

**WETLAND RESTORATION
AND MANAGEMENT PLAN**

**BOUNDARY CREEK
WILDLIFE MANAGEMENT AREA
BOUNDARY COUNTY, IDAHO**



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BOUNDARY CREEK
Wildlife Management Area

Management Plan
April 2001

Idaho Department of Fish and Game
Panhandle Region
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TABLE OF CONTENTS

LIST OF FIGURES	iii
LIST OF TABLES	iv
INTRODUCTION	1
ROLE OF COOPERATING AGENCIES AND ORGANIZATIONS.....	1
U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE	2
U.S. DEPARTMENT OF INTERIOR, U.S. FISH AND WILDLIFE SERVICE	2
U.S. DEPARTMENT OF ENERGY, BONNEVILLE POWER ADMINISTRATION.....	2
ALBENI FALLS INTERAGENCY WORK GROUP	4
DUCKS UNLIMITED, INCORPORATED	4
INTERMOUNTAIN WEST JOINT VENTURE, INCORPORATED.....	4
CROWN PACIFIC LIMITED PARTNERSHIP	5
PUBLIC INVOLVEMENT	5
ACQUISITION.....	6
ENVIRONMENTAL CONTAMINANT SURVEY	7
CULTURAL RESOURCE SURVEY.....	7
PUBLIC RECORDS SEARCH	8
IMPROVEMENTS	8
SITE DESCRIPTION	8
HISTORICAL PERSPECTIVE.....	11
NATURAL HYDROLOGY, FLOODPLAIN LANDSCAPE AND VEGETATION.....	11
FLOOD CONTROL AND AGRICULTURAL DEVELOPMENT	13
CURRENT PHYSICAL ENVIRONMENT	17
CLIMATE	17
TOPOGRAPHY AND SOILS	19
WATER RESOURCES AND HYDROLOGY.....	20
BIOLOGICAL RESOURCES	20
VEGETATION	20
NOXIOUS WEEDS.....	22
WILDLIFE	24
BIG GAME.....	24
UPLAND GAME	25
WATERFOWL.....	25
FURBEARERS.....	26
NON-GAME WILDLIFE.....	26

FISHERIES	26
THREATENED AND ENDANGERED SPECIES	27
WILDLIFE	27
FISH.....	28
PLANTS	28
HABITAT EVALUATION PROCEDURE.....	28
MANAGEMENT CONSTRAINTS	30
CONSERVATION EASEMENT	30
WILDLIFE MITIGATION FUNDS	31
MANAGEMENT GOALS AND OBJECTIVES	32
WETLAND RESTORATION PLAN – OBJECTIVES 1-4.....	33
OBJECTIVE 1 – RESTORE AND MAINTAIN WETLAND HYDROLOGY.....	33
OBJECTIVE 2 – RESTORE AND MAINTAIN WETLAND BASINS	35
DIVERSION STRUCTURE	35
WATER CONTROL STRUCTURES.....	37
OBJECTIVE 3 - RESTORE AND MAINTAIN VEGETATIVE COMMUNITIES	38
GRASS/FORB ESTABLISHMENT	39
HERBACEOUS WETLAND VEGETATION	40
SCRUB-SHRUB HABITAT AND FLOODPLAIN COTTONWOOD FOREST....	41
OBJECTIVE 4 – PROTECT AND MAINTAIN EXISTING NATIVE VEGETATIVE COMMUNITIES.....	44
FLOODPLAIN COTTONWOOD FOREST AND SCRUB-SHRUB WETLANDS	44
MIXED CONIFER FOREST	44
PUBLIC ISSUES AND CONCERNS - OBJECTIVE 5	45
MANAGEMENT DIRECTION – OBJECTIVES 1-7	50
WATER LEVEL MANAGEMENT	50
MANAGED DRAWDOWNS.....	52
MOIST SOIL MANAGEMENT.....	54
GRASS/FORB HABITAT MANAGEMENT	54
TREE AND SHRUB HABITAT MANAGEMENT	55
NESTING STRUCTURES	56
WILDLIFE FOOD PLOTS.....	57
NOXIOUS WEED CONTROL	57
PUBLIC USE.....	58
ENHANCE HABITAT FOR NATIVE FISH.....	58

MONITORING AND EVALUATION - OBJECTIVE 8	58
M & E METHODS USED FOR WILDLIFE HABITAT	59
M & E METHODS USED FOR WILDLIFE POPULATIONS	59
OPERATIONS AND MAINTENANCE BUDGET – OBJECTIVES 1-9.....	60
CAPITAL OUTLAY - OBJECTIVES 1-9	60
OFFICE AND RESIDENCE	63
MAINTENANCE SHOP AND STORAGE FACILITY	63
TRACTOR AND IMPLEMENTS	64
OFFICE AND FIELD EQUIPMENT	66
LITERATURE CITED	68
ACKNOWLEDGMENTS	72

LIST OF FIGURES

Figure 1. Boundary Creek WMA Vicinity Map.	9
Figure 2. Boundary Creek Wildlife Management Area.	10
Figure 3. US Forest Service Photograph of the Kootenai River Floodplain Near Smith Creek Prior to 1916.	14
Figure 4. Photograph of the Boundary Creek WMA in 1931 – The Klockman’s Colony Ranch.	15
Figure 5. US Forest Service Aerial Photograph of Boundary Creek in 1934.	16
Figure 6. US Geological Survey Map at Boundary Creek in 1928.....	18
Figure 7. Boundary Creek discharge volume (cfs), monthly averages (1980-1997).	21
Figure 8. Boundary Creek WMA Vegetative Cover Types, US Forest Service Aerial Photograph, 1996.....	23
Figure 9. Boundary Creek WMA, Location and Extent of Wetland Basins.	34
Figure 10. Kootenai River elevations, monthly averages, Porthill Gauge.....	36
Figure 11. Focus Areas Identified for Supplemental Tree and Shrub Plantings, Boundary Creek WMA.	42

LIST OF TABLES

Table 1. Annual water use plan, Boundary Creek water right^a38

Table 2. Storage capacity of wetland basins at spring target elevation of 1,755 feet, Boundary Creek WMA. 39

Table 3. Cumulative storage capacity of wetland basins at elevations of 1,748 feet through 1,755 feet, Boundary Creek WMA^a. 39

Table 4. Permanent grass/forb cover seeding, Boundary Creek WMA, November 1999..... 40

Table 5. Supplemental Shrub and Tree Planting Locations and Planting Schedule, Boundary Creek WMA, 2001-2005. 43

Table 6. Annual Operations and Maintenance Costs to be Funded by BPA, Boundary Creek WMA. 61

Table 7. WMA Costs to be Funded by the IDFG or Other Sources. 62

Table 8. Total Costs for Operations and Maintenance, Monitoring and Evaluation, and Capital Outlay Recommended for Funding by BPA, Boundary Creek WMA, 2001-2006..... 67

INTRODUCTION

This document is the combined wetland restoration and long-range management plan for the 1,405-acre Boundary Creek Wildlife Management Area (WMA) in Boundary County, Idaho. The purpose of this plan is to describe the development, enhancement, protection and maintenance measures necessary to restore and manage 1,039 acres of drained wetlands in the Kootenai River floodplain and 366 acres of associated uplands.

The WMA was acquired by the Idaho Department of Fish and Game (IDFG) using funds provided by the sale of Idaho hunting licenses, tags, and state waterfowl stamps; and the Bonneville Power Administration (BPA). Funding for the conservation easement and restoration of the property's historic wetlands was provided primarily by the US Department of Agriculture's (USDA) Wetlands Reserve Program (WRP) together with grants from the Intermountain West Joint Venture (IWJV); Ducks Unlimited (DU); the US Fish and Wildlife Service (USFWS); and Crown Pacific Limited Partnership (CP).

The Boundary Creek property was selected by the IDFG as a site for wildlife habitat restoration and mitigation for the following reasons: 1.) the owners were willing to sell; 2.) the USDA's, Natural Resources Conservation Service (NRCS) had committed funds from the WRP to purchase a conservation easement from the owners and restore the historic wetland hydrology; 3.) the property lies relatively close (within 50 miles) to the area of habitat losses associated with the construction of Albeni Falls Dam; 4.) the property was not encumbered by a formal drainage district; 5.) the original wetland basins appeared to be intact; and 6.) the property included a water right from Boundary Creek sufficient to serve as the source of water to restore the area's wetland hydrology. The IDFG believes that a change in land use will greatly improve wildlife habitat and associated wildlife populations.

The WMA will be managed by the IDFG to develop wildlife and fish habitat and to provide public access for hunting, fishing, and other recreational pursuits. To accomplish this, development activities will focus on restoring historic wetlands, establishing native vegetative communities, and promoting compatible public recreation. Bringing the property into public ownership assures public access previously unavailable under private ownership.

ROLE OF COOPERATING AGENCIES AND ORGANIZATIONS

The acquisition of the Boundary Creek WMA and the preparation of a wetland restoration and long-term management plan could not have been accomplished by the IDFG acting on its own. The financial and technical assistance offered by other public agencies and private organizations allowed this project to come together, and their assistance was invaluable. This section of the plan briefly identifies the role of each of the primary agencies and organizations involved and the extent of their contribution.

U.S. DEPARTMENT OF AGRICULTURE, NATURAL RESOURCES CONSERVATION SERVICE

The NRCS is the branch of the USDA responsible for providing technical advice and voluntary conservation programs to the nation's farmers and ranchers to conserve and protect natural resources. The Wetlands Reserve Program (WRP) is a voluntary program administered by the NRCS that was authorized by an act of Congress – The Food, Agriculture, Conservation and Trade Act of 1990 (Public Law 101-624) commonly referred to as the 1990 Farm Bill (McKenzie 1997).

The goal of the WRP is to assist landowners in restoring and protecting wetlands through cost-share agreements or the purchase of conservation easements. Under the program, a permanent easement purchases 100% of the agricultural value of a property or an established cap for the area and also funds 100% of the restoration costs. For the Boundary Creek WMA, the NRCS purchased a conservation easement on the property from the former owners for \$1,176,900. The NRCS also committed \$657,500 towards restoring the site's historic wetlands.

The NRCS is not staffed nor funded to be a land management agency. Once the WRP restoration funds have been spent on a project, the NRCS delegates operations and maintenance of conservation easements to the landowner or other qualified agencies or groups through cooperative agreements (Fink 2000). The NRCS will be responsible for replacing or repairing structures (water delivery system, dikes, and water control structures) due to normal wear and tear or events beyond the control of the landowner (Fink 2000). The WRP restoration funds cannot be used to purchase maintenance equipment or buildings (Fink 2000). In the case of the WRP easement on the Boundary Creek WMA, the IDFG (landowner) has been delegated the responsibility for operations and maintenance.

U.S. DEPARTMENT OF INTERIOR, U.S. FISH AND WILDLIFE SERVICE

As part of the WRP, the USFWS has a statutory consultation role for policy development and implementation (McKenzie 1997). In addition, the USFWS is the lead agency responsible for reviewing all federal agency programs for compliance with the provisions of the Endangered Species Act. The USFWS also administers grant programs to landowners for qualified wildlife habitat developments on wetland sites. The USFWS committed \$20,000 towards restoring native shrub and tree communities on the Boundary Creek WMA.

U.S. DEPARTMENT OF ENERGY, BONNEVILLE POWER ADMINISTRATION

The BPA is the federal agency that markets and transmits electricity produced by federal hydroelectric facilities constructed by the US Army, Corps of Engineers and the US Bureau of Reclamation within the Columbia River Basin in Washington, Oregon, Idaho and Montana.

The Pacific Northwest Electric Power Planning and Conservation Act of 1980 (Public Law 96-501) directed that measures be implemented by BPA to protect, mitigate, and enhance fish and wildlife to the extent affected by development and operation of hydropower projects on the Columbia River system (Martin et al. 1988). The Act created the Northwest Power Planning Council (NPPC), which in turn developed the Columbia River Basin Fish and Wildlife Program (Program). Under the Act, BPA has the authority and obligation to fund fish and wildlife mitigation activities that are consistent with the NPPC's Program (USDE 1996).

Part of the Program was the development of wildlife protection, mitigation, and enhancement plans for each of the hydropower facilities on the Columbia River system and, ultimately, implementation of the plans to mitigate wildlife habitat losses. The IDFG, assisted by a team of agency and tribal biologists, developed a mitigation plan in 1987 for the Albeni Falls hydroelectric facility that had been constructed by the U.S. Army, Corps of Engineers on the Pend Oreille River in Bonner County, Idaho (Martin et al. 1988). The plan identified numerous opportunities to mitigate for past hydroelectric impacts, one of which was acquisition of the area at Boundary Creek in the Kootenai River drainage. The Albeni Falls Wildlife Protection, Mitigation, and Enhancement Plan was approved by the NPPC in 1990.

BPA prepared the Albeni Falls Wildlife Management Plan: Environmental Assessment in 1996. The plan guides the development of wildlife mitigation projects associated with Albeni Falls Dam proposed by the IDFG and the Albeni Falls Interagency Work Group (Work Group), approved by the NPPC, and proposed for funding by BPA. The plan enables the IDFG and the Kalispel, Coeur d'Alene, and Kootenai Indian Tribes to protect and enhance, through land acquisition, a variety of wetland and riparian habitats lost as a result of the construction of Albeni Falls Dam; and conduct long-term wildlife habitat management activities at individual mitigation project sites (USDE 1996).

The Northern Idaho Wildlife Mitigation Agreement (Agreement) was jointly prepared and approved by the IDFG and BPA in June 1997 (USDE and IDFG 1997). The Agreement formalizes obligations of both parties in the protection, mitigation, and enhancement of wildlife habitat through the acquisition, protection and management of projects.

BPA's contribution to the Boundary Creek acquisition was \$672,885. The Agreement specifies that BPA will receive habitat protection credit for an acquisition proportional to its investment. In this case, BPA contributed 29.8% towards the total acquisition cost and will receive 29.8% of the baseline habitat credits associated with the property. It is uncertain at this time the extent to which BPA will be involved in any enhancement activities. However, the IDFG anticipates that BPA will be asked to fund some tree and shrub plantings for which BPA will receive enhancement credits. The IDFG anticipates that BPA will fund all reasonable and allowable operations and maintenance activities associated with the property, estimated at \$69,822 per year.

ALBENI FALLS INTERAGENCY WORK GROUP

The Work Group is comprised of representatives of the IDFG, Kalispel Tribe of Indians, Coeur d'Alene Tribe, Kootenai Tribe of Idaho, USFWS, NRCS, and the US Army, Corps of Engineers. The IDFG, all three Tribes, and the USFWS have been recognized by the NPPC as having the authority as state, tribal and federal wildlife managers to ensure that mitigation activities related to the construction of Albeni Falls Dam are implemented and consistent with the NPPC's Program.

The purpose of the Work Group is to identify, evaluate, and recommend wildlife mitigation funding opportunities; develop funding proposals; and compete for funds provided by BPA for the purpose of mitigating the loss of wildlife habitat through land acquisitions, easements, enhancements, and long-term management activities.

The IDFG presented a proposal to the Work Group in January 1998 to fund a portion of the acquisition cost of the Boundary Creek WMA with BPA funds. The Work Group evaluated the proposal, recommended the project for future funding, and secured \$672,885 from BPA towards the acquisition cost.

DUCKS UNLIMITED, INCORPORATED

DU is a private, nonprofit nationwide organization dedicated to conserving wetland habitat for waterfowl and other wildlife in the United States, Canada, and Mexico through private fund raising. The mission statement of DU is to fulfill the annual life cycle needs of North American waterfowl by protecting, enhancing, restoring, and managing wetlands and associated uplands.

DU has been contracted by the NRCS through a nationwide Memorandum of Agreement to produce a one-foot contour map of the floodplain, design and engineer the wetland restoration plan, and contract all construction and restoration activities. For the Boundary Creek restoration project, DU committed \$76,700 in engineering and design costs.

INTERMOUNTAIN WEST JOINT VENTURE, INCORPORATED

The IWJV is a private, nonprofit organization comprised of representatives from the federal government, state fish and wildlife agencies within the Intermountain west, and private organizations, companies and individuals interested in the conservation of wetland ecosystems.

The purpose of the IWJV is to pool financial resources among the public and private sectors to compete for federal matching funds authorized by the North American Wetlands Conservation Act of 1989, Public Law 101-233 as amended.

In May 1999, the IWJV Management Board approved a \$73,000 contribution to be used for restoration of the Boundary Creek WMA wetlands.

CROWN PACIFIC LIMITED PARTNERSHIP

Crown Pacific (CP) was formed in 1994 to acquire, own, and operate timberlands and wood product manufacturing assets located in the northwest. The company's business consists primarily of growing and harvesting timber for sale as logs in domestic and export markets, and the manufacturing and marketing of lumber and other wood products. The company owns approximately 800,000 acres of timberland in Washington, Oregon, Idaho, and Montana,

CP owns property due west of the Boundary Creek WMA and donated an easement valued at \$5,000 to allow the NRCS to construct a water diversion in Boundary Creek at a more favorable location upstream from the existing point of diversion. CP also agreed to purchase and install a new bridge across Boundary Creek to facilitate construction of the water diversion (\$22,000); donate equipment time (\$8,000); and donate rock from their property (\$15,000). CP's total commitment to wetland restoration on the WMA is \$50,000.

PUBLIC INVOLVEMENT

The IDFG's first contact with local elected public officials occurred 1.5 years prior to the acquisition of the Boundary Creek property. On January 13, 1998, IDFG representatives met with the Boundary County Commissioners to discuss purchasing the property. On April 7, 1998, IDFG representatives met with the Boundary County Soil Conservation District Board to discuss the WRP easement applied for by the former owners and to express the desire to purchase the Boundary Creek property once the easement was purchased by the NRCS. At both meetings, the Commissioners and the Board requested the IDFG to assemble a group of local people to seek public input after the acquisition had been finalized and prior to development of a management plan. The Department agreed to both requests.

Boundary County was officially notified by the IDFG of its intent to purchase the Boundary Creek property by letter dated April 9, 1999. This notification satisfied the requirements of Idaho Code 36-104(b)(7), and the County Commissioners requested that the Department hold a public meeting to discuss the proposed acquisition and solicit public input.

A public meeting was held at the Mount Hall School near Copeland, Idaho, on May 19, 1999. Thirty individuals attended the meeting including all three County Commissioners. Most of the public who chose to offer comments expressed a common theme. Few people wanted to see agricultural land go out of production and into public ownership but realized that a property owner had the right to sell to whomever they chose. No one spoke in outright opposition to the acquisition.

Once the property was acquired, the IDFG formed a citizen's task force to provide community input on issues and concerns that needed to be addressed in the management plan. Twenty-one local residents, representing sportmen's groups, elected officials, agricultural producers, neighboring landowners, environmental groups, the Kootenai Tribe, and the Chamber of

Commerce, were invited to represent a cross-section of the community. Meetings were held on July 6, August 31, September 14 and October 7, 1999. A final report was presented to the IDFG on November 15 and to the Boundary County Commissioners on November 23, 1999 (Taylor 1999). Management recommendations identified in the final report are covered under **PUBLIC ISSUES AND CONCERNS** on pages 43-48. The individuals who were invited to attend and their areas of interest are listed below.

Phil Allegretti	Local landowner, Ducks Unlimited member
Scooter Bremer	Ducks Unlimited member, Pheasants Forever member
Ken Brink	Kootenai Valley Sportsman's Association, cattle rancher
Ripley Comeges	Local landowner and sportsman
Merle Dinning	Boundary County Commissioner
Wally Dinning	Selkirk Archers, Kootenai Valley Sportsman's Association
Mark Hubbard	Local landowner
Tom Iverson	Farmer, Soil Conservation District Board
Bob Krause	Longtime resident and historian
Paul Matejovsky	Bonnors Ferry Chamber of Commerce
Kennon McClintock	Crown Pacific Limited Partnership
Paul Merritt	Pheasants Forever member
John O'Connor	Local businessman, Idaho Conservation League
Dennis Ponsness	Cattle rancher, nearby landowner
Chuck Roady	Crown Pacific LP, Kootenai Valley Sportsman's Association
Allen Rose	Audubon Society, Boundary Backpackers
Scott Soultz	Kootenai Tribe of Idaho
Gordon Stanley	Rancher, Kootenai Valley Sportsman's Association
Digger Thorman	Neighboring farmer
Bob Vickaryous	Neighboring rancher
Dave Wattenbarger	County Extension Agent, Kootenai Valley Sportsman's Association

ACQUISITION

The acquisition of the Boundary Creek WMA occurred in two phases. The first transaction was the purchase of a perpetual easement from Deon and Louise Hubbard on 1,241 acres by the USDA, NRCS under the provisions of the WRP. The easement was purchased on January 12, 1999, for \$1,176,900. The second transaction was the fee-title purchase by the IDFG of the residual value of the Hubbard's property covered by the WRP easement and an additional 164 acres outside the easement. The fee-title purchase of the 1,405-acre property was completed on June 1, 1999, for \$1,072,885. The funds for the fee-title acquisition came from two sources. The BPA contributed \$672,885 from Albeni Falls Dam wildlife mitigation funds. The IDFG paid the remaining \$400,000 from its land acquisition budget and Habitat Improvement Program budget. CP, an adjacent landowner, donated an easement in June 2000 valued at \$5,000 to allow re-locating the point of diversion for the IDFG's Boundary Creek water right. The total cost of

acquiring the property, including the WRP easement, fee-title acquisition, and CP's easement was \$2,254,785.

Acquisition Costs		
NRCS WRP Easement	\$1,176,900	52.2%
BPA Wildlife Mitigation Funds	672,885	29.8%
IDFG Land Acquisition Funds	400,000	17.7%
CP Easement	<u>5,000</u>	<u>0.3%</u>
TOTAL	\$2,254,785	100.0%

Acquisition of the property served two main purposes: 1.) It provides for partial mitigation to the State of Idaho for wildlife losses associated with the inundation of wildlife habitat along the shores of Lake Pend Oreille and its tributaries resulting from the construction of Albeni Falls Dam in 1952; and 2.) It provides for the restoration of a portion of the nation's historic wetlands that were lost to development.

ENVIRONMENTAL CONTAMINANT SURVEY

Prior to the acquisition of the property, the appraiser noted the presence of two tanks used to treat fence posts, several above ground fuel tanks, and a buried fuel tank (Neibergs 1998). On May 8, 1999, a 10,000 gallon underground diesel tank and two tanks used to treat fence posts were removed by Minex Exploration who had been hired by Mr. Hubbard to do the removal (Deon Hubbard, personal communication as cited in Maxim 1999). Soil samples taken beneath the tanks showed no evidence of leakage (Schifrin 1999).

A Phase I Environmental Assessment was ordered by the IDFG after the tanks were removed. No other issues of concern were identified that warranted further investigation (Maxim 1999).

CULTURAL RESOURCE SURVEY

Prior to the acquisition of the WRP easement by the NRCS, the Boundary Creek property was surveyed by the NRCS cultural resource specialist for the presence of cultural resources. Four cultural resource sites were identified – the locations of the Klockman house and barn, the Porthill Ferry, and two sets of bridge pilings from the early 1930's. None of these sites will be affected by the proposed WRP restoration plan (Spencer 2000). Recommendations for management of the identified sites were provided. Once the WRP restoration work has been completed, the IDFG will assume management responsibility.

PUBLIC RECORDS SEARCH

The public records search of Boundary County disclosed seven rights-of-way easements for public road access granted to Boundary County and one to the United States of America. Two utility easements and the WRP easement purchased by the NRCS were also disclosed.

IMPROVEMENTS

All buildings on the site except one are located on the extreme northeast corner of the property. A 27' x 40' shop and two open front machine sheds are over 50 years old and in poor to fair condition. An 8' x 30' Nassau travel trailer that once served as a temporary residence and office for the former owner is in poor condition.

The property is supplied with electric and telephone lines. No usable well for drinking water exists. The former owner pumped water from Boundary Creek for purposes other than drinking.

Grain loading and storage facilities are in good condition and consist of six 12,000-bushel, galvanized steel, storage bins on concrete foundations together with an adjacent pole shed and an auger used to fill the storage bins. Three small steel grain bins, probably once used to store livestock feed, are in poor condition.

At one time, the majority of the property was fenced with three strands of barbed wire. However, the fence has not been maintained for years and is no longer functional in some areas. The northern and western boundaries of the property are adjacent to graveled public roads in good condition.

The farm ground (1,039 acres) is protected from flooding on three sides by dikes that are still in good condition. An old diesel engine set up in a small shed was used to power a large pump to move water off the farm ground into Boundary Creek near the northwest corner of the property.

The purchase of the property included a 19.8 cubic feet per second (cfs) water right from Boundary Creek with an annual volume of 2,970 acre-feet. (An acre-foot of water covers one acre to a depth of one foot.) During dry years, the former owner used this right to sub-irrigate the property in the fall after replanting.

SITE DESCRIPTION

The Boundary Creek WMA is located on the west side of the Kootenai River Valley in Boundary County, Idaho, immediately south of the International border between the United States and British Columbia, Canada (Figures 1 and 2). The nearest population centers are Bonners Ferry, Idaho, 26 miles to the south, and Creston, British Columbia, five miles to the north. The property is directly west across the Kootenai River from Porthill, Idaho, and the United States and Canadian Ports of Entry.

Figure 1. Boundary Creek WMA Vicinity Map.

Figure 2. Boundary Creek Wildlife Management Area.

The 1,405-acre property is situated at the foot of the Selkirk Mountains. Approximately 1,241 acres lie within the floodplain of the Kootenai River protected by a series of dikes. The bottomland has been drained through a series of ditches and pipes and reclaimed over the last 80 years for growing hay crops, grazing livestock and growing wheat.

The WMA is bordered on the north by the present channel of Boundary Creek just inside the Canadian border. The Kootenai River forms the eastern boundary of the property and flows from south to north into Canada. The southern boundary is private farmland, also diked and drained. The western boundary is a public road separating the property from timberland owned by CP, a private timber company.

Access to the WMA is primarily from US Highway 95 on the east side of the Kootenai River Valley. A paved county road crosses the river at Copeland and intersects the Westside Road on the west side of the valley. The Westside Road is a paved county road that travels north where it turns into a graveled US Forest Service road at the junction of the Smith Creek and Boundary Creek roads. A Forest Service road traverses the western edge of the property and eventually meets a graveled county road constructed on top of the southern dike of Boundary Creek. The dike road runs approximately three miles due east ending at the Kootenai River and is the main access road for the property.

The Boundary Creek WMA is located eight miles south of the 17,000-acre Creston Valley WMA due west of Creston, British Columbia, and 20 miles north of the 2,774-acre Kootenai National Wildlife Refuge northwest of Bonners Ferry, Idaho. A 70-acre non-contiguous portion of the Creston WMA called the Dale Marsh Unit is adjacent to the northwest corner of the Boundary Creek WMA.

HISTORICAL PERSPECTIVE

NATURAL HYDROLOGY, FLOODPLAIN LANDSCAPE AND VEGETATION

The Kootenai River originates in the Canadian Rocky Mountains in southeastern British Columbia approximately 160 miles north of the International boundary. The river flows due south and enters the United States in the northwest corner of Montana. The river continues to flow south in Montana then abruptly turns due west near Libby, Montana, before entering Idaho east of Moyie Springs. The river flows west in Idaho before turning north at Bonners Ferry. From Bonners Ferry, the river flows north to cross the International boundary again at Porthill, Idaho. The river continues north in Canada and enters Kootenay Lake near Sirdar, British Columbia. (The Canadian spelling of Kootenai is Kootenay.)

North of Bonners Ferry, the river lies within a portion of the Purcell Trench, a broad, U-shaped valley scoured by great ice sheets approximately 10,000 years ago (Chugg and Fosberg 1980). The river valley includes a floodplain varying from 0.5 to three miles in width bordered by the Purcell Mountains on the east and the Selkirk Mountains on the west. The valley was filled by sediments associated with glacial Lake Kootenay (Chugg and Fosberg 1980). Remnants of these sediments formed high terraces dissected by streams entering the floodplain on both sides of the river.

Historically, the Kootenai River floodplain in Idaho and British Columbia included approximately 70,000 acres of contiguous floodplain wetlands (Chugg and Fosberg 1980 and Don Low, B.C. Ministry of Agriculture, personal communication). The watershed of the Kootenai River upstream from the International border at Boundary Creek encompasses 13,700 square miles of mountainous terrain in Idaho, Montana and British Columbia and amasses an extensive snowpack. The wetlands in the floodplain were created and maintained by flooding from the Kootenai River watershed each year from April through July due to melting snow. The extent and duration of the annual flood was dynamic depending upon the accumulation of snow at high elevations within the watershed. Each year before rising spring temperatures initiated run-off in the mountains, low elevation snowmelt and rainfall partially filled depressions in the floodplain.

Tributary streams flowing across the Kootenai River floodplain would reach peak flows each year in May. As the high flows reached the flat river floodplain, the rate of flow diminished and the streams lost energy. Large boulders, gravel and sand accumulated in alluvial fans at the foot of the mountains. In the floodplain, tributary flows swelled to fill the deeply incised stream channels and over-topped their banks spreading out across the floodplain area. As floodwaters overflowed and lost energy, silt was deposited along the stream banks forming natural levees of higher ground. The first written description of the annual tributary flooding near Boundary Creek was documented by the British explorer David Thompson on May 14, 1808: “The water from the melting snow in the mountains had risen upwards of six feet and overflowed all the extensive fine meadows of this country” (Rockwell 1984).

Tributary flows throughout the watershed were still very high in June, eventually causing the Kootenai River to reach its maximum annual elevation and overtop its banks. As river flood waters poured onto the floodplain and slowed down, silt was deposited on the riverbanks forming natural levees higher than the adjacent floodplain. The finest material, high in clay content, was deposited on the floodplain farthest from the river’s channel. Over thousands of years, this cycle of annual river flooding resulted in deep accumulations of rich alluvial soil on the floodplain.

In July, the annual flooding receded and the wetland basins on the floodplain were left filled with water but isolated from the tributary streams and the main river by the natural levees built up by the deposition of sediments. The length of time the wetland basins retained water varied annually depending upon summer temperatures, precipitation, and the depth of the wetland basins.

The natural hydrodynamics and the resultant floodplain landscape created diverse plant communities and habitats. Amos D. Robinson, a surveyor for the General Land Office (now the Bureau of Land Management), a branch of the US Department of the Interior, provided a basic description of the Boundary Creek area in August 1894: “The body of this township is composed of marsh lands and a narrow strip of rich alluvial bottom along the Kootenai River slightly above ordinary high water.” “Land, level bottom and marsh; soil, alluvial, first rate; timber, cottonwood with dense brush” (GLO Notes 1894).

The General Land Office survey of the Boundary Creek property was completed by A.W. Barber in December 1898 (GLO Notes 1898). Barber noted that higher land in the floodplain was occupied by cottonwoods, some as large as three to four feet in diameter, aspen, “dense snowy brush” (probably snowberry), “bearberry” (?), “thorn” (probably hawthorn), and willow. Timber and brush varied from “dense” and “heavy” to “a scattering”. Lower portions of the floodplain were described as “meadow”, “marshy meadow”, “wet marsh”, “tule marsh” (probably cattails), “tules and deepmarsh”, and “open slough”. According to Barber, the steep, forested land adjacent to the floodplain at Boundary Creek was composed of heavy timber including cedar, larch, pine, fir and cottonwood.

A US Forest Service (USFS) photograph taken near Smith Creek prior to 1916 provides documentation of what the natural vegetation of the Kootenai River floodplain looked like over 80 years ago (Figure 3). At that time, the main channel of Smith Creek entered the floodplain upstream of Boundary Creek and flowed across the southeast corner of the WMA before entering the Kootenai River. The coarse material of the Smith Creek alluvial fan (lower right portion of the photograph) was densely forested and included cottonwoods and conifers. Wetland basins were vegetated by herbaceous species. The natural levee associated with Long Canyon Creek, the next drainage upstream from Smith Creek, runs across the center of the photograph while the natural levee associated with the Kootenai River occurs further out on the floodplain. These natural levees were vegetated by stringers of cottonwoods and shrubs. The natural condition, composed of trees and shrubs on high ground and herbaceous species in floodplain basins, is further born out by a photograph of the WMA taken in 1931 when the property was owned by Albert and Martha Klockman (Figure 4). A USFS aerial photograph of Boundary Creek taken in 1934 indicates the natural pattern of floodplain vegetation was generally still intact even though the Klockman’s reclamation efforts (diking, drains) were actively underway (Figure 5).

FLOOD CONTROL AND AGRICULTURAL DEVELOPMENT

During the last 100 years, the pioneer settlers of the 70,000-acre Kootenai River floodplain in Idaho and British Columbia, gradually reclaimed the area for grazing and then farming. Historically, Boundary Creek flowed northeast from Idaho into Canada before entering the Kootenai River. In 1892, the Alberta-British Columbia Exploration Company built a dike along the International border in an attempt to reclaim the floodplain for farmland (Constable 1978). This effort resulted in the diversion of Boundary Creek south into Idaho. This reclamation attempt failed with the great flood of 1894 when the new dike washed out (Constable 1978). In spite of the dike failure, in 1898, A.W. Barber, the General Land Office surveyor, noted that Boundary Creek was flowing south in an old channel of Smith Creek that still exists along the base of the mountain on the western edge of the WMA (GLO Notes 1898). A May 1899 General Land Office survey map shows the diverted channel of Boundary Creek behind a 15 foot high dike built just inside Canada. The channel abruptly turns 90° from the border and flows south into Idaho joining the main channel of Smith Creek a short distance away. The “new” channel of Boundary Creek in Idaho is labeled on the map – “Big Slough, Outlet of Boundary Creek”. The map also depicts a breach in the dike approximately 1/4 mile east of the point where Boundary Creek turns 90° south. This breach presumably was evidence of the damage caused by the 1894 flood cited by Constable (1978).

Figure 3. US Forest Service Photograph of the Kootenai River Floodplain Near Smith Creek Prior to 1916.

Figure 4. Photograph of the Boundary Creek WMA in 1931 – The Klockman’s Colony Ranch.

Figure 5. US Forest Service Aerial Photograph of Boundary Creek in 1934.

Thirty years later, a US Geological Survey map dated 1928 shows Boundary Creek running in a straight line due east to the Kootenai River immediately north of the International border (Figure 6). Two active channels of Smith Creek flowed across the WMA. One channel of Smith Creek flowed north into the new channel of Boundary Creek at the International border. The other channel of Smith Creek forked about 1.5 miles south of the border and flowed northeast to the Kootenai River. The Kootenai Valley Power and Development Company rebuilt the dike along Boundary Creek at the International boundary in 1929-30 (Constable 1978). For the last 70 years, Boundary Creek has remained within its dikes aided by periodic dredging of the lower channel. Smith Creek continued to flow across the WMA until it was re-channeled, straightened and diked sometime in the 1950's to run due east to the Kootenai River (Albert Thorman personal communication).

Floodplain reclamation efforts in the United States mirrored those in British Columbia. Albert and Martha Klockman owned the WMA property in the 1920's and 1930's and made the first efforts to drain and dike the area (Bessler 1990). The first dike along the banks of the Kootenai River to reduce flooding at the WMA was constructed around 1921 (Bessler 1990). Photographic evidence of the Klockman's efforts to drain the property in 1934 can be seen in Figure 5. Throughout the 1930's, 40's and 50's the entire river floodplain in Boundary County was reclaimed for farming with the assistance of US government programs and funding provided by the US Department of Agriculture and the US Army, Corps of Engineers. A system of Drainage Districts was created to drain and pump water off of farmland and both sides of the Kootenai River were diked. Tributary streams were channeled, straightened and diked to run directly into the river to eliminate flooding.

In spite of the dikes, the Kootenai River still caused flooding and landowners were forced to pump water off their fields until 1973 when Libby Dam was completed on the river upstream

near Libby, Montana. Due to its storage capacity, Libby Dam significantly reduced spring flood events and further increased the potential for agricultural development in the Kootenai River Valley.

The Kootenai River Grazing Association owned the WMA prior to 1972 and utilized the property for growing hay and grazing cattle. Deon Hubbard and his brothers purchased the Boundary Creek property in 1972. In 1985, Deon and Louise Hubbard became the sole owners. The Hubbards systematically improved the drainage system on the property for 25 years, but during high river flows, still had to pump water off the fields. The Hubbards farmed approximately 1,039 acres of the property annually for wheat production. In August 1999, the last wheat crop was harvested.

CURRENT PHYSICAL ENVIRONMENT

CLIMATE

Boundary County, Idaho, has a typical Pacific Northwest climate. Normal weather patterns include cool, wet springs and falls; dry, moderately warm summers; and relatively long cool winters with periods of severe and moderate temperatures.

Figure 6. US Geological Survey Map at Boundary Creek in 1928.

The weather locally is influenced by both the Pacific maritime and mid-continent weather systems. Fronts moving eastward from the Pacific Ocean are moist and warm, while mid-continent fronts moving south from Canada are generally cold and dry.

Boundary County winters are warmer and wetter than similar latitudes and elevations in mid-continent locations. The area receives most of its 20 to 24 inches of average annual precipitation from October to March. Average daily maximum temperatures in the winter are at or slightly below freezing, and average daily minimum temperatures vary from the high teens to the lower twenties. While temperatures of zero or lower are never recorded in many winters, as many as 20 days of zero or lower temperatures occur in other years. The coldest winter temperatures occur when Arctic air from Canada dominates, resulting in cold, clear winter nights. Winter snow accumulations may vary from less than 10 to more than 90 inches.

Summers are generally warm, dry, and sunny. Average daily maximum temperatures in the summer vary from the mid-seventies to the mid-eighties while average daily minimums are in the forties.

On the average, the last spring freeze occurs about mid-May, while the first fall freeze occurs around mid-September. The frost-free period varies from 120 to 140 days a year.

TOPOGRAPHY AND SOILS

The majority of the WMA is relatively flat except for the western edge. Elevations on the floodplain, excluding the dikes, range from 1,748 feet to 1,760 feet (DU and USDA 2000). The highest elevation on the WMA is about 2,040 feet on the timbered hillside near the southwest corner. The lowest elevation in Boundary County is where the Kootenai River enters Canada near the northeast corner of the property.

While much of the WMA encompasses the flat Kootenai River floodplain, the western edge includes steeply rising glaciated mountainsides at the foot of the Selkirk Mountains. Soils in this area belong to the Pend Oreille-Idamont association and are composed of gravelly sandy loam and rock outcroppings (Chugg and Fosberg 1980).

The floodplain soils and landscape reflect thousands of years of annual flooding. Coarse textured Bane soils occur at the mouths of steep canyons where high energy, spring tributary flows meet the wide, flat Kootenai River floodplain. A portion of the Boundary Creek alluvial fan occurs on the northwest corner of the property and is composed of large boulders, cobble, gravel and sand. This soil type is excessively drained and formed in granitic alluvium. Soil pH is neutral and permeability is rapid (Chugg and Fosberg 1980).

Finer material was carried onto the floodplain by both tributary creeks and the Kootenai River. As annual floodwaters over-topped creek and riverbanks, silt was deposited forming natural levees. These natural levees make up the Farnhampton soil-mapping unit. Farnhampton soils are composed of silt loam formed in alluvium. This soil is moderately well drained, moderately

permeable, mildly alkaline, and calcareous throughout. Snail shells are present in many soil samples (Chugg and Fosberg 1980).

As annual flood water flowed further onto the floodplain, even finer material was deposited in basins, depressions, and swales. The Schnoorson soil type is composed of silty clay loam with 27 to 34 percent clay. Schnoorson soil is poorly drained with moderately slow permeability. The soil type is mildly alkaline and moderately calcareous. Snail shells are common in the upper soil profile (Chugg and Fosberg 1980).

WATER RESOURCES AND HYDROLOGY

The WMA includes over two miles of frontage along Boundary Creek and approximately three miles along the Kootenai River. Dikes have been constructed along both Boundary Creek and the Kootenai River to prevent high spring flows from flooding the property.

The remnants of two historic channels of Smith Creek occur on the WMA but neither is currently connected to the present channel of Smith Creek. The western-most channel runs north and south at the foot of the steep hillside on the western edge of the property and is approximately 1.5 miles long. While this channel is no longer connected to Smith Creek, it does carry run-off and spring water north into Boundary Creek. Flows vary from no flow in the summer to over seven cfs in the spring. At the south dike of Boundary Creek, a one-way culvert beneath the dike allows gravity flow off the WMA but prevents high spring flows in Boundary Creek from flowing back onto the property. A pump, located at the entrance to the culvert, has been used to accelerate the removal of water from the property in wet years.

The second former channel of Smith Creek is situated at the southeast corner of the WMA. This channel is approximately $\frac{3}{4}$ mile long with no inlet or outlet.

Spring run-off flows in Boundary Creek can exceed 1,000 cfs (Figure 7). However, high flows cannot flood the adjacent properties due to the dike on both sides of the creek. Due to the operation and storage capacity of Libby Dam, Kootenai River flows are much lower than would occur naturally. The combined affects of lower flood elevations and dikes along the Kootenai River now prevent flooding throughout the Kootenai Valley including the WMA.

With the acquisition of the WMA, the IDFG received a 19.8 cfs water right from Boundary Creek. This water right is available for use from March 15 to November 15 each year with a maximum diversion volume of 2,970 acre-feet.

BIOLOGICAL RESOURCES

VEGETATION

Current vegetative cover types on the WMA include 1,039 acres of former cropland, most of which was planted to perennial grasses and forbs by the NRCS in the fall of 1999; 43 acres of

Boundary Creek Discharge Volume Monthly Averages 1980-1997

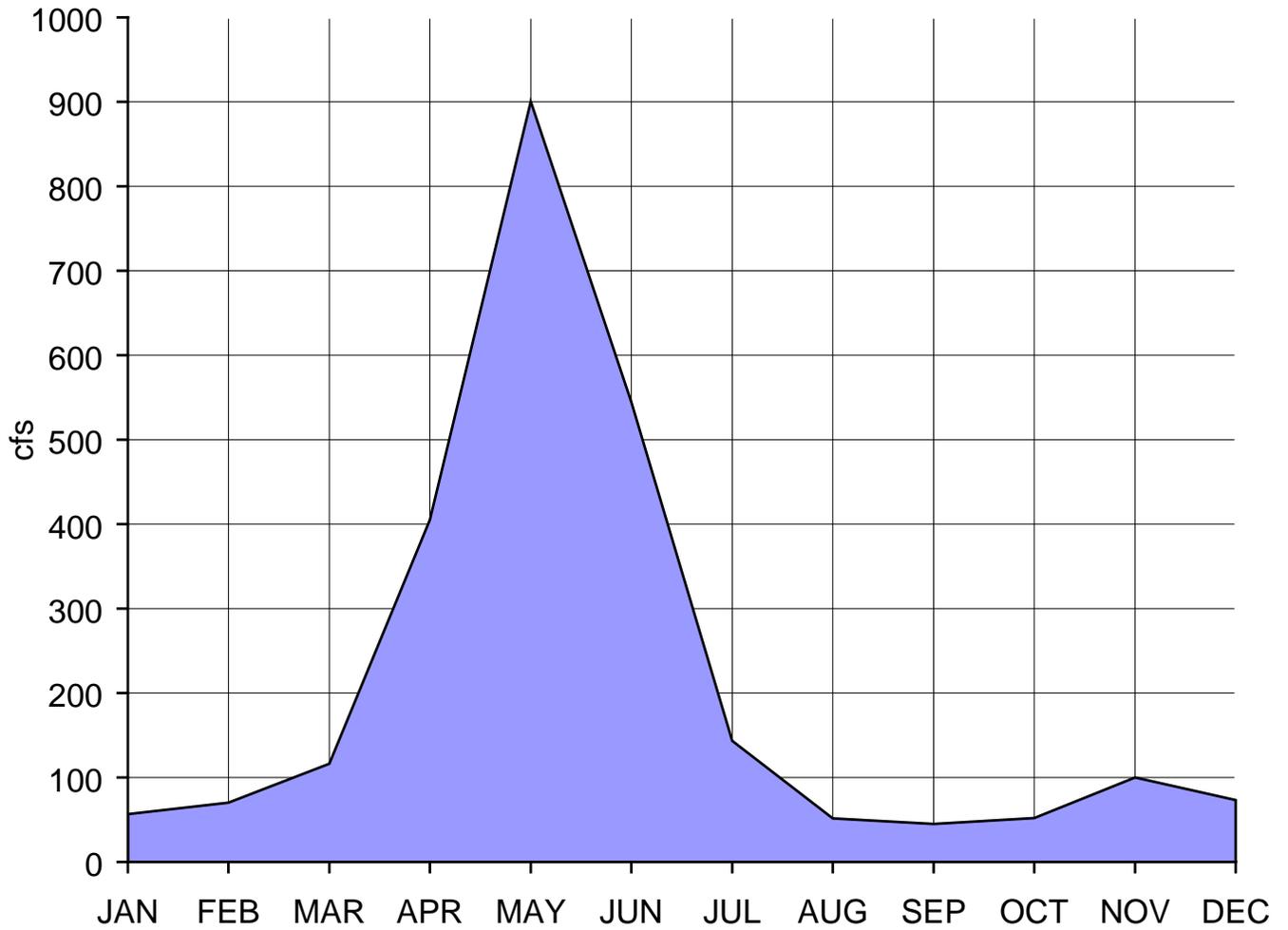


Figure 7. Boundary Creek discharge volume (cfs), monthly averages (1980-1997).

emergent herbaceous wetlands; 80 acres of deciduous scrub-shrub wetlands; 68 acres of floodplain forest; 141 acres of upland coniferous forest; and 34 acres of roads (Figure 8).

The last wheat crop was harvested from cropland on the WMA in August 1999. In November 1999 approximately 850 acres were prepared and planted to perennial grasses and forbs. While most of the cropland area was farmed for many years, poorly drained portions of the property continued to support wetland vegetation. Species occurring at these sites include soft stem bulrush, cattail, water plantain, poverty rush, horse tail, beggars tick, spike rush, slough grass, smartweed, sorrel, burreed, and manna grass.

The former channels of Smith Creek have cut deep channels across the WMA and contain narrow wetland edges. Plants in these channels include cattail, spike rush, sedge, beggars tick, elodea, and marsh buttercup.

Grassland sites occur along the dikes and in the northwest corner of the WMA. Grass species in these locations include orchard grass, timothy, smooth brome, reed canarygrass, quackgrass, redtop, and intermediate wheatgrass. Some cropland margins are occupied by barnyard grass.

Narrow strips of floodplain forest occur along Boundary Creek, the Kootenai River, and one of the former channels of Smith Creek. These riparian areas support trees and shrubs as well as grasses and forbs. Trees in these sites include black cottonwood, aspen, paper birch, red alder, western white pine, western red cedar, western larch, grand fir, and Douglas fir. Shrubs occupying riparian sites include red-osier dogwood, black hawthorn, woods rose, snowberry, blue elderberry, scouler willow, and bittercherry. The riparian zones have been subject to periodic grazing over many years. Past grazing has affected species composition, plant density, and growth form.

The steep mountainside on the western edge of the WMA supports a mixed conifer forest. Past timber harvest activities have removed most of the large trees. However, the present forest canopy is relatively dense. Tree species include western red cedar, Douglas fir, western larch, grand fir, western white pine, black cottonwood, paper birch, aspen, and a few scattered ponderosa pine. Shrubs in this area include buffaloberry, Rocky Mountain maple, serviceberry, oceanspray, ninebark, woods rose, snowberry, common chokecherry, redstem ceanothus, and Rocky Mountain juniper on rock outcrops. Forb species are numerous including pachistima, kinnikinnick, and Oregon grape.

Noxious Weeds

Noxious weeds present on the WMA include Canada thistle, common tansy, spotted knapweed, orange hawkweed, meadow hawkweed, St. John's wort, and hound's tongue. The most prevalent noxious weed on the WMA is Canada thistle. Thistle occurs mainly along dike roads near Boundary Creek and the Kootenai River. Thistle also occurs sporadically throughout the former cropped area and along logging skid trails on the western portion of the WMA.

Figure 8. Boundary Creek WMA Vegetative Cover Types, US Forest Service Aerial Photograph, 1996.

Common tansy is widely scattered along the dike roads as individual plants or small groups of plants. A small patch of hound's tongue occurs in the northeast corner of the property near the mouth of Boundary Creek. St. Johns wort, orange hawkweed, meadow hawkweed, and spotted knapweed occur along logging skid trails in the mixed conifer forest on the western edge of the WMA.

WILDLIFE

Despite many decades of grazing, farming, and occasional logging, the WMA continues to support significant wildlife resources. These include big game, upland game, waterfowl, furbearers, and nongame species. Four wildlife species listed under the Endangered Species Act as threatened or endangered occur as well (NRCS 1999 and USDI 2000).

The WMA lies at the foot of the Selkirk Mountains adjacent to the Kootenai River floodplain. Consequently, wildlife species with large home ranges can seasonally capitalize on the food and cover resources the WMA provides. It is this linkage with a large, undeveloped landscape that allows the WMA to seasonally support all species of big game animals found in northern Idaho with the exception of mountain goats.

Most wildlife use is currently associated with the relatively undeveloped forested habitat located on the western edge of the WMA and between the dikes that contain Boundary Creek. The interior portions of the former croplands are sparsely used by wildlife, but the edges near forested cover are used heavily.

Big Game

Elk and their sign are frequently observed on the WMA from early spring to winter. Steep terrain, dense cover and forage shrubs in the mixed conifer forest on the western edge of the WMA are the most important existing elk habitat. However, in late spring and summer, small groups of elk (10-15) with calves were often observed using green wheat fields throughout the day. The previous landowner observed up to 40 elk in the southwest corner of the wheat fields during the summer of 1999 (Deon Hubbard personal communication). By winter, elk use of the property declines.

Moose appear to make year-round use of a portion of the WMA associated with the alluvial fan where Boundary Creek meets the bottomlands. Moose have also been observed feeding on aquatic plants in the former Smith Creek channel and on shrubs in the mixed conifer forest on the western edge of the WMA. A cow, calf, adult bull, and pair of two-year-old bulls were all observed on the WMA in 1999.

White-tailed deer make year-round use of the WMA and are the most abundant big game species present. Most whitetail use occurs during the winter and early spring. White-tailed deer exploit all existing habitats on the WMA including the former wheat fields. However, winter habitat is restricted to the conifer forest and the floodplain forest in the Boundary Creek alluvial fan.

Abundant sign indicates a considerable amount of black bear use on the WMA in the spring, summer, and fall. Most of the use is confined to the coniferous forest on the western edge of the WMA, the riparian area along Boundary Creek, and the wetland habitat associated with the former Smith Creek channel at the foot of the mountains adjacent to the timber. Old apple orchards on adjacent ownerships are especially attractive to black bears in the fall.

Due to the abundance of white-tailed deer, especially in the winter and early spring, the presence of mountain lions is assumed. Mule deer, although not abundant, are occasionally observed on the WMA .

Upland Game

Ruffed grouse are relatively common in both the coniferous forest and the floodplain forest along Boundary Creek. Snowshoe hares inhabit these areas as well.

Small numbers of wild turkeys occur throughout the year near the forested habitat on the western portion of the WMA. Waste grain from the previous owner's farm operation likely supported turkeys in the winter. Hens with poultts were observed on the WMA in 1999.

Mourning doves nest on the WMA and occur along the Boundary Creek riparian zone in late summer, fall, and winter. Fall and winter use has likely been due to grain storage and spillage near the existing grain bins in the northeast corner of the property.

Waterfowl

The WMA contains seasonal waterfowl habitat even in its drained condition. While gravity drainage continues year-round, field run-off exceeds the drainage capacity and accumulates in former wetland basins in early spring. The former wetland basin in the center of the WMA probably exceeded 100 surface acres at times. During April, surface water accumulations support thousands of migrating waterfowl, primarily tundra swans, Canada geese, white-fronted geese, pintails, and mallards. Approximately 500 white-fronted geese were observed using the WMA for over a week in April 1999. This is the largest concentration of this species documented in northern Idaho. White-fronted geese are rarely seen in the Idaho Panhandle during spring or fall migrations. However, white-fronted geese are common on the Creston Valley WMA eight miles north of Boundary Creek in British Columbia (Brian Stushnoff personal communication).

Waterfowl use on the WMA declines as the spring migration ends and field surface water drains off. By late May, only small numbers of ducks and geese use the limited remaining field surface water. However, at this time Boundary Creek flows peak, filling the floodplain wetlands contained within the dikes. Water levels also remain high in the old Smith Creek channels on the WMA.

Wood duck and mallard broods were commonly observed in wetlands along Boundary Creek and in the old Smith Creek channels in 1999. However, no effort was made to census broods. A common merganser brood was also observed near the mouth of Boundary Creek. Wood ducks are probably nesting in natural tree cavities in the Boundary Creek riparian zone or using nesting

boxes erected on the Dale Marsh Unit of the Creston Valley WMA in British Columbia adjacent to the Boundary Creek property.

Wood duck numbers increase in Boundary Creek and the old Smith Creek channels in late summer. A local sportsman indicated that in past years he has observed concentrations of up to 500 wood ducks near Boundary Creek (Matt Bremer personal communication). In 1999, groups of up to 200 wood ducks were frequently observed. Wood ducks are known to develop roosting concentrations at traditional sites just prior to migration (Belrose and Holm 1994). The WMA may host such a traditional roost site.

Following the wheat harvest in August, field feeding by Canada geese, mallards, and wood ducks was common on the WMA. Concentrations of over 1,000 ducks and geese have been reported in the old Smith Creek channels in mid to late August.

Groups of over 100 mallards concentrate on open water segments of the old Smith Creek channels in the winter. Several hundred mallards have been observed on the Kootenai River adjacent to the WMA during the fall and winter.

Furbearers

Beaver, muskrat, otter, and mink tracks were commonly encountered in the riparian forest along Boundary Creek in 1998 and 1999. Bobcat tracks were also noted during the 1998-99 winter. Other furbearing mammals observed include weasels, coyotes, raccoons, and striped skunks.

Non-Game Wildlife

Very little information exists regarding use of the WMA by non-game species. Species frequently observed include red-tailed hawks (including a nest site), northern harriers, rough-legged hawks (during late fall, winter, and early spring), great horned owls, and great blue herons. Painted turtles are common in the old Smith Creek channels and spotted frogs were also documented.

Agricultural fields provide poor habitat for most non-game wildlife. However, the coniferous forest on the western edge of the WMA and the riparian areas support numerous non-game wildlife species.

FISHERIES

Important fishery resources occur in Boundary Creek and the Kootenai River which form the northern and eastern boundaries of the WMA, respectively. Boundary Creek is one of the largest tributaries to the Kootenai River in Idaho that is accessible to fish migrating from the main river. Many of the tributaries to the river upstream from Boundary Creek are blocked by waterfalls. Boundary Creek is also the most likely producer of bull trout in this stretch of the river. Bull trout were listed as Threatened under the Endangered Species Act in June 1998. Juvenile bull trout have been collected in the lower reaches of Boundary Creek.

Other salmonids inhabiting Boundary Creek include redband rainbow trout, westslope cutthroat trout, eastern brook trout, mountain whitefish, and kokanee salmon. Historically, the lower reach of Boundary Creek was an important spawning area for kokanee migrating upstream from Kootenay Lake in British Columbia. However, this run has declined dramatically over the years and its current status in Boundary Creek is unknown. A small number of kokanee were observed in a side channel of Boundary Creek on the WMA by biologists with the Kootenai Tribe of Idaho in September 1999.

Game fish species occurring in the Kootenai River include redband rainbow trout, cutthroat trout, bull trout, brook trout, mountain whitefish, kokanee salmon, burbot, and white sturgeon. Kootenai River white sturgeon were listed as an Endangered species in September 1994. The Kootenai River is the only drainage in Idaho where burbot are native. However, the population has declined since the 1970's and is closed to harvest.

Prior to the purchase of the WMA, the former owner indicated that several species of spiny ray fish occupied the historic channels of Smith Creek on the property (Deon Hubbard personal communication). These channel segments became isolated due to reclamation efforts to channelize and re-route Smith Creek to its present location sometime in the 1950s. In June 2000, IDFG fishery management personnel surveyed the larger of the two historic Smith Creek channels to determine fish species composition; assess size of game fish collected; and offer recommendations for future management (Fredericks and Litter 2000). Seven species of fish were collected, only three of which are classified as game fish – yellow perch, pumpkinseed sunfish, and black bullhead. The four nongame species represented were peamouth chub, northern pikeminnow, largescale sucker, and longnose sucker. None of the game fish species were over eight inches long.

THREATENED AND ENDANGERED SPECIES

Seven federally listed wildlife, fish, and plant species pursuant to the Endangered Species Act of 1973, as amended, occur either on the WMA or in close proximity (USFWS as cited in NRCS 1999 and USDI 2000). Listed as endangered are the gray wolf and Kootenai River white sturgeon. Listed as threatened are the bald eagle, grizzly bear, Ute ladies'-tresses, bull trout and Canada lynx.

Wildlife

The grizzly bear was listed as threatened in 1975. The WMA provides attractive cover and food resources for grizzly bears due to low levels of human disturbance. Grizzly bears traditionally visit the area during the spring and fall. Primarily they utilize the coniferous forest located on the western edge of the WMA immediately adjacent to wetland habitat associated with the old Smith Creek channel. In spring, succulent wetland vegetation attracts grizzlies that have recently emerged from dens. At least six different grizzly bears were known to use the WMA in the spring of 1999, including a female with cubs (Wayne Wakkinen, IDFG, personal communication). Early settlers in the area established apple orchards that still exist today. One such orchard occurs immediately west of the WMA. These orchards are a strong attractant for grizzlies in the fall that also supplement their diet with sprouting grain and other foods. At least

two grizzly bears were known to use the WMA in the fall of 1999 and another bear was known to be nearby (Wayne Wakkinen, IDFG, personal communication).

The bald eagle was listed as endangered in 1978 and downlisted to threatened in 1995. The WMA supports a bald eagle nest that produced one eaglet to flight stage in August 1999. This nest has been active since 1992 and has successfully produced eaglets to flight stage for the last six consecutive years. Bald eagles also winter along the Kootenai River since it remains ice-free. Important bald eagle foraging sites in the winter include waterfowl concentrations such as often occurs adjacent to the WMA.

The gray wolf was listed as endangered in 1978. Historically, wolves were present in the Kootenai River Valley but were believed to be extirpated in the 1930's (NRCS 1999). Currently there is no known wolf pack activity in the valley. However, transient wolf activity moving between Canada and the United States has been reported (USFWS as cited in NRCS 1999). The Canada lynx was listed as a threatened species in the lower forty-eight states in March 2000. No lynx have been documented on the WMA but the Selkirk Mountains to the west offer suitable lynx habitat at higher elevations.

Fish

The Kootenai River White Sturgeon was listed as endangered in 1994. The population is restricted in the drainage to the Kootenai River upstream from Kootenay Lake, British Columbia, to Kootenai Falls below Libby, Montana. Sturgeon populations have declined in the Kootenai River since natural river flows have been altered by the operation of Libby Dam and sloughs adjacent to the river have been eliminated by diking (NRCS 1999). During the year, sturgeon move up and down the Kootenai River adjacent to the WMA. Some spawning has been documented in the river below Bonners Ferry and may occur near the WMA (NRCS 1999).

Bull trout were listed as threatened in 1998. The entire Kootenai River drainage is listed as a watershed key to the species' recovery. Boundary Creek is known to support bull trout but their relative abundance is unknown (Chip Corsi, IDFG, personal communication). Bull trout would be expected to spawn in the upper reaches of Boundary Creek during the fall. The lower reach of Boundary Creek adjacent to the WMA most likely serves as a migration corridor for bull trout due to its altered condition.

Plants

Ute Ladies'-tresses, an orchid, was listed as threatened in 1998. This plant can be found in wetlands, riparian areas and river meanders. A survey of the Boundary Creek riparian zone was done but no plants were located (NRCS 1999).

HABITAT EVALUATION PROCEDURE

The Work Group selected eight target species to represent wildlife and habitats affected by Albeni Falls Dam and/or that benefitted from mitigation projects such as the Boundary Creek WMA. These species are: bald eagle, black-capped chickadee, Canada goose, mallard, redhead,

muskrat, yellow warbler, and white-tailed deer. These species were chosen because they are high priority according to state, tribal or federal wildlife programs, and/or are indicator species of habitats that were inundated. The ability to determine whether mitigation for Albeni Falls Dam has been achieved will, in part, be determined by whether habitat for the target species improves over time as a result of restoration and management activities undertaken on the Boundary Creek WMA.

The Habitat Evaluation Procedure (HEP), developed by the USFWS in 1980, is a species-habitat based approach used to document existing ecological conditions and the predicted effects of proposed management actions. The HEP can also be used to determine habitat benefits that have accrued after enhancement or restoration activities. The HEP has been endorsed by the NPPC and is the standard methodology used by state, tribal and federal wildlife managers in the Columbia River basin to evaluate the quality of wildlife habitat purchased with BPA wildlife mitigation funds (USDE 1996).

The HEP utilizes habitat suitability models for target wildlife species found within certain vegetative cover types. The HEP is based on the assumption that habitat for selected wildlife species can be described by a Habitat Suitability Index (HSI). This value is derived from an evaluation of the ability of key habitat components to supply the life requisites of selected wildlife species. Habitat quality, expressed as the index or HSI, measures how suitable the habitat is for a particular species when compared to optimum habitat. The HSI varies from zero to one (optimum). The value of an area to a given species of wildlife is a product of the size of the area and the quality of the area (HSI) for the species. This product is comparable to "habitat value" and is expressed as a Habitat Unit (HU). One HU is equal to a unit of area (one acre, for example) which has optimum value to the target species.

The objective of using the HEP on the Boundary Creek WMA was to document the quality and quantity of available habitat for selected target species. In this way, HEP provides information on the relative value of the same area at future points in time so that the impact of land use changes on wildlife habitats can be quantified. The product of the baseline survey determined the number of HUs currently available for each target species and the amount that can become available with management. The WMA provides a total of 991.00 HUs for seven target species evaluated (Stovall 1999).

The forested wetland cover type provides a total of 218.96 HUs for both breeding and wintering bald eagle, black-capped chickadee, Canada goose and mallard. Deciduous scrub-shrub habitat provides 159.20 HUs for Canada goose, mallard, yellow warbler and white-tailed deer. The emergent herbaceous wetlands provide 32.68 HUs for muskrat and mallard. The agricultural area on the property provides 580.16 HUs for Canada goose (Stovall 1999).

Baseline HEP results indicate there are opportunities to improve existing habitat conditions for all target species. These include restoring the WMA's hydrology and wetland basins; increasing the diversity of grasses, forbs, emergents and woody plant species; and implementing moist soil and other wetland management practices.

For a more complete explanation of the HEP process, including habitat suitability models; data collection and interpretation; and the coordinates of HEP transect points, refer to Appendix A.

MANAGEMENT CONSTRAINTS

This section outlines legal requirements and obligations accepted by the IDFG that were imposed by the WRP easement terms and conditions and by BPA regarding the use of wildlife mitigation funds for acquisition and long-term maintenance of the WMA.

CONSERVATION EASEMENT

As previously mentioned, the IDFG purchased the Boundary Creek WMA after the WRP easement had already been purchased from the former owners by the NRCS. All provisions of the WRP easement are therefore binding on the IDFG as the new owner. The easement contains a statement of purpose and intent as follows:

"The purpose of this easement is to restore, protect, manage, maintain, and enhance the functional values of wetlands and other lands, and for the conservation of natural values including fish and wildlife habitat, water quality improvement, floodwater retention, groundwater recharge, open space, aesthetic values, and environmental education."

Part III.A. of the easement lists in detail the following rights purchased by the United States that are prohibited activities by the owner on the easement area unless they are later determined by the NRCS to be compatible uses:

1. Haying, mowing, or seed harvesting for any reason;
2. Altering of grassland, woodland, wildlife habitat, or other natural features by burning, digging, plowing, disking, cutting or otherwise destroying the vegetative cover;
3. Dumping refuse, wastes, sewage or other debris;
4. Harvesting wood products;
5. Draining, dredging, channeling, filling, leveling, pumping, diking, impounding or related activities, as well as altering or tampering with water control structures or devices;
6. Diverting or causing or permitting the diversion of surface or underground water into, within or out of the easement area by any means;
7. Building or placing buildings or structures on the easement area;
8. Planting or harvesting any crop; and
9. Grazing or allowing livestock on the easement area.

It is the policy of the NRCS that only those activities that are consistent with both the long-term protection and enhancement of the wetland and other natural values of the easement area may be authorized as compatible uses.

The NRCS is not staffed nor funded to be a land management agency. Once the WRP restoration funds have been spent on a project, the NRCS delegates operations and maintenance of conservation easements to the landowner or other qualified agencies or groups through cooperative agreements (Fink 2000). The NRCS will be responsible for replacing or repairing structures (e.g., water delivery system, dikes, and water control structures) due to normal wear and tear or events beyond the control of the landowner (Fink 2000). The WRP restoration funds cannot be used to purchase maintenance equipment or buildings (Fink 2000). In the case of the WRP easement on the Boundary Creek WMA, the IDFG (landowner) has been delegated the responsibility for operations and maintenance.

WILDLIFE MITIGATION FUNDS

As a condition of accepting funds provided by BPA, the IDFG is obliged to meet the requirements and objectives defined in the Wildlife Mitigation Program Final Environmental Impact Statement (USDE 1997); Albeni Falls Wildlife Management Plan Final Environmental Assessment (USDE 1996); and Northern Idaho Wildlife Mitigation Agreement (USDE and IDFG 1997).

Specifically, the IDFG has agreed to meet the following requirements in the management of the Boundary Creek WMA property:

1. Permanently protect, mitigate and enhance wildlife, and wildlife habitat;
2. Manage the property according to a site-specific management plan prepared by the IDFG and approved by the Work Group, the NPPC's Wildlife Caucus, and BPA;
3. Conduct HEP surveys to measure habitat improvements for target wildlife species;
4. Monitor and evaluate enhancement measures and management activities to document their effectiveness;
5. Protect historic and cultural resources;
6. Provide reasonable public access;
7. Enhancement, operation, and maintenance activities funded by BPA will comply with the guidelines prepared by the Columbia Basin Fish and Wildlife Authority program managers (CBFWA 1998);
8. The deed is encumbered with a covenant that the property can revert to BPA if a 20% reduction occurs in the number of HUs determined by the HEP survey;
9. Fee-in-lieu-of tax payments to Boundary County and fire protection fee payments to the Idaho Department of Lands are not eligible for payment using BPA funds and must be paid out of other IDFG budgets; and

10. BPA funds are not available for recreation management activities or wildlife law enforcement.

MANAGEMENT GOALS AND OBJECTIVES

The IDFG acquires and develops WMA's throughout the state with the following four general goals in mind (IDFG 1991):

- Preserve and improve habitat for the production and maintenance of wildlife and fish populations;
- Provide public hunting and fishing opportunities;
- Provide nonconsumptive wildlife and fish uses; and
- Provide scientific, educational and recreational uses not related to wildlife and fish.

The following management objectives were developed for the Boundary Creek WMA. These objectives are responsive to the IDFG's goals for acquiring WMA's, the intent of the WRP, the intent of the NPPC's Program funded by BPA, habitat enhancement measures recommended in the HEP report (Stovall 1999), and issues identified by the Boundary County citizen's task force (Taylor 1999).

Objective #1. Restore and maintain wetland hydrology to 1,039± acres of Kootenai River floodplain.

Objective #2. Restore and maintain seven wetland basins totaling 400 ± acres.

Objective #3. Restore and maintain native vegetative communities, including 250± acres of grass/forb habitat; 400± acres of herbaceous wetlands; and 300± acres of scrub-shrub habitat and floodplain cottonwood forest.

Objective #4. Protect and maintain existing native vegetative communities, including 150± acres of floodplain cottonwood forest and scrub-shrub wetlands; and 140± acres of mixed conifer forest.

Objective #5. Provide for public access and recreational use compatible with wildlife and habitat management objectives.

Objective #6. Control noxious weeds.

Objective #7. Explore opportunities to enhance aquatic habitat for migration, spawning, and rearing of native fish species compatible with wildlife and habitat management objectives.

Objective #8. Monitor and evaluate habitat conditions and wildlife use.

Objective #9. Establish and maintain administrative facilities.

Strategies to accomplish these objectives are discussed in the following sections of the plan: **WETLAND RESTORATION PLAN, PUBLIC ISSUES AND CONCERNS, MANAGEMENT DIRECTION, MONITORING AND EVALUATION, OPERATIONS AND MAINTENANCE BUDGET, and CAPITAL OUTLAY.**

WETLAND RESTORATION PLAN – OBJECTIVES 1-4

This section of the WMA plan deals with the restoration of 1,039± acres of floodplain that were drained and farmed for decades and outlines strategies to accomplish Objectives 1 through 4. As noted previously, the objectives of habitat restoration are to restore and maintain floodplain wetlands and native vegetative communities. The wetland restoration plan is estimated to cost \$877,200. Funds were provided by the WRP - \$657,500; IWJV - \$73,000; DU - \$76,700; CP - \$50,000; and USFWS - \$20,000.

<u>Restoration Costs</u>		
WRP	\$657,500	75.0%
IWJV	73,000	8.3%
DU	76,700	8.7%
CP	50,000	5.7%
USFWS	<u>20,000</u>	<u>2.3%</u>
TOTAL	\$877,200	100.0%

The wetland restoration plan for the Boundary Creek WMA involved consideration of three major features: 1) basin morphology or shape; 2) hydrology; and 3) vegetation. A topographic survey of the WMA was conducted by DU in May 1999 to determine if the wetland basins had been leveled by many years of farming. Using global positioning satellite technology, DU engineers surveyed over 5,000 elevation points. The results of the survey verified that natural floodplain basins, depressions, and swales remained intact (DU and USDA 2000). Seven separate wetland basins were identified (Figure 9).

OBJECTIVE 1 – RESTORE AND MAINTAIN WETLAND HYDROLOGY

Three water sources were considered for wetland restoration: 1) the Kootenai River; 2) local field run-off and spring water; and 3) use of the existing Boundary Creek water right.

Ideally, the WMA's wetlands would be restored with natural hydrology involving annual flooding by the Kootenai River. However, Kootenai River flows have been significantly

Figure 9. Boundary Creek WMA, Location and Extent of Wetland Basins.

modified by the operation of Libby Dam. Pre-dam river elevations peaked well above floodplain elevations each year in June (Figure 10). General Land Office surveyors recorded wetland boundaries on the WMA near the 1,754 feet elevation contour in August 1894 and December 1898 (GLO Notes 1894 and 1898). However, since the construction of Libby Dam, river elevations have only reached the lowest floodplain elevation of 1,750 feet in ten of 17 years between 1980 and 1997 according to the US Geological Survey gauge at Porthill. Flood durations have also been reduced. Even if river water could be conveyed to wetland basins through natural river levees, wetlands would not receive water in some years; would be small and few in number; and would be filled for a very short period. Current Kootenai River elevations are no longer high enough to restore natural wetland extent or hydroperiod on the WMA.

Surface water is drained from the WMA to Boundary Creek at two locations. Flows from these drains were measured during the spring of 1998 and 1999 to determine if local run-off and spring water would be adequate to restore wetland hydrology. From these measurements (maximum of 7 cfs), capturing local run-off could fill some wetlands in some years. However, local run-off appears to cease in May. This contrasts with natural spring floods that peaked in May and June resulting in wetlands that likely retained water throughout the year. Capturing local field run-off, while important, would not fully restore natural wetland extent, hydroperiod, or frequency of occurrence.

As previously mentioned, a 19.8 cfs water right from Boundary Creek was acquired with the purchase of the property. The diversion period extends from March 15 to November 15 and the maximum diversion volume is 2,970 acre-feet. The restoration plan calls for this water right to be used to supplement local spring run-off to meet the objective of restoring wetland hydrology. This is the only source of water on the WMA capable of filling wetland basins rapidly to mimic what occurred naturally prior to the construction of the dikes along the Kootenai River and the construction of Libby Dam.

OBJECTIVE 2 – RESTORE AND MAINTAIN WETLAND BASINS

The restoration plan relies on capturing local run-off and supplementing it with water diverted from Boundary Creek to fill the historic wetland basins. The plan involves the following strategies to meet this objective: 1) blocking lateral drain ditches and plugging subsurface drain tiles; 2) constructing a water diversion system in Boundary Creek that will collect water at the creek bed level; and 3) adding a series of water control structures that will be used to distribute and control water throughout the wetland complex (DU and USDA 2000).

Diversion Structure

To effectively use the water right from Boundary Creek, a “fish friendly” water collection system will be placed in the streambed. The structure to be used is referred to as an inverted fish screen and is also commonly called an invisible weir. The structure consists of two sections of poured concrete buried in the streambed in the shape of a vee, with the tip of the vee pointing upstream. The structure will span the entire creek, level with the streambed and be tied into both banks with concrete abutments. One leg of the vee serves as an anchor. The other leg is

Kootenai River Elevations Monthly Averages, Porthill Gauge

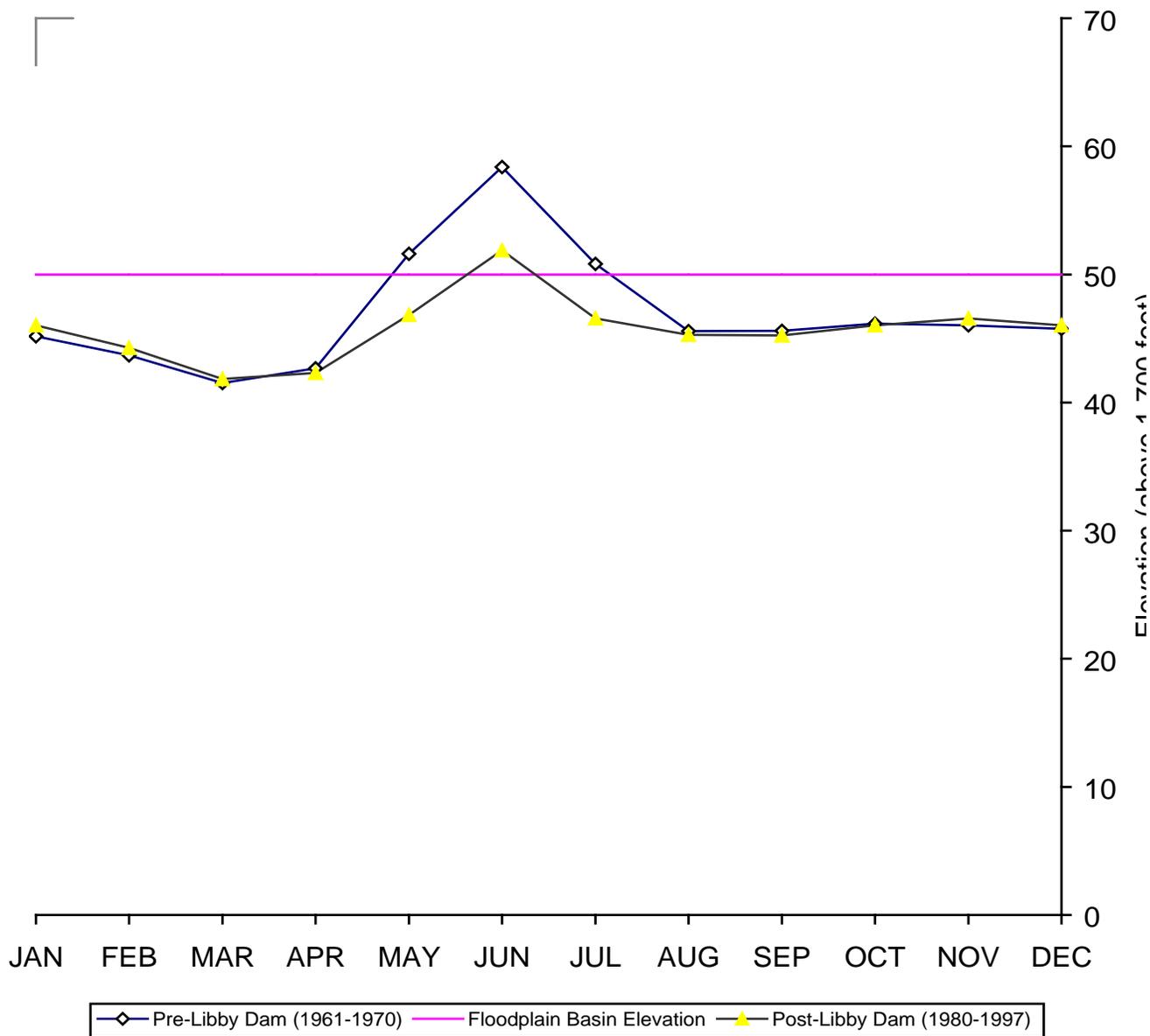


Figure 10. Kootenai River elevations, monthly averages, Porthill Gauge.

constructed in the shape of a trough. The top of the trough is fitted with stainless steel grates. The trough is partially filled with concrete, and collects water that is funneled to a collection chamber fitted with a screw gate at the outlet. The upstream side of the collection trough is slightly higher so it is self-cleaning and prevents impinging fish. A notch is built in to the upstream point of the vee to allow fish passage at low flows. At average stream flows, the collection system will almost be hidden, hence the name “invisible weir”.

The screw-gate on the outlet of the collection chamber determines the rate of flow sent through a 36” pipe on to the property. A flow meter installed at the outlet will be used to ensure that the maximum diversion rate and volume allowed by the water right are not exceeded. The diversion will be constructed August through September 2000 to minimize impacts to spawning, rearing, and migrating fish.

The best location for the diversion was determined to be slightly upstream from the existing point of diversion on property owned by CP. A utility easement was granted to the NRCS by CP to build and maintain the diversion on their property.

To protect aquatic biota in Boundary Creek, an annual water use plan has been developed (Table 1). In any given month, no water will be diverted from Boundary Creek when the stream flow is below 50 cfs. From March 15 through July 31, no more than 10 percent of the stream flow up to a maximum 19.8 cfs will be diverted. From August 1 through November 15, no more than 5 cfs will be diverted. No diversion will occur from November 15 to March 15.

Water Control Structures

DU designed the restoration plan to distribute water throughout the wetland complex using 20 water control structures and three low embankments (DU and USDA 2000). Water diverted from Boundary Creek will flow first to two wetland basins in the northwest corner of the WMA. Water will then fill the old Smith Creek channel that lies against the hillside. Once this channel is filled, water will flow through control structures to each of the remaining four wetland basins. Water will also be able to flow off of the WMA into Boundary Creek through three water control structures; one each in the outlet of the old Smith Creek channel, and the two northern-most wetland basins. This system of water control structures will allow management of each of the six wetland cells separately to maximize wildlife benefits. Staff gauges will be installed at known elevations at each water control structure to aid in determining the water surface elevation in each basin at any point in time. The seventh wetland basin will be regulated based on natural water level variation.

The wetland restoration plan’s target elevation for the wetland basins in the spring is 1,755 feet (DU and USDA 2000). The surface area and storage capacity of each of the seven basins at that elevation are shown in Table 2. The cumulative surface area and storage capacity for all of the wetland basins from 1,748 feet through the target elevation of 1,755 feet are shown in Table 3 (DU and USDA 2000)

OBJECTIVE 3 - RESTORE AND MAINTAIN VEGETATIVE COMMUNITIES

The overall objective of vegetative restoration on the WMA is to re-establish native plant communities to the extent possible. Insight on native plant communities was determined from the 1898 General Land Office notes and from examination of historical photographs. These information sources reveal that floodplain basins, depressions, and swales were vegetated by herbaceous species, while natural levees and higher ground were occupied by “cottonwood with dense underbrush” (GLO Notes 1898). The following strategies will be used to meet this objective.

Table 1. Annual water use plan, Boundary Creek water right^a.

Month	Average Discharge (cfs) 1980-1997 ^b	Volume Diverted ^c
January 1	70	None
February 1	80	
March 1	120	March 15
April 1	400	No more than 10% of flow to a maximum of 19.8 cfs
May 1	900	
June 1	540	
July 1	140	July 31
August 1	65	August 1
September 1	50	No more than 5 cfs
October 1	65	
November	100	November 15
December 1	85	None

^a Diversion period extends from March 15 through November 15 and the maximum diversion volume is 2,970 acre-feet.

^b Source: Readings taken from US Geological Survey gauge in Boundary Creek and averaged.

^c No diversion will occur at any time when the stream flow falls below 50 cfs.

Table 2. Storage capacity of wetland basins at spring target elevation of 1,755 feet, Boundary Creek WMA.

Basin	Surface Area (acres)	Storage Capacity (acre-feet)
1	35.9	57.1
2	28.6	58.2
3	212.6	743.7
4	171.0	380.5
5	59.3	90.4
6	18.3	50.0
7 ^a	5.1	9.7
TOTAL	530.8	1,389.6

^a Surface area and storage capacity calculated at 1,758 feet

Table 3. Cumulative storage capacity of wetland basins at elevations of 1,748 feet through 1,755 feet, Boundary Creek WMA^a.

Elevation (feet)	Surface Area (acres)	Storage Capacity (acre-feet)
1,748	0	0
1,749	25.4	12.7
1,750	64.6	57.7
1,751	99.9	140.0
1,752	210.8	295.5
1,753	307.1	554.5
1,754	416.2	916.0
1,755	530.8	1,389.6

^a Surface area and storage capacity of wetland basin #7 calculated from 1,751 – 1,758 feet.

Grass/Forb Establishment

Establishing grasses and forbs is the first priority of the WMA's restoration plan. Grasses and forbs historically were components of most habitats on the floodplain and will serve an immediate need to reduce noxious weed infestations in the former wheat fields. Little historic information is available on native grass and forb species occupying floodplain sites. Consequently, a mixture of native and introduced grasses and forbs was selected based on cover or forage attributes and cost (Table 4). The mixture included species that will provide dense nesting habitat for upland nesting birds (tall and intermediate wheat grasses); forage for deer, elk,

bear, wild turkeys and other wildlife (orchardgrass, timothy, big bluegrass, clover, birdsfoot trefoil, and alfalfa); and species adapted to wetland edges (redtop and tufted hairgrass).

Approximately 850 acres of agricultural fields required planting with the grass/forb mixture. These sites were planted as soon as possible following acquisition of the WMA to limit potential weed infestations. Following the last wheat harvest in August 1999, crop stubble was burned, and the area was disced, cultivated, and harrowed. A dormant grass/forb planting was completed in November 1999. Success of the planting will be assessed in the spring and summer of 2000.

Herbaceous Wetland Vegetation

Due to subtle differences in hydrology, wetland plantings are often unsuccessful (Kentula et al. 1993). Instead of planted species, native plants from other sources become established. In addition to being potentially ineffective, wetland planting is time-consuming and labor-intensive. Up to 400 acres of wetlands on the WMA will require revegetation.

Table 4. Permanent grass/forb cover seeding, Boundary Creek WMA, November 1999.

Species	Lbs/acre
Alkar Tall Wheatgrass	6.0
Greenar Intermediate Wheatgrass	2.4
Latar Orchardgrass	2.0
Climax Timothy	0.8
Sherman Big Bluegrass	1.1
Kenland Clover	0.5
Redtop	0.4
Empire Birdsfoot Trefoil	1.0
Rambler Creeping Alfalfa	1.0
Tufted Hairgrass	0.3
TOTAL	15.5

Given an available seed source, the most effective way to establish and manage wetland vegetation is through hydrology (Mansell et al. 1998). While much of the wetland basins on the WMA have been farmed for decades, wetland plant seed and other propogules (e.g., rootstocks, spores, winter buds, etc.) occur in remnant field wetlands and in the old Smith Creek channels. Wetland plant seed and propogules will disseminate as water moves through the wetland complex. In addition, wetland basins will be “seeded” by propogules carried in plumage, pelage, and droppings of birds and mammals. Consequently, the WMA's wetlands will be allowed to naturally revegetate without direct planting.

If wetland revegetation appears to be inadequate, soil plugs from nearby weed-free wetlands will be planted in poorly vegetated sites. Soil plugs contain a portion of the wetland seed bank including native plant species from various successional stages. The soil plugs will be planted at depths similar to where they were obtained so that locally adapted wetland plants can become established.

Initial successional stages are often the most productive for marsh vertebrates. As marsh succession advances, wetlands may require periodic drawdowns to maintain high wildlife productivity and/or to control monotypic stands of cattails.

Scrub-Shrub Habitat and Floodplain Cottonwood Forest

Higher elevations on the floodplain were naturally vegetated by shrubs and trees as well as grasses and forbs. Native species suitable for these areas can be discerned from historical photographs; General Land Office survey notes; and by examining existing floodplain vegetation on relatively unaltered sites. Once the hydrologic infrastructure has been developed on the WMA, woody species will be re-established by two methods: 1) natural regeneration, and 2) supplemental plantings of shrubs and trees.

Narrow bands of native trees and shrubs exist along most of the perimeter of the WMA. Over time, seed, suckers and plant fragments, depending upon the species, will gradually spread into suitable habitat. Seeds will spread throughout the wetland area by the wind, seed-eating birds and mammals, and the water delivery system. Relying on natural regeneration to move woody plant communities towards climax succession will take many decades. Areas with existing natural regeneration, or good potential, have been identified in Figure 11 and will be protected from management activities that will hinder the establishment of woody plant species.

Supplemental tree and shrub plantings on the WMA will include native species known to occur in the Kootenai River floodplain. An array of techniques will be employed to establish trees and shrubs since: 1) a variety of habitats require woody revegetation; 2) no one technique is best for all species; 3) the area of tree and shrub reestablishment is large, (potentially 300 acres); and 4) plantings will fulfill various functions ranging from providing dense wildlife cover, to reestablishing scattered native tree and shrub seed sources.

Five focus areas have been identified for supplemental tree and shrub planting activities (Figure 11, Table 5). These areas have been selected in sites far removed from existing seed sources where natural regeneration is not expected to occur in the foreseeable future. Within each focus area, individual planting sites will be located approximately 1,000 feet apart.

The recommended planting schedule (Table 5) takes into account the need to establish wetland hydrology prior to planting; the ability to acquire nursery stock; the contracting of planting activities; the acquisition of maintenance equipment the Department currently does not have; and the approval of an operations and maintenance budget to staff the area. Even with supplemental plantings, establishing woody species to historic conditions is still expected to take decades.

The original woody species that inhabited the floodplain occurred along elevational bands depending upon the height of the water table. All of the species were subjected to periodic flooding but survived and flourished at different elevations above standing water.

Figure 11. Focus Areas Identified for Supplemental Tree and Shrub Plantings, Boundary Creek WMA.

- 1758' elevation and above. These areas are composed mainly of the Farnhampton soil type and are located along the banks of the Kootenai River and old Smith Creek channels. They were characterized by scattered, linear strips of cottonwood, aspen, and birch with a well developed shrub understory including snowberry, woods rose, Douglas hawthorn and lesser amounts of elderberry, serviceberry, Rocky Mountain maple, and bitter cherry.
- 1756'-1758' elevation. This area was composed mainly of open, grass dominated sites with pockets of woody vegetation occupying less than 50% of the site. The woody pockets contained snowberry, woods rose, Douglas hawthorn, birch, alder, cottonwood, and red-osier dogwood.
- 1754'-1756' elevation. These areas are composed mainly of the Schnoorson soil type and are seasonally flooded. They were characterized by broad, open expanses of herbaceous species such as grasses, sedges, rushes, and other moist soil plants. A small woody component of willows, pink spirea, and red-osier dogwood was present (probably less than 25% of the area).

Table 5. Supplemental Shrub and Tree Planting Locations and Planting Schedule, Boundary Creek WMA, 2001-2005.

Focus Area	Planting Location	Elevation Zone	Species	Proposed Planting Date	Size
1	A	1754' - 59'	TBD*	Spring 2004	1 Acre
	B	1754' - 61'	”	Spring 2001	1 Acre
	C	1754' - 61'	”	Spring 2004	1 Acre
2	A	1754' - 57'	”	Spring 2002	1 Acre
	B	1754' - 57'	”	Spring 2005	1 Acre
3	A	1754' - 57'	”	Spring 2002	1 Acre
	B	1754' - 57'	”	Spring 2005	1 Acre
4	A	1754' - 60'	”	Spring 2003	1 Acre
	B	1754' - 60'	”	Spring 2003	1 Acre
5		1755' - 58'	”	Spring 2001	2 Acres

* TBD – To be determined by Boundary Creek WRP Interagency Technical Committee.

While many information sources for tree and shrub establishment will be consulted, Bentrup and Hoag (1998) will be used for basic direction. Techniques likely to be implemented on the WMA include pole plantings, post plantings, as well as planting cuttings and containerized seedlings. Measures used to control competing vegetation may include cultivation, use of herbicides, or placement of weed control fabric. Temporary fences or plant tubes may be employed to protect new tree and shrub plantings from browsing by deer, elk, moose, and rodents. Temporary beaver control may also be implemented if deemed necessary.

OBJECTIVE 4 – PROTECT AND MAINTAIN EXISTING NATIVE VEGETATIVE COMMUNITIES

Although the majority of the WMA has been cleared, diked, drained, and farmed, remnants of native vegetative communities occur within the former river floodplain and upland areas.

Floodplain Cottonwood Forest and Scrub-Shrub Wetlands

The portion of the WMA contained within the Boundary Creek dike encompasses approximately 150 acres \pm . This area functions as the current floodplain of Boundary Creek and, although it has been altered, still contains remnants of two native riparian communities – floodplain cottonwood forest and scrub-shrub wetlands. This area contains some of the highest quality wildlife habitat left on the WMA; offers limited opportunities for enhancement; and will require little active management.

Most of the area within the dike is fenced and evidence of past livestock grazing is readily apparent. Cottonwood regeneration and shrubs palatable to domestic livestock are greatly reduced in the understory compared to the area that was not fenced. The portion of the Boundary Creek floodplain across the border in British Columbia is still being grazed by cattle annually.

Strategies recommended to meet Objective 4 include the cessation of livestock grazing; preventing livestock trespass; and protecting the area from fire during extended dry periods. Due to the dense growth of reed canarygrass in the understory, the presence of noxious weeds is low.

Mixed Conifer Forest

The southwest corner of the WMA contains approximately 140 \pm acres of coniferous forest on steep terrain at the foot of the Selkirk Mountains that is not included in the boundary of the WRP easement. The majority of the timberland has been selectively logged by previous owners. Few large diameter trees remain except in those areas that were too steep and rocky to access easily. Even with previous forest management, this habitat continues to receive a lot of use by deer, elk, moose, and bears for security, cover, and foraging.

Few management activities to benefit wildlife species are necessary. Over time, the understory will partially fill in with native shrub species due to the openings in the forest canopy. Strategies recommended to meet the objective of protection include: controlling noxious weeds in log landings and along skid trails; protecting the area from fire during extended dry periods; and avoiding the construction of visitor use facilities.

PUBLIC ISSUES AND CONCERNS - OBJECTIVE 5

This section of the plan outlines all of the recommendations from the citizen's task force and the IDFG's response. Eight of the ten recommendations are related to Objective 5 – Provide for public access and recreational use compatible with wildlife and habitat management objectives. The intent of this section is to provide a decision to the public and communicate what strategy or course of action the IDFG will take on each of the recommendations. The Department's response to each of the recommendations from the task force was based on three criteria:

- 1) Is the recommendation consistent with the IDFG's mission?
- 2) Will the recommendation conflict with the purposes for which the WMA was purchased or any legal constraints or obligations the IDFG must comply with?
- 3) Is funding readily available, or could funding come from a source other than the IDFG?

1) Picnic Area

We would like to see a picnic area developed on the peninsula (near the old ferry landing at the end of the county road). This picnic area should have restroom facilities and several heavy duty picnic tables. Trash facilities would probably be limited.

The Department will accommodate this request as much as possible. The end of the county road will be the location of the WMA's future headquarters and logically lends itself to providing facilities for WMA visitors also. In addition, a boat ramp maintained by Boundary County is located directly across the Kootenai River at Porthill.

The Department's Panhandle Region is currently responsible for maintaining over 40 access sites throughout the five northern counties of Idaho for hunters, fishermen and other WMA visitors. While a fund source is available for developing new access sites, maintaining, repairing, and upgrading existing facilities is a higher priority. It would be optimistic to indicate the Department will be able to provide facilities in the near future. However, if the local community prefers not to wait for an extended period of time, the Department will cooperate with local residents to seek alternative funding sources.

2) Nature/Historic Trail

We would like to see a non-motorized trail accessible to senior citizens and disabled beginning at the picnic area and proceeding along the dike southwesterly to a point just south of the eastern most pond. Thence the trail should proceed northerly until intersecting the county road. At that point, the trail would cross the road and proceed easterly through the riparian floodplain of Boundary Creek to the point of beginning.

There should be historic and natural history markers along this trail as conditions dictate and allow. Along the trail, there should be accommodations made for disabled people.

At the easternmost portion of the easternmost pond, the community would like to build an observation tower so guests can get a birds-eye perspective of the area.

A trail system and viewing tower on the WMA can be accommodated without conflicting with the WMA's habitat objectives if they are located to minimize impacts to wildlife, primarily waterfowl.

Constructing nature trails and observation towers has not traditionally been a Department strategy to encourage public use of WMA's primarily because of the costs involved. Emphasizing the historical significance of properties purchased by the IDFG by means of trails and interpretive sites is not part of the Department's mission. The Department will, however cooperate with the local community, Kootenai Tribe, and any other interested parties to seek outside funding and expertise to accommodate this request.

3) Refuge Area

Should conflicts arise between hunting and non-hunting publics, and/or public use and wildlife needs, we think that the easternmost pond could be a logical refuge area. However, the group would prefer to wait until conflicts arise before enacting any regulations.

A refuge, or designated non-hunting area, can be a useful management tool on a WMA if it is necessary and serves a purpose. At this point, the Department agrees that no refuge area is necessary since there are no conflicts.

4) Boat Dock on River

A boat dock on the river at the mouth of Boundary Creek is a high priority for the group. This dock should be a high quality facility that would allow recreational boaters' access to the WMA.

As previously mentioned, the Department has a budget for developing access site facilities. Providing boat docks is an integral part of that program. However, funding is prioritized on a statewide basis each year and it could take several years or more before a request for dock facilities at Boundary Creek is approved. There are other fund sources available if the community chooses to pursue them. For example, Boundary County receives funding each year from the sale of statewide boat registration fees and may be willing to purchase and maintain a dock facility. The Idaho Department of Parks and Recreation administers the statewide Waterways Improvement Fund Grant Program that also funds dock facilities through boat registration fees.

5) Hay Fields and Big Game Feeding

The group expressed an interest in providing hayfields and round bales for big game feeding on a trial basis.

Leaving round bales for big game feeding, even on a trial basis, is in conflict with Department policy FW-10.00, Big Game Feeding Policy, revised April 30, 1996 (IDFG 1983). It is the policy of the Idaho Fish and Game Commission that:

"The Department is authorized to feed big game only if the following conditions exist."

- 1. To prevent damage to private property or for public safety when other methods of preventing damage and providing safety measures are determined to be impractical, inappropriate, or ineffective and the amount of damage or cost of protection is expected to exceed the cost of feeding.**
- 2. To prevent the excessive mortality of big game populations in drainages that would affect the recovery of the herd. Some mortality should be expected, especially from the young and old segments of the population.**

In addition, wildlife mitigation funds provided by BPA cannot be used to conduct any artificial or winter feeding programs (CBFWA 1998). Clearly, the recommendation does not meet the policy guidelines and, therefore, the Department will not pursue the establishment of any artificial winter feeding program that will draw big game animals to the WMA. The Department realizes that the WMA, in its present condition, does not provide winter range for very many deer, elk, or moose due to the absence of preferred shrubs. The Department's management direction will be to re-establish the missing component of woody species. However, it will take a long time before enough shrubs have become established and spread to support any significant number of wintering big game animals.

The restoration of grass/forb habitat in its natural state is one of the objectives of the wetland restoration plan on the WMA and meets the intent of the WRP easement and the NPPC's wildlife mitigation program funded by BPA. Maintaining and rejuvenating grass/forb habitat over time by prescribed burning and not haying will be one of the Department's management strategies. Providing pasture each year that is maintained by annual haying is not a wildlife or habitat management objective or strategy for the Boundary Creek WMA and is not recommended.

6) Reducing Human/Grizzly Bear Interaction and Conflicts

The group held diverse opinions on handling the grizzly bear issue. There is not a consensus of opinions.

Most of the group recommends that Fish and Game continue allowing human intrusion in all seasons in all areas until a problem arises. Only after a conflict arises should the Department consider access restrictions. This philosophy is the same as reflected in recommendation #3 concerning refuge areas.

However, we do understand the liability concerns of all the area's landowners. And, the safety of both humans and grizzly bears must be insured. We think this can be accomplished by intense signage on the area that warns the public the area is frequented by bears. Additionally, a seasonal road closure might reduce the chance of interaction.

One of the members offered the following dissenting opinion: "I feel strongly about taking a proactive stance on protecting grizzly bears and the people who might come into contact with them within the boundaries of the Boundary Creek WMA. Therefore... I suggest these additions:

- 1) Closure of any spring bear hunt on the acreage.*
- 2) Closure of the uplands portion of the acreage to all human activity during the spring and fall when grizzly bears are certain to be using this area and are at their most vulnerable.*
- 3) I do not believe waiting for a conflict to arise addresses the situation. There will be a significant increase in recreational activity in an area historically heavily used by a vulnerable endangered species, and it is the mandate of the Fish and Game Department to protect it."*

Another of the members recommended a closure of bear hunting during all seasons and within the entire area.

The Department agrees with the majority opinion. Interagency efforts to reduce human-caused mortality of grizzlies have already been taken throughout the Selkirk ecosystem. These include eliminating baiting and hunting with dogs for black bears; road closures; increased public information and education; and increased law enforcement. In addition, the Department will locate visitor use facilities on the WMA at the end of the county road and sign the area that grizzlies are known to use in cooperation with adjacent landowners. The Department does not believe that the presence of grizzly bears requires closing the black bear hunting seasons or prohibiting all public access without justification.

The Department will monitor the situation and, should problems arise, its position on this issue will be subject to change if necessary. If human/bear interactions develop that could reach levels endangering public safety, the Department will consider options, including temporary access restrictions, that reduce risks to both the public and bears.

7) Recommendation to County Commissioners Regarding Public Road Availability

The group feels that the county should not maintain the road for public access for the winter months. This would effectively close the road for 5 months depending on weather. This idea is in line with the county's operating procedure on other remote county roads.

But, the group also understands the Department's and Crown Pacific's concerns about: 1) the safety of citizens, 2) the security of wildlife and equipment, and 3) the integrity of the roadbed. Therefore, we do not oppose standard operating dates, provided those dates do not include closure during the waterfowl hunting season. An acceptable schedule would be to leave the road open from the end of the spring hunting seasons through January 15th and closed to vehicles during the winter and early spring months.

The Department agrees that a seasonal closure including a locked gate on the access road bordering the northern perimeter of the WMA would be beneficial for security reasons. It would

also limit damage to the roadbed and minimize disturbance to migrating waterfowl, wintering big game, elk calving, and spring grizzly bear use. However, the Boundary County Commissioners have indicated they do not have the authority to close a county road seasonally or with a locked gate according to the Idaho Code. Their only option by statute is to formally abandon the road.

8) Pheasant Food Plots

We encourage the Department to plant some food plots for ringnecks.

The Department agrees with this recommendation and has included it in the next section – MANAGEMENT DIRECTION.

9) Fishery Enhancement

The group would like the Department to explore opportunities to create a fishery (perhaps a put and take) in Smith Creek Slough.

In June 2000, Department fish management personnel surveyed the Smith Creek Slough to determine the presence of game fish and assess the potential for developing or enhancing fishing opportunity. Yellow perch, pumpkinseed sunfish and black bullheads were the only game fish present. Although relatively abundant, average sizes were less than eight inches (Fredericks and Liter 2000). Access to the slough is poor and the shoreline is steep and not conducive to bank fishing. The bottom of the slough is soft and not conducive to wading. Along most of its length, at least 50% of the surface area is covered with dense aquatic vegetation (Fredericks and Liter 2000).

The current species composition and size structure are not sufficient to provide a popular fishery. Because of the lack of large game species, development of a fishery would require some level of stocking. Largemouth bass, tiger muskies, or channel catfish could be stocked to utilize the abundant forage fish and provide a limited fishery for larger fish. Any coldwater fish, such as rainbow trout, would not likely survive past late spring and would have to be stocked as catchables on an annual basis. Based on the poor access and the short time that trout could survive, it is unlikely that an acceptable return to the creel of hatchery rainbows would be realized (Fredericks and Liter 2000).

The Department's fish management staff did not recommend enhancing the existing fishery or developing a new fishery. Boundary County currently has an abundant variety of lake, pond, and stream fishing opportunities. Smith Creek Slough has limited potential to add to the existing opportunity that anglers already have for warm water fishing. The slough will remain open to fishing to utilize the fishery that currently exists. The minimal interest that this will generate should not be enough to conflict with waterfowl production and other wildlife use of the area.

10) Funding

We understand that some of the projects listed above are beyond the role and scope and funding mechanisms of the Fish and Game Department. Nonetheless, we would like to have them included in the WMA management plan so the Boundary County community citizens have the opportunity to pursue them as needs and funding materialize.

The Department will cooperate with local citizens to accommodate compatible public uses of the WMA as time and funding permit.

MANAGEMENT DIRECTION – OBJECTIVES 1-7

The WRP wetland restoration plan will be the driving force behind the IDFG's management of the WMA. Management strategies will emphasize mimicking natural hydrology on a seasonal basis; increasing and protecting native plant communities that will result in increasing wildlife populations; and accommodating public use. The following strategies will facilitate meeting Objectives 1 through 7; meet the intent of the WRP's restoration program and the NPPC's wildlife mitigation program funded by BPA; and address the input of local citizens. All proposed management activities are eligible for funding by BPA unless specifically mentioned otherwise.

WATER LEVEL MANAGEMENT

Following construction of the diversion system and other water control structures, the WMA's wetlands will be managed as much as possible to mimic natural floodplain hydrology by using the Boundary Creek water right. The general pattern of natural wetlands, involving high spring water levels and receding summer water elevations, will be applied across the wetland complex. The resulting wetland basins will generally be characterized by seasonal perimeters and semi-permanent interiors. The extent of spring flooding and summer water level recession will be varied across the WMA to maintain habitat heterogeneity and long-term productivity.

Manipulating water levels on the WRP easement for habitat management purposes must have prior approval from the NRCS as a compatible use to comply with the easement's restrictions.

The IDFG will avoid rigid water level management scenarios. Too often wetland management results in the lack of seasonal and long-term water fluctuations that revitalize wetland systems and maintain high productivity (Weller 1978, Fredrickson 1985). Repetitive manipulations scheduled for specific calendar dates year after year often are associated with declining productivity (Fredrickson 1991). The IDFG's on-site manager will need considerable flexibility in exercising water level management decisions to allow for the development of adaptive strategies to achieve greater management effectiveness.

1) March 15 - April 15

The wetland restoration plan's target elevation for the wetland basins in the spring is 1,755 feet (DU and USDA 2000). At 1,755 feet elevation, there will be 530.8 surface acres (Table 2). The Boundary Creek water right will be used each year, beginning March 15, to supplement local run-off to achieve maximum water levels as early as possible (early to mid-April). High spring water levels will provide the maximum flooded area for greater isolation of territorial breeding waterfowl and invertebrate production in seasonal wetland perimeters.

2) April 15 – July 15

High water elevations will be maintained through mid-July by diverting water from Boundary Creek. This will mimic the high water levels that occurred naturally due to flooding from the Kootenai River and its tributaries prior to the construction of Libby Dam.

3) July 15 – October 1

Water levels will be allowed to gradually recede over the next 2.5 months from 0.5 to 3.0 feet (1,754.5 feet to 1,752.0 feet, Table 3). Late summer and early fall water level recession will mimic natural Kootenai River floodplain wetland water level recession following spring flooding. According to pre-Libby Dam records from the USGS gauge at Porthill, Kootenai River elevations fell below floodplain elevations by mid to late July (Figure 10). This scenario also mimics a general water level pattern that occurs to varying degrees in natural wetlands across North America.

The natural summer wetland water level recession that occurs across North America often results in seasonal wetland perimeters that are occupied by wet meadow plant species. The occurrence of wet meadows on wetland perimeters in the Kootenai River floodplain is verified by descriptions at approximately 1,754 feet elevation in the General Land Office notes (GLO Notes 1898). Descriptions included: “Leave woods, enter meadow and marsh” (between Sections 7 and 12); “Leave scattering timber and enter meadow and tule marsh not well frozen” (between Sections 12 and 13); and “Leave willows, enter meadow and open slough” and “Enter marshy meadow and ice” (between Sections 13 and 14).

Vegetation occupying seasonal wetland perimeters is often shorter and less dense. These conditions are selected by shorebird species. The late summer wetland water level recession that occurs across North America coincides with shorebird migrations. Shorebirds migrate through western North America from July through October (Harrington undated). The gradual, continuous nature of summer water level recession is important because it provides a constantly changing soil/water interface, exposing new foraging substrate and invertebrates to shorebirds (Eldridge 1992). Wetland management practices that standardize water depths and fluctuations across wetland complexes generally preclude the very short-term wetland dynamics with which shorebirds evolved (Skagen and Knopf 1994). Consequently, gradual wetland water level recession should be employed at various levels in different wetland basins.

Seasonal wetland perimeters will also benefit many species of ducks. Late summer exposure of wetland substrate allows for more complete aerobic decomposition rendering nutrients available for uptake by invertebrates upon re-flooding (Swanson et al. 1974). Consequently, breeding pairs (Kantrud and Stewart 1977) and broods (Talent et al. 1982) of many duck species select seasonal wetlands. Sparsely vegetated wetland shorelines exposed during summer water level recession are also preferred sites for loafing ducks.

Vegetation that occupies sites in areas with greater water permanency includes cattail and soft stem bulrush. If water levels are maintained at maximum height through the growing season (i.e., through August), the wetland perimeter will be dominated by dense growth of these species, and wet meadow conditions favorable to many wetland species will not occur.

4) October 1 – March 15

Beginning in September, average monthly precipitation increases while average temperature declines in northern Idaho. Consequently, wetlands enter a period of stable or slowly increasing water levels. If adequate water flows occur in Boundary Creek (greater than 50 cfs), up to five cfs may be diverted to slowly fill wetland basins until November 15 when the use period for the Boundary Creek water right ends. Following November 15, natural precipitation increases and may accumulate as snow. Significant natural wetland recharge is anticipated until freeze-up typically in late November or December. Snowmelt, periodically throughout the winter but especially in February and March, will partially or completely fill wetlands by March 15 when the diversion from Boundary Creek is allowed again under the Boundary Creek water right.

MANAGED DRAWDOWNS

Kootenai River floodplain wetlands were naturally dynamic with droughts in some years and very wet conditions in others. Droughts are important for long-term habitat maintenance since they allow emergent vegetation to germinate and re-occupy sites from which they receded during extended periods of inundation. Droughts also expose bottom sediments to oxygen so complete decomposition (inhibited by anoxic conditions during inundation) can occur. Complete decomposition renders nutrients available for uptake by plants and invertebrates benefiting the entire wetland food chain. Droughts can also have negative impacts by reducing short-term habitat availability.

Conversely, wet periods result in maximum habitat availability for marsh vertebrates resulting in high productivity. With prolonged inundation, however, emergent vegetation recedes, and nutrients become tied up in partially decomposed organic material. Rejuvenation through drought, or planned drawdowns is required to maintain high plant and animal productivity.

Research on native and created marshes indicates a relatively predictable and natural successional sequence in wetland systems (Kadlec 1962, Harris and Marshall 1963, Weller and Fredrickson 1974, Van der Valk and Davis 1978, Weller 1978). Periodic drawdown is a tool by which natural water level dynamics can be mimicked in managed systems to maintain high wetland productivity through time.

The WMA's wetland restoration design allows for both dry and wet cycles, critical to marsh habitat maintenance, to occur in a managed sequence across the seven basins that comprise the wetland complex. Consequently, the benefits of a drawdown can be realized in one basin, while wetland habitat remains in others. Each basin can be drawn down once every six or seven years or when deemed necessary. The following techniques will be used for implementing drawdowns on the Boundary Creek WMA.

- 1) Complete drawdowns may, depending on need, be implemented every six or seven years to manage marsh succession and maintain wetland productivity.
- 2) Drawdowns should begin before July 1st to allow for aerobic decomposition during the summer, achieve a rich plant species assemblage resulting from the drawdown, and

maximize seed production by moist soil plants (Jacobs et al. 1997, Merendino and Smith 1991).

- 3) The drawdown should be gradual to concentrate invertebrates at the soil-water interface for exploitation by shorebirds, waterfowl, great blue herons, and other wildlife. Gradual drawdowns also retain moisture to stimulate germination and support the growth of moist soil plants.
- 4) As complete a drawdown as possible should be maintained through late summer and early fall.
- 5) Re-flooding could begin in October, and be completed by late December, or be completed in the following spring. Maintaining the drawdown through an additional season would enhance aerobic decomposition and emergent plant response.
- 6) Water levels should remain relatively low in the year following a drawdown to allow emergent species that germinated on exposed wetland soils to become established.

The need for wetland drawdowns will be determined by the extent of emergent vegetation; the number of duck breeding pairs, broods, and average brood size; and best professional judgement. A general management goal will be to maintain a hemi-marsh condition where the ratio of emergent vegetation to open water is 50:50. This condition is highly productive for wetland dependent wildlife and invertebrate abundance and diversity (Weller 1978). However, drawdowns may also be employed if the extent of emergent vegetation is declining, irrespective of the ratio of emergent vegetation to open water. Drawdowns may also be conducted if emergent vegetation is too dense. In this case, a drawdown would facilitate mechanical treatments implemented to reduce emergent plant growth such as burning and plowing dense stands of cattails.

General marsh vertebrate productivity will be assessed by censusing duck breeding pairs and broods. Ducks were chosen as indicators of vertebrate productivity since 13-15 species of locally breeding ducks are easily censused with established techniques, and are dependent on the full spectrum of wetland types. Important criteria will be the size of the duck breeding population, the number of broods produced, and the average brood size. Chronic declines in one or more of these criteria may indicate the need for wetland rejuvenation through drawdowns. Other wildlife information may also be evaluated to determine the need for wetland drawdowns such as bald eagle nest success, numbers of muskrat lodges, and numbers of waterfowl or shorebirds hosted during migration

The IDFG needs to have the ability to use the above criteria in conjunction with best professional judgement to determine the need for wetland drawdowns. Drawdown information (e.g., drawdown initiation date, rate, re-flooding date, plant and animal responses, etc.) will be recorded to assess management success and the need for modifications if necessary.

MOIST SOIL MANAGEMENT

Moist soil management refers to managed marsh drawdowns that stimulate the germination of annual native plants typical of early marsh succession (Fredrickson and Taylor 1982, Fredrickson 1991, and Fredrickson 1996). These plants often become densely established on recently exposed mudflats, and produce an abundance of seed. Many of these seeds are selected as food by birds and mammals. Following seed maturation, an area can be progressively reflooded to make the seeds available to wetland vertebrates. In addition to high seed availability, decomposing plant material often results in high invertebrate production, another essential food source for many wetland wildlife species. Drawdowns for moist-soil management would also be initiated before July 1, and be implemented gradually to concentrate invertebrates at the soil/water interface and retain soil moisture for germination and growth of moist-soil plants. The drawdown would be maintained until seeds mature in moist-soil plants.

Re-flooding should be implemented gradually. As moist-soil plants are flooded, their seeds are made readily available to waterfowl, and invertebrates are produced in the flooded detritus. Re-flooding could occur in late summer, early fall, or the following spring, and timed to benefit migrating waterfowl and shorebirds. Drawdowns implemented for moist-soil management would not be conducted more frequently than once every six years in any individual wetland basin.

One negative aspect associated with moist soil management is that dense, monotypic stands of cattail may become established. This has been the case nearby at the Creston Valley WMA in British Columbia (Brian Stushnoff personal communication). While the Creston Valley WMA obtained an excellent response from smartweed due to growing season drawdowns, cattails also became established and eventually required expensive control measures.

Moist soil management will initially be employed on the Boundary Creek WMA on an experimental basis in one small wetland basin. If monotypic stands of cattails become established, control efforts can be more effectively implemented. Cattail control may include periodic use of herbicides and plowing and discing followed by flooding to a depth of three feet. Prescribed burning may also be employed to open, diversify, and improve the vigor of emergent vegetation.

Wetland management techniques, such as drawdown dates, drawdown rates, reflooding dates, water level elevations, etc., will be documented so that beneficial results can be repeated and negative results avoided.

GRASS/FORB HABITAT MANAGEMENT

Important habitat attributes of grass/forb stands include species and habitat diversity, plant density, stand health, and residual cover. No management other than noxious weed control is anticipated to be required to maintain important habitat attributes for five to ten years following the successful establishment of grasses and forbs (Duebber et al. 1981, Higgins and Barker

1982). However, over time, species diversity, density, and vigor will decline. Herbaceous upland vegetation will be monitored to determine the need for rejuvenation.

Grass and forb cover can be rejuvenated in a number of ways including mechanical treatment, haying, grazing, and burning. Because trees and shrubs will be scattered throughout most grass/forb stands, mechanical and haying treatments would be very difficult to implement. Both techniques would remove shrubs and trees from the treatment area and are not recommended. Rejuvenation using haying is also short-lived since haying does not remove the lower litter layer (Duebber et al. 1981).

Controlled grazing and burning remove plant litter, return nutrients to the soil, break up dense, monotypic stands, and diversify species and habitat. However, effective grazing requires fences which are costly and can impede movement by elk and moose. Consequently, prescribed burning will be the preferred rejuvenation method for grass/forb habitats on the WMA. Fire is the only treatment that would have occurred naturally. In this case, prescribed burning will duplicate the beneficial effects of natural caused fires.

Burning on the WRP easement for habitat management purposes must have prior approval from the NRCS as a compatible use to comply with the easement's restrictions. When grass/forb habitats are determined to require burning, only selected portions of the WMA will be treated in any one year. A significant portion of the WMA will remain untreated each year to provide undisturbed cover for nesting birds. Burning will be rotated across the WMA so no area is burned more than once every five years. Planning for prescribed burning will consider environmental conditions conducive to managing smoke; ignition method; the use of wetland areas as natural fire breaks; protection of shrubs and trees, if necessary; and the use of plowed firebreaks.

TREE AND SHRUB HABITAT MANAGEMENT

Re-establishing native tree and shrub habitat is anticipated to require many decades. In addition to woody plant occurrence, important habitat attributes must develop. These attributes include tree/shrub size, density, species diversity, and decadence. The 1898 General Land Office notes refer to cottonwoods with three to four foot diameters (GLO Notes 1898). It will require a long time for established cottonwood trees to attain this size. Decadence (dead, downed, storm-damaged, diseased and dying trees) is a critical habitat feature for many wildlife species, particularly those that use tree cavities or logs. These include squirrels, bats, woodpeckers, cavity-nesting ducks, swallows, swifts, nuthatches, chickadees, raptors and owls. Management of native trees and shrubs already present may include protection from big game browsing, beaver, fire, and herbicides to allow woody species to get established and spread.

The most important management action within the first decade after supplemental planting will be protecting trees and shrubs from competition and damage until they are adequately established. Control of competing vegetation may include cultivation, herbicide use, and placement of vegetation control fabric around tree and shrub plantings. Temporary fences or

plant tubes may be used to protect new tree and shrub plantings from browsing by deer, elk and moose. Temporary beaver control may also be implemented if necessary.

Initial supplemental plantings will be limited to two acres per year for three consecutive years. The IDFG's proposed operations and maintenance budget and staffing will be adequate to take care of six acres of "new" plantings, three years old or less, at any one time. Once plantings survive over three years, maintenance needs decline and additional plantings can be added (Table 5).

After the identified supplemental planting activities are completed and WRP restoration funds have been expended, the IDFG is committed to continue to monitor tree and shrub establishment. In the event natural regeneration and plantings are not spreading at an acceptable rate, the need to continue planting activities will be evaluated. Long-term maintenance of the plantings will be the responsibility of the IDFG, extending far beyond the period for which WRP restoration funds will be available. For this reason, planting activities will be conducted in such a manner that maintenance associated with the plantings will not exceed the IDFG's financial and manpower resources.

Following establishment, prescribed burning can be conducted on an infrequent basis to stimulate sprouting of palatable and nutritious browse species within reach of deer, elk, and moose, and initiate seed germination to diversify tree-shrub stands. Burning on the WRP easement for habitat management purposes must have prior approval from the NRCS as a compatible use to comply with the easement's restrictions.

NESTING STRUCTURES

Man-made nesting structures for cavity-nesting ducks (wood duck, common goldeneye, hooded merganser, bufflehead, common merganser) have been effectively employed across the United States and Canada for decades (Belrose and Holm 1998). Historically the Kootenai River floodplain provided ample habitat for cavity-nesting ducks in extensive cottonwood forests before the floodplain was drained, diked and farmed. Currently, cottonwood stands occur on the WMA along Boundary Creek and one of the channels of Smith Creek. These stands are relatively sparse due to many years of grazing that removed most regeneration. In addition, past logging has removed most of the large coniferous trees from other forested sites. Even though 400± acres of additional wetland brood-rearing habitat will be available in the near future, the current low density of tree cavities of adequate dimensions for cavity-nesting ducks will limit breeding populations for decades. Consequently, the use of nesting boxes on the WMA will be an important interim measure. Nesting boxes placed for cavity-nesting ducks will also benefit many other cavity-dependent wildlife species.

Artificial nesting structures are also very effective in increasing Canada goose productivity (Ball 1990). As restored marshes develop, muskrat lodges that support Canada goose nests are anticipated to increase markedly. Consequently, artificial nesting structures for Canada geese will be employed as an interim measure which may be wholly or partially replaced by muskrat lodges over time.

Small nest boxes are valuable to a wide variety of cavity-nesting birds including swallows, bluebirds, nuthatches, chickadees, wrens, and American kestrels. Artificial nest boxes will be particularly valuable for insectivorous cavity-nesters due to the abundance of emerging aquatic insects associated with restored wetlands. Artificial bat boxes may also be employed to facilitate more complete utilization of abundant insect populations associated with restored wetlands.

Nesting structures will be built, erected and maintained primarily by volunteers. Funding for waterfowl nesting structures will be available from the IDFG's Habitat Improvement Program. No wildlife mitigation funds provided by BPA will be used for the construction or maintenance of any nesting structures.

WILDLIFE FOOD PLOTS

The area near Porthill, Idaho, is one of the few places where ring-necked pheasants persist in the Kootenai River Valley. It is likely that the local pheasant population could be enhanced by habitat restoration on the WMA, increasing hunting and viewing opportunities. Restored wetland and upland habitats will provide excellent nesting and winter cover. However, a lack of winter food sources will still limit pheasant populations. Consequently, up to four, one-acre corn food plots may be developed on the WMA to benefit wintering pheasants. These food plots could be watered by a portable drafting pump with irrigation systems (e.g., set lines, big guns, etc.). Corn food plots would also be attractive to wild turkeys, white-tailed deer, and a host of other wildlife. Funding for food plot developments (pump, irrigation system, seed, fertilizer, herbicide, etc.) is available from the IDFG's Habitat Improvement Program and possibly the local chapter of Pheasants Forever. Planting any crop on the WRP easement, such as wildlife food plots, must have prior approval from the NRCS as a compatible use to comply with the easement's restrictions. No wildlife mitigation funds provided by BPA will be used for growing or maintaining any wildlife food plots.

NOXIOUS WEED CONTROL

Noxious weed control will be required to prevent the spread of weeds to neighboring landowners and the displacement of desirable vegetation (Objective 6). Noxious weeds known to occur on the WMA include Canada thistle, common tansy, spotted knapweed, St. Johns-wort, orange hawkweed, meadow hawkweed, and hound's tongue. Noxious weeds will be controlled by contracting and spot herbicide application. Herbicides will be kept well away from surface water. Herbicides selected for use will be those with a short environmental persistence and effective target species control. A noxious weed control plan for the WRP easement must have prior approval from the NRCS as a compatible use to comply with the easement's restrictions.

PUBLIC USE

Public use of the Boundary Creek WMA will be encouraged and accommodated (Objective 5). Visitor facilities will be minimal and developed at the extreme northeast corner of the property near the proposed WMA headquarters. Facilities will be located to ensure they are compatible with the protection and enhancement of wildlife and their habitats. No overnight camping will be authorized. All facilities for public visitation will be located so as not to infringe on the WRP easement. Vehicle access will be restricted to existing public roads and the turn around where the main access road ends at the Kootenai River. Boundary County has expressed an interest in building several vehicle turnouts for public viewing of the WMA within the county's right-of-way along the dike road (Merle Dinning, County Commissioner, personal communication).

The IDFG will cooperate with the local community to seek other fund sources for those facilities that are either not part of the IDFG's mission or where IDFG funds may not be forthcoming in a timely manner due to higher priorities elsewhere. All hunting, fishing and trapping seasons and bag limits authorized by the Idaho Fish and Game Commission that are applicable to the surrounding area will be offered on the WMA. Current regulations governing public use of IDFG owned/managed lands statewide will be in effect on the WMA.

ENHANCE HABITAT FOR NATIVE FISH

Considerable interest has been expressed by state, federal, and tribal fish managers and researchers regarding the possibility of enhancing Boundary Creek and the old channels of Smith Creek to benefit native fish species (Objective 7). The intent of including this objective in the WMA plan is not to preclude future opportunities to enhance stream habitat for migration, spawning and rearing of native fish species as long as they are compatible with WMA wildlife and habitat management objectives.

MONITORING AND EVALUATION - OBJECTIVE 8

Monitoring and evaluation (M&E) consists of assessing changes in habitat and wildlife abundance that test the effectiveness of restoration and mitigation measures. M&E procedures will be used on the Boundary Creek WMA to measure changes in habitat for both target and non-target wildlife species.

M&E procedures will also be used to determine when management activities should be employed and whether or not they achieve desired results. For example, M&E will be required to determine where weed control efforts should be directed; if prescribed burning is required to rejuvenate grass/forb stands or open dense marsh vegetation; when drawdowns are required for marsh rejuvenation; if tree and shrub plantings are successfully established; and if temporary beaver control is warranted. Wildlife populations may also be monitored for general trends. While some monitoring measures can be anticipated, others may be developed as management proceeds. Estimated annual project costs for M&E are included in the proposed O&M budget (Tables 6 and 8).

M & E METHODS USED FOR WILDLIFE HABITAT

1. The HEP analysis, completed in September 1999, will be replicated every five years to monitor changes in vegetation and habitat quality, and provide updated crediting to BPA. Data collected are those necessary to use target species models and, depending on the model, include such things as plant species composition, plant canopy coverage, height, density, and plant age-class distribution.
2. Eight permanent photo points marked with steel stakes and located with global positioning satellite technology were established in July 1999. Photos will be retaken every five years to monitor changes in plant communities over time.
3. A noxious weed control plan will be prepared each year containing maps of the WMA where noxious weeds are present; an ocular estimate of acreages by weed species; specific herbicides or other methods to be used to treat each weed species; and a summary of the previous years weed control efforts.
4. Staff gauges at water control structures will be used to monitor water level elevations in seven wetland basins. Water levels will be recorded the first day of each month from August through April and twice a month from May through July. Fluctuating water levels will enable managers to improve and maintain desirable vegetative composition and wetland productivity.
5. The Boundary Creek water right will be monitored by measuring flows at the diversion weir to ensure the diversion rate does not exceed 19.8 cfs and the maximum volume does not exceed 2,970 acre-feet. Flow measurements will be recorded as necessary to support beneficial use of the water right (e.g. daily, weekly, bi-weekly, or monthly).
6. The survival and growth of supplemental tree and shrub plantings will be evaluated each year to determine the need for additional plantings.

M & E METHODS USED FOR WILDLIFE POPULATIONS

1. Monitor the Boundary Creek WMA bald eagle nest annually to determine presence, nest initiation, number of young, and fledgling rate.
2. Two duck breeding pair counts will be conducted in May and three brood counts in July and August each year to estimate the breeding population and annual productivity.
3. A nest search will be conducted the first two weeks of April each year to estimate the breeding population of Canada geese. Goslings will be counted in early June to estimate annual productivity.
4. An estimate of the spring and fall migration of waterfowl will be conducted by random ground counts each year in March, April, October, and November.

5. The number of elk and moose observed on the WMA each year will be monitored on a random basis. Calf production will be documented each year in May and June.
6. Spring and fall grizzly bear use will be monitored by IDFG wildlife research personnel by radio-tracking collared bears from fixed-wing and ground surveys. Funding will be provided from existing IDFG budgets.

OPERATIONS AND MAINTENANCE BUDGET – OBJECTIVES 1-9

Operations and maintenance (O&M) costs (Table 6) are recurring annual costs necessary for the IDFG to manage the WMA in order to achieve and sustain the goals and objectives previously outlined on pages 30-31. Wildlife mitigation funds provided by BPA will be the source of funds for the WMA's annual operating budget since these costs are necessary to protect BPA's investment in mitigation and additional future benefits to wildlife habitat.

O&M includes such costs as: employee salaries, communications, materials and supplies, travel, fuel, rentals, contracting, overhead, etc. O&M includes work such as project administration, wildlife surveys, moving water, controlling water levels, weed control, supervision of contractors, repairing facilities and equipment, information and education, monitoring and evaluation, and managing public use.

All enhancement, restoration, operation and maintenance activities recommended for funding by BPA meet the guidelines approved by the Columbia Basin Fish and Wildlife Authority Wildlife Committee (CBFWA 1998). Those activities that are not eligible for BPA funding, or not recommended, have been identified and will be funded from other IDFG budgets or outside sources (Table 7). Examples include: Fee-in-lieu of tax payments to Boundary County; Idaho Department of Lands fire protection fees; artificial nesting structures; wildlife food plots; outdoor recreation facilities; and law enforcement.

Direct supervision of the wildlife technician assigned to the Boundary Creek WMA will be provided by Regional Habitat Biologist, IDFG. The second level supervision will be the responsibility of the Regional Habitat Manager, IDFG, stationed at the Panhandle Regional Office in Coeur d'Alene, Idaho. All of the personnel costs related to supervision will be absorbed by existing IDFG budgets and not charged to BPA.

CAPITAL OUTLAY - OBJECTIVES 1-9

Capital outlay includes land, buildings, and equipment with a useful life of three years or more. The following capital outlay items have been identified by the IDFG as necessary to efficiently operate and manage the WMA and successfully achieve the objectives previously stated (Table 8).

Table 6. Annual Operations and Maintenance Costs to be Funded by BPA, Boundary Creek WMA.

Expense	Estimated Cost	Total
A. <u>Personnel Costs</u>		
Wildlife Technician – 12 months		
Salary – 2,080 hrs x \$10.97/hr	\$22,817.60	
Benefits - \$22,817.60 x 0.3764	<u>8,588.54</u>	
TOTAL		\$31,406.14
B. <u>Operating Costs</u>		
Communications	\$1,300.00	
Training	500.00	
Other Services	400.00	
Repair and Maintenance	2,800.00	
Travel	650.00	
Supplies	3,450.00	
Fuel and Lubricants	2,200.00	
Insurance	300.00	
Utilities	500.00	
Rentals and Leasing	5,000.00	
Professional Services	<u>6,000.00</u>	
TOTAL		\$23,100.00
C. <u>Overhead</u>		
Personnel plus Operating x 28.1%		
\$54,506.14 x 0.281	<u>\$15,316.23</u>	
		\$15,316.23
D. <u>Total Annual O&M</u>		
Personnel Costs	\$31,406.14	
Operating Costs	23,100.00	
Overhead	<u>15,316.23</u>	
TOTAL		\$69,822.37
	Rounded to	<u>\$69,822.00</u>

Table 7. WMA Costs to be Funded by the IDFG or Other Sources.

Expense	Estimated Cost	Fund Source
A. <u>Operations and Maintenance Costs</u>		
<u>Personnel Costs – Salaries and Benefits</u>		
Supervision – Regional Habitat Biologist 4 months	\$16,926/yr	IDFG
Supervision – Regional Habitat Manager 1 month	5,527/yr	IDFG
Law Enforcement – Sr. Conservation Officer 1.5 months	6,347/yr	IDFG
Subtotal	<u>\$28,800/yr</u>	
<u>Operating</u>		
Fee-in-lieu-tax payment	\$10,000/yr	IDFG
Fire protection fee	<u>208/yr</u>	IDFG
Subtotal	\$10,208/yr	
<u>Management Activities</u>		
Wildlife food plots	\$ 4,000/yr	IDFG HIP; (Pheasants Forever*)
Artificial Nesting Structures	1,000/yr	IDFG HIP; Volunteers
Subtotal	<u>\$ 5,000/yr</u>	
TOTAL O&M	\$44,008/yr	
B. <u>Improvements – Outdoor Recreation Facilities</u>		
Picnic Area	\$12,000	IDFG Boating Access; (Boundary Co. Waterways*); (WIF Grant*)
Nature/Historic Trail	15,000	(IDPR Grant Program*)
Boat Dock	5,000	IDFG Boating Access; (Boundary Co. Waterways*); (WIF Grant*)
TOTAL IMPROVEMENTS	<u><u>\$32,000</u></u>	

*These groups/agencies are potential fund sources only. Their inclusion in this table is solely to provide the public and IDFG with a place to start.

OFFICE AND RESIDENCE

The proposed site for the WMA's headquarters is at the extreme northeast corner of the property at the end of the main access road. This is the same area where the former owner's grain bins, storage sheds, machine shop and trailer are located. Except for the grain bins, the rest of the buildings are in poor to fair condition. The former owner used an 8'x30' travel trailer that is now over 30 years old for a temporary residence and office. Water was pumped out of Boundary Creek but drinking water had to be hauled on site. The condition of the septic tank and drainfield are unknown.

The WMA is located in a remote rural area 30 miles away from the nearest population center. On-site housing and office facilities are necessary for IDFG personnel to provide greater operational security to prevent fire, vandalism and theft; immediate response time in case of an emergency; space for a telephone, computer, fax and filing cabinets; greater flexibility in work scheduling; and better public service to WMA visitors.

Providing office space at other locations and no housing was considered but dropped due to the driving distances involved, increased costs, lack of efficiency, inadequate security, and poor response time. The McArthur Lake WMA, owned by the IDFG, is 50 miles away, too far to offer a practical solution. In addition, the WMA has no vacant office space or vacant housing. The Kootenai National Wildlife Refuge, managed by the USFWS, is 25 miles away. The refuge is closer, but also does not have any vacant office space or vacant housing. The nearest population center is Bonners Ferry, 30 miles away. Managing the WMA from an office 30 miles away is not efficient and over time, the cost to lease an office for the life of the Boundary Creek project would greatly exceed the cost of providing a combination residence and office on-site.

The IDFG has requested, through the Work Group, that wildlife mitigation funds be provided by BPA for a combination residence and office in fiscal year 2001. These facilities are eligible for BPA funding (CBFWA 1998).

Cost Estimate (Table 8)

24'x48' manufactured home, including delivery and set up; or equivalent frame construction; foundation; septic tank and drainfield; buried water line; buried power line.	\$63,000
Develop a well for potable water, including water pump; pressure tank; water line; and electrical.	10,000
	<hr/>
	<u>\$73,000</u>

MAINTENANCE SHOP AND STORAGE FACILITY

The existing 27'x40' machine shop on the WMA is estimated to be 50-60 years old. The building was constructed of untreated wooden posts and needs repairs. The roof support beams

are sagging, there is no insulation, the wiring is outdated, and the only source of heat is a homemade wood stove. This building will not pass a safety inspection by the Idaho Department of Labor and Industrial Services in its present condition.

An adequate combination shop and storage facility will be necessary for IDFG personnel in order to have a workspace to perform minor repairs and maintenance to equipment and a secure building to store tools, equipment and supplies to prevent theft and vandalism. Leasing a shop and storage facility off-site was not deemed practical, efficient or cost effective, since the WMA is too far away from any potential sources.

The IDFG hired an engineering firm in March 2000 that determined the existing machine shop is structurally sound and can be repaired (Davis 2000). Repairing the existing machine shop and adding new wiring, insulation and a heater can be accomplished for about half the cost of a new building with the same amenities.

The IDFG will request BPA funding in both fiscal year 2001 and 2002 to repair this building and bring it up to modern code requirements. Shop and storage facilities are eligible for BPA funding (CBFWA 1998).

Cost Estimate (Table 8)

Column and beam replacement; add lateral wall supports; replace electrical system and light fixtures; replace windows; add insulation and wallboard; install forced-air propane gas heater; replace sliding doors.	<u>\$25,620</u>
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TRACTOR AND IMPLEMENTS

A four-wheel drive tractor with at least 80HP and related implements (loader, rotary mower, back blade, disc, plow, roller-packer and seed drill) will be required for a variety of management and maintenance activities.

- ◆ Supplemental shrub and tree plantings – Eleven acres of plantings to be funded by the WRP have been identified in the restoration plan as the initial attempt to restore woody species back to the property (Figure 11, Table 3). Even with high survival rates, some areas will need to be replanted due to mortalities caused by drought, damage from rodents, beaver, and big game browsing. It will require a long-term commitment from the IDFG to maintain these plantings and to establish additional plantings if necessary. Equipment will be necessary to mow, cultivate, spray weeds, and apply fertilizer around new plantings to reduce competition. For areas that need to be replanted, or where establishing new plantings, equipment will be needed for site preparation (plow), pulling a tree planter and laying weed control mats.

◆ Grass/forb habitat – In November 1999, 850 acres of the WMA were reseeded with a grass/forb mixture to establish a permanent cover crop as quickly as possible (Table 2). The water delivery system and infrastructure on the WMA will be completed by the end of the summer of 2000 and the wetland basins will be full for the first time during the spring of 2001. Approximately 250± acres of the WMA will be managed for grass/forb habitat. Maintenance will be needed to re-seed areas that did not become established and control Canadian thistle. Control of large areas of noxious weeds will be contracted. However, once weed infestations are reduced in size, it will be more efficient and cost-effective to spot spray weed patches with the WMA’s own equipment.

In the long-term, grass/forb habitat will decline in vigor, diversity and density. Prescribed burning will be used to periodically rehabilitate grass/forb habitat. Plowed firebreaks are routinely used to keep prescribed burns confined in the absence of natural firebreaks and to protect other habitats that managers do not want burned. Plowed firebreaks will immediately need to be re-seeded to grasses and forbs to prevent the establishment of noxious weeds. Rehabilitating grass/forb habitat will be an ongoing management activity for the life of the project.

◆ Control Cattails – The majority of the WMA’s wetland basins will be shallow - less than 3 feet deep. These areas will be susceptible to colonization by dense monotypic stands of cattails. Control of cattails will be accomplished by draining wetland cells to dry them out, then burning, spraying herbicides, plowing and discing, and re-flooding. Cattail control will be an ongoing management activity for the life of the project.

◆ Controlling noxious weeds – Mowing and/or spraying noxious weeds along the main access road along the northern edge of the WMA (3 miles) and along the Kootenai River dike (3 miles) will be an annual task. Initial weed control efforts will be handled by contracting. However, once weed infestations are reduced in scope, it will be more efficient to spot spray or mow weed patches with the WMA’s own equipment.

◆ Repair and maintenance of water delivery system – The infrastructure of the WMA’s water delivery system will need to be maintained and repaired for the life of the project. (Three low-head dikes, several miles of ditches and twenty water control structures). Equipment will be necessary to repair dikes, keep ditches open and remove beaver dams.

The IDFG will request BPA funding for a tractor and related implements in fiscal year 2003. This equipment is eligible for BPA funding (CBFWA 1998).

Cost Estimate (Table 8)

80HP, 4WD tractor w/enclosed cab, w/loader attachment, three point hitch	\$40,000
Three bottom plow	3,000
10’ two-way disc	5,000
10’ roller-harrow	8,500

10' Brillion seeder	9,500
7' rotary mower	3,000
8' back blade rear attachment	<u>3,000</u>
	<u>\$72,000</u>

OFFICE AND FIELD EQUIPMENT

Cost Estimates (Table 8)

Fiscal Year 2001

Desk, chair, two four-drawer filing cabinets	\$1,000
Computer, monitor, printer, fax/photocopier	2,500
VHF mobile radio	500
Truck mounted tool box	600
Spotting scope	600
Binoculars, 10x50	400
SLR camera w/50mm f1.4 lens, and 28-70mm-zoom lens	1,000
	<u>\$6,600</u>

Fiscal Year 2002

Power drill	\$ 300
Bench grinder	200
Chain saw	400
Weed whacker	500
Portable generator	1,500
Above ground 500 gallon, bulk gas tank with containment/spill protection base	3,000
	<u>\$5,900</u>

Fiscal Year 2004

Above ground 500 gallon, bulk diesel tank w/containment/spill protection base	\$3,000
Welder	1,200
Cutting torch, gas bottles	800
10HP air compressor	1,000
Pressure washer	800
Table Saw	800
Radial arm saw	<u>800</u>
	<u>\$8,400</u>

Fiscal Year 2005

17' square stern canoe	\$1,000
5HP outboard motor	1,500
Electric motor	<u>800</u>
	<u>\$3,300</u>

Table 8. Total Costs for Operations and Maintenance, Monitoring and Evaluation, and Capital Outlay Recommended for Funding by BPA, Boundary Creek WMA, 2001-2006.

Objective	Cost by Fiscal Year					
	2001	2002	2003	2004	2005	2006
<u>Operations and Maintenance</u>						
Continuous Costs	69,822	70,629 ^a	71,436	72,279	73,123	74,003
Upgrade Machine Shop	12,810	12,810				
SUBTOTAL	82,632	83,439	71,436	72,279	73,123	74,003
<u>Monitoring and Evaluation</u>						
	*	*	*	*	*	*
<u>Capital Outlay</u>						
Equipment	6,600	5,900		8,400	3,300	
Office/Residence	63,000					
Develop Well	10,000					
Tractor and Implements			72,000			
SUBTOTAL	79,600	5,900	72,000	8,400	3,300	
<hr/>						
ANNUAL TOTALS	162,232	89,339	143,436	80,679	76,423	74,003

^a Personnel costs for FY2002 through FY2006 were adjusted upward to reflect a projected 2% salary increase each year.

- Included in O&M continuous costs.

LITERATURE CITED

- Ball, J. I., 1990. Artificial Nesting Structures for Canada Geese. *In* D. H. Cross compiler, Waterfowl Management Handbook. USDA Fish and Wildlife Leaflet 13.2.12.
- Belrose, F. C., and D. J. Holm. 1994. Ecology and Management of the Wood Duck. Stockpole Books, Mechanicsburg, PA.
- Bentrup, G., and J. C. Hoag. 1998. The Practical Streambank Bioengineering Guide. Natural Resources Conservation Service, Aberdeen, ID. 67 pp.
- Bessler, C. 1990. Editor. The Klockman Diary. Keokee Publishing Co., Sandpoint, ID.
- Chugg, J. C., and M. A. Fosberg. 1980. Soil Survey of Boundary County Area, Idaho. U.S. Department of Agriculture, Soil Conservation Service. 72 pp.
- Columbia Basin Fish and Wildlife Authority, Wildlife Caucus. 1998. Enhancement, Restoration, Operation and Maintenance of Columbia Basin Wildlife Mitigation Projects. 64 pp.
- Constable, W. 1978. A Dream Fulfilled: The Reclamation of Creston Flats. Pp. 46-51 *in* J. Jeffries ed., Waters of Wealth: A Seminar on the Kootenai Region of the United States and Canada. Montana Historical Society and the U.S. Army, Corps of Engineers, Libby, MT.
- Davis, D. C. 2000. Letter to IDFG dated March 16, 2000. Condition of Boundary Creek WMA Machine Shop. Tucker Engineering Consultants, Sandpoint, ID. 4 pp.
- Ducks Unlimited and US Department of Agriculture, Natural Resources Conservation Service. 2000. Boundary Creek, Project No. ID-0024-001.
- Duebbert, H. F., E. T. Jacobson, K. F. Higgins, and E. B. Podall. 1981. Establishment of Seeded Grasslands for Wildlife Habitat in the Prairie Pothole Region. US Fish and Wildlife Service. Special Scientific Report. Wildlife No. 234. 21 pp.
- Eldridge, J. 1992. Management of Habitat for Breeding and Migrating Shorebirds in the Midwest. *In* D.H. Cross compiler, Waterfowl Management Handbook. U.S. Fish and Wildlife Service. Fish and Wildlife Leaflet 13.
- Fink, F. 2000. Letter from Frank Fink, State Biologist, NRCS, Boise, to Paul Hanna, IDFG, Coeur d'Alene, dated June 14, 2000. Letter on file at the Regional Office IDFG, Coeur d'Alene, ID.
- Fredericks, J. and M. Liter. 2000. Boundary Creek WMA, Smith Creek Slough Assessment. Unpublished Report. Idaho Department of Fish and Game, Coeur d'Alene, ID. 4 pp.
- Fredrickson, L. H., and T. S. Taylor. 1982. Management of Seasonally Flooded Impoundments for Wildlife. U.S. Fish and Wildlife Service Resource Publication 148. 29 pp.

- _____. 1985. Managed Wetland Habitats for Wildlife: Why Are They Important? Pages 1-8 in M. D. Knighton compiler, Water Impoundments for Wildlife: A Habitat Management Workshop. USDA Forest Service General Technical Report NC-100.
- _____. 1991. Strategies for Water Level Manipulations in Moist-Soil Systems. In D. H. Cross compiler, Waterfowl Management Handbook. U.S. Fish and Wildlife Service. Fish and Wildlife Leaflet 13.
- _____. 1996. Moist-Soil Management, 30 Years of Field Experimentation. Pages 168-177 in 7th International Waterfowl Symposium. Memphis, Tennessee.
- General Land Office, U. S. Department of Interior. 1894. Surveyor's Notes – West Boundary of T65N, R1W, August 1894. Copy on file at the office of the U.S. Forest Service, Sandpoint Ranger District, Sandpoint, ID.
- _____. 1898. Surveyor's Notes – T65N, R2W, pages 776-793, December 6, 1898 to January 16, 1899. Copy on file at the office of the U.S. Forest Service, Sandpoint Ranger District, Sandpoint, ID.
- Harrington, B. Undated. Shorebird Migrations - Fundamentals for Land Managers in the United States. Ducks Unlimited. Memphis, Tennessee.
- Harris, S. W., and W. H. Marshall. 1963. Ecology of Water-Level Manipulations on a Northern Marsh. *Ecology* 44:331-343.
- Higgins, K. F., and W. T. Barker. 1982. Changes in Vegetation Structure in Seeded Nesting Cover in the Prairie Pothole Region. US Fish and Wildlife Service. Special Scientific Report. Wildlife No. 242. 26pp.
- Idaho Department of Fish and Game. 1983. Policy Manual.
- _____. 1991. A Vision For The Future. Policy Plan 1990-2005. IDFG, Boise, ID. 32 pp.
- Jacobs, K. J., D. R. Diefenbach, and J. P. Dunn. 1997. Predictions of Emergent Vegetation Establishment Following Drawdown in Various State Game Lands Wetlands. Pennsylvania Game Commission. 14 pp.
- Kadlec, J. A. 1962. Effects of a Drawdown on a Waterfowl Impoundment. *Ecology* 43:267-281.
- Kantrud, H. A., and R. E. Stewart. 1977. Use of Natural Basin Wetlands by Breeding Waterfowl in North Dakota. *Journal of Wildlife Management* 41:243-253.
- Kentula, M. E., R. P. Brooks, S. E. Gwin, C. C. Holland, A. D. Sherman, and J. C. Sifneos. 1993. An Approach to Improving Decision Making in Wetland Restoration and Creation. CRC Press, Boca Raton, FL. 151 pp.

- Mansell, D., L. Christl, R. Maher, A. Norman, N. Patterson, and T. Whillans. 1998. *Temperate Wetlands Restoration Guidelines*. Ontario Ministry of Natural Resources and Ducks Unlimited, Canada. 140 pp.
- Martin, R. C., H. J. Hansen, and G. A. Meuleman. 1988. *Albeni Falls Wildlife Protection, Mitigation, and Enhancement Plan*. Idaho Department of Fish and Game. Prepared for Bonneville Power Administration, Portland, OR. Project No. 87-43. 123 pp.
- Maxim Technologies. 1999. *Phase I Environmental Site Assessment, Port Hill Farm, Boundary County, Idaho*. Maxim Technologies, Inc., Helena, MT. Project No. 9902272-100. 17 pp.
- McKenzie, D. F. 1997. *A Wildlife Manager's Field Guide to the Farm Bill*. Wildlife Management Institute Report, Washington, D. C. 44 pp.
- Merendino and Smith. 1991.
- Natural Resources Conservation Service. 1999. *Biological Assessment for the Boundary Creek Project, Wetlands Reserve Program, Boundary County, Idaho*. NRCS, Boise, ID. 16 pp.
- Niebergs, P. D. 1998. *Appraisal of the DLH, L.L.C., Boundary Creek Farm*. Farm Credit Services, Spokane, WA. 113 pp.
- Rockwell, W. 1984. *Creston Valley Profiles*. Caxton Printers, Ltd., Caldwell, ID. 343 pp.
- Schifrin, G. 1999. *Tier O Risk Based Corrective Action, UST Site Closure Reporting, Deon Hubbard Property, Boundary Creek, Boundary County, Porthill, Idaho*. Selkirk Environmental Testing, Inc., Sandpoint, ID.
- Skagen, S. K., and F. L. Knopf. 1994. *Migrating Shorebirds and Habitat Dynamics at a Prairie Wetland Complex*. *Wilson Bulletin*. 106(1):91-105.
- Spencer, A. C. 2000. *Cultural Resources Inventory of the Hubbard Wetlands Reserve Program, Porthill, Boundary County, ID*. NRCS, Portland, OR. 26 pp.
- Stovall, S. 1999. *Boundary Creek Habitat Evaluation Procedure (HEP) Report*. Idaho Department of Fish and Game, Boise, ID. 18 pp.
- Swanson, G. A., M. I. Meyer, and J. R. Serie. 1974. *Feeding Ecology of Breeding Blue-Winged Teal*. *Journal of Wildlife Management* 38:396-407.
- Talent, G. L., G. L. Krapu, and R. L. Jarvis. 1982. *Habitat Use by Mallard Broods in South Central North Dakota*. *Journal of Wildlife Management* 46(3):629-635.
- Taylor, M. S. 1999. *Citizen Input for Management of Boundary Creek Wildlife Management Area*. Report Prepared for Boundary County Commissioners. Idaho Department of Fish and Game, Coeur d'Alene, ID.
- US Department of Energy. 1996. *Albeni Falls Wildlife Management Plan Final Environmental Assessment*. Bonneville Power Administration, Portland, OR. 46 pp.

- _____. 1997. Wildlife Mitigation Program Final Environmental Impact Statement, DOE/EIS-0246. Bonneville Power Administration, Portland, OR. 132 pp.
- US Department of Energy, Bonneville Power Administration and Idaho Department of Fish and Game. 1997. Northern Idaho Wildlife Mitigation Agreement. 11 pp.
- US Department of Interior. 2000. News Release, March 21, 2000. US Fish and Wildlife Service, Region 1.
- Van der Valk, A. G., and C. B. Davis. 1978. The Role of Seed Banks in the Vegetation Dynamics of Prairie Glacial Marshes. *Ecology* 59:322-335.
- Weller, M. W. 1978. Management of Fresh Water Marshes for Wildlife. Pp. 267-284 in R. Good, D. Whigham, and R. Simpson, eds., *Freshwater Wetlands*. Academic Press, New York.
- _____, and L. H. Fredrickson. 1974. Avian Ecology of a Managed Glacial Marsh. *The Living Bird* 12:269-291.

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Rick Donaldson, US Fish and Wildlife Service, Albeni Falls Interagency Work Group
Ray Entz, Kalispel Tribe of Indians, Albeni Falls Interagency Work Group
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BOUNDARY CREEK WILDLIFE MANAGEMENT AREA PLAN

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