BEAR RIVER BASIN MEMORANDUM

TO: Wyoming Water Development Commission

FROM: Bear River Basin Team

DATE: November 20, 2000

RE: **APPENDIX L - Environmental Use**

INTRODUCTION

This memorandum discusses the approach, analysis and results of the Wyoming Water Development Commission's Water Resource Evaluation of the Bear River Basin, Wyoming, Task 2E "Environmental Use." The task objectives were to:

- Compile minimum reservoir conservation pools, reservoir bypass requirements, and instream minimum flows and show their location on a GIS coverage.
- Identify and reference existing GIS mapping showing wetlands, seasonal and big game habitat, and other environmental information.
- Prepare a memorandum that describes qualitatively the water related environmental uses and benefits within the basin and brackets the optimum streamflows and/or reservoir levels for these benefits.

APPROACH

The following data was collected to help identify environmental uses in the Bear River Basin:

- EPA wetlands GIS mapping
- Instream flow (bypass) requirements
- Minimum reservoir pools and releases
- Bear River Valley Refuge information

RESULTS

Instream Flows

In 1986, the State of Wyoming passed legislation defining "instream flow" as a beneficial use of water, and stipulated how instream flow water rights are filed, evaluated and ultimately regulated. The legislation is codified under Wyoming statutes 41-3-1001 to 1014.

The law allows for instream flow water rights to be filed or granted on unappropriated water originating as natural flow or from storage in existing or new reservoirs. The use of natural flow sources is defined as the minimum needed to maintain or improve existing fisheries. The use of stored water is defined as the minimum needed to establish or maintain new or existing fisheries.

The law requires that the Game and Fish Commission identify stream segments for instream flow filings and the minimum flows required. The Wyoming Water Development Commission (WWDC) then files the application with the State Engineer's Office in the name of the State of Wyoming. According to the law the State of Wyoming is the only entity allowed to hold an instream flow permit. WWDC then performs the hydrologic analyses necessary to determine feasibility of providing the flows requested. The findings of the hydrologic analyses are then submitted to the Game and Fish Commission, the Legislature and the State Engineer for the use in evaluating the application for approval. The instream flow application is then subject to a public hearing, which is administered by the State Engineer.

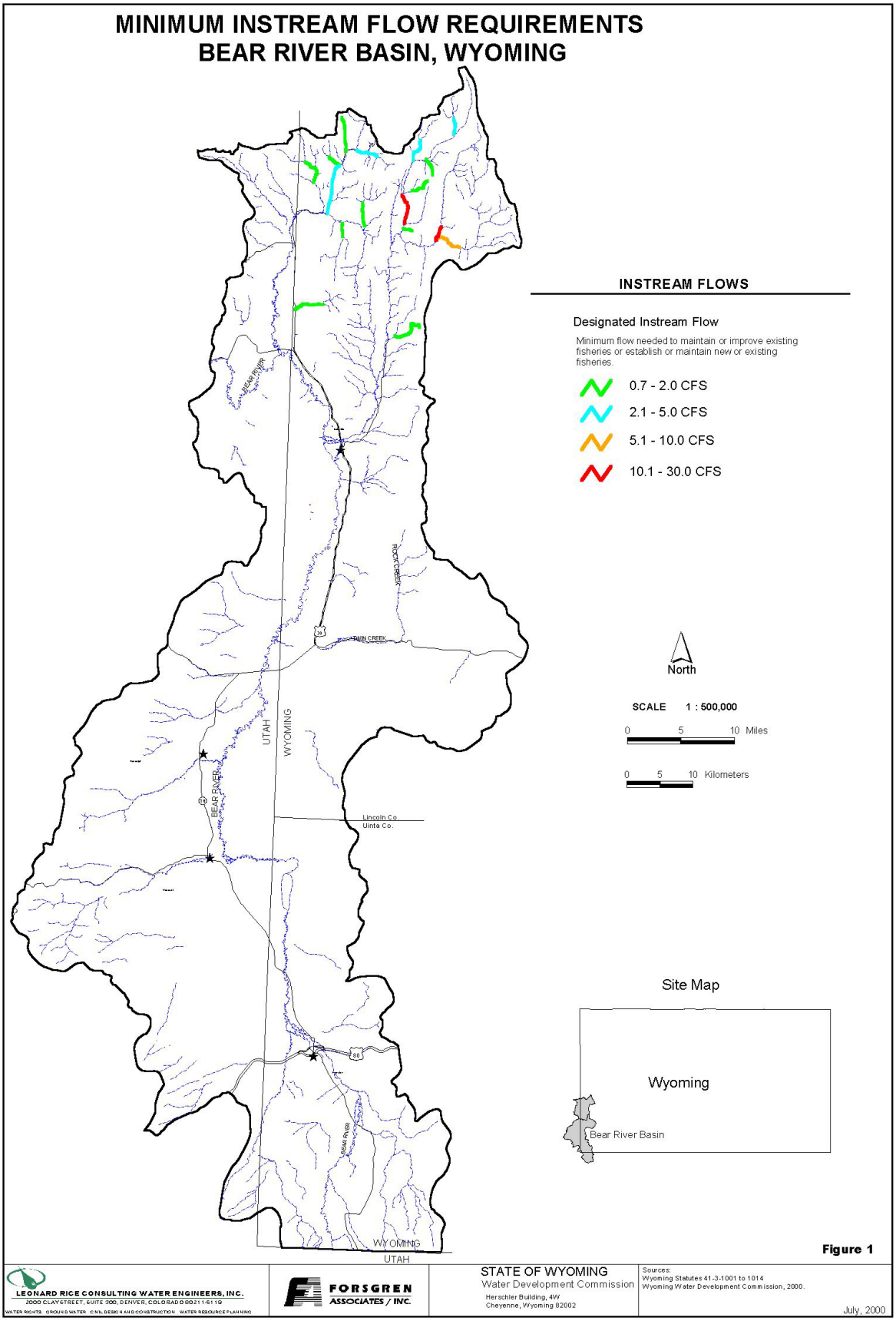
The law provides protection for senior rights and compact allocation water. The following are summaries from the law:

- No instream flow shall be allowed to interfere with existing water rights, and no instream flow permit shall be issued where the amount thereof, would be included as a portion of the consumptive share of the water allocated to the State of Wyoming under interstate compact or United States Supreme Court Decree.
- The amount of water appropriated for instream flow in each river basin in Wyoming shall not result in more water leaving the state than the amount of water that is allocated by interstate compact or United States Supreme Court Decree for downstream uses outside of Wyoming.
- Instream flow waters may be diverted for (other) beneficial consumptive use within one mile upstream from where the instream flow segment crosses the state line, or from where it enters a reservoir that straddles the state line.

In the Bear River Basin there are currently 17 instream flow filings. A public hearing was held on April 27, 1999 for all filings. There was no significant opposition to the filings at the public hearing. At this time, none are permitted. All of the filings are tied to natural flow water and there are no diversions above the segments. Table 1 describes the instream flow filings in the Bear River Basin, Wyoming. The table contains:

- the name of the filing,
- the priority date,
- minimum and maximum flows (csf),
- stream length (miles), and
- hydrologic code unit (HUC).

The Game and Fish Commission identified the monthly flows required to maintain aquatic habitat, which generally follow the pattern of natural flow. Figure 1 shows the locations of instream flow filings in the basin. All of the filings are located in the Central Division of the Bear River Basin. The minimum flow requirements in the Bear River Basin range from 0.7 to 30.0 cfs. 10 of the requirements are less than 2.0 cfs.


MINIMUM INSTREAM FLOW REQUIREMENTS
BEAR RIVER BASIN, WYOMING
INSTREAM FLOWS
Designated Instream Flow
Minimum flow needed to maintain or improve existing fisheries or establish or maintain new or existing fisheries.
0.7 - 2.0 CFS
2.1 - 5.0 CFS
5.1 - 10.0 CFS
10.1 - 30.0 CFS
North
SCALE 1 : 500,000
0 5 10 Miles
0 5 10 Kilometers
Site Map
Wyoming
Bear River Basin
BEAR RIVER
ROCK CREEK
BIG CREEK
UTAH
WYOMING
Lincoln Co.
Uinta Co.
Figure 1
LEONARD RICE CONSULTING WATER ENGINEERS, INC.
2000 CLAY STREET, SUITE 300, DENVER, COLORADO 80211-5119
WATER RIGHTS GROUND WATER CIVIL DESIGN AND CONSTRUCTION WATER RESOURCE PLANNING
FORSGREN ASSOCIATES / INC.
STATE OF WYOMING
Water Development Commission
Herschler Building, 4W
Cheyenne, Wyoming 82002
Sources:
Wyoming Statutes 41-3-1001 to 1014
Wyoming Water Development Commission, 2000.
July, 2000

The Game and Fish Commission has indicated that the instream flow filings are an insurance policy against unknown future development. The main goal for instream flow rights in the Bear River Basin is to help preserve and manage habitat for the Bonneville Cut Throat Trout, which is proposed for the Endangered Species List. The Game and Fish Commission has indicated that the Bear River Trout habitat the Central Bear River Basin is a better head water habitat for the Bonneville Cut Throat Trout than other areas of the basin.

TABLE 1
INSTREAM FLOW FILINGS

Segment Name	Priority	Stream Minimum (cfs)	Stream Maximum (cfs)	Stream Length (miles)	HUC
Coal Creek Seg No. 1	6/20/95	1.8	7.5	0.80	16010102
Coal Creek Seg No. 1	6/27/96	1.8	4.4	4.20	16010102
Coantag Creek Segment No. 1	6/27/96	7.2	24.0	4.90	16010102
Giraffe Creek Seg No. 1	6/27/96	1.5	5.5	2.40	16010102
Hobble Creek Seg No. 1	06/20/95	30.0	48.0	2.70	16010102
Huff Creek Seg No. 1	06/20/95	1.3	6.5	3.30	16010102
Lander Creek IF Segment No. 1	8/25/97	1.1		0.40	16010102
Little White Ck IF Segment No. 1	8/25/97	1.2	2.9	2.50	16010102
North Fork Smiths Fork R Seg No.1	8/25/97	2.1	16.0	2.40	16010102
Packstirng Ck If Segment No. 1	8/25/97	0.7		1.30	16010102
Poker Hollow Ck IF Segment No 1	8/25/97	3.7	42.0	1.60	16010102
Porcupine Creek Seg No. 1	12/19/95	1.5	7.5	1.30	16010102
Raymond Creek Seg No. 1	12/19/95	1.4	1.9	1.60	16010102
Salt Creek Seg No. 1	6/27/96	4.4	14.0	4.50	16010102
Smiths Fork Seg No. 1	12/19/95	17.0	45.0	5.00	16010102
Trespass Ck IF Segment No 1	8/25/97	1.1		1.00	16010102
Water Canyon Ck Seg No. 1	6/27/96	2.4	10.0	1.20	16010102

Sources: Wyoming State Engineer's, Wyoming Instream Flow Applications Database, 2000.
WWDC GIS coverage Wyoming Instream Flow Filings, 2000.

Mapping Data Source and Procedure

The following are the sources for the instream flow filings:

- Wyoming State Engineer, Wyoming Instream Flow Applications Database, 2000.
- WWDC, Wyoming Instream Flow Filings GIS Coverage, 2000.
- Wyoming Game and Fish Department, Phone conversation and fax from Paul Dey, November 2, 2000.

The GIS mapping shown here was obtained from WWDC. A few minor changes were made to the coverage. The coverage was clipped to the Bear River Basin Boundaries and the features of the segments were "unioned" to form one feature per segment.

Wetlands Mapping

The National Wetlands Inventory (NWI) of the U.S. Fish and Wildlife Service produces information on the characteristics, extent, and status of the Nation's wetlands and deepwater habitats. Federal, State, and local agencies, academic institutions, U.S. Congress, and the private sector use this information. The Emergency Wetland Resources Act of 1986 directs the Service to map the wetlands of the United States. The NWI has mapped 89% of the lower 48 states, and 31% of Alaska. The Act also requires the Service to produce a digital wetlands database for the United States. About 39% of the lower 48 states and 11% of Alaska are digitized. Congressional mandates require the NWI to produce status and trends reports to Congress at ten-year intervals. In 1982, the NWI produced the first comprehensive and statistically valid estimate of the status of the Nation's wetlands and wetland losses, and in 1990 produced the first update. Future national updates scheduled for 2000, 2010, and 2020.

The Spatial Data and Visualization Center downloaded the digital line graphs (dlg) from the NWI web page and converted the dlg data to Arc/Info vector coverages with matching attributes. Vector coverages include both line (riverine) and polygon (lacustrine and palustrine) wetland features.

Wetlands are lands transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water. For purposes of the NWI classification, wetlands must have one or more of the following three attributes:

1) at least periodically, the land supports predominantly hydrophytes;
2) the substrate is predominantly undrained hydric soil; and
3) the substrate is non-soil and is saturated with water or covered by shallow water at some time during the growing season of each year.

The wetland classification system is hierarchical, with wetlands and deepwater habitats divided among five major systems at the broadest level. The five systems include Marine (open ocean and associated coastline), Estuarine (salt marshes and brackish tidal water), Riverine (rivers, creeks, and streams), Lacustrine (lakes and deep ponds), and Palustrine (shallow ponds, marshes, swamps, sloughs). Systems are further subdivided into subsystems, which reflect hydrologic conditions. Below the subsystem is the class, which describes the appearance of the wetland in terms of vegetation or substrate. Each class is further subdivided into subclasses; vegetated subclasses are described in terms of life form and substrate subclasses in terms of composition. The classification system also includes modifiers to describe hydrology (water regime), soils, water chemistry (pH, salinity), and special modifiers relating to man's activities (e.g., impounded, partly drained).

The NWI coverage for the Bear River Basin contains 3 systems:

- **Riverine**: The Riverine System includes all wetlands and deepwater habitats contained within a channel, with two exceptions: (1) wetlands dominated by trees, shrubs, persistent emergents, emergent mosses, or lichens, and (2) habitats with water containing ocean derived salts in excess of 0.5%. A channel is "an open conduit either naturally or artificially created which periodically or continuously contains moving water, or which

forms a connecting link between two bodies of standing water" (Langbein and Iseri 1960:5).

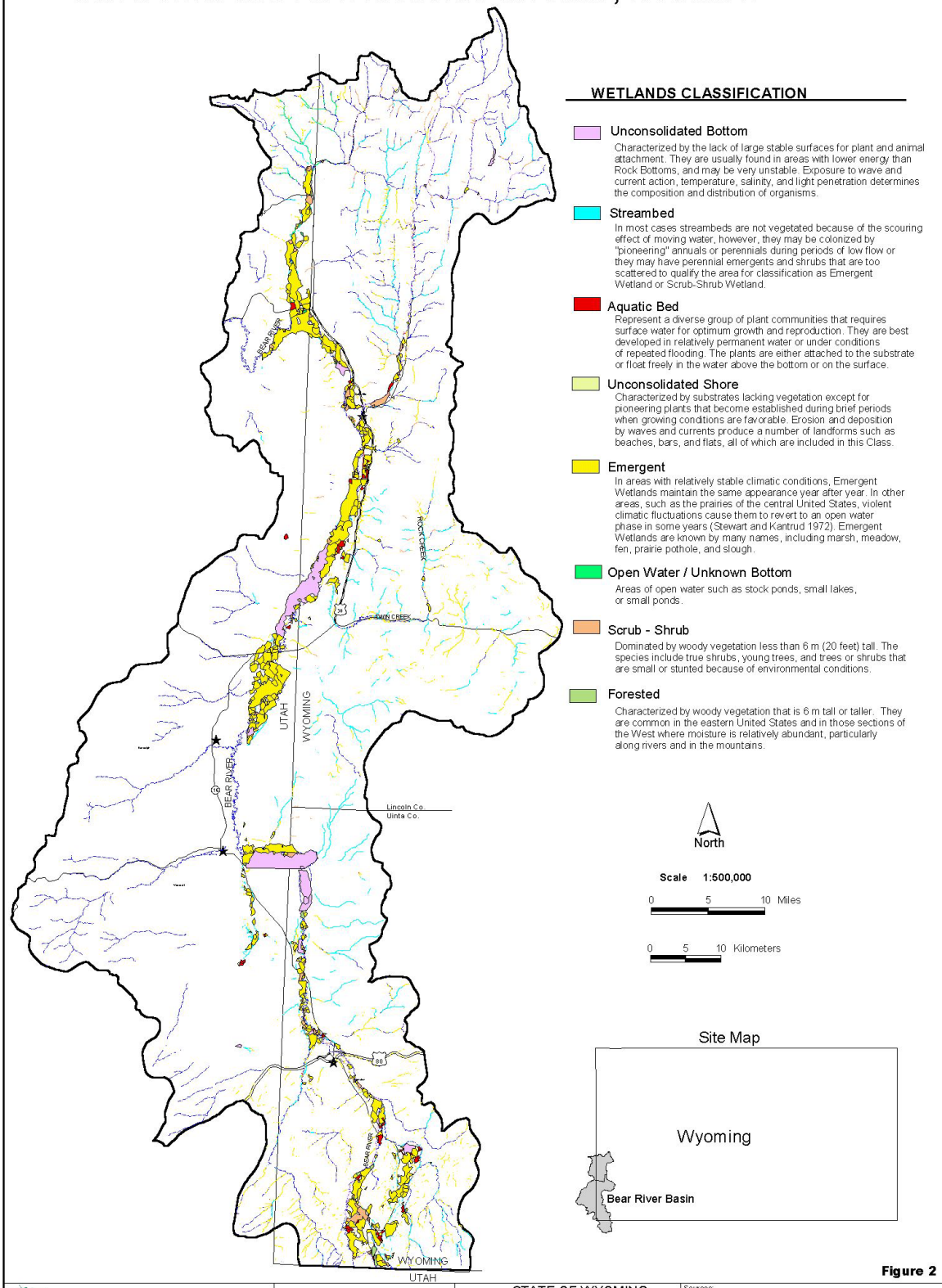
- **Lacustrine:** The Lacustrine System includes wetlands and deepwater habitats with all of the following characteristics: (1) situated in a topographic depression or a dammed river channel; (2) lacking trees, shrubs, persistent emergents, emergent mosses or lichens with greater than 30% areal coverage; and (3) total area exceeds 8 ha (20 acres). Similar wetland and deepwater habitats totaling less than 8 ha are also included in the Lacustrine System if an active wave-formed or bedrock shoreline feature makes up all or part of the boundary, or if the water depth in the deepest part of the basin exceeds 2 m (6.6 feet) at low water. Lacustrine waters may be tidal or nontidal, but ocean derived salinity is always less than 0.5%.
- **Palustrine**: The Palustrine System includes all nontidal wetlands dominated by trees, shrubs, persistent emergents, emergent mosses or lichens, and all such wetlands that occur in tidal areas where salinity due to ocean-derived salts is below 0.5%. It also includes wetlands lacking such vegetation, but with all of the following four characteristics: (1) area less than 8 ha (20 acres); (2) active wave-formed or bedrock shoreline features lacking; (3) water depth in the deepest part of basin less than 2 m at low water; and (4) salinity due to ocean-derived salts less than 0.5%.

The three systems are divided into six subsystems:

- **Riverine/Lower Perennial:** The gradient is low and water velocity is slow. There is no tidal influence, and some water flows throughout the year. The substrate consists mainly of sand and mud. Oxygen deficits may sometimes occur, the fauna is composed mostly of species that reach their maximum abundance in still water, and true planktonic organisms are common. The gradient is lower than that of the Upper Perennial Subsystem and the floodplain is well developed.
- **Riverine/Upper Perennial:** The gradient is high and velocity of the water fast. There is no tidal influence and some water flows throughout the year. The substrate consists of rock, cobbles, or gravel with occasional patches of sand. The natural dissolved oxygen concentration is normally near saturation. The fauna is characteristic of running water, and there are few or no planktonic forms. The gradient is high compared with that of the Lower Perennial Subsystem, and there is very little floodplain development.
- **Riverine/Intermitten:** In this Subsystem, the channel contains flowing water for only part of the year. When the water is not flowing, it may remain in isolated pools or surface water may be absent. Classes. Rock Bottom, Unconsolidated Bottom, Aquatic Bed, Streambed, Rocky Shore, Unconsolidated Shore, and Emergent Wetland (nonpersistent).
- **Lacustrine/Limnetic:** All deepwater habitats within the Lacustrine System,many small Lacustrine Systems have no Limnetic Subsystem.
- **Lacustrine/Littoral:** All wetland habitats in the Lacustrine System.
- **Palustrine: (**see above definition).

The subsystems are further divided into Classes. The Classes describes the general appearance of the habitat in terms of either the dominant life form of the vegetation or the physiography and composition of the substrate-features that can be recognized without the aid of detailed environmental measurements. Figure 2 shows the NWI coverage divided into eight classes.

U.S. FISH AND WILDLIFE SERVICE, NATIONAL WETLANDS INVENTORY MAPPING BEAR RIVER BASIN, WYOMING



The following list identifies and defines the classes in the Bear River Basin:

- Unconsolidated Bottom: Characterized by the lack of large stable surfaces for plant and animal attachment. They are usually found in areas with lower energy than Rock Bottoms, and may be very unstable. Exposure to wave and current action, temperature, salinity, and light penetration determines the composition and distribution of organisms.
- Streambed: In most cases streambeds are not vegetated because of the scouring effect of moving water, however, they may be colonized by "pioneering" annuals or perennials during periods of low flow or they may have perennial emergents and shrubs that are too scattered to qualify the area for classification as Emergent Wetland or Scrub-Shrub Wetland.
- Aquatic Bed: Represent a diverse group of plant communities that requires surface water for optimum growth and reproduction. They are best developed in relatively permanent water or under conditions of repeated flooding. The plants are either attached to the substrate or float freely in the water above the bottom or on the surface.
- Unconsolidated Shore: Characterized by substrates lacking vegetation except for pioneering plants that become established during brief periods when growing conditions are favorable. Erosion and deposition by waves and currents produce a number of landforms such as beaches, bars, and flats, all of which are included in this Class.
- Emergent: In areas with relatively stable climatic conditions, Emergent Wetlands maintain the same appearance year after year. In other areas, such as the prairies of the central United States, violent climatic fluctuations cause them to revert to an open water phase in some years (Stewart and Kantrud 1972). Emergent Wetlands are known by many names, including marsh, meadow, fen, prairie pothole, and slough.
- Open Water/Unknown Bottom: Areas of open water such as stock ponds, small lakes,or small ponds.
- Scrub-Shrub: Dominated by woody vegetation less than 6 m (20 feet) tall. The species include true shrubs, young trees, and trees or shrubs that are small or stunted because of environmental conditions.
- Forested: Characterized by woody vegetation that is 6 m tall or taller. They are common in the eastern United States and in those sections of the West where moisture is relatively abundant, particularly along rivers and in the mountains.

The wetlands mapping was overlayed on the GIS Irrigated Acreage coverage used in the Bear River Basin plan. More than half of the defined irrigated acreage is classified in the wetlands mapping as Emergent. This may be, inpart, due to the scale of the wetlands mapping, which varied between 1:20,000 and 1:132,000. Also, the Emergent wetlands classification reports to be known by many names, including meadow. Almost all of the irrigated acreage in the Bear River Basin is meadow composed of emergent plant types.

Minimum Reservoir Conservation Pools and Bypass Requirements

In general, conservation pools are intended to provide the minimum volume of water necessary to maintain the existing aquatic life in the reservoir. Because on-stream reservoirs disrupt the natural flow in a stream, minimum bypass requirements are often dictated during the permitting process to provide the minimum flow downstream required to maintain existing fisheries.

There is no indication that the other smaller reservoirs in the basin have conservation pool or bypass requirements. Table 2 shows the minimum reservoir conservation pools and bypass requirements for Sulphur Creek and Woodruff Narrows Reservoirs:

TABLE 2 MINIMUM RESERVOIR POOLS AND RELEASES		
Reservoir	Conservative Account (AF)	Minimum Downstream Release (cfs)
Sulphur Creek Reservoir	4,180	9
Woodruff Narrows Reservoir	4000*	10
Sources: Wyoming Game and Fish *Temporary storage account of 4,000 acre-feet was set up to accommodate an agreement between the Reservoir Company and the Utah Department of Fish and Game to supply the 10 cfs winter minimum release for fishery purposes.		

Cokeville Meadows National Wildlife Refuge

The Cokeville Meadows National Wildlife Refuge is located along the Utah and Wyoming border south of the town of Cokeville, Wyoming. The area is approximately 16 miles long, bounded by Cokeville on the north and by the Beckwith-Quinn (BQ) diversion system. The refuge is maintained for Aquatic fowl production.

Table 3 outlines the wetland types and proposed management plan, based on the Proposed Bear River Valley Refuge Water Resource Analysis, U.S. Fish and Wildlife Service, December 20, 1988. Note that the refuge was referred to as the Bear River Valley Refuge during initial investigations and proposals.

TABLE 3 COKEVILLE MEADOWS NATIONAL WILDLIFE REFUGE MANAGEMENT PLAN		
Wetland Type	Acres	Management Plan:
Oxbows	1,500	500 of the 1,500 acres will be drawn down each year on July 10. The remaining 1,000 acres will be maintained through the summer.
Seasonal Hay Meadows	12,100	Will be left to dry up naturally, be drained, or used to provide additional water to the brood ponds.
Brood Ponds	1,000	Will be flooded early spring and maintained full through August or later.
Total	14,600	
Sources: Bellinger, T. U.S. Fish and Wildlife Service, December 20, 1988.		

The above management plan was developed with the following assumptions and criteria:

- No diversions from BQ or Pixley dams will occur from July 10 – August 15 unless additional shares can be purchased from Woodruff Narrows Reservoir. If water is available small diversions may take place after August 15.
- No more than a 1,000 acres (other than oxbows) will be maintained as brood ponds. The location of brood ponds will change year to year to prevent undesirable vegetation.

- No wetlands will be totally dry year round unless water is in very short supply.
- Outside of irrigated meadows there will be 1,777 acres used as cropland and 2,301 acres classified as pasture and / or hay production that will be used for nesting.
- About 400 of the 1,777 acres of cropland will be small grain and irrigated until mid-August. The remaining 1,377 acres will be alfalfa and irrigated for one cutting the first part of July.
- The 2,301 acres of pasture/hay land will be managed as nesting cover and will be irrigated in historical manner with irrigation ending in early July.

The Memorandum of Understanding between U.S. Fish and Wildlife Service and the Wyoming State Engineer was finalized in October 1990, Appendix A. The U.S. Fish and Wildlife Service has agreed to comply with all Wyoming Water Laws and to submit a petition to the proper State authority for change in use and other appropriate proceedings.

The Cokeville Meadows National Wildlife Refuge is in the land acquisition phase, currently purchasing land from willing sellers. The U.S. Fish and Wildlife Service has signed an agreement with the State Engineer's Office to maintain historical quantities and timing of depletions.

COMMENTS AND CONCERNS

None.

SOURCES

Bellinger, T. Proposed Bear River Valley Refuge Water Resource Analysis. U.S. Fish and Wildlife Service, Region 6, Water Resources Division; December 20, 1988.

Cowardin, L.M.; Carter, V.; Golet, F.C.; LaRoe, E.T. Classification of Wetlands and Deepwater Habitats of the United States. Performed for U.S. Department of the Interior Fish and Wildlife Service Office of Biological Services Washington, D.C. 20240. December, 1979.

U.S. Fish and Wildlife Service. National Wetland Inventory, 1997.

Wyoming State Engineer’s Office. Wyoming Instream Flow Applications Database, 2000.

Wyoming State Engineer’s Office. Memorandum of Understanding between U.S. Fish and Wildlife Service and Wyoming State Engineer, October 1990.

Wyoming Statutes 41-3-1001 to 1014.

Wyoming Water Development Commission. Wyoming Instream Flow Filings GIS Coverage, 2000.

Wyoming Game and Fish Department, Phone conversation and fax from Paul Dey, November 2, 2000.

ATTACHMENT "A"
Cokeville Meadows National Wildlife Refuge Memorandum of Understanding

1890-1990 WYOMING CENTENNIAL A LASTING LEGACY

THE STATE OF WYOMING

MIKE SULLIVAN
GOVERNOR

GORDON W. FASSETT
STATE ENGINEER

State Engineer's Office

HERSCHLER BUILDING, 4-E
CHEYENNE, WYOMING 82002-0370
(307) 777-7354
FAX (307) 777-5451

October 8, 1990

Harvey Wittmier
U.S. Fish and Wildlife Service
P.O. Box 25486
Denver Federal Center
Denver, CO 80225

Dear Harvey:

Enclosed please find one original of the Cokeville Meadows National Wildlife Refuge Memorandum of Understanding. I have signed the other original and kept it for our files. Several people had requested copies of this agreement after it was executed. If there were others that had contacted you about copies that are not listed below, please feel free to send them copies.

I feel that we have reached agreement on the critical water issues that will provide protection for current water right holders yet will allow the Service flexibility in maintaining and enhancing waterfowl habitat.

With best regards,

Jeff

Gordon W. Fassett
State Engineer

GWF/SL
Enclosure
cc: Governor Mike Sullivan
Rod Miller, SPC
Pete Petera, Game and Fish
Jennifer Gimbel, AG's Office
John Teichert, Superintendent Div IV
John Yarbrough, Hydrographer, Evanston
Reed Dayton, Bear River Commission
Wes Myers, Bear River Commission
Jack Barnett, Bear River Commission
Eric Esterholdt
Jack Metcalfe

MEMORANDUM OF UNDERSTANDING
between
U.S. FISH AND WILDLIFE SERVICE
and
WYOMING STATE ENGINEER

This Memorandum of Understanding is entered into between the United States of America acting through the Department of the Interior, Fish and Wildlife Service (Service), and the Wyoming State Engineer (WSE) for the following reasons:

A. The Migratory Bird Treaty Act (16 U.S.C. 703-711), the Migratory Bird Conservation Act (16 U.S.C. 715-715r), the Migratory Bird Hunting and Conservation Stamp Act (16 U.S.C. 718-718h), the Fish and Wildlife Act of 1956 (16 U.S.C. 742a-742j), and the Land and Water Conservation Fund Act of 1965 (16 U.S.C. 4601-4-4601-11), authorize the Service to acquire by purchase or exchange, land and water or interest therein for the development, advancement, management, conservation, and protection of fish and wildlife resources. The primary objectives of waterfowl refuges acquired pursuant to and under the authority of the above legislation are to provide habitat for migratory birds and other wildlife; and protect, maintain, and enhance wetlands for the purpose of waterfowl production.

B. The above-referenced Migratory Bird Conservation Act provides that no lands for the conservation of migratory birds may be acquired under the terms of the Act unless the State in which the area is located shall have consented by law to the acquisition. Section 23-1-106 of the Wyoming Statutes (W.S.) is enabling legislation which authorizes the Service to acquire lands in Lincoln County, Wyoming, near the town of Cokevilie, for the purpose of establishing a National Wildlife Refuge. The Service must enter into an agreement with the WSE as provided for in the enabling legislation, W.S. 23-1- 106(d).

This Memorandum of Understanding between the Service and the WSE is entered into under the authority of the National Wildlife Refuge System Administration Act (16 U.S.C. 668dd-668ee) for the express purposes of providing for the proper administration, preservation, management, and development of the proposed refuge area consistent with Wyoming State law governing the acquisition and utilization of water rights, and for

meeting the terms of the legislative consent by the State for the establishment of the Refuge. The Service and WSE agree as follows:

1. With respect to all lands and their accompanying water rights (surface and groundwater) purchased for inclusion in the Cokeville Meadows National Wildlife Refuge (Refuge), the United States through the Service will comply with State water law and rules and regulations of the State Engineer and the State Board of Control, in acquiring, changing, and exercising water rights for any and all beneficial uses related to the Refuge and, in addition, the following procedures will apply:

a. Before specific lands acquired by the United States are developed for wildlife purposes, the Service will provide the WSE detailed engineering and water operation and refuge management plans to describe fully the water use and water rights proposed to be used or managed to serve or benefit any portion of the Refuge. As the Service proposes to use current adjudicated or valid unadjudicated water rights for the filling and maintenance of brood ponds and oxbows or other purposes of the Refuge, the Service will submit a petition to the proper State authority (State Board of Control or State Engineer) for change in use and other appropriate proceedings. No change in historic use shall occur prior to State approval of the petition. The Service will consult and coordinate with the WSE in developing water management plans. The Refuge management plans will clearly document to which of the Management Units, as defined in the Development and Management Plan, a specific water right will be applied. In addition, to-scale maps showing the design, characteristics, and location of the low-head dikes and outlet structures will be filed with and approved by the State Engineer's Office, as provided by State law. Because the lands that are acquired may have water rights with priority dates of varying seniority, it will be necessary to document the lands and beneficial uses to which each water right will be applied. The WSE will cooperate with the Service in obtaining and securing information needed by the Service for application and petitioning proceedings.

b. The Service agrees that the operation of Pixley

and BQ diversion dams, two Bear River diversion facilities which are key to appropriators in Wyoming within the proposed exterior boundary of the Refuge, will continue as in the past. The flashboards in the two dams will be removed and the diversion structures drained beginning no later than the 10th of July of each year, as directed by the Superintendent, Water Division IV, unless he determines that Service requests for additional diversions will not injure or impair any other Wyoming water users. Neither the operation of these two diversion dams nor the construction and operation of additional dikes on the Refuge shall in any way cause water flooding or other damage to landowners adjacent or downstream from lands owned by the Service. No additional diversions through the facilities will be allowed after July 10th of water from other sources, such as storage waters or groundwater, if such deliveries and diversions may cause any injury to holders of valid water rights. The United States agrees that the operation of the two diversion dams and the construction and operation of any additional dikes on the Refuge will be by the use of standard dam building and operating practices as recognized in the industry.

c. Should the Service wish to supplement the water supply to the Refuge by the purchase or lease of reservoir water or other source of supply, a separate agreement with the appropriate reservoir company or irrigation district or other appropriate entities may be necessary. The Service will consult with the WSE during development of and prior to closing of any such agreements.

d. The State of Wyoming has allocated to appropriators the increased depletions from the Bear River provided for in the 1980 Amended Bear River Compact, Article V. Due to water management changes by the Service, it is understood by the WSE that the Refuge may deplete more water than has occurred under historical practices. This increase in depletion above historic use cannot occur without prior approval of the WSE. The Service shall be required to determine the amount of any difference in depletion for Compact and State water law administration purposes subject to review of its findings by the WSE. The

determination and administration of depletion amounts may require installation of measuring devices, evaporation pans, and other equipment necessary to estimate accurately depletions occurring on Refuge lands. The WSE may order the Service to install such devices and may require the Service to submit water budaet. diversion. storage, and consumption and use reports in order to assess and comply with Wyoming's obligations under the Compact, as amended.

e. The Service acknowledges that groundwater withdrawals that deplete the Bear River and its tributaries are covered under the Amended Bear River Compact. The Service recognizes it would not be able to offset additional depletions attributable to the Refuge through the use of depletive groundwater withdrawals.

f. If the Service desires to change the use of any water rights attached to lands on which conservation easements are obtained, those water right use changes must be filed with the appropriate State authority, as required by Wyoming law. The water on these easement lands must also be managed such that historic use practices are addressed and that no injury occurs to other Wyoming appropriators in the Bear River Basin.

2. No rights to the use of water shall be implied or claimed by the creation of the Refuge, and nothing in W.S. 23-1-106 shall be construed as establishing or consenting to the creation of a reserved or nonreserved water right for the United States.

3. No water rights shall be condemned by the United States to provide water for the Refuge.

4. The Service shall grant the WSE access to any measuring devices installed as per 1. d. above or any other water control, diversion, storage or measuring devices required for proper administration and regulation of the Bear River system by the WSE.

5. The Service shall grant permission by special use permit for the necessary repair, rehabilitation, and maintenance of water delivery ditches, diversion dams, or other facilities that are located on Refuge lands. Special use permits will be granted to water rights

holders served by ditches or other facilities that flow through Refuge lands for the necessary access to complete routine cleaning and other maintenance to those facilities.

6. This Memorandum of Understanding shall remain in effect until modified by mutual agreement of both parties. Modifications may be proposed in writing at any time by either party and shall become effective upon written approval by both parties.

IN WITNESS WHEREOF, the parties hereto have caused this Memorandum of Understanding (Agreement) to be executed and effective as of the latest date of the signatures hereinafter affixed.

WYOMING STATE ENGINEER

Gordon W. Fassett
Wyoming State Engineer

Date: 10-5-90

Attest: _____

UNITED STATES OF AMERICA,
DEPARTMENT OF INTERIOR
FISH AND WILDLIFE SERVICE

Galen L. Buterbaugh
Regional Director

Date: SEP 25 1990

Attest _____