, depressions, marshes, meadows, springs, seeps, or vegetated drainage areas	Allenrolfea occidentalis (pickleweed) Sporobulus airoides (alkali sacaton) Carex spp. (sedges) Distichlis spicata (inland saltgrass) Eleocharis spp. (spikerush) Asclepias speciosa (showy milkweed) Hordeum jubatum (foxtail barley) Juncus spp. (rush) Phragmites australis (common reed) Phleum pratense (timothy) Puccinellia airoides (Nuttall alkali grass) Polygonum spp. (smartweed) Rumex spp. (dock) Sueda spp. (seepweed) Spartina gracilis (alkali cord grass) Triglochin maritimum (arrow grass) Scirpus americanus (common threesquare) Scirpus spp. (bulrush) Typha spp. (cattail)

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

NWI CODE WATER REGIME	COWARDIN DESCRIPTION	COMMON DESCRIPTION	VEGETATION
PSS (A,B,C)	Palustrine, scrub-shrub	Willow thicket, river banks or drainage areas	Salix spp. (willow) Tamarix spp. (saltcedar) Atriplex nuttalli (Nuttall saltbush)
PFO (A,B,C)	Palustrine, forested	Cottonwood, river banks, floodplains, or drainage areas	Populus spp. (cottonwood) Salix spp. (willow) Acer negundo (boxelder)
PUS (A,C,J)	Palustrine, unconsolidated shore	Salt flats	Unconsolidated shore

V. WATER REGIME DESCRIPTION

(J) Intermittently Flooded- Substrate is usually exposed, but surface water is present for variable periods without detectable seasonal periodicity. Weeks or months or even years may intervene between periods of inundation. The dominant plant communities under this regime may change as soil moisture conditions change. Some areas exhibiting this regime do not fall within our definition of wetland because they do not have hydric soils or support hydrophytes. In areas mapped as intermittently flooded, refer to regional guidelines for specific applications.

(A) Temporarily Flooded- Surface water is present for brief periods during growing season, but the water table usually lies well below the 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. When surface water is absent, the water table is often near the land 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 and is a gray/green/purple emulsion for all the photography. Photo signatures are similar among the dates of photography. Overall, the 1984-1987 photography indicated wetter conditions than oberved during the June, 1998 field trip. The majority of wetlands in the field are well vegetated which facilitates wetland identification and classification. The photo signatures of these wetlands are also readily identifiable due to wet conditions at the time of photography. The areas around springs have excellent photo signatures and correspond well with the spring symbols on the topographic maps. Many palustrine wetlands occur along rivers and streams and the wetland/upland breaks are generally discernable on the photo. Playa basins also have a distinct border and photo signature.

Field reconnaissance provided the following mapping conventions for all the imagery based on seasonal and climatic conditions.

GENERAL CONVENTIONS

- All open water impoundments are classified $PABF_h$ unless field reconnaissance and/or collateral data justifies a $PUBG_h$ classification. Impoundments 20 ha or greater are classified lacustrine.
- All open water pools associated with springs are classified PUBG.
- Open water dugouts are classified $PUBF_x$ and occasionally $PUBG_x$ unless they exhibit an aquatic bed signature. Waste water treatment facilities that contain water are classified as $PABK_x$.
- Salt evaporation ponds are classified as excavated, either $PUSA_x$ or $PUSC_x$.
- Intermittent versus perennial riverine classifications are determined by photosignature coupled with other collateral data and in field observations. The perennial or intermittent designations on USGS topographic maps have no bearing on riverine system classification. However, topographic maps aid in the delineation of channels that are obscured by shadows on the photography.

CONVENTIONS FOR POLYGON WETLANDS

Temporary Wetlands

Temporary emergent wetlands are not common on the project area. They have a smooth texture and a photo signature that is light red, light red with gray, or light red with dark red and tan patches.

Seasonal Wetlands

Seasonal emergent wetlands are common on the project area and are located along streams and rivers, bordering lakes, in meadows, and in waterfowl management and water storage impoundments. Seasonal emergent wetland signatures have a smooth texture and can be described as either dark red, dark purple, or dark reddish purple. These signatures can be of uniform color or mixed with patches of dark blue-black or dark gray. Some seasonal wetlands are primarily dark gray with reddish or purple tints. Other seasonal wetlands are a mixture of all four shades of dark red, dark purple, dark gray, and dark reddish purple.

Unconsolidated shore seasonal wetlands are usually lacustrine wetlands and have a blue-gray signature or light blue shallow water signature.

Semipermanent Wetlands

Natural semipermanent emergent wetlands are not common in this area. Some semipermanent emergent wetlands are associated with impoundments and others are located in the wetter portions of seasonal wetlands along streams. A clumped dark red, dark purple, or dark reddish purple signature is characteristic of semipermanent emergent wetlands. These various shades of clumped red and purple may be intermixed with dark blue to black colors.

Semipermanent aquatic bed impoundments have a black to dark blue signature.

Saturated Wetlands

Saturated emergent wetlands are fairly abundant on the project area. They have the same smooth texture and dark red, dark purple, dark gray, and/or dark reddish purple signatures as seasonal wetlands. The distinguishing characteristic of saturated wetlands is their location on slopes and association with springs and seeps.

Intermittently Flooded Wetlands

Palustrine, emergent, intermittently flooded wetlands are not common on the project area. These wetlands are often associated with larger lacustrine systems. They have a smooth gray signature, stippled with dark gray and some red tints mixed in. Palustrine, unconsolidatd shore, intermittently flooded wetlands have very distinct basin boundaries. They have a smooth bright white or smooth gray signature.

Intermittently flooded lacustrine wetlands are unconsolidated shore areas associated with salt flats and mud flats. They have a smooth texture and vary in color from bright white or light gray to gray with swirls of grayish white. Upland islands located in these flats have a distinctive signature, a rough textured dark gray to light gray color. Also, the elevational difference of these uplands are obvious.

Scrub-Shrub and Forested Wetlands

Scrub-shrub and forested wetlands are rare in Western Utah. Temporary scrub-shrub wetlands signatures have a puffy red appearance with light red underneath. Temporarily flooded forested wetlands are similar to scrub-shrub except for being taller. Saturated shrubs have a red puffy texture with dark gray or red underneath and are located on slopes or associated with springs. Except for height differences, saturated trees have the same signature as shrubs. Seasonal scrub-shrub wetlands have either a red, dark red, or dark reddish purple puffy appearance with dark gray to dark red underneath the shrubs.

CONVENTIONS FOR LINEAR WETLANDS

Linear wetlands on the project area have very limited floodplains and an obvious deep-cut channel. No temporary emergent linear wetlands were observed during field reconnaissance but that does not mean they are absent from Western Utah. Seasonal emergent linear signatures are dark red, dark reddish violet, dark purple, dark gray with red or dark red mixed in, or dark blue with bright reds. Linear seasonal emergent wetlands have a very distinct, well-defined channel. Semipermanent emergent linear wetlands were not observed in the field.

Linear intermittent riverine systems are classified by signature and watershed size. R4SBC linears generally exhibit a blue or blue gray signature in a distinct channel. R4SBJ linears are found in well-defined channels with a bright white, tan, light grayish green, or light gray signature.

Upland linear channels or washes can be distinguished from linear wetlands by a flat, indistinct channel that is similar in color to the surrounding upland matrix. Upland linear signatures are white/light green, mottled green/white, bluish green mottled, tan/light green , or light green to dark green mottled.

Perennial rivers are not common in the project area and are essentially nonexistent in the Great Salt Lake Desert area. The perennial rivers that are present are classified upper perennial with water regimes of F through H. Water regimes are determined by photosignature coupled with the USGS Water Resources Data. Light tan riverine sandbars with non-persistent vegetation or no vegetation are classified R3USA and gray signatures associated with the main river channel are classified R3USC.

VII. SPECIAL MAPPING PROBLEMS

On photo 349-60 (7/25/85) (Delta SE) there are two basins which have water present. During field reconnaissance these areas were dry with alfalfa growing in them. The northern basin is delineated strictly by the photo signature. The southern basin is partly on photo 435-74 (9/3/86) (Delta SE) and this basin is drier on this photo. Photo 435-74 is used for delineation of this basin at the edge of both photos. There is no Soil Survey available for this area.

An area northwest of Delta, UT is wet on photographs 237-15 (Delta NE) and 237-17 (Delta SE). In the field these areas were sagebrush (Artemisia spp.), greasewood (Sarcobatus vermiculatus), and upland grasses which were covered with water. This location is classified as upland due to the plant community present. It may be important to recheck this area in draft map review for further verification.

On photo 235-105 (Richfield NE) the signature of the Beaver River channel is the dark red color associated with wetlands. However, in the field this area was observed to be upland. The channel is very flat and broad at this location which is indicative of upland conditions.

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 during late summer or early fall of 1983, 1984, 1985, 1986, and 1987.

Field check sites were evaluated within all project area quads prior to the actual classification and delineation of wetlands. Field check sites were

selected to clarify photosignatures. Wetland photosignatures were identified in the field using vegetation types, soil types, water conditions, and additional input from field personnel.

Collateral data included USGS topographic maps, NRCS soil surveys, USGS water resources data, vegetation, climate, and ecoregional information from various agencies.

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

IX. 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 1-605-688-5890

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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XI. COLLATERAL RESOURCE DATA

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Box Elder County, Utah, Western Part 1997
Panguitch Area, Utah, Parts of Garfield, Iron, Kane, and Piute Counties 1990
Delta Area, Utah, Part of Millard County 1977
Fairfield-Nephi Area, Utah, Parts of Juab, Sanpete, and Utah Counties 1984
Beaver-Cove Fort Area, Utah, Parts of Beaver and Millard Counties 1976

Mason, J.L. and K.L. Kipp Jr. 1998. Hydrology of the Bonneville Salt Flats, Northwestern Utah, and Simulation of Ground-Water Flow and Solute Transport in the Shallow-Brine Aquifer. U.S. Geological Survey Professional Paper 1585. U.S. Dept. Interior, U.S. Geological Survey. 108 pp.

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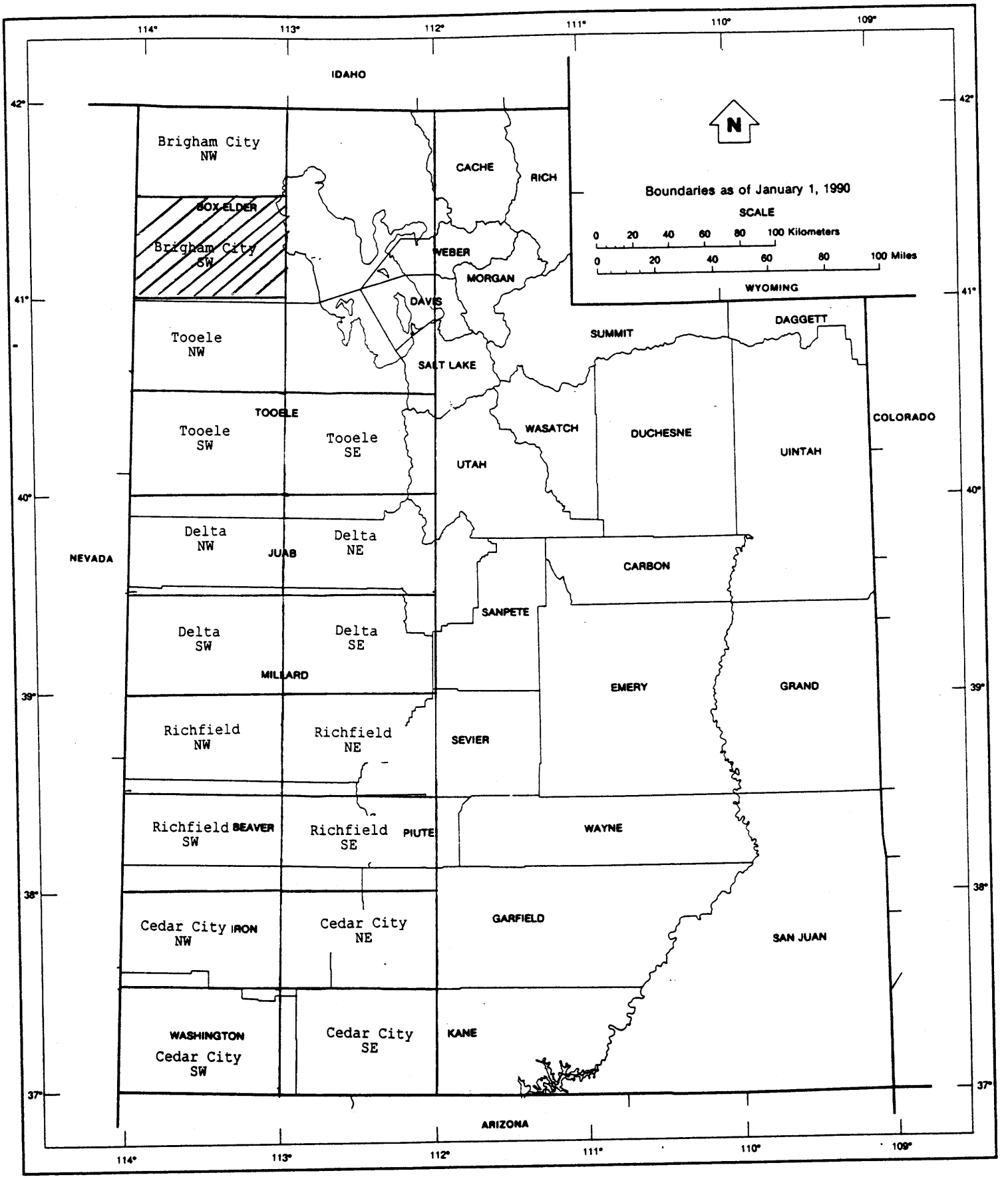
7.5 Minute, 15 Minute, and 1:250,000 USGS Topographic Maps.

Appendix A: Locator Map
Western Utah



U.S. DEPARTMENT OF COMMERCE Economics and Statistics Administration Bureau of the Census