

Comprehensive Conservation Plan

Lee Metcalf National Wildlife Refuge

Montana

September 2012

Approved by



7/18/12

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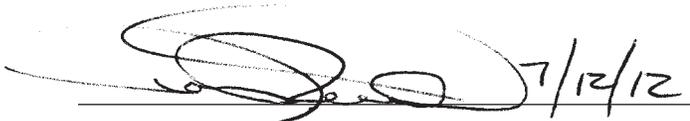
U.S. Fish and Wildlife Service. 2012. Comprehensive Conservation Plan, Lee Metcalf National Wildlife Refuge, Montana. Lakewood, CO: U.S. Department of the Interior, U.S. Fish and Wildlife Service. 204 p.

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Contents

<i>Summary</i>	XI
<i>Abbreviations</i>	XVII
CHAPTER 1—Introduction	1
1.1 The Comprehensive Conservation Plan	3
<i>Final Decision</i>	3
<i>Plan Development</i>	3
<i>Plan Amendment and Revision</i>	3
1.2 Purpose and Need for the Plan	3
1.3 North American Model of Wildlife Conservation	4
1.4 The U.S. Fish and Wildlife Service and Refuge System	5
<i>U.S. Fish and Wildlife Service</i>	5
<i>Service Activities in Montana</i>	5
<i>National Wildlife Refuge System</i>	6
<i>People and the Refuge System</i>	6
1.5 National and Regional Mandates	7
1.6 Contributions to National and Regional Plans	7
<i>Fulfilling the Promise</i>	7
<i>Partners in Flight</i>	7
<i>North American Waterbird Conservation Plan</i>	8
<i>North American Waterfowl Management Plan</i>	9
<i>Intermountain West Regional Shorebird Plan</i>	9
<i>State Comprehensive Fish and Wildlife Conservation Strategy</i>	10
1.7 Strategic Habitat Conservation	10
<i>Climate Change</i>	11
1.8 Planning Process	12
<i>Coordination with the Public</i>	12
<i>State Coordination</i>	15
<i>Tribal Coordination</i>	15
CHAPTER 2—The Refuge	17
2.1 Establishment, Acquisition, and Management History	17
<i>Lee Metcalf National Wildlife Refuge</i>	17
<i>Summary of Land Acquisition History</i>	19
2.2 Purposes	19
2.3 Vision	21
2.4 Goals	21
<i>Bitterroot River Floodplain and Associated Wildlife</i>	21
<i>Wetland Impoundment Habitat and Associated Wildlife</i>	21
<i>Grassland and Shrubland Habitat and Associated Wildlife</i>	21
<i>Invasive and Nonnative Species</i>	21
<i>Research</i>	21
<i>Cultural Resources</i>	21
<i>Visitor Services</i>	21

Partnerships	22
Operations and Facilities	22
2.5 Special Values	22
2.6 Planning Issues	23
<i>Bitterroot River Migration</i>	23
<i>Wetland Impoundments (or Ponds)</i>	23
<i>Upland Habitat and Associated Wildlife</i>	25
<i>Water</i>	25
<i>Invasive and Noxious Species</i>	25
<i>Research, Inventory, and Monitoring</i>	26
<i>Visitor Services</i>	26
<i>Staffing</i>	26
CHAPTER 3—Refuge Resources	27
3.1 Physical Environment	27
<i>Climate and Hydrology</i>	27
<i>Climate Change</i>	29
<i>Physiography and Geology</i>	32
<i>Soils</i>	33
<i>Topography and Elevation</i>	35
<i>Water Rights</i>	35
<i>Hydrogeomorphic Changes</i>	35
<i>Air Quality</i>	39
3.2 Biological Resources	39
<i>Land Cover and Vegetation Communities</i>	40
<i>Habitat Modifications since Establishment</i>	44
<i>Changes to the Vegetation Communities</i>	48
<i>Changes to Fish and Wildlife Populations</i>	48
<i>Upland Habitat</i>	50
<i>Riparian Habitat</i>	51
<i>Wetland Impoundment Habitat</i>	52
<i>Remaining Refuge Acres</i>	53
<i>Invasive Species</i>	53
<i>Wildlife Diseases and Contaminants</i>	54
3.3 State and Federally Listed Species	56
<i>Species of Concern</i>	56
3.4 Cultural Resources and History	58
<i>Prehistoric Occupation</i>	58
<i>History of the Salish</i>	59
<i>Euro-American Settlement and Land Use Changes</i>	60
3.5 Special Management Areas	64
<i>Wilderness Review</i>	64
<i>Important Bird Area</i>	64
3.6 Visitor Services	64
<i>Hunting and Fishing</i>	65
<i>Wildlife Observation and Photography</i>	67
<i>Environmental Education</i>	68
<i>Interpretation</i>	70
3.7 Management Tools	71
<i>Water Level Manipulation</i>	71
<i>Prescribed Burning</i>	71
<i>Prescriptive Grazing or Mowing</i>	71
<i>Cooperative Farming</i>	71

3.8 Socioeconomic Environment	71
<i>Population and Demographics</i>	72
<i>Employment</i>	72
<i>Public Use of the Refuge</i>	72
<i>Baseline Economic Activity</i>	73
<i>U.S. Fish and Wildlife Service Employment</i>	73
<i>Visitor Spending</i>	73
3.9 Partnerships	73
3.10 Operations	74
<i>Staff</i>	74
<i>Facilities</i>	74
CHAPTER 4—Management Direction	75
4.1 Management Focus	75
<i>Target Species Selection Process</i>	76
4.2 Goal for the Bitterroot River Floodplain and Associated Wildlife	78
<i>Target Species for the Bitterroot River Floodplain</i>	78
<i>Floodplain Objective 1</i>	78
<i>Floodplain Objective 2</i>	80
<i>North Burnt Fork Creek Objective (Including Francois Slough)</i>	81
<i>Three Mile Creek Objective</i>	82
<i>Riverfront Forest Habitat Objective</i>	83
<i>Gallery Forest Habitat Objective</i>	84
4.3 Goal for Wetland Impoundment Habitat and Associated Wildlife	85
<i>Target Wetland Habitat Species</i>	85
<i>Wetland Impoundment Habitat Objective 1</i>	85
<i>Wetland Impoundment Habitat Objective 2</i>	87
<i>Gravel Pits Objective</i>	88
4.4 Goal for Grassland and Shrubland Habitat and Associated Wildlife	88
<i>Target Grassland and Shrubland Species</i>	89
<i>Grassland and Shrubland Habitat Objective</i>	89
4.5 Goal for Invasive and Nonnative Species	91
<i>New Invasive Species Objective</i>	91
<i>Established Invasive Species Objective</i>	91
4.6 Goal for Research	93
<i>Research Objective</i>	93
4.7 Goal for Cultural Resources	94
<i>Cultural Resources Objective 1 (Protection)</i>	94
<i>Cultural Resources Objective 2 (Interpretation)</i>	94
4.8 Goal for Visitor Services	95
<i>Hunting Objective</i>	96
<i>Fishing Objective 1</i>	96
<i>Fishing Objective 2</i>	97
<i>Wildlife Observation and Photography Objective</i>	97
<i>Environmental Education Objective</i>	99
<i>Interpretation Objective</i>	101
<i>Signage Objective</i>	102
4.9 Goal for Partnerships	103
<i>Partnership Objective</i>	103
4.10 Goal for Operations and Facilities	103
<i>Staff Objective</i>	103
<i>Facilities, Equipment, and Supplies Objective</i>	104

4.11 Stepdown Management Plans	105
4.12 Research, Monitoring, and Evaluation	105
4.13 Plan Amendment and Revision	106
Glossary	107
Appendixes	
Appendix A—Public Involvement	113
Appendix B—Environmental Compliance	139
Appendix C—Compatibility Determinations	143
Appendix D—Intra-Service Section 7 Biological Evaluation	155
Appendix E—Key Legislation and Policy	163
Appendix F—List of Preparers, Consultation, and Coordination	167
Appendix G—Species Lists	169
Appendix H—Fire Management Program	195
Bibliography	199

FIGURES

1 Location map for Lee Metcalf National Wildlife Refuge, Montana	XII
2 Area map for Lee Metcalf National Wildlife Refuge, Montana	2
3 Process steps for comprehensive conservation planning and associated environmental analysis	12
4 Approved acquisition boundary of Lee Metcalf National Wildlife Refuge, Montana	18
5 Composite vegetation community models Lee Metcalf National Wildlife Refuge, Montana, for 1964 and 2005 (Heitmeyer et al. 2010)	24
6 Ravalli County, Montana, average annual precipitation (inches) (USDA 2012)	28
7 Primary channels and sloughs present at Lee Metcalf National Wildlife Refuge, Montana, in the 1940s	30
8 Flooding of the Bitterroot River on Lee Metcalf National Wildlife Refuge, Montana, in 1974	31
9 Bitterroot River streamflow near Darby, Montana (USGS 2011)	31
10 Network of minor channels occurring in the valley floor on Lee Metcalf National Wildlife Refuge, Montana (Heitmeyer et al. 2010)	34
11 Map of Lee Metcalf National Wildlife Refuge, Montana, showing 1-foot contour intervals (Heitmeyer et al. 2010)	36
12 Car bodies along the Bitterroot River on Lee Metcalf National Wildlife Refuge, Montana, that were intended for erosion control before refuge establishment	38
13 Bank and levee erosion along the Bitterroot River on the west side of Lee Metcalf National Wildlife Refuge, Montana (Heitmeyer et al. 2010)	38
14 Maps showing the changes in the main channel of the Bitterroot River in Montana	41
15 Hydrogeomorphic-derived map of potential vegetation communities on Lee Metcalf National Wildlife Refuge, Montana, before European settlement in the mid-1800s	43
16 Existing habitat and vegetation communities on Lee Metcalf National Wildlife Refuge, Montana	45
17 Ponds and upland fields in Lee Metcalf National Wildlife Refuge, Montana	46
18 Field planted as dense nesting cover on Lee Metcalf National Wildlife Refuge, Montana	47
19 Osprey production on Lee Metcalf National Wildlife Refuge, Montana, 1964–2007	49
20 Mercury concentration in fish from Montana national wildlife refuges	50
21 Proposed land use and drainage and irrigation infrastructure on Lee Metcalf National Wildlife Refuge, Montana, in the 1960s (Heitmeyer et al. 2010)	62
22 Locations of structures near Lee Metcalf National Wildlife Refuge, Montana (Heitmeyer et al. 2010)	63
23 Public use map for Lee Metcalf National Wildlife Refuge, Montana	66

24 Roads in Lee Metcalf National Wildlife Refuge, Montana, including Service roads proposed for removal.	69
25 Kenai Nature Trail, Lee Metcalf National Wildlife Refuge, Montana.	77
26 Adaptive management process.	106

TABLES

1 Summary of the CCP planning process for Lee Metcalf National Wildlife Refuge, Montana	13
2 Habitat type and associated acreages found on Lee Metcalf National Wildlife Refuge, Montana.	19
3 Land acquisition history for Lee Metcalf National Wildlife Refuge, Montana (1964–2009)	20
4 Water rights summary for Lee Metcalf National Wildlife Refuge, Montana	37
5 Hydrogeomorphic matrix of historical distribution of vegetation communities and habitat types on Lee Metcalf National Wildlife Refuge, Montana	40
6 Documented invasive and nonnative plant species on Lee Metcalf National Wildlife Refuge, Montana, as of 2010 and the degree of infestation, priority for treatment, and State noxious status	54
7 Montana listed species of concern and Federal birds of conservation concern recorded in the Bitterroot Valley and on Lee Metcalf National Wildlife Refuge, Montana	57
8 Target species for the Bitterroot floodplain and their habitat needs.	79
9 Wetland impoundment target species and their habitat needs	86
10 Target species for the grassland and shrubland areas and their habitat needs	89
11 Current and proposed staff for Lee Metcalf National Wildlife Refuge, Montana	105
12 Stepdown management plans for Lee Metcalf National Wildlife Refuge, Montana	106

Summary



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View of the Lee Metcalf National Wildlife Refuge from the Bitterroot Mountains.

The U.S. Fish and Wildlife Service has prepared a comprehensive conservation plan for the Lee Metcalf National Wildlife Refuge in Montana. The Regional Director of the Service's Mountain–Prairie Region selected alternative B from the draft comprehensive conservation plan and environmental assessment, and this alternative is now the final comprehensive conservation plan. Substantive public comments (appendix A) were addressed, resulting in modifications to this final document. Implementation of this plan will be monitored throughout its 15-year effective period.

The Refuge

Lee Metcalf National Wildlife Refuge, established on February 4, 1964, is a 2,800-acre refuge located in the Bitterroot River Valley of southwest Montana (figure 1). The refuge encompasses a portion of the Bitterroot River and is located between the scenic Bitterroot and Sapphire Mountains. The channel of the Bitterroot River has been altered from levees, bank stabilization, and some channelization; nevertheless, this floodplain refuge provides a diverse mosaic of western mountain valley habitats including gallery and riverfront forest, wet meadow, wetlands, and grassland benches.

The refuge provides opportunities for the public to enjoy compatible wildlife-dependent public use activities including hunting, fishing, wildlife observation and photography, environmental education, and interpretation. The refuge is a very popular community and tourist destination with more than 143,000 visitors annually.

Issues

Substantive issues were identified following an internal review of refuge information and through public scoping, which began in 2009. The following issues are detailed in chapter 2:

- riparian habitat loss and fragmentation caused by the migration of the Bitterroot River
- overgrown emergent vegetation and eroded levees and water management structures that have compromised the ability to properly manage wetland impoundments
- reduction in the quality and diversity of upland habitats due to invasive plants and lack of native species
- algal blooms that have diminished clarity and quality of refuge waters
- inefficient water supply due to silted and overgrown supply ditches
- invasive species that have become widespread and difficult to control
- lack of baseline research, inventory, and monitoring data to guide management
- small visitor contact area, outdated displays, and inadequate public access by trails
- inadequate staff to manage and enhance refuge habitats and visitor services

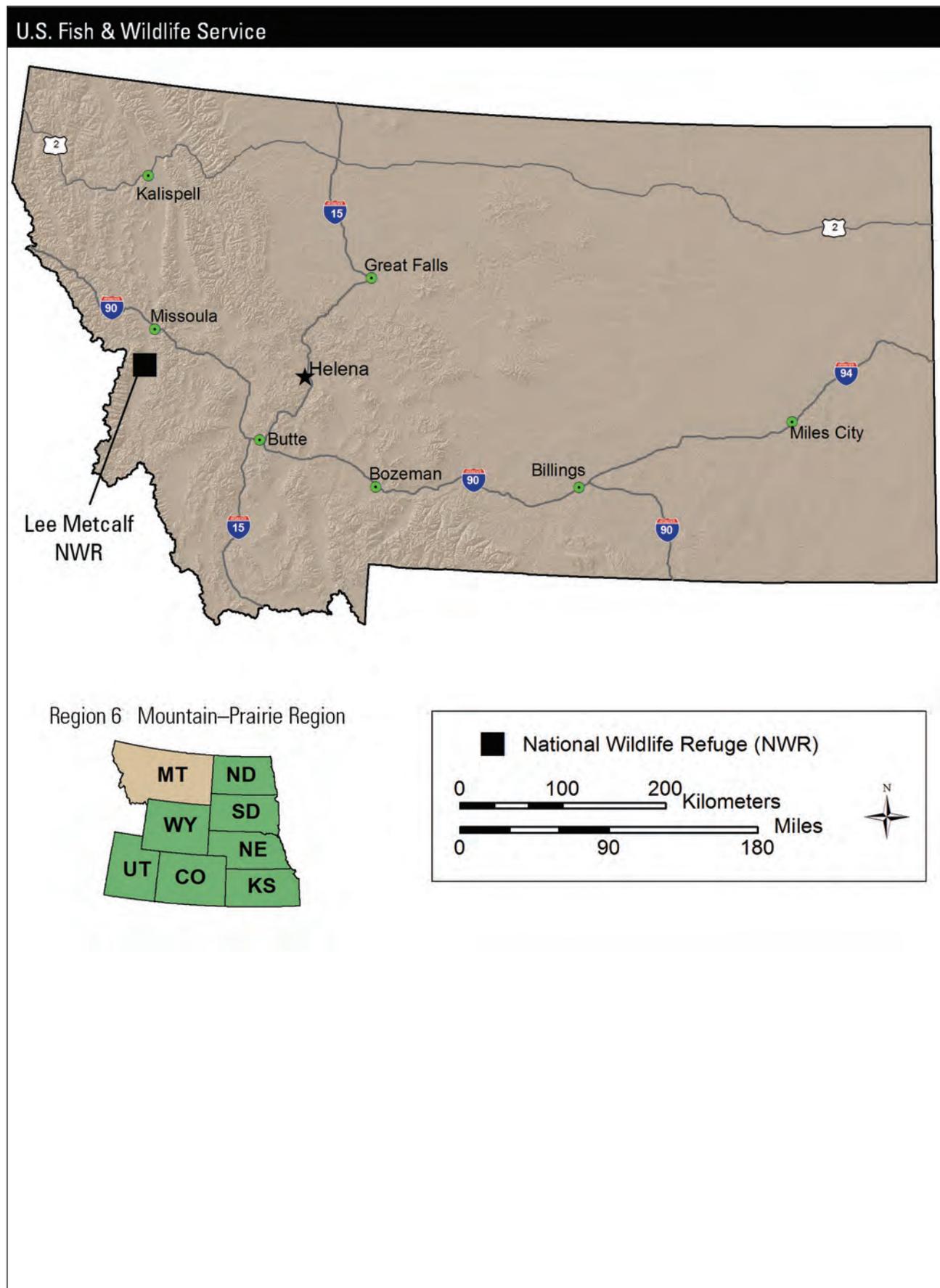


Figure 1. Location map for Lee Metcalf National Wildlife Refuge, Montana.

The Future of the Refuge

The vision for Lee Metcalf National Wildlife Refuge is based on the establishing purposes of the refuge, resource conditions and potential, and the issues identified during the planning process. The goals were developed to meet the vision for the refuge.

VISION FOR THE REFUGE

Lee Metcalf National Wildlife Refuge is a representation of the diverse native wildlife habitat once found abundantly between the Bitterroot and Sapphire Mountains and along the ever-changing Bitterroot River. This floodplain refuge, fed by mountain snow, is a diverse mosaic of forest, grassland, and riparian habitat that provides protected lands and waters for migratory and resident wildlife.

The refuge, in partnership with its neighbors, friends, and the community, is a conservation leader in the valley, ensuring that the biological integrity of this refuge and other valley habitats remains intact or, where appropriate, is restored.

These protected lands and waters are a place of discovery for visitors to experience fish and wildlife firsthand and where children can experience nature with all their senses. Visitors to the refuge can appreciate the beauty of the setting and experience a sense of wonder and pride to be preserving this part of the Bitterroot Valley and the National Wildlife Refuge System.

GOAL FOR THE BITTERROOT RIVER FLOODPLAIN AND ASSOCIATED WILDLIFE

Manage and, where appropriate, restore the natural topography, water movements, and physical integrity of surface water flow patterns across the Bitterroot River floodplain to provide healthy riparian habitats for target native species and to educate visitors about the benefits of sustaining a more natural floodplain.

GOAL FOR WETLAND IMPOUNDMENT HABITAT AND ASSOCIATED WILDLIFE

Where appropriate, manage wetland impoundments to create a diversity of habitats for target waterfowl, shorebirds, and other associated native wetland-dependent species.

GOAL FOR GRASSLAND AND SHRUBLAND HABITAT AND ASSOCIATED WILDLIFE

Create the conditions that will allow for the restoration, maintenance, and distribution of native grassland and shrubland species (such as rabbitbrush, needle and thread grass, Junegrass, and hairy golden aster) to provide healthy lands for a diverse group of target native resident and migratory wildlife species and to educate visitors about the historical plant and animal diversity of the valley.

GOAL FOR INVASIVE AND NONNATIVE SPECIES

Prevent, reduce, and contain the invasion and spread of noxious, invasive, and harmful nonnative species within the refuge while working with partners to address off-refuge infestations within the surrounding landscape.

GOAL FOR RESEARCH

Pursue and maintain compatible research projects that will provide information on refuge resources and address refuge issues to assist management in making decisions based on the best available information and science.



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Great horned owl is one of ten owl species found on Lee Metcalf Refuge.



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Under the new management direction described in this plan, environmental education programs will be expanded on the refuge.

GOAL FOR CULTURAL RESOURCES

Provide opportunities for visitors to learn about the unique glacial, Native American, and Euro-American history of the Bitterroot Valley while maintaining and protecting the integrity of the refuge’s cultural and historical resources.

GOAL FOR VISITOR SERVICES

Provide visitors of all abilities with opportunities to participate in and enjoy quality, compatible wildlife-dependent recreation, environmental education, and interpretation programs that foster an awareness and appreciation of the importance of protecting the natural and cultural resources of the refuge, the Bitterroot Valley, and the National Wildlife Refuge System.

GOAL FOR PARTNERSHIPS

Maintain and cultivate partnerships that help achieve the vision and supporting goals and objectives of the Lee Metcalf National Wildlife Refuge Comprehensive Conservation Plan and support other initiatives designed to protect and restore habitats for Federal trust species within the Bitterroot River Valley.

GOAL FOR OPERATIONS AND FACILITIES

Prioritize wildlife first and emphasize the protection of trust resources in the utilization of staff, volunteers, funding, and facilities.

TARGET SPECIES SELECTION PROCESS

Early in the planning process, the Service selected three groups of target species that will be supported by the objectives and strategies described under the habitat goals for the Bitterroot River floodplain, wetland impoundment habitat, and grassland and shrubland habitat. The initial suite of birds, amphibians, or mammals was selected after Service staff reviewed three documents focused on sustaining or recovering species in Montana:

- “Montana Intermountain West Joint Venture Plan”
- “Montana State Conservation Plan”
- “Bitterroot River Subbasin Plan”

The criteria for this species list were based on whether a species either occurred on Lee Metcalf Refuge or could occur on the refuge if its preferred habitat was expanded or restored, as indicated under each goal. The life history needs of over 100 species were examined for similarities and relevance to the proposed goals. Ultimately, 16 species (tables 8, 9, and 10 in chapter 4) were selected based on their ability to represent guilds or because they were good indicators of the quality of a specific habitat type. The habitats that support the migration, foraging, nesting, and migration needs of these selected species should benefit a much broader group of secondary bird species as well as a variety of other wildlife, both migratory and resident.

These target species will be monitored for trends in abundance and distribution to evaluate the effectiveness of the objectives and strategies.

Management of the Refuge

The comprehensive conservation plan directs the management of the Lee Metcalf Refuge to meet the purposes of the refuge and address issues.

The plan is intended to be a broad umbrella of general concepts and specific objectives for wildlife, habitat, visitor services, and partnerships over the next 15 years. As the plan is implemented, the Service will develop stepdown plans (section 4.11) with additional details for carrying out the actions needed to achieve objectives.

HABITAT AND WILDLIFE

The Service will focus on the expansion and restoration of native plant communities on the refuge including



Bob Danley/USFWS

Variegated meadowhawk is one of many dragonfly species found on Lee Metcalf Refuge.

grasslands, shrublands, and gallery and riverfront forests. Some areas that are currently part of wetland impoundments will be restored to native communities including forest and shrubland. A significant focus of restoration proposals will be controlling invasive species and preventing further spread. Grasses and shrubs native to the uplands, including the alluvial fans (that is, areas of sedimentary deposits where fast-

flowing streams have flown into flatter plains), will begin to be restored to provide habitat for native wildlife including grassland-dependent migratory birds. Some wetland impoundments and Service (non-public) roads will be removed or reduced in size to allow for river migration and to restore native gallery and riverfront forest for riparian-dependent wildlife. The remaining impoundments will be managed to mimic natural conditions for wetland-dependent migratory birds.

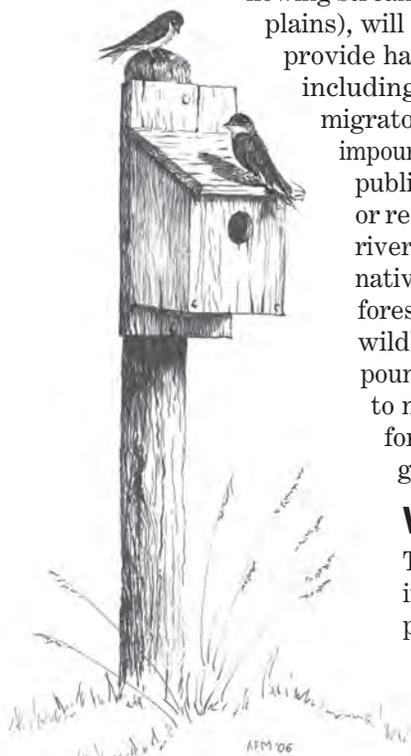
VISITOR SERVICES

The Service will expand and improve the refuge's compatible wildlife-dependent

public use programs, in particular the wildlife observation, environmental education, and interpretation programs. The visitor contact area will be expanded into a visitor center with new displays and a combination conference room and environmental education classroom. New displays will be professionally planned and produced. The refuge will work with Ravalli County staff to designate the county road in the refuge as an auto tour route, which will include pulloffs and some form of interpretation. A seasonal hiking trail will be added, and current trails will be improved for wildlife observation and photography. Interpretation and environmental education programs will be expanded using added staff and volunteers. All public use programs will provide visitors with a consistent message about the purposes and values of the refuge and the mission of the National Wildlife Refuge System.

PARTNERSHIPS AND OPERATIONS

Increased research and monitoring, staff, funding, infrastructure, and partnerships will be required to accomplish the goals, objectives, and strategies in this final plan. The refuge staff will be expanded by 3.5 individuals to include an assistant refuge manager (one full-time equivalent), a full-time and a career-seasonal biological science technician (1.5 full-time equivalents), and a visitor services specialist (one full-time equivalent) who will serve as a visitor center manager and volunteer coordinator. Additional staff and funding will be added depending on the regional priorities for those funds given to the Service for management of lands and water within the Refuge System.



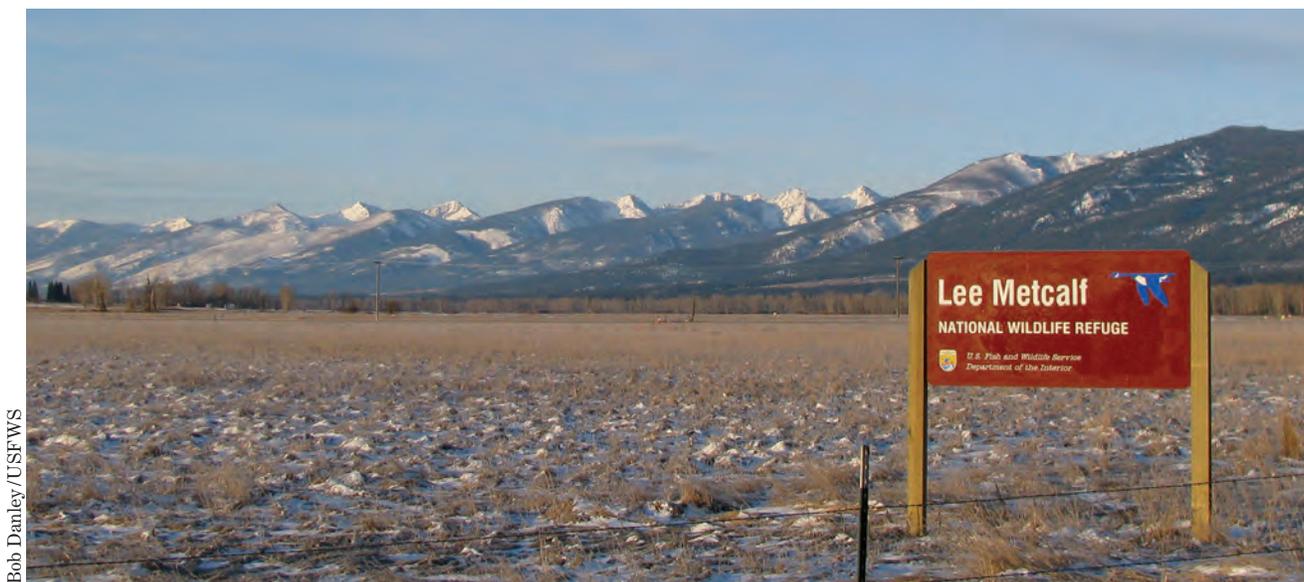
Tree Swallows
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Abbreviations

A.D.	Anno Domini or “year of our Lord”
Administration Act	National Wildlife Refuge System Administration Act of 1966
amsl	above mean sea level
B.C.	before Christ
B.P.	before present
CCP	comprehensive conservation plan
CFR	Code of Federal Regulations
cfs	cubic feet per second
CO₂	carbon dioxide
CWD	chronic wasting disease
DBH	diameter at breast height
EA	environmental assessment
FONSI	finding of no significant impact
GIS	geographic information system
GS	General Schedule
HGM	hydrogeomorphic
Improvement Act	National Wildlife Refuge System Improvement Act of 1997
IPM	integrated pest management
IWJV	Intermountain West Joint Venture
MFWP	Montana Fish, Wildlife & Parks
mg/L	milligrams per liter
n/a	not applicable
NEPA	National Environmental Policy Act of 1969
PM_{2.5}	particulate matter less than 2.5 microns in size
POD	point of diversion
refuge	Lee Metcalf National Wildlife Refuge
Refuge System	National Wildlife Refuge System
RLGIS	Refuge Lands Geographic Information Systems database
Service	U.S. Fish and Wildlife Service
SHPO	State Historic Preservation Office
U.S.C.	United States Code
U.S.	United States
USDA	U.S. Department of Agriculture
USFWS	U.S. Fish and Wildlife Service
WG	Wage Grade Schedule
WVA	wildlife viewing area

Definitions of these and other terms are in the glossary, located after chapter 4.

CHAPTER 1—Introduction



Lee Metcalf Refuge is a 2,800-acre refuge located in the Bitterroot River Valley of southwest Montana.

The U.S. Fish and Wildlife Service (Service) has developed this final comprehensive conservation plan (CCP) to provide a foundation for the management and use of the Lee Metcalf National Wildlife Refuge (refuge) in Montana for at least the next 15 years.

This chapter provides an introduction to the CCP with descriptions of the steps in the CCP planning process; the involvement of the Service, the State of Montana, the tribes, the public, and others; and other plans that may be affected or supported by the future management of the refuge.

The remainder of the document contains the information the Service used and the results of the Service's analysis that are the foundation of this final plan:

- Chapter 2 describes the refuge and planning issues.
- Chapter 3 describes the physical, biological, and social environments of the refuge.
- Chapter 4 describes objectives and strategies for all aspects of management of the refuge.

The remaining document contains a glossary of terms, several appendixes, and a bibliography that support the information provided in the CCP.

Lee Metcalf Refuge is a 2,800-acre refuge located in the Bitterroot River Valley of southwest Montana (figure 2). The refuge encompasses a portion of the Bitterroot River and is located between the scenic ranges of the Bitterroot and Sapphire Mountains. This unique

location includes a diverse mosaic of western mountain valley ecosystem types and provides many public use opportunities including recreation, education and discovery, and research. The recreational opportunities and natural beauty of this valley have made it one of the most rapidly expanding human population areas of Montana. This refuge is surrounded by development, including agriculture and housing. The nearby Bitterroot National Forest is visited by thousands of people each year, and annually the refuge has more than 143,000 visitors. The refuge was authorized primarily for management of migratory birds and incidental fish- and wildlife-oriented recreation.

The Service and other Federal, State, and tribal partners have developed this final CCP to provide a foundation for the management and use of the Lee Metcalf Refuge. The CCP specifies the necessary actions to achieve the vision and purposes of the refuge. Wildlife is the first priority in refuge management, and public use (wildlife-dependent recreation) is allowed and encouraged as long as it is compatible with the purposes of the refuge. This final CCP will serve as a working guide for management programs and activities over the next 15 years. Although this document contains management direction for the refuge, greater detail will be provided in stepdown management plans as part of implementing the final CCP. (Refer to table 12 in chapter 4.)

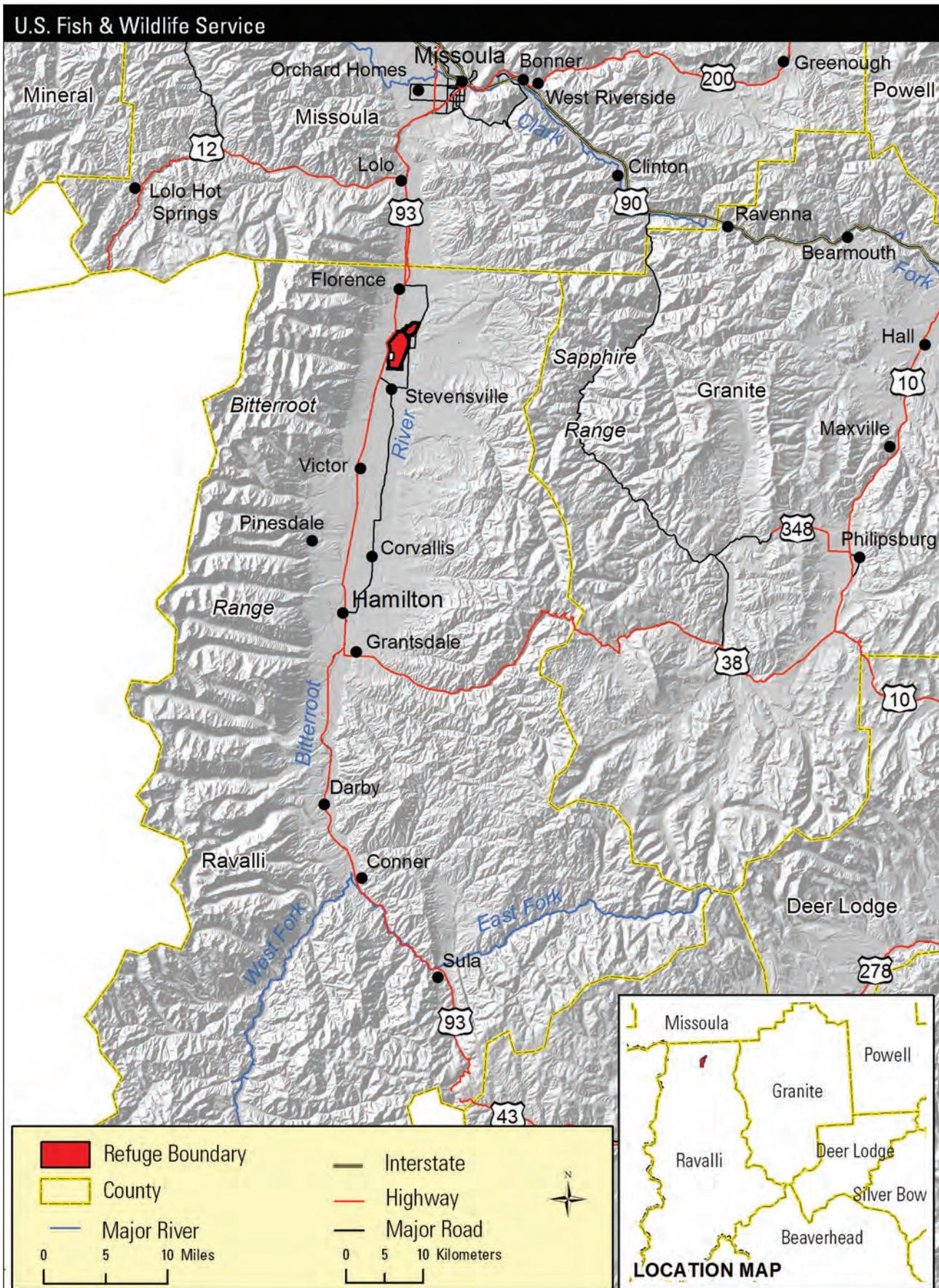


Figure 2. Area map for Lee Metcalf National Wildlife Refuge, Montana.

1.1 The Comprehensive Conservation Plan

The CCP specifies the goals and objectives necessary to achieve the vision and purposes of Lee Metcalf National Wildlife Refuge.

FINAL DECISION

The Regional Director of the Mountain–Prairie Region of the Service selected alternative B from the draft CCP and environmental assessment (EA) as the preferred alternative for the final CCP for Lee Metcalf National Wildlife Refuge. Appendix B documents the Regional Director’s decision in the environmental action statement and the finding of no significant impact. The specifics of the final CCP can be found in “Chapter 4—Management Direction.” Appendix C contains the final compatibility determinations for public uses described in this document. The section 7 biological evaluation (appendix D) documents the effects of CCP actions on threatened and endangered species: a determination of no effect or may affect but not adversely, depending on the species.

The CCP is a broad umbrella plan that provides general concepts and specific wildlife, habitat, visitor services, and partnership objectives over the next 15 years. Implementation begins with publication of the final CCP. The Service will carry out the plan with help from partner agencies, organizations, and the public. As the CCP is implemented, stepdown management plans will be developed to provide greater detail to managers and employees for carrying out specific actions and strategies authorized by the CCP. Table 12 in chapter 4 lists the stepdown plans needed for the refuge.

The CCP details program planning levels that are sometimes substantially above current budget allocations and thus are primarily for Service strategic planning purposes. The CCP does not constitute a commitment for staff increases, operation and maintenance increases, or funding for future land acquisition.

PLAN DEVELOPMENT

The CCP was developed in compliance with the National Wildlife Refuge System Improvement Act (Improvement Act) and Service policy. The actions described in the CCP meet the requirements of the Council on Environmental Quality regulations that implement the National Environmental Policy Act of 1969 (NEPA). Staff from several Montana State agencies, other Federal agencies, and tribes provided critical support in developing the CCP. The Service’s involvement of the public was another important aspect of planning and part of compliance with NEPA. In addition to the initial scoping with the public, there



Cattails
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was a public review of the draft CCP and EA before the final CCP was completed.

The planning process is described in detail in section 1.8, and the public involvement process is described in appendix A, including the Service’s response to substantive public comments.

PLAN AMENDMENT AND REVISION

The Service will annually review the final CCP to determine the need for amendment. An amendment would occur if significant information became available, such as a change in ecological conditions. The Service will evaluate the plan every 5 years and revise it after 15 years, as necessary.

1.2 Purpose and Need for the Plan

The purpose of this final CCP is to identify the role that the Lee Metcalf Refuge will play in supporting the mission of the National Wildlife Refuge System (Refuge System) and to provide long-term guidance for managing programs and activities. The CCP is needed to:

- communicate with the public and other partners in efforts to carry out the mission of the Refuge System;
- provide a clear statement of direction for managing the refuge;
- provide neighbors, visitors, and government officials with an understanding of the Service’s management actions on and around the refuge;

- ensure that the Service’s management actions are consistent with the mandates of the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act);
- ensure that management supports other Federal, State, and county plans, as appropriate;
- provide a basis for development of budget requests for the refuge’s operation, maintenance, and capital improvement needs.

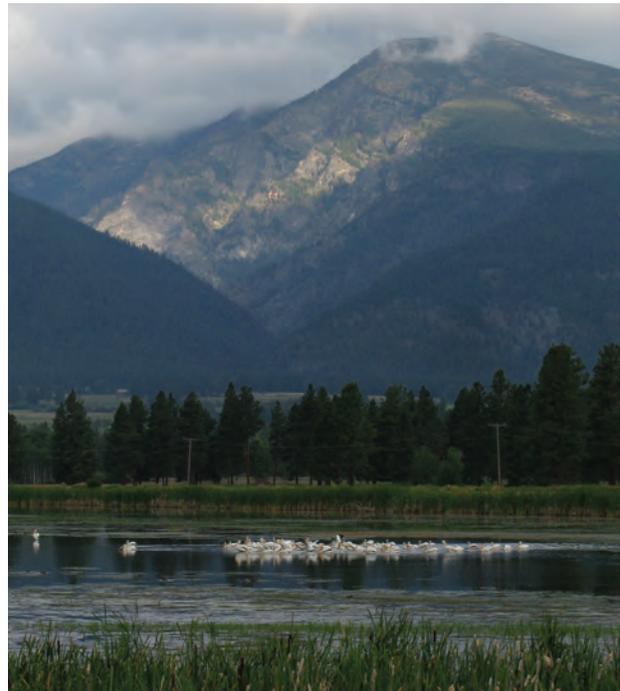
Sustaining the Nation’s fish and wildlife resources is a task that can be accomplished only through the combined efforts of governments, businesses, and private citizens.

1.3 North American Model of Wildlife Conservation

Wildlife conservation in North America evolved to take on a form unique in the world; in recent years, it has come to be known as the North American Model of Wildlife Conservation (Geist et al. 2001). The wildlife conservation movement arose out of the conflict between market hunters and sport hunters in the mid- to late-nineteenth century. Market hunting increased in response to the growth in urban population fueled by the Industrial Revolution. Between 1820 and 1860, the percentage of Americans who lived in cities increased from 5 percent to 20 percent; this fourfold increase is the greatest proportional increase in urban population that ever occurred in the United States (Reiss 1995). The demand for meat and hides—along with feathers for the millinery trade—led to exploitation of game animals by market hunters. Along with the increase in the urban population came a new breed of hunter—one who hunted for the chase and the challenge it provided. These sport hunters valued game animals more when they were alive; market hunters, however, placed value on dead animals they could bring to market. The growing legion of sport hunters started a national movement that resulted in Federal and State governments taking responsibility for regulating the take of wildlife.

The keystone concept of the North American Model of Wildlife Conservation, and the bedrock that allowed government to exercise control, is the public trust doctrine (Geist and Organ 2004). With origins in Greek and Roman law, the Magna Carta, and the 1842 *Martin v. Waddell* U.S. Supreme Court decision, the public trust doctrine as it applies to wildlife conservation is the principle that wildlife belongs to no one; it is held in trust for all by government.

The seven pillars of the North American Model of Wildlife Conservation follow:



Bob Damley / USFWS

American white pelicans use the ponds of Lee Metcalf Refuge for foraging and cover.

- wildlife as a public trust resource
- elimination of markets for game
- allocation of wildlife by law
- wildlife only killed for a legitimate purpose
- wildlife considered an international resource
- science as the proper tool to discharge wildlife policy
- democracy of hunting

For more than 100 years, these pillars have stood the test of time despite significant changes in approaches to wildlife conservation. The original conservation movement championed by Theodore Roosevelt, George Bird Grinnell, and others emphasized stemming wildlife population declines through implementing programs that restricted take and protected lands. During the 1920s, conservationists realized that more was needed, and a committee including Aldo Leopold, A. Willis Robertson, and other leading conservationists of the time authored the 1930 American Game Policy. This policy called for a restoration program for habitats and populations based on scientific research and supported with stable, equitable funding. Within a decade, many needs of this program were fulfilled through landmark legislation, including the Duck Stamp Act to fund land acquisition for national wildlife refuges. In addition, the Pittman–Robertson Wildlife Restoration Act shifted excise taxes imposed on firearms and ammunition to fund wildlife restoration through cooperation between the Service and State fish and wildlife agencies. To use this money, States were required to pass laws that prevented diversion of hunting license

revenues to any purpose other than administration of the State fish and wildlife agency.

In recent decades, wildlife management has placed greater emphasis on overall wildlife diversity. All wildlife species have benefited from the North American Model of Wildlife Conservation pillars, not just game animals. The Refuge System has evolved along with the North American Model of Wildlife Conservation—it today provides refuge for virtually all species found in the United States and recreation for all Americans.

It is a realization of the North American Model of Wildlife Conservation to provide for science-based management of international wildlife resources held in trust for all. The importance of this system to American society can best be appreciated if we were to contemplate its loss. Wildlife connects us to the heritage of this country and our ancestors who built our society. It connects us as well to the natural world of which we are a part, but from which we have become so disconnected. To lose this connection is to lose the basis of our humanity.

1.4 The U.S. Fish and Wildlife Service and Refuge System



The Service is the principal Federal agency responsible for fish, wildlife, and plant conservation. The Refuge System is one of the Service's major programs.

U.S. FISH AND WILDLIFE SERVICE

The mission of the U.S. Fish and Wildlife Service, working with others, is to conserve, protect, and enhance fish and wildlife and their habitats for the continuing benefit of the American people.

In the late 19th and early 20th centuries, America's fish and wildlife resources were declining at an alarming rate, largely due to unrestricted market hunting. Concerned citizens, scientists, and hunting and angling groups joined together and generated the political will for the first significant conservation measures

taken by the Federal Government. These actions included the establishment of the Bureau of Fisheries in the 1870s and, in 1900, passage of the first Federal wildlife law—the Lacey Act—which prohibited interstate transportation of wildlife taken in violation of State laws. Beginning in 1903, President Theodore Roosevelt established more than 50 wildlife refuges across the Nation.

Over the next three decades, the United States ratified the Migratory Bird Treaty with Great Britain, and Congress passed laws to protect migratory birds, establish new refuges, and create a funding source for refuge land acquisition. In 1940, the U.S. Fish and Wildlife Service was created within the Department of the Interior, and existing Federal wildlife functions including law enforcement, fish management, animal damage control, and wildlife refuge management were combined into a single organization for the first time.

Today, the Service enforces Federal wildlife laws, manages migratory bird populations, restores nationally significant fisheries, conserves and restores vital wildlife habitat, protects and recovers endangered species, and helps other governments with conservation efforts. In addition, the Service administers a Federal aid program that distributes hundreds of millions of dollars to States for fish and wildlife restoration, boating access, hunter education, and related programs across the United States.

SERVICE ACTIVITIES IN MONTANA

Service activities in Montana contribute to the State's economy, ecosystems, and education programs. The following list highlights the Service's presence and activities in 2009:

- employed 220 people in Montana
- coordinated 446 volunteers who donated more than 21,780 hours to Service projects on refuge and district lands
- managed two national fish hatcheries, one fish and wildlife management assistance office, six coordination areas, one fish health center, four ecological services offices, and one fish technology center
- managed 23 national wildlife refuges encompassing 1,217,617 acres (1.29 percent of the State)
- managed five wetland management districts
 - 48,026 acres of fee-title waterfowl production areas
 - 146,816 acres under leases or easements
- hosted 690,173 visitors to Service-managed lands
 - 96,866 hunting visits
 - 80,370 fishing visits
 - 506,632 wildlife observation, photography, and interpretation visits
 - 6,305 visits from students participating in environmental education programs

- provided \$9.6 million to Montana Fish, Wildlife & Parks (MFWP) for sport fish restoration and \$17.4 million for wildlife restoration and hunter education
- paid Montana counties \$394,799 under the Refuge Revenue Sharing Act (money used for schools, roads, and any other public purpose)

Additionally, since 1988 the Service's Partners for Fish and Wildlife Program has helped private landowners restore more than 31,759 wetland acres, 360,826 upland acres, and 1,263 miles of river habitat as well as install 45 structures to open 502 river miles for fish passage.

NATIONAL WILDLIFE REFUGE SYSTEM

In 1903, President Theodore Roosevelt designated the 5.5-acre Pelican Island in Florida as the Nation's first wildlife refuge for the protection of native nesting birds. This was the first time the Federal Government set aside land for wildlife. This small but significant designation was the beginning of the National Wildlife Refuge System. One hundred years later, the Refuge System has become the largest collection of lands in the world specifically managed for wildlife, encompassing more than 150 million acres within 553 refuges and more than 3,000 waterfowl production areas providing breeding and nesting habitat for migratory birds. Today, there is at least one refuge in every State as well as in Puerto Rico and the U.S. Virgin Islands.

The Improvement Act established a clear mission for the Refuge System.

The mission of the National Wildlife Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

The Improvement Act states that each national wildlife refuge (that is, every unit of the Refuge System, which includes wetland management districts) shall be managed to accomplish the following:

- Fulfill the mission of the Refuge System.
- Fulfill the individual purposes of each refuge and district.
- Consider the needs of fish and wildlife first.
- Fulfill the requirement of developing a CCP for each unit of the Refuge System and fully involve the public in preparation of these plans.

- Maintain the biological integrity, diversity, and environmental health of the Refuge System.
- Recognize that wildlife-dependent recreation activities including hunting, fishing, wildlife observation, photography, environmental education, and interpretation are legitimate and priority public uses.
- Retain the authority of refuge managers to determine compatible public uses.

In addition to the mission for the Refuge System, the wildlife and habitat vision for each unit of the Refuge System maintains the following principles:

- Wildlife comes first.
- Ecosystems, biodiversity, and wilderness are vital concepts in refuge and district management.
- Habitats must be healthy.
- Growth of refuges and districts must be strategic.
- The Refuge System serves as a model for habitat management with broad participation from others.

Following passage of the Improvement Act, the Service immediately began to carry out the direction of the new legislation including preparation of CCPs for all national wildlife refuges and wetland management districts. Consistent with the Improvement Act, the Service prepares CCPs in conjunction with public involvement. Each refuge and each district is required to complete its CCP within the 15-year schedule (by 2012).

PEOPLE AND THE REFUGE SYSTEM

The Nation's fish and wildlife heritage contributes to the quality of American lives and is an integral part of the country's greatness. Wildlife and wild places have always given people special opportunities to have fun, relax, and appreciate the natural world.

Whether through bird watching, fishing, hunting, photography, or other wildlife pursuits, wildlife recreation contributes billions of dollars to local economies. In particular, money generated from the taxing of sporting arms and ammunition and of fishing equipment that is authorized by the Pittman–Robertson and Dingell–Johnson Acts, respectively, has generated tens of billions of dollars. Distributed by the Service, this money has been used by States to increase wildlife and fish populations, expand habitat, and train hunters across the Nation. Approximately 35 million people visited the Refuge System in 2006, mostly to observe fish and wildlife in their natural habitats (Caudill and Henderson 2006). Visitors are most often accommodated through nature trails, auto tours, interpretive programs, and hunting and fishing opportunities. Local communities that surround the refuges and wetland management districts derive significant economic benefits. Economists report that Refuge System visitors contribute more than \$1.7 billion annually to local economies (Carver and Caudill 2007).

1.5 National and Regional Mandates

Refuge System units are managed to achieve the mission and goals of the Refuge System along with the designated purpose of the refuges and districts (as described in establishing legislation, Executive orders, or other establishing documents). The key concepts and guidance for the Refuge System are in the National Wildlife Refuge System Administration Act of 1966, as amended (16 U.S.C. 668dd–668ee) (Administration Act), Title 50 of the Code of Federal Regulations (CFR), “The Fish and Wildlife Service Manual,” and the Improvement Act (an amendment of the Administration Act).

The Improvement Act amends the Administration Act by providing a unifying mission for the Refuge System, a new process for determining compatible public uses on refuges and districts, and a requirement that each refuge and district be managed under a CCP. The Improvement Act states that wildlife conservation is the priority of Refuge System lands and that the Secretary of the Interior will make sure that the biological integrity, diversity, and environmental health of refuge lands are maintained. Each refuge and district must be managed to fulfill the Refuge System’s mission and the specific purposes for which the unit was established. The Improvement Act requires the Service to monitor the status and trends of fish, wildlife, and plants in each national wildlife refuge and wetland management district.

A detailed description of these and other laws and Executive orders that may affect the CCP or the Service’s implementation of the CCP is in appendix E. Service policies for planning and day-to-day management of refuges and districts are in the “Refuge System Manual” and “The Fish and Wildlife Service Manual.”

1.6 Contributions to National and Regional Plans

Lee Metcalf Refuge contributes to the conservation efforts outlined in the various State and national plans described below.

FULFILLING THE PROMISE

A 1999 report, “Fulfilling the Promise, The National Wildlife Refuge System” (USFWS 1999), is the culmination of a yearlong process by teams of Service employees to evaluate the Refuge System nationwide. This report was the focus of the first national Refuge System conference (in 1998), which was attended by

refuge managers, other Service employees, and representatives from leading conservation organizations.

The report contains 42 recommendations packaged with three vision statements for wildlife and habitat, people, and leadership—all three of these major topics are included in this CCP.

PARTNERS IN FLIGHT

The Partners in Flight program began in 1990 with the recognition of declining population levels of many migratory landbird species. The challenge is to manage avian population growth while maintaining functional natural ecosystems in the face of human population growth. To meet this challenge, Partners in Flight worked to identify priorities for landbird species and habitat types. Partners in Flight activities have resulted in 52 bird conservation plans covering the continental United States. Partners in Flight is a cooperative effort involving partnerships among Federal, State, and local government agencies, philanthropic foundations, professional organizations, conservation groups, industries, the academic community, and private individuals.

The Partners in Flight program was initiated to provide for the long-term health of landbird life of this continent. Its mission can be expressed in three related priorities: helping species at risk, keeping common birds common, and forming voluntary partnerships benefiting birds, habitat, and people. The three goals developed in support of this mission are as follows:

- Ensure an active, science-based conservation design process that identifies and develops solutions to threats and risks to landbird populations.
- Create a coordinated network of conservation partners to implement the objectives of the landbird conservation plans at multiple scales.
- Secure sufficient commitment and resources to support vigorous implementation of landbird conservation objectives (Rich et al. 2004).

Montana Partners in Flight considered 141 species for priority status. It identified 14 high-priority species (priority I) in need of immediate conservation action, 43 moderate-priority species with lesser threats but in need of better monitoring and conservation consideration (priority II), and 51 species of local interest whose habitat needs may influence design and selection of conservation strategies (priority III). The highest priority species are common loon, trumpeter swan, harlequin duck, greater sage-grouse, piping plover, mountain plover, interior least tern, flammulated owl, burrowing owl, black-backed woodpecker, olive-sided flycatcher, brown creeper, Sprague’s pipit, and Baird’s sparrow (Casey 2000).

The highest priority habitats in Montana are mixed grassland, sagebrush steppe, dry forest (ponderosa pine and Douglas-fir), riparian deciduous forest, and

prairie pothole wetlands, some of which occur on the refuge. The primary objectives in each priority habitat are to restore ecological processes necessary to provide suitable habitat for priority (target) species, identify and protect those remaining blocks of habitats that have undergone drastic declines, and develop management prescriptions that can be applied at all geographic scales.

To fully implement the goals of the international Partners in Flight plan, a series of science-based landbird conservation plans with long-term strategies for bird conservation have been developed. The geographical context of these plans is composed of 58 physiographic regions, each defined by similar physical geographic features and wholly or partially contained within the continental United States and Alaska. Lee Metcalf Refuge lies within the physiographic area known as the Central Rocky Mountain Physiographic Region.

Central Rocky Mountain Physiographic Region

The Central Rocky Mountain Physiographic Region is a huge physiographic area, extending from north-west Wyoming to all of western Montana, the northern two-thirds of Idaho, large areas of eastern Oregon and Washington, much of southeast British Columbia, and a sliver of west Alberta. It is an area of high mountains, with elevations exceeding 10,000 feet. Glaciation has left broad, flat valleys between mountain ranges.

Elevation determines the dominant vegetation. The highest areas are alpine tundra. The subalpine zone is dominated by Engelmann spruce and subalpine fir, with ponderosa pine and Douglas-fir in the montane zone below. Stand-replacing fire can change forests in either of these zones to lodgepole pine or aspen. Fire in higher-elevation coniferous forests of the central Rocky Mountains tends to be of high intensity and low frequency. Grass and sagebrush occur under open pine forests that grade downslope into grasslands, wetlands, woodlands, or shrub-steppe. Approximately 28 species of birds have a higher population in the central Rocky Mountains than in any other physiographic area. This is the highest such number in any physiographic area in the contiguous United States, and it seems to represent the huge size of the area and the vast amount of quality bird habitat that still exists.

A huge percentage of the central Rocky Mountains in the United States are in public ownership, mostly managed by the U.S. Department of Agriculture (USDA) Forest Service. Maintenance or restoration of healthy forest ecosystems on public and private industrial lands will be the most important factor in keeping the central Rocky Mountains a healthy ecosystem for so many forest birds.

There are currently 141 species identified for special consideration within the Montana portion of the Central Rocky Mountain Physiographic Region. Generally, priority I species are the highest priority and



Donna Dewhurst/USFWS

A priority I species of the Central Rocky Mountain Physiographic Region, the brown creeper has been documented on Lee Metcalf Refuge.

are the focus of proposed conservation actions. The priority I species identified for this physiographic region are common loon, trumpeter swan, harlequin duck, greater sage-grouse, piping plover, mountain plover, (interior) least tern, flammulated owl, burrowing owl, black-backed woodpecker, olive-sided flycatcher, brown creeper, Sprague's pipit, and Baird's sparrow. The common loon, trumpeter swan, olive-sided flycatcher, and the brown creeper have been documented on the refuge, primarily using the refuge for resting and feeding. No nesting has been recorded.

NORTH AMERICAN WATERBIRD CONSERVATION PLAN

The North American Waterbird Conservation Plan provides a contiguous framework for conserving and managing colonial-nesting waterbirds including 209 species of seabirds, coastal waterbirds (gulls, terns, and pelicans), wading birds (herons and ibises), and marshbirds (certain grebes and bitterns). The overall goal of this conservation plan is to make sure that the following are sustained or restored throughout the waterbirds' ranges in North America: (1) the distribution, diversity, and abundance of waterbird populations; (2) waterbird habitats (breeding, migratory, and nonbreeding); and (3) important sites for waterbirds. The geographic scope of the plan covers 28 countries from Canada to Panama as well as islands and near-shore areas of the Atlantic and Pacific Oceans, the Gulf of Mexico, and the Caribbean Sea. This waterbird partnership consists of Federal, State, and Provincial wildlife agencies; individuals; and nonprofit conservation organizations.

Waterbird planning regions were identified to allow for planning at a practical, landscape-level scale. Planning region boundaries are based on a combination of political considerations and ecological factors.

Sixteen planning regions were identified within North and South Americas. Lee Metcalf Refuge is located within the Intermountain West Waterbird Conservation Region. This is a vast inland area stretching from the Rocky Mountains on the east to the Sierra Nevada and Cascades on the west. The Intermountain West's dispersed high-mountain lakes, large terminal hypersaline lakes, marshes, playas, rivers, streams, riparian zones, and fresh and brackish wetlands host about 40 waterbird species, including many or most of the world's California gulls, eared grebes, white-faced ibises, and American white pelicans. Eleven waterbirds are identified as species of high concern in one or more of the four bird conservation regions within the planning area: yellow rail, Franklin's gull, black tern, eared grebe, western grebe, Clark's grebe, snowy egret, American white pelican, common loon, American bittern, and certain managed populations of the greater and lesser sandhill crane. The Franklin's gull, black tern, western grebe, American white pelican, bittern, loon, and sandhill crane have all been documented using the refuge, primarily for resting and feeding. However, recent years have seen the sandhill cranes nesting with at least two to five successful nests per season.

Waterbirds using this region are highly adaptable to constantly changing wetland conditions and depend on a regional-scale association of wetlands to meet habitat and forage requirements during stages of their annual life cycle. The competing demands for water from agriculture, development, and recreation pose the greatest threats to regional waterbird populations. Also, contaminants such as mercury and dichlorodiphenyltrichloroethane (known as DDT) and its breakdown products significantly threaten the region's waterbirds. Because of the west's feast-or-famine water regime, the "Intermountain West Joint Venture Coordinated Bird Conservation Plan" stresses the necessity of conserving a network of high-quality wetland habitats with secure water sources to provide options for waterbirds during drought and flood cycles (Kushlan et al. 2002).

NORTH AMERICAN WATERFOWL MANAGEMENT PLAN

Written in 1986, the "North American Waterfowl Management Plan" envisioned a 15-year effort to achieve landscape conditions that could sustain waterfowl populations. Specific plan objectives are to increase and restore duck populations to the average levels of the 1970s—62 million breeding ducks and a fall flight of 100 million birds (USFWS and Canadian Wildlife Service 1986). The plan is innovative because of its international partnerships and its implementation at the local level. Its success depends on the strength of the joint ventures, which involve Federal, State,

Provincial, tribal, and local governments; businesses; conservation organizations; and individual citizens.

Joint ventures are regional, self-directed partnerships that carry out science-based conservation through a wide array of community participation. Joint ventures develop implementation plans that focus on areas of concern identified in the plan. Lee Metcalf Refuge lies within the Intermountain West Joint Venture.

Intermountain West Joint Venture

The Intermountain West Joint Venture (IWJV) was established in June 1994 to serve as the implementation arm of the "North American Waterfowl Management Plan" (IWJV 2005a) in the Intermountain West region. The focus of the IWJV is conservation of wetland and associated habitats. The IWJV comprises multilevel partnerships between diverse public and private organizations who share common interests in the conservation, maintenance, and management of key ecosystems in the Intermountain West region.

The IWJV encompasses much of the Intermountain West region, from the Sierra Nevada and Cascades on the west to just east of the Rocky Mountains, and from the Mexican border on the south to the Canadian border on the north. This extensive geographic region encompasses portions of eleven western states and includes an enormous diversity of avian habitat.

In 2005 the IWJV Montana steering committee developed a "Coordinated Implementation Plan for Bird Conservation in Western Montana" (IWJV 2005b). This team divided the State of Montana into Bird Habitat Conservation Areas to be used for all bird conservation projects over the next 5–7 years. Lee Metcalf Refuge is located in the Bitterroot Valley Bird Habitat Conservation Area. The priority habitat types for this area include dry forest (ponderosa pine and Douglas-fir), riparian (such as cottonwood), wetland (reservoirs, lakes, and marshes), and burned forest (recent fires). The refuge has two of these high-priority habitat types, the riparian and the wetland.

INTERMOUNTAIN WEST REGIONAL SHOREBIRD PLAN

As noted above, the Intermountain West is a huge region, stretching from Canada to Mexico and from the Rocky Mountains to the Sierra Nevada and Cascades. The six bird conservation regions of the Intermountain West include an array of habitats from saline sinks to alpine streams (Oring et al. 2010). The refuge is located in the Northern Rocky Mountain Bird Conservation Region, an area characterized by low lying desert flats surrounded by rugged, boreal mountain ranges. Stream and river valleys occur in the mountains along with many small wetlands and natural and constructed lakes. Sewage lagoons near many urban areas also host numerous shorebirds. The area is of some importance for breeding of several shorebird species and of modest importance to many species of transients. Eleven species of shorebirds regularly

breed in the Intermountain West, and 23 additional species are annual migrants.

The most important issue facing shorebird conservation in the Intermountain West is the very great human-driven competition for water. Finding ample high quality fresh water will be the greatest challenge faced by future shorebird conservation interests.

The “Intermountain West Regional Shorebird Plan” recognizes the Lee Metcalf Refuge as 1 of 79 managed shorebird sites in the nation, 1 of only 3 identified in Montana (Oring et al. 2010).

STATE COMPREHENSIVE FISH AND WILDLIFE CONSERVATION STRATEGY

“Montana’s Comprehensive Fish and Wildlife Conservation Strategy” (MFWP 2005) is for all vertebrate species known to exist in Montana including both game and nongame species, as well as some invertebrate species such as freshwater mussels and crayfish.

Although game species are included in Montana’s conservation strategy, the priority is those species and their habitats “in greatest conservation need”—that is, focus areas, community types, and species that are significantly degraded, declining, federally listed, or for which important distribution and occurrence information is lacking. The conservation strategy uses five ecotypes to describe the broad areas of Montana’s landscape that have similar characteristics. Lee Metcalf Refuge is located in the intermountain and foothill grassland ecotype. The intermountain and foothill grassland ecotype is a mosaic of private and public land that extends from the glaciated Flathead River Valley to the north, south to the Centennial Valley, and east to the Little Belt Foothills, where there remain some of Montana’s most diverse fish and wildlife habitats. This western Montana ecotype harbors more wildlife communities than any other in Montana. It also harbors Montana’s largest human population concentration in and near the towns of Kalispell, Missoula, Helena, and Bozeman. The attraction for wildlife and people is western Montana’s broad, lush, and sweeping valleys cradled by the peaks of the Rocky Mountains. The intermountain and foothill grasslands are cut and formed by meandering rivers that create core riparian zones and wetland areas that often include glacial lakes and potholes that attract nesting waterbirds. Addressing the challenges that accompany the interface between human settlement and fish and wildlife and their habitats will be critical to the conservation of these areas.

Within each of the ecotypes, tier 1 geographic focus areas (that is, those in greatest need of conservation) were identified for all terrestrial and aquatic areas of the State. Lee Metcalf Refuge is located within the Bitterroot/Frenchtown Valleys focus area, which is dominated by views of the jagged peaks of the Bitterroot Range to the west and the lower Sapphire Mountains to the east. The Bitterroot River bisects the

valley floor north to Missoula. The valley is arid, flat, or gently rolling landscapes between 2 and 15 miles wide. While the valley supports many habitats—from grassland and riparian to forest and sagebrush—most of the area is now in subdivided for home sites interspersed with some agricultural production. The rolling mountain foothills at the valley edges are important elk, white-tailed deer, and mule deer winter ranges. In the valley bottoms, the cottonwood riparian habitats are some of the most productive wildlife habitats in the State and are home to a wide variety of birds, mammals, reptiles, and amphibians. Of the 16 tier 1 priority (target) species for this area, 8 have been documented on the refuge: boreal toad, long-billed curlew, black tern, olive-sided flycatcher, common loon, trumpeter swan, bald eagle, and Townsend’s big-eared bat. The target species for this area that have not been documented on the refuge are the Coeur d’Alene salamander, northern leopard frog, harlequin duck, flammulated owl, black-backed woodpecker, northern bog lemming, gray wolf, and grizzly bear.

The “Montana Comprehensive Fish and Wildlife Conservation Strategy” (MFWP 2005) outlines five conservation concerns and strategies for the Bitterroot/Frenchtown Valleys focus area. The key concerns are:

- habitat loss, degradation, and fragmentation, especially as a result of human population growth and development of transportation infrastructure;
- invasive and exotic plant and animal species;
- range and forest management practices;
- streamside residential development.

All of these conservation concerns identified in this State plan for the Bitterroot/Frenchtown Valleys focus area are affecting the management and future protection of the Lee Metcalf Refuge.

1.7 Strategic Habitat Conservation

In the face of escalating challenges such as land use conversion, invasive species, water scarcity, and refuge issues that have been amplified by accelerating climate change, the Service has evolved from its ecosystem approach of thinking about conservation to developing a broader vision.

A cooperative effort by the Service and U.S. Geological Survey culminated in a report by the National Ecological Assessment Team (USGS 2006). The report outlines a unifying adaptive resource management approach for conservation at a landscape scale, the entire range of a target species or a suite (or guild) of species. This approach is strategic habitat conservation—a structured, science-driven approach for making

efficient, transparent decisions about where and how to expend Service resources for species, or groups of species, that are limited by the amount or quality of habitat. It is an adaptive management framework integrating planning, design, delivery and evaluation.

Since 2006, the Service has taken significant steps to turn this vision into reality and has defined a framework of 21 geographic areas. Experts from the Service and U.S. Geological Survey developed this framework through an aggregation of bird conservation regions. Lee Metcalf Refuge lands and waters lie in geographic area 6—the great northern. This geographic area is unique in social values, natural resources, and managerial challenges. The great northern geographic area includes one of the largest surface areas of all of the geographic areas in North America and spans more than 447,000 square miles in the United States (57 percent) and Canada (43 percent). Ecologically, this area represents one of the most relatively intact and functional ecosystems in the United States with diverse groups of species and important conservation and restoration opportunities. Habitats support plant and animal species with cultural significance to multiple Native American tribes and important societal and conservation value to the United States, Canada, and the world. Cultural traditions are tied closely to the land's natural resources as are contemporary ways of life, such as ranching, logging, and recreational and subsistence hunting and fishing. The Nation's largest communities of free-roaming bison, elk, deer and other ungulates, wolves, and bears as well as diverse salmon and trout populations are hallmarks of the great northern geographic area.

The Service is using this framework of geographic areas as the basis to locate the first generation of landscape conservation cooperatives. These cooperatives are conservation–science partnerships between the Service and other Federal agencies, States, tribes, nongovernmental organizations, universities, and other entities. Designed as fundamental units for planning and science, the cooperatives have the capacity to help the Service carry out the elements of strategic habitat conservation—biological planning, conservation design and delivery, and monitoring and research. Coordinated planning and scientific information will strengthen the Service's strategic response to accelerating climate change, land use conversion, invasive species, water scarcity, and a host of other challenges.

CLIMATE CHANGE

The Service expects that accelerating climate change will affect the Nation's fish, wildlife, and plant resources in profound ways. While many species will continue to thrive, some may decline and in some instances go extinct. Others will survive in the wild only through direct and continuous intervention by managers. In 2010, the Service drafted a strategic plan to address

climate change for the next 50 years entitled “Rising to the Challenge—Strategic Plan for Responding to Accelerating Climate Change” (USFWS 2010). The strategic plan employs three key strategies: adaptation, mitigation, and engagement. In addition, the plan acknowledges that no single organization or agency can address climate change without allying itself with others across the Nation and around the world (USFWS 2010). This plan is an integral part of the Department of the Interior's strategy for addressing climate change as expressed in Secretarial Order 3289 (September 14, 2009).

The Service will use the following guiding principles from the strategic plan (USFWS 2010) in responding to climate change:

- priorities setting—continually evaluate priorities and approaches, make difficult choices, take calculated risks, and adapt to climate change
- partnership—commit to a new spirit of coordination, collaboration, and interdependence with others
- best science—reflect scientific excellence, professionalism, and integrity in all the Service's work
- landscape conservation—emphasize the conservation of habitats within sustainable landscapes, applying the Service's strategic habitat conservation framework
- technical capacity—assemble and use state-of-the-art technical capacity to meet the climate change challenge
- global approach—be a leader in national and international efforts to meet the climate change challenge

Scientific information suggests that the great northern landscape has already undergone observable environmental and ecological changes as a result of climate change trends. Current patterns in climate change are expected to affect high-mountain ecotypes and lower-elevation, snowmelt-dependent watersheds more acutely than it will affect some other geographic areas. Because of the valley-floor location of this refuge, it is expected that ground water would continue to surface at least though the life of this plan. In consideration of anticipated climatic changes and the resulting potential ecological impacts, the following 12 species are currently considered to be focal species for the great northern geographic area: bull trout, pacific lamprey, salmon, steelhead, greater sage-grouse, Lewis's woodpecker, trumpeter swan, willow flycatcher, Columbia spotted frog, cutthroat trout subspecies, Arctic grayling, and wolverine. Four of these focal species have been documented on Lee Metcalf Refuge: Lewis's woodpecker, trumpeter swan, willow flycatcher, Columbia spotted frog, and westslope cutthroat trout (in the Bitterroot River). To address the ongoing effects of climate change, any proposed management changes must continue to adapt to a changing environment.

1.8 Planning Process

The final CCP was prepared in compliance with the National Wildlife Refuge System Improvement Act and Part 602 (National Wildlife Refuge System Planning) of “The Fish and Wildlife Service Manual.” Additional requirements and guidance are contained in the Refuge System’s planning policy, issued in 2000. This policy established requirements and guidance for refuge and district plans—including CCPs and step-down management plans—to make sure that planning efforts follow the Improvement Act. The planning policy identified several steps of the CCP and environmental analysis process (figure 3).

The Service began the preplanning process in July 2009 by establishing a planning team composed primarily of Service staff from the refuge. Additional contributors included staff from other Service divisions; MFWP; Bitterroot National Forest; Confederated Salish and Kootenai Tribes; local schools; and Greenbrier Wetland Services, as well as several other partners (appendix F).

During planning, the team identified and reviewed current programs, compiled and analyzed relevant data, and determined the purposes of the refuge. An additional part of this process was the preparation of

a habitat analysis report by Greenbrier Wetland Services, a company that focuses on wetland conservation and management. Its report entitled, “An Evaluation of Ecosystem Restoration and Management Options for Lee Metcalf National Wildlife Refuge,” took more than 2 years to research and prepare and resulted in some sound recommendations for the restoration and future management of the refuge.

The planning team provided opportunities for public involvement as detailed in appendix A. Following public review of the “Draft Comprehensive Conservation Plan and Environmental Assessment—Lee Metcalf National Wildlife Refuge,” the Service analyzed the comments received. The planning team reviewed all comments both individually and as a team. Modifications, including clarifications, were made to this final document based on the public review. Responses to substantive comments appear in appendix A.

Following the Regional Director’s decision on which alternative to implement (refer to previous section 1.1), the planning team prepared the final CCP.

Table 1 lists the specific steps in the planning process to date for the preparation of this final CCP.

COORDINATION WITH THE PUBLIC

During preplanning, a mailing list of more than 270 names was prepared that included private citizens;



Figure 3. Process steps for comprehensive conservation planning and associated environmental analysis.

local, regional, and State government representatives and legislators; other Federal agencies; and interested organizations (appendix A). The Service coordinated the following efforts to provide information and request ideas and comments from the public:

- Web site. The CCP Web page displayed background information on the refuge, the CCP development schedule, public meeting information, planning contacts, and electronic versions of planning updates, the draft plan, and other planning documents.
- Two planning updates. These fact sheets were sent to everyone on the project mailing list. Information was provided on the history of the refuge, the CCP process, and the alternatives in the draft CCP and EA. The updates included invitations to public meetings and provided information on how to provide written comments.
- Public meetings. The Service presented information about the planning process; the resources; and the draft CCP and EA. Attendees were encouraged to offer comments and ask questions.
- Public review of the draft CCP and EA. The public had 34 days to review and provide comments about the draft plan for the refuge.

Table 1. Summary of the CCP planning process for Lee Metcalf National Wildlife Refuge, Montana.

<i>Date</i>	<i>Event</i>	<i>Outcome</i>
July 13, 2009	Kickoff meeting	The planning team learned about the CCP process; discussed the initial planning team list; developed a mailing list, planning schedule, and the first draft of internal issues and qualities list; and reviewed biological data needs.
July 14, 2009	Vision statement development	The planning team developed a proposed vision statement for the draft CCP.
August 11, 2009	Public scoping planning	The planning team discussed an effective outreach plan for public scoping.
September 9, 2009	Planning update mailing	The first planning update was sent to mailing list recipients. This update described the planning process and announced upcoming public scoping meetings.
September 29, 2009	Public scoping meeting	Public attendees learned about the CCP process and discussed issues and ideas for future management.
September 30, 2009	Notice of intent publication	A notice of intent to prepare the CCP was published in the Federal Register.
October 1, 2009	Public scoping meeting	Public attendees learned about the CCP process and discussed issues and ideas for future management.
November 17, 2009	Visitor services workshop	A panel of visitor services experts from State, tribal, and Federal agencies gathered to discuss and propose options for managing the refuge's visitor services programs and facilities.
January 26–27, 2010	Review of draft habitat analysis report	Service staff reviewed the draft analysis and recommendations (prepared by Greenbrier Wetland Services) that described the proposed future ecological restoration and management of the refuge's wetland and floodplain complex.
January 27, 2010	Review of draft grasslands restoration and management report	Service staff reviewed the draft analysis and recommendations (prepared by Aeroscene Land Logic) that described proposed future ecological restoration and management of the refuge's grassland areas.
March 3, 2010	Goals workshop	The planning team prepared draft goal statements in support of the proposed vision statement.
April 7, 2010	Alternatives development	The planning team began developing and evaluating three alternatives for managing visitor services.
April 20, 2010	Target species determination	The planning team determined CCP target species by reviewing State and national priorities species lists for the Service, the State of Montana, and the Bitterroot Valley.
May 26–27, 2010	Alternatives development and evaluation	The planning team began developing alternatives for biological programs and continued evaluating alternatives for managing visitor services.

Table 1. Summary of the CCP planning process for Lee Metcalf National Wildlife Refuge, Montana.

<i>Date</i>	<i>Event</i>	<i>Outcome</i>
June 23–24, 2010	Alternatives review and consequences development	The planning team reviewed the alternatives table and discussed environmental consequences.
July 8, 2010	Environmental consequences review	The planning team continued to review the alternatives table and discussed environmental consequences.
July 20–22, 2010	Alternatives and consequences workshop	An expanded team of partners from the Service and other Federal, tribal, and State agencies assembled to review three alternatives and determine the environmental consequences of each. Alternative B was selected as the proposed action.
November 16, 2010	North Burnt Fork Creek meeting	The planning team met with scientists from other Service divisions and State and Federal agencies to discuss options for reconnecting North Burnt Fork Creek to the Bitterroot River.
November 17, 2010	Objectives and strategies workshop	The planning team drafted objectives and strategies for the proposed action.
January 13, 2011	Map and figure review	The planning team developed a list of needed maps and figures for draft CCP and EA.
January 25 and February 2–3, 2011	Proposed alternatives review	Refuge staff met to review and revise the list of proposed alternatives.
March 21–22, 2011	Proposed action review	The planning team reviewed the list of objectives, strategies, and rationale for the proposed action (chapter 4 of this CCP).
February 2011–September 2011	Internal draft plan preparation	The planning team prepared the draft CCP and EA, including maps. The document was edited and prepared for internal review.
September 12–30, 2011	Internal review of draft plan	The draft CCP and EA was sent to a list of internal reviewers consisting of Service, State, tribal, and other Federal staff. Comments were collected and resulted in several modifications to this public draft.
October 2011–March 2012	Public draft plan preparation	The planning team prepared the public draft CCP and EA. The document was edited and prepared for public distribution.
March 28, 2012	Notice of availability publication, draft plan public review, planning update distribution	The notice of availability of the draft CCP and EA was published in the Federal Register (volume 77, number 60, pages 18852–18853). The draft CCP and EA was made available on the project Web page, and hard copies were distributed per requests. The public was provided 34 days to review and comment on the draft CCP and EA. A planning update was sent to the mailing list; the update summarized the draft plan and announced the upcoming public meeting.
April 9, 2012	Public meeting	The public had an opportunity to learn about and provide comments on the draft CCP and EA.
April 30, 2012	End of public review period	Public comments that would be considered had to be received or postmarked by this date.
May 7 and 9, 2012	Public comments review	The planning team reviewed the public comments and determined needed changes for the final CCP.
May 10–July 13, 2012	CCP revision	The planning team made revisions to the draft CCP based on substantive public comments.
July 18, 2012	Decision on preferred alternative	The Regional Director selected the preferred alternative and signed the finding of no significant impact.
August 2012	Final CCP preparation	The planning team finished revising and editing the final CCP for printing and distribution.

The Service recorded all comments given at the public meetings. In addition to oral comments, the planning team received written comments through email, comment forms, and letters. Planning team members, individually and as a team, reviewed all comments. Some modifications, including clarifications, were made to this final document based on the public review. Appendix A contains more detail about the Service's involvement of the public, including responses to substantive public comments on the draft CCP and EA.

STATE COORDINATION

At the start of the planning process, the Service's Regional Director (Region 6) sent a letter to MFWP, inviting its staff to participate in the planning process. State biologists and outdoor recreation specialists have since been involved in the planning process, offering input on current and future biological and visitor services programs. At the start of the process, each office of Montana's U.S. congressional delegation—Senator Jon Tester, Senator Max Baucus, and Representative Dennis Rehberg—were sent letters that notified them

of the planning process and invited their comments. Five Montana State senators and representatives and Governor Brian Schweitzer were sent similar letters.

The State has been most concerned with the visitor services programs, and State staff participated in the planning meetings to discuss the proposed future management of these programs. The State has been supportive of the planning process.

TRIBAL COORDINATION

Early in the planning process, the Service's Regional Director (Region 6) sent a letter to tribes with potential cultural and historical connections to the area in which the refuge is located. Tribes contacted were the Confederated Salish and Kootenai and Nez Perce tribal councils and culture committees. A staff person and tribal member from the Confederated Salish and Kootenai Natural Resources Division offered her assistance in developing and reviewing the alternatives for the visitor services and cultural resources programs. Each contacted tribe was provided an opportunity to comment on the draft CCP and EA.

CHAPTER 2—The Refuge



Bob Danley/USFWS

Nearly 1,000 acres of Lee Metcalf National Wildlife Refuge consist of open water, mostly in wetland impoundments.

Lee Metcalf National Wildlife Refuge consists of 2,800 acres of lands and waters all located within Ravalli County near Stevensville, Montana. This chapter discusses the refuge's establishment, management history, purposes, and special values as well as its proposed vision, goals, and planning issues.

2.1 Establishment, Acquisition, and Management History

The following section describes the establishment, acquisition, and management history of the Lee Metcalf Refuge.

LEE METCALF NATIONAL WILDLIFE REFUGE

Lee Metcalf Refuge is approximately 2 miles north of Stevensville and 25 miles south of Missoula in Ravalli County, Montana. The refuge lies in the heart of the Bitterroot Valley, cradled between two mountain ranges: the Bitterroot Mountains to the west and the Sapphire Mountains to the east. Today, the refuge boundary encompasses 2,800 acres (figure 4). Elevation ranges from about 3,225 feet on the north end of the refuge to about 3,314 feet on the south.

The refuge contains upland habitat composed of floodplain and terrace grasslands, shrublands, or a combination of both. The refuge also has riparian habitat consisting of woodlands, wetlands, and wetland impoundments that have open water and persistent emergent vegetation. Other habitats include the

river channel and areas of either bare or very sparse vegetation (table 2).

The refuge serves as a staging and nesting area for migrating waterfowl, shorebirds, sandhill cranes, and other migratory birds. A variety of refuge habitats are home for native resident wildlife such as bats, white-tailed deer, porcupines, and beaver.

The refuge is located in the Bitterroot River floodplain, and the river runs through or alongside refuge lands for approximately 5 miles. The Bitterroot River has two forks with headwaters in the Anaconda-Pintler Mountains and in the Bitterroot Mountains at the Idaho and Montana stateline. The river flows north and has areas of inherently unstable channel configurations until its confluence with the Clark Fork River near Missoula. The floodplain at the refuge is characterized by multiple abandoned channels, backwater flooding, and entrances of two tributaries from the east (North Burnt Fork Creek and Three Mile Creek).

After establishment of the refuge in 1964, an extensive system of levees, ditches, and water control structures were constructed to capture and manage the available water supply with a primary purpose of providing migration and nesting habitat for waterfowl. By the late 1980s, more than 1,000 acres had been partially or completely impounded in 14 ponds for managed wetland units. Today, these ponds range in size from 8 acres to more than 200 acres, and their water levels are seasonally managed for waterfowl and shorebirds. Additionally, tributaries and natural springs have been altered by dams or weirs that have allowed the direction or level of surface waterflow to be manipulated. With 24 water claims and 1 water permit,

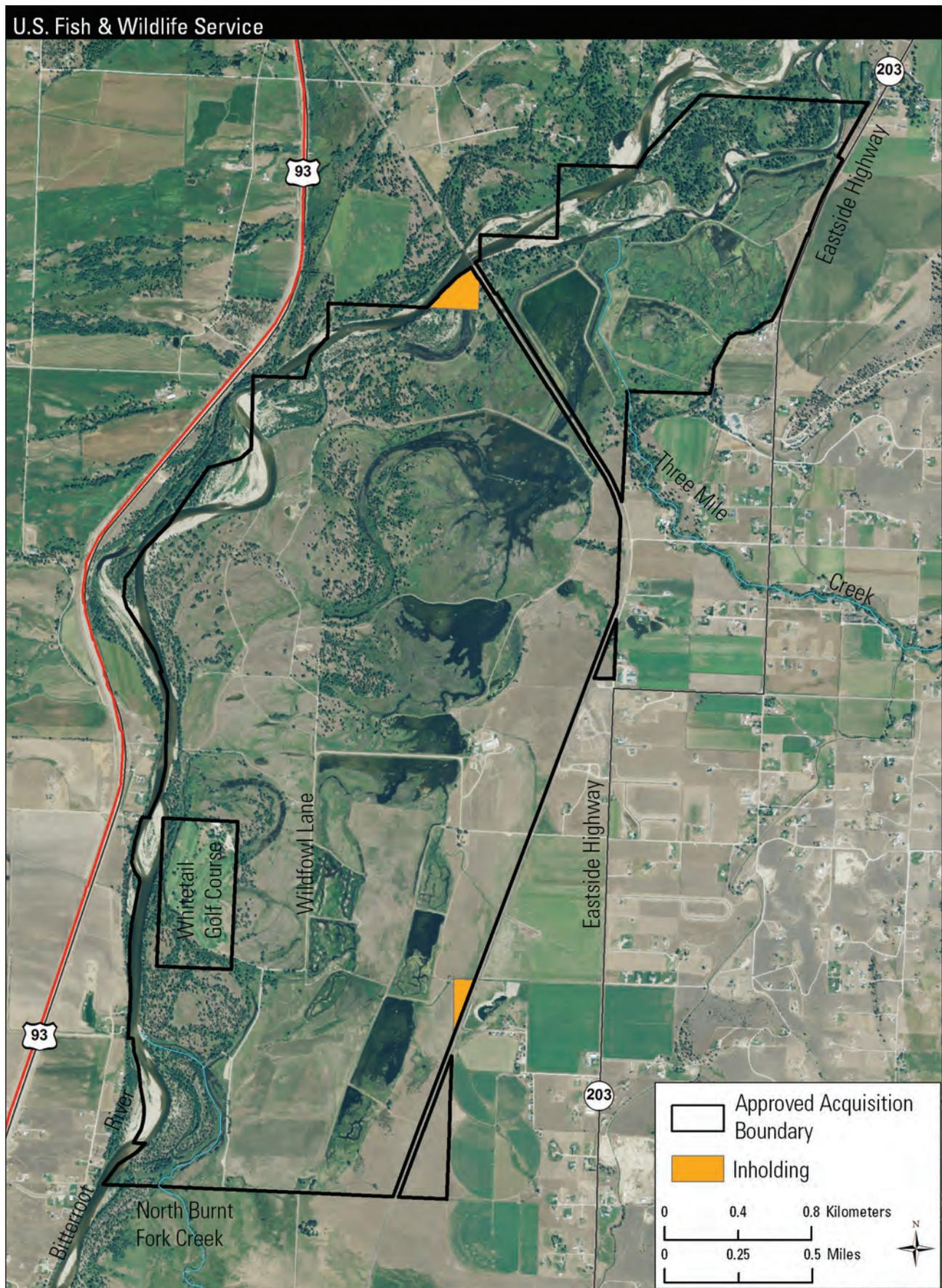


Figure 4. Approved acquisition boundary of Lee Metcalf National Wildlife Refuge, Montana.

Table 2. Habitat type and associated acreages found on Lee Metcalf National Wildlife Refuge, Montana.

<i>Habitat type</i>	<i>Acres</i>
Uplands (primarily tame grasses)	1,186.43
Woodlands and wetlands near woodlands	502.58
Wetland impoundments (open water, emergent vegetation)	958.19
River channel	62.73
Bare or sparse vegetation	89.59
Total	2,799.52

the refuge has the right to 34,209.38 acre-feet of water per year to use for habitat management purposes. The diverted water provides feeding, resting, and nesting habitat for migratory birds, wetland-related wildlife, and other resident wildlife.

Gallery and riverfront forest cover portions of the western third of the refuge. Soil types, elevation, and historical vegetation data suggest that several of the impoundments or ponds were once forested or consisted of native grasslands.

SUMMARY OF LAND ACQUISITION HISTORY

On December 10, 1963, the Migratory Bird Conservation Commission used the authority of the 1929 Migratory Bird Conservation Act (16 United States Code [U.S.C.] 715–715d, 715e, 715f–715r) (45 Stat. 1222) to approve the acquisition of 2,700 acres in 18 tracts of land to establish the Ravalli National Wildlife Refuge. In 1978, the refuge was renamed to honor the late Senator Lee Metcalf, who was instrumental in establishing this refuge, and to recognize his lifelong commitment to conservation. On February 4, 1964, the first purchase was made, Tract 21, consisting of 408.05 acres. Over the next 25 years, the Service purchased an additional 23 tracts for a total of 2,799.52 refuge acres (table 3). There were also two permits acquired from the Northern Pacific Railroad Company to access a pumping station and to cross the railroad tracks to access refuge lands. In 2009, a facilitation easement was recorded for an irrigation ditch that traverses through a subdivision.

2.2 Purposes

Every national wildlife refuge has a purpose for which it was established. This purpose is the foundation on which to build all refuge programs—from biology and public use to maintenance and facilities. The refuge purposes are found in the legislative acts or Executive actions that provide the authorities to either transfer or acquire a piece of land. Over time, an individual refuge may contain lands that have been acquired under various transfer and acquisition authorities, giving the

unit more than one purpose. The goals, objectives, and strategies in this final CCP (chapter 4) are intended to support the individual purposes for which the refuge was established.

The Migratory Bird Conservation Commission justification for establishing the Lee Metcalf Refuge was to provide a feeding and resting area for migrating waterfowl in a locality where some sanctuary is needed.

The legislative purposes of the Lee Metcalf Refuge are as follows:

For “use as an inviolate sanctuary, or for any other management purpose, for migratory birds.” (Migratory Bird Conservation Act 16 U.S.C. 715–715d, 715e, 715f–715r, 45 Stat. 1222, as amended)

As “suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ...”

“the Secretary ... may accept and use ... real ... property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors ...” (Refuge Recreation Act 16 U.S.C. 460k–460k–4)



Bob Damley/USFWS

In 1978, the refuge was renamed to honor the late Senator Lee Metcalf, who was instrumental in establishing this refuge, and to recognize his commitment to conservation.

Table 3. Land acquisition history for Lee Metcalf National Wildlife Refuge, Montana (1964–2009).

<i>Tract number</i>	<i>Acres</i>	<i>Date acquired</i>	<i>Means of acquisition</i>
21	408.05	02/04/1964	Fee
21a	25.39	02/04/1964	Fee
19	305.93	04/10/1964	Fee
25	167.10	06/09/1964	Fee
25a	90.86	06/09/1964	Fee
12	298.11	06/11/1964	Fee
24	9.47	06/12/1964	Fee
13	160	08/24/1964	Fee
11	309.32	05/21/1965	Fee
11a	4.27	05/21/1965	Fee
20	175.89	01/03/1966	Fee
15	2.23	06/14/1966	Fee
14a	5.13	06/15/1966	Fee
23	2.60	01/25/1967	Fee
10	26.48	06/12/1967	Fee
10a	292.53	06/12/1967	Fee
22	8.13	08/14/1967	Fee
27	336.31	12/06/1968	Fee
27-I	0.31	12/06/1968	Fee
19a	63.78	11/13/1974	Fee
29	4.4	06/12/1978	Fee
16	80	03/23/1988	Fee
17	16.23	05/23/1988	Fee
19b	0 ¹	10/01/1989	Fee—life estate
28M	0 ¹	12/01/1967	Permit from railroad company—pump station
28R	0 ¹	02/01/1970	Permit from railroad company—crossing
30D	7	01/09/2009	Easement
Total	2,799.52		

¹Acres figure is minimal.



Bob Danley/USFWS

The refuge's upland habitat primarily consists of grassland, shrubland, and a combination of both.

2.3 Vision

A vision is a concept, including desired conditions for the future, that describes the essence of what the Service is trying to accomplish. The following vision for the Lee Metcalf Refuge is a future-oriented statement and is to be achieved through refuge management throughout the life of this CCP and beyond.

Lee Metcalf National Wildlife Refuge is a representation of the diverse native wildlife habitat once found abundantly between the Bitterroot and Sapphire Mountains and along the ever-changing Bitterroot River. This floodplain refuge, fed by mountain snow, is a diverse mosaic of forest, grassland, and riparian habitat that provides protected lands and waters for migratory and resident wildlife.

The refuge, in partnership with its neighbors, friends, and the community, is a conservation leader in the valley, ensuring that the biological integrity of this refuge and other valley habitats remains intact or, where appropriate, is restored.

These protected lands and waters are a place of discovery for visitors to experience fish and wildlife firsthand and where children can experience nature with all their senses. Visitors to the refuge can appreciate the beauty of the setting and experience a sense of wonder and pride to be preserving this part of the Bitterroot Valley and the National Wildlife Refuge System.

2.4 Goals

The Service developed nine goals for the refuge based on the Improvement Act, the purposes of the refuge, and information developed during project planning. The goals direct efforts toward achieving the vision and purposes of the refuge and outline approaches for managing refuge resources.

BITTERROOT RIVER FLOODPLAIN AND ASSOCIATED WILDLIFE

Manage and, where appropriate, restore the natural topography, water movements, and physical integrity of surface water flow patterns across the Bitterroot River floodplain to provide healthy riparian habitats for target native species and to educate visitors about the benefits of sustaining a more natural floodplain.

WETLAND IMPOUNDMENT HABITAT AND ASSOCIATED WILDLIFE

Where appropriate, manage wetland impoundments to create a diversity of habitats for target waterfowl, shorebirds, and other associated native wetland-dependent species.

GRASSLAND AND SHRUBLAND HABITAT AND ASSOCIATED WILDLIFE

Create the conditions that will allow for the restoration, maintenance, and distribution of native grassland and shrubland species (such as rabbitbrush, needle and thread grass, Junegrass, and hairy golden aster) to provide healthy lands for a diverse group of target native resident and migratory wildlife species and to educate visitors about the historical plant and animal diversity of the Bitterroot Valley.

INVASIVE AND NONNATIVE SPECIES

Prevent, reduce, and contain the invasion and spread of noxious, invasive, and harmful nonnative species within the refuge while working with partners to address off-refuge infestations within the surrounding landscape.

RESEARCH

Pursue and maintain compatible research projects that will provide information on refuge resources and address refuge issues to assist management in making decisions based on the best available information and science.

CULTURAL RESOURCES

Provide opportunities for visitors to learn about the unique glacial, Native American, and Euro-American history of the Bitterroot Valley while maintaining and protecting the integrity of the refuge's cultural and historical resources.

VISITOR SERVICES

Provide visitors of all abilities with opportunities to participate in and enjoy quality, compatible wildlife-dependent recreation, environmental education, and interpretation programs that foster an awareness and appreciation of the importance of protecting the natural and cultural resources of the refuge, the Bitterroot Valley, and the National Wildlife Refuge System.

PARTNERSHIPS

Maintain and cultivate partnerships that help achieve the vision and supporting goals and objectives of the Lee Metcalf National Wildlife Refuge Comprehensive Conservation Plan and support other initiatives designed to protect and restore habitats for Federal trust species within the Bitterroot River Valley.

OPERATIONS AND FACILITIES

Prioritize wildlife first and emphasize the protection of trust resources in the utilization of staff, volunteers, funding, and facilities.

2.5 Special Values

Early in the planning process, the planning team and public identified the refuge's unique qualities or special values—characteristics and features of the refuge that make it special, valuable for wildlife, and an integral part of the Refuge System. It was important to identify the special attributes of the refuge to recognize its value and to make sure that these attributes are conserved, protected, and enhanced through the planning process. These special values can be unique biological values as well as simple values like providing a quiet place to see a variety of birds and enjoy nature. The following list summarizes many of the qualities that make the refuge unique and valued:

- protects 2,800 acres of diverse habitats—riparian, wetland, and upland—in a rapidly growing county
- supports a healthy riparian corridor used by breeding neotropical songbirds
- contains gallery forest along the Bitterroot River
- provides a wildlife corridor that runs north to south along the Bitterroot River and east to west from North Burnt Fork Creek to Kootenai Creek
- contains the largest montane wetland complex in the Bitterroot Valley on which many migratory bird species are dependent for breeding and migration stopovers
- provides resting habitat for trumpeter swans primarily during migration
- provides habitat for a great blue heron rookery containing 12–18 nests
- provides habitat for one bald eagle nest and foraging habitat for one additional nest less than 0.5 mile from the refuge
- provides exceptional viewing opportunities for nesting osprey and maintains the longest running dataset for nesting osprey in Montana
- lies within the Bitterroot River Important Bird Area, as designated by the National Audubon Society
- provides habitat for 242 bird species, 40 mammal species, and 11 species of reptiles and amphibians
- contains 45 documented species of concern (38 birds, 3 mammals, 2 plants, 1 aquatic insect, and 1 amphibian) listed in Montana
- provides habitat for moose, black bear, and (occasionally) elk on the valley floor
- includes designated critical habitat for endangered bull trout
- includes a portion of the Bitterroot River, which is considered a blue ribbon trout fishery
- lies within the Bitterroot Valley, the traditional homeland of the Salish, Nez Perce, and Pend d'Oreilles native peoples
- located a few miles from Stevensville, the oldest continuous Euro-American settlement in Montana
- contains the historic Whaley Homestead, which was built in 1885 and is listed on the National Register of Historic Places
- offers one of the few places to hunt waterfowl on public land in Ravalli County and the entire Bitterroot Valley
- provides environmental education and research opportunities for more than 16,000 area students of all ages (Missoula to Hamilton)
- serves as a “window” on the Refuge System for its 143,000 annual visitors, providing the public with a multitude of wildlife-dependent recreational activities in a peaceful and beautiful setting
- provides a visitor contact area staffed by volunteers and an outdoor amphitheater with vistas of refuge wetlands, the heron rookery, and the Bitterroot Mountains
- provides universally accessible nature trails with views of multiple habitat types and opportunities to view a variety of wetland, grassland, and forest bird species
- contains a 2.5-mile-long designated National Recreation Trail
- contains portions of the Ice Age Trail and the Nez Perce Trail
- collaborates with a wide variety of area organizations to carry out the refuge mission (that is, land management, visitor service, historic restoration, and research)
- provides close-up wildlife viewing opportunities
- serves as a point of pride for area citizens
- provides research opportunities for dozens of wildlife and environmental researchers
- attracts dozens of volunteers who annually donate 8,500 work hours

2.6 Planning Issues

Several key issues were identified following the analysis of comments collected from refuge staff and the public and a review of the requirements of the Improvement Act and NEPA. Two public meetings, news releases in the local and regional press, an announcement in the Federal Register, and planning updates were used to solicit public input on which issues the CCP should address. Substantive comments (those that could be addressed within the authority and management capabilities of the Service) were considered during formulation of the alternatives for future management. These key issues are summarized below.

BITTERROOT RIVER MIGRATION

The Bitterroot River traverses the Bitterroot Valley floor and is characterized by a constantly migrating stream channel that flows through extensive cottonwood and ponderosa pine bottomland forest. Naturally, the river fluctuates in water volume depending on winter snowpack and spring precipitation. These fluctuations regularly flood braided river channels and may create new ones. Much of this flooding and migration is natural and can be beneficial. However, as development increases, many more landowners are installing riprap along their properties in an attempt to prevent riverbank erosion; this directs the river (and its energy and increased velocity) to unprotected areas and increases the rate of erosion above natural levels. Such erosion has occurred in the refuge's wildlife viewing area (WVA), where erosion has exceeded 100 feet in one area, partially destroyed a universally accessible paved trail, removed many large ponderosa pine and black cottonwood trees, and left a steep bank next to the shelter and terminus of the WVA accessible trail, a National Recreation Trail.

Additionally, increased erosion from upstream bank stabilization also contributes to a loss of riparian habitat, including both types of woodlands (riverfront and gallery forest) and wetlands (streams and sloughs). Woodlands provide a migration corridor for birds, a home to several bat species of State concern, and shade and habitat structure for terrestrial and aquatic species. The refuge faces challenges and uncertainty in managing riparian habitat in the face of intensified bank erosion, increased river velocities, and shorter and more dramatic flood frequencies due to upstream channel alterations and bank stabilization.

WETLAND IMPOUNDMENTS (OR PONDS)

Shortly after acquiring the first tract of refuge land, the Service constructed several impoundments (commonly referred to as ponds) to hold water for migratory waterfowl. These impoundments were mostly built atop agricultural fields. Before this area was



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Flooding of the Bitterroot River is a common occurrence on the refuge.

homesteaded in the 1870s, these lands consisted of native grassland and shrubland habitats, gallery forests, and some natural streams (as identified in a 1964 habitat map, figure 5). Currently, there are 958 acres of wetland impoundments.

Some impoundments are surrounded by persistent emergent wetland vegetation like cattail. Cattail is an aggressive emergent plant that can completely fill wetland areas; once established, it is extremely difficult to control and can limit habitat value for waterfowl and other migratory birds. However, a balanced mosaic of open water, cattail, and other emergent vegetation usually benefits nesting habitat for diving ducks; brood habitat for diving and dabbling ducks; and nesting and roosting habitat for rails, American bitterns, and red-winged and yellow-headed blackbirds.

The constantly migrating Bitterroot River has started to erode some levees on the north end of the refuge, making Pond 13 susceptible to river movements and leaving refuge staff with little control over its water level. The structures and levees on one other impoundment in the refuge's north end are threatened by erosion as well. Maintaining these impoundments may be costly and ecologically unsound, depending on the river's future channel migration.

Management of impoundments depends on a consistent water source and the ability to fill and drain wetlands. Refuge impoundments receive water from irrigation ditches diverted from the Bitterroot River, tributary creeks, natural springs, tile drainage of agricultural fields, and subsurface groundwater. Drainage and irrigation ditches may receive outflow from adjacent agricultural operations and residential and industrial septic systems, and such impacts on water quality could in turn pose a threat to refuge wildlife.

Also of concern is the presence of nonnative aquatic predators. In the early 1990s, MFWP and the refuge released 10,000 bass fingerlings into Otter Pond for ospreys and eagles and to promote recreational fishing; as a result, largemouth bass have spread to most ponds (Ponds 5–13). Largemouth bass can be voracious

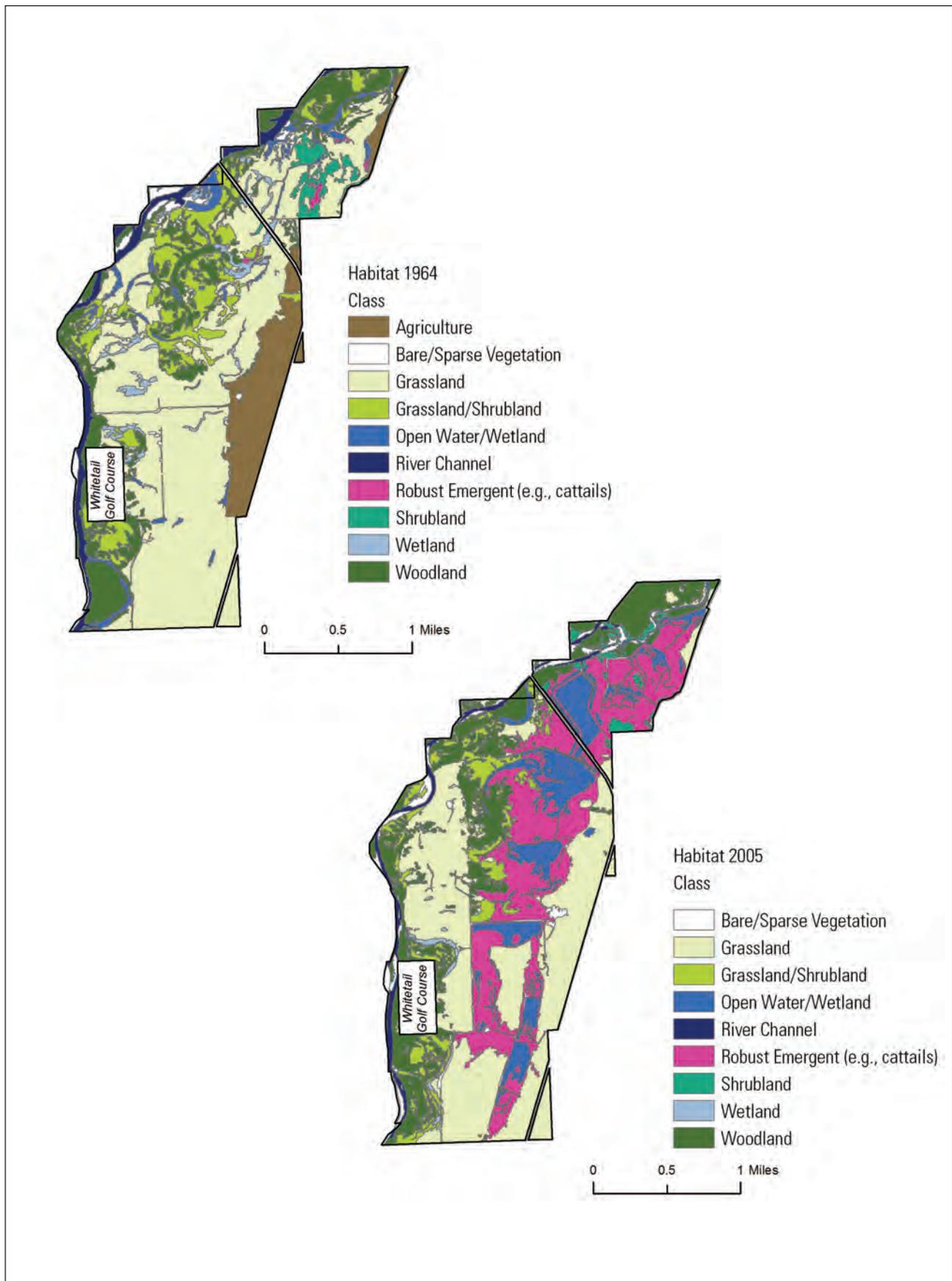


Figure 5. Composite vegetation community models Lee Metcalf National Wildlife Refuge, Montana, for 1964 and 2005 (Heitmeyer et al. 2010).

predators on fish, frogs, and aquatic insects and have been known to consume ducklings. In addition, bullfrogs also inhabit most of the impoundments. This nonnative amphibian displaces and consumes not only native amphibians but avian chicks, small snakes, and small mammals as well.

UPLAND HABITAT AND ASSOCIATED WILDLIFE

The intermountain and foothill grassland ecotype, which is found in the Bitterroot Valley and other broad mountain valleys in western Montana, contains some of Montana's most diverse fish and wildlife habitats. These areas also contain some of the largest populations of humans in Montana. The Bitterroot Valley area is considered a terrestrial conservation focus area in greatest need due to the loss of this habitat to agricultural production (MFWP 2005).

The refuge has 1,186 acres of upland habitat that consists of grassland, shrubland, and a combination of both. Due to the retirement of agricultural crops, encroachment of development, and spread of invasive plants, few native plant species remain, and wildlife value has been degraded. In many uplands, the dominant plant species are nonnative (tame) grasses and weeds such as smooth brome, crested wheatgrass, cheatgrass, knapweed, and thistle. A combination of management actions have been applied—prescribed fire, disking and seeding, herbicide application, and manual weed removal—with varying results.

WATER

Lee Metcalf Refuge receives surface water from tile drain ditches, springs, ephemeral and perennial creeks and subsurface flow, and three lateral irrigation ditches: the North Lateral Ditch, Middle Lateral Ditch, and South Lateral Ditch. These lateral ditches are supplied by the Supply Ditch, a primary canal that carries diverted Bitterroot River water from Victor to just north of the refuge. Water entering the refuge from the east often has a high nutrient load as it traverses or drains out of grazed or farmed lands. As a result, the refuge receives nutrient-rich drainage water that results in abundant algal growth during summer months.

In the past 5 years, algal growth has increased in the impoundments, possibly in part due to the combination of increased nutrient loading in surface water and potentially in subsurface water. Algal growth results in diminished water clarity and subsequent reduction in light penetration and vegetative quality of refuge impoundments.

Currently, the Montana Bureau of Mines and Geology has established shallow wells to collect subsurface water quality data and is also evaluating surface water quality within the refuge boundary.

The North Lateral Ditch, also called the Alleman Ditch, flows through private land, traverses alongside

Eastside Highway, and then enters the refuge on Rathbun Lane. In the last several years, the refuge has received water from this ditch, even though it has become silted and overgrown with vegetation. However, when the headgate is opened, the ditch tends to overflow and flood private lands.

East of the Eastside Highway, subdivisions have been developed along and over the Middle Lateral Ditch (also called the McElhaney Ditch) and affected the efficiency of flows leaving the Supply Ditch and reaching the refuge. Currently, refuge management is working with the Supply Ditch Association, landowners, and staff to replace this ditch with a pipeline. If successful, this effort could conserve water, provide a more reliable flow to the refuge, reduce noxious weed seed transfer from ditchbanks and neighboring lands, end periodic localized flooding, and possibly provide a gravity-flow water source into the refuge wheel lines, thereby saving thousands of dollars annually in pumping costs.

In recent years, much of the refuge water from the South Lateral Ditch (also called the Warburton Ditch) has not reached the refuge. Refuge law enforcement officers have monitored diversions along this ditch in the past.

Other historical ditches (now McPherson and Nickerson Creeks) remain on the refuge but have not been maintained in recent years.

INVASIVE AND NOXIOUS SPECIES

The State of Montana has identified 32 noxious plant species, which are nonnative plants that must be treated by rule of the Montana County Weed Control Act. Fifteen of these species have been found on the refuge. Invasive species prevent desirable native vegetation growth and often severely degrade habitat for native wildlife by altering its structure and its species and ecosystem interactions. When invasive species become widespread, they often change the habitat structure and vegetative variability that wildlife need for food and cover. These nonnative plants



Bob Damley/USFWS

Invasive and noxious species are a threat to native plants on the refuge, including velvet lupine.

often create monotypic stands, using up soil moisture and nutrients and outcompeting more desirable native species. This change in plant species, structure, and diversity impacts habitat for migratory birds, a group of species for which this refuge was established.

Multiple factors have likely contributed to the noxious and invasive plant problem on the refuge. Historically, factors like soil type, flood frequency, topography, availability of irrigation, and dominant vegetation likely influenced how lands that now compose the refuge were used. Much of this land was managed for agriculture, including growing small grains and potatoes, haying, and grazing. It is also evident that croplands were leveled and parts of the refuge may have been drained. After refuge establishment, much of the agricultural land was developed into wetland impoundments or managed for migratory waterfowl food resources. Later, gravel levees were developed to protect refuge facilities from periodic flooding from the Bitterroot River. White-tailed deer move daily off the refuge and back from neighboring lands and potentially carry weed seeds in fur or scat. All of these actions—both before and after refuge establishment—disturbed the soil and created abundant opportunities for noxious and invasive plants to take root.

Land uses in and around the refuge contribute to invasive species challenges. Such uses include subdivisions, irrigation laterals and tile drains, roads, and uncontrolled weed infestations on neighboring lands. In particular, roads like Rathbun Lane and Eastside Highway present opportunities for invasive species transport and establishment, as does the county road, Wildfowl Lane, which runs west, north, and east through the southern half of the refuge. The Montana Rail Link traverses the width and length of the refuge and provides additional opportunity for weeds to spread on disturbed ground. Also, the Bitterroot River runs the length of the refuge, and the water current as well as recreationists often transport seed from one area to another along this waterway.

RESEARCH, INVENTORY, AND MONITORING

Over the years, research, inventory, and monitoring of refuge resources have been sporadic and minimal. In most cases, research is proposed by another agency or a university, not by refuge staff. Consequently, some management programs have not necessarily been designed from refuge-specific data or in response to critical refuge needs and issues. This had led in part to some of the habitat management difficulties described in this section.

VISITOR SERVICES

Each year, the refuge hosts more than 143,000 visitors from all over the country and the world. It is valued as a place to discover, enjoy the beautiful scenery, and be close to nature.

The refuge has always done well to accommodate visitors by providing facilities and programs intended for education and enjoyment. The refuge currently employs one outdoor recreation planner who manages and designs all programs. Dedicated volunteers assist with these programs and help greet visitors at the refuge headquarters. Nevertheless, there is tremendous potential for improvement, namely through providing new programs, tours, offsite programs, and interpretive displays and by expanding and improving current facilities, particularly the visitor contact area. Although the visitor contact area does allow for some interpretation, it is small (about 500 square feet) and inadequate for conducting tours, accommodating larger groups, or housing displays that could better interpret refuge resources and programs. The refuge is very popular with local schools and other groups; accordingly, there is a need for additional programs and an indoor classroom.

Many visitors asked for additional trails and opportunities to explore more of the refuge. Requests were also made to afford all visitors the same access provided to refuge hunters. The refuge currently has 2.09 miles of trails in the WVA, some of which require improvement or relocation. A portion of the trail in the WVA is slowly eroding as a result of the migrating Bitterroot River. The Kenai Nature Trail, located north of the refuge headquarters, is also very popular with visitors, but it is surrounded by a closed area that does not allow visitors to leave this trail.

Hunting for waterfowl and white-tailed deer is very popular on the refuge. The refuge is located in a State management unit that only permits archery hunting for big game. The refuge suspects that the lack of regeneration in the understory of the forest is a direct result of overbrowsing by white-tailed deer. Should this be the case, the refuge may need to work with the State to find other methods to better disperse the deer or reduce the population on the refuge.

STAFFING

Currently, the refuge employs eight full-time employees (three of whom are zone or state-wide support employees who do not exclusively support refuge operations). If the refuge is to accomplish the goals set forth in this CCP within the established timeframe, adequate staffing and resources will be needed.

CHAPTER 3—Refuge Resources



Bob Danley/USFWS

Sagebrush buttercup is one of many plant species found on Lee Metcalf National Wildlife Refuge.

This chapter describes the characteristics and resources of the Lee Metcalf National Wildlife Refuge in Montana and is organized in the following sections:

- 3.1 Physical Environment
- 3.2 Biological Resources
- 3.3 State and Federally Listed Species
- 3.4 Cultural Resources
- 3.5 Special Management Areas
- 3.6 Visitor Services
- 3.7 Management Uses
- 3.8 Socioeconomic Environment
- 3.9 Partnerships
- 3.10 Operations

3.1 Physical Environment

The following sections describe aspects of the physical environments that may be affected by implementation of the CCP. Physical characteristics include climate and hydrology, climate change, physiography and geography, soils, topography and elevation, and air quality. Unless otherwise noted, the information in this section is from unpublished Service data or a hydrogeomorphic (HGM) report entitled “An Evaluation of Ecosystem

Restoration and Management Options for Lee Metcalf National Wildlife Refuge,” which was developed by Greenbrier Wetland Services (Heitmeyer et al. 2010).

CLIMATE AND HYDROLOGY

The climate of the Bitterroot Valley is characterized by cool summers, generally light precipitation, little wind, and relatively mild winters. Annual precipitation averages about 13 inches but is variable related to position in the valley (figure 6). Precipitation increases with elevation along the valley margins and ranges from less than 13 inches in the Bitterroot Valley floor to nearly 60 inches near the Bitterroot Mountain summits on the west side of the valley. In contrast, precipitation along the crest of the Sapphire Mountains on the eastern margin of the valley is about 25–35 inches per year. The growing season in the Valley averages about 103 days; on average, the last freeze occurs May 30, and the first frost occurs September 10. Spring is the wettest period of the year, with about 25 percent of the annual precipitation falling in May and June (Heitmeyer et al. 2010). Runoff in the Bitterroot River is highest in spring, with about 55 percent of the river’s discharge occurring in May and June following snowmelt and local rainfall (McMurtrey et al. 1972). Natural flows in the Bitterroot River decline from spring peaks throughout the summer and remain relatively stable through winter. On average about

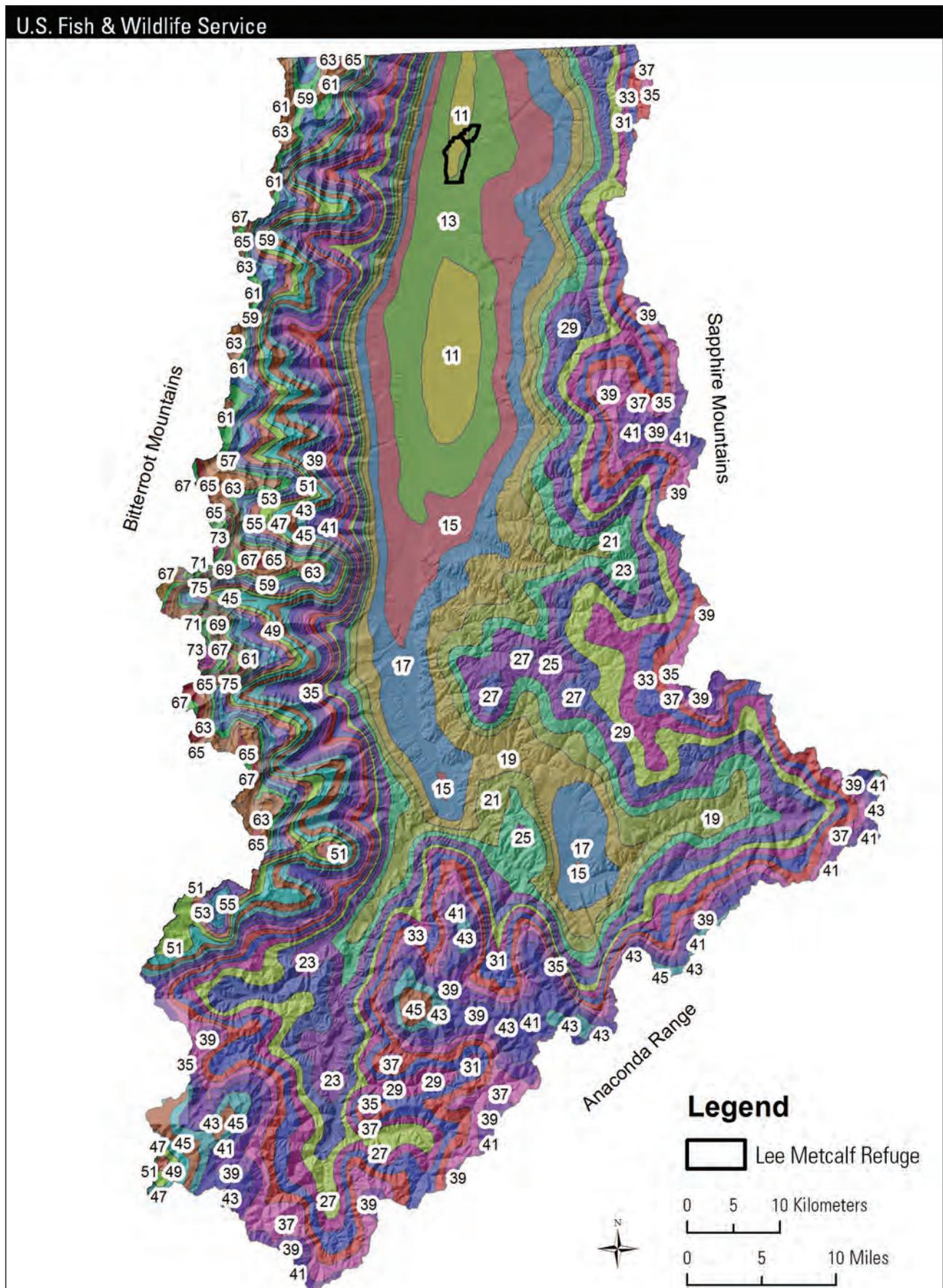


Figure 6. Ravalli County, Montana, average annual precipitation (inches) (USDA 2012).

1.772 million acre-feet of water flows into the Bitterroot basin via the Bitterroot River each year. Of this, 52 percent flows from the west, 37 percent flows from the south, and 11 percent flows from the east (Briar and Dutton 2000).

Numerous tributaries enter the Bitterroot Valley from mountain canyons. North Burnt Fork Creek and Three Mile Creek are major tributaries flowing across Lee Metcalf Refuge into Francois Slough and North Island Slough, respectively (figure 7). Other minor, within-floodplain drainages that historically crossed refuge land and ultimately emptied into the Bitterroot River included, Swamp Creek, Rogmans Creek, and the modified McPherson and Nickerson Creeks (now called Ditches). Rogmans Creek's historical channel is now covered by Ponds 2–10 and Otter Pond. Rogmans Creek was renamed "Spring Creek" on the 1967 U.S. Geological Survey topographical map. Valley-wide, about four times as many tributaries join the river from the Bitterroot Mountains on the west compared to the drier Sapphire Mountains on the east.

Records of flow and flood frequency relationships for the Bitterroot River near Florence date back to 1950. For this period of record, the river exceeded 1,050 cubic feet per second (cfs) at a 50-percent recurrence interval, or a frequency of every other year. Bank full discharge at Florence is about 13,000 cfs. This high flooding discharge causes extensive flooding throughout higher floodplain areas (figure 8) but occurs very infrequently (that is, at a greater than 50-year recurrence interval). At flows greater than 10,000 cfs, some modest backwater flooding on the refuge occurs with a greater than 7-foot stage height (USFWS 1974). This spring backwater flooding into connected floodplain sloughs and oxbows occurs regularly (that is, at a 5–10 year recurrence interval).

The Darby stream gauge station, approximately 35 miles upstream of the refuge, has the longest period of record for discharge on the Bitterroot River (beginning in 1937). Discharges on the Bitterroot River at Darby have less influence from irrigation return flow; accordingly, this gauge station represents the best location to evaluate relatively natural long-term patterns in riverflow. Records of peak discharge at Darby from the 1940s suggest some higher periodic discharge (greater than 10,000 cfs) at about 20- to 25-year intervals, with intervening years of moderate to low flows (figure 9). During the period of record, more very low flow (less than 4,000 cfs) years, about 20, occurred than did more average flow (greater than 8,000 cfs) years, about 16. In summary, river gauge data suggest the floodplain at the refuge was seldom extensively flooded historically (for example, 1974; figure 8), but that some backwater flooding into primary sloughs and tributaries occurred at a less than 50-percent recurrence interval in spring.

Many of the morphological characteristics of capillary (or secondary) channels of the Bitterroot River floodplain, including those at the refuge (such as Three Mile, Rogmans, McPherson, and Nickerson Creeks and Francois Slough), show an intimate connection with ground water discharge (Gaeuman 1997). Large up-stream and downstream variations in discharge within individual channels, and observed springs along the margins of floodplain terraces reveal a substantial subsurface flow. Many of these channels are probably remnants of formerly large channels (including past abandoned channels of the Bitterroot River) that have filled incompletely. In other cases, ground water discharge may be actively excavating channels that seem to be growing by head cuts (abrupt changes in streambed elevation).

Alluvial aquifers in the Bitterroot Valley are generally unconfined and interconnected, although the configuration of water-bearing layers in the heterogeneous valley fill is highly variable (Briar and Dutton 2000). Permeability is highest in alluvium of the low Quaternary terraces and floodplain, and hydraulic conductivity of up to 75 feet per day has been calculated in low terrace alluvium. Ground water circulation is predominantly away from the valley margins toward the Bitterroot River. The basin-fill aquifers are recharged by infiltration of tributary streams into coarse terrace alluvium, subsurface inflow from bedrock, and direct infiltration of precipitation and snowmelt. High amounts of precipitation on the western side of the valley cause greater recharge in this area than on the east side of the valley. Ground water discharge occurs through seepage to springs and streams, evapotranspiration, and now by withdrawals from wells. Water in basin-fill aquifers is primarily a calcium bicarbonate type. Median specific conductance is about 250 microsiemens per centimeter at 77 °F, and median nitrate concentration is relatively low—0.63 milligrams per liter (mg/L)—within the aquifer. Nitrate concentration in surface waters may reach 6 mg/L (Briar and Dutton 2000).

CLIMATE CHANGE

The U.S. Department of the Interior issued an order in January 2001 requiring Federal agencies under its direction with land management responsibilities to consider potential climate change effects as part of long-range planning endeavors. The U.S. Department of Energy's report, "Carbon Sequestration Research and Development" (1999), concluded that ecosystem protection is important to carbon sequestration and may reduce or prevent loss of carbon currently stored in the terrestrial biosphere. The report defines carbon sequestration as "the capture and secure storage of carbon that would otherwise be emitted to or remain in the atmosphere."

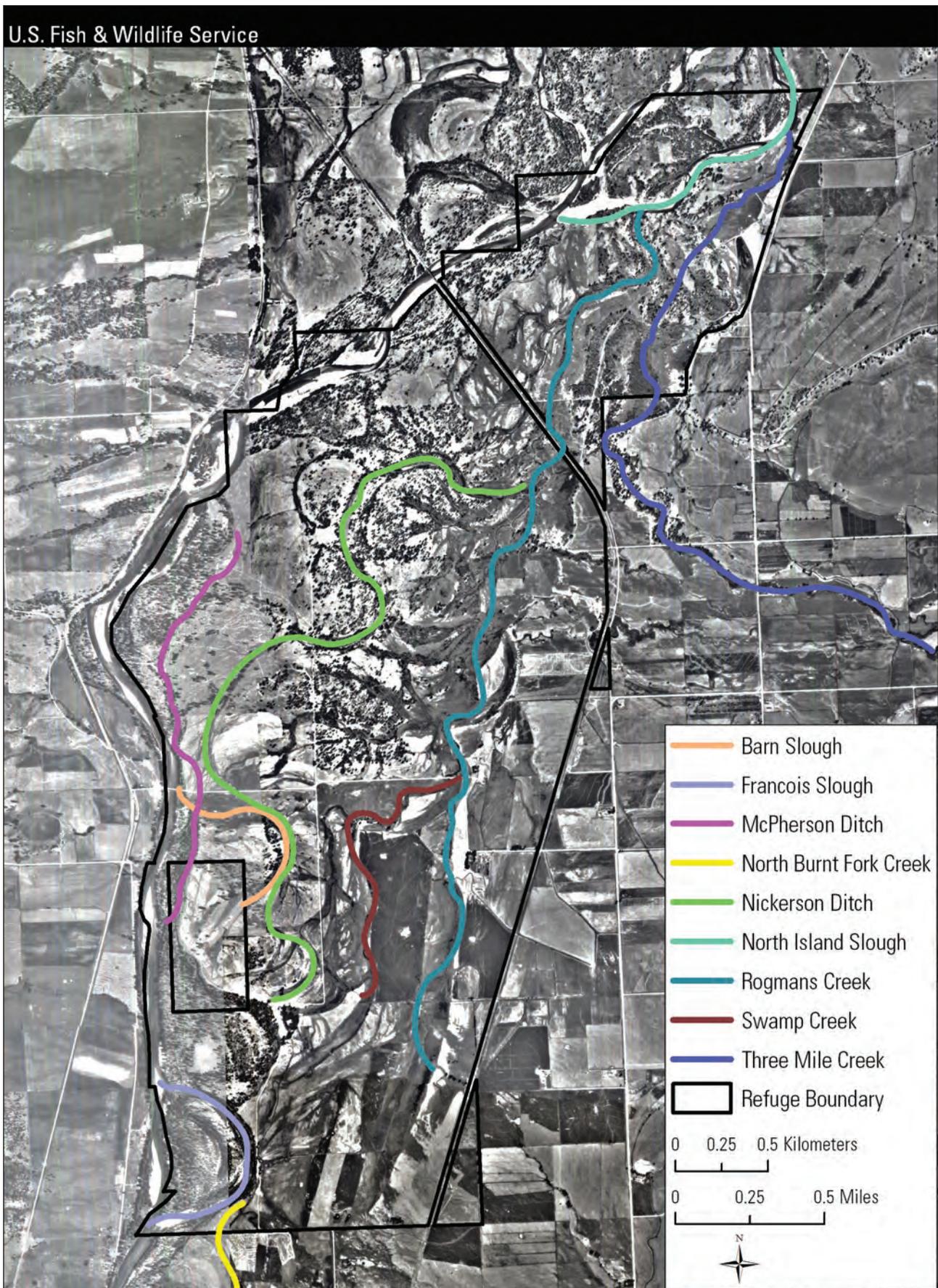


Figure 7. Primary channels and sloughs present at Lee Metcalf National Wildlife Refuge, Montana, in the 1940s.



USFWS

Figure 8. Flooding of the Bitterroot River on Lee Metcalf National Wildlife Refuge, Montana, in 1974.

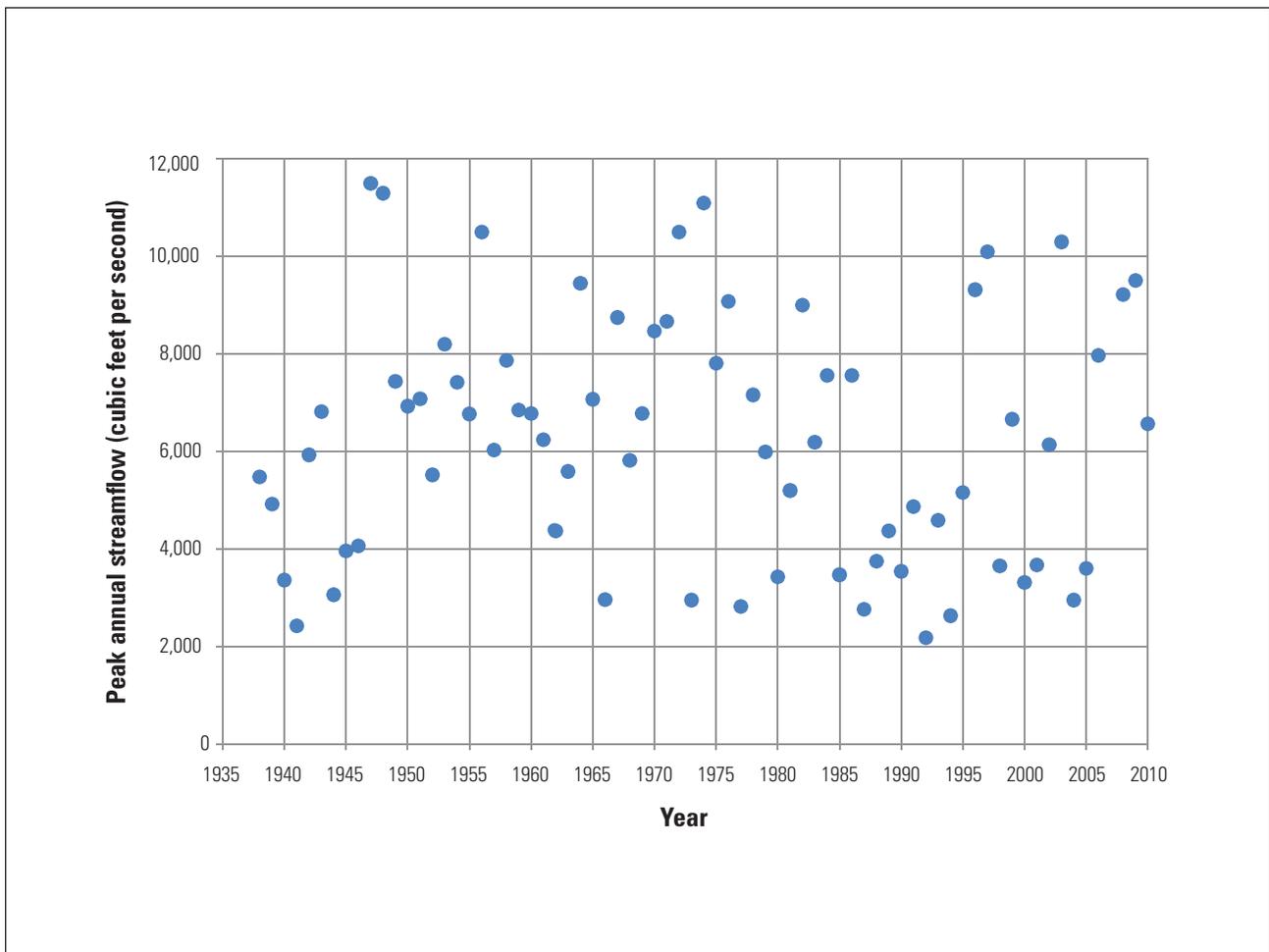


Figure 9. Bitterroot River streamflow near Darby, Montana (USGS 2011).



Bob Danley/USFWS

Although prescribed burning releases CO₂, there is no net loss of carbon because new vegetation quickly germinates or regrows to replace the burned-up biomass.

The increase of carbon dioxide (CO₂) within the earth's atmosphere has been linked to the gradual rise in surface temperature commonly referred to as global warming. In relation to comprehensive conservation planning for Refuge System units, carbon sequestration constitutes the primary, climate-related effect to be considered in planning.

Vegetated land is a tremendous factor in carbon sequestration. Large, naturally occurring communities of plants and animals that occupy major habitats—grassland, forest, wetland, tundra, and desert—are effective both in preventing carbon emission and in acting as biological scrubbers of atmospheric CO₂.

One Service activity in particular—prescribed burning—releases CO₂ directly to the atmosphere from the biomass consumed during combustion. However, there is no net loss of carbon because new vegetation quickly germinates or regrows to replace the burned-up biomass. This vegetation sequesters an approximately equal amount of carbon as was lost to the air (Dai et al. 2006).

Climate data for Montana show a slight reduction in annual precipitation and increases in temperatures over the last 100 years (National Climatic Data Center 2011). Climate change impacts predicted in the Rocky Mountains are rising temperatures, less snow, less water in snowpacks, earlier spring snowmelts, and lower streamflows in the summer. These changes will in turn lead to increased forest ecosystem water stress, increased winter temperatures, earlier snowmelts, and longer summer drought periods. With this warming trend, the growing season will increase, but with limited water resources, forest ecosystems will be water stressed and most likely begin to release CO₂ instead of acting as net absorbers of CO₂ (Running 2010). Other impacts anticipated include increased wildfires and insect infestations. This change in climate could also alter vegetation patterns and species, possibly allowing for additional invasive species to become established. Invasive plants could spread more rapidly,

the effectiveness of control methods may be altered, and certain species would likely survive the drier and milder climates, thereby outcompeting native plants.

Stronger and more frequent droughts associated with climate change could cause waterfowl and other waterbirds to lose breeding and stopover habitat. Because of the valley-floor location of this refuge, it is expected that ground water would continue to surface at least through the life of this plan. In addition, changes in the timing of migration and nesting could put some birds out of synchronization with the life cycles of their prey. Natural food sources for wildlife could be reduced or eliminated.

As surface water supplies might decrease with climate change, the refuge could depend more on subsurface water sources; this would increase management costs due to the challenges of pursuing ground water that has also been depleted by increased demand. Less ground water recharge, along with a greater demand for human consumption and irrigation, could limit water available for wildlife purposes. Increased potential exists for managed wetlands that depend on runoff and delivered water to not receive adequate amounts of water for waterbird habitat. Water impoundments might go dry more often and for possibly longer periods of time. Compatible public use activities may be affected on Service lands due to degraded habitats and less wildlife. Furthermore, climate change could displace local ranchers and farmers if they could no longer produce enough crops and livestock to maintain the viability of their businesses; this could cause an even greater change in land use as ranches and farms become further subdivided and developed.

PHYSIOGRAPHY AND GEOLOGY

The Bitterroot Valley, where the Lee Metcalf Refuge is located, is a north-trending basin bounded by the Bitterroot Mountains on the west and the Sapphire Mountains on the east. These mountains and the rich montane Bitterroot Valley date to nearly 90 million years before the present (B.P.) (Hodges and Applegate 1993). The Bitterroot Valley extends about 120 miles from the confluence of the east and west forks of the Bitterroot River south of Darby to its junction with the Missoula Valley and Clark Fork River 5 miles south of Missoula. The elevation of the valley floor ranges from about 3,900 feet above mean sea level (amsl) in the south to about 3,200 feet amsl near Missoula. Summit elevations of surrounding mountains range from 6,000 to 8,000 feet amsl in the Sapphire Range and exceed 9,500 feet amsl in the Bitterroot Range.

The Bitterroot Mountains are composed of granitic rocks, metamorphic materials, and remnants of pre-Cambrian sediments of the Belt series. The Sapphire Mountains are mostly Belt rocks with localized occurrences of granitic stocks.

The unusually straight front of the Bitterroot Range is a zone of large-scale faulting (Langton 1935, Pardee 1950); however, the Bitterroot Valley shows little sign of recent tectonic activity (Hyndman et al. 1975). Undisturbed valley fill shows that tectonic movement since the early Pliocene has been slight or that the entire valley floor has moved as a single unit. The structural basin of the Bitterroot Valley has accumulated a considerable thickness of Tertiary sediments capped in most places by a layer of Quaternary materials. Surficial geology evidence suggests Tertiary fill in the Bitterroot Valley may be up to 4,000 feet thick in some locations (Lankston 1975). Sediment is coarse colluviums near the fronts of mountains with finer-grain alluvial fill deposits that interfinger with floodplain silts and clays. Channel deposits of the ancestral Bitterroot River lie beneath the valley center.

Low terrace alluvium occurs as outwash, or alluvial fans, below the mouths of tributaries on both sides of the valley (Lonn and Sears 2001). Floodplain alluvium is mostly well-rounded gravel and sand with a minor amount of silt and clay derived from the edges of the neighboring terraces and fans. Most of the refuge is mapped as Qal alluvial deposits of recently active channels and floodplains. These deposits are well-rounded, and sorted gravel and sand with a minor amount of silt and clay. Minor amounts of Qaty (younger alluvial outwash terrace and fan complex deposits from the late Pleistocene) occur next to the Bitterroot Valley alluvium on the north end of the refuge. Materials in these terraces are well-rounded and sorted gravel of predominantly granitic, gneissic, and Belt sedimentary origin (Lonn and Sears 2001). Qafy surfaces extend along the Bitterroot Valley on both sides of the refuge. These surfaces are younger (late Pleistocene) alluvial outwash terrace and fan complexes of well-rounded cobbles and boulders in a matrix of sand and gravel deposited in braided-stream environments that formed between and below the dissected remnants of older fans. These surfaces appear to have been at least partly shaped by glacial Lake Missoula, which reached an elevation of 4,200 feet and covered the Bitterroot Valley near the refuge 15,000–20,000 years B.P. during the last glacial advance (Weber 1972).

The Bitterroot River has an inherently unstable hydraulic configuration and high channel instability, particularly between the towns of Hamilton and Stevensville (Cartier 1984, Gaeuman 1997). The river reach immediately upstream from the refuge has a complex pattern that is characterized by numerous braided channels that spread over a wide area of the valley bottom. The zone of non-vegetated gravels associated with this main braided channel system has widened and straightened since 1937 (Gaeuman 1997). In addition to this widening, severe bank erosion is common, but numerous cutoff chutes counteract some lateral bend displacement. Together, active river movements

and a braided river channel pattern create low riverbanks and natural levees that encourage chutes and other avenues of river overflow. A complex network of minor channels occurs in the valley floor including the floodplain lands on the refuge (figure 10). These minor channels appear to flow from ground water discharge, which promotes erosion at slope bases and headwater retreat of small channel head cuts on the floodplain. Channel fragmentation appears to be controlled by irregularities in the respective elevation gradients of the valley.

About 10–15 miles north of Stevensville, the Bitterroot River channel is more confined, compared to its highly braided form farther south. Despite limited changes in river shape north of Stevensville, the river stretch along the refuge has maintained a highly dynamic, unstable channel form due to its geological, topographic, and hydraulic position. The historical floodplain at the refuge was characterized by the following: (1) multiple abandoned channels (for example, Barn and Francois Sloughs) that were connected with the main river channel during high-flow events; (2) small within-floodplain channels (for example, Rogmans and Swamp Creeks) that received water from ground water discharge and occasional overbank backwater flooding during high-flow events; (3) entry of two mountain- or terrace-derived major tributaries to the Bitterroot River (for example, North Burnt Fork Creek and Three Mile Creek); (4) slightly higher elevation inter-drainage point bars, natural levees, and terraces; and (5) alluvial fans (figure 7).

SOILS

Nearly 25 soil types or groups currently identified by the U.S. Department of Agriculture Soil Survey Geographic Databases are present on or next to the Lee Metcalf Refuge. The most extensive soils are Riverrun-Curlew-Gash complex, Ambrose creek sandy loams, and Riverside-Tiechute-Curlew complexes. Current soil maps of the refuge are constrained by numerous water impoundments where no soil type is identified and each impoundment area is simply identified as water. Consequently, soil surveys conducted before major floodplain developments and impoundment construction are more useful for understanding soil types. These soil surveys can also be used to determine the historical distribution of plant communities.

The combination of soils on the refuge is complex and highly interspersed, and it reflects the numerous channel migration events across the floodplain. It also reflects the introduction of mixed-erosion sediments from surrounding Quaternary and Tertiary terraces and alluvial deposition of Bitterroot Valley parent materials. Most soils on the refuge are shallow, with thin layers of silts and clays overlying deeper sands and gravels. In many places sandy outcrops occur, especially near the Bitterroot River.

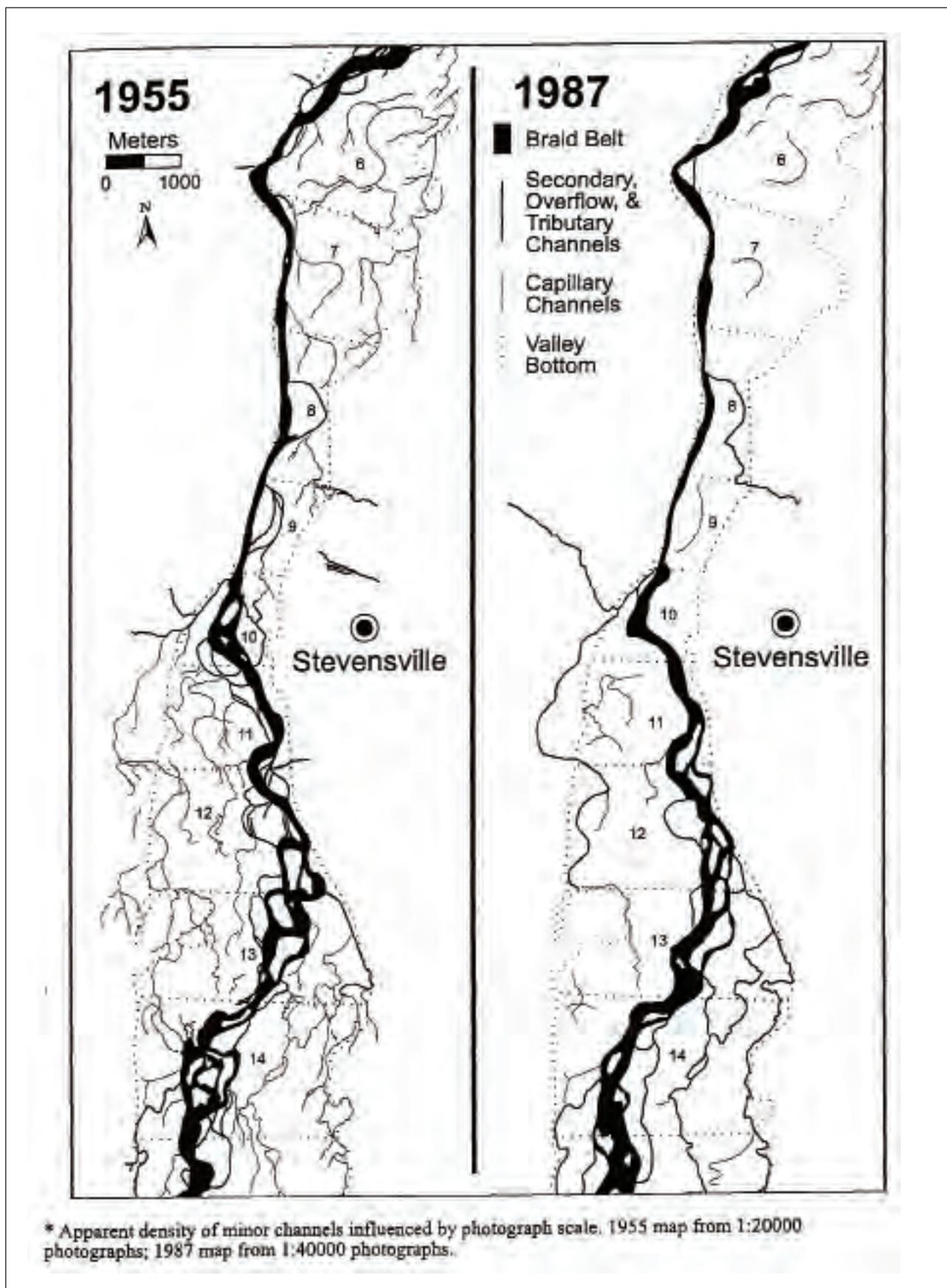


Figure 10. Network of minor channels occurring in the valley floor on Lee Metcalf National Wildlife Refuge, Montana (Heitmeyer et al. 2010).

TOPOGRAPHY AND ELEVATION

Elevations on the Lee Metcalf Refuge range from about 3,230 feet on its north end to about 3,260 feet on its south end at the river (figure 11). The topographic variation within the refuge is related to the historical channel migrations of the Bitterroot River and its tributaries, scouring and natural levee deposition along minor floodplain channels, and alluvial deposition. A large southeast portion of the refuge contains higher, more uniform elevations while north and west portions of the refuge have lower, more diverse elevations. Alluvial fans are present in many locations along the Qafy geomorphic surfaces on the east side of the refuge. A larger tributary fan is present where North Burnt Fort Creek enters the Bitterroot River floodplain; this fan is much larger than the alluvial fans along the floodplain margin that grade into the Sapphire Mountains.

WATER RIGHTS

The refuge has a complex system of irrigation ditches, springs, creeks, impoundments, and water control structures for moving water within the refuge to fill the various impoundments and to irrigate upland fields. In 1982, the refuge submitted 24 water right claims in response to State Senate Bill 76, which mandated adjudication of pre-1973 State water rights. These 24 pre-1973 claims total 31,297.88 acre-feet per year. There is also one post-1973 storage permit (300 acre-feet per year) and two domestic well permits (11.5 acre-feet per year) that increase the total refuge-owned water rights to 31,609.38 acre-feet per year (table 4). Most of these rights are supplemental, meaning the water sources are commingled to supply the refuge needs for optimum operation. In addition, the refuge receives up to 2,600 acre-feet per year (average diversion rate of 8.57 cubic feet per second) from the Supply Ditch Association to augment refuge water rights. This water flows through three lateral irrigation ditches and costs approximately \$3,600 annually; however, the refuge does not receive this water at a rate of 8.57 cfs for a variety of reasons including the lack of ditch capacity and side diversions. Post-1973 claimed, permitted water rights total 34,209.38 acre-feet per year.

In 2008, the Department of Natural Resources and Conservation of the State of Montana began examining water right claims for the refuge. In this process, a claims examiner reviews various elements to determine the validity and necessity of each claim. A preliminary decree is anticipated to be issued by the water courts in the next few years. After the objection process is completed and the water court is satisfied, the claim representing prior use and a final decree will be issued.

Water is diverted on the refuge to store approximately 2,079 acre-feet of water on 795 acres of wetland impoundments. Water is also used for grassland

units on approximately 205 acres. The main season of water use is from mid-March until early December. This varies with water conditions as determined by annual precipitation, snowmelt, and availability of water from the Supply Ditch. Adequate water is important to provide spring and fall migration stopover habitat for migratory birds and for irrigation of habitat restoration sites within upland fields during the summer. During the winter, most impoundments are kept full to provide water for resident species such as bass, aquatic invertebrates, and wintering waterfowl.

HYDROGEOMORPHIC CHANGES

The Bitterroot River stretch at the Lee Metcalf Refuge lies near the geomorphic threshold between a highly braided river channel pattern from Hamilton to Stevensville and a straight or sinuous channel pattern immediately downstream (figure 10). Consequently, the river channel pattern for the area is changing and highly sensitive to perturbation (for example, inputs of sediment, changes to shading or discharge) (Gaeuman 1997). The combination of irrigation development and land use changes, mainly in the 1900s, significantly altered hydrology and river channel morphology and movement in the Bitterroot Valley and its floodplains and facilitated degradation and loss of wetlands in this ecosystem (for example, Kudray and Schemm 2008). The extensive irrigation network of the Bitterroot Irrigation District led to construction of reservoirs, ditches, water diversion structures, and modified natural drainage routes. Stream channel networks, common in the Bitterroot Valley near the refuge, were altered by culvert and bridge crossings, railroad levees and beds, and extensive channelization of tributaries. Many stream channels, including sections of the Bitterroot River, were lined with riprap rock and car bodies to slow stream migration and in-channel bank erosion (figure 12). In addition to local physical disruptions to topography and hydraulics, the entire fluvial system of the Bitterroot River has been altered by historical land use changes (see section 3.4, “Cultural Resources”). The valleys and lower hill slopes have been grazed and farmed, while the upper valleys and mountains have been partly deforested. Overgrazing was common on many valley terraces and, when coupled with deforestation in neighboring mountains and slope areas, led to erosion and increased sediment loading in the Bitterroot River (Briar and Dutton 2000). Subsequently, extensive sedimentation has occurred in drainages and floodplain depressions on the refuge (USFWS 1988–93).

The channel morphology and discharge of the Bitterroot River has also been affected by land and water use in the valley (Gaeuman 1997). From 1936 to 1972, the Bitterroot River underwent significant adjustments in sinuosity and braided character causing a nearly 4-percent reduction in channel length between Darby

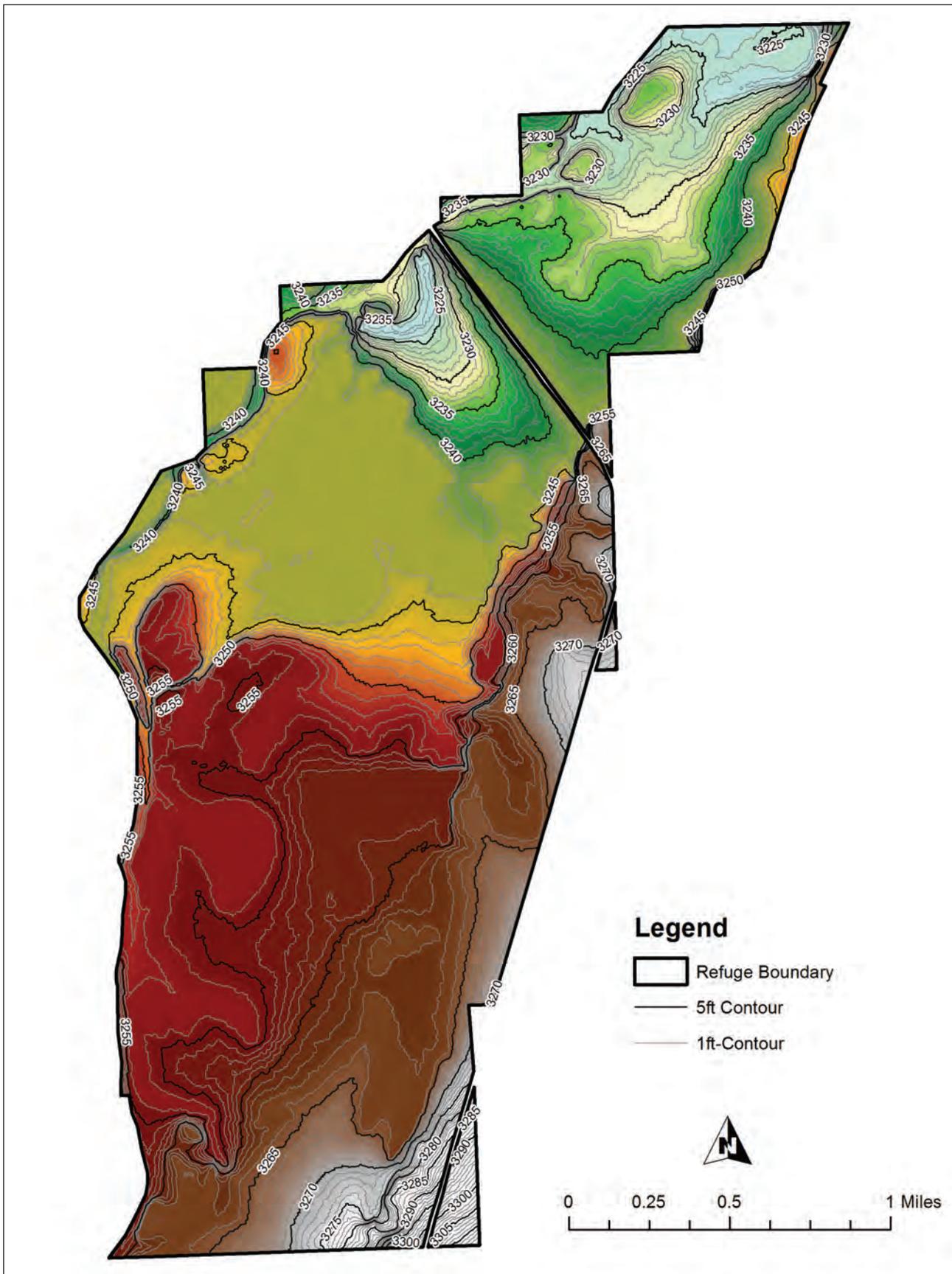


Figure 11. Map of Lee Metcalf National Wildlife Refuge, Montana, showing 1-foot contour intervals (Heitmeyer et al. 2010).

Table 4. Water rights summary for Lee Metcalf National Wildlife Refuge, Montana.

<i>Water right number</i>	<i>Priority date</i>	<i>Volume rate (cubic feet per second)</i>	<i>Volume (acre-feet per year)</i>	<i>Irrigated acres</i>	<i>Source</i>
76H-W-142486	04/05/1882	3.57	1,060	1,837	North Burnt Fork Creek
76H-W-188239	06/10/1882	5	560	1,929	Rogmans Creek (also known as Spring Creek)
76H-W-142487	10/01/1882	2.5	742.5	1,837	North Burnt Fork Creek
76H-W-142482	06/15/1903	10	742.6	2,188	South Drain
76H-W-188233	06/15/1905	1.86	1,344	1,536	Unnamed tributary of Bitterroot River
76H-W-142483	05/15/1930	1	49	14	Three Mile Creek
76H-W-188235	07/02/1931	1.28	470	51	Middle Drain
76H-W-188236	05/07/1938	8	3,008	1,038	Rogmans Creek
76H-W-188231	08/15/1941	10	535.5	1,866	Swamp Creek
76H-W-142493	01/29/1947	10	2,162	1,544	Bitterroot River
76H-W-188238	11/04/1950	25	980	1,929	Rogmans Creek
76H-W-142492	04/01/1952	0.9	212	1,029	Unnamed tributary of Spring Creek
76H-W-142491	05/15/1953	5	301	1,619	Unnamed tributary of Bitterroot River
76H-W-142489	11/13/1957	1.8	1,306	2,188	Unnamed tributary of Spring Creek
76H-W-142484	07/13/1960	1	49	None	Three Mile Creek
76H-W-142485	12/10/1963	2	1,120	209	Three Mile Creek
76H-W-188237	12/10/1963	20	6,317	1,929	Rogmans Creek
76H-W-188232	12/10/1963	0.25	181.5	720	Unnamed tributary of Spring Creek
76H-W-142490	12/10/1963	2	629.8	67	Drain #2 (also known as water and seepage; also known unnamed tributary of Spring Creek)
76H-W-188234	12/10/1963	1.86	1,344	1,536	Middle Drain (also known as water and seepage; also known unnamed tributary of Spring Creek)
76H-W-184100	12/10/1963	5	3,629	1,288	South Drain (also known as water and seepage; also known unnamed tributary of Spring Creek)
76H-W-142488	12/10/1963	2	1,445	1,837	Drain #1 (also known as water and seepage; also known unnamed tributary of Bitterroot River)
76H-W-188240	12/10/1963	1.25	32	1,288	Spring (unnamed tributary to Bitterroot River)
76H-W-188230	12/10/1963	5	3,078	1,866	Swamp Creek
76H-81434	02/02/1968	0.02 ¹	1.5	None ²	Ground water
76H-W-10850	12/30/1976	0.03 ³	10	None ²	Ground water
069642-S76H	10/14/1988	25	300	None ⁴	Spring Creek

¹ Equals well pumping capacity of 12 gallons per minute.² Domestic use.³ Equals well pumping capacity of 15 gallons per minute.⁴ Post-1973 permit for Otter Pond.

Source: USFWS, Region 6 Water Resources Division 2011.

and Missoula (Cartier 1984). Other data suggest that in the last decade, increased instability, channel migration, and overall widening of the river's braided area from Hamilton to Stevensville has occurred compared to other reaches of the Bitterroot River both above and below (Gaeuman 1997). This instability has caused rapid erosion of riverbanks on the refuge (figure 13) and increased physical dynamics of sediment and waterflow that facilitate rapid lateral channel migration across the refuge floodplain. In contrast to the highly active river migration physics from Hamilton to Stevensville, substantial narrowing of the Bitterroot River

occurred near Stevensville and the refuge lands after 1937 in part because of artificial control structures. Part of the river has been channelized immediately upstream of riprap bank stabilization structures near the railroad embankment on the refuge. This artificial narrowing of the Bitterroot River to control river migration and bank erosion has actually heightened river migration tendencies immediately upstream of structures and has the potential to carve new channels across the refuge floodplain.

Aerial photograph maps of a 2.5-mile stretch of the Bitterroot River on the north end of the refuge from



Bob Danley/USFWS

Figure 12. Car bodies along the Bitterroot River on Lee Metcalf National Wildlife Refuge, Montana, that were intended for erosion control before refuge establishment.



Bob Danley/USFWS

Figure 13. Bank and levee erosion along the Bitterroot River on the west side of Lee Metcalf National Wildlife Refuge, Montana (Heitmeyer et al. 2010).

1937 to 2009 show the highly unstable channel location of the river (figure 14). Three key points (labeled A, B, and C on figure 14) of river migration are apparent through the time-series of photographs, and typical movements of the outer riverbanks average about 8 feet per year. During more active periods of river channel bank migration, the rate of erosion is greater than 32 feet per year. The 1955 photograph reveals that the river migrated significantly to the south and was deemed a threat to the existing railroad bed and trestle. Subsequently, actions were taken by the railroad company to stop river migration by placing car bodies (figure 12) along the riverbank to act as riprap and cut off the river, which created an oxbow that is still present. The most active area of river migration in 2009–2010 is at point C. Between 2004 and 2009, the river migrated about 197 feet east, or about 39 feet per year. If this rate of river migration continues, then the river may reach the refuge's main road in about 15 years and effectively remove about 10.5 acres of current floodplain land.

The Bitterroot River Irrigation District's Main Supply Canal continues to transport water to most of the eastern benches in the Bitterroot Valley, including those next to the refuge. This canal facilitates a net transfer of about 75,000 acre-feet per year of water from the west side of the valley to the eastern benches and terraces. During summer, irrigation withdrawals significantly reduce flow in the Bitterroot River and some of its tributaries. Part of the diverted flow eventually drains back into the river system; this irrigation return flow is about 280,000 acre-feet per year in normal precipitation years. This includes well water and other canals used for irrigation. Average discharge of the Bitterroot River near Florence is 1,540,000 acre-feet per year, and at this point there is about a 13 percent current loss of discharge from irrigation use, other consumptive uses, and evapotranspiration. More than 10,000 wells are now in the valley, and the extraction of water from these wells, coupled with irrigation diversion, may be affecting ground water levels, recharge to floodplain wetlands, ground and surface water quality, and the connections of branches (anastomosis) of the Bitterroot River (Briar and Dutton 2000).

AIR QUALITY

Air quality is a global concern. The U.S. Environmental Protection Agency has lead responsibility for the quality of air in the United States; through the 1990 Clean Air Act, the agency sets limits on the amount of pollutants that can be discharged into the air. More than 170 million tons of pollution are emitted annually into the air within the United States, through either stationary sources (such as industrial and power plants) or mobile sources (such as automobiles, airplanes, trucks, buses, and trains). There are

also natural sources of air pollution such as fires, dust storms, volcanic activity, and other processes. The U.S. Environmental Protection Agency has identified six principal pollutants that are the focus of its national regulatory program: carbon monoxide, lead, nitrogen dioxide, ozone, particulate matter, and sulfur dioxide.

Air quality problems in Montana are usually related to urban areas and narrow mountain river valleys that are prone to temperature inversions. These temperature inversions cause chemical and particulate matter to become trapped in the air. (Particulate matter is tiny liquid or solid particles in the air that can be breathed in through the lungs, with the smaller particulates being more detrimental than larger particles.) These air pollutants have the greatest adverse effect on Montana's air quality.

Air quality in the Bitterroot Valley and Ravalli County is classified as either "attainment" or "unclassifiable-expected attainment" with respect to the National and Montana Ambient Air Quality Standards for all regulated air pollutants. The primary pollutant of concern in the Bitterroot Valley is particulate matter less than 2.5 microns in size (PM_{2.5}). Ambient PM_{2.5} levels have been measured at several locations in the Bitterroot Valley over the past several years and continue to be measured in the community of Hamilton, approximately 20 miles south of the refuge. Smoke from wood burning appliances (primarily residential heaters and woodstoves), forestry and agricultural prescribed burning practices, and forest fires occasionally result in elevated PM_{2.5} levels in the Bitterroot Valley. The Montana Department of Environmental Quality conducts an open burning smoke management program to mitigate impacts from forestry and agricultural burning. Nevertheless, Missoula experienced 16 days of Stage I Air Alerts in 2003. The Montana Department of Environmental Quality evaluates monitored concentrations of PM_{2.5} during the winter months to address elevated PM_{2.5} levels primarily resulting from wood burning appliance emissions during periods of poor atmospheric dispersion (Hoby Rash, Monitoring Section Supervisor, Ambient Air Monitoring, Montana Department of Environmental Quality; email; September 27, 2010).

3.2 Biological Resources

This section describes the biological resources that may be affected by CCP implementation. It begins with a description of the refuge's historical land cover and vegetation communities, and it discusses changes to the refuge since its establishment. Following this background, the current vegetative habitat type descriptions (upland, riparian, and wetland) and the associated birds, mammals, amphibians, reptiles, and

fishes are described. The remainder of this section describes the invasive species, wildlife diseases, and contaminants found on the refuge.

Unless otherwise noted, the information in this section is from unpublished Service data; a hydrogeomorphic (HGM) report entitled “An Evaluation of Ecosystem Restoration and Management Options for Lee Metcalf National Wildlife Refuge,” developed by Greenbrier Wetland Services (Heitmeyer et al. 2010); or from another habitat analysis entitled “Lee Metcalf National Wildlife Refuge 2009 Assessment of Upland Units” prepared by Aeroscene Logic (Graham 2009). These data and reports are available at the refuge headquarters.

LAND COVER AND VEGETATION COMMUNITIES

The Bitterroot Valley is composed of the intermountain and foothill grassland ecotype cut and formed by the meandering Bitterroot River that creates core riparian zones and wetland areas. This ecotype harbors more wildlife communities than any other in Montana (MFWP 2005). The relatively low precipitation in the Bitterroot Valley prohibits the establishment of expansive areas of densely wooded or herbaceous wetland vegetation communities. Consequently, the distribution of woody or wetland-type species is restricted to areas of greater soil moisture—primarily sites next to the Bitterroot River and in floodplain drainages and depressions (Heitmeyer et al. 2010).

Historically, vegetation in the Bitterroot River floodplain on the Lee Metcalf Refuge included seven distinct habitat and community types: (1) riverfront-type forest, (2) floodplain gallery-type forest, (3) persistent emergent wetland, (4) wet meadow herbaceous, (5) floodplain and terrace grassland, (6) saline

grassland, and (7) grassland-sagebrush. Figure 15 is a composite model of potential historical vegetation communities present on the refuge before significant alteration and development beginning in the late 1800s; community identification was made on the basis of HGM attributes (table 5).

The Bitterroot River floodplain at the refuge historically supported a wide diversity of vertebrate and invertebrate animal species associated with the interspersed riparian woodlands, floodplain wetland, and grassland habitats (appendix G). Resources used by animal species were seasonally dynamic and also annually variable depending on long-term climate and riverflow and flooding patterns. In the refuge region, most bird species exploited seasonal resources during migration and in the summer, but a few species overwintered in the area. Many waterbirds likely stayed in the Bitterroot Valley during wet summers to breed when floodplain wetlands had more extensive and prolonged water regimes. In contrast, limited numbers of species and individuals probably bred in the valley during dry years. In the years when wet springs combined with carryover water in the fall, larger numbers of waterbirds would stopover in the valley during fall migration. In average or dry years, however, little wetland habitat would have been available in fall except in historical river channels. Cold winter temperatures freeze most wetlands in the floodplain, but the river and a few springs remain open throughout winter in most years and provided sanctuary, loafing, and some foraging resources for some species. Amphibian and reptile annual emergence and life cycle events coincided with spring thaw and flooding and the availability of key arthropod and other prey species. Larger mammals moved in and out of the floodplain

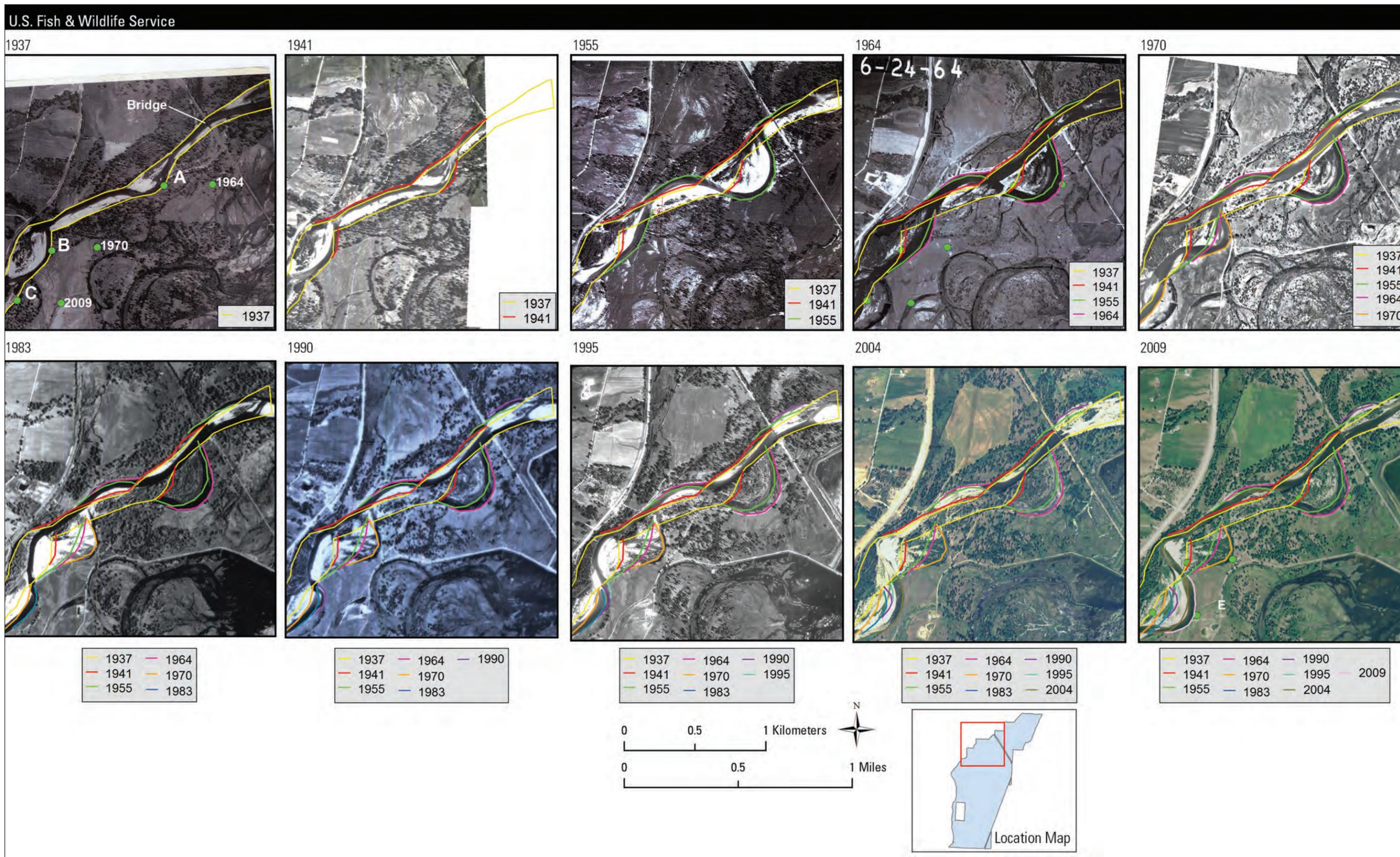
Table 5. Hydrogeomorphic matrix of historical distribution of vegetation communities and habitat types on Lee Metcalf National Wildlife Refuge, Montana.

<i>Habitat type</i>	<i>Geomorphic surface</i> ¹	<i>Soil type</i>	<i>Flood frequency</i> ²
Riverfront forest	Qal, Qaty	Riverside, Riverwash, Chamokane gravelly-sand, sand, fine sand-loam	1YR-I
Gallery forest	Qal	Chamokane loam and loamy sand	2-5YR
Robust emergent-shrub or scrub	Qal	Slocum poorly drained loam	1YR-P
Wet meadow	Qal	Slocum deep loams	2-5YR
Grassland	Qal, Qafy	Corvallis, Hamilton, Grantsdale silt loam	>5YR
Grassland-saline	Qal	Corvallis saline silt loam	>5YR
Grassland-sage	Qafy	Lone Rock mixed erosional alluvial fan	>10YR

¹ Qal = Quaternary alluvial deposits, Qafy = Quaternary younger alluvial fan and outwash terrace complex, Qaty = late Riverside and Hamilton terraces.

² 1YR-I = annually flooded for intermittent periods, primarily during high water periods of the Bitterroot River; 2-5YR = surface inundation at a 2- to 5-year recurrence interval; 1YR-P = annually flooded primarily for most of the year; >5YR = surface inundation at a greater than 5-year recurrence interval; >10YR = surface inundation rare except for lower elevations during extreme flood events.

Source: Heitmeyer et al. 2010.



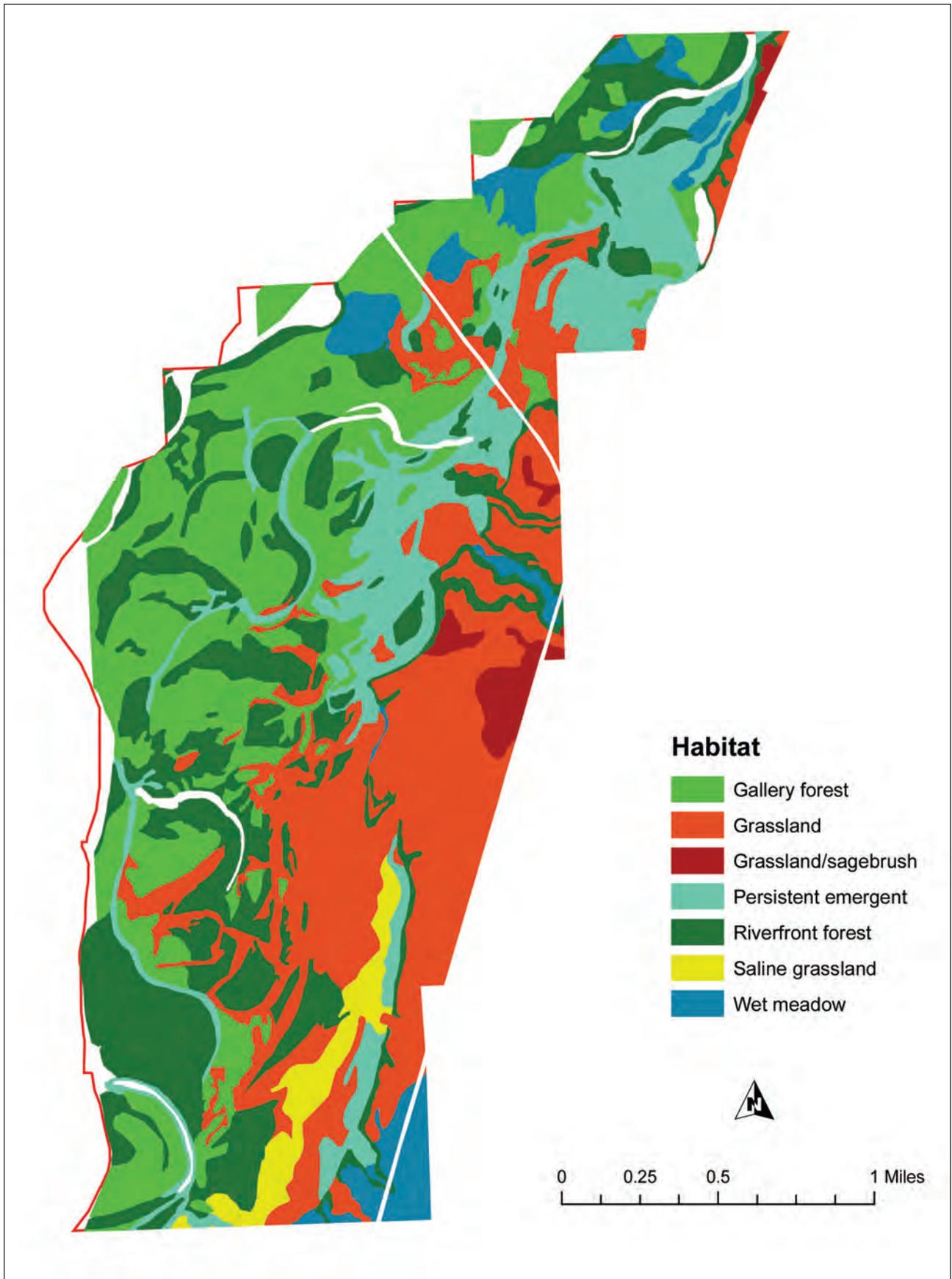


Figure 15. Hydrogeomorphic-derived map of potential vegetation communities on Lee Metcalf National Wildlife Refuge, Montana, before European settlement in the mid-1800s.

to forage and take advantage of cover during winter and in other seasons when nutritious grassland forage and prey were present.

Figure 16 shows the 2,800 acres of habitat and vegetation communities that exist today. Historical vegetation communities have changed over time due to past and present land uses, including agriculture and the creation of wetland impoundments. The existing habitat and community types present today are shown in figure 16 and described below in three different vegetation communities:

- uplands (grassland, shrubland, and a combination of both)
- riparian (river channel, woodland, and natural wetlands)
- wetland impoundments (open water and robust emergent)

Migratory birds are especially abundant on the refuge during fall and spring migration. More than 260 species of birds are present in the Bitterroot River watershed, and 242 species have been documented on the refuge (USFWS, unpublished refuge files), including grebes, bitterns, herons, egrets, waterfowl, raptors, shorebirds, flycatchers, swallows, chickadees, warblers, wrens, sparrows, and blackbirds. Additionally, many bird species nest in forest, wetland, and grassland areas; the most common species are ducks, warblers, flycatchers, swallows, blackbirds, sparrows, wading birds, and raptors.

More than 40 mammal species also are present in the refuge. Some of the more common species include white-tailed deer, yellow-bellied marmot, yellow-pine chipmunk, northern pocket gopher, meadow vole, porcupine, striped skunk, muskrat, American beaver, mink, and raccoon. At least eight species of reptiles and amphibians commonly use the refuge including three snakes, one turtle, two frogs, one toad, and one salamander. Several species of native fish historically were present in the Bitterroot River, and many moved into floodplain drainages, oxbows, and wetlands during high flow periods. Native species include mountain whitefish, northern pikeminnow, large scale sucker, longnose sucker, and redbreast shiner. Presently several nonnative fish are also present in refuge impoundments, including, but not limited to, largemouth bass, yellow perch, and brown and rainbow trout.

HABITAT MODIFICATIONS SINCE ESTABLISHMENT

Following establishment, the refuge began physical developments on floodplain lands in the mid-1960s, with the purpose of creating wetland habitat for waterfowl and other waterbirds. By the late 1980s, fourteen impoundments (or ponds) encompassing more than 1,000 acres had been created (figure 17).

The following list encompasses major wetland management and development activities on refuge lands from 1963 through the early 1990s, according to refuge annual narratives (USFWS 1988–93) and as summarized in Heitmeyer et al. (2010):

- Lee Metcalf National Wildlife Refuge was authorized by Migratory Bird Conservation Commission on December 10, 1963.
- The first parcel was purchased in February 1964.
- In the mid-1960s, evidence revealed that the west Barn Slough area, a pre-refuge diversion structure, was sending water through the McPherson and Nickerson Creeks (now Ditches).
- Ponds 1–4 were completed in the summer of 1966 (refuge files). By 1970, Pond 5 was impounded by forming the existing county road into a levee. Ponds 6, 8, and 10 were constructed between 1967 and 1970, judging from photos from this period.
- In the mid-1960s, no dikes or structures existed on Francois Slough and North Burnt Fork Creek was unimpeded on the refuge. By 1970, three water control structures were constructed on these waterways, and they remain in place today.
- Ponds 11–13 were built between 1970 and 1973, as refuge photos show the north ponds in the flood of 1974. Pond E, which was a small impoundment on Rogmans Creek near Pond 11, was likely built around the same time. Pond E was expanded by the creation of Otter Pond in 1989.
- In the early 1980s, the refuge focused on Three Mile Creek sedimentation issues. This creek flowed into Pond 11 and out through Pond 13 to the river. Two supply ditches were cleaned out in 1985. A bypass channel with three sediment ponds was constructed in 1984 to lead the creek directly to the river. These ponds filled quickly and were cleaned out in 1987.
- By July 1988, the Pair Ponds were established as part of a rehabilitation project by the Montana Power Company. Pair Ponds comprise 10 acres and are up to 3 feet deep in some areas.
- Otter Pond was built in 1989 as a solution to the sedimentation of the northern ponds from Three Mile Creek. An 18-inch diameter siphon was constructed to bring water from Pond 10 under Three Mile Creek bypass to supply water to Ponds 11, 12, and 13. This expanded the existing Pond E to about 65 surface acres.
- In the early 1990s, ditch leveling was completed in Swamp Creek and Ponds 1, 3, 4, 11, and 12.

These wetland impoundments were developed using levees to back water up drainages and depressional areas. Because of river channelization, development, and wetland loss, the refuge currently manages more than 20 percent of all palustrine wetlands present in

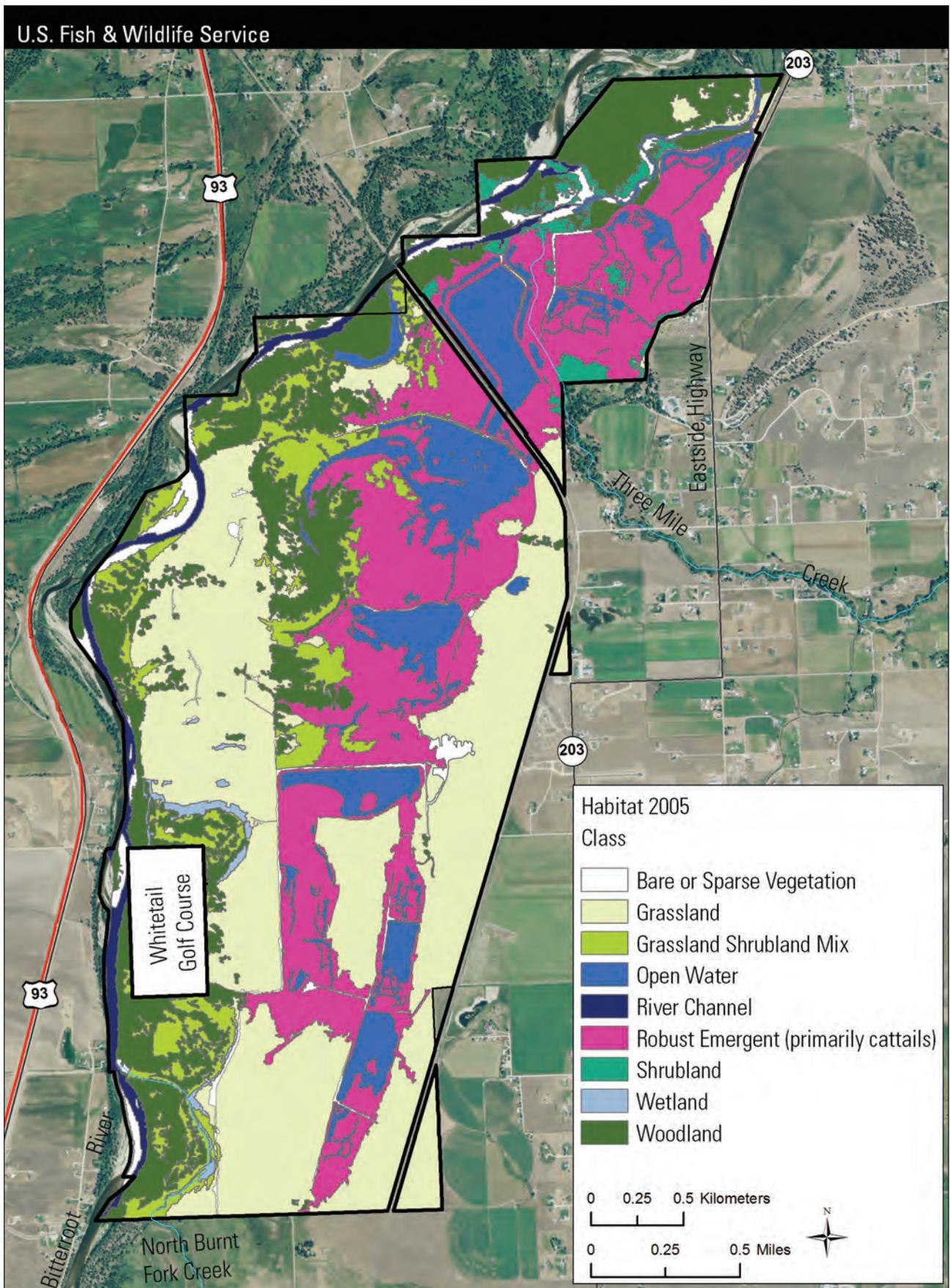


Figure 16. Existing habitat and vegetation communities on Lee Metcalf National Wildlife Refuge, Montana.

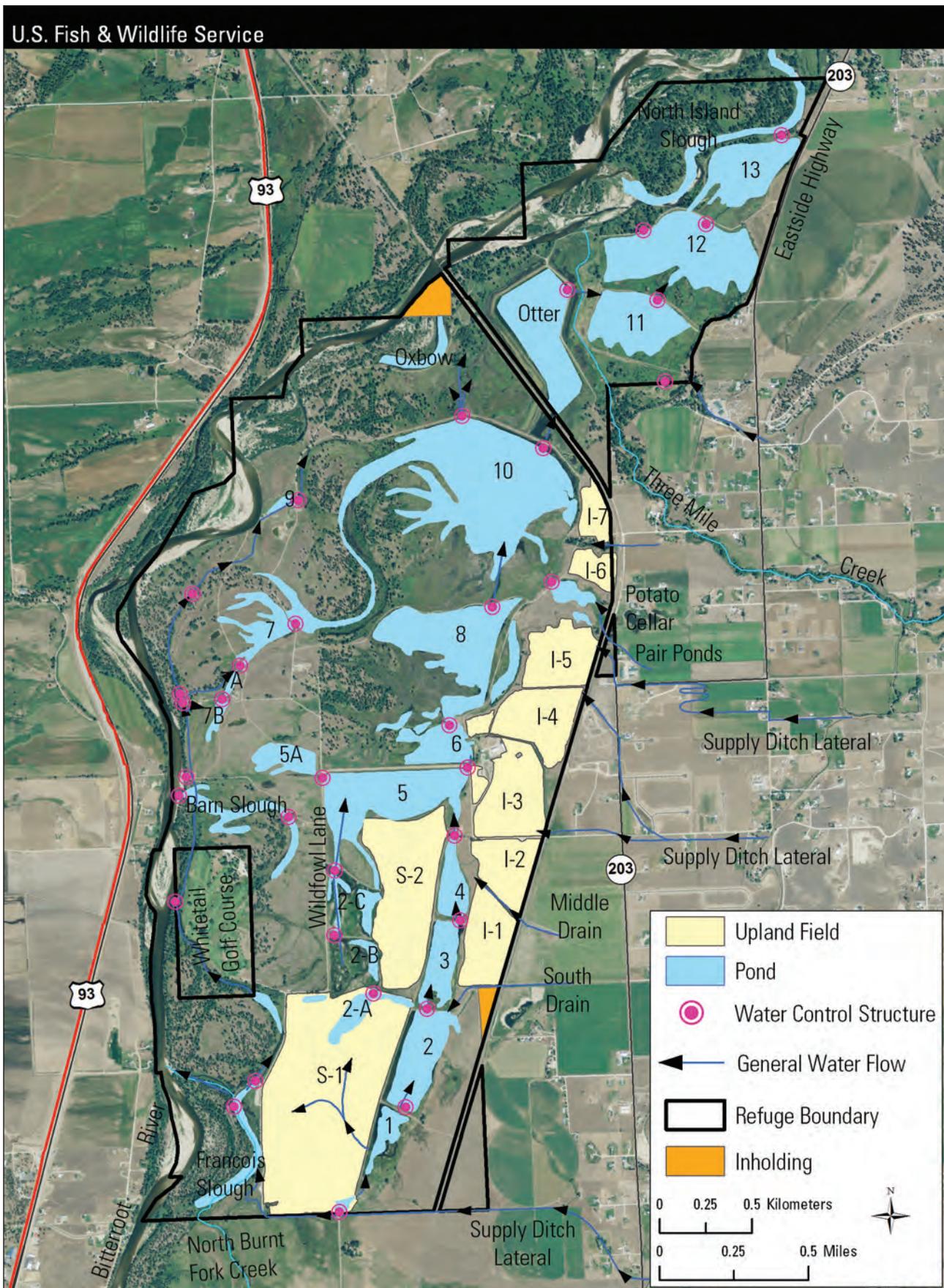


Figure 17. Ponds and upland fields in Lee Metcalf National Wildlife Refuge, Montana.

the Bitterroot Valley (Kudray and Schemm 2008). Water control structures that significantly alter the direction and amount of surface water flow in natural drainages have been constructed on Rogmans Creek, Barn Slough, and Francois Slough/North Burnt Fork Creek. Three Mile Creek used to feed Ponds 11, 12, and 13 but was re-routed because of sedimentation in ponds. Wetland impoundments have been managed by diverting irrigation and tile drain water (that is, excess water drained from agricultural subsurfaces), flows in minor channels and tributaries, springs, and Three Mile Creek water into and through the impoundments.

Water that enters or can be diverted to the refuge comes from multiple points of diversion (PODs). Certain sources, such as the South Lateral Ditch and Middle Lateral Ditch, supply private property in addition to the refuge. Tile drain water also enters the refuge from open tile drains or ditches from surrounding private lands. The refuge receives nutrient-rich water from these drains, and during summer months this water has abundant algal growth. Most water enters managed wetland impoundments from the south end of the refuge and sequentially is routed via gravity flow through Ponds 1–13. However, the variability of water sources often results in variable amounts and timing of available water for individual ponds. For example, water from the South Lateral Ditch can be moved by gravity flow into all refuge ponds, whereas water from Rogmans Creek can only be used for Ponds 2–13. The Spring Creek POD (outlet of Pond 10) flows under the railroad tracks into Otter Pond and is then siphoned under Three Mile Creek to feed Ponds 11, 12, and 13. Currently, Three Mile Creek contains high sediment

loading that, when diverted into impoundments, precipitates out. Three Mile Creek is currently directed via a bypass channel to what is now North Island Slough.

Since refuge establishment, most wetland impoundments have been managed to promote waterfowl production by holding water through summer or year-round and occasionally draining areas for vegetation management using tillage, grazing, and burning (USFWS 1988–93). Otter Pond was stocked with warm-water fish in 1989 to provide both prey for nesting osprey and limited public fishing opportunities. Other wetland developments included construction of a siphon to move water from Otter Pond to Ponds 11, 12, and 13; level-ditching in Swamp Creek and Ponds 1, 3, 4, 11, and 12; pool construction near Potato Cellar Pond; and sediment removal in Three Mile Creek. Ephemeral ponds also resulted from the excavation of gravel pits.

Certain upland areas were converted to warm- or cool-season grasses for dense nesting cover for waterfowl in the early 1990s (figure 18), and two predator-exclusion fences were built around some fields and a levee. These fences were removed in 2010. From the 1960s through the early 1980s, some higher elevation fields on the refuge were used for small grain production.

In 1971, the refuge contracted the placement of riprap material along 1,250 feet of the east bank of the Bitterroot River west of McPherson Ditch (USFWS 1988–93). This riprap was subsequently eroded and moved by high riverflows; by 1984 the riprap was gone, and the bank at this location was moving eastward. Since the mid-1990s, levees built along the Bitterroot River, including the area where the riprap was placed



Bob Danley/USFWS

Figure 18. Field planted as dense nesting cover on Lee Metcalf National Wildlife Refuge, Montana.

in 1971, have eroded and been at least partly breached in places as the Bitterroot River attempts to move laterally (figure 14). Also, the Bitterroot River appears to be moving more discharge through the North Island Slough area immediately north of Otter Pond on the north side of the refuge. These river movements could potentially affect the north Otter Pond levee; cause water movement across other floodplain areas on the refuge; and affect other structures, roads, and the railroad bed.

More than 18 miles of roads are present on the refuge along with six buildings, two trails, two shelters, and an amphitheater. Eight residences and several outbuildings have been removed over time.

CHANGES TO THE VEGETATION COMMUNITIES

Collectively, the many landscape and hydrological changes in the Bitterroot Valley since the presettlement period have dramatically altered the physical nature, hydrology, and vegetation communities of the Lee Metcalf Refuge. Before Euro-American settlement, the relatively dry climate of the valley and the traveling nature of the Bitterroot River created a heterogeneous mix of communities: riverfront and gallery forest next to the Bitterroot River and floodplain drainages, persistent emergent wetland communities along floodplain drainages and fluvial-created depressions, wet meadow habitats, and grassland and sagebrush communities on higher elevation terraces and alluvial fans (figure 15). This community matrix was maintained by:

- periodic overbank flooding of the Bitterroot River that inundated much of the floodplain for relatively short periods in spring;
- regular backwater flooding of the Bitterroot River up tributaries and floodplain secondary channels into floodplain wetland depressions;
- annual spring discharge of water from tributaries, sheet flow across terraces and alluvial fans, and seep and spring discharge from mountain slopes and terraces;
- frequent burning of the grasslands and shrublands (primarily by Native Americans) that may have led to frequent, low-intensity fires in the adjacent ponderosa pine forest (Arno 1980) that, when combined with grazing, recycled nutrients and established germination and regeneration sites for specific plant species.

Each of these primary ecological processes at the refuge has been systemically altered:

- Water diversions, channel constriction, and river channel modification have reduced overbank flooding and restricted floodplain connectivity. Fewer extensive overbank events now occur, but lateral movement and bank erosion of the Bitterroot River have been accelerated in this river stretch.

- The above changes, some of which have occurred upstream of the refuge, have restricted backwater flow from the Bitterroot River into its floodplain and tributaries, and floodplain secondary channels have been ditched, diverted, dammed, and impounded.
- Waterflow across the floodplain has been altered by extraction and diversion of water from drainages before reaching the floodplain. Sheet flow across terraces and alluvial fans is almost completely eliminated, and ground water aquifers and discharge from seeps and springs are changed, usually by reduction from presettlement times.
- Wildfires have been eliminated or greatly reduced.

In addition to changes in the primary ecological processes of the Bitterroot Valley ecosystem on the refuge, the local and regional landforms and vegetation communities have been negatively affected by many alterations to topography, drainages, clearing, conversion to various agricultural crops or livestock forage, extensive grazing by cattle and sheep, sedimentation, expansion of nonnative plants, and recent urban expansion. Vegetation changes are documented in aerial photographs from the 1940s to the present (figures 5 and 10). Collectively, the system now has:

- reduced areas of riverfront and gallery forest;
- fewer wet meadows;
- increased areas of persistent emergent and open-water habitat;
- increased areas of herbaceous wetland vegetation;
- fewer native grassland communities;
- more agricultural and tame grass fields;
- increased presence of invasive and exotic plant species.

Invasions of sulfur cinquefoil, Dalmatian toadflax, leafy spurge, spotted knapweed, Canada and musk thistle, houndstongue, St. Johnswort, and yellow flag iris are present in many areas on the refuge (Kudray and Schemm 2008, Lee Metcalf Refuge unpublished data). Of the 32 currently considered noxious weeds in Montana, 15 species are present on the refuge. (Refer to “Invasive and Noxious Species” under section 2.6 for more detail).

CHANGES TO FISH AND WILDLIFE POPULATIONS

The many ecological and community changes to the Lee Metcalf Refuge ecosystem have corresponding effects on fish and wildlife populations using the area. Unfortunately, few quantitative data are available on animal use of the area during historical times, but correlations of species occurrences with specific habitat types can indicate relative abundance for at least some groups. Apparently, waterbirds and other wetland associated birds increased in number and seasonal occurrence on the refuge at least during the 1970s and

1980s after wetland impoundments were built and managed for more prolonged water regimes during summer and fall. Peak numbers of dabbling and diving ducks, shorebirds, and wading birds on the refuge collectively exceeded 20,000, especially during spring and fall migrations in some years in the 1970s and 1980s; now, they seldom exceed 5,000 (USFWS 1988–93). One contributing factor may be the conversion of grain fields surrounding the refuge to housing developments. Production of ducks on the refuge also reached 10,000 in some years during the 1970s and 1980s, but now annual production typically is less than 1,000 ducklings (unpublished refuge data). Populations of other birds associated with more permanently flooded wetlands including osprey and certain passerines also apparently increased 20–30 years after wetland impoundments were built, but now these populations are declining. For example, osprey production on the refuge reached a peak of forty young in 1988, but it has declined since (figure 19). Concerns about mercury contamination of osprey eggs and young relate to their consumption of warm-water fish present in several ponds and high mercury levels of fish in other refuge impoundments and regional waters. Methylmercury concentrations in fish (mainly largemouth bass) on the refuge average

more than 0.1 milligram per kilogram wet weight for 14- to 22-inch size classes (figure 20).

Some data suggest declines in animals using riparian forest, grassland/sagebrush communities, and floodplain channels and tributaries to the Bitterroot River (Brandt 2000, USFWS unpublished refuge inventories). Reduction of riparian forest habitat has meant less foraging, nesting, loafing, and stopover habitat for many passerine birds, raptors, and native resident species. Additionally, conversion of native grassland to pasture, hayland, and agricultural crops has reduced resources for many birds, mammals, and amphibians. While the Bitterroot River and its floodplain did not historically support a large diversity of native fishes, many species were highly abundant and widely distributed, especially when overbank and back-water floods occurred. Distribution is now restricted to primary channels of the Bitterroot River and impoundments or ponds (Brandt 2000). The federally listed threatened native bull trout is now rarely found in the river (Chris Clancy, fisheries biologist, MFWP, personal communication, October 2011) but historically occurred in North Burnt Fork Creek. The bull trout is now restricted to the upper reaches of this creek on U.S. Forest Service land because of dammed and

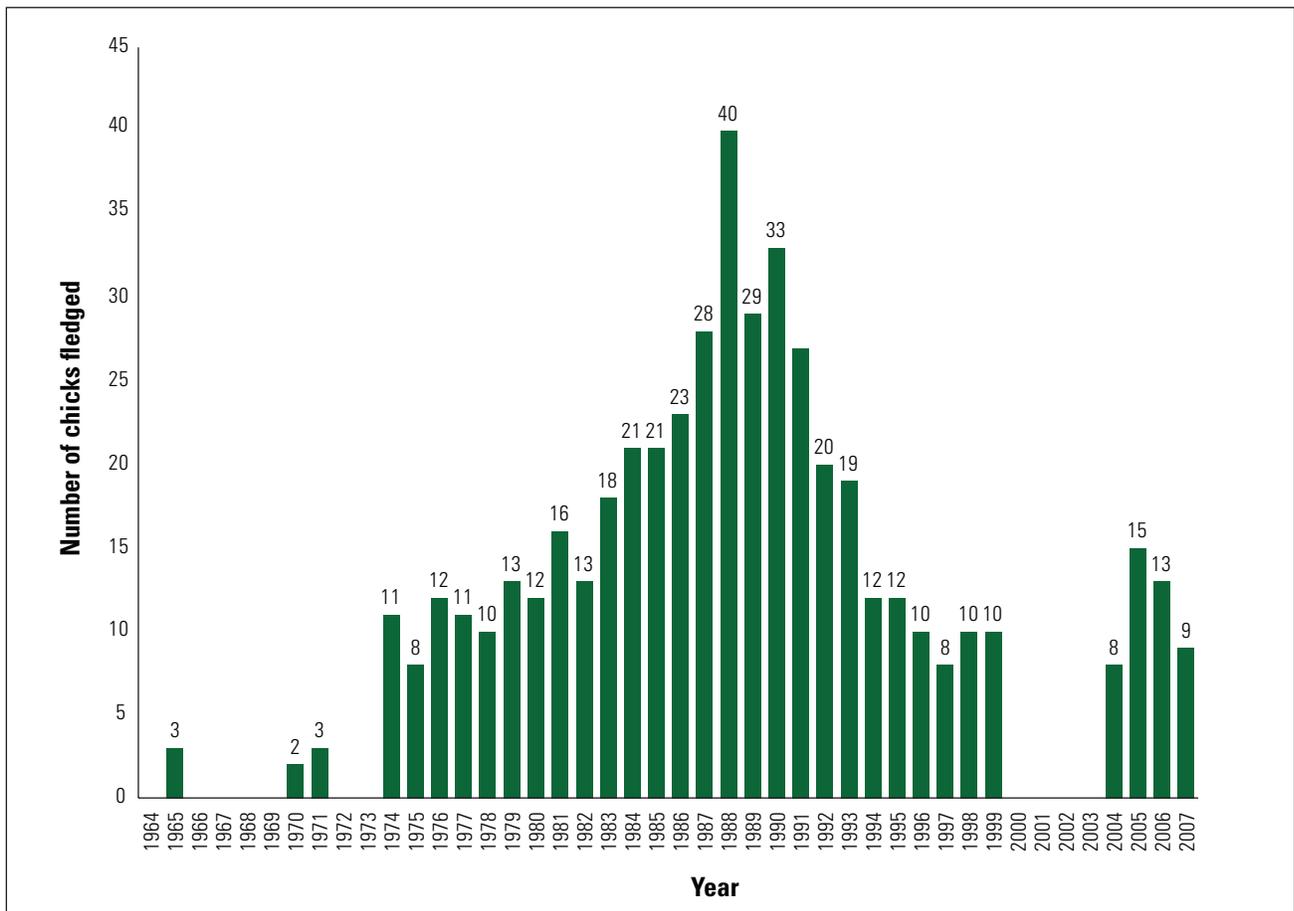


Figure 19. Osprey production on Lee Metcalf National Wildlife Refuge, Montana, 1964–2007.

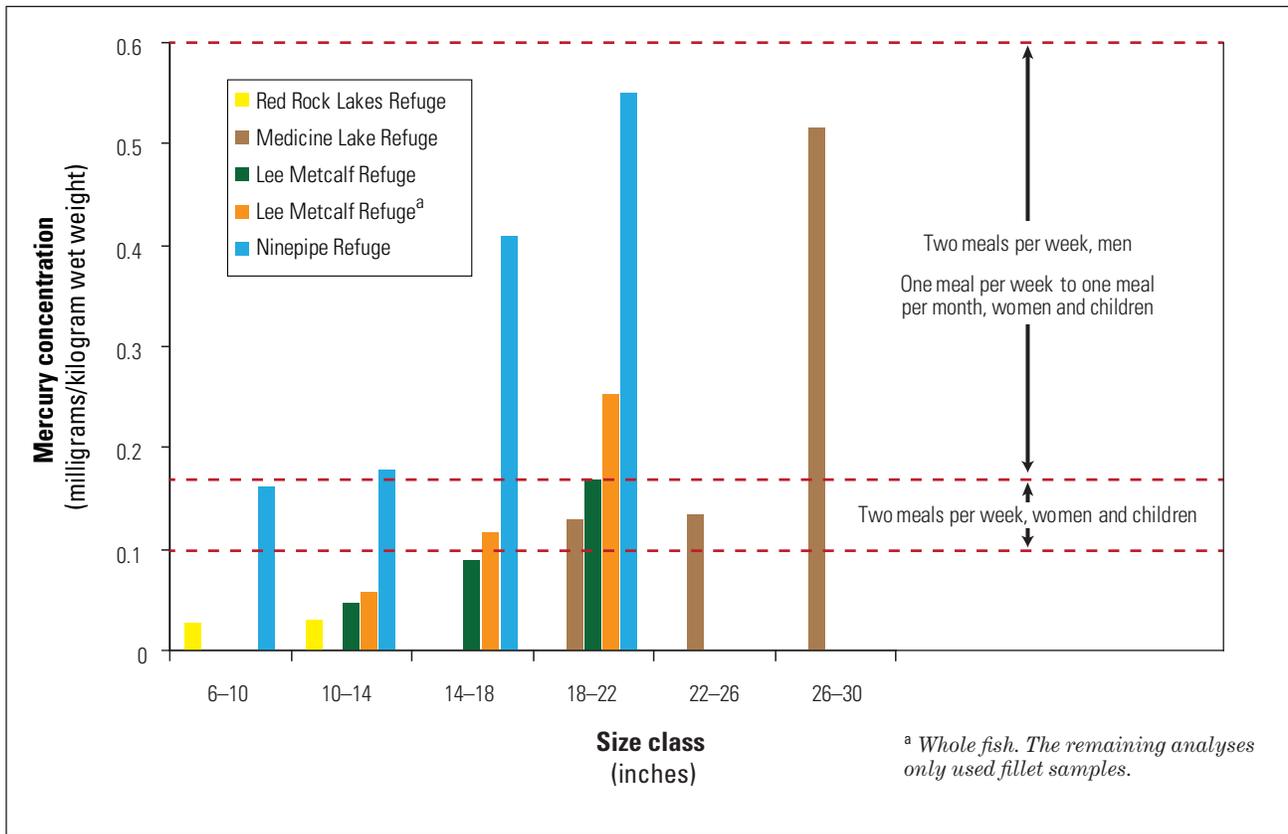


Figure 20. Mercury concentration in fish from Montana national wildlife refuges.

diverted waterflows, sedimentation, and increased water temperatures in the creek and the impounded Francois Slough area on the refuge (Stringer 2009); heavy irrigation modifications upstream of the refuge have also contributed to the decline of this species.

UPLAND HABITAT

The Lee Metcalf Refuge’s 1,186 acres of uplands consist of floodplain and terrace grasslands, combined grasslands and shrublands, and shrublands. These communities are characterized by having grassland and shrubland species that usually occur in non-wetland habitats. Historical documents suggest that most higher elevations within the refuge’s floodplain region were covered with grasses and some scattered shrubs (Eckmann and Harrington 1917, Cappious 1939, Popham 1998). Sites with occasional surface flooding contained more wet meadow or grassland communities interspersed with wetland herbaceous plants (like smartweed), while higher floodplain terraces, slopes, and alluvial fans included both wetland and upland-type grasses (like needle and thread and Junegrass) and shrubs (like rabbit brush and sage). Most floodplain grassland areas have Corvallis, Hamilton, and Grantsdale silt loam and loam soils. Certain small sites in the refuge have saline soils that could have supported more salt-tolerant species. Larger alluvial fans, such as those near Three Mile Creek, are

present on “Qafy” surfaces with Lone Rock mixed erosion soils, and these sites historically had a mixed grassland-sagebrush community (for example, Clary et al. 2005).

The uplands in the valley have historically been disturbed by a variety of land uses since Euro-American settlement in 1841. In 1872 Peter Whaley broke the first sod on what would become the refuge. The primary land use in the valley was cattle grazing and, later, agricultural crops (vegetables and grains). Once the refuge was established, the uplands were still disturbed by grazing, farming, haying, and other land practices. Eventually, these grazed and farmed areas were retired and seeded with nonnative grasses. These practices greatly altered the land, decreasing overall habitat and animal diversity and increasing the presence of invasive plant species (Graham 2009). Most wet meadows have disappeared, and potential saline grasslands are now mostly thistle and wheatgrass. Historical grassy upland terraces no longer contain substantial amounts of native forbs, grass, or shrub species. It is estimated that invasive and other nonnative species now affect more than 70 percent of refuge uplands. Dominant species now found in those areas include, but are not limited to, cheatgrass, smooth brome, common tansy, mustard species, spotted knapweed, and musk and Canada thistle.

Characteristic Wildlife

Some of the more common wildlife species observed in the upland habitat are small mammals like the Columbian ground squirrel, meadow vole, American deer mouse, white-tailed deer, striped skunk, coyote, red fox, and American badger. Common reptile species include the terrestrial garter snake and the common garter snake. Sandhill cranes have also been seen foraging in the upland fields. The abundance of small mammals in this habitat provides feeding opportunities for great blue herons and raptors including red-tailed hawk, rough-legged hawk, American kestrel, and prairie falcon. Upland habitats also provide browsing opportunities for white-tailed deer. As uplands are dominated by invasive and other nonnative species, most upland areas do not provide adequate nesting cover and protection from predators for many species of grassland-dependent migratory birds.

RIPARIAN HABITAT

The Bitterroot Valley is bisected by the Bitterroot River, which originates in the Anaconda-Pintler Wilderness and the Bitterroot Mountains and flows north to empty into the Clark Fork River near Missoula. Alongside the river are riparian habitats consisting of woodlands (riverfront and gallery forest), scattered grasslands, and wetlands.

The Bitterroot River is characterized by constantly shifting stream channels through the riparian habitat. This habitat provides some of the most productive wildlife habitat in the State and is a home to a wide variety of birds, mammals, reptiles, and amphibians (MFWP 2005). According to the Bitterroot Audubon Society, the Lee Metcalf Refuge is a cornerstone of the Bitterroot River Important Bird Area: it is the place where all key valley habitats come together and provide bird species richness (Sherry Ritter, Chair of the Important Bird Area Committee, Bitterroot Audubon Society, Montana; email; August 14, 2010).

The riparian habitat also includes wetlands in low elevation oxbows, depressions, and tributary off-channel areas that contain more permanent water regimes and support water-tolerant wetland vegetation species edged by persistent emergent species such as cattail.

Riparian Woodlands (Riverfront and Gallery Forests)

The riparian woodlands of the refuge consist of 483 acres of riverfront and gallery forest. Each community has different vegetation and succession requirements.

Riverfront forest includes early successional species such as black cottonwood and sandbar willow characterized by very little, if any, understory. Wood's rose, fescue, and wheatgrass species may be present. This vegetation is present on newly deposited and scoured gravelly-sand, sand, and fine sandy-loams near the active channel of the Bitterroot River and in



© Kimi Smith

A bull moose browses on the refuge.

sand outcrop sites next to floodplain drainages. These sites have high water tables for most of the year and are inundated for short periods during high spring riverflows almost annually. Regularly scoured soils provide bare soil sites for seed deposition and subsequent germination and growth of willow and cottonwood (Cooper et al. 1999).

The riverfront forest lies alongside the Bitterroot River, running south to north within the boundary of the refuge. In some places, the riverfront forest occupies both sides of the river; in others, the riverfront forest occupies only the eastern side, primarily due to land clearing on the western side for other uses. Upstream development and riprap efforts along the river have caused increased flow velocity and energy reaching the refuge, resulting in the loss of riverfront forest in several areas in the refuge.

Gallery forest is located mostly on the western portion of the refuge, west of the river as well as east of the river, between the riverfront forest and the wetland impoundments. This habitat is more closely associated with backwater and overbank flooding than with drier upland conditions. Dominated by mature black cottonwood and ponderosa pine, it is found on higher floodplain elevations with layers of Chamokane loams over underlying sands along natural levees and point bar terraces next to minor floodplain tributaries. Indicator tree and shrubs species for gallery forest include ponderosa pine with black cottonwood along with an understory of large woody shrubs such as thin-leaved alder, river hawthorn, red osier dogwood, and Wood's rose. There may also be mixed grasses such as bluebunch and fescue under and between trees and shrubs. Historically, gallery forests were flooded by occasional overbank or high backwater floods from the Bitterroot River and secondary floodplain channels. When flooding did occur, it was for short durations during spring. Fire and grazing by native ungulates probably sustained the savanna nature of these sites and encouraged a mix of grass, shrubs, and overstory trees (Fischer and Bradley 1987).

Riparian Wetlands

The wetland component of the refuge's riparian habitat community is 20 acres of oxbows, sloughs, remnants of former gravel pits and creeks—specifically, Barn Slough, Oxbow, North Island Slough, Francois Slough, North Burnt Fork Creek, and Three Mile Creek. These wetlands are interspersed in the southern portion of the refuge with the exception of Three Mile Creek, Oxbow and North Island Slough, which are in the north. A bypass was constructed in the mid-1980s to channel Three Mile Creek directly to the Bitterroot River to end sediment buildup in the open-water impoundments. Waterflow in some of these sloughs and creeks varies seasonally according to spring rainfall, upstream irrigation use, and the upstream snowpack and the rate at which it melts.

Barn Slough is fed by natural springs; North Island Slough was created by the migration of the Bitterroot River and is now becoming a more established river channel. Oxbow was the river channel in the mid-1950s but was closed at both ends when the river moved back north. North Burnt Fork Creek and Three Mile Creek originate in the Sapphire Mountains and flow westward down the valley slope, ending at the Bitterroot River on the refuge. North Burnt Fork Creek feeds Francois Slough, which then empties into the river. Dominant vegetation in these riparian habitats consists of alder willow, snowberry, horsetail, various sedges, rushes, and reed canarygrass.

Characteristic Wildlife

Riverfront woodlands and wetlands provide important nesting, foraging, and stopover habitat for many birds. These include neotropical songbirds such as least flycatcher, yellow warbler, Vaux's swift, and Lewis's woodpecker, and waterbirds such as common merganser and wood duck. Riverfront forest is also important for nesting and perching sites for large raptors such as bald eagles and osprey. There is at least one known eagle nest on the refuge, and trees and numerous nesting platforms provide desirable nesting sites for osprey. The most common reptiles are garter snakes. Mammals that use the riverfront forest include the northern river otter, mink, white-tailed deer, raccoon, beaver, muskrat, and the yellow-pine chipmunk.

As the gallery forest is found upslope from the riverfront corridor, many of the same bird species found in the riverfront forest—including Lewis's woodpecker, Vaux's swift, and wood duck—are present in the gallery forest, along with the red-naped sapsucker and brown creeper. These last two species rely on the mature trees found in the gallery forest for feeding and nesting. Yellow warbler, least flycatcher, and MacGillivray's warbler feed and nest in the understory of the forest. Some mammals include the red squirrel, raccoon, white-tailed deer, porcupine, yellow-bellied marmot, red fox, and coyote. There are eleven bat



Dave Menke/USFWS

Lewis's woodpecker nests in tree cavities on the refuge.

species found on the refuge (appendix G), all of which depend on the gallery forest for various stages of their life cycles. Of these 11 species, 3 of them are State species of concern including Townsend's big-eared bat, hoary bat, and fringed myotis.

Throughout the riparian woodlands are various wetland types including ephemeral pools, sloughs, and remnants of former gravel pits which provide breeding grounds for amphibians such as the long-toed salamander and the boreal toad, a State species of concern. Documented fish species include both native fish (pike minnow and longnose sucker) and nonnative fish (largemouth bass, pumpkinseed, and brook and brown trout). Native beavers and Columbia spotted frogs and nonnative American bullfrogs also inhabit these wetlands.

The Service designated North Burnt Fork Creek as critical habitat for bull trout in October 2010. Historically, bull trout used North Burnt Fork Creek as a passageway to return to their spawning grounds in the headwaters in the Sapphire Mountains where populations are still viable. This no longer occurs. The refuge installed several structures along the refuge portion of the creek in an effort to create more pond-like habitat for waterfowl and warm-water fish (providing more fishing opportunities in the public area). Off-refuge, along the creek, ditching and irrigation occurred on private land. These actions resulted in a loss of stream habitat and fish passage for the federally listed bull trout (listed as threatened in 1994). Fish occupying the creek still consist of native species including minnows, suckers, and whitefish. Nonnative species such as brown and brook trout and pumpkinseed also use the stream (unpublished refuge files: Fish Trap Data 2009).

WETLAND IMPOUNDMENT HABITAT

Wetland habitat on the refuge, other than that described above, consists of wetland impoundments and their surrounding areas. Wetland impoundments were created throughout the refuge to provide wetland habitat for migratory birds, particularly waterfowl.

Levees were constructed, and water control structures were installed. A number of impoundments were semi-permanently flooded, constituting the largest area of open water in the Bitterroot Valley. The refuge now manages many impoundments for migratory birds by periodic drawdowns to increase their productivity. Water to flood the impoundments is provided by natural springs, tile drains, creeks, and irrigation ditches.

The impoundments have areas of open water with mudflat edges and are surrounded and interspersed with submergent and emergent vegetation. Submergent flowering aquatic vegetation in many areas of the open water includes northern water milfoil, hornwort, and Richardson and Sago pondweed. Emergent vegetation includes, water smartweed, cattail, and various species of rushes and sedges. The combination of these and similar vegetative species is often referred to as persistent/robust emergent habitat, and it provides cover and nesting opportunities for American bitterns, rails, wrens, blackbirds, and waterfowl. However, if left unmanaged, emergent vegetation such as cattail can grow into a monoculture and leave little edge, outcompeting other emergent vegetation and reducing the amount of open water.

Characteristic Wildlife

The wetland impoundments and surrounding emergent vegetation make up 958 acres of the refuge. These impoundments provide stopover habitat for migrant waterbirds including waterfowl species such as mallard; gadwall; northern pintail and shoveler; cinnamon, green-winged, and blue-winged teal; and wood, red-head, and ruddy duck. Other waterbirds documented on these impoundments includes six species of grebe, American white pelican, white-faced ibis, and occasionally a great egret. Both trumpeter and tundra swans stopover at the refuge, and bitterns are sometimes seen hiding amongst the cattail. When extensive mudflats are present, migrant shorebirds such as least sandpiper, semipalmated plover, American avocet, black-necked stilt, dowitcher, and yellowleg are seen feeding in these areas. Double-crested cormorants can usually be found in the north ponds and have historically nested over water in dead trees. Abundant yellow-headed and red-winged blackbirds can be found nesting in the summer among the cattails along with marsh wren, sora, and Virginia rail.

REMAINING REFUGE ACRES

Habitats that do not fall in the above categories include 63 acres of the Bitterroot River channel and 90 acres of bare or sparse vegetation that includes gravel bars, parking lots, roads, and facilities.

INVASIVE SPECIES

Nonnative species are prolific on the refuge, displacing native plants and affecting more than 70 percent of

refuge lands as a result of alterations to topography, drainages, clearing, conversion to various agricultural crops or livestock forage, grazing by cattle and sheep, and sedimentation pre- and post-establishment of the refuge. Many of the species are transported to the refuge as “hitchhikers” on vehicles, pedestrians, and animals. Wildfowl Lane, a county road that bisects the refuge, is used by more than 143,000 visitors annually in vehicles from all over the country. These factors have contributed to the introduction and distribution of invasive species, as have the surrounding development, landscape level invasive species in western Montana, the vulnerable exposed soil on the refuge (from wetland habitat construction and prior agricultural uses), and the locations of the Bitterroot River, the railroad bed, Highway 93, and Eastside Highway.

The State of Montana has 32 plant species on the Montana Noxious Weed List, 15 of which are found on the refuge in various degrees of infestation. During the past several years, new invaders (hoary alyssum, Dalmatian toadflax, and blueweed) have been detected. These species rank as high priority species for early detection and rapid response treatment. Some species, while not considered noxious by the State of Montana, are considered undesirable and problematic by refuge staff; these include musk thistle, cheatgrass, kochia, reed canarygrass, and teasel (table 6).

The refuge has a number of resources to respond to the invasive species problem. The refuge provides office space and other support for one of the Service’s Montana Invasive Species Strike Teams. This team works with refuges throughout the State, including Lee Metcalf Refuge, inventorying and treating new invaders and high priority invasive and nonnative plants. Additionally, a partnership with the Ravalli County Weed District has provided several crew members wholly dedicated to treating more established noxious weeds. An annual volunteer weed-pull event for the public occurs, and youth groups like the Montana Conservation Corps, Youth Conservation Corps, and Selway-Bitterroot Foundation interns have also assisted in refuge treatment efforts. Also, invasive species spread and control is integrated into staff fieldwork.

The main planning tool for treating invasives on the refuge is using integrated pest management (IPM). IPM is a structured and logical approach to managing weeds by using a combination of biological, mechanical, and chemical tools. Past IPM efforts have included mapping, treating, and monitoring invasive species on the refuge. Treatment methods for invasives vary with species, daily weather conditions, plant growth stage, and time of year. Methods used to treat invasives have included herbicide application, prescribed fire, biological controls (including goats, flower and root weevils, and flower and root moths), hand pulling, mowing, and cultivating. Along with prescribed burning and grazing, chemical applications of herbicides

Table 6. Documented invasive and nonnative plant species on Lee Metcalf National Wildlife Refuge, Montana, as of 2010 and the degree of infestation, priority for treatment, and State noxious status.

<i>Common name</i>	<i>Degree of infestation</i>	<i>Area of infestation or number of plants found</i>	<i>Priority for treatment</i>	<i>State noxious status¹ and comments</i>
Tall buttercup	Medium	0.23 acre ²	High	Priority 2A—common in some areas, eliminate or contain
Yellowflag iris	Medium	0.82 acre ²	High	Priority 2A
Blueweed	Low	Two plants found	High	Priority 2A
Hoary alyssum	Low	3.56 acres ²	High	Priority 2A
Canada thistle	High	50 acres ³	Medium	Priority 2B—abundant and widespread, eradication or containment where less abundant
Field bindweed	Low	1 acre	High	Priority 2B
Leafy spurge	Medium	7.51 acres ²	High	Priority 2B
Spotted knapweed	High	6.64 acres ²	Medium	Priority 2B
Dalmatian toadflax	Low	<5 plants	High	Priority 2B
St. Johnswort	Medium	15.2 acres ²	Medium	Priority 2B
Sulfur cinquefoil	Low	0.06 acre ²	High	Priority 2B
Common tansy	High	28.89 acres ^{2,3}	Medium	Priority 2B
Oxeye daisy	Medium	6.43 acres ²	Medium	Priority 2B
Houndstongue	High	48.33 acres ^{2,3}	High	Priority 2B
Yellow toadflax	Medium	1.48 acres ^{2,3}	Medium	Priority 2B
Cheatgrass	High	26.74 acres ^{2,3}	Low	Priority 3—regulated plant with potential to have significant impacts, may not be intentionally spread or sold
Musk thistle	High	70 acres ³	Medium	n/a
Italian bugloss	Medium	2.97 acres ²	High	n/a
Teasel	Low	0.5 acre ³	Medium	n/a
Kochia	High	7 acres ³	Medium	n/a
Reed canarygrass	High	200 acres ³	Low	n/a

¹ Sources: Montana Department of Agriculture 2010, USDA 2010.

² Estimated acreage of infestation (treated and untreated) within areas surveyed based on USFWS, Montana Invasive Species Strike Team 2009; additional infestations may occur within unsurveyed areas.

³ Acreage is estimated.

Additional source: unpublished refuge data.

have significantly aided efforts to control the spread of invasive plant species and possibly the elimination of invasives from specific areas on the refuge. Chemical applications are used on specific species and applied during the optimal plant stage of growth to increase the effectiveness of the application. All chemicals must be approved by the Service for use on refuges, and the application of a specific chemical onsite must undergo a pesticide use proposal evaluation. Approximately 400 acres per year are treated for invasive plants, using chemical applications and mechanical means.

WILDLIFE DISEASES AND CONTAMINANTS

Several wildlife diseases have the potential in the near future to spread to the refuge from western Montana

and neighboring states. Contaminants from surrounding residential development, historical mining activity, and atmospheric deposition also pose a threat.

Wildlife Diseases

Two common avian diseases have been documented near the refuge in very small numbers (less than 30 birds): aspergillosis and salmonellosis. Often fatal, aspergillosis is caused by birds ingesting or inhaling toxic fungi in contaminated feeds. Salmonellosis can also be fatal; it is caused by *Salmonella* bacterium that spreads through (1) the air via bacteria shed from seed kernels or insects, (2) an infected organism's feather dust or feces, or (3) through other contact. While these are the only two diseases documented in this area, there may

be impacts on the refuge in the future from unknown or emerging contaminants or diseases.

Highly pathogenic avian influenza has not yet been documented in North America, but because of the serious health risks to humans and domestic fowl, the Service has entered into an interagency agreement to develop an early detection system should this influenza migrate to the continent. Additionally, in 2006 the refuge completed a “Highly Pathogenic Avian Influenza Disease Contingency Plan.” This plan will be reviewed annually and updated as new information becomes available.

Since 2006, the refuge has collaborated with MFWP to sample for avian influenza. More than 200 samples (obtained through cloacal and pharyngeal swabbing of hunter-killed ducks) were collected. All of these samples tested negative for highly pathogenic avian influenza. Another avian influenza testing effort was led by the University of California, Los Angeles and the Institute for Bird Populations. The goal of this project was to determine the pattern, distribution, and transmission of various strains of avian influenza between migratory and resident species. Neotropical migrants and resident passerines were sampled for avian influenza in 2007 and 2008 at the refuge bird banding station. No highly pathogenic avian influenza was documented in refuge birds.

Chronic wasting disease (CWD) is a transmissible spongiform encephalopathy that is found in deer and elk in North America. Spongiform encephalopathy is a progressive neurodegenerative disorder that produces changes in the brain and causes fatal chronic weight loss. The main theory of a causative agent is the abnormality of a group of proteins called prions. These prions infect the host and cause tissue damage in the brain, resulting in a “sponge-like” appearance. CWD is contagious and can be transmitted directly between animals through nose-to-nose contact and indirectly through shedding of infectious prions into the environment that are later ingested by healthy animals (U.S. Geological Survey, National Wildlife Health Center 2007). All 48 contiguous states have some form of CWD surveillance in place, and CWD has been found in Montana but only in game farms. It is anticipated that CWD will appear in wild populations because it is documented in the neighboring states of North Dakota, South Dakota, and Wyoming, as well as in Alberta and Saskatchewan. The refuge completed a “Chronic Wasting Disease Surveillance and Contingency Plan” in 2005. Beginning in 2014, this plan will be reviewed annually and updated as new information becomes available.

Contaminants

Concerns about links between mining-related contaminants in river sediment and their occurrence in nesting osprey prompted scientists to study the refuge and

other areas throughout the Clark Fork River Basin (Langner et al. 2011). The refuge participated in this 3-year research project conducted between 2006 and 2009 by the University of Montana. The Bitterroot River was used as a control site, including the stretch alongside the refuge. The study tested mercury levels from several sources: river sediments, aquatic invertebrates, trout, and blood and feathers from osprey chicks. Osprey were chosen as subjects in this study as they are regarded as indicators of aquatic ecosystem health. Chicks were sampled because virtually all of their biomass grew from consumption of local fish, thus reflecting local environmental conditions.

One discovery was that osprey chicks within and downstream of the refuge were found to have methylmercury in their blood and tissue samples. An organic form of mercury, methylmercury is the most toxic form, and it bioaccumulates in fish (USGS 2012). In the Lee Metcalf Refuge Bitterroot River reach, the mercury concentration of the fine-grain sediment is relatively low; nevertheless, the blood analysis showed the presence of methylmercury in refuge osprey chicks. Methylation occurs when elemental mercury enters the water and is taken up by bacteria that convert it to methylmercury in anaerobic conditions (Langner et al. 2011). Many of the sampled chicks from the refuge were in nests alongside wetland impoundments. The wetland impoundments likely enhance methylation rates and mercury biomagnification within the aquatic food web (Langner 2011). Both methylation rates and the stability of methylmercury in sediments appear to be enhanced under anaerobic conditions, whereas methylation rates are low under aerobic conditions, probably because of the reduced activity of anaerobic sulfate-reducing bacteria. On the other hand, the degradation of methylmercury appears to be generally favored by aerobic conditions (Ullrich et al. 2001). The resulting methylmercury is moved through the food chain, eventually reaching osprey and other top predators such as otter. This could be a cause of the 20-year decline in chicks fledged on the refuge from a peak of 40 in 1988 to 9 in 2007 (figure 19). The precise mechanism of forming methylmercury is still unclear as the synthesis of methylmercury in aquatic systems is influenced by a wide variety of environmental factors. The efficiency of microbial mercury methylation generally depends on factors such as microbial activity and the concentration of bioavailable mercury (rather than the total mercury pool), which in turn are influenced by parameters such as temperature, pH, redox potential (gain or loss of electrons), and the presence of inorganic and organic complexing agents. While there is no simple relationship, it appears that enhanced rates of methylmercury production are linked in particular with low pH, low salinity, and the presence of decomposable organic matter in reducing environments (Ullrich et al. 2001).

Other contaminant concerns on the refuge are pharmaceuticals and nutrients (which enter the refuge ground water from the many subdivisions next to the refuge), acid rain, and residual pesticides.

3.3 State and Federally Listed Species

The Service has not documented any current candidate or federally listed species under the Endangered Species Act using any lands or water within the Lee Metcalf Refuge. Many of the species found within the refuge have been designated as species of concern by MFWP and the Montana Natural Heritage Program (Montana Natural Heritage Program 2012) or as birds of conservation concern by the Service (USFWS 2008).

SPECIES OF CONCERN

According to the Montana Natural Heritage Program, species of concern are native animals breeding in Montana that are considered to be at risk due to their declining population trends, threats to their habitats, or restricted distribution (Montana Natural Heritage Program 2012). The Service identifies birds of conservation concern as migratory and nonmigratory birds of the United States and its territories that have declining populations, naturally or human-caused small ranges or population sizes, threats to their habitat, or other threats. Bird species considered for inclusion on this Federal list include non-gamebirds, gamebirds without hunting seasons, subsistence-hunted non-gamebirds in Alaska, birds that are candidates or proposed as threatened or endangered under the Endangered Species Act, and birds that recently have been removed from a Federal listing (USFWS 2008). Some of these Federal birds of conservation concern are not listed as State species of concern (for example, the horned grebe). This Federal species list covers the entire Northern Rockies, not just Montana; therefore, the species may not be imperiled in Montana and not warrant listing as a State species of concern. This designation helps stimulate coordinated and proactive conservation actions among Federal, State, tribal, and private partners.

A total of 42 wildlife State species of concern and 21 Federal birds of conservation concern have been found in the Bitterroot Valley (USFWS 2008). These wildlife species are identified on the State and/or Federal lists as species that require special attention to prevent them from becoming threatened or endangered. All but eight of these species have been documented using the refuge. There are also two plant species of concern found on or near the refuge, Guadalupe water-nymph and shining flatsedge.

The State forest and grassland bird species of concern that have been recorded on Lee Metcalf Refuge are peregrine falcon, black swift, burrowing owl, great gray owl, Lewis's woodpecker, olive-sided flycatcher, Clark's nutcracker, loggerhead shrike, black-and-white warbler, Le Conte's sparrow, and bobolink. There are also three documented mammal State species of concern on the refuge: hoary bat, fringed myotis, and Townsend's big-eared bat. A damselfly, the boreal bluet, and an amphibian, the boreal toad, are also species of concern that have been recorded on the refuge.

The State wetland bird species of concern that have been recorded on the refuge are common loon, American white pelican, American bittern, great blue heron, black-crowned night-heron, white-faced ibis, trumpeter swan, bald eagle, long-billed curlew, Franklin's gull, black tern, common tern, Caspian tern, and Forster's tern.

The bull trout is federally listed as threatened and historically used North Burnt Fork Creek, which traverses through the refuge, as passage to spawning grounds. Although it has not been documented on the refuge, there is a population off the refuge in the upper reaches of North Burnt Fork Creek in the Sapphire Mountains. On September 30, 2010, the Service designated 18,795 miles of streams and 488,252 acres of lakes and reservoirs in Idaho, Oregon, Washington, Montana, and Nevada as critical habitat for the wide-ranging native fish. The Bitterroot River and North Burnt Fork Creek are both located within this designated area. This designation and the status of the bull trout emphasize the need for coordination with other efforts to restore this critical habitat including special consideration in management of refuge resources.

Table 7 lists State species of concern and Federal birds of conservation concern that have been found in the Bitterroot Valley and on the refuge.



Jim Mogen/USFWS

Bull trout, a threatened species, are not found in refuge waters but once crossed the refuge to spawning grounds.

Table 7. Montana listed species of concern and Federal birds of conservation concern recorded in the Bitterroot Valley and on Lee Metcalf National Wildlife Refuge, Montana.

<i>Species</i>	<i>State species of concern¹</i>	<i>Federal birds of conservation concern²</i>	<i>Recorded using the refuge³</i>
Boreal toad ⁴	X	n/a	X
Trumpeter swan	X	—	X
Common loon	X	—	X
Horned grebe	X	X	X
Clark's grebe	X	—	X
American white pelican	X	—	X
American bittern ⁴	X	X	X
Great blue heron	X	—	X
Black-crowned night-heron	X	—	X
White-faced ibis	X	—	X
Bald eagle	X	X	X
Northern goshawk	X	—	X
Swainson's hawk	—	X	X
Golden eagle	X	X	X
Peregrine falcon	X	X	X
Prairie falcon	—	X	X
Black-necked stilt	X	—	X
Long-billed curlew	X	X	X
Marbled godwit ⁴	—	X	X
Short-billed dowitcher	—	X	X
Franklin's gull	X	—	X
Forster's tern	X	—	X
Black tern	X	—	X
Caspian tern	X	—	X
Common tern	X	—	X
Least tern	X	—	X
Black-billed cuckoo	X	X	X
Burrowing owl	X	X	X
Short-eared owl	—	X	X
Great gray owl	X	—	X
Flammulated owl	X	X	X
Black swift	X	X	X
Calliope hummingbird	—	X	X
Lewis's woodpecker ⁴	X	X	X
Pileated woodpecker	X	—	X
Willow flycatcher ⁴	—	X	X
Olive-sided flycatcher	—	X	X
Loggerhead shrike	X	X	X
Clark's nutcracker	X	—	X
Pinyon jay	X	—	X
Brown creeper ⁴	X	—	X
Winter wren	—	—	X
Veery	X	—	X

Table 7. Montana listed species of concern and Federal birds of conservation concern recorded in the Bitterroot Valley and on Lee Metcalf National Wildlife Refuge, Montana.

<i>Species</i>	<i>State species of concern</i> ¹	<i>Federal birds of conservation concern</i> ²	<i>Recorded using the refuge</i> ³
Sage thrasher	X	X	X
Le Conte's sparrow	X	—	X
Bobolink ⁴	X	—	X
Fringed myotis	X	n/a	X
Townsend's big-eared bat	X	n/a	X
Hoary bat ⁴	X	n/a	X
Bull trout ⁵	X	n/a	—
Boreal bluet	X	n/a	X
Boreal whiteface	X	n/a	X
Shining flatsedge	X	n/a	X
Guadalupe water-nymph	X	n/a	X

¹ Source: *Montana Natural Heritage Program 2012.*

² Source: *USFWS 2008.*

³ Source: *unpublished refuge data, includes casual sightings.*

⁴ *Proposed target species for refuge management.*

⁵ *Listed under the Federal Endangered Species Act as threatened.*

3.4 Cultural Resources and History

The following section describes the cultural resources and history of the refuge and the Bitterroot Valley, starting with the earliest documented occupation by Native Americans circa 12–15,000 years before present (B.P.). It then discusses Euro-American settlement in the valley and changes to the area's land uses, including those within the refuge boundary.

PREHISTORIC OCCUPATION

The cultural sequence for prehistoric occupation in this area is split into three major subdivisions based on Malouf (1956) including Early Hunter (10,000 to 6,000 before Christ [B.C.]), Middle Period (6,000 B.C. to Anno Domini [A.D.] 800), and Late Hunter (A.D. 800 to 1870).

Early Hunter

Woodside (2008) examined oral histories and other documentation to propose the presence of Paleo-Indians in Oregon and Washington before the flooding of Glacial Lake Missoula. Paleo-Indians, or Paleoamericans, is a classification term given to the first peoples who entered, and subsequently inhabited, the North American continent during the final glacial episodes of the late Pleistocene period. Woodside examined the Native American oral history of tribes in Oregon and Washington that described the cataclysmic flooding of Glacial Lake Missoula and how the tribes survived this event, dating about 15,000 years ago. Her research did cover other areas impacted by Glacial Lake

Missoula, including the refuge. Ryan (1977) recovered two Cascade Points (projectiles) while performing archaeological research along the Clark Fork River west of Missoula. These points are indicative of this period and definitive evidence of Paleo-Indian presence. Ryan hypothesized that the Clark Fork Valley was an important corridor connecting the Columbian Plateau and the Northern Plains. Ryan also found an abundance of sites containing prehistoric activity. Alternately, Ward (1973) found a small number of archaeological sites in the Bitterroot Valley; many were pictographs only and not considered evidence of this period, nor did they date to this period of time.

Middle Period

Glacial Lake Missoula receded about 12,000 B.P., according to Alt (2001). Eventually native people occupied the new valleys formed by this event. Ward (1973) searched the Bitterroot Valley for middle prehistoric evidence of occupation. She found 19 sites no older than 5,000 B.P. None contained the traditional pottery, roasting pits, tipi rings, battle pits, rock piles, or fishing gear associated with this time period. Many had pictographs, which connect site occupation to the middle period. Ward refers to other work including that done in 1951 by Carling Malouf and his University of Montana archaeology class who found jasper and flint chips at the mouth of the North Burnt Fork Creek (a small occupation site on the refuge) (Malouf 1952).

Late Hunter

Malouf (1952) notes that in A.D. 1730 the Shoshoni of Idaho gave horses to the Salish of this area. This significantly changed the culture of the Salish people. Malouf stated that the Salish have occupied western

Montana for several centuries dating back at least A.D. 1700. He cites tribal myths of animals that occupied this area, specifically coyote, beaver, otter, jay, and owl.

Protohistoric and Early Native Americans

The protohistoric period is the period of time between the arrival of horses and manufactured goods but before the arrival of Euro-American traders and explorers. This time period lasted only about 70 years due to the arrival of the Lewis and Clark expedition in 1805. Malouf (1952) noted that these intermountain areas of western Montana were the last areas of the United States to be settled by whites. Many traits of aboriginal times survived through this period without influence from Euro-American culture.

When early Euro-American explorers arrived, the area of western Montana was occupied primarily by three tribal groups: the Flathead and Pend d'Oreille (both considered Salish) and the Kutenai. In 1855, Governor Isaac Stevens stated the tribal population in western Montana to be 2,750 (Ryan 1977). In an unpublished University of Montana paper, Malouf (1952) reconstructed economy and land use by these tribes in western Montana using ethnographical and historical data.

All tribes were hunters and gatherers, and as such they did not allow for the accumulation of surplus food and supplies. However, famines were rare. Approximately 28 species of plants were the main sources of foods, medicines, cookware, and housing. The root of the bitterroot plant was a central dietary feature. One of the best places to dig the root was a mere 3 miles north of the refuge boundary at the mouth of Eight Mile Creek. Families could dig 50–70 pounds of bitterroot in late March or April. Arrowleaf balsamroot, an abundant plant in most elevations of western Montana, was also extensively eaten. Stems were typically peeled and eaten raw before flowering, and later roots were harvested and cooked. Ponderosa pine provided four forms of food: inner bark, sap between woody layers, cone nuts, and moss hanging from branches. Narrow leaf willow, a pioneer species on river gravel bars, was used in the construction of sweat lodges and baskets for cooking (sealed with gum). Most of the common mammals present today in western Montana were hunted including white-tailed deer and mule deer. Columbian ground squirrel, which is still abundant in places on the refuge, was also harvested. Woodchuck Creek, about 5 miles north of the refuge, was a site where Salish regularly used dead fall traps to harvest marmots. Most birds were not harvested except waterfowl, yet mallard eggs were particularly plentiful and popular. Other gamebirds were not numerous. Fishing was employed on bison hunts and by those left behind when these bison hunt parties were gone. The place name for Missoula refers to the bull trout caught there.

The vicinity of Stevensville was the center of social and economic life for the Salish. Most tributaries in the Bitterroot Valley had one or more families inhabiting it. The alluvial fan at the mouth of North Burnt Fork Creek (partially on refuge property) was also home for a considerable number of Salish families. JoAnn BigCrane, a Native American historian, visited this part of the refuge in August 1990 (refuge annual narrative) and agreed that a seasonal encampment was here at one time. North Burnt Fork Creek doubled as a highway of sorts for Native American travel to the Clark Fork Valley over the Sapphire/Rock Creek divide. This was the shortest route requiring only one night of camping.

HISTORY OF THE SALISH

The Salish–Pend d'Oreille Culture Committee furnished the following narrative for use on the Lee Metcalf Refuge Web site.

The Bitterroot Mountain range is the backbone of the valley. The Salish call the Bitterroot Mountains “Vck Welk Welqey” which means “the tops are red.” The life way of the Salish people is a cooperative dependent relationship with the land, plants, and animals.

Salish is the name of a group of people, consisting of several tribes, and the language they spoke. The Bitterroot Valley was the permanent home of their forefathers. The Stevensville vicinity was their main winter camp.

After the Hellgate Treaty of 1855, pressure increased for the removal of the Salish from the Bitterroot to the Jocko Valley on the Flathead Reservation. In 1872, General James Garfield presented the three Salish Chiefs Charlo, Arlee, and Adolf, with a second treaty which Charlo refused to sign. Charlo remained in the Bitterroot for 20 more years until he and his band were escorted from the valley by General Carrington in October 1891.

The respect and love for the Bitterroot can be summed up in the words of Louise Vanderburg, a Salish elder:

“When we go home I think about our old people. I walk lightly when I walk around. The bones of my Grandparents and their Grandparents are all around here. We return to the Bitterroot each year on a Pilgrimage to honor our connection with our homeland. Also to ensure the preservation of our ancestors’ graves and sacred sites. In doing so we acknowledge the gifts left here by those who have gone on before us, gifts of language, songs, dance, spirituality. This way of life has been sustained for generations by our ancestors’ prayers.”

EURO-AMERICAN SETTLEMENT AND LAND USE CHANGES

The Bitterroot Valley was used by the first Euro-American explorers to the western United States, including Lewis and Clark. Following the Lewis and Clark expedition, fur traders from the Hudson's Bay Company entered the Bitterroot Valley to secure furs from the Indians and establish forts and missions. The oldest consistently occupied town in Montana was initially established at the present day site of Stevensville by Catholic missionaries in 1841 (Stevensville Historical Society 1971). At the request of four separate Indian delegations from the Salish tribe, Father Pierre De Smet came to the valley from St. Louis in the late 1830s. De Smet and other priests were eventually joined by Father Anthony Ravalli in 1845. Named St. Mary's Mission, this community kindled additional settlement in the region. St. Mary's Mission was closed in 1850, and the community was renamed Fort Owen, and then later Stevensville, after Isaac Stevens, the first Governor of the Montana territory.

The primary early land use by settlers in the Bitterroot Valley was cattle grazing. By 1841 extensive areas of the valley were grazed and used for winter range as cattle were moved from summer grazing and calving locations in mountain slopes and foothills back into the valley in the fall (Clary et al. 2005).

In the mid-1850s, the discovery of gold in western Montana fueled immigration to the State, and a short flurry of gold exploration and mining occurred in the Bitterroot Valley. Early workers in the gold camps subsisted on wild meat and the importation of produce, meat, and dairy products. At this time some residents began growing vegetable crops to feed the miners, and this demand stimulated the first agricultural development in the Bitterroot Valley. Subsequently, the Bitterroot Valley became the "breadbasket" that nourished Montana's genesis, and Fort Owen was the nucleus of the first Euro-American settlement. Gold exploration was short-lived in the Bitterroot region, and by the 1870s the area's economy was almost solely based on local agricultural crops and cattle production. Ravalli County was created in 1893, and by 1914 extensive settlement had occurred in the region. Timber harvest and grazing were the predominant economic uses of the area at that time (Clary et al. 2005).

The dry climate of the Bitterroot Valley created annual variation in the availability of water to support agricultural crops. As early as 1842, priests at St. Mary's Mission successfully planted and irrigated crops of wheat, potatoes, and oats (Stevensville Historical Society 1971), and thus by appropriation, the first water right in Montana was established. A water right on the North Burnt Fork Creek was filed in 1852 by Major John Owen, who used creek water to run a grist mill and sawmill.

Two methods of water appropriation occur in Montana. The first—used by early settlers, miners, and mill operators—applies the "relation back" rule of law, meaning that the right is dated to the beginning of construction of a ditch or a means to use the water in a so-called "beneficial" way. The second method involves posting a POD on a creek or other drainage and filing notices in the courthouse. A stream inevitably becomes over-appropriated when many people and industries make demands on it. Over-appropriation usually ends in "quick frozen" or "decreed" action, and adjudication of a stream becomes necessary when rights are conflicting.

In the early 1900s, the Bitterroot Valley Irrigation Company (formerly the Dinsmore Irrigation and Development Company) began construction of a major irrigation system for the Bitterroot Valley (U.S. Bureau of Reclamation 1939, 1982; Stevensville Historical Society 1971). This system included water storage and conveyance facilities along the Bitterroot River and its tributaries as well as several reservoirs, including Lake Como west of Darby, and a diversion dam on Rock Creek. In 1905 the existing dam at Lake Como was raised 50 feet, and by the winter of 1906, 17 miles of canals were built to convey Lake Como water northward in the Bitterroot Valley. Eventually, a channel was built from Lake Como to the Bitterroot River, at which point it was reverse siphoned into a 24-foot-wide canal, capable of carrying water 6 feet deep. Water was then flumed across several small gulches, across Sleeping Child Valley, and around the foothills for 75 miles to the Eight Mile Creek east of Florence. By 1909, 56 miles of canal had been built northward to North Burnt Fork Creek. Subsequently about 14,000 acres of cropland were sold, and irrigation water was delivered to the acreage. The company's Main Supply Canal (known as the "Big Ditch") was originally constructed to primarily deliver water to apple orchards. The canal, however, was only able to supply about half an inch of water per acre, which was barely enough to support fruit trees and only about half enough for other crops. The land was bought by local farmers and then re-sold in promotional schemes to eastern families for mainly apple production. Limited water and poor yields collapsed orchard production, and by 1918 the Bitterroot Valley Irrigation Company went bankrupt.

In 1920, a reorganized Bitterroot Irrigation District was formed, and it issued bonds to purchase water rights and to develop water storage and distribution works. Drought conditions in the late 1920s and 1930s coupled with the Depression-era economics further exacerbated water problems in the valley and curtailed agricultural expansion in the region during this period (Cappious 1939, Stevensville Historical Society 1971). Following further financial difficulty, in 1930 Congress authorized the Bureau of Reclamation to liquidate private indebtedness and rehabilitate

the Bitterroot Irrigation District (U.S. Bureau of Reclamation 1939). Extensive rehabilitation to the district's Main Supply Canal and its distribution system was conducted from 1963 to 1967. Flood damage occurred in 1974, and extensive repairs were made on many structures. Currently the Bitterroot Irrigation District provides water to about 16,665 acres on the east side of the Bitterroot River (U.S. Bureau of Reclamation 1982).

Today, the Bitterroot Irrigation District's Main Supply Canal runs 1 mile east of the Lee Metcalf Refuge; however, it does not supply water to the refuge. Instead, irrigation water is supplied by the Supply Ditch Association, a private company formed in 1909. The association's Supply Ditch delivers Bitterroot River water to the refuge via three lateral ditches: the North Lateral Ditch (also called the Alleman Ditch), the Middle Lateral Ditch (also called the McElhaney Ditch), and the South Lateral Ditch (also called the Warburton Ditch) (figure 21).

Most of the Bitterroot Valley was unfenced in the early era of settlement from 1850 to 1910. However, in the early 1900s, the "apple boomers" who bought land in the valley began fencing most of the area. By the mid-1930s, more than 50,000 sheep and 30,000 cattle were present in the Bitterroot Valley; only about 22 percent of the valley was harvested cropland (Richey 1998). In the late 1940s and early 1950s generally wet conditions stimulated agricultural production in the Bitterroot Valley. Large-scale cattle grazing and haying operations and some small grain farming were conducted in and near the Lee Metcalf Refuge. Some native riparian forest and grassland in the Lee Metcalf Refuge region had been cut, cleared, or converted to alternate land uses by the mid-1900s. Two of the larger minor floodplain channels, Nickerson and McPherson Creeks (now called Ditches), were partly ditched in the early 1900s, and some minor impoundment of low elevation depressions and drainages occurred. By the 1960s, lands that became part of the refuge were controlled by about 13 landowners who heavily cropped and grazed the area. Much of the site was irrigated crop and pastureland using the extensive ditch and irrigation diversion system constructed across the floodplain (figure 21). These impounded ponds probably were created as water sources for livestock. Another development—a golf course—was established in 1933 within the southwest side of what became the refuge. It still exists today.

Many roads have been built in the Bitterroot Valley starting with a stage coach road in 1867 (Stevensville Historical Society 1971). This route eventually became Highway 93. Part of the main county road through the refuge follows the existing road shown on the 1873 plat map. Other early roads in the area were constructed from 1870 to 1900. These roads skirted higher ground and avoided the river, but eventually bridges were

built across the Bitterroot River beginning in the late 1800s. These bridges were often destroyed by high water levels and floods.

The Bitterroot Branch of the Northern Pacific Railroad was constructed from Missoula to Grantsdale in 1889 and soon thereafter was extended to Darby. This rail line was built primarily to transport timber from the slopes of the Bitterroot Mountains and sawmills that sprang up all along the west side of the valley. Rail spurs connected mills, and eventually logging and mills expanded to the east side of the valley. Transporting lumber from the east side of the valley eventually led to the construction of rail bridge crossings over the Bitterroot River including the bridge and line at the northern boundary of the Lee Metcalf Refuge. In the high waters of June 1943, this bridge collapsed under the weight of a train loaded with logs. In 1927 and 1928, the railroad was relocated from south of Florence to the east side of the river.

By the late 1970s, farm sizes in the Bitterroot Valley increased greatly, but agricultural economies prevented more extensive small grain farming in the valley and landowners began subdividing holdings for residential development (Richey 1998). By the early 1990s, Ravalli County had the fastest growing population and residential expansion in Montana, expanding from about 25,000 residents in 1990 to more than 40,000 in 2010 (U.S. Census Bureau 2010). Today, most Ravalli County residents live on the Bitterroot Valley floor within a few miles of the river. Much of the increase in population occurred outside of established towns and became concentrated in areas where each dwelling or subdivision has its own well and septic system. Several hundred residential structures now essentially surround Lee Metcalf Refuge (figure 22).

Whaley Homestead (National Register of Historic Places)

The Whaley Homestead, which was included as part of a major land acquisition by the refuge in 1988, is listed on the National Register of Historic Places.

The Whaley Homestead was home to the family of Peter Whaley, an Irish immigrant who came to Montana in the 1860s, lured by gold strikes at Bannack and Alder Gulch. Whaley's wife, Hannah, and their nine children shared his adventures, including his service as the first agent on the Flathead Reservation, until the family settled on deserted land claimed in 1877. The house, built circa 1885, survives as an outstanding example of vernacular frontier architecture. Weatherboard siding conceals a massive, complicated understructure of square-hewn logs.

The Whaley family farmed and raised livestock until 1905 when they sold the property to a short-lived horse breeding operation. At the height of the "apple boom" in 1909, the Bitterroot Valley Irrigation Company purchased the homestead, planting the

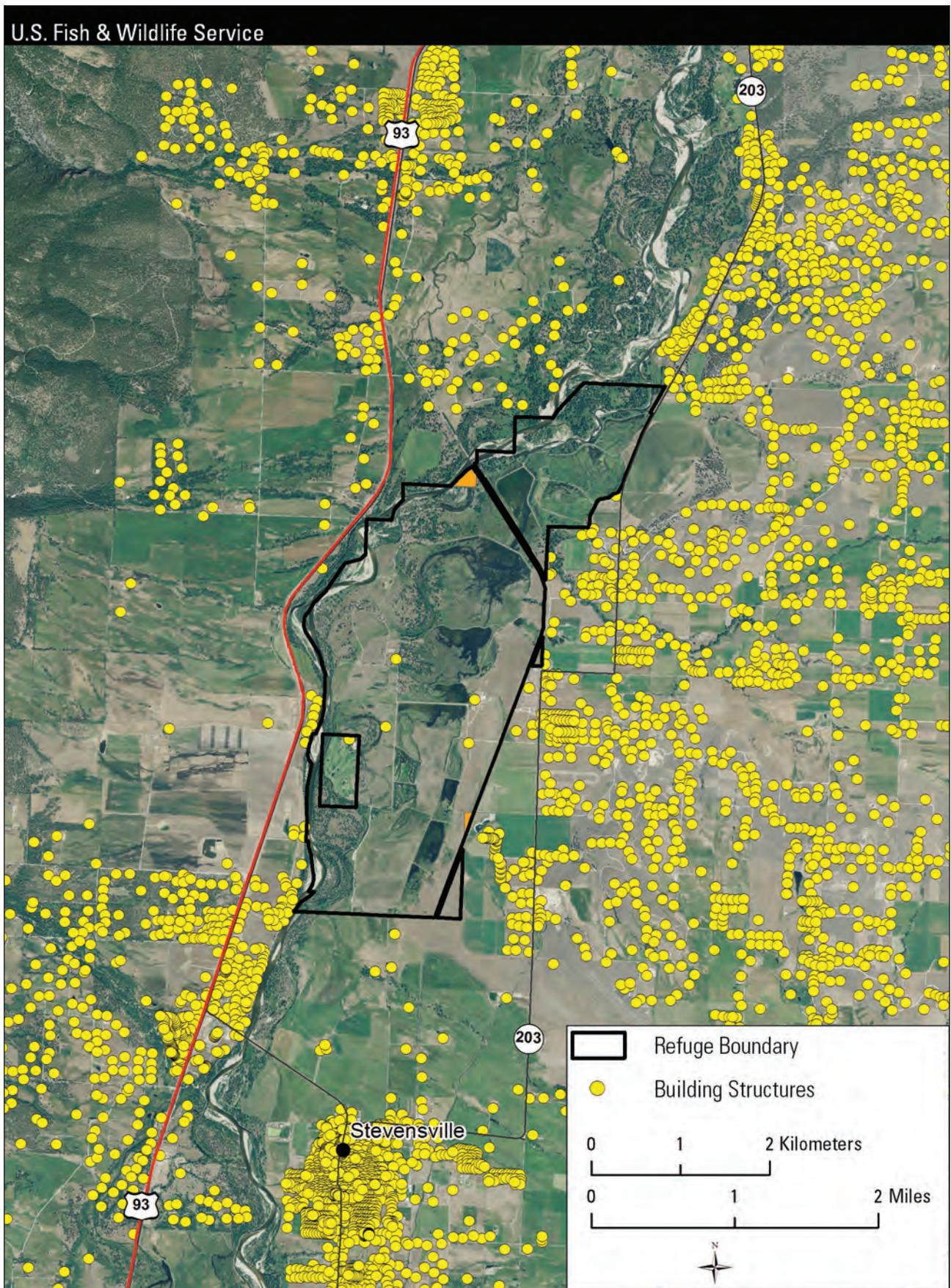


Figure 22. Locations of structures near Lee Metcalf National Wildlife Refuge, Montana (Heitmeyer et al. 2010).

upper fields with McIntosh apple trees and gooseberry bushes for nursery stock.

In 1921 new owners Fred and Anna Hagen returned the homestead to a self-sufficient farm, raising corn, potatoes, hogs, and dairy cows. After more than 50 years of farming, they sold the land to the refuge and their son, Harold, and his wife remained there until 1988. During the 1979 ceremony renaming the refuge in Senator Lee Metcalf's honor, Harold Hagen waxed philosophical of the agricultural practices on the family farm that became refuge property: "I believe that we have attempted to mold the land to our ideas, to what it should produce when the land should have shaped our ideas and dictated to us what it could best produce" (refuge files).

3.5 Special Management Areas

Areas with official designations are managed to retain the special features that led to their designation. While not suitable for inclusion in the Wilderness System, the Lee Metcalf Refuge has been identified as a significant part of the Bitterroot River Important Bird Area.

WILDERNESS REVIEW

A wilderness review is the process used for determining whether to recommend Service lands or waters to Congress for designation as wilderness. The Service is required to conduct a wilderness review for each refuge as part of the CCP process. Lands or waters that meet the minimum criteria for wilderness would be identified in a CCP and further evaluated to determine whether they merit recommendation for inclusion in the Wilderness System. To be designated as wilderness, land must meet certain criteria as outlined in the Wilderness Act of 1964:

- generally appears to have been affected primarily by the forces of nature, with the imprint of human work substantially unnoticeable
- has outstanding opportunities for solitude or a primitive and unconfined type of recreation
- has at least 5,000 acres of land or is of sufficient size to make practicable its preservation and use in an unimpaired condition
- may also contain ecological, geological, or other features of scientific, educational, scenic, or historical value

The refuge is only 2,800 acres and is altered by roads, ditches and levees. The refuge is also bordered by private land that has been developed for agriculture or housing. Although the refuge does provide visitors with opportunities for solitude and educational

and scenic value, overall the refuge does not meet the criteria for wilderness designation and is not being recommended for inclusion in the Wilderness System.

IMPORTANT BIRD AREA

The Important Bird Areas program, initiated in Montana in 1999, is a global effort managed by the National Audubon Society to identify and conserve areas vital to birds and biodiversity. To date 39 sites have been designated as important bird areas in Montana, encompassing more than 10 million acres of outstanding wildlife habitat, including streams and wetlands. To qualify as an important bird area, sites must satisfy at least one of the following criteria to support the following types of bird species groups:

- species of conservation concern (for example, threatened and endangered species)
- restricted-range species (species vulnerable because they are not widely distributed)
- species that are vulnerable because their populations are concentrated in one general habitat type or biome
- species or groups of similar species (such as waterfowl or shorebirds) that are vulnerable because they occur at high densities due to their behavior of congregating in groups

Lee Metcalf Refuge is part of the Bitterroot River Important Bird Area, one of the largest riparian and wetland important bird areas in the State, and part of an important bird area network crucial for bird survival throughout the year. The boundaries of the entire Bitterroot River Important Bird Area were made to correspond closely to the 500-year floodplain, and the northern and southern extent of the area was decided based on wanting to capture the most extensive cottonwood gallery forest that was present. Lee Metcalf Refuge is a cornerstone of the Bitterroot River Important Bird Area. From the cottonwood galleries to willow shrubland, extensive wetlands, and valley bottom coniferous forests patches, all key valley habitats come together on this refuge to provide great bird species richness. The important bird area documentation notes that more than 30 species of waterfowl, 20 species of shorebirds, and 20 species of riparian-dependent bird species, plus marshbirds, terns, and gulls are found on the refuge.

3.6 Visitor Services

Visitors to the Lee Metcalf Refuge enjoy a variety of compatible wildlife-dependent public use activities: hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation.



Bob Danley/USFWS

Members of the Audubon Society spot birds at the refuge.

The Lee Metcalf National Wildlife Refuge office and visitor contact area are open Monday–Saturday, 8:00 a.m.–4:30 p.m. The remaining areas open to the public can be accessed from dawn to dusk, except during hunting season when hunters are allowed reasonable time to access hunting areas. Brochures containing area maps, public use regulations, wildlife checklists, and general information are available to the public at the visitor contact area or the WVA kiosk.

HUNTING AND FISHING

The refuge is open to waterfowl hunting and archery-only hunting for white-tailed deer, both of which have occurred on the refuge since 1965 (USFWS 1966, refuge narratives).

A refuge hunting and fishing brochure was developed and printed in 2010. In addition to the site-specific regulations mentioned in the hunting brochure, all State of Montana hunting regulations apply to Service lands. All entry to refuge hunting areas is restricted to five specific parking areas, and all hunter parking areas have sign-in boxes to collect harvest data. A kiosk in the parking lot for the waterfowl hunting area provides refuge-specific waterfowl hunting regulations and information.

White-Tailed Deer Archery Hunting

The refuge is located in a State hunting district that only permits white-tailed deer to be harvested using a bow, also known as archery hunting. The earliest reference to archery hunting for deer on the refuge is found in the “Wildlife Inventory Plan” (USFWS 1966), which states that controlled archery hunts were taking place on the refuge but only in the river bottom. Today, 82 percent of the refuge (2,275 acres) land is open to archery hunting for deer. Hunters sign in at each of the five parking and access sites and may use tree stands. Hunters must walk to designated hunting areas from these access sites. Archery hunting in the waterfowl hunt area (see restricted archery deer hunting area in figure 23) is permitted in September except during the youth waterfowl hunt weekend;

thereafter, archery hunting is permitted during waterfowl hunting season on Mondays and Thursdays. An average of 949 archery visits have occurred annually between 2005 and 2010 (refuge unpublished data), and the trend is moving upward. The highest documented usage was in the 2009–2010 season at 1,321 hunt visits. An analysis of harvest data collected between 2000 and 2009 revealed an average of 891 visits annually totaling 2,318 hours and resulting in an average harvest of 32 deer per year.

In 1966, the population of white-tailed deer was “about 10 head” (USFWS 1966). In the 1980s, refuge staff began to observe that parts of the refuge were being overbrowsed, resulting in fewer shrubs and little understory in forested areas, both of which are important habitat components for a variety of migratory bird species. It is suspected that the larger number of deer (100–300 deer between 2001 and 2005) (unpublished refuge data) residing on the refuge today may be the cause; however, additional data will be needed to make this determination.

Waterfowl Hunting

The size of the waterfowl hunting area has remained fairly consistent at 654 acres. In 1983 the refuge established 28 hunting blinds within this area. Today 14 blinds remain and 2 blinds (numbers 2 and 7) are reserved for hunters with Montana disability licenses. Hunters with disabilities are allowed to park near these blinds along Wildfowl Lane. All other hunters must enter and exit on foot through the waterfowl hunt area parking lot. Waterfowl hunters may only possess and use nontoxic shot on refuge lands and waters when hunting waterfowl. From 2005 to 2010, an average of 1,029 waterfowl hunting visits occurred annually. Between 2000 and 2009, the average waterfowl harvest was 786 birds per year from an average of 1,299 annual hunt visits totaling 4,111 hours. Refuge staff meet with duck hunters each year to discuss the upcoming season and address issues to improve the quality of the hunt.

Fishing

Refuge anglers must adhere to the fishing regulations designated by MFWP. Designated fishing sites are located in the WVA (figure 23) and include Francois Slough and the Bitterroot River shoreline. A fishing platform is located along the paved portion of the WVA nature trail at a water control structure that moves water from Francois Slough to the Bitterroot River. The area where Francois Slough intersects the Bitterroot River provides shallow water habitat with a solid gravel bottom that is used for fly fishing.

There are no boat launches within the refuge. However, people can float and fish the part of the Bitterroot River that passes through the refuge, but they must remain below the high watermark and must not access the refuge from the river.

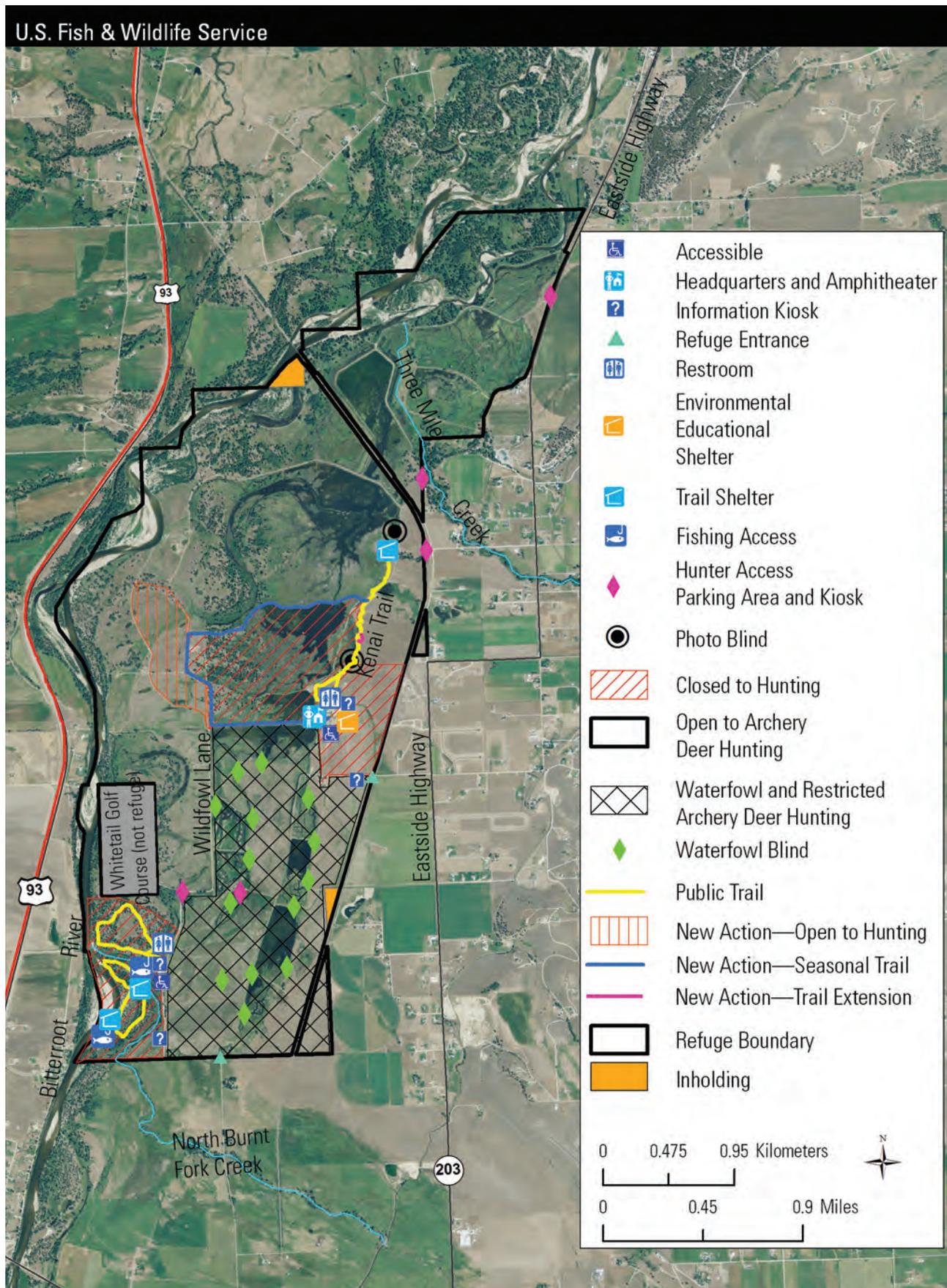


Figure 23. Public use map for Lee Metcalf National Wildlife Refuge, Montana.

It is difficult to obtain an accurate count on the number of anglers. In recent years fishing seems to be less popular within the WVA and Francois Slough.

WILDLIFE OBSERVATION AND PHOTOGRAPHY

Opportunities for wildlife observation and photography are located at or along the following places: (1) the WVA; (2) visitor contact area (3) Kenai Nature Trail; and (4) Wildfowl Lane, a county road that runs through the refuge (figure 23). Visitors must follow refuge regulations to protect wildlife and their habitats while enjoying the opportunity to view and photograph them.

Commercial filmmakers must acquire a special use permit to work on the refuge. Commercial photographers need a permit if they are granted access to areas not normally opened to the general public. The permit specifies regulations and conditions that the permittee must follow to protect the wildlife and habitats they have come to capture on film.

Wildlife Viewing Area

The WVA is about 188 acres and has a trail 2.5 miles long (figure 23). The trail passes through different vegetation communities, specifically riverfront and gallery forest and persistent emergent wetland. This trail is designated as a National Recreation Trail. The first 0.55 mile of the trail is a 10-foot-wide paved path that is considered accessible for visitors with disabilities. This paved section of trail starts immediately at the trailhead, located at a large parking area, and ends at a turn-around point at the refuge's shelter at the edge of the Bitterroot River. Other sections of the trail are soil or gravel. Facilities at the trailhead include an information kiosk and restroom facilities ("porta-potties"). This area is open year-round from dawn to dusk and is probably the most popular area with refuge visitors. Parking at the trailhead is very spacious; motorhomes or buses can easily enter and exit. Dogs on leashes are allowed here but not bicycles or horses.

Visitor Contact Area and the Kenai Nature Trail

Visitors are provided a spotting scope to view waterfowl and other waterbirds and raptors on the ponds next to the visitor contact area. This is one of the most popular wildlife observation and photography sites for visitors, including school groups. The visitor contact area is just over 500 square feet and provides some interpretation of refuge resources, including numerous taxidermy displays of local wildlife species.

The Kenai Nature Trail is a 1.25-mile trail accessed just north of the refuge headquarters (figure 23). At the start of this trail is a 0.25-mile paved loop that is 5 feet wide. This part of the trail meets Americans with Disabilities Act guidelines. A stationary, all-weather spotting scope and viewing bench are also along this section of trail. The remaining trail is a soil and gravel



© Kimi Smith

Painted turtles can be found along refuge ponds.

footpath that tracks northward, above and parallel to the eastern shorelines of Ponds 8 and 10 (figure 23). The views of the Bitterroot Mountains are spectacular between this point and the end of the trail, where a viewing platform with an all-weather spotting scope is available. This part of the trail travels through a closed area, so visitors are not permitted off this trail and no dogs are allowed.

Two permanent photo blinds are located along the Kenai Nature Trail. Blind 1 is located one-third of a mile from the visitor contact area on Pond 8; it sits on the edge of 5 acres of open water and marsh land and is sheltered to the east by cottonwood, aspen and alder trees. Blind 2 is located 1.25 miles from the visitor contact area on approximately 85 acres of open water on Pond 10. These blinds are positioned on the edge of two different wetlands and face open water. Photographers who have regularly contributed photos and volunteer time to the refuge helped determine the design, construction, and placement of these photo blinds. Photographers are gently reminded that subjects and habitats are more important than photographs; nevertheless, there is always the potential to disturb wildlife.

The Kenai Nature Trail traverses the following vegetation communities: persistent emergent wetland, floodplain and terrace grassland, and grassland-sagebrush. The plant communities and views differ from those in the WVA, offering visitors a different wildlife viewing experience.

Wildfowl Lane

Wildfowl Lane (figure 24) is a Ravalli County road that travels almost 3 miles through the southern half of the refuge. This road loops through the refuge and connects at both ends to Eastside Highway. It is not an official auto tour route, but all refuge visitors use this road to access the refuge and view wildlife in the adjoining lands and wetland impoundments. Most of the road is gravel, but the southern third is tar and chip pavement, and the first 3,200 feet of the east end is coated with recycled asphalt chipping. Ravalli County

is attempting to make the road more maintenance-free so that it requires less summer blading and fewer applications of anti-dust chemical.

A superior feature of this road is the width—greater than 33 feet—so motorists can safely pull over and view wildlife. Automobiles make great wildlife viewing blinds, and with modern optics visitors can easily see wildlife from the road, causing minimal disturbance.

ENVIRONMENTAL EDUCATION

Environmental education is a process designed to teach citizens and other visitors the history and importance of conservation and share scientific knowledge of our Nation's natural resources. Through this process, we can help develop a citizenry with the awareness, knowledge, attitudes, skills, motivation, and commitment to work cooperatively towards the conservation of our Nation's environmental resources. Environmental education within the Refuge System incorporates on-site, offsite, and distance learning materials, activities, programs, and products that address the audience's course of study, refuge purposes, physical attributes, ecosystem dynamics, conservation strategies, and the Refuge System mission. The refuge headquarters has a conference room (the Okefenokee Room) that can be used for larger groups. There is an amphitheater and an environmental education shelter for refuge programs and three public restrooms, all within the footprint of the refuge headquarters.

Schools

On average, the refuge hosts 2,309 students annually. Students come from communities as far as Darby to the south and Ronan to the north. Most students are from grades 3 through 5. Most visits occur during May



Bob Danley/USFWS

The refuge provides environmental education and research opportunities for students from surrounding schools and universities.

and are usually restricted to one visit per year. Since 2005, the philosophy of the environmental education program has centered on introducing students to common, native wildlife of the refuge. The refuge does not have a dedicated or formal curriculum for student visits. There is no visitor services plan, but one will be produced following the completion of this CCP.

Most onsite environmental education programs take place in the area immediately around the refuge headquarters due to the availability of ample parking, the Okefenokee Room, visitor contact area, restrooms, the environmental education shelter and amphitheater, habitat diversity, and the Kenai Nature Trail. This infrastructure gives staff opportunities and flexibility for providing quality environmental education. The Okefenokee Room is especially valuable because of its multimedia capabilities; it functions much like a formal classroom space. Environmental education partner organizations and self-guided teachers and school groups also use the WVA. A diverse supply of materials and equipment, including a refuge reference library, is available for these spaces for use in refuge programs or for visiting teachers and students.

Onsite Educators

The refuge outdoor recreation planner is the only staff position dedicated to environmental education. However, all refuge staff participate in environmental education activities when possible. Volunteers also assist with programs and staffing the visitor contact area. Many of these volunteers are self-taught, but the refuge works with volunteers in both formal and non-formal learning settings to augment their wildlife knowledge and associated skills. Without assistance from volunteers and partner organizations, the refuge could not accommodate the often large groups of students or visitors requesting environmental education programs. Nevertheless, there are requests that cannot be met due to a lack of staff. The refuge has been investigating the possibility of recruiting skilled naturalists as volunteers at the refuge.

Teacher Workshops

Teacher workshops were offered many years during the 1990s and in 2006. In 2006 the workshop was based on the "Flying Wild Educator's Guide." The goal of these teacher workshops is to build teachers' wildlife knowledge so they may appreciate and use the refuge appropriately for student learning and become self-directed when using the refuge for environmental education.

Off-Refuge Efforts

Refuge staff have visited local schools and attended community organization meetings to perform environmental education, interpretation, and outreach using established education kits and programs highlighting refuge resources.

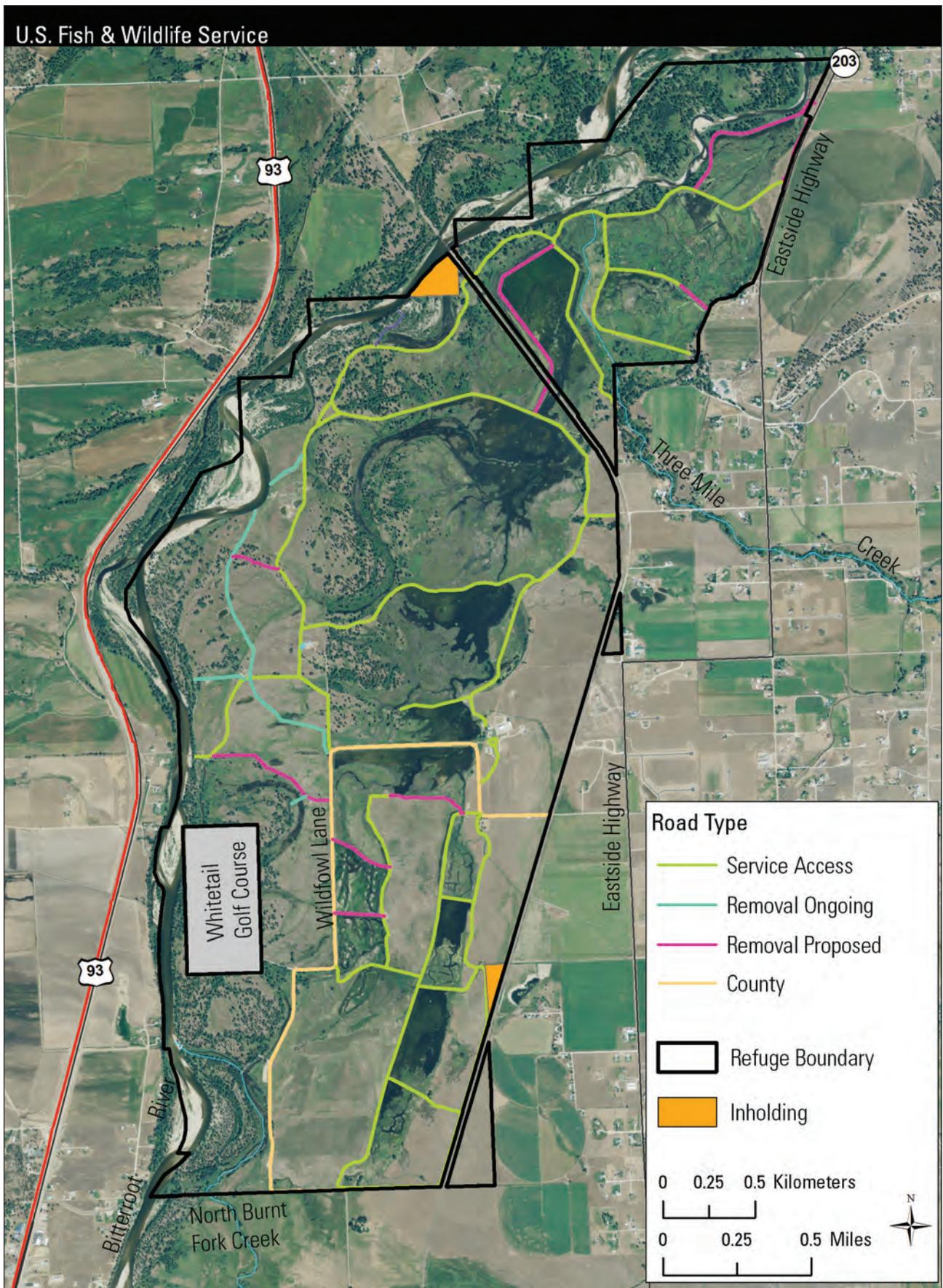


Figure 24. Roads in Lee Metcalf National Wildlife Refuge, Montana, including Service roads proposed for removal.



Bob Danley/USFWS

Attendees of the 2011 Montana Junior Duck Stamp Award Ceremony gather at the refuge amphitheater.

Montana Junior Duck Stamp Program

The refuge outdoor recreation planner is also the State coordinator for the Montana Junior Duck Stamp program. Both Houses of Congress passed H.R. 3679, the Junior Duck Stamp Conservation and Design Act in 1994. This is a national program managed by the Service. Its goals are to connect children with nature through science and art.

A national curriculum is available but is currently being updated. Students are asked to depict a North American duck, goose, or swan in its natural habitat. At the State level, the artwork is then judged by a distinguished panel of local wildlife experts, artists and photographers and the entry deemed “best of show” is sent to Washington, DC to compete at the national level. The winner from the Federal competition is then made into the Federal Junior Duck Stamp, available for purchase for \$5. All proceeds from the sale of the Federal Junior Duck Stamps support conservation education. Awards include savings bonds, art supplies, and various other gifts.

Nationally, about 25,000 entries are received per year. In Montana, the average annual number of participants in kindergarten through grade 12 is 391 (2000–2010, refuge files). A Montana entry has won the national championship twice between 1994 and 2010. Montana’s best of shows have finished in the national top ten in 2009 and 2010, a sign of continued excellence by Montana students.

For program support within Montana, two trunks have been developed that contain a variety of waterfowl reference materials; these trunks can be loaned to schools. A portable exhibit showcases the program and winning entries and is sent to libraries, schools and post offices around the state. A detailed overview of the program is available at www.fws.gov/juniorduck.

INTERPRETATION

Interpretation provides opportunities for visitors to make their own connections to resources. By providing

opportunities to connect to the resource, interpretation provokes participation in resource stewardship. It helps refuge visitors understand their relationships to, and impacts on, those resources. Well-designed interpretive programs can be effective resource management tools. For many visitors, taking part in an interpretive program may be their primary contact with a refuge, the Refuge System, and the Service. It is their chance to learn about refuge resource management objectives and could be their first contact with conservation and wildlife. Through such contact, the Service has the opportunity to influence visitor attitudes about natural resources, refuges, the Refuge System, and the Service and to influence visitor behavior when visiting units of the Refuge System.

Brochures

Refuge brochures contain area maps, public use regulations, and general information. The current refuge brochures are available at the refuge headquarters and at the main kiosk of the WVA.

Most of the public brochures have not been updated to meet Service standards, with the exception of the new hunting and fishing brochure. Brochures that require updating include the general brochure and the wildlife checklist for Lee Metcalf Refuge.

Kiosks

There are five kiosks on the refuge that are used to interpret refuge resources and provide information to visitors including maps and refuge regulations. The kiosk at the WVA has three interpretive panels displaying a location map, general refuge information, wetland facts, and information on habitat management techniques. There is a kiosk at each of the entrance points on both the south and east end of Wildfowl Lane that primarily highlight information about the Refuge System. At the start of the Kenai Nature Trail there is a small interpretive kiosk primarily used to distribute refuge brochures (figure 23). There is also a kiosk in the waterfowl hunting area that provides updated hunting regulations.

Visitor Contact Area

The refuge has a 513-square-foot visitor contact area that provides a small library of books, natural history displays (including representations of refuge wildlife), interpretive displays, other environmental education materials, a small bookstore, and a large screen television. There are many interpretive displays on local plant and animal life. The information is updated based on the season or changing refuge activities. The refuge also has a Web site that provides information about resources, programs, and regulations.

Media

The refuge has a Web site (<http://leemetcalf.fws.gov>), blog, and social media sites (Facebook, Twitter, and Flickr) that provide up-to-date information about

refuge resources, programs, upcoming activities, and refuge regulations. Refuge staff provide the three local newspapers with periodic news articles on refuge activities and events and informative articles on the natural resources found throughout the refuge.

3.7 Management Tools

In recent years, the Service has manipulated habitat using various management tools that are carried out under specific, prescribed conditions to meet the needs of wildlife. These management tools have included water level manipulation, prescribed burning, and prescriptive grazing or mowing, and cooperative farming.

WATER LEVEL MANIPULATION

The refuge manipulates the water levels in 17 wetland impoundments that provide approximately 800 acres of open water and mudflats for migratory waterbirds. The development of these wetland impoundments began in 1964 when levees and berms were constructed to capture and impound water. Water control structures were added to control the inflow and outflow of water in attempt to mimic wetland cycles. Water levels continue to be timed to the needs of wildlife and the season. For example, during the migrating shorebird season, water levels are lowered to create mudflats. For migratory and breeding waterfowl, water levels are raised slowly to create optimum foraging conditions and to provide for brood and roosting habitat. Wetland impoundments are occasionally drained to improve the health and productivity of these impoundments for waterbirds. This also allows the opportunity to reduce cattail monocultures, thereby restoring open water areas.

PRESCRIBED BURNING

Prescribed burning is a management tool that has been used on the refuge since 1988 to control some invasive plant species or undesirable monotypic vegetation stands, particularly cattails. It is also used to clear ditches of vegetation that may impede waterflow. One of the most widespread uses of prescribed fire on the refuge is to rejuvenate grassland vigor.

Since 2004, the refuge has burned 491 acres to improve grassland habitat and 463 acres to improve wetlands. Each year 3–5 acres of ditches are burned to keep them free of vegetation allowing water to travel more freely.

PRESCRIPTIVE GRAZING OR MOWING

Historically, the Bitterroot River Valley was grazed and browsed by native ungulates such as white-tailed deer, mule deer, moose, and elk. Following Euro-American settlement, these valley lands were used for cattle grazing, primarily as winter range as cattle were

moved in the fall from the summer grazing and calving locations in the mountain slopes and foothills (Clary et al. 2005). Cattle grazing on the refuge grasslands continued until 1975. Between 1993 and 1997 sheep and goats were brought into the refuge in an attempt to control cattails and invasive species; however, prescriptive cattle grazing was not consistently used as a management tool until 2006. To control monotypic stands of cattails in the wetland impoundments, cattle were brought in to graze primarily on the young cattail plants. This is one part of a multi-step process of thinning cattails.

COOPERATIVE FARMING

Cooperative farming is an arrangement whereby a farmer is compensated for planting crops on a refuge through keeping a certain percentage of the harvest. The refuge can retain its share (1) as standing cover for wildlife forage, (2) in exchange for additional work from the cooperators such as invasive plant control and grass seeding, or (3) in exchange for supplies from the cooperators such as herbicides and fence materials. Any income received by the refuge is deposited in the Refuge Revenue Sharing Account.

Before cooperative farming can take place, the refuge manager must issue a cooperative farming agreement or a special use permit. Subsequently, cooperators are allowed to (1) till, seed, and harvest small grain, (2) control invasive plants, or (3) harvest hay on the restoration site until native seed can be planted and becomes established. These agreements are generally issued for 2–4 years to achieve a specific management objective, such as preparing a field for restoration to native species. In some cases these agreements may extend longer to allow time for the establishment of native plants.

When the refuge was first established, farming was used to grow grains including wheat and barley. Historically, the 800 pounds of grain that was harvested was sent to Red Rock Lakes National Wildlife Refuge to feed wintering swan. Cooperative farming stopped in 2002, partly due to the difficulty of finding cooperative farmers and partly due to a trend of restoring farmlands to native grasslands.

While cooperative farming can assist with restoration efforts, unfortunately most of these restoration efforts have not succeeded on the refuge, primarily due to competition from invasive species.

3.8 Socioeconomic Environment

Most of the Lee Metcalf Refuge is open to the public for uses including hunting, fishing, wildlife observation,

and photography. These recreational opportunities attract outside visitors and bring in dollars to the community. Associated visitor activities—such as spending on food, gasoline, and overnight lodging in the area—provide local businesses with supplemental income and increase the local tax base. Management decisions for the refuge about public use, expansion of services, and habitat improvement may either increase or decrease refuge visitation and, in turn, affect the amount of visitor spending in the local economy.

POPULATION AND DEMOGRAPHICS

The refuge is located approximately 4 miles northeast of Stevensville, Montana in Ravalli County. During the 1990s, Ravalli County was the fastest growing county in Montana and became one of the fastest growing counties in the entire United States, as measured by percentage change in population. For the period from 1990 to 2009, the county's population increased from 25,010 to 40,431—an increase of 62 percent. A key factor in the character and change of the Bitterroot area economy is the county's proximity to a mid-size regional center, the city of Missoula, which is located 25 miles to the north in Missoula County. During the 1980s, the county of Missoula grew from 76,016 to 78,687, an increase of only 3.5 percent. However, between 2000 and 2009, Missoula County grew by 13.4 percent.

The communities of the Bitterroot Valley are located on a “peninsula” of largely private lands occupying the valley floor and mountain foothills surrounded by a “sea” of public forest lands. Within the boundaries of Ravalli County itself, there are 1,850 square miles of forest lands administered by the USDA Forest Service, representing about 77 percent of the entire county's land base. Beyond the perimeters of the county, these forest lands and wilderness stretch for many miles. The presence of these public forest lands has heavily influenced the settlement and economic development of the Bitterroot Valley, and wood products manufacturing has been a key component of the area's economic base. Historically, the economic role of these forest lands has been primarily one of a supplier of raw material for lumber processing in the area. However, the role these lands play in the area's development is changing. The Bitterroot Valley's economy is now being increasingly shaped by rapid growth spurred by in-migration. The amenities of this picturesque mountain valley with its surrounding forests appear to be the primary attraction for many of the valley's recent migrants. Similar migration patterns are occurring in non-metropolitan forest land areas like the Bitterroot Valley throughout the west.

The recent rise in population in the Bitterroot Valley has not been evenly shared by various age groups within the population. While Ravalli County's population as a whole grew by 43 percent between 1990 and 1999, the greatest growth occurred among persons in

their mid-to-late 40s and 50s. The population 45–54 years of age increased from 2,994 persons to 6,356—a 112 percent increase in less than a decade. The population of age group 55–64 increased by 71 percent. The county's 65-and-older population increased by only 24 percent during this period and actually decreased as a percentage of the population between 1990 and 1999. The area may in fact be losing a disproportionate number of people 65 or older who move away from the area.

The area's population is racially non-diverse, as is the population of the larger region. Of Ravalli County's 40,431 residents in 2009, more than 97 percent were white. The population of Hispanic or Latino origin is the largest racial minority group at 2.8 percent. American Indians, who have a distinct cultural connection to this area, make up only 0.9 percent of the population.

EMPLOYMENT

The unemployment rate in Ravalli County in 2010 was 10.4 percent, which is greater than Montana's average of 7.4 percent. In 2009, the median family income was \$45,691, which is close to the rest of State but less than the national 2008 average of \$52,029.

The fastest growing industries are administrative and support services, followed closely by waste services, arts, entertainment, and recreation.

PUBLIC USE OF THE REFUGE

During 2010, 166,767 visits were recorded on the refuge. Between 2005 and 2010 (the period after which the new refuge office and visitor contact area opened) annual visits averaged 142,971. During this time period, the maximum visitation was 177,563 in 2005 and the minimum was 90,000 in 2008. These numbers are based on mechanical counters strategically located at the WVA, Wildfowl Lane, and the Kenai Nature Trail. These numbers do not account for the refuge visitors on the Bitterroot River or on refuge lands west of the Bitterroot River. The average number of individuals who actually came into the visitor contact area during this same period was 6,118. Visitors attending special events accounted for 1,741 visitors annually. These latter figures are recorded manually by refuge volunteers. During hunting and fishing seasons from 2005–2010, the visitors participating in these activities accounted for 2 percent of all visits (Carver and Caudill 2007). It is assumed that the remaining visitors were participating primarily in wildlife observation and photography activities along the county road and nature trails. Most wildlife observers visit in the spring and summer, when the greatest numbers of migratory birds inhabit the area.

Camping and fires are not allowed on the refuge; however, the Bitterroot National Forest manages land throughout Ravalli County, including campgrounds, one of which is near Stevensville. There is a motel

located in the town of Stevensville, a few in Hamilton and Lolo, and dozens more in Missoula, as well as several recreational vehicle campgrounds.

BASELINE ECONOMIC ACTIVITY

It is difficult to place a value on the worth of outdoor experiences or the importance of maintaining and preserving habitat vital to migratory birds and a variety of resident wildlife species. One way of defining a refuge's value and the opportunity to experience wildlife-dependent recreation on the refuge may be to ask what the area would be like without the refuge (Carver and Caudill 2007). According to the latest "Banking on Nature" economic analysis (Carver and Caudill 2007), 13 percent of expenditures associated with a wildlife-dependent recreational visit to a refuge come from local residents, thus 87 percent of revenue comes from outside area visitors. These expenditures include purchases of food, lodging, transportation, and other expenses. In 2007, refuge visits generated approximately \$185.3 million in tax revenue at the local, county, State, and Federal levels (Carver and Caudill 2007).

Public use is just one way that Lee Metcalf Refuge generates revenue and contributes to the economic engine of the local economy. Other economic benefits include spending by the refuge, spending by refuge employees, payment in lieu of taxes (\$13,439 in 2010), the economic value of the function of the refuge's habitats, and the increased value of lands next to the refuge.

U.S. FISH AND WILDLIFE SERVICE EMPLOYMENT

In 2010, Lee Metcalf Refuge was staffed by nine permanent employees and six seasonal employees. Its payroll equaled approximately \$601,000. Based on the Bureau of Labor statistics, approximately 79 percent of each employee's annual income is spent locally. Using this figure, refuge employees contribute nearly \$475,000 to the local economy.

VISITOR SPENDING

An average of 143,000 visitors enjoy Lee Metcalf Refuge every year through wildlife observation, photography, hiking, and environmental education (sometimes referred to as nonconsumptive uses). On Lee Metcalf Refuge it is estimated that more than 97 percent of visitors participate in these activities. The remaining visitors participate in fishing and hunting (often referred to as consumptive uses).

According to the 2007 "Banking on Nature" report, 87 percent of refuge visitors travel more than 30 miles to visit a refuge (Carver and Caudill 2007). This same report stated that 77 percent of these visitors engage in nonconsumptive activities. Nonresident visitors tend to contribute more money to the local economy. Based on refuge visitor numbers and the estimated percentage of nonresident visitors, it

is estimated that Lee Metcalf Refuge could possibly contribute as much as \$15 million annually to the local economy from nonresident, nonconsumptive users, and nearly \$4 million from nonresident consumptive users. Resident nonconsumptive users spend an additional \$356,000 while resident hunters and anglers spend approximately \$140,000.

3.9 Partnerships

Lee Metcalf Refuge has a history of fostering partnerships that help accomplish the refuge mission and implement programs. From 2005 to the present, the Service has entered into various projects and activities with more than 65 organizations including local and national conservation organizations, private companies and businesses, other Federal agencies, State agencies, universities, local schools, and county and city governments. The refuge also has a very active volunteer program that primarily assists visitor services programs. The refuge could not begin to meet the needs of the thousands of refuge visitors without these volunteers.

These partners have assisted in wildlife and habitat management, visitor services and recreational activities, land protection, law enforcement, and community outreach. Several of these relationships have developed into formalized partnerships with written agreements or memoranda of understanding while others remain more informal.



Bob Danley/USFWS

The Hollingsworth Wetland Project was a collaborative effort among the Service and numerous partner organizations.

3.10 Operations

Service operations consist of the staff, facilities, equipment, and supplies needed to administer resource management and public use programs throughout the Lee Metcalf Refuge.

STAFF

Lee Metcalf Refuge provides supervision, logistical support, office space, storage, and supplies to multiple positions that serve a broader set of responsibilities than the mission of the refuge. Current staff at the refuge consists of five permanent full-time employees including a refuge manager, outdoor recreation planner, law enforcement officer, maintenance worker, and an administrative support assistant. There are also four permanent Service employees who are based out of this office, but they are not assigned to exclusively support refuge programs. These positions include the district fire management officer, fire technician, regional maintenance team member, and the Montana Invasive Species Strike Team leader. These employees and their programs are supported partially or wholly by Lee Metcalf Refuge with logistics, equipment, and materials, and most of these positions are supervised by the refuge manager. The refuge does receive some assistance on refuge projects from these positions if they are not dedicated to other priority projects.

Seasonal employees are often hired each year. In addition to the above refuge positions, the refuge uses its management funding to annually hire one to two seasonal workers, including a biological technician and a maintenance assistant. Since 2009, the refuge has hosted a Youth Conservation Corps Crew and leader. In 2010, the refuge coordinated with Ravalli County Weed District to employ three, 5-month seasonal employees to treat invasive species on the refuge.

FACILITIES

Facilities are used to support habitat and wildlife management and wildlife-dependent public use activities. The refuge's buildings have been updated over the years, yet much of the habitat management infrastructure such as irrigation components, some wetland impoundment levees, and water control structures are in disrepair.

The refuge headquarters and visitor contact area were developed in 2004 from an existing maintenance garage. The current maintenance shop, a metal Butler building, was constructed in 2000, and a cold storage equipment bay building was constructed in 2005. The

refuge has a bunkhouse, built in 2005, to provide housing for seasonal workers. The refuge historically had one refuge house but it was recently deemed unsafe for occupancy, and in August 2010 it was removed.

Most of the refuge wetland impoundments were constructed in the late 1960s through the early 1970s. Roads and dikes associated with these wetlands were constructed at that time and many are in need of repair. In addition to the visitor contact area, visitor service facilities include the amphitheater, shelters, and 5 miles of trails.

The following is a list of most of the facilities found on the Lee Metcalf Refuge:

- headquarters and visitor contact area (4,488 square feet)
- maintenance shop (7,200 square feet)
- cold storage building (3,500 square feet)
- outdoor amphitheater (4,000 square feet) and two shelters
- bunkhouse (2,080 square feet)
- hazmat building (390 square feet)
- pole barn (3,000 square feet)
- Grube Barn (3,162 square feet) (poor condition)
- Whaley Homestead (1,416 square feet)
- approximately 23 miles of dikes and roads
- 22 large (greater than 2-foot diameter) water control (stoplog) structures
- 10 small (less than 2-foot diameter) water control (stoplog) structures
- 3 water delivery ditches, totaling 6 miles, plus 2 tile drain ditches
- 3 pumping stations for Fields I-1 through I-7
- 4 domestic wells
- 2 recreational vehicle pads with septic, electrical, and water hookups
- 3 vehicle bridges
- 5 miles of walking trails
- 5 walking bridges
- 2 wooden photo blinds
- wildlife observation deck (Kenai Nature Trail)
- 3 entrance signs
- 5 interpretive kiosks
- universally accessible fishing deck (168 square feet)
- 14 waterfowl hunt blinds (includes 2 blinds for hunters with disabilities)
- 5 archery hunter parking lots

CHAPTER 4—Management Direction



Bob Danley / USFWS

A young visitor participates in a refuge educational program.

The U.S. Fish and Wildlife Service selected the management direction described in this chapter after determining that it:

- best achieves the Lee Metcalf National Wildlife Refuge purposes, vision, and goals, and helps fulfill the Refuge System mission;
- maintains and, where appropriate, restores the biological integrity of the refuge and the Refuge System;
- best addresses the substantive issues;
- is consistent with principles of sound fish and wildlife management.

This chapter first describes the management focus for the refuge and then sets out the associated objectives and strategies that the refuge staff will carry out to achieve the CCP goals. Stepdown management plans (section 4.11) will provide implementation details for specific programs. The chapter sections follow:

- 4.1 Management Focus
- 4.2 Goal for Bitterroot Floodplain and Associated Wildlife
- 4.3 Goal for Wetland Impoundment Habitat and Associated Wildlife
- 4.4 Goal for Grassland and Shrubland Habitat and Associated Wildlife
- 4.5 Goal for Invasive and Nonnative Species
- 4.6 Goal for Research

- 4.7 Goal for Cultural Resources
- 4.8 Goal for Visitor Services
- 4.9 Goal for Partnerships
- 4.10 Goal for Operations and Facilities
- 4.11 Stepdown Management Plans
- 4.12 Research, Monitoring, and Evaluation
- 4.13 Plan Amendment and Revision

4.1 Management Focus

The Service will carry out science-based management of the habitat and wildlife associated with the refuge along with compatible visitor services:

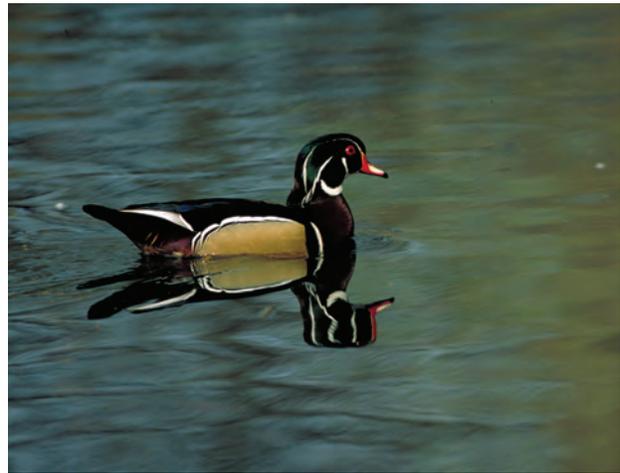
- The Service will use the best available science to determine the most effective methods for conserving, restoring, and enhancing the habitats within the refuge, including grassland and shrubland, gallery and riverfront forests, and wetland impoundments. Providing these habitats for target migratory birds would achieve the purposes of this refuge. A significant part of the restoration proposals will be to control invasive plant species, where possible, and prevent further spread. Grasses and shrubs native to the uplands, including the alluvial fans, will be restored, where appropriate, to provide habitat for native wildlife including grassland-dependent

migratory birds. Some wetland impoundments will be removed or reduced in size to allow for river migration or provide restoration sites with an overall long-term goal to restore the gallery and riverfront forest for wildlife that are dependent on riparian areas. Most of the remaining impoundments will be managed to emulate natural conditions for wetland-dependent migratory birds.

- The Service will expand and improve the refuge's compatible, wildlife-dependent, public use programs, in particular the wildlife observation, environmental education, and interpretation programs. The visitor contact area and associated headquarters will be expanded into a visitor center, new office space, and a combination conference room and environmental education classroom. New displays will be professionally planned and produced for the expanded visitor center. Interpretive panels will be located at strategic points on the refuge, highlighting the restoration efforts. These panels will be designed so they could be updated as needed. The refuge will work with the county to designate the public road traveling through the refuge as an auto tour route, which will include pulloffs and interpretation. A seasonal hiking trail will be added, and some other existing trails will be improved for wildlife observation and photography and other interpretive and education programs. The Service will investigate options for slowing the erosion of the portion of the WVA next to the Bitterroot River. All options will be evaluated based on their cost, effectiveness, and impacts on the environment, including the river system. Eroding trails may also be relocated if they become impassible. The entire length of the Kenai Trail will remain unchanged. However, along a small portion of this trail, the public will be given the choice to walk down to the pond's edge on the current trail or remain on the higher bench (figure 25) that provides a more level walking surface. All public use programs will provide visitors with information on the purposes of the refuge and the mission of the Refuge System, ensuring that almost every visitor would know that he or she is on a national wildlife refuge.

- Increased research and monitoring, staff, funding, infrastructure, and partnerships will be required to accomplish the goals, objectives, and strategies outlined in this chapter.

Sections 4.2 through 4.10 set out the objectives and strategies that serve as the steps needed to achieve the CCP goals for the refuge. While a goal is a broad statement, an objective is a concise statement that reveals what is to be achieved, the extent of the achievement, who is responsible, and when and where the objective should be achieved—all to address the goal. The strategies are the actions needed to achieve



Thomas Barnes / USFWS

Expanding riparian forest habitat should provide additional nesting trees (cavities) for target species, such as the wood duck.

each objective. Unless otherwise stated, refuge staff will carry out the actions in the objectives and strategies. The rationale for each objective provides context such as background information, assumptions, and technical details.

Appendix C contains the required compatibility determinations for public and management uses associated with this CCP. In addition, appendix H describes the fire management program for the refuge.

TARGET SPECIES SELECTION PROCESS

Early in the planning process, the Service selected three groups of target species that will be supported by the objectives and strategies described under the habitat goals for the Bitterroot River floodplain, wetland impoundments, and grassland and shrubland habitat. Part of this process was to review three separate documents focused on sustaining or recovering species in Montana: the "Montana Intermountain West Joint Venture Plan," "Montana State Conservation Plan," and the "Bitterroot River Subbasin Plan." An initial list was developed based on whether a species either occurred on the refuge or could occur on the refuge if its preferred habitat was expanded or restored, as indicated under each goal. Almost all of the species selected are recognized in these three documents. The life history needs of over 100 species were examined for similarities and relevance to the proposed goals. The final lists of 16 species were selected based on their ability to represent guilds or because they were good indicators of the quality of a specific habitat type. The habitats that support the migration, foraging, and nesting needs of these selected species should benefit a much broader group of secondary bird species as well as a variety of other wildlife, both migratory and resident. These target species will be monitored for trends in abundance and distribution to evaluate the effectiveness of these actions.

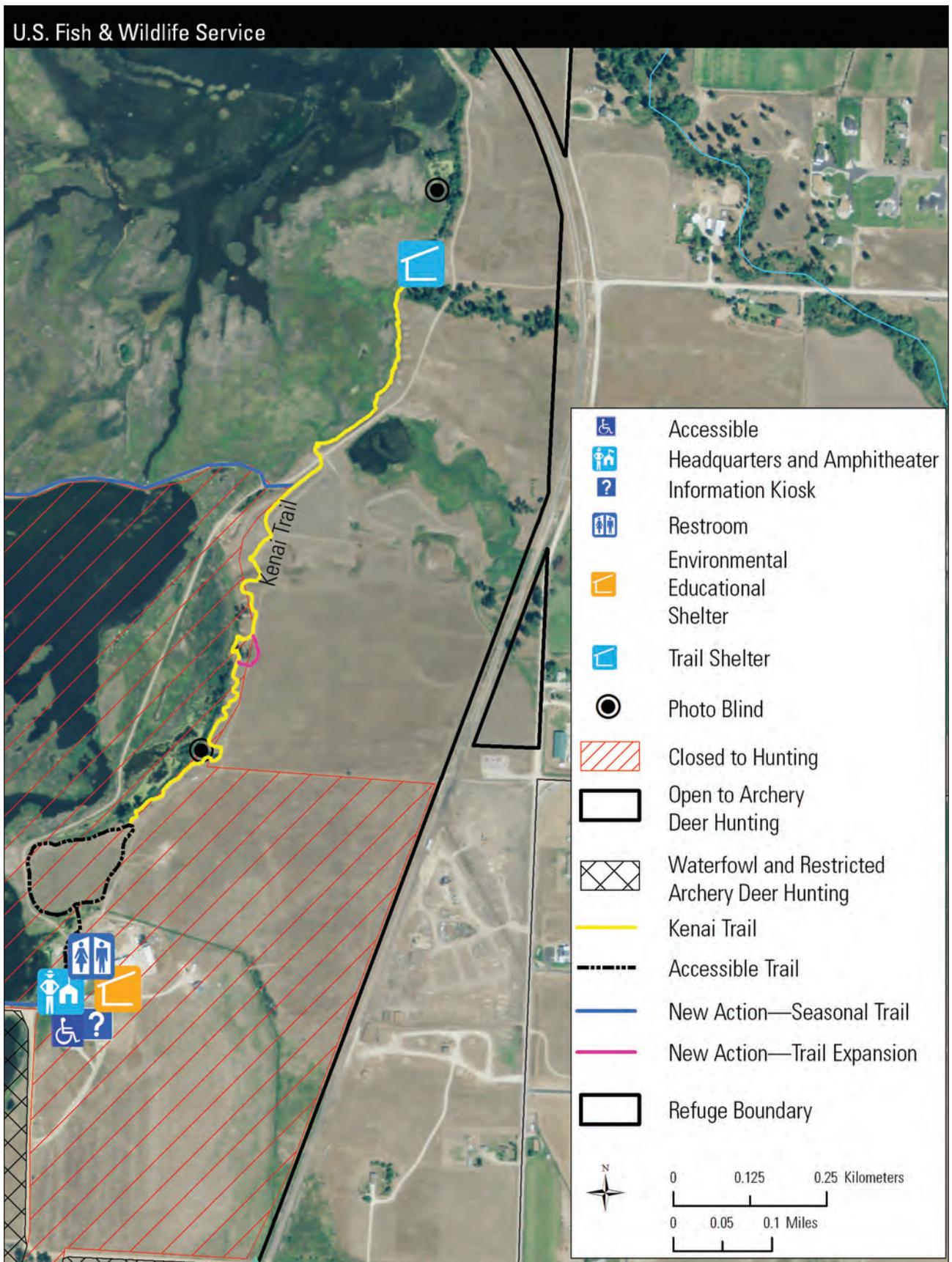


Figure 25. Kenai Nature Trail, Lee Metcalf National Wildlife Refuge, Montana.

4.2 Goal for the Bitterroot River Floodplain and Associated Wildlife

Manage and, where appropriate, restore the natural topography, water movements, and physical integrity of surface water flow patterns across the Bitterroot River floodplain to provide healthy riparian habitats for target native species and to educate visitors about the benefits of sustaining a more natural floodplain.

TARGET SPECIES FOR THE BITTERROOT RIVER FLOODPLAIN

The Service has identified the habitat needs of a diverse group of target floodplain species, including waterbirds, neotropical migrants, and mammals (table 8). Providing for the life history needs of these species will provide the natural floodplain habitat diversity and conditions needed not only for these targeted species, but also for a broad suite of other floodplain-associated wildlife. Monitoring will focus on these target species to determine their response to floodplain management actions.

FLOODPLAIN OBJECTIVE 1

Where channel migration of the Bitterroot River is occurring, do not inhibit the river from establishing natural flow patterns during high flow events, where appropriate, to enhance existing riparian woodlands and provide suitable restoration sites for both gallery and riverfront forest vegetation that could provide breeding, nesting, feeding, or migration habitat for target species (over the next 15 years).

Strategies

- Contracting as necessary, work with engineers and hydrologists (with expertise in fluvial geomorphology) to determine and design overflow channels in the north part of the refuge (Ponds 11, 12, and 13) and remove infrastructure to allow for river movements into these channels. The design for this restoration may indicate the need for changes to Otter Pond. Revegetate exposed soils with gallery and riverfront forest species. A second intra-Service consultation will be conducted once this site-specific design is completed.
- Work with partners to investigate options for slowing the erosion of the WVA. All options will be evaluated based on cost, effectiveness, and impacts on the environment, including the river system.
- Continue to allow seasonal flows (including backwater flooding into Francois Slough) of the Bitterroot



Bob Dantley/USFWS

The erosion caused by the meandering Bitterroot River, next to the WVA.

River into and through North Island and Francois Sloughs. File for changes to existing water rights as directed by the Service's water resources division.

- Allow and promote natural regeneration of native gallery and riverfront forests and plant native trees, shrubs, and grasses, where appropriate.
- Monitor and treat new invaders within channels and on the newly exposed soils.
- Monitor the abundance and distribution of target species to determine the success of management techniques, and use adaptive management to ensure that the refuge is using the most effective methods and proven technologies.

Rationale

The combination of irrigation ditches and associated infrastructure (culverts, water diversion structures), development (bridge crossings, riprapping), and land use changes has significantly altered the Bitterroot River's channel form, structure, and movement within the Bitterroot Valley and its floodplain (Heitmeyer et al. 2010). Notably, existing river stabilization structures on the refuge, including frontline levees and riprap placed along the Bitterroot River in the 1950s, altered the river's physical and hydraulic dynamics and character. Ultimately, these structures may be contributing to potential damage on other stretches or off-refuge lands along the river, both upstream and downstream (Heitmeyer et al. 2010).

In addition to the possible impacts caused by infrastructure and land use, the Bitterroot River has an inherently unstable hydraulic configuration and high channel instability in the stretch immediately upstream from and at the Lee Metcalf Refuge. The river in this area is characterized by numerous braided channels that spread over a wide area of the Bitterroot Valley floodplain. Many of these channels are evident on Lee Metcalf Refuge.

Since the 1930s, lateral migration of the Bitterroot River channel has apparently accelerated, and the river

Table 8. Target species for the Bitterroot floodplain and their habitat needs.

<i>Habitat</i>	<i>Vegetation height and cover</i>	<i>Structural or foraging requirements</i>	<i>Area requirements</i>	<i>Nesting or breeding (after 1991)</i>	<i>Migration</i>
Wood Duck					
Creeks, streams, marshes, beaver ponds	Nests in natural cavities; trees for nest site are >24 inches DBH; cavities average 24 feet or higher aboveground	Freshwater wetlands with an abundance of vegetative cover; small areas of open water with 50–75% cover	Not territorial—priority is adequate cover	X	X
Lewis's Woodpecker					
Riparian woodland with ponderosa pine and cottonwood, logged or burned pine, and snags	Uses brushy understory and ground cover; requires snags for nesting (standing dead or partially dead); nest heights vary between 3 and 171 feet	During breeding, eats free-flying insects and fruit found on service-berry, hawthorn, dogwood, elderberry and sumac	Determined by food and storage-site availability	X	X
Willow Flycatcher					
Riparian woodland with willow and other shrubs and cottonwood; restricted to river and creek corridors	Nests in shrub thickets close to ground (3–5 feet high on average); willow shrubs are favored nesting substrate, but will use other shrubs	Eats primarily insects and occasionally fruit	Wintering home range estimated at 0.25 acre and breeding range at 1 acre	X	X
Vaux's Swift					
Coniferous and deciduous forest; large-diameter hollow trees (dead or alive) and chimneys are favored nesting and roosting sites	Cover not important for nesting; DBH averages 30 inches (17–43 inches); tree height averages 85 feet (30–131 feet); nest height averages 56 feet (30–108 feet)	Forages for flying insects in air over forest canopy and grasslands	Not territorial; nest singly or semi-colonially, when roosting-thousands can roost in a single tree	X	X
Brown Creeper					
Continuous and unfragmented mixed coniferous–deciduous forest, mostly old growth (>100 years); large snags and live trees; high canopy closure and high density of trees preferred	Forages especially on large trees (average >12 inches DBH) and tall trees (>89 feet) with trunks that have deeply furrowed bark that contain higher arthropod densities; nest height ranges between 2 and 45 feet and nest is almost always between trunk and a loose piece of bark on a dead or dying tree in a dense tree stand	Forages on variety of insects and larvae, spiders and their eggs, ants, and a small amount of seeds and other vegetable matter; forages primarily on trunks of live trees and occasionally on large branches, but rarely on the ground	During breeding, average territory size ranges from 0.02 to 0.06 acre; territories break down late in the fledging period	X	X
Hoary Bat					
Summer resident in forested riparian areas and woody wetlands	Roosts on trees 12–40 feet aboveground; dense vegetation above roost preferred	Open-air forager that prefers moths, but also feeds on beetles, wasps, grasshoppers, and occasionally small bats	Solitary with no real defined territory	Unknown	X

Sources: Bull et al. 2007, MFWP 2005, Hejl et al. 2002, Hepp 1995, Montana Bird Distribution Committee 1996, Sedgwick 2000, Texas State Parks and Wildlife 2011, Tobalske 1997.

Abbreviations: DBH = diameter at breast height, X = recorded use on the refuge.

is actively attempting to cross the floodplain at the refuge in new pathways, including seasonally shifting primary discharge through the North Island Slough. Lateral migration of the river has been discouraged to date by land interests along the river—including those of the refuge—to protect existing roads, agricultural land, and the railroad bed and trestle on the north end of the refuge. Control of river migration has been attempted by channeling and armoring channel banks with riprap and other materials. Eventually, more channel stabilization would be needed to keep the Bitterroot River channel “in place” because hydraulic dynamics from future high-flow events would continue to destabilize the current river channel configuration and destroy or damage existing physical structures. It is not only practical but preferable to balance the Bitterroot River’s natural fluctuations with restoration of native refuge conditions and land use interests. Riverbank erosion has occurred all along the refuge, and several levees have been breached by the river. This erosion has led to some loss of riparian habitats, a community type that provides some of the most productive wildlife habitat in the State and is home to a wide variety of birds, mammals, reptiles, and amphibians (MFWP 2005). Nevertheless, this type of flooding and erosion enriches the soil and creates the conditions necessary for expanding and sustaining riparian habitats across the refuge’s floodplain.

The levees impounding Ponds 12 and 13 have been partially eroded by the Bitterroot River’s side channel movements into the refuge through North Island Slough. The best use of these areas would be to remove the structures and allow the river to flood and recede. Current climate change models predict lower precipitation and lower river levels, and these historic flooding events may rarely take place. However, if natural flow patterns were restored—even to some degree—there would be opportunities to restore native habitats, such as riverfront and gallery forest, providing areas for target bird species (table 8). As necessary, the refuge will closely monitor and treat newly exposed soils as the river recedes. Although necessary for cottonwood and willow regeneration, newly exposed soil and channels could also create ideal conditions for the downstream movement and spread of existing and new invasive species. An active monitoring and treatment program would prevent this invasion and encourage native vegetation to outcompete less desirable species.

A section of trail in the WVA is being threatened with erosion caused by the river’s migration and flooding. The riverbank alongside the paved section of the WVA trail has eroded at least 100 feet in since 2008. It would be very difficult to prevent further movement of the river without significant cost and possible damage to other refuge resources. However, the Service will evaluate viable options for slowing the erosion in

the WVA. The decision on whether to pursue any option will be based on cost, effectiveness, and impacts on resources, including the river system. The Service will also evaluate relocating established trails if they were to become completely eroded and impassible. New trail designs will only be considered if the new trail will not be eroded by the river’s movements or impede river movements.

FLOODPLAIN OBJECTIVE 2

Reconnect floodplain habitats with the Bitterroot River to allow natural overbank and backwater flooding into and out of the floodplain during high flow events to support and expand the health, diversity, and extent of the riparian woodlands that could provide breeding, nesting, feeding, or migration habitat for target species (table 8) (over the next 15 years).

Strategies

- Construct wide spillways in or remove artificial levees, roads, and ditches that prohibit overbank and backwater flooding of the Bitterroot River and disrupt natural sheet flow into the central floodplain of the refuge.
- Work with engineers and hydrologists, contracting as necessary, to determine and design the best methods available to remove structures, level ditching, and islands that are impeding natural overbank and backwater flooding on the refuge, including Ponds 11–13. An intra-Service consultation will be conducted on final project designs affecting areas next to the river.
- Improve high water flow west of Ponds 6–10 into and through historical slough and swale channels by removing obstructions, levees, and dams in and across these drainages. File for changes to existing water rights as directed by the Service’s water resources division.
- Monitor and treat invasive species as necessary, particularly on newly exposed soils.
- Monitor the abundance and distribution of target species to determine the success of management techniques and use adaptive management to ensure the refuge is using the most effective methods and proven technologies.

Rationale

The diversity and productivity of the Bitterroot River Valley at and near Lee Metcalf Refuge was created and sustained by a diverse floodplain surface that was seasonally inundated each spring from both flooding of the Bitterroot River and drainage or seepage from surrounding mountain slopes. Occasional overbank and more regular backwater flooding from the river into its floodplain at the refuge historically helped create and sustain communities and basic ecological functions and values of the site. These flooding processes on the

refuge are now restricted by levees along the river, levees and dams on constructed wetland impoundments, roads, the railroad bed, and dams or other obstructions on tributary channels.

To restore the floodplain system at the Lee Metcalf Refuge, restoring the capability of the Bitterroot River to overflow its banks and to back water up tributaries and into other floodplain channels is desirable. The seasonal “pulsed” flooding regime provided uninhibited movement of water, nutrients, sediments, and animals between the river and the floodplain and supported life cycle events and needs of both plant and animal communities. Periodic long-term floods are also important floodplain processes that help maintain community dynamics and productivity. For example, overbank flooding deposits silts and nutrients in floodplains that enhance soil development and productivity. Overbank flooding also creates scouring and deposition surfaces critical for germination and regeneration of riparian woodland species, especially cottonwood (Heitmeyer et al. 2010). Backwater flooding provides foraging habitat for pre-spawning native fish and rearing habitat for larval and juvenile fishes. Annual backwater flooding recharges water regimes in depressions and shallow floodplain wetlands that serve as productive breeding habitat for amphibians, reptiles, waterbirds, and certain mammals. Subsequent drying of floodplains concentrates aquatic prey for fledgling waterbirds. Collectively, the body of scientific evidence suggests that restoring the hydrologic connectivity between the Bitterroot River and its floodplain at Lee Metcalf Refuge is desirable (Heitmeyer et al. 2010).

The variations in topography and soil created a mosaic of elevations and site-specific hydrology that supported many vegetation and wildlife communities on the Lee Metcalf Refuge. Unfortunately, the topography and flow of water across the floodplain has been altered, initially from land conversion, physical developments, and diversion of water for irrigation and then from construction of water-control infrastructure by the Service in an attempt to create more permanent wetland areas (ponds) for breeding waterfowl. The physical developments on and around the refuge have been detrimental to sustaining the natural functions and processes that made this area so rich and diverse.

Restoration of the physical and biological diversity and productivity of the refuge will require at least some restoration of natural topography, especially reconnecting waterflow pathways or corridors in the floodplain. Restoration of topography and waterflow pathways is important to allow water, nutrients, and animals to move through the system in more natural patterns. Additionally, restoring water pathways can improve both flooding and drainage capabilities to more closely emulate natural hydroperiods that sustained native plant communities (Heitmeyer et al. 2010).

The Service will work with engineers and hydrologists to determine the location, design, and steps needed to effectively restore natural waterflow without damaging other refuge resources or neighboring lands. Some of the options include completely removing levees, breaching them, or constructing a spillway to allow water to pass through a specific area.

One of the areas proposed for restoration is the old residence site on the west-central side of the refuge. This area has several levees that were created to form shallow water ponds. These ponds were abandoned due to an inability to deliver water or because of flooding of the residence due to subsurface waterflows.

There are many levees or berms that are not part of any impoundment. The vegetation on these levees is often a combination of nonnative grasses and invasive species. Keeping these levees and berms could not only inhibit river movements, but it may contribute to the spread of nonnative grasslands and invasive species. Removing these structures, or placing spillways in them, will allow natural backwater flooding and sheet flow to occur, but monitoring backwater areas for invasives will be required. Restored processes would encourage maintenance and propagation of native habitats of the riverfront and gallery forest.

Ponds 11–13 on the north side of the refuge are difficult to manage. These impoundments have fallen into disrepair due to non-operational water control structures and, more importantly, erosion of the impoundment dikes and levees by the Bitterroot River. Maintaining these ponds will be very costly and not very effective in providing habitat for a variety of target migratory floodplain species. The refuge will work with an engineer and hydrologist to transition this area—which currently contains artificial islands, level ditching, and cattail monocultures—into riparian woodlands, persistent aquatic vegetation, and uplands to benefit a variety of wildlife species. Initial steps will be to survey topography and design sustainable side channels of the Bitterroot River. Grading and revegetation will follow.

It will be important that the refuge closely monitor and treat newly exposed soils that would provide ideal conditions for the spread of existing and new invasive species. The refuge will have to implement an active treatment and restoration program to prevent this invasion and encourage native vegetation to outcompete less desirable species.

NORTH BURNT FORK CREEK OBJECTIVE (INCLUDING FRANCOIS SLOUGH)

Within the refuge, restore unimpeded flow from North Burnt Fork Creek with flow pathways into the Bitterroot River to reduce creek water temperatures, improve water and nutrient flow, create habitat conditions conducive to native cold-water species and

restore riparian woodland habitat that will support target species (within 8 years).

Strategies

- Based on historical channel information (photos, topographical features), establish the North Burnt Fork Creek entrance into the Bitterroot River where it is sustainable and conducive for native salmonids.
- Work with an engineer and hydrologist to determine the best route for North Burnt Fork Creek to return to the river, considering the requirements of bull trout. Strategically remove water control structures and other obstructions in the tributary and floodplain channels to allow fish and other aquatic animals to use this riparian corridor. An intra-Service consultation will be conducted once this site-specific design is completed.
- Through partnerships, encourage restoration and stream connectivity off the refuge to reestablish natural fish passage and flow pathways in the creek to its upper reaches.
- Monitor and treat invasive species, particularly on newly exposed soils.
- Monitor the changes in water quality to determine the success of management techniques, and use adaptive management to ensure the refuge is using the most effective methods and proven technologies (including invasive species).
- Restore newly exposed banks to riparian habitat.
- Monitor the trends in abundance and distribution of target species to evaluate the effectiveness of these proposed actions.

Rationale

North Burnt Fork Creek is a mountain and terrace derived tributary to the Bitterroot River. This stream channel has been altered both off and on the refuge through installation of culverts, bridge crossings, and artificial channels and from using the creek to transport water. The refuge has installed water control structures to provide fishing opportunities and has impounded water for waterfowl. Undesirable species, such as cattail and reed canarygrass, formed monocultures along the stream, crowding out and preventing the regeneration of native riparian vegetation such as cottonwood, willow, and dogwood.

Strategic removal of water control structures in the WVA and other areas along the creek will deepen and narrow the streambed. This reconnection will encourage riparian ecological processes to become reestablished.

Newly exposed soil will provide optimal conditions for invasive species encroachment or monocultures of cattails. The refuge will need to treat cattails and

other undesirable vegetation, including invasive species, using various techniques such as prescribed fire and other effective mechanical, biological, and chemical treatments. These methods will also be used to prepare areas for native plant restoration, as needed.

To further encourage riparian habitat restoration, the refuge will plant native vegetation, such as willow and cottonwood, on restored sites. It will be important to monitor the stream's response to the removal of structures and other management actions. Monitoring water chemistry (temperature, dissolved oxygen, total dissolved solids), streamside vegetation, and target species response will help to determine the success of management techniques.

THREE MILE CREEK OBJECTIVE

Reestablish a channel to the Bitterroot River that mimics the historical flow pattern of Three Mile Creek to create habitat conditions supporting native cold-water species (cooler water temperature, riffles, deep pools) and the restoration of riparian habitat. This objective will complement the Bitterroot River side channel restoration proposed for Ponds 11–13.

Strategies

- Develop contracts as necessary with engineers and hydrologists to determine and design the best methods available to remove structures, level ditching, and islands. Through partnerships, attempt to restore river and stream connectivity off refuge to reestablish natural fish passages and flow pathways in the creek. An intra-Service consultation will be conducted once this site-specific design is completed. File for changes to existing water rights as directed by the Service's water resources division.
- Plant and encourage native vegetation (for example, cottonwood or willow) on restored sites to prevent invasive species encroachment as Ponds 11–13 (see Floodplain Objective 2) dry up and overbank and backwater flow patterns reestablish.
- Treat cattails and other undesirable vegetation (including invasive species) using various techniques including disking, prescribed fire, chemical application and other effective mechanical, biological, and chemical treatments to control undesirable plants or prepare areas for native plant restoration.
- Monitor changes in water quality, including conducting a macroinvertebrate analysis, to determine the success of management techniques, and use adaptive management to ensure the refuge is using the most effective methods and proven technologies.
- Monitor the trends in abundance and distribution of target species to evaluate the effectiveness of these proposed actions.

Rationale

Three Mile Creek is another mountain and terrace derived tributary to the Bitterroot River. Much like North Burnt Fork Creek, this stream channel has been altered both off and on the refuge by the installation of culverts, bridge crossings, irrigation diversions, and spill. This creek contributes a high sediment and nutrient load to the Bitterroot River compared to other tributaries in the Bitterroot watershed (McDowell and Rokosch 2005).

In 1984, three sediment catch pools were built just south of Pond 11 to prevent sediment from entering and filling in Pond 11. The pools were filled to capacity in only 1 year. Then in 1989, as a solution to the sedimentation, Otter Pond was built. The refuge portion of Three Mile Creek was channeled into a bypass directly to the river. Water from Otter Pond was then siphoned under Three Mile Creek to feed Ponds 11–13. Undesirable species, such as reed canarygrass, formed monocultures along the stream, crowding out and preventing establishment of native riparian vegetation such as shrubs and sedges.

Currently, the river's mainstem is directed northward (figure 17), just west of this confluence, and the sediment from Three Mile Creek has created a willow-filled island and beaver ponds within what is now considered part of North Island Slough. Restoring Three

Mile Creek to its historical channel will encourage riparian ecological processes to become reestablished. Additionally, overbank flooding capabilities will improve and more closely emulate natural hydrological regimes that sustained native plant communities.

Newly exposed soil would provide optimal conditions for invasive species encroachment. The refuge will need to treat cattails and other undesirable vegetation, including invasive species, using various techniques including prescribed fire and other effective mechanical, biological, and chemical treatments, where appropriate. These methods will also be used to prepare areas for native plant restoration.

To further encourage riparian habitat restoration, the refuge will plant native vegetation, such as hawthorn and dogwood, on restored sites. It will be important to monitor the response of the stream to the removal of structures and other management actions. Monitoring water chemistry (dissolved oxygen, total dissolved solids, and temperature) and streamside vegetation will help to determine the success of management techniques and determine if another method would be more effective.

RIVERFRONT FOREST HABITAT OBJECTIVE

Restore regenerating and sustaining mechanisms for riverfront forest communities alongside the Bitterroot River that will provide nesting and migration habitat for target species such as willow flycatcher and Lewis's woodpecker.

Strategies

- Develop a riverfront forest inventory map and compare it with areas where riverfront forest occurred historically. Use this information to determine the most effective and strategic areas for restoration.
- Remove levees, berms, and roads to allow for natural overbank and backwater flooding (see Floodplain Objective 2). These occasional flood events would scour surfaces, deposit sands, and create regeneration sites to restore and sustain riverfront forest vegetation, including cottonwood, along the margins of the Bitterroot River.
- Use prescribed fire and grazing during dry periods to sustain occurrence of grasses and forbs.
- Construct temporary deer exclosures, as needed, to protect newly planted tree areas and regeneration sites.
- Monitor and treat invasive species and promote and restore vegetation native to riverfront forest to provide quality habitat for target species.
- Monitor the abundance and distribution of target species to determine the success of management techniques, and use adaptive management to ensure the refuge is using the most effective methods and proven technologies.



Bob Danley/USFWS

The Service will restore unimpeded flow from North Burnt Fork Creek and Three Mile Creek into the Bitterroot River.

GALLERY FOREST HABITAT OBJECTIVE

Restore regenerating and sustaining mechanisms for gallery forest communities on higher floodplain elevations (natural levees and benches) in areas with sandy-loam soils, on natural levees, and on other floodplain ridges that have 2- to 5-year flood occurrence intervals in order to sustain and expand nesting and migration habitat for target species such as Lewis's woodpecker, willow flycatcher, and hoary bat.

Strategies

- Develop a gallery forest inventory map to identify its current extent and historical range, particularly along the west side of Ponds 8 and 10. Use this information to determine the most effective and strategic areas for restoration.
- Reduce the size of Ponds 8 and 10 to allow for expansion of gallery forest on the west side of these impoundments, thereby reducing the amount of water diverted to these ponds. Use prescribed fire, grazing, and chemical applications to manage cattail encroachment, and sustain the occurrence of grasses and forbs.
- Plant cottonwood and ponderosa pine to expand gallery forest areas, focusing on areas with appropriate soils.
- Allow for continued natural regeneration of the shrubland component in the gallery forest (hawthorn, alder, wood's rose, and dogwood) while applying and evaluating proven techniques for promoting the shrubland component within the gallery forest.
- Construct deer exclosures to protect newly planted areas and regeneration sites, as needed.
- To protect restoration sites, monitor and treat invasive species using prescribed fire, chemical applications, and mechanical techniques.

- Seed grasses such as bluebunch wheatgrass and Idaho fescue under and between the trees and shrubs to reestablish ground cover and outcompete noxious and invasive plants.
- Survey and monitor the population and response of forest target species before and after enhancement and restoration treatments.
- Sustain wet meadow communities on Slocum loam soils with 2–5 year flood frequencies.

Rationale for Riverfront and Gallery Forest Objectives

Historically the Bitterroot River Valley, which includes the Lee Metcalf Refuge, supported a wide diversity of animal species associated with the interspersed riparian forest, wetland, and grassland habitats. The riparian forest is made up of riverfront forest and gallery forest (Heitmeyer et al. 2010).

Riverfront forest includes early succession tree species such as black cottonwood and sandbar willow that are present on newly deposited and scoured gravelly-sand, sand, and fine sandy loams near the active channel of the Bitterroot River and in sand-outcrop sites next to floodplain drainages. These sites have high water tables for most of the year and are inundated for short periods during high spring river flows almost annually. Regularly scoured soils provide bare soil sites for seed deposition and subsequent germination and growth of willow and cottonwood (Cooper et al. 1999, Heitmeyer et al. 2010)

Gallery forest is dominated by cottonwood and ponderosa pine and is present on higher floodplain elevations along natural levees and point bar terraces next to minor floodplain tributaries. Gallery forest areas often have woody shrubs such as alder, hawthorn, dogwood, and Wood's rose in the understory and mixed grass species such as bluebunch wheatgrass and Idaho fescue under and between the trees and shrubs. The gallery forests were flooded occasionally by overbank or backwater floods from the river and for short durations in the spring (Burkhardt 1996, Fischer and Bradley 1987, Heitmeyer et al. 2010).

Most wildlife species in these forests were seasonal visitors that used resources provided by spring and early summer pulses of water into the system. Riparian woodlands in the Bitterroot Valley were sustained by fertile floodplain soils and seasonal inundation for generally short periods at about 2- to 5-year intervals. Occasional disturbance mechanisms provided suitable substrates for regenerating tree species and shrubs. Riparian woodlands in Montana generally are in poor condition if the shrub components are not present, most commonly due to overgrazing (Heitmeyer et al. 2010).

Collectively, many landscape and hydrological changes in the Bitterroot Valley since Euro-American settlement have dramatically altered the physical nature, hydrology, and vegetation communities



Bob Danley / USFWS

Restoring and expanding gallery and riverfront forest would enhance habitat for species including brown creeper and hoary bat.

of the refuge. Before Euro-American settlement, the relatively dry climate of the valley and the migration of the Bitterroot River created a diverse mix of communities including riverfront and gallery forest next to the Bitterroot River and floodplain drainages.

In response to the altered ecological processes, there are now reduced areas of riverfront and gallery forest. Restoration and expansion of the riparian woodlands will be a long-term project that will surpass the life of this plan. Ideally, and over time, using prescribed fire, planting native plants (plugs of dominant tree species and shrubs), treating and controlling invasive species, and restoring hydrological regimes will allow for the restoration of these habitats to support target species.

The refuge does not have a complete forest inventory map. Developing this map will help the refuge determine the extent of this native forest and where it occurred historically; in turn, this will help determine the most effective and strategic restoration areas. However, there are some areas that need immediate attention along the river. Removal of levees and roads will allow overbank and backwater flooding into historical forest areas. This action will scour the surface of the soil and deposit fine sediments, creating conditions to promote cottonwood regeneration—a main vegetative component of the riparian woodlands. Where appropriate, the refuge will implement prescriptive fire and grazing in forest areas to allow scarifying of pine cones, which promotes germination of ponderosa pine, another component of riparian woodlands.

Other focus areas will be Ponds 8 and 10. The HGM-derived map of vegetation before Euro-American settlement shows this area to be a mixture of gallery and riverfront forest (figure 15). Creating these ponds reduced the amount of native forest habitat. Past water level management has also created very large monocultures of cattails that have reduced the amount of open water available to the waterbirds these ponds were intended to support. Returning gallery and riverfront forest to these historical sites will begin to restore a unique and important habitat to this part of the refuge and the Bitterroot Valley, providing new areas for identified forest target species. The Service will draw down water in Ponds 8 and 10, as needed, to allow for this expansion. The ponds will still be managed for open water, but the water table will be lowered and the amount of cattail surrounding these ponds will be reduced to allow for forest expansion. Reducing cattail is most effective using a variety of methods including prescribed fire, grazing, and chemical applications.

It will be important that the refuge closely monitor and treat newly exposed soils. This newly exposed soil would create ideal conditions for the spread of existing and new invasive species. The refuge will have to implement an active treatment and restoration program to prevent this invasion and encourage

native vegetation to outcompete less desirable species. Additionally, erecting deer exclosures or other plant protectors will help protect tree and shrub plantings from being overbrowsed and killed by deer.

4.3 Goal for Wetland Impoundment Habitat and Associated Wildlife

Where appropriate, manage wetland impoundments to create a diversity of habitats for target waterfowl, shorebirds, and other associated native wetland-dependent species.

TARGET WETLAND HABITAT SPECIES

The Service has identified the habitat needs of a diverse group of target waterbird species, including ducks and shorebirds. Providing for the life history needs of these species will provide the natural wetland diversity and conditions needed not only for these target species, but also for an even greater variety of wetland-associated wildlife. Monitoring will focus on these target species to determine their response to wetland management actions.

In the Bitterroot Valley, the Lee Metcalf Refuge is an important refuge for migratory birds during the spring and fall. Waterfowl breeding and brood rearing occurs on Lee Metcalf Refuge with a great variety of waterfowl using the refuge for these life history requirements; however, the refuge is not a major production refuge. The most important habitat management efforts will focus on providing optimal habitat for foraging and resting during migration. Lowering the water levels will serve to increase food availability by concentrating foods in smaller areas and at water depths within the foraging range of target wildlife. The rate and timing of drawdowns have important influences on the production and composition of semi-permanent wetland plants and invertebrates that provide protein-rich food resources (USFWS 1991) for each of these target bird species.

WETLAND IMPOUNDMENT HABITAT OBJECTIVE 1

Over the next 15 years, manage water levels on 628 acres to emulate natural and seasonal water regimes including natural increases in waterflow in the spring followed by rotational drying in the summer and fall. Managed properly, these wetland impoundments, or ponds, should provide a variety of wetland conditions to meet the life cycle requirements of target wetland-dependent species (table 9).

Table 9. Wetland impoundment target species and their habitat needs.

<i>Species</i>	<i>Spring migration</i>	<i>Forage depth</i>	<i>Fall migration</i>
Birds			
American wigeon	Mid-March to mid-April	5–8 inches	Mid-November to mid-December
Redhead	Mid-March to mid-April	6–30 inches	Mid-November to mid-December
Marbled godwit	Early May to early June	Mudflats, 0–4 inches	Early July to early September
Long-billed dowitcher	Mid May to mid-June	Mudflats, 0–4 inches	Early July to early September
American bittern	May to June	Mudflats, 0–4 inches	July to September
Amphibians			
<i>Species</i>	<i>Habitat</i>	<i>Breeding</i>	<i>Active period</i>
Boreal toad	Wide variety; survive best in shallow ephemeral ponds to avoid American bullfrog predation	April to mid-July	April to October

Sources: Gratto-Trevor 2000, Lowther et al. 2009, Mowbray 1999, MFWP 2005, Montana Bird Distribution Committee 1996, refuge data, Takekawa 2000, Texas State Parks and Wildlife 2011, Woodin et al. 2002.

Strategies

- Maintain or replace the water management structures in Ponds 1–6, Ponds 8 and 10, and Otter Pond. The remaining wetland impoundment structures will be maintained as needed.
- Water level management of all ponds will be changed to a more seasonal water regime that emulates natural increases in distribution and depth in spring, followed by occasional drying in summer and fall to encourage the restoration of wetland and shrub habitat. While drawing wetlands down, exposed shorelines will be monitored and treated to prevent invasive species and monotypic stands of cattails from becoming established. File for changes to existing water rights as directed by the Service's water resources division.
- Prevent invasive species encroachment into newly exposed soil using various mechanical, biological, and chemical treatments to control invasive species and prepare areas for native restoration.
- Manage, or maintain, a hemi-marsh condition of the ponds to create a ratio of 50:50 open-water to emergent vegetation (such as bulrush and cattail), providing optimal breeding and brood rearing habitat for diving ducks and dense emergent vegetation over water 2–8 inches deep for bitterns.
- Manage or maintain dry ground with tall grasses and mixed herbaceous cover for dabbling ducks.
- Emulate long-term patterns of drier conditions in floodplain wetlands in most years including periodic complete drying in some years and occasional prolonged flooding in a few years.
- To determine the water-level targets needed to provide adequate food, cover, and nesting substrate for target waterbird species, install staff gauges in all wetland impoundments where they are missing.

- Determine the feasibility and methods for restoring the historical flow of the side channel of the Bitterroot River and Three Mile Creek through Ponds 11–13 to restore riparian habitat (see Floodplain Goal) and reestablish unimpeded flow to the river.
- Monitor the trends in abundance and distribution of target species to evaluate the effectiveness of these proposed actions.

Rationale

Wetland impoundments on the refuge were constructed and developed to provide open-water habitat for migratory waterfowl and shorebirds. However, past management has not consistently emulated seasonal or long-term dynamics of water levels that naturally occur in wetlands. Instead, water regimes in some ponds have consisted of drawdown in the spring to provide mudflats for shorebirds, followed by flooding the ponds for nesting waterfowl. The ponds would then stay full during the summer until early fall with drawdown again for shorebirds, followed by flooding for migratory waterfowl and to enhance waterfowl hunting opportunities. This water regime occurs only on some ponds while others—notably Pond 6, Pond 8, Pond 10, and Otter Pond—are usually full year-round. These permanently flooded wetlands have experienced algal blooms, encroachment of cattails, and low productivity and nutrients. Overall, the refuge's past water regime has not provided the optimal habitat for target wetland species.

Researchers from the University of Montana have been investigating the contamination of mercury on the refuge and elsewhere in Montana. This study and similar investigations by Service staff have discovered concentrations of methylmercury in largemouth bass (within the wetland impoundments) and in osprey chick tissue samples. It is theorized that there has been bioaccumulation of methylmercury as a result

of stagnant water, and mercury concentration in fish on the refuge has been high (Langner et al. 2011). It is possible that this methylmercury may also be contributing to the decline of osprey production over the years (figure 19) and has prompted concern of contamination in osprey eggs, making some nonviable (Heiko Langner, personal communication, professor of biological sciences, University of Montana, November 2010 and February 2011). The precise mechanism of forming methylmercury is still unclear as the synthesis of methylmercury in aquatic systems is influenced by a wide variety of environmental factors. While there is no simple relationship, it appears that enhanced rates of methylmercury production are linked in particular with low pH, low salinity, and the presence of decomposable organic matter in reducing environments. Both methylation rates and the stability of methylmercury in sediments appear to be enhanced under anaerobic conditions (Ullrich et al. 2001), a condition that can occur when water is stagnant.

To provide optimal habitat, increase nutrient uptake and plant productivity, and decrease methylation of mercury, the Service will manage Ponds 1–6, Pond 8, Pond 10, and Otter Pond for a more seasonal and dynamic water regime by increasing water levels in spring and slow drying in summer and fall. Rotation of ponds with drawdowns will depend on annual habitat objectives and responses of target wildlife to water regimes. To manage and move water more effectively, the refuge will need to replace old, dilapidated water management structures as well as structures that are not effective due to size. Some of the existing structures are extremely unsafe and require more than one person to operate. Replacement of these structures will provide more cost effective and safe operations. It will also be important for the refuge to manage cattails and prevent their further encroachment into open water. Cattail is very difficult to control, and management will require a variety of methods such as prescribed fire, grazing, and chemical application. It will be important that the refuge closely monitor water levels and quality to evaluate the effectiveness of any water regime. Documenting the response of target species will also help evaluate the effectiveness of this management program while using adaptive management to ensure that the refuge is using the most effective methods and proven technologies.

WETLAND IMPOUNDMENT HABITAT OBJECTIVE 2

Where appropriate, reduce the area of more permanently flooded wetland impoundments and persistent emergent vegetation to restore native plant communities, such as gallery forest, while improving the diversity and productivity of the remaining impoundments for the benefit of target waterbird species (over the next 10 years).

Strategies

- Remove levees, ditches, and water control structures from abandoned wetland impoundments to facilitate the restoration and expansion of the gallery forest (Ponds 7, 7a, 7b, and 9) and native grassland (Pair Ponds and Potato Cellar Pond) habitat.
- Reduce Pond 8 and Pond 10 in size to allow for the restoration of gallery forest habitat on the west side of these impoundments.
- Treat exposed shorelines to prevent invasive species and monotypic stands of cattails from becoming established before restoration. Use a variety of management techniques such as prescribed fire, chemical application, livestock grazing, and mechanical means.
- Monitor the trends in abundance and distribution of target species to evaluate the effectiveness of these proposed actions.

Rationale

Refuge lands around and within Ponds 8 and 10 were once a mixture of riverfront and gallery forest, but today this habitat is less extensive here and in the Bitterroot Valley. Creating these ponds reduced the amount of forest habitat and created open water. Over time, the shallow margins of these ponds have become covered with cattail growth, creating a management challenge and reducing habitat for most waterbirds. Managing these permanently flooded ponds for open water is not the highest and best use of this habitat type due in part to a lack of nutrient cycling, a reduction in early successional submergent vegetation, and the spread of monotypic cattail stands. These stands are difficult to control and provide less than optimal habitat for target wildlife species.

The best use of this area is to restore and expand the gallery and riverfront forest in these historical sites, thereby enhancing the habitat needed by native forest target species such as brown creeper and hoary bat. The Service will draw down water in Ponds 8 and 10 and Otter Pond to allow for this expansion. The ponds will still be managed for open water, but the amount of cattail surrounding these ponds will be reduced to allow for forest expansion and restoration. Some of the most effective methods for reducing cattails are prescribed fire, grazing, and chemical applications; it is important to use the right treatment at the right time to be effective and prevent further spread. In addition to reducing the ponds in size, the refuge will replace the water control structures on Ponds 8 and 10 to allow more effective, productive water level management on the remaining wetland area.

There are several old and abandoned ditches and levees throughout the refuge from former attempts to impound water. These attempts have failed due to lack of water availability and the inability of the soil

to hold water. These levees, ditches, and water control structures will be removed to facilitate the restoration of gallery forest in Ponds 7, 7a, 7b, and 9 and native uplands in Pair Ponds and Potato Cellar Pond.

GRAVEL PITS OBJECTIVE

Use the gravel pits—created when gravel is harvested east of the Bitterroot River—to provide nursery habitat for amphibians such as the boreal toad, a State species of concern, and the Columbia spotted frog.

Strategies

- Remove vegetation and soil from the artificial gravel pits to restore the desired habitat conditions for native amphibians, as appropriate. If necessary, harvest gravel October through March, avoiding disturbance and displacement of any amphibians during breeding season.
- Manage these old gravel pits as ephemeral pools to discourage the American bullfrog, an invasive predator of amphibians and other desirable native species.
- Survey amphibian populations and monitor the response of amphibians to determine the success of management techniques. Adapt management techniques to ensure the refuge is using the most effective methods, research, and proven technologies.

Rationale

Since the 1990s boreal toads have been declining throughout the Rocky Mountains. In Montana, the species status is uncertain, but it has been listed by the State as a species of concern. There are relatively few known breeding populations.

Throughout its life cycle, the boreal toad uses a wide variety of habitats including streams, wet meadows, beaver pools, marshes, and lakes. They prefer shallow areas and edges with mud bottoms. These gravel pits have become shallow, disturbed gravel ephemeral pools—desirable breeding habitat for these toads. In 2001, researchers on the refuge found 20,469 eggs from a single female in a refuge gravel pit. This was the largest clutch ever reported for this species (Maxwell et al. 2002).

It is suspected that breeding boreal toads are limited to just a few areas on the refuge, like the gravel pits, due to American bullfrog predation, an invasive species that has been introduced throughout the western United States. Introduced in Montana sometime before 1968, the bullfrogs have been documented all along the Bitterroot River and extensively throughout the refuge. This species is so widespread throughout the Bitterroot Valley, it is almost impossible to control through treatments other than removing their desired habitat, which affects native species. Extremely territorial, they are voracious predators that feed on young birds, fish, snakes, crayfish, invertebrates, and

other amphibians. This feeding behavior allows them to displace native species easily (Werner et al. 2004). They have been implicated in extirpations of amphibians and declines in waterfowl production (State of Montana 2011). Any suitable pond habitats available for native amphibians are typically occupied solely by American bullfrogs.

The American bullfrog is highly aquatic and spends much of its life in warmer permanent water. As the gravel pits are fairly shallow and ephemeral in nature, they experience dry periods. This hydrology is not conducive to the life cycle of the American bullfrog. The refuge will continue to manage these old gravel pits as ephemeral pools to discourage American bullfrogs. This will serve to maintain, if not promote, boreal toad populations. Columbia frogs have similar habitat needs as the boreal toad; however, they prefer emergent and aquatic vegetation. Removing too much of this vegetation for boreal toad larval habitat may impact the other native frogs that use these gravel pits.

4.4 Goal for Grassland and Shrubland Habitat and Associated Wildlife

Create the conditions that will allow for the restoration, maintenance, and distribution of native grassland and shrubland species (such as rabbitbrush, needle and thread grass, Junegrass, and hairy golden aster) to provide healthy lands for a diverse group of target native resident and migratory wildlife species and to educate visitors about the historical plant and animal diversity of the valley.



Steve Maslowski/USFWS

The bobolink is a target species for the grassland and shrubland areas.

TARGET GRASSLAND AND SHRUBLAND SPECIES

The Service has identified the habitat needs of a diverse group of target upland (grassland and shrubland) species (table 10). Providing for the life history needs of these species will provide the natural upland diversity and conditions needed not only for these targeted species but an even greater variety of upland-associated wildlife. Monitoring will be focused on these target species to determine their response to upland management actions.

GRASSLAND AND SHRUBLAND HABITAT OBJECTIVE

Reduce the presence of invasive species to facilitate the restoration, maintenance, and distribution of native grasslands and shrublands in higher floodplain elevations and terraces and on alluvial fans (over the next 10 years).

Strategies

- Use Service staff and equipment—possibly in combination with cooperative farming—to plant annual grain crops (including glyphosate-tolerant crops) to eliminate invasive species, including the seedbed, and to prepare an area for restoration to native plant species (over 5–10 years).
- As appropriate, keep some fields fallow using repeated disking or chemical applications to continually treat and reduce invasive species. Some fields may also be planted to winter wheat to reduce erosion from wind and runoff.
- Use small tame grassland sites to determine the best methods to restore native plants and shrubs on the refuge both with and without irrigation.
- Continue to implement and evaluate tested techniques for reducing cheatgrass.

Table 10. Target species for the grassland and shrubland areas and their habitat needs.

<i>Habitat</i>	<i>Vegetation height</i>	<i>Vegetation cover</i>	<i>Litter and/or residual cover</i>	<i>Area requirements</i>	<i>Nesting or breeding (after 1991²)</i>	<i>Migration</i>
Western Meadowlark¹						
Open, treeless areas with widely dispersed shrubs	Varies—shortgrass prairie to mixed and tallgrass prairie	Nest sites in grass clumps or next to prickly pear	Abundance is positively correlated with litter depth	5–32 acres depending on vegetation height; more abundant on interior plots >656 feet from edge	X	X
Bobolink¹						
Mixture of grasses and broad-leaved forbs	2–6 inches	Nests beneath the shade of forbs; no nests found where grass is only concealment	Density is higher in areas with low total vegetation cover but with high litter cover (hayfields >8 years old)	2–4 acres depending on habitat quality; on fields >74 acres, there are more than twice the number of males than on fields <25 acres	X	X
Grasshopper Sparrow¹						
Idle grasslands with clumped vegetation interspersed with bare ground.	Intermediate, >4 inches	Bird numbers are positively correlated with percent grass cover (the more cover, then the more birds)	Moderately deep litter and sparse cover of woody vegetation	Average size is <5 acres but prefers 20–74 acres; more abundant on interior plots >656 feet from edge		X
Brewer's Sparrow¹						
Considered a sagebrush-dependent species; moderate shrub cover	2–5 feet	>10% average shrub cover; abundance decreases as shrub cover falls below 10% and over 50%; nests on shrubs 9–75 inches in height	No information	Usually 1–5 acres		X

¹ These species do not currently nest on the refuge in great numbers, but with restoration of these desirable habitat qualities, it may allow them to become reestablished.

² Refuge data.

Sources: Dechant et al. 2002a, 2002b; Martin et al. 1995; MFWP 2005; Montana Bird Distribution Committee 1996; Texas State Parks and Wildlife 2011; Walker 2004.

Abbreviation: X = recorded use on the refuge.

- Use fire, grazing, seeding, and other proven techniques to facilitate the spread and distribution of remnant native species into areas surrounding existing native grassland and shrubland sites.
- Systematically convert tame grassland areas to native species of grass, forbs, and shrubs using direct seeding, irrigation (where possible), prescribed fire, and other mechanical, chemical, and biological methods.
- Restore intermittent and seasonal water regimes to higher elevation sites within the floodplain and restore patterns of sheet flow surface water movement across the sites by removing unnecessary roads (figure 24), ditches, levees, and other infrastructure.
- Based on soil type, convert higher banks of current impounded wetlands (that is, Pair Ponds and southwest corner of Field S-1) to native grasses, sedges, and shrubs by removing levees and water control structures and restoring seasonal water regimes. Seed tame grassland fields with nonnative grasses (not noxious) to outcompete the noxious and invasive weeds. Once these are established, interseed native grasses, forbs, and shrubs.
- Due to a lack of irrigation and moisture, use native seed that can be germinated with minimal moisture.
- Where possible, harvest native seed from plants found on the refuge.
- Based on historical frequencies and the habitat requirements of target species, provide occasional disturbances from fire, mowing, or grazing to recycle nutrients and regenerate grass, shrub, and forb species.
- As saline soils require a different seed mix and management, determine where these soils exist and map them in Refuge Lands Geographic Information System (RLGIS).
- Monitor trends in abundance and distribution to evaluate the effectiveness of these proposed actions.

Rationale

Soil maps reveal that most uplands on the refuge were historically covered with grasses and some scattered shrubs. Some areas experienced occasional flooding and had more wet grassland communities interspersed with herbaceous plants such as smartweed and sedges. By contrast, higher floodplain terraces, slopes, and alluvial fans included mixed wet and upland-type grasses and shrubs such as rabbit brush, sage, needle and thread, and Junegrass (Heitmeyer et al. 2010). These uplands were altered by farming and agricultural practices. Very little, if any, native grassland and shrubland was intact when the refuge was established. Some of these agricultural and tame grass fields are heavily infested with invasive species and provide minimal

habitat value to upland wildlife, such as grassland birds. Since refuge establishment, the uplands have continued to undergo various management techniques, and there has been no long-term management approach due to a lack of management plans. Since the 1870s (when this area was homesteaded), the soils in these uplands have been altered and disturbed by farming and agricultural practices; they have also been affected by the change in system hydrology due to irrigation practices, impoundments, roads, and levees (Graham 2009). While the refuge retired these tame grasslands and rested them for many years, invasive plants such as spotted knapweed, cheatgrass, and Canada thistle have become widespread in these areas. This has reduced the tame grasses that can provide some habitat value for grassland nesting birds.

There are many challenges to restoring the uplands. Restoration will be costly and time consuming. To begin restoration, the refuge will first focus on treating and eliminating invasive species and testing restoration techniques in small patches of tame grassland sites. Since many of these areas do not have irrigation, it may be challenging to germinate some native grassland seed. Many of the upland field soils receive no moisture or shade from the drying sun. This has resulted in a hard soil cap that is almost impossible for native vegetation to take root in and seed successfully. Grazing or disking may help to break up this soil cap to allow for seeding.

Treatment and restoration will be accomplished through a variety of methods including chemical applications (using the Service's approved chemicals only), cropping for multiple years before seeding with natives, mowing, grazing, prescribed fire, and direct planting. Effectively controlling invasive species may require using several of these methods (see section 4.5, "Goal for Invasive and Nonnative Species").

To reduce the invasive weed seedbed, formerly disked and farmed fields with considerable amounts of invasive species will be planted to small grains for several years. Using herbicide-treatable seed and applying herbicide will reduce the weed seedbed that has built up in these soils for years. The small grain crops will also provide an interim wildlife food source for a number of migratory birds and resident wildlife. Some fields will also be kept fallow and disked at strategic times when invasive plants begin to grow. This farming will stimulate the weeds to grow, and then they will be mowed, and in some cases disked, before seeding. Winter wheat could be used on these fallow fields to reduce erosion from wind and runoff. These fields will be disked again in the spring. Once the resprouting of invasive plants is reduced (after 4–7 years), restoration to native plants will begin and soil disturbance will cease. Upland Fields I-1 through I-7 could potentially be irrigated by a wheel line (figure 17). However, the wheel line is expensive and time

consuming to repair and operate. The refuge will use irrigation where it will be beneficial for the transition from small grains to native grasslands. Many of the former agricultural fields are dominated by cheatgrass and smooth brome. Upland Fields S-1 and S-2 are subirrigated units with a high water table that keeps the soil somewhat moist. These fields have more of a mixture of grasses but still have considerable invasive species. Canada and musk thistle are rapidly invading these fields in the south part of the refuge.

Other potential treatment and restoration sites include formerly impounded areas and proposed restoration sites where the Service will remove levees, berms, and water control structures by the old residence site; Ponds 7, 7a, 7b, and 9; and Pair Ponds (see section 4.3, “Goal for Wetland Impoundment Habitat and Associated Wildlife,” and figure 17).

4.5 Goal for Invasive and Nonnative Species

Prevent, reduce, and contain the invasion and spread of noxious, invasive, and harmful non-native species within the refuge while working with partners to address off-refuge infestations within the surrounding landscape.

NEW INVASIVE SPECIES OBJECTIVE

Within 5 years, establish a baseline inventory of all invasive plants including noxious weeds for the refuge to develop thresholds or triggers for management actions and priority management areas. Use early detection and rapid response to prevent, monitor, and treat all new invaders or small infestations (for example, blueweed, hoary alyssum, and Dalmatian toadflax) to prevent establishment and additional management burden for invasive species.

Strategies

- Recruit one biological science technician to coordinate the IPM program.
- Continue to map known locations of early invaders and continue to update the database as areas are treated.
- Train or certify employees and cooperators (including the Service’s strike team) in invasive species identification, mapping techniques, mechanical techniques (shovel, hand pulling, and netting), and chemical application.
- Prioritize treatment in those areas where restoration is occurring and in heavy public use areas.
- Through partnerships, determine the presence of known and new harmful wildlife and insect species and treat them as needed. Through partnerships,



Bob Dantley/USFWS

Service equipment will be used to plant annual cover crops as part of a process to eliminate invasive species.

develop a program to treat and monitor off-refuge sources of early invaders.

- Actively include volunteers, cooperators, and community support groups in new invader treatment and restoration programs.
- Develop a partnership with MFWP, Ravalli County, and others to monitor aquatic invaders.
- Use geographic information system (GIS) technologies to map treated sites and monitor and re-treat areas to prevent reintroduction and spread.

ESTABLISHED INVASIVE SPECIES OBJECTIVE

Reduce infestations of Canada thistle, spotted knapweed, common tansy, houndstongue, reed canarygrass, cheatgrass, and musk thistle by at least 20–30 percent (measured by canopy cover) over 15 years. Reduce infestations of tall buttercup, yellowflag iris, leafy spurge, St. Johnswort, oxeye daisy, yellow toadflax, and common bugloss on the refuge by at least an average of 45–50 percent (measured by canopy cover) over 15 years.

Strategies

- Using RLGIS, continue to monitor invasive species distribution and abundance and use this information to prioritize treatment, monitor treatment sites for effectiveness, and re-treat as needed.
- Use a combination of biological, mechanical, cultural, and Service-approved chemical techniques to reduce infestations of established invasive species. Map and monitor all treatment sites.
- Continue to investigate viable options for controlling invasive species using minimal amounts of chemicals.
- Train or certify employees and cooperators (including the Service’s strike team) in invasive species identification, mapping techniques, mechanical techniques (shovel, hand pulling), and chemical application.

- Monitor and re-treat areas to reduce patch sizes and to prevent reintroduction.
- Continue to use partnerships to treat known invasive species areas, including off-refuge sources of invasive plants.
- Expand capabilities to treat and restore identified priority areas to create contiguous blocks of native habitat for native wildlife species.
- As soil is disturbed for restoration and management activities, treat these areas for invasive plants and restore them to desirable or native species.
- Only purchase gravel for the refuge that is certified weed-free.
- Review and update the IPM plan.
- Through partnerships, attempt to prevent the re-invasion of treated areas from off-refuge sources.
- Actively involve volunteers and community support groups in education and outreach to increase awareness and prevent establishment of invasives.
- Work cooperatively with the Whitetail Golf Course, located within the refuge boundary, to address invasive species that can be transported to the refuge.

Rationale for New and Established Invasive Species

Due to changes in the refuge's landscape—including conversion of native habitat to agriculture (before refuge establishment) and the advancing of nonnative species across the landscape—the refuge is infested with at least 15 invasive plant species. These invasive species are so widespread that the refuge is challenged in fulfilling its wildlife conservation mission with respect to biological diversity and biological integrity.

These invasive plants can displace native vegetation over large areas and form nearly monotypic stands in the absence of management—accordingly, they threaten native biodiversity (Bedunah 1992, Hutchison 1992). The control or elimination of invasive plants on Service lands will comply with State and Federal laws for invasive and noxious species, including all Service policies pertaining to chemical treatments.

The treatment of weeds requires two different tactics. The first, Early Detection and Rapid Response, focuses on treating new invaders to prevent establishment, which will add to the existing management burden. New invaders are species that are present in small infestations or which have recently been documented on the refuge and are not widespread or well documented. The second tactic involves continual treatments to reduce the size of larger, established infestations. These areas will be targeted repeatedly in multiple-year treatment plans. All invasive species treatments will require monitoring to measure their effectiveness and allow adaptive management as necessary.

Invasive plant management requires baseline information of size, canopy cover, location relative to priority wildlife habitat areas, and rate of spread to be able to determine the most cost-effective management strategies. An inventory will help prioritize management areas and strategies for eliminating new and isolated infestations, containing them, or reducing larger infestations. Using IPM techniques, the refuge will develop both short- and long-term plans to target and reduce the low, medium, and high ranking infestations of weeds. Montana Department of Agriculture ranks invasive noxious weeds on the degree of infestation and threat to the State. Using these rankings and the degree of threat to refuge lands, the refuge has developed high, medium, and low rankings for treatment. High ranking species are those that are just arriving on the refuge in very small infestations—that is, new invaders. Targeting these species before they become more established is critical. Medium ranking species are those that are more abundant and a bit more established than high ranking species. Finally, low ranking species are those that are well established and cover a lot of acreage, making their control and eradication more challenging, much more costly, and often less successful than smaller infestations.

Controlling invasive species must start on the ground level with education and training because prevention is the most cost-effective management method. Employees, volunteers, and cooperators will be trained in species identification including how to identify new invaders. Each will be trained on how to treat invasive species and which technique (chemical, mechanical, biological, or cultural) is most effective for each species, including timing and duration.

Employees travel all around the refuge, and thus they are highly likely to transport weeds; therefore, the refuge will make sure that all employees can identify weeds and at least one employee maintains a pesticide applicator's license. Steps will be taken to reduce the probability of transporting weeds, such as washing equipment before transporting it to another location. Additionally, any dirt work that is performed will be immediately followed by reseeding of desired species and treatment of invasives.

Infestations of invasive species from adjoining lands have increased in recent years. The refuge will continue to develop its partnership with the Ravalli County Weed District to provide education to adjoining landowners on weeds and their detrimental effects on habitat. A program will be developed to treat and monitor off-refuge sources of new invaders.

As more established and larger infestations are targeted, such as those in upland fields, focus areas will be developed to maintain consistent treatment and monitoring over several years in one area to prevent reintroduction of invasive species. The refuge will recruit volunteers and youth groups for this effort.

Invasive species treatment is an important step in habitat restoration; however, once native plant species become established, they should resist reinvasion.

4.6 Goal for Research

Pursue and maintain compatible research projects that will provide information on refuge resources and address refuge issues to assist management in making decisions based on the best available information and science.

RESEARCH OBJECTIVE

Identify and support research projects that substantially benefit the refuge and species conservation and management (for example, floodplain restoration, target species studies, and public use).

Strategies

- Evaluate all current research projects to determine their value in addressing refuge management objectives and concerns.
- Focus wildlife research on assessments of species–habitat relationships.
- Identify, design, and conduct issue-driven research and work with universities to develop senior thesis projects, graduate projects, or other research proposals that will address identified issues or provide useful data for management actions and adaptive management. Continue to participate with other Service divisions and the State in researching wildlife diseases on the refuge.
- Evaluate impacts on both ground and surface water quality from off-refuge water sources including supply ditches, creeks, and other public inputs (for example, subdivisions, septic systems, and underground tile). Continue to participate in the Montana Bureau of Mines and Department of Environmental Quality research on ground water quality impacts.
- Work with partners, including universities, to research methylmercury contamination on the refuge and the potential correlation with the management of wetland impoundments and any impacts on the nesting osprey population and any other wildlife species.
- Work with partners to provide opportunities to research the best methods and net effects of restoring refuge habitats, particularly gallery and riverfront forest, and reconnecting waterways to the Bitterroot River.
- Complete a forest inventory (baseline) and upland inventory (baseline) before major restoration activities to better understand and monitor the response

of those vegetative communities to restoration efforts and other management actions.

- Investigate the relationship of how water moves through the refuge by recording data such as the arrival of irrigation water, ground water movements, water level management, and the fluctuating water levels of the Bitterroot River.
- Through partnerships, investigate the impacts and monitor changes to refuge habitats and wildlife as a result of climate change. Use these results to adapt refuge management programs to the changing environment.
- Seek out grant opportunities to fully or partially fund research projects.
- Use an adaptive management approach to incorporate ongoing research and monitoring results into management options and decisions.
- Evaluate the impacts of herbivory on the survival and recruitment of current and restored shrubland and forested areas.

Rationale

Past research conducted on the refuge has been beneficial in understanding resources and making management decisions. However, no concerted effort has been made to design a research program based on the refuge's most pressing issues or to provide missing data for effectively managing and restoring habitats. The habitat-based goals and objectives in this CCP will form the basis for establishing research and monitoring priorities for the refuge. The restoration proposals will provide a number of research opportunities to both develop restoration methods and study their effects.

To ensure that research proposals address refuge issues and inform management decisions, research proposals will be evaluated to determine if they support refuge research objectives and needs. The refuge will also present research opportunities to other partners such as universities. Partnerships are critical for



A bird on Lee Metcalf Refuge is banded to track its migration route.

achieving the research goal and objectives. Cooperative efforts—such as shared funding, lodging, vehicles, equipment, knowledge, and expertise—are needed to accomplish research projects.

4.7 Goal for Cultural Resources

Provide opportunities for visitors to learn about the unique glacial, Native American, and Euro-American history of the Bitterroot Valley while maintaining and protecting the integrity of the refuge's cultural and historical resources.

CULTURAL RESOURCES OBJECTIVE 1 (PROTECTION)

Through partnerships, systematically develop a comprehensive cultural resource inventory for the refuge, giving priority to proposed habitat restoration sites, and preserve and protect all known cultural resources while ensuring future activities comply with Section 106 of the National Historic Preservation Act.

Strategies

- Work with the zone archeologist, contractors, local tribes, the State Historic Preservation Office, universities, and other partners to start developing a comprehensive cultural resource inventory.
- Use the Montana statewide cultural resource inventory list to determine sensitive sites before conducting activities (such as construction or excavation) that may disturb these sites.
- Document discovered cultural resource sites and ensure their protection.
- Continue to comply with Section 106 of the National Historic Preservation Act before starting projects.
- Collaborate with universities and anthropology students looking for projects and inventory opportunities.
- Develop a partnership with the Native American studies program at the Salish Kootenai College to better understand the significance and cultural history of the refuge area to the Salish and other tribes.

Rationale

The Bitterroot Valley has a rich history and a dynamic culture. Ideally, a comprehensive inventory will help better describe that history on the refuge and ensure the protection of cultural resources. However, these types of inventories are time consuming. Throughout the life of this 15-year CCP, refuge staff will work with partners and the regional archaeologist to begin

documenting cultural sites, focusing first on any areas proposed for restoration or other developments.

Before Euro-American settlement, the Salish people called this valley home for several centuries, and literature shows that there were several Salish campsites on the refuge. Within decades of the passage of Lewis and Clark through the Bitterroot Valley in 1805 and 1806, other Euro-Americans followed. The first Euro-American settlers were fur traders who built a fort and later Jesuit priests who built a mission. The area surrounding the mission became the oldest community in Montana: what is now the town of Stevensville. As more Euro-Americans settled in the valley, the land and waters that had provided the Salish people with their traditional supplies and foods, such as the bitterroot plant, were converted to grazing and agriculture. In 1891, the United States Government relocated the Salish people to a reservation in the Jocko Valley.

The arrival of Euro-American settlers forever changed the landscape and the uses of this valley from traditional harvesting of native plants and wildlife to intensive agriculture. One of the earliest homesteads in the valley was the Whaley Homestead, located on the refuge and listed on the National Register of Historic Places. This homestead was established by Indian Agent Peter Whaley in 1885 and survives as an outstanding example of frontier architecture. Weatherboard siding conceals a massive, complicated understructure of square-hewn logs. The Service will continue to weatherproof and seal this structure to prevent physical deterioration from climate and animals.

Federal laws and policies mandate the identification and protection of cultural resources on Federal lands. Section 106 of the National Historic Preservation Act requires Federal agencies to consider the effects on cultural resources before conducting any Federal action. Without a complete inventory, the refuge's identification of all cultural resources is incomplete. Until the inventory is completed, the staff will continue to work with the regional archaeologist and State Historic Preservation Office on a case-by-case basis to evaluate projects with the potential to cause impacts.

CULTURAL RESOURCES OBJECTIVE 2 (INTERPRETATION)

Through partnerships, develop a multimedia education and interpretation program that provides visitors with information about the unique history and culture of the Bitterroot Valley and the refuge. Topics will include the Salish, Pend d'Oreille, and Nez Perce tribes; Lewis and Clark expedition; Euro-American settlement; and the Whaley Homestead. These displays and programs will also highlight the effects—both positive and negative—of these peoples, events, and land uses on the resources and ecology of this area.



Bob Danley/USFWS

Volunteers help restore the Whaley Homestead, which is listed on the National Register of Historic Places.

Strategies

- Work with tribal, State, and other partners to create professionally planned and produced displays at kiosks and at the expanded visitor center that interpret the unique culture and early history of the refuge and the Bitterroot River Valley, including the traditional uses of native plants.
- Partner with volunteers and other organizations to restore and interpret the Whaley Homestead site. Once restored, consider creating a visitor contact area and history displays, including period furniture.
- Working with Salish Cultural Committee, incorporate traditional Native American place names and the history of place names in interpretive signage, as appropriate.
- Work with refuge partners to determine what degree of interpretation and accompanying restoration is needed for the Whaley Homestead.
- Develop a set of education kits highlighting the history of the refuge and the Bitterroot Valley.
- Continue to identify and interpret historical and nationally designated trails that pass through the refuge including the Nez Perce (National Historic Trail) and Ice Age (National Geologic Trail).

Rationale

Cultural resources interpretation communicates important messages about the area's history, context, and resources to diverse audiences. A tremendous opportunity exists to work with partners, including the Confederated Salish and Kootenai Tribes culture committee and other State and Federal agencies, to develop a comprehensive interpretive program that adequately describes the significance and history of this valley and the refuge. Thousands of Native Americans once lived throughout the valley, although many of their traditional sites have been lost to development. The refuge contained many of the resources that will have been needed to live and survive, including the

Bitterroot River and native plants; however, no known traditional sites have been identified on the refuge. The refuge and the surrounding Bitterroot Valley also have a rich history of Euro-American settlement, including the earliest town in Montana, Stevensville.

Several major historical and cultural sites occurred or occur on or within 5 miles of the refuge: Salish camps, Lewis and Clark National Historic Trail, St. Mary's Mission, Fort Owen, Whaley Homestead, and Nez Perce National Historic Trail. The buildings of St. Mary's Mission, Fort Owen, and the Whaley Homestead are all on the National Register of Historic Places. Additional signage and interpretation programs will need to be developed to interpret these sites.

Very little interpretation of the Whaley Homestead has been completed because of its current condition. The structure is not safe enough to allow visitors to regularly walk through the building, despite the resources and time the refuge and other partners have dedicated to maintaining it. A National Register of Historic Places sign does provide some history of the site. The interior has been updated by the occupants over the years but does not match the period of the late 1800s. To properly interpret this site while protecting the structure and visitors, the refuge will need to determine what level of interpretation is appropriate and then work with partners to restore and interpret this historical homestead based on these guidelines. To date many refuge partners have expressed enthusiasm and willingness to help restore the site (in part by providing period furniture). Such efforts could ultimately allow visitors to enter this home and interpret the history of early settlers. Nevertheless, these efforts will be costly, and the Service must ensure that this historical structure remains protected.

The overarching interpretive theme for the Whaley Homestead will be land use and its effects on wildlife. Topics will include hydrological changes, agricultural practices, grassland conversion, lumber and forest ecology, and native plant usage, all of which have and will continue to affect refuge resources.

4.8 Goal for Visitor Services

Provide visitors of all abilities with opportunities to participate in and enjoy quality, compatible wildlife-dependent recreation, environmental education, and interpretation programs that foster an awareness and appreciation of the importance of protecting the natural and cultural resources of the refuge, the Bitterroot Valley, and the National Wildlife Refuge System.

HUNTING OBJECTIVE

Continue to provide and improve the quality of compatible waterfowl and deer hunting opportunities, facilities, and access points to provide for the safety and enjoyment of refuge hunters of all abilities and work with the State to determine if additional opportunities for hunting white-tailed deer hunting opportunities could be provided.

Strategies

- Continue to provide a quality white-tailed deer (archery only) hunt on designated lands according to State regulations. Continue to provide a quality waterfowl hunt from designated blinds on the southeast part of the refuge (figure 23), according to State regulations.
- Work with the State to determine the viability of allowing hunters to use muzzleloaders and shotguns to harvest white-tailed deer (depending on the deer population) within this archery-only hunting district (currently Hunting District 260). Consider rotating the areas where firearms are permitted depending on management objectives. Limit the number of hunters permitted to use firearms.
- Continue to work with local hunters to rebuild, prepare, and maintain waterfowl hunting blinds. Upgrade the current blinds that are available to hunters with disabilities.
- Allow archery hunters with disabilities to access refuge roads near the Whitetail Golf Course (within the refuge boundary).
- Produce a large print version of the hunting and fishing brochure.
- Provide an annual “tear sheet” outlining the specific refuge regulations for all hunting programs.
- Post a sign at the beginning of the Kenai Nature Trail to make trail users aware of their potential proximity to archery hunters.
- Provide spent-shell deposit sites near hunting areas.
- Continue to monitor hunter satisfaction and harvest information.
- Manage submergent aquatic and upland vegetation within waterfowl hunt areas to improve the hunt quality.
- Enforce waterfowl hunt regulations, including shoot times and access.
- Continue to collaborate with the State to provide hunter education programs to youth.
- Provide a limited number of waterfowl decoys for checkout from the refuge headquarters.

Rationale

White-tailed deer and waterfowl hunting were permitted soon after the refuge was established. Today,

hunting is one of the most popular compatible wildlife-dependent activities offered on the refuge. As practiced on Lee Metcalf Refuge, hunting does not pose a threat to the wildlife populations, and in some instances it is necessary for sound wildlife management. The refuge works with the State to carefully regulate its hunting program and maintain equilibrium between population levels and wildlife habitat.

On the refuge there is limited regeneration of native trees and shrubs, which are important components for migratory bird habitat. White-tailed deer browse heavily and may be the cause of this limited regeneration and plant diversity. Although the refuge is open to hunting, it lies within Hunting District 260, an archery-only hunting area. Archery hunting does remove some of these deer; however, the challenges associated with this type of hunting (for example, animals must be in close range) affect the success rate of hunters. Adding a limited firearm season, during which shotguns and muzzleloaders could be used, will provide opportunities for non-archery hunters; it may also improve harvest rates and better disperse the deer during the long archery season (currently over 4 months). The refuge will work with the State and collect data on white-tailed deer numbers to help determine the need for expanding this hunting opportunity.

The refuge maintains 14 designated waterfowl hunting blinds, two of which are reserved for hunters with disabilities. The labor and cost associated with maintaining the blinds will continue to be offset by volunteer assistance, particularly from waterfowl hunters.

FISHING OBJECTIVE 1

Following State and Federal regulations, continue to provide opportunities for anglers of all abilities to fish within the WVA, including the associated banks of the Bitterroot River and Francois Slough.

Strategies

- Continue to permit fishing on Francois Slough after the riparian habitat is restored.
- Maintain the accessible fishing (and wildlife observation) platform in the WVA.
- Prohibit boats anywhere on the refuge (except the Bitterroot River). No boats can be launched on the refuge.
- Prohibit boaters from accessing the refuge uplands from the Bitterroot River.
- Continue to provide updated fishing regulations in a combined hunting and fishing brochure, following Service graphic standards.
- Restore instream and riparian habitat on North Burnt Fork Creek to improve the quality of the creek’s cold-water fishery.

Rationale

Compatible and accessible recreational fishing opportunities are available at Francois Slough and the Bitterroot River, both within the designated WVA. The remainder of the refuge is closed to fishing, except for special events.

Most anglers come to the refuge not only to fish but also to appreciate the wildlife and beautiful scenery of the Bitterroot Valley. Fishing, like hunting, can serve as the foundation for an individual's appreciation of conservation efforts and environmental ethics. Once people begin to appreciate and care about the wildlife they enjoy and experience firsthand, they take this appreciation and awareness back to their own communities and backyards.

Currently some anglers use the fishing platform to access Francois Slough and its largely nonnative fishery. The restoration proposed for Francois Slough (associated with North Burnt Fork Creek) will restore it to a natural stream that could improve the quality of the habitat for native fish. The existing accessible fishing platform could still be used by anglers to access this restored stream.

Thousands of anglers and boaters float the Bitterroot River. In many areas, the refuge property includes the entire existing channel of the Bitterroot River along with the uplands west of the river. Recent land surveys indicate that lands through and west of the Bitterroot River are part of the refuge. The refuge will seek to open the areas west of the river for public uses, including fishing.

FISHING OBJECTIVE 2

Provide an opportunity for children of all abilities to learn about the techniques and enjoyment of catching fish.

Strategies

- Work with partners to host an annual accessible fishing event and others, if possible. Consider holding these events within areas closed to public fishing (to increase fishing success) if they do not violate the policy requirements of appropriate use and compatibility or inhibit restoration efforts.
- As part of the environmental education program, provide students at these events with educational materials on the impacts of nonnative fish—particularly largemouth bass, which dominates many refuge impoundments.
- As appropriate, provide an opportunity for MFWP to transfer captured largemouth bass to existing State closed-basin, warm-water fisheries.
- At events, deliver presentations on the refuge, its purposes and resources, and the values of the Refuge System.

Rationale

The Service's wildlife recreation policy promotes the enjoyment and techniques of fishing, particularly among children and their families. The refuge has an opportunity to work with partners, including the State, to provide opportunities for students to learn about the enjoyment and proper methods and ethics for catching fish while fostering a desire to continue fishing on refuges and other State waters. This initiative has an even broader purpose of teaching children about the outdoors so they may be able to appreciate it.

The greatest opportunities to catch fish on the refuge—particularly largemouth bass—are in Ponds 8 and 10. These ponds are closed to all other public fishing, so allowing any public events requires a compatibility determination (appendix C). Also, since largemouth bass are not native to this area, students will be provided information on the impacts of nonnative fish on native species and their habitats. The State would assist with this education and may be permitted to transfer these captured nonnative fish to other State warm-water fisheries. These State waters already contain populations of largemouth bass. The State uses these closed basin nonnative fisheries to take pressure off more sensitive fishing areas that may contain threatened cold-water species, such as bull trout.

WILDLIFE OBSERVATION AND PHOTOGRAPHY OBJECTIVE

Considering the migration of the Bitterroot River, maintain and create additional facilities and programs for wildlife observation and photography for visitors of all abilities. These additional opportunities will provide visitors with a new and exciting perspective that will enhance the visitor's appreciation and connection to the wildlife and the habitats of the refuge and the Bitterroot Valley.

Strategies for Wildlife Observation

- Continue to maintain and improve all current facilities within the WVA such as the shelter, fishing platform, and kiosk.
- By 2016, investigate options for slowing the erosion of the portion of the WVA next to the Bitterroot River. All options will be evaluated based on cost, effectiveness, and impacts on the environment, including the river system. Work with other jurisdictions and regulatory agencies to reduce upstream impacts on floodplain dynamics that may be causing this accelerated erosion.
- Continue to maintain the walking trails within the WVA, considering the movements and flooding of the Bitterroot River in any decisions or designs.
- Maintain those facilities (two trails and a viewing platform) that are accessible to visitor with disabilities. Consider the movements and flooding of

the Bitterroot River in any rehabilitation proposals and designs.

- Improve the WVA entrance for wheelchair use.
- Continue to provide spotting scopes, binoculars, and bird books for wildlife observers at the expanded visitor center.
- Add signage to ensure that visitors remain on designated trails.
- Keep the Kenai Nature Trail along its current route. However, visitors will be allowed to walk on the upper bench of a small portion of the trail to provide a more level walking surface (figure 25).
- Add a seasonal walking loop around the current Service road around Pond 8 (figure 23). This trail will be opened seasonally for foot traffic, as appropriate, to protect waterfowl and other waterbirds using this pond. In the winter, users will be permitted to use cross country skis and snowshoes when adequate snow is available.
- Replace the stationary spotting scopes located along existing trails and add an additional spotting scope within the WVA.
- Treat invasive species along designated trails.
- Add interpretation to new and existing trails, including information on the plant and wildlife species that visitors may encounter.
- Work with the county to develop Wildfowl Lane—the county road that travels through the refuge—as an auto tour route with pulloffs and accompanying interpretation.
- Update and reprint the refuge’s current wildlife species list, including a large print version that meets the Service’s graphic standards.
- Add recommendations for wildlife viewing etiquette to the general brochure and wildlife list.
- Consider installing a remote camera on a nest area; this image could be streamed not only in the visitor contact area but also on the refuge’s Web site.
- Provide wildlife observation information through the internet via the refuge’s homepage, blog, and social media sites.

Strategies for Photography

- Continue to maintain two stationary photography blinds.
- Require a special use permit (approved by the refuge manager) for commercial photography proposals that benefit the refuge and provide the photographer access or privileges not afforded to the general public. Commercial photography proposals not benefitting the refuge or Refuge System will not be allowed.

- Require a special use permit (approved by the refuge manager) for commercial filming.
- All permitted commercial photography and film will be made available for Service use (excluding that which is provided to other parties for commercial uses).
- Through partnerships, work with photographers to build the refuge’s photo library.
- Make two portable photo blinds available for use in areas currently open to the public.
- Through partnerships, conduct an annual wildlife photography workshop highlighting how to photograph wildlife while causing minimal disturbance.
- Upgrade waterfowl hunting Blind 2 to provide a photo blind for photographers, including those with disabilities.
- Work with photography schools to build the refuge’s photo library and assist with the annual photography workshops while providing wildlife photography opportunities to their students.

Rationale

Most visitors to the refuge come to view and photograph wildlife and the beautiful scenery of the Bitterroot Valley. Wildlife observation has been found compatible on the refuge. Wildlife observation often serves as the foundation for an individual’s environmental ethics. Once people begin to appreciate and care about the wildlife they enjoy and experience firsthand, they take this appreciation and awareness back to their own communities and backyards.

Currently most visitors view wildlife from Wildfowl Lane, a county road that travels through the refuge. However, this is not an official tour route and offers no interpretation. Working with the county to turn Wildfowl Lane into an auto tour route, if appropriate, may take some effort, particularly for any improvements such as pulloffs and accompanying interpretation.

The proposed walking loop (trail) around Pond 8 will be 1.25 miles in length and provide visitors with another opportunity to independently explore the refuge and view and photograph wildlife. This trail will extend the Kenai Nature Trail westward using the Pond 8 dike road; it will then loop south, past a former residence site, and then connect to Wildfowl Lane (figure 23). This trail will be located close to an existing heron rookery and waterfowl habitat. To protect these species, the trail will be closed seasonally. These and other proposed improvements to the photography and wildlife viewing areas within the refuge will enhance the visitors’ experiences, provide better opportunities for viewing and photographing wildlife, and help foster their connection to the area’s unique habitat and wildlife. This connection may result in a greater understanding and appreciation of the refuge



Bob Danley/USFWS

The Kenai Nature Trail ends at a trail shelter where visitors can sit and view wildlife and the surrounding landscape.

and its resources including the wildlife species found within the Bitterroot River Valley.

The Service will investigate if there are any viable options (based on cost, effectiveness, and impacts) for slowing the erosion of the WVA. This will require the Service to work with an engineer and other partners to evaluate not only site-specific options, but to determine if the erosion can be lessened by other means.

The Kenai Trail's current path will remain unchanged. However, giving visitors the option of choosing to remain on the upper bench in a small portion of the trail (figure 25) will provide a more level, less steep walking surface option.

By working with partners, including commercial photographers, the refuge will continue to build a photo library that could be used in publications and education and outreach tools, including interpretive displays and the refuge's Web site. There is almost always some disturbance to wildlife in areas open to the public, particularly when visitors approach too closely or don't follow refuge regulations (for example, by traveling off designated trails or removing vegetation for a photo). To reduce these impacts, visitors will be provided refuge-specific materials (brochures, podcasts, and education programs) to facilitate wildlife friendly behaviors that minimize disturbance. This will not only reduce the impacts on refuge wildlife and their habitats but improve the overall quality of opportunities for all visitors.

ENVIRONMENTAL EDUCATION OBJECTIVE

Continue and expand environmental education programs and activities on and off the refuge for at least 1,500 adults and 4,000 students of all abilities. These programs will focus on the values and importance of the natural, historical, and cultural resources of the refuge and the Bitterroot Valley, including the refuge's efforts to maintain, enhance, and restore native plant and wildlife communities on the refuge.

Strategies

- Recruit a visitor services specialist to develop and present programs.
- Develop programs and materials that could be used year-round and encourage teachers and students to explore the refuge beyond the popular spring season.
- Through partnerships, continue to organize and provide at least 15 on- and off-refuge annual and special events for adults and students.
- Provide at least five offsite school presentations annually.
- Conduct teacher workshops annually to better orient and equip teachers to independently explore and learn about the refuge resources.
- Establish and widely publicize field trip planning procedures for teachers.
- Use current and new education kits to provide at least five offsite school presentations annually.
- Continue to allow teachers and students to independently explore the refuge's public use areas, determining if any participants require special assistance due physical limitations. Provide an orientation on where and how to best explore the refuge, and provide teachers with background information before their arrival.
- Develop exploration backpacks that can be checked out and used by students; these backpacks will include suggested projects, species they would see, along with some field supplies such as invertebrate sampling nets, water testing kits, and binoculars.
- Working with local teachers, continue to maintain, develop, and provide multimedia educational kits related to refuge resources and make them available to local teachers and students for use in onsite visits or in their classrooms.



Bob Danley/USFWS

The refuge will continue to coordinate the State Junior Duck Stamp Program.



Bob Danley/USFWS

The refuge's visitor contact area will be expanded to provide additional opportunities for programs and the interpretation of refuge management and resources.

- Develop an education program that focuses on climate change in the Bitterroot Valley.
- Work with local teachers to develop a refuge-specific curriculum that meets State standards.
- Develop an education kit that explains the history and value of the restoration efforts proposed under this alternative.
- Continue to serve as the coordinator for the State Junior Duck Stamp Program.
- Expand opportunities to collaborate with universities to provide outdoor classrooms for students wanting to learn about the refuge, its management programs, its current issues, and the values of the Refuge System.
- Develop a partnership with local universities to provide opportunities for students to conduct research and monitoring projects that are beneficial to the refuge, and provide an opportunity for students work with refuge staff.
- Add a classroom and associated supplies to the expanded visitor center for environmental education programs.
- Organize or participate in five additional annual environmental education events on and off the refuge.
- Pursue partnerships and grants to acquire additional resources for environmental education programs.
- Expand the refuge's online presence (social media, blog, Web site) to include interactive educational opportunities and help teachers plan field visits.
- Provide training opportunities for added staff and volunteers to improve their capabilities and knowledge in developing and presenting environmental education programs.
- Meeting Service graphic standards, use both the refuge's Web site and a tearsheet to list all the educational resources available through the refuge and the Service, and make this available to schools and other interested groups.
- Continue to collaborate with the State to provide hunter education training.
- Provide assistance to students interested in completing school science projects related to the natural resources found on the refuge, including mentoring and project development.
- Collaborate with the State, universities, the Confederated Salish and Kootenai Tribes, and other entities to create focused activities (environmental education and other visitor uses) for environmental education and visitor service programming, including special events.
- Participate in events sponsored by the Confederated Salish and Kootenai Tribe, including the River Honoring event for students. Provide information on refuge resources and the Bitterroot River Valley, where the Salish Tribe had lived for centuries.

Rationale

Environmental education is a learning process that increases people's knowledge and awareness about the environment and associated challenges; develops the necessary skills and expertise to address the challenges; and fosters attitudes, motivation, and commitments to make informed decisions and take responsible action (United Nations Educational, Scientific and Cultural Organization 1978). Through environmental education, the Service can help develop a citizenry with the awareness, knowledge, attitudes, skills, and drive to work cooperatively toward the conservation of environmental resources. Environmental education within the Refuge System incorporates onsite, offsite, and distance-learning materials, activities, programs, and products. These educational tools describe the refuge's purposes, physical attributes, ecosystem dynamics, and conservation strategies as well as the Refuge System mission. They also provide some history and perspective on this area before Euro-American settlement, including the native vegetation, natural waterways, and the unique culture and importance of this area to Native American people.

Since today's children are tomorrow's land stewards, it is essential to help them become aware of the natural world and how they can protect and restore it. Today, most students learn about their natural world online, through books, or highly structured programs. These methods do provide educational benefits, but it is also effective simply to allow students to explore on their own. Refuge programs must not be so rigid that children cannot learn by using their own imaginations and senses.

Environmental education is one of six wildlife-dependent recreational uses identified in the Improvement Act as a priority public use for the Refuge System, and

it has been emphasized and supported on Lee Metcalf Refuge for many years. Given the refuge's proximity to some of the more urban areas in Montana, including Missoula, there is a tremendous opportunity to do even more, including promoting the refuge as a conservation learning center where adults and children can learn about refuge resources, the unique history and importance of the Bitterroot Valley, and the values of the Refuge System. The refuge has focused most of its efforts on schools and groups that travel to the refuge, but with additional staff, greater opportunities will exist to travel offsite and reach a broader audience.

Providing teacher workshops and materials for independently exploring the refuge will make even more teachers and students feel welcome while learning why the refuge is here, how it benefits them, and why it should be protected for future generations to enjoy and appreciate.

INTERPRETATION OBJECTIVE

Improve, maintain, and create additional interpretive opportunities for the public that focus on refuge purposes; the natural, cultural, and historical resources of the refuge and Bitterroot Valley; and management programs and challenges, including future habitat restoration projects. These enhanced facilities and universally accessible programs will encourage visitors to independently explore and learn more about not only the values of this refuge, but also about how they can be part of protecting and restoring native and productive habitats to this refuge, the Bitterroot Valley, and other lands within the Refuge System.

Strategies

- Recruit a full-time permanent General Schedule (GS)-7 (could be upgraded to 9) visitor services specialist to work with volunteers, manage the visitor center, and develop and present programs.
- Identify interpretive themes for the refuge and use them to develop professionally planned and



Bob Danley/USFWS

The refuge's amphitheater is a good venue for environmental education and interpretation programs.

produced interpretive panels and brochures; these themes will be used in future interpretive programs to consistently highlight the most important and unique aspects of the refuge, its history and purposes, current management and challenges, and proposed habitat restoration projects.

- Develop a theme and message for the visitor center that focuses on floodplain restoration, wetland impoundment management, native wildlife, migratory birds, the refuge's cultural and natural resources, and the role of the Refuge System.
- Update interpretive panels to provide a variety of information including rules and regulations, the natural and cultural resources of the refuge and the Bitterroot Valley, habitat restoration projects, and the value of the Refuge System. Design panels to have a consistent appearance and to allow refuge staff to easily update them with dynamic and timely information.
- Continue to maintain and update the current four kiosks, including three with interpretive panels. Locate an additional interpretive panel along the river trail within the WVA that explains the migration of the Bitterroot River.
- Ensure that all current and future refuge brochures meet Service graphic standards and provide up-to-date information that is useful for interpretive programs and better orients visitors.
- Train volunteers to provide interpretive programs on the natural, historical, and cultural resources of the refuge and the Bitterroot Valley.
- Make online resources (podcasts, Web site, blog, social media) available that interpret refuge resources along the public roads and trails.
- Restore native habitat around entrance areas and kiosks and provide identification and interpretation of this native vegetation.
- Provide interpretation along the Kenai Nature Trail, within the WVA, and along the auto tour route.
- Participate in events highlighting the history of the Lewis and Clark expedition in the Bitterroot Valley.
- Through partnerships, develop a new refuge video highlighting the history and resources of the refuge.
- Construct a kiosk at the parking lot on the north end of the refuge, used by refuge hunters, that provides regulations as well as information on refuge purposes and resources.

Rationale

Interpretation is the identification and communication of important messages about natural and cultural resources to diverse audiences. Interpretation is designed to reveal relationships about the nature, origin, and purpose of a resource, landscape, or site in a way that

forges connections between the interests of the audience and meanings inherent in the resource (National Association for Interpretation 2011). Interpretation is a resource management tool that can be designed to develop understanding, and through understanding comes appreciation, and through appreciation comes protection of our natural resources.

Interpretation is one of six wildlife-dependent recreational uses identified in the Improvement Act as a priority public use for the Refuge System. The refuge already contains some facilities and displays that interpret refuge resources, provide regulations, and orient visitors. The refuge has documented over 143,000 visitors annually traveling through the refuge and predicts that number will increase over the next 15 years. Tremendous opportunity exists to further educate these and future visitors about the importance of maintaining, restoring, and enjoying the natural and cultural resources of the refuge and the Refuge System.

SIGNAGE OBJECTIVE

Maintain an effective network of signs that meet the Service's standards and notify the public of refuge boundaries, public use areas, and closed areas by annually reposting, replacing, or maintaining 20 percent of the refuge signs.

Strategies

- Determine the opportunity to add directional signage along Interstate 90 and improve it along Highway 93.
- Develop an entrance sign on or near the shelter in the WVA to notify river floaters that they are entering the refuge.
- Add and maintain more consistent boundary signage—particularly along the west side of the refuge (and the river)—so the public is aware that they are entering the refuge.
- Ensure that electronic directional devices, Web sites, and other printed materials correctly identify the location and information for refuge.
- Ensure that signage has a similar appearance, meets Service graphic standards, and provides a consistent message or theme.
- Mark the west boundary of the refuge with signage and open or maintain closure for public use.
- Post a sign at the beginning of the Kenai Nature Trail to make visitors aware of appropriate uses of the trail and their potential proximity to archery hunters.
- Establish the refuge's primary point of entry as the east entrance, which will be closest to the expanded visitor center.
- Develop an entrance sign for the northeast corner of the refuge within easy view of the Eastside Highway.
- Place a directional sign at the east and south entrances identifying the distance to the visitor center.
- In areas open to public use, such as the WVA, exchange "unauthorized entry" signs for "refuge boundary" signs.
- Develop new panels for the two entrance kiosks including an orientation panel with regulations, a Refuge System panel, and a system for displaying changing information including current events.
- Develop new panels for the kiosk in the WVA to include an orientation panel, a panel with a map and information about this part of the refuge, and a system for displaying changing information.
- Develop a 2-foot by 3-foot orientation panel at refuge headquarters to provide information for after-hours visitors.
- Move the single-paneled kiosk from behind the visitor center out to the front of the building for after-hours visitors.
- Develop a sign that guides visitors to the WVA from the visitor center, and provide a directional sign to the visitor center at the road where the Whitetail Golf Course begins.
- Work with the community of Stevensville to install interpretative and regulation signage at the Bitterroot River boat launch.
- Add a Service logo to the side of the headquarters building that faces the parking area.
- Update publications to show the same hours of operation that are posted at the visitor center.
- Post the law enforcement officer's phone number at kiosks and instruct visitors to call 911 for emergencies.
- Post a sign in the WVA and at the Poker Joe access point to alert river floaters and other visitors that they are entering the refuge.

Rationale

Overall, the refuge boundaries are well signed, and directional signage orients visitors. However, opportunities exist to improve boundary, directional, and informational signage for the refuge's 143,000 visitors. Maintaining and replacing these signs is time-consuming but critical for orienting visitors, welcoming visitors, protecting refuge habitats, and preventing trespass. The refuge is surrounded by private, State, and some USDA Forest Service land. There are issues with trespassing that could be resolved with additional boundary signage and outreach. Most trespass occurs on the western boundary, particularly by boaters who leave their boats, unaware that they are entering the refuge.

4.9 Goal for Partnerships

Maintain and cultivate partnerships that help achieve the vision and supporting goals and objectives of the Lee Metcalf National Wildlife Refuge Comprehensive Conservation Plan and support other initiatives designed to protect and restore habitats for Federal trust species within the Bitterroot River Valley.

PARTNERSHIP OBJECTIVE

Foster a strong and effective working relationship with existing partners and new partners for the purpose of protecting cultural and historical resources, developing and providing visitor services programs, and managing and restoring the refuge's habitats for target species. The refuge may participate in other partnerships that support refuge and Service initiatives including providing additional habitat for Federal trust species within the Bitterroot River Valley.

Strategies

- Continue to work with conservation organizations, communities, schools, State and Federal agencies, and tribes to collaborate on projects of mutual interest.
- Pursue and foster a refuge advocacy group that will actively support the priorities for refuge management and programs including the goals and objectives described in this and other stepdown planning documents.
- Work with partners to restore the connectivity of North Burnt Fork Creek for native fish species and riparian habitat.
- Continue to participate in the interagency weed group to address invasive and nonnative species on and near the refuge.
- Expand efforts to recruit and support volunteers for the refuge's visitor services and biological programs.
- Continue to work with partners to restore and preserve the Whaley Homestead.
- Work with universities to incorporate various disciplines into refuge programs to address issues concerning visitor services and refuge resources.
- Continue to participate in valley-wide efforts to protect habitat and wildlife corridors on private lands surrounding the refuge.
- Work with the Whitetail Golf Course, located within the refuge boundary, to address wildlife habitat and impacts on adjoining refuge lands and waters.
- Work with Montana Rail Link to address impacts from riprap, the railroad trestle, and the rail bed.
- Receive assistance from the Confederated Salish and Kootenai Tribes and other tribes with a cultural

connection to the Bitterroot Valley in developing programs and displays highlighting their histories and uses of natural resources.

Rationale

Partnerships are vital to achieving the Service's mission, including the vision for Lee Metcalf Refuge. Many of the refuge's wildlife, habitat, and public use programs and habitat projects could not continue without the funding and support from refuge partners, including volunteers.

The Service must emphasize working cooperatively with others; develop a more integrated approach to problem-solving and share resources to get the job done; and make choices and find efficiencies in both resource and business management practices. This focus reinvigorates the refuge's current intergovernmental coordination efforts. Numerous Federal, State, tribal, and local agencies and private citizens could be considered partners for the refuge. However, more could be done to inform and educate the partners about the refuge's value and goals. In the same vein, the Service is willing to help other agencies with issues, such as invasive plant control and specific wildlife conservation issues. Much of this coordination could be accomplished through regular meetings and by developing personal relationships with individuals within other agencies and surrounding communities.

4.10 Goal for Operations and Facilities

Prioritize wildlife first and emphasize the protection of trust resources in the utilization of staff, volunteers, funding, and facilities.

STAFF OBJECTIVE

Recruit additional staff and volunteers needed to fully carry out the proposed actions in this CCP, including actions concerning public use, habitat management, inventory and monitoring, and research.

Strategies

- Retain the current permanent, full-time refuge positions: refuge manager, outdoor recreation planner, law enforcement officer, administrative assistant, and maintenance worker.
- Continue to provide office space and support for zone and state-wide support staff, including a fire management officer, range (fire) technician, business team staff member, regional maintenance team member, and IPM strike team leader and team.
- Recruit a GS-7 (could upgrade to 9) visitor services specialist to manage the visitor center, develop and conduct programs, and recruit and supervise volunteer staff.

- Recruit a GS-9 (could upgrade to 11) deputy refuge manager.
- Recruit a GS-5 (could upgrade to 7) biological science technician.
- Recruit one GS-5 career seasonal biological science technician.
- Continue to work with Montana universities to develop a volunteer program by providing college credits in exchange for volunteer work experience.
- Actively recruit additional volunteers to assist with expanded visitor services programs and habitat management and restoration projects.

Rationale

Lee Metcalf Refuge supports several other State and regional Service programs, including fire, regional maintenance team, business team, and invasive species programs. Although 14 full-time and seasonal Service employees are stationed at Lee Metcalf, only 5 are specifically assigned to conduct refuge programs. The State and regional resource employees do provide some support for the refuge's maintenance and habitat projects, but their regional duties take precedence.

To accomplish the goals and objectives described in this CCP, additional staff, partnerships, and volunteers will be needed. One of the most significant needs is in the refuge's visitor services program. Currently the refuge has over 143,000 visitors annually. The refuge has one outdoor recreation planner who is able to provide onsite programs, but there is a tremendous opportunity to do more outreach, interpretation, and education with students and adults, both on- and off-refuge. The vision for the refuge is to serve as an ambassador for not only the refuge but also the Refuge System. To accomplish this goal, additional staff will be needed to develop and provide programs, work with local schools and communities, and develop partnerships that could expand the refuge's capabilities and outreach.

Some of the objectives and strategies described under the goals for habitat management can be achieved with current staff (for example, improved water level management). However, there are other actions—particularly the restoration of riparian forests, grasslands, and shrublands; the effective control of invasive species; and long-term monitoring—that will require additional staff to design and implement these actions.

Current staff at the refuge consists of five permanent full-time employees including a refuge manager, outdoor recreation planner, law enforcement officer, maintenance worker, and an administrative assistant. There are also five zone and regional Service employees who are based out of this office, but they are not assigned to exclusively support refuge programs. Table 11 shows the current staff and proposed additional staff required to fully implement the CCP.



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The refuge's headquarters will be expanded to include a larger visitor center, more office space, and a classroom.

If all requested projects and positions were funded, the refuge would be able to carry out all aspects of this CCP, which would provide the most benefit to wildlife, improve facilities, and significantly enhance public use programs. In the interim, projects that have adequate funding and staffing will receive priority for accomplishment. Staffing is requested for the 15-year life of this CCP.

FACILITIES, EQUIPMENT, AND SUPPLIES OBJECTIVE

Maintain and acquire the facilities, equipment, and supplies needed to support all current and proposed biological, visitor services, and maintenance programs in this CCP including support for added staff.

Strategies

- Expand the current visitor contact area into a visitor center including added space for professionally planned and produced displays, office space, a restroom available during closed hours, and a combined environmental education classroom and conference room.
- Relocate the pole barn closer to the maintenance area.
- Purchase or build a seed storage bin for storing native seed.
- Construct a duplex to provide housing for seasonal, transitional, and detailed staff.
- Through partnerships, rehabilitate and maintain the historical Whaley Homestead.
- Incorporate green technology and power sources into all new construction and rehabilitation.
- Purchase an excavator to complete proposed restoration projects.
- Add a wash bay and containment area for washing equipment and vehicles to reduce the spread of invasive species.

Table 11. Current and proposed staff for Lee Metcalf National Wildlife Refuge, Montana.

<i>Program</i>	<i>Current positions</i>	<i>Proposed additional staff</i>
Management	GS-485-12 refuge manager	GS-485-9 (could upgrade to 11) deputy refuge manager
Biology	None	GS-404-5 (could upgrade to 7) biological science technician GS-404-5 career seasonal biological science technician
Administration	GS-0303-7	None
Law enforcement	GS-0025-7 (could upgrade to 9)	None
Maintenance	WG-4749-08 maintenance worker	None
Visitor services	GS-025-11 outdoor recreation planner	GS-025-7 (could upgrade to 9) visitor services specialist

Abbreviations: GS = General Schedule, WG = Wage Grade.

- Eliminate 3.3 miles of the current Service-only access road system (figure 24). The roads will be systematically eliminated or modified through a priority system dependent on the objectives of the proposed restoration program.

Rationale

A large portion of refuge facilities, equipment, and supplies are adequate to support the current refuge operations; however, most facilities are fully utilized and some are in need of modifications to support even current programs, particularly the public use facilities. The refuge hosts over 143,000 visitors annually. Currently, about 6,000 visitors are greeted in the small visitor contact area, which is inadequate for supporting large groups of refuge visitors and for housing an effective interpretive program. Expanding this area to include a combined environmental education classroom and conference room will allow the refuge to develop more effective and dynamic interpretation and education programs for adults and children. This expansion will also include additional offices for proposed added staff.

The bunkhouse remains full throughout the field season, supporting refuge and regional programs based out of the refuge. Additional seasonal and transitional staff housing is needed. Availability of this housing will be critical to recruitment of seasonal staff, because rental housing is very limited and costly in the surrounding rural communities. This need will be even more critical if the refuge does not receive support for permanent staff, as more seasonal employees would be required.

Acquiring the necessary equipment and supplies to support these restoration and maintenance programs will also be essential to completing and maintaining the projects described in this proposed action.

Refuge vehicles and equipment can be a source of transport for seeds and plant materials from invasive species. This can allow these plants to spread into other areas of the refuge. Installing a wash station where each piece of equipment could be cleaned after use in the field or before being transported to other areas could help prevent some of this spread.

4.11 Stepdown Management Plans

The CCP is a broad umbrella plan that provides general concepts and specific objectives for habitat, wildlife, public use, cultural resources, partnerships, and operations over the next 15 years. The purpose of the stepdown management plans is to provide details to Service staff for carrying out specific actions and strategies authorized by the CCP. Table 12 lists the stepdown plans needed for the refuge, status, and next revision date. Refuge staff will conduct an intra-Service consultation through ecological services once the stepdown water management plan is completed.

4.12 Research, Monitoring, and Evaluation

Appendix C contains the compatibility determination for research that supports refuge objectives and programs. Furthermore, the Service proposes to most efficiently deal with the uncertainty surrounding restoration and habitat management with adaptive resource management (figure 26; Kendall 2001, Lancia et al. 1996, Walters and Holling 1990). This approach provides a framework within which objective decisions can be made and the uncertainty surrounding those decisions reduced at the time that they are made. The key components of an adaptive resource management plan follow:

- clearly defined management goals and objectives
- a set of management actions with associated uncertainty as to their outcomes
- a suite of models representing various alternative working hypotheses describing the response of species or communities of interest

Table 12. Stepdown management plans for Lee Metcalf National Wildlife Refuge, Montana.

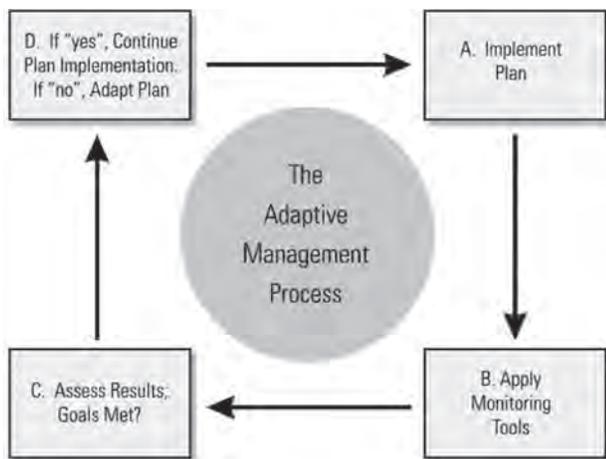
<i>Plan</i>	<i>Completed plan (year approved)</i>	<i>New or revised plan (completion year)</i>
Disease contingency plan	—	2015
Chronic wasting disease	2005	2015
Avian influenza	2006	2015
Fire management	2001	2013
Habitat management plan	—	2014
Inventory and monitoring plan	—	2014
Integrated pest management	—	2015
Wildlife inventory	1991	2018
Refuge safety	—	2013
Occupant emergency	1995	2014
Spill prevention	—	2013
Water management	2002	2014
Visitor services	—	2016

- monitoring and assessment of the response of target organisms
- use of monitoring and assessment information to direct future decision-making through the selection of a best model

The first three components—goals, actions, and models—are largely defined before initiation of an adaptive resource management plan. The latter two components, monitoring and directed decision-making, compose a repetitive process whereby each year the predictive ability of models is tested against what was observed during monitoring. This may result in

a new best model, greater support for the existing best model, or new models constructed from emerging hypotheses. In this way, management can evolve as more information about the refuge is gained and uncertainty is reduced.

Development of adaptive resource management plans for habitat management will allow refuge staff to “learn by doing” and adapt to a changing climate while focusing on management objectives. Knowledge gained from assessing management actions is as integral to the process as the management actions themselves. This emphasis on gaining knowledge about the refuge creates a situation whereby the staff can refine its habitat management with feedback between management and assessment.

**Figure 26. Adaptive management process.**

4.13 Plan Amendment and Revision

The Service will annually review the final CCP to determine the need for revision. A revision will occur if and when significant information became available such as a change in ecological conditions. Substantial revisions to the CCP and the stepdown management plans will be subject to public review and compliance with NEPA (which includes a categorical exclusion). At a minimum, the Service will evaluate the plan every 5 years and revise it after 15 years.

Glossary

accessible—Pertaining to physical access to areas and activities for people of different abilities, especially those with physical impairments.

adaptive resource management—The rigorous application of management, research, and monitoring to gain information and experience necessary to assess and modify management activities. It is a process that uses feedback from research, monitoring, and evaluation of management actions to support or modify objectives and strategies at all planning levels. It is also a process in which policy decisions are implemented within a framework of scientifically driven experiments to test predictions and assumptions inherent in management plans. Analysis of results helps managers determine whether current management should continue as is or whether it should be modified to achieve desired conditions.

Administration Act—National Wildlife Refuge System Administration Act of 1966.

alluvial fan—A sedimentary deposit where a fast-flowing stream has flown into a flatter plain.

alternative—A reasonable way to solve an identified problem or satisfy the stated need (40 CFR 1500.2); one of several different means of accomplishing refuge purposes and goals and contributing to the Refuge System mission (Draft Service Manual 602 FW 1.5).

amphibian—A class of cold-blooded vertebrates that includes frogs, toads, and salamanders.

anastomosis—Reconnection of two streams that formerly had been separated.

annual—A plant that flowers and dies within 1 year of germination.

baseline—A set of critical observations, data, or information used for comparison or a control.

biological control—The use of organisms or viruses to control invasive plants or other pests.

biological diversity, also biodiversity—The variety of life and its processes, including the variety of living organisms, the genetic differences among them, and the communities and ecosystems in which they occur (Service Manual 052 FW 1.12B). The National Wildlife Refuge System's focus is on indigenous species, biotic communities, and ecological processes.

breeding habitat—Habitat used by migratory birds or other animals during the breeding season.

canopy—A layer of foliage, generally the uppermost layer, in a vegetative stand; midlevel or understory vegetation in multilayered stands. Canopy closure (also canopy cover) is an estimate of the amount of overhead vegetative cover.

CCP—See comprehensive conservation plan.

CFR—See Code of Federal Regulations.

cfs—Cubic feet per second.

Code of Federal Regulations (CFR)—The codification of the general and permanent rules published in the Federal Register by the executive departments and agencies of the Federal Government. Each volume of the CFR is updated once each calendar year.

compatibility determination—See compatible use.

compatible use—A wildlife-dependent recreational use or any other use of a refuge that, in the sound professional judgment of the director of the U.S. Fish and Wildlife Service, will not materially interfere with or detract from the fulfillment of the mission of the National Wildlife Refuge System or the purposes of the refuge (Draft Service Manual 603 FW 3.6). A compatibility determination supports the selection of compatible uses and identified stipulations or limits necessary to ensure compatibility.

comprehensive conservation plan (CCP)—A document that describes the desired future conditions of the refuge and provides long-range guidance and management direction for the refuge manager to accomplish the purposes of the refuge, contribute to the mission of the National Wildlife Refuge System, and to meet other relevant mandates (Draft Service Manual 602 FW 1.5).

concern—See issue.

conservation—Management of natural resources to prevent loss or waste. Management actions may include preservation, restoration, and enhancement.

cover, also cover type, canopy cover—Present vegetation of an area.

cultural resources—The remains of sites, structures, or objects used by people in the past.

dense nesting cover—Composition of grasses and forbs that allows for a dense stand of vegetation that protects nesting birds from the view of predators, usually consisting of one to two species of wheatgrass, alfalfa, and sweetclover.

disturbance—Significant alteration of habitat structure or composition. May be natural (for example,

fire) or human-caused events (for example, timber harvest).

drawdown—The act of manipulating water levels in an impoundment to allow for the natural drying-out cycle of a wetland.

duck, dabbling—Duck that mainly feeds on vegetable matter by upending on the water surface, or by grazing, and only rarely dives.

duck, diving—Duck that mainly feeds by diving through the water.

EA—See environmental assessment.

ecosystem—A dynamic and interrelating complex of plant and animal communities and their associated nonliving environment; a biological community, together with its environment, functioning as a unit. For administrative purposes, the U.S. Fish and Wildlife Service has designated 53 ecosystems covering the United States and its possessions. These ecosystems generally correspond with watershed boundaries, and their sizes and ecological complexity vary.

ecotype—A subspecies or race that is especially adapted to a particular set of environmental conditions.

EIS—Environmental impact statement.

Elderhostel—A not-for-profit organization established in 1975 that allows senior citizens to travel and take educational programs in the United States around the world.

emergent—A plant rooted in shallow water and having most of the vegetative growth above water. Examples include cattail and hardstem bulrush.

endangered species, Federal—A plant or animal species listed under the Endangered Species Act of 1973, as amended, that is in danger of extinction throughout all or a significant portion of its range.

endangered species, State—A plant or animal species in danger of becoming extinct or extirpated in a particular State within the near future if factors contributing to its decline continue. Populations of these species are at critically low levels, or their habitats have been degraded or depleted to a significant degree.

environmental assessment (EA)—A concise public document, prepared in compliance with the National Environmental Policy Act, that briefly discusses the purpose and need for an action and alternatives to such action, and provides sufficient evidence and analysis of impacts to determine whether to prepare an environmental impact statement or finding of no significant impact (40 CFR 1508.9).

fauna—All the vertebrate and invertebrate animals of an area.

Federal trust resource—A trust is something managed by one entity for another who holds the ownership. The Service holds in trust many natural resources for the people of the United States of America as a result of Federal acts and treaties. Examples are

species listed under the Endangered Species Act, migratory birds protected by international treaties, and native plant or wildlife species found on a national wildlife refuge.

Federal trust species—All species where the Federal Government has primary jurisdiction including federally endangered or threatened species, migratory birds, anadromous fish, and certain marine mammals.

fee title—Acquisition of most or all of the rights to a tract of land.

Federal land—Public land owned by the Federal Government, including lands such as national forests, national parks, and national wildlife refuges.

flora—All the plant species of an area.

forb—A broad-leaved herbaceous plant; a seed-producing annual, biennial, or perennial plant that does not develop persistent woody tissue but dies down at the end of the growing season.

fragmentation—The alteration of a large block of habitat that creates isolated patches of the original habitat that are interspersed with a variety of other habitat types; the process of reducing the size and connectivity of habitat patches, making movement of individuals or genetic information between parcels difficult or impossible.

fire management plan—Wildland fire management (wildfire and prescribed) and related activities within the context of approved land and resource management plans.

full-time equivalent—One or more job positions with tours of duty that, when combined, equate to one person employed for the standard government work-year.

gallery forest (as it relates to the Bitterroot River floodplain)—The forested area found on the higher floodplains along natural levees and point bar terraces next to minor floodplain tributaries. It is more closely associated with backwater and overbank flooding. When flooding occurs, it is for short duration. This forest is dominated by mature black cottonwood and ponderosa pine along with an understory of large woody shrubs such as thin-leaved alder, river hawthorn, red osier dogwood, and Wood's rose. There may also be mixed grasses between the trees and shrubs (Heitmeyer et al. 2010).

geographic information system (GIS)—A computer system capable of storing and manipulating spatial data; a set of computer hardware and software for analyzing and displaying spatially referenced features (such as points, lines, and polygons) with nongeographic attributes such as species and age.

GIS—See geographic information system.

goal—Descriptive, open-ended, and often broad statement of desired future conditions that conveys a purpose but does not define measurable units (Draft Service Manual 620 FW 1.5).

- GS**—General Schedule (pay rate schedule for certain Federal positions).
- habitat**—Suite of existing environmental conditions required by an organism for survival and reproduction; the place where an organism typically lives and grows.
- habitat type, also vegetation type, cover type**—A land classification system based on the concept of distinct plant associations.
- head cuts**—abrupt changes in streambed elevation.
- hemi-marsh**—The emergent phase of a seasonal or semipermanent wetland where the ratio of open-water area to emergent vegetation cover is about 50:50, and vegetation and open-water areas are highly interspersed.
- hydrogeomorphic methodology (HGM)**—An interdisciplinary science that focuses on the interaction and linkage of hydrologic processes with landforms or earth materials and the interaction of geomorphic processes with surface and subsurface water in temporal and spatial dimensions.
- hydroperiod**—Period of time during which soils, waterbodies, and sites are wet.
- impoundment**—A body of water created by collection and confinement within a series of levees or dikes, creating separate management units although not always independent of one another.
- Improvement Act**—See National Wildlife Refuge System Improvement Act of 1997.
- indigenous**—Originating or occurring naturally in a particular place.
- integrated pest management (IPM)**—Methods of managing undesirable species such as invasive plants; includes education, prevention, physical or mechanical methods of control, biological control, responsible chemical use, and cultural methods.
- interseed**—Mechanical seeding of one or several plant species into existing stands of established vegetation.
- introduced species**—A species present in an area due to intentional or unintentional escape, release, dissemination, or placement into an ecosystem as a result of human activity.
- invasive species**—A species that is nonnative to the ecosystem under consideration and whose introduction causes, or is likely to cause, economic or environmental harm or harm to human health.
- inviolate sanctuary**—Place of refuge or protection where animals and birds may not be hunted.
- IPM**—See integrated pest management.
- issue**—Any unsettled matter that requires a management decision; for example, a Service initiative, opportunity, resource management problem, a threat to the resources of the unit, conflict in uses, public concern, or the presence of an undesirable resource condition (Draft Service Manual 602 FW 1.5).
- level ditching**—Ditches developed to improve water distribution, provide open water for waterfowl, furnish nesting islands, and encourage aquatic vegetation for waterfowl and furbearers. The material removed and piled along the ditch edge provides nesting and loafing sites for waterfowl. The production of waterfowl from level ditching is dependent upon the suitability of the wetland.
- management alternative**—See alternative.
- management plan**—Plan that guides future land management practices on a tract of land.
- migration**—Regular extensive, seasonal movements of birds between their breeding regions and their wintering regions; to pass usually periodically from one region or climate to another for feeding or breeding.
- migratory bird**—Bird species that follow a seasonal movement from their breeding grounds to their wintering grounds. Waterfowl, shorebirds, raptors, and songbirds are all migratory birds.
- mission**—Succinct statement of purpose or reason for being.
- mitigation**—Measure designed to counteract an environmental impact or to make an impact less severe.
- monitoring**—The process of collecting information to track changes of selected parameters over time.
- national wildlife refuge**—A designated area of land, water, or an interest in land or water within the National Wildlife Refuge System, but does not include coordination areas; a complete listing of all units of the Refuge System is in the current “Annual Report of Lands Under Control of the U.S. Fish and Wildlife Service.”
- National Wildlife Refuge System (Refuge System)**—Various categories of areas administered by the Secretary of the Interior for the conservation of fish and wildlife, including species threatened with extinction; all lands, waters, and interests therein administered by the Secretary as wildlife refuges; areas for the protection and conservation of fish and wildlife that are threatened with extinction; wildlife ranges; game ranges; wildlife management areas; and waterfowl production areas.
- National Wildlife Refuge System Improvement Act of 1997 (Improvement Act)**—Sets the mission and the administrative policy for all refuges in the National Wildlife Refuge System; defines a unifying mission for the Refuge System; establishes the legitimacy and appropriateness of the six priority public uses (hunting, fishing, wildlife observation, wildlife photography, environmental education, and interpretation); establishes a formal process for determining appropriateness and compatibility; establish the responsibilities of the Secretary of the Interior for managing and protecting the Refuge System; requires a comprehensive conservation plan for each refuge by the year 2012. This Act amended portions of the Refuge Recreation Act and National Wildlife Refuge System Administration Act of 1966.

native species—A species that, other than as a result of an introduction, historically occurred or currently occurs in that ecosystem.

neotropical migrant—A bird species that breeds north of the United States and Mexican border and winters primarily south of this border.

nest success—The chance that a nest will hatch at least one egg.

nongovernmental organization—Any group that is not composed of Federal, State, tribal, county, city, town, local, or other governmental entities.

North American Waterfowl Management Plan—The North American Waterfowl Management Plan, signed in 1986, recognizes that the recovery and perpetuation of waterfowl populations depends on restoring wetlands and associated ecosystems throughout the United States and Canada. It established cooperative international efforts and joint ventures comprised of individuals; corporations; conservation organizations; and local, State, Provincial, and Federal agencies drawn together by common conservation objectives.

noxious weed—Any plant or plant product that can directly or indirectly injure or cause damage to crops (including nursery stock or plant products), livestock, poultry, or other interests of agriculture, irrigation, navigation, natural resources of the United States, public health, or the environment.

objective—An objective is a concise target statement of what will be achieved, how much will be achieved, when and where it will be achieved, and who is responsible for the work; derived from goals and provides the basis for determining management strategies. Objectives should be attainable and time-specific and should be stated quantitatively to the extent possible. If objectives cannot be stated quantitatively, they may be stated qualitatively (Draft Service Manual 602 FW 1.5).

obligate—Necessary for survival.

palustrine—Relating to a system of inland, nontidal wetlands characterized by the presence of trees, shrubs, and emergent vegetation (vegetation that is rooted below water but grows above the surface). Palustrine wetlands range from permanently saturated or flooded land to land that is wet only seasonally.

Partners in Flight program—Western Hemisphere program designed to conserve Neotropical migratory birds and officially endorsed by numerous Federal and State agencies and nongovernmental organizations; also known as the Neotropical Migratory Bird Conservation Program.

partnership—Contract or agreement entered into by two or more individuals, groups of individuals, organizations or agencies in which each agrees to furnish a part of the capital or some in-kind service, such as labor, for a mutually beneficial enterprise.

patch—An area distinct from that around it; an area distinguished from its surroundings by environmental conditions.

perennial—Lasting or active through the year or through many years; a plant species that has a life span of more than 2 years.

planning team—Team that prepares the comprehensive conservation plan. Planning teams are interdisciplinary in membership and function. A team generally consists of a planning team leader; refuge manager and staff biologist; staff specialists or other representatives of Service programs, ecosystems or regional offices; and State partner wildlife agencies, as appropriate.

planning team leader—Typically a professional planner or natural resource specialist knowledgeable of the requirements of National Environmental Policy Act and who has planning experience. The planning team leader manages the refuge planning process and ensures compliance with applicable regulatory and policy requirements.

planning unit—Single refuge, an ecologically or administratively related refuge complex, or distinct unit of a refuge. The planning unit also may include lands currently outside refuge boundaries.

plant community—An assemblage of plant species unique in its composition; occurs in particular locations under particular influences; a reflection or integration of the environmental influences on the site such as soil, temperature, elevation, solar radiation, slope, aspect, and rainfall; denotes a general kind of climax plant community, such as ponderosa pine or bunchgrass.

preferred alternative—The selected final alternative that becomes the final plan. It can be the proposed action, the no-action alternative, another alternative, or a combination of actions or alternatives discussed in the draft comprehensive conservation plan and National Environmental Policy Act document.

prescribed fire—A wildland fire originating from a planned ignition to meet specific objectives identified in a written and approved prescribed fire plan for which NEPA requirements (where applicable) have been met before ignition.

pristine—Typical of original conditions.

private land—Land that is owned by a private individual, a group of individuals, or a nongovernmental organization.

private landowner—Any individual, group of individuals, or nongovernmental organization that owns land.

private organization—Any nongovernmental organization.

priority public use—One of six uses authorized by the National Wildlife Refuge System Improvement Act of 1997 to have priority if found to be compatible with a refuge's purposes. This includes hunting,

fishing, wildlife observation, wildlife photography, environmental education, and interpretation.

proposed action—The alternative proposed to best achieve the purpose, vision, and goals of a refuge (contributes to the National Wildlife Refuge System mission, addresses the significant issues, and is consistent with principles of sound fish and wildlife management).

public—Individuals, organizations, and groups; officials of Federal, State, and local government agencies; Native American tribes; and foreign nations. It may include anyone outside the core planning team. It includes those who may or may not have expressed an interest in Service issues and those who do or do not realize that Service decisions may affect them.

public involvement or scoping—A process that offers affected and interested individuals and organizations an opportunity to become informed about, and to express their opinions on, Service actions and policies. In the process, these views are studied thoroughly, and thoughtful consideration of public views is given in shaping decisions for refuge management.

purpose of the refuge—The purpose of a refuge is specified in or derived from the law, proclamation, Executive order, agreement, public land order, donation document, or administrative memorandum establishing authorization or expanding a refuge, refuge unit, or refuge subunit (Draft Service Manual 602 FW 1.5).

raptor—A carnivorous bird such as a hawk, falcon, or vulture that feeds wholly or chiefly on meat taken by hunting or on carrion (dead carcasses).

refuge purpose—See purpose of the refuge.

Refuge System—See National Wildlife Refuge System.

refuge use—Any activity on a refuge, except administrative or law enforcement activity, carried out by or under the direction of an authorized Service employee.

resident species or wildlife—A species inhabiting a given locality throughout the year; nonmigratory species.

rest—Free from biological, mechanical, or chemical manipulation, in reference to refuge lands.

restoration—Management emphasis designed to move ecosystems to desired conditions and processes, such as healthy upland habitats and aquatic systems.

riparian corridor—An area or habitat that is transitional from terrestrial to aquatic ecosystems including streams, lakes, wet areas, and adjacent plant communities and their associated soils that have free water at or near the surface; an area whose components are directly or indirectly attributed to the influence of water; of or relating to a river; specifically applied to ecology, “riparian” describes the land immediately adjoining and directly influenced

by streams. For example, riparian vegetation includes all plant life growing on the land adjoining a stream and directly influenced by the stream.

riverfront forest (as it relates to the Bitterroot River floodplain)—The forested area next to the Bitterroot River that includes early successional species such as black cottonwood and sandbar willow. This early-successional vegetation is present on newly deposited and scoured gravelly-sand, sand, and fine silty loams near the active channel of the Bitterroot River and in outcrop sites next to floodplain drainages. This area is characterized by little, if any, understory. These sites have high water tables for most of the year and are inundated for short periods during high spring riverflows (Heitmeyer et al. 2010).

runoff—Water from rain, melted snow, or agricultural or landscape irrigation that flows over the land surface into a waterbody.

scoping—The process of obtaining information from the public for input into the planning process.

sediment—Material deposited by water, wind, and glaciers.

Service—See U.S. Fish and Wildlife Service.

shelterbelt—Single to multiple rows of trees and shrubs planted around cropland or buildings to block or slow down the wind.

shorebird—Any of a suborder (Charadrii) of birds, such as a plover or snipe, that frequent the seashore or mud flat areas.

special use permit—A permit for special authorization from the refuge manager required for any refuge service, facility, privilege, or product of the soil provided at refuge expense and not usually available to the general public through authorizations in Title 50 CFR or other public regulations (Refuge Manual 5 RM 17.6).

species of concern—Those plant and animal species, while not falling under the definition of special status species, that are of management interest by virtue of being Federal trust species such as migratory birds, important game species, or significant keystone species; species that have documented or apparent populations declines, small or restricted populations, or dependence on restricted or vulnerable habitats. Species that (1) are documented or have apparent population declines, (2) are small or restricted populations, or (3) depend on restricted or vulnerable habitats.

stand—Any homogenous area of vegetation with more or less uniform soils, landform, and vegetation. Typically used to refer to forested areas.

stepdown management plan—A plan that provides the details necessary to implement management strategies identified in the comprehensive conservation plan (Draft Service Manual 602 FW 1.5).

strategy—A specific action, tool, or technique or combination of actions, tools, and techniques used to meet unit objectives (Draft Service Manual 602 FW 1.5).

submergent—Vascular or nonvascular hydrophyte, either rooted or nonrooted, that lies entirely beneath the water surface, except for flowering parts in some species.

tame grasses—Nonnative species of grasses that are introduced to a site.

temporal—Of or relating to time.

threatened species, Federal—Species listed under the Endangered Species Act of 1973, as amended, that are likely to become endangered within the foreseeable future throughout all or a significant portion of their range.

threatened species, State—A plant or animal species likely to become endangered in a particular State within the near future if factors contributing to population decline or habitat degradation or loss continue.

tile drainage—In agricultural, a method of draining the soil subsurface to reduce moisture.

trust resource—See Federal trust resource.

trust species—See Federal trust species.

U.S. Fish and Wildlife Service (Service or USFWS)—The principal Federal agency responsible for conserving, protecting, and enhancing fish and wildlife and their habitats for the continuing benefit of the American people. The Service manages the 93-million-acre National Wildlife Refuge System that comprises more than 530 national wildlife refuges and thousands of waterfowl production areas. It also operates 65 national fish hatcheries and 78 ecological service field stations. The agency enforces Federal wildlife laws, manages migratory bird populations, restores national significant fisheries, conserves and restores wildlife habitat such as wetlands, administers the Endangered Species Act, and helps foreign governments with their conservation efforts. It also oversees the Federal aid program that distributes millions of dollars in excise taxes on fishing and hunting equipment to State wildlife agencies.

USFWS—See U.S. Fish and Wildlife Service.

U.S. Geological Survey—A Federal agency whose mission is to provide reliable scientific information to describe and understand the earth; minimize loss of life and property from natural disasters; manage

water, biological, energy, and mineral resources; and enhance and protect our quality of life.

ungulate—A hooved mammal.

vision statement—A concise statement of the desired future condition of the planning unit, based primarily on the National Wildlife Refuge System mission, specific refuge purposes, and other relevant mandates (Draft Service Manual 602 FW 1.5).

wading birds—Birds having long legs that enable them to wade in shallow water; includes egrets, great blue herons, black-crowned night-herons, and bitterns.

waterbird—Birds dependent upon aquatic habitats to complete portions of their life cycles (for example, breeding).

waterfowl—A category of birds that includes ducks, geese, and swans.

watershed—Geographic area within which water drains into a particular river, stream or body of water. A watershed includes both the land and the body of water into which the land drains.

wetland—Land transitional between terrestrial and aquatic systems where the water table is usually at or near the surface or the land is covered by shallow water.

WG—Wage Grade Schedule (pay rate schedule for certain Federal positions).

wildfire—Unplanned ignition of a wildland fire (such as a fire caused by lightning, volcanoes, unauthorized and accidental human-caused fires) and escaped prescribed fires.

wildland fire—A general term describing any non-structure fire that occurs in the wild. There are two types of wildland fire, wildfire and prescribed fire.

wildlife-dependent recreational use—Use of a refuge involving hunting, fishing, wildlife observation, wildlife photography, environmental education, or interpretation. The National Wildlife Refuge System Improvement Act of 1997 specifies that these are the six priority general public uses of the Refuge System.

wildlife management—Practice of manipulating wildlife populations either directly through regulating the numbers, ages, and sex ratios harvested, or indirectly by providing favorable habitat conditions and alleviating limiting factors.

woodland—Open stands of trees with crowns not usually touching, generally forming 25–60 percent cover.

Appendix A

Public Involvement

A.1 Public Involvement Activities

This appendix describes how the U.S. Fish and Wildlife Service (Service) conducted public involvement activities and considered the resulting information for developing the comprehensive conservation plan (CCP) for the Lee Metcalf National Wildlife Refuge. The appendix contains the following sections:

- A.1 Public Involvement Activities
- A.2 Public Mailing List
- A.3 Public Comments on the Draft Plan

A notice of intent to prepare a CCP was published in the Federal Register on September 30, 2009. The Service compiled a mailing list of more than 270 names during preplanning. The list included private citizens; local, regional, and State government representatives and legislators; other Federal agencies; and interested organizations.

PUBLIC SCOPING

Public scoping was announced through news releases and a mailed planning update; it provided information on the history of the refuge, an overview of the CCP process, and invitations to two public scoping meetings. The planning update included a form for providing written comments. Emails were also accepted at the refuge's email address: leemetcalf@fws.gov.

Two public meetings were held in the communities of Stevensville and Missoula, Montana on September 29 and October 1, 2009, respectively. There were 12 attendees, primarily local citizens and staff from Senator Max Baucus's local office. Following a presentation about the refuge and an overview of the CCP and National Environmental Policy Act processes, attendees were encouraged to ask questions and offer comments. Verbal comments were recorded, and each attendee was given a comment form to submit additional thoughts or questions in writing.

All written comments were due November 13, 2009; 20 emails and letters were received in addition to the verbal comments recorded at the public scoping meeting. All comments were shared with the planning team and considered throughout the planning process. In addition to 200 private individuals, the following

organizations and agencies were given the opportunity to provide comments about this planning process.

REVIEW OF THE DRAFT PLAN

The draft CCP and final environmental assessment (EA) was released to the public on March 28, 2012, though a notice of availability published in the Federal Register (volume 77, number 60, pages 18852–18853). Copies of either the draft CCP and EA or a planning update were mailed to over 180 individuals or organizations on the planning mailing list. In addition, over 35 copies were distributed to visitors who came to the refuge headquarters requesting the document. The document was also available on the refuge Web site.

The public was offered 34 days to review this document and provide comments. On April 9, 2012, the Service held a public meeting attended by 44 participants at the refuge headquarters in Stevensville, Montana. Before this meeting, the Service's External Affairs Office issued a news release, and planning updates were mailed providing details on where and when this meeting would be held. It was also announced through the refuge's Web site. During this 2-hour meeting a presentation was given on the draft plan, followed by an opportunity for participants to ask questions and offer comments. In addition to the oral comments recorded at the meeting, 13 emails and 20 letters were received. All comments needed to be received or post-marked by April 30, 2012.

The planning team reviewed all the individual comments and met together as a team to discuss the responses to these comments and the proposed changes. These substantive comments and the Service responses are summarized in section A.3.

A.2 Public Mailing List

The Service sent planning updates to all individuals and organizations on the mailing list. In addition, many hard copies of the draft CCP and EA were distributed using the mailing list, additional requests, and through the refuge headquarters.

FEDERAL OFFICIALS

U.S. Representative Dennis Rehberg, Washington, DC
U.S. Senator Jon Tester, Washington, DC
U.S. Senator Max Baucus, Washington, DC

FEDERAL AGENCIES

Bitterroot National Forest, USDA Forest Service, Hamilton, Montana
 Lewis and Clark National Trail, National Park Service, Omaha, Nebraska
 National Park Service, Denver, Colorado
 Northern Rocky Mountain Science Center, Missoula, Montana
 USDA Forest Service, Bitterroot National Forest, Stevensville, Montana
 USDA Forest Service, Regional Office and Lolo National Forest, Missoula, Montana

TRIBAL OFFICIALS

Confederated Salish and Kootenai Tribal Council, Pablo, Montana
 Nez Perce Tribal Executive Council, Lapwai, Idaho

STATE OFFICIALS

Governor Brian Schweitzer, Helena, Montana
 Representative Ray Hawk, Florence, Montana
 Representative Gary MacLaren, Victor, Montana
 Representative Bob Lake, Hamilton, Montana
 Senator Rick Laible, Darby, Montana
 Senator Jim Shockley, Victor, Montana

STATE AGENCIES

Travelers Rest State Park, Lolo, Montana
 Montana Department of Environmental Quality, Helena, Montana
 Montana Fish, Wildlife & Parks, Missoula, Montana
 Montana Fish, Wildlife & Parks, Hamilton, Montana
 Montana Fish, Wildlife & Parks, Helena, Montana
 Montana Historical Society, Helena, Montana
 Montana State Historic Preservation Office, Helena, Montana
 Ravalli County Extension Office, Hamilton, Montana
 Ravalli County Weed District, Stevensville, Montana

LOCAL GOVERNMENT

Mayor of Stevensville, Stevensville, Montana
 Ravalli County Commissioners, Hamilton, Montana

ORGANIZATIONS

American Bird Conservancy, The Plains, Virginia
 American Bird Conservancy, Kalispell, Montana
 American Legion Post #94, Stevensville, Montana
 Audubon Society, Helena, Montana
 Audubon Society, Hamilton, Montana
 Audubon Society, Missoula, Montana
 Audubon Society, Washington, DC
 Bitterroot Water Forum, Hamilton, Montana
 Defenders of Wildlife, Washington, DC
 Ducks Unlimited, Clancy, Montana
 Ducks Unlimited, Memphis, Tennessee
 Family of Peter Whaley, Missoula, Montana
 Five Valleys Audubon Society, Missoula, Montana

Friends of Lee Metcalf National Wildlife Refuge, Stevensville, Montana
 Institute for Bird Populations, Point Reyes Station, California
 Isaak Walton League, Gaithersburg, Maryland
 Missoula Convention & Visitors Bureau, Missoula, Montana
 Montana Conservation Science Institute, Missoula, Montana
 Montana Natural Heritage Program, Helena, Montana
 Montana Natural Heritage Program, Missoula, Montana
 Montana Natural History Center, Missoula, Montana
 Montana Preservation Alliance, Helena, Montana
 National Trappers Association, New Martinsville, West Virginia
 National Wildlife Federation, Reston, Virginia and Helena, Montana
 National Wildlife Refuge Association, Washington, DC
 The Nature Conservancy, Helena, Montana
 Ravalli County Fish & Wildlife Association, Hamilton, Montana
 Ravenworks Ecology, Stevensville, Montana
 Sierra Club, San Francisco, California
 Stevensville Historical Museum, Stevensville, Montana
 Stevensville Main Street Association, Stevensville, Montana
 The Teller, Corvallis, Montana
 Watershed Education Network, Missoula, Montana
 The Humane Society, Washington, DC
 The Wilderness Society, Washington, DC
 Trout Unlimited, Missoula, Montana
 The Wildlife Society, Townsend, Montana

UNIVERSITIES AND SCHOOLS

Colorado State University Libraries, Fort Collins, Colorado
 Northwestern University, Evanston, Illinois
 University of Montana, Missoula, Montana
 Stevensville Public Schools, Stevensville, Montana

MEDIA

Billings Gazette Online, Billings, Montana
 The Billings Outpost, Billings, Montana
 Bitterroot Star, Stevensville, Montana
 Great Falls Tribune, Great Falls, Montana
 The Missoulian, Missoula, Montana
 Montana Public Radio, Missoula, Montana
 Ravalli Republic, Hamilton, Montana
 Stoneydale Press, Stevensville, Montana
 Yellowstone Public Radio, Billings, Montana

INDIVIDUALS

200 private individuals

A.3 Public Comments on the Draft Plan

In addition to the comments received at the public meeting, the refuge received 33 individuals letters or emails during the public review period for the draft CCP and EA. The Service read all comments and found the following comments to be substantive.

The Service developed responses to each of these comments after grouping them in the following topics:

- Kenai Nature Trail
- Pond 8 trail
- public access (roads and other trails)
- dogs on the refuge
- cultural and historical resources
- hunting and fishing
- law enforcement
- visitor services—general comments
- partnerships and community relations
- operations and facilities
- floodplain restoration
- wetland impoundments
- grassland and shrubland
- target species
- wildlife
- bull trout (threatened species) and other native salmonids
- mercury contamination
- invasive species
- planning process
- alternatives
- general comments

KENAI NATURE TRAIL

Comment 1. a. *On page 146 it states that the existing footprint of the Kenai Nature Trail would be moved east in select areas by 10–30 yards to lessen disturbance to waterbirds using the slough portion of Pond 8. It would be helpful to show where the trail will be relocated.*

b. *It is our judgment that the existing Kenai Trail by the slough portion of Pond 8 does not need to be moved to the east. This section has adequate distance and shrubbery to minimize the disturbance to waterfowl that use that slough. However, we do recommend that the portion of the trail that drops steeply down to the cattails be closed and that the trail be connected on the bench for the safety and ease of hiking for the participants.*

c. *I have heard there is a proposal to close the Kenai (I hope I have spelled that correctly) Nature Trail. If this is true, I am adamantly opposed to the idea. It is the best Nature Trail in the Bitterroot and Missoula Valleys. There does not exist another trail that gives you access to look down on large ponds.*

d. *Please do not close this trail. I use it regularly and look forward to being able to see the wildlife here that cannot be seen elsewhere. Closing this trail would be a sad loss to the community who enjoy the wildlife for with [Lee Metcalf Refuge] manages so well. If there are wildlife–human conflicts, then please try to address them in a manner that still allows enjoyment of the trail by foot traffic.*

e. *Do not remove portions of this trail to the existing road way. It is the ‘ups and downs’ of the trail that make it interesting and provide variety.*

f. *I would prefer that [the Kenai Nature Trail] be left as it is. It seems to meet the needs of those participants who frequent this area.*

g. *Access to view birds while walking close to the bank is much better than it would be if the trail is moved to the east. The trail should be open all year for wildlife viewing.*

h. *I am writing to oppose the abandonment of portions of the Kenai Nature Trail. Put portions of the trail on the existing two-track maintenance road as proposed, but leave the existing trail in place for those who prefer to walk on trails rather than maintenance roads.*

i. *Although there is nothing in the writeup to suggest that the beginning half of the existing Kenai Trail will become subject to the conditions of the seasonal trail around Pond 8, it needs to be clarified that only the new trail around Pond 8 will be closed during nesting season.*

j. *Page 120—Strategies for Wildlife Observation as appropriate, relocate portions of the Kenai Nature Trail to the adjacent upper road to provide a more level walking surface (average grade now is 3) and to reduce disturbance to waterfowl and other waterbirds, using the wetlands below the trail. The wetlands are nothing but a landscape of cattails with minimal water in the late spring if any water at all—two very poor excuses for relocating this portion of the trail.*

Response 1a–j. The proposed action (alternative B) did not recommend closing the Kenai Nature Trail or only allowing visitors to access it seasonally. We did propose to relocate two small sections of the trail to address disturbance to waterbirds that use the wetland impoundments along the trail and to create a more level walking surface. The final decision is to leave the Kenai Nature Trail unchanged but add an optional walking path to allow visitors to remain on the higher bench (figure 25 in the final CCP) where the trail drops down to the pond. Many visitors already cross on this upper bench, which is currently

in a closed area. This will give visitors who might not be able to walk this steeper portion of the trail the option to remain on a more level walking surface without violating a closed area boundary.

The refuge has and will continue to address the amount of cattails in wetlands that can be caused by keeping water levels static. The refuge has already begun drawing down and treating these large expanses of cattails to restore more open-water habitat.

Comment 2. *I personally like the portion of the trail from where it crosses the road and descends down to the slough, which it follows to the trail shelter; I appreciate not seeing houses and vehicles on Eastside Highway.*

Response 2. The draft CCP did not recommend any changes to this portion of the trail.

Comment 3. *The rationale for relocating the trail (p. 120) is to reduce disturbance to waterfowl and other waterbirds using the wetlands below the trail. Are there scientific studies which address this?*

Response 3. No, no studies specific to this area are available, but refuge staff have consistently observed waterbirds being flushed along the portion of the trail that comes close to the wetlands. Despite this resource disturbance, no portion of the trail will be relocated.

Comment 4. *The growing usage of the Kenai Trail suggests needs: widen the trail, provide more level grade, boardwalks where appropriate, hedge row of bushes or trees to block view of homes to the east.*

Response 4. We appreciate your suggestions to improve this trail. There may be opportunities in the future to continue improving the trail to provide for the safety and enjoyment of visitors.

Comment 5. *Page 91 and 145—Visitor Contact Area and the Kenai Nature Trail—second paragraph 7th sentence. The remaining trail is a soil footpath. [This] is not true. The remaining trail is 85 gravel and 15 soil.*

Response 5. The trail is now described as a gravel and soil footpath in the final CCP.

Comment 6. *Page 145. Third paragraph—At the visitor contact area—Then the fourth paragraph—Kenai Nature trail is 1.1 miles long. It starts at the refuge headquarters—Why two different names for the same starting point?*

Response 6. The visitor contact area and headquarters are located in the same building. The visitor contact area is open to the public, and the headquarters is the part of the building where the refuge offices are located.

Comment 7. *Page 95—What is the number of visitation for the Kenai Nature Trail and why has the counter been removed?*

Response 7. The counter no longer works and was removed. Over 6,000 people come to the visitor contact area annually, and many of these visitors walk at least a portion of the Kenai Nature Trail.

Comment 8. *See Exhibit for a line diagram with distances to features along the trail. Note the two suggested segments of trail construction 1) Sta. 23 + 75 construct a 180' by pass for visitors not wanting to negotiate the short (240,) steep section of the trail, 2) construct a 700' loop on the west side of the trail, starting at Sta.31 +95 and returning to the trail at Sta. 36+20. This was originally planned as part of the Kenai Nature Trail but due to the now defunct pistol range was never built. This loop would be on the elevated ridge (probably part of a dike for a pond never completed) and give visitors a view of ponds to the west, without any disturbance to waterfowl.*

Response 8. The current path of the Kenai Nature Trail will not be altered, and no expansions of this trail are planned.

Comment 9. *Page 120—As appropriate, relocate portions of the Kenai Nature Trail to the adjacent upper road. In other words where the trail crosses the service road, near the Potato Cellar Pond, close the trail that drops down and parallels the marsh. The purpose of this segment was to give people the feeling that they were away from civilization for a while. Away from houses, power lines, Eastside Highway view and noises. Relocating this segment would also mean abandoning the 128 foot raised boardwalk. Forcing people to traverse a 12 foot wide service road is no longer a trail experience.*

Response 9. The draft CCP did not propose to close or relocate this portion of the trail.

Comment 10. *Page 146—there is very little disturbance to waterfowl, most of this area has brush and trees along the Pond 8 slough to screen the waterfowl from birders and photographers have walked this trail dozens of times and nine times out of ten any waterfowl that are on the slough do not flush. Also part of the handicap trail parallels the southern end of the Pond 8 slough, with no vegetation for screening, so are you planning on moving that segment of the handicap trail back so disabled people no longer will have the opportunity to view waterfowl?*

Response 10. The draft CCP did not propose to alter the universally accessible trail. The Kenai Nature Trail route will not be changed except for the added segment where visitors can stay on the upper bench if they do not want to follow the steeper grade to the pond (figure 25 in the final CCP).

POND 8 TRAIL

Comment 1. a. *I support the development of the walking trail around Pond 8 (page 42) to allow access to more of the refuge. The document states “This trail may only be opened seasonally...”, but it did not explain which season(s).*

b. *Open the new Pond 8 Trail beyond just the winter months.*

Response 1a–b. It is unknown what level of disturbance will occur on this new trail. While birds are nesting or concentrated during migration, the trail would be closed to provide sanctuary. Refuge management will determine which months this trail will be opened after monitoring waterbird response to this new use.

Comment 2. *Will the Kenai Trail relocation and Pond 8 walking trail be included in the [stepdown] plans? Will more detailed information regarding the trails be available in the plans and will the public have the opportunity to provide comments on the proposed actions?*

Response 2. Yes, with appropriate resources a visitor services stepdown plan will be completed within 5 years of CCP completion. This stepdown plan will be available for public review.

Comment 3. a. *The March 2012 planning update states: “A seasonal hiking trail would be added around Pond 8” but that is simply untrue. What is being proposed is to allow the public to walk along refuge roads some times of the year. I can only conclude that the people who wrote the conservation plan don’t recognize the difference between a road and a trail.*

b. *Page 121—Rationale—left column 3rd paragraph. The proposed trail around Pond 8, it’s not a trail—tell it like it is. Seasonally visitors would be allowed to walk on the dike road around the northern end of Pond 8, then south along a service road adjacent to the former residence site and then connect to Wildfowl Lane and thence east along Wildfowl Lane to the visitor contact area. Refuge manager will set the dates for visitors to have access to this road system and dates may vary from year to year. NOTE: Everywhere the reference to around Pond 8 is written it should be changed to read around the north side of Pond 8, as the road doesn’t circle Pond 8.*

Response 3a–b. The public will be able to walk this gravel Service road to access a previously inaccessible portion of the refuge. With the availability of this single-lane road, it is both fiscally and environmentally responsible to use the existing infrastructure for this new opportunity. The trail would ultimately make a wide loop around Ponds 8 and 6, although it would not be immediately next to Pond 8 along the entire length.

Comment 4. *If the Service road is developed in to a trail there would be no need to cross any wetlands. I would*

hope walking would be allowed most of the year, not just the winter months.

Response 4. The trail is next to wetlands that are used by numerous waterbirds for migration and nesting, including a concentration of great blue herons. The seasonal closure of this trail will minimize disturbance to waterbirds, and when the trail is open, visitors will have an opportunity to visit an additional section of the refuge.

Comment 5. *It is not a good idea to have the last part of the trail [new Pond 8 trail] on the roadway. True, anyone can walk on the road now if they want but making it part of the trail is a very bad and dangerous idea. Perhaps the trail could go a certain distance around the pond and end. Then folks could just walk back the same way.*

Response 5. We appreciate your comment. This is one of the challenges in proposing to open this new area to the public. The refuge will consider your suggestion and also work with Ravalli County staff to determine the feasibility of creating a walking path next to the county road.

Comment 6. a. *Page 146—Paragraph 5—The Kenai Nature Trail would be extended westward using the Pond 8 dike road. By definition this is not an extension of the Kenai Nature Trail. Suggest it should read as follows—Where the Kenai Nature Trail (Sta. 39+27 Exhibit B page 8) crosses the upper maintenance road, the segment of the maintenance road going south would be open seasonally for pedestrian walking. Description: Walking south for 335 feet from the Kenai Nature Trail to the junction with the Pond 8 dike road then westerly to the junction of the residence maintenance road and then south to Wildfowl lane and then east on Wildfowl Lane to the visitor contact area.*

b. *The proposed trail around Pond 8 would be 1.25 miles in length. This trail would extend the Kenai Nature Trail westward, then loop south and connect to the county road and then east along the county road to the visitor center. Side of Pond 8. This is not an extension of the Kenai Nature Trail; it is a spur off of the Kenai Nature Trail. The term around Pond 8 is misleading, as the proposed service road system only travels along the north side of Pond 8.*

c. *Page 146—Third paragraph—The proposed extension of the Kenai Nature Trail may require the construction of a boardwalk in wet areas. First this is not an extension of the Kenai Nature Trail, secondly why go off the maintenance roads for a short distance and construct a true trail section? The cost of construction and maintenance doesn’t justify it. Third and last it is unlikely that the area would be wet in the winter when the area is open.*

Response 6a–c. In order to access this new trail from the east, visitors will need to use the Kenai Nature

Trail; the proposed trail is a spur off the existing Kenai Nature Trail. The trail will remain on the current Service roads and not require a boardwalk to be constructed. The current descriptions are meant to note its location.

Comment 7. *Page 145 Last sentence—This spur to the Kenai Nature Trail would provide additional education opportunities for wildlife viewing and photography, environmental education and interpretation. Page 95. Most wildlife observers visit in the spring and summer when the greatest number of migratory birds inhabit the area. So how does a seasonal (winter) opening of this road for pedestrians meet the Statement in the last sentence of paragraph 5 above starting with—This spur to the Kenai Nature Trail?*

Response 7. The trail will be opened seasonally beyond the winter months to provide wildlife viewing and photography, education, and interpretation opportunities.

Comment 8. *We use different terms for the proposed Pond 8 Trail. Suggests we choose one. By definition this is not a trail, it's more of a pedestrian walking area on refuge service roads and a county road. Suggests calling is Pond 8 dike road.*

Response 8. The new trail spur has not been officially named. Once it is opened, refuge staff will work with the public to select a new name for this seasonal trail. The current descriptions are meant to note its location.

Comment 9. *Suggest we add the description of the Pond 8 trail: Beginning at the intersection of the Kenai Nature Trail and the service road approximately Sta. 39+27—(see—Kenai Nature Trail map pg. 8) then south 335 feet to the intersection with the Pond 8 dike road, then west along the dike road to the intersection with the residence road, then south along this service road to the intersection with Wildfowl Lane, then east along Wildfowl Lane to the visitor contact area. All wording stating ‘around Pond 8’, should be changed to ‘around the north side of Pond 8’. Around Pond 8 gives the impression that the walking area on the service roads circles Pond 8.*

Response 9. Although the proposed location does encircle Pond 8, this is the general description of the area where the new trail will be located.

PUBLIC ACCESS (ROADS AND OTHER TRAILS)

Comment 1. *What is the possibility of opening more of the refuge to visitors, particularly those using nonmotorized means of travel? It seems as though hunters have access to much more of the refuge than wildlife observers/photographers and recreationists.*

Response 1. The refuge was established to manage for migratory birds and other wildlife. All national wildlife refuges are closed until portions are specifically opened for compatible public uses. Hunting use

is seasonal and more limited in the number of participants compared with wildlife observation and wildlife photography, which account for most visitations and occur year-round. Archery hunting for deer also serves a management purpose to disperse and help control the deer population. Waterfowl hunting is limited to 654 acres of the refuge, and hunters must be within 10 feet of a Service hunting blind. The refuge does provide several trails for wildlife observation and photography, including blinds, and we will be adding 1.25 miles of trail along Pond 8 to create more wildlife observation and photography opportunities in a new part of the refuge.

Comment 2. *Was any thought given to developing a hiking trail or walking path in the northern portion of the Refuge, by Ponds 11, 12, 13, and Otter? This area could be accessed utilizing the road which takes off from the Hunter Access Parking Area and kiosk located on the Eastside Highway. That way visitors would have access to the southern, central, and northern portions of the Refuge.*

Response 2. No, but based on other public comments, the Service will determine the feasibility of constructing a viewing platform in this or a different portion of the refuge that is accessible to vehicles.

Comment 3. *The Friends of Lee Metcalf Refuge, in association with the refuge staff, offered motorized tours of the refuge. This was a great way to see areas of the refuge normally off-limits to the public. What is the possibility of the refuge staff offering such tours to the public as part of the Visitor Services actions? The tours were greatly appreciated by the members of the Friends Group.*

Response 3. Thank you for your comment. The refuge will continue to provide staff-led programs in places where, and at times when, the refuge is not open to general public access. Typically these special programs will be planned during special celebrations such as National Wildlife Refuge Week or International Migratory Bird Day. Such events will be preplanned by the visitor services staff in the station's annual work plan and publicized well in advance. In the past, such events have included special youth fishing events that are held in areas normally closed to the public; special guided nighttime events to provide opportunities for the public to listen for owls; and special guided programs for college and university students as part of the refuge's environmental education programs. Any special interpretive or wildlife observation programs offered will be open to the general public and will not be conducted for a select group.

Comment 4. a. *Paved trail from the south viewing area needs to be in a condition to allow wheelchair access.*

Many families walk the trail pushing a stroller they also need a good surface.

b. Repave portions of the trail in the wildlife viewing area—it is no longer accessible to wheelchairs. Although there is erosion occurring in this area, the trail will not be washed away for years. In the meantime, the trail should be repaired.

c. The paved trail does not need to be replaced and smoothed out. There is no area on that trail that has holes to walk over. It is a trail that is very well smooth for people in wheelchairs going to the end and around and back.

Response 4a–c. We agree that the trail needs to be maintained, and this issue will be addressed in future.

Comment 5. Provide skiing and mountain biking on of the existing trails and roads on the refuge.

Response 5. All of these activities are permitted on the county road. It would be difficult to accommodate both biking and walking on refuge trails; however, the refuge may permit snowshoeing and cross country skiing in support of wildlife observation and photography activities during the winter months when adequate snow cover is available.

Comment 6. Identify plants along some of the refuge trails.

Response 6. The refuge is currently working on this, and it was proposed in the draft CCP.

Comment 7. a. The Lee Metcalf Refuge is a very important part of the social fabric of the Bitterroot Valley especially for older and handicapped individuals. There are limited areas on the Refuge that [are] accessible to these individuals and at least one of those areas is threatened by unnatural bank erosion caused by rock stabilization of banks upstream installed by private land owners. Floodplain Objective 1 states “Remove or replace hard points along Bitterroot River Channel unless they are protecting Non-service property or structures. The popular and well used handicapped access trail down to the river is a site that will be lost to erosion with no action. This area could be protected with a river friendly engineered log jam that would deflect the flow away from the bank, reduce water velocity and provide valuable fish habitat. I agree strongly with the plan about removal of rip rap but engineered log Jams have been used on many salmon streams in the Northwest to protect infrastructure, provide fish habitat and mimic natural river processes. This is a proven and ecologically friendly technique that mimics natural processes on rivers such as the Bitterroot which contain large amounts of woody debris and should be considered as a technique to protect important features on the refuge in an environmentally friendly manner. I believe that this technique would fit in well with the philosophy and goals of the CCP.

b. Page 102—Floodplain Objective 1—Strategies—3rd paragraph 4th line: education to inform visitors with information about the benefits of this process and the Service’s plans to relocate facilities and eroded trails as appropriate. Where is there any benefit to losing any portion of the 188 acre WVA [wildlife viewing area]? Seems like a weak excuse for ignoring the situation.

Response 7a–b. Due to the recent significant erosion of the wildlife viewing area and associated habitat, the Service will investigate this and other options for potentially slowing the erosion. The decision to move forward will be based on cost, effectiveness, and impacts on the environment and the river system.

Comment 8. On page 20 of your draft plan you discuss working with the county to develop Wildfowl Lane. I hope you consider keeping the roadway safe and allowing for pedestrians and bicyclists as opposed to a major emphasis on motorized traffic. Slow speed limits and possibly signs noting multiple users may help in this regard.

Response 8. Yes, we agree but this is a Ravalli County-maintained road. The Service has and will continue to work closely with the county to provide for the safety of visitors using this roadway to view wildlife.

Comment 9. I am against making Wildfowl Lane into an auto tour route. There is plenty of traffic there as it is and keeps growing each year. Leave it alone.

Response 9. In addition to providing interpretation of the resources along this road, the objective of designating this road as an auto tour route is to improve the safety of visitors who use it. Wildfowl Lane is used by approximately 143,000 visitors annually. These visitors pull off the road, stop in the middle of the road, and get out of their vehicles to view and photograph wildlife. These uses will likely increase as the communities around the refuge expand, regardless if the road is officially designated as an auto tour route. By working with Ravalli County staff to provide pulloffs and a walking or biking path, refuge staff will help increase the safety of visitors who use this road. In addition, providing interpretation of the refuge habitats that visitors can see from the road will improve their understanding and appreciation of the resource.

Comment 10. Do not put new signs out on highway 90 and 93. This is very unnecessary and will cost a lot of money.

Response 10. The benefit of providing this additional signage is to better orient visitors who are new to the area. The feasibility of placing a sign on Interstate 90 is very low. There is signage on highway 93 that the Service would like to improve to give better directions to the refuge. Additional details will be provided in the visitor services plan.

Comment 11. *I would like to see more hiking trails in areas in the north end of the refuge.*

Response 11. After reviewing options for providing additional trails for visitors, the decision was made to provide a new walking trail around Pond 8 (the central portion of the refuge).

Comment 12. *Page 46—Improve access to the WVA by replacing the gate with bollards (large rocks) that allow wheelchairs to pass through. How would Sweet Pea Sanitation Service be able to access the toilets? In addition refuge ATVs, side by side Mule and other small vehicles would require either a front end loader or a backhoe to move the bollards. An alternative would be to widen the existing paved path on the south side of the hinge gate post. This might require kind of a railing as the ground slopes off along the edge.*

Response 12. The bollards can be removed as needed. The bollards the Service is proposing to use would not require this type of heavy equipment to move. However, the Service will consider other options for improving access for visitors who use wheelchairs.

Comment 13. *Middle column—No public roads (namely Wildfowl Lane) would be eliminated. Why is this sentence even in here? The refuge has no jurisdiction over the county road.*

Response 13. We added this statement so that the public would understand that the Service does not propose to reduce vehicle access by existing public roads (including Wildfowl Lane).

Comment 14. a. *Page 90—Wildlife Viewing Area—the WVA has three pedestrian trails that total about 2.0 miles: Ponderosa Trail, Metcalf Trail and Slough Trail. Due to erosion by the Bitterroot River and deadfall the Cottonwood Trail is no longer maintained and impassable in a significant portion of the trail.*

b. *Page 145—Wildlife Observation and Noncommercial Photography—right column—2nd paragraph—the WVA located in the southwest corner of the refuge, has four trail segments that total 2.5 miles. The majority of the Cottonwood Trail has been lost due to the erosion actions of the Bitterroot River and is no longer a viable trail. Paragraph should now read—The WVA, located in the southwest corner of the Refuge, has three trail segments that total 0 miles.*

Response 14a–b. This is true; the Cottonwood Trail is gone. However, in total 2.5 miles of the trail remain. Internally, the refuge does not use these separate trail names. They are referred to as the WVA trails. For consistency, the individual trail names have been removed from this final CCP and will now be referred to as the WVA trail system.

DOGS ON THE REFUGE

Comment 1. *The problem with irresponsible dog owners is severely and negatively impacting the wildlife habitat. The sign at the bridge [in the WVA] is ignored.*

Response 1. We agree, and it is a continuing challenge for refuge management with current staffing. If this continues to be a significant issue, the Service will prohibit all dogs on refuge trails or minimize public access to areas that are being abused.

CULTURAL AND HISTORICAL RESOURCES

Comment 1. *The Lewis and Clark National Historic Trail is listed as a special value in Section 2.5 of the draft CCP. We noted the statement on page 20 that the Refuge “contains portions of the Ice Age Trail, the Nez Perce Trail and the actual (not officially designated) Lewis and Clark Trail.” As stewards of the Trail charged with identifying the historic route, the NPS [National Park Service] is interested in learning more about this implied discrepancy in designation. The Trail is defined in the National Trails System Act as the outbound and inbound routes of the Expedition, extending from Wood River, Illinois, to the mouth of the Columbia River in Oregon. We recognize that the exact historic route of the Expedition in the area of the Refuge is open to interpretation. Current research that we’re aware of shows the Trail bracketing the eastern and western borders of the Refuge. This research indicates that the Expedition likely did travel in and very near the current Refuge boundaries. The NPS would welcome a discussion on the historic Trail location in the area.*

Response 1. The document has been modified to reflect your comments, and we welcome any future dialogue about the value of the refuge to this historic trail.

HUNTING AND FISHING

Comment 1. *Summary Page—“The Refuge”, hunting is mentioned as a wildlife dependent compatible public use. This concept should again be mentioned and carried through in all goal statements in the rest of the plan. Otherwise it gets lost in the rest of the text.*

Response 1. Congress has deemed hunting one of the six appropriate wildlife-dependent uses of refuges, and this use is supported in this document. Hunting was described as a wildlife-dependent public use throughout the draft CCP including the summary and chapters 1, 3, 4, 5; the glossary; appendix A; and appendix D.

Comment 2. *Page 89, Visitor Services—Hunting and fishing. Text should make clear that these activities would continue and be major visitor uses.*

Response 2. Having objectives and strategies in the plan for both of these activities, including compatibility determinations, confirms the refuge’s commitment that these uses will continue.

Comment 3. *Page 109, general discussion of ponds—Will proposed pond management allow the same number of duck blinds in the future for hunting as was permitted in say 2010? What will be the proposed number of increase or decrease of blinds with the approved CCP?*

Response 3. The goal is to increase the quality of the hunt by maintaining the same number of blinds while replacing some of them and increasing the distance between them. There are other improvements including replacing kiosks, improving parking areas, ensuring more consistent water delivery, and improving wetland and upland habitat.

Comment 4. *I am not in favor of charging fees for use of hunting blinds because it is [a] restrictive measure and affects the youth and retired hunters with an unfair disadvantage. If waterfowlers have to pay a fee than birdwatchers and other users should also be taxed.*

Response 4. The draft CCP did not propose a user fee for using the waterfowl blinds.

Comment 5. *Development of furthering pheasant and waterfowl hunting opportunities on refuge for youth should be given high consideration. Managing populations by harvest is biologically essential.*

Response 5. Given the size of the refuge it is difficult to accommodate multiple uses, particularly when introducing firearms. The refuge is not opposed to providing additional hunting opportunities for youth, but refuge management will need to determine if it can be provided without compromising the safety of other visitors.

Comment 6. *My impression is that archery hunting for whitetail deer is not reducing the population enough. If a short season at the end of, or in lieu of, the last ten days of archery season were open to shotgun, slug only, the whitetail overpopulation problem could be reduced.*

Response 6. The CCP proposes that refuge staff work with the State to determine if a firearm hunting season is feasible.

Comment 7. *As a lifelong resident of Montana who spent 20 years of my life in the Bitterroot Valley, I would really like to see hunting opportunities continued and expanded upon for the Lee Metcalf Wildlife Refuge. As more and more of the prime river bottom country in the Bitterroot posts No Hunting or Fishing signs, the places that we can take our kids to pass on the hunting and fishing tradition shrinks. As a place that is easily accessible and holds lots of game like the Lee Metcalf becomes more accessible and more opportunities are opened up, the more we get our kids involved in the outdoor sports, the better we are.*

Response 7. The refuge contributes significant time and resources to provide quality hunting opportunities

including improving waterfowl hunting blinds, providing parking areas, and providing law enforcement. The Service will continue to determine if additional opportunities can be provided without decreasing the quality of the hunt or significantly impacting other users or wildlife.

Comment 8. *I'd prefer to see the hunting blinds separated out further and have more opportunities that require longer walks to access the blinds but have a reward of being farther from other hunters.*

Response 8. The refuge is currently replacing multiple blinds and relocating some of them to better distribute hunters.

Comment 9. *I am against using shot guns and muzzle loaders for deer hunting. I hope you do not plan on all hikers to wear hunter orange! You mention having too many deer and yet we rarely see very many when driving through (regardless of the time of day) compared to the late 90's when we would consistently count 20 to 30 (even 40) when driving thru.*

Response 9. A significant consideration when determining with the State whether to pursue a limited firearm harvest will be the safety of visitors and neighboring landowners. If it cannot be done safely and it does not support management objectives, the Service would not pursue it.

Comment 10. *Can you open some of the ponds for bass fishing for the public during the fishing season? It's stated that bass are becoming an invasive problem in the draft CCP. You have hunters in the refuge in the hunting season.*

Response 10. The area where the bass are located is also a waterbird nesting and migratory area (spring through fall). Allowing fishing along these ponds would disturb these birds. Fishing is permitted in the WVA and along the Bitterroot River. Future seasonal drying of these ponds will decrease bass numbers and increase more desirable subaquatic vegetation for waterfowl and other waterbirds.

Comment 11. *Page 144—Anticipated Impacts of Use—right column last sentence—Furthermore, despite the potential impacts of hunting, a goal of Lee Metcalf Refuge is to provide opportunities for quality wildlife-dependent recreation. Why is this statement not included under Wildlife Observation and Noncommercial Photography. Hunting seems to be the number one priority under current management.*

Response 11. We did not intend to highlight one wildlife-dependent recreational opportunity over any others. All current compatible wildlife dependent recreational programs will continue, with many being improved or expanded.

LAW ENFORCEMENT

Comment 1. *Trash is a growing problem.*

Response 1. We agree. This is always a challenge when areas are opened for public use. If these types of impacts are significant enough, they can affect the compatibility of that permitted activity with the purposes of the refuge. We will continue to educate visitors and patrol areas for littering. Some of this litter floats into the refuge through the canals and during flood events. We are fortunate to have a group of dedicated volunteers who assist with periodically collecting trash and educating visitors about the impacts of littering.

Comment 2. *Page 23—Refuge law enforcement officers have monitored diversions along this ditch in the past. Why has there been no enforcement of the ditch water rights?*

Response 2. Refuge staff currently inspect all three lateral ditches to clean them and monitor water use. The Service is currently in the process of piping these ditches to better manage the timing and application of the refuge-allocated share of water for wildlife management and irrigation.

VISITOR SERVICES—GENERAL COMMENTS

Comment 1. *Under Chapter 1 Introduction it states, the Refuge has 143,000 visitors each year. Where is the factual evidence for this number? On page 97 it states an estimated 143,000 visitors.” There is no check-in point along Wildfowl Lane. There is no way to determine who is a “visitor” on this road.*

Response 1. The refuge has a car counter on Wildfowl Lane, which travels through the refuge. Although we can't say for certain if each motorist is there to visit the refuge, each passes through the refuge (refuge land lies under Wildfowl Lane) and is counted as a visitor. In addition volunteers keep a count of visitors who come to the visitor contact area. Hunter visits are also counted, and there is a people counter in the WVA. The visitors on the west side of the refuge or floating the Bitterroot River through the refuge are not counted. The number 143,000 is an average of total visits spanning the years 2005 through 2011.

Comment 2. *Page 127, rational, sixth line. The refuge hosts over 143,000 visitors annually. Currently, most visitors are greeted in the small visitor contact area—Misleading statement, this implies that the majority of the 143,000 visitors annually visit the small visitor center. According to your report on page 49 & 95, the number visiting the visit center is around 6,000 annually.*

Response 2. This has been corrected in this final document.

Comment 3. a. *How can more traffic, more people, more encroachment, and more dogs not negatively impact this “sanctuary” as it has already done?*

b. *First of all, the refuge is a wildlife refuge, not a people refuge. So when you talk about staffing up with three more positions aimed at people, I object. Wildfowl Lane is for the people, the headquarters complex is for the people and the various programs are for the people and that is, by and large, enough of that...Now let's put together a plan—for the wildlife...*

Response 3a–b. We agree that refuges should be managed for wildlife first. That is why the Service has appropriate use and compatibility policies to ensure that any activity permitted on the refuge does not materially detract from the purposes for which it was established. Balancing the desires of visitors with the needs of wildlife is always a challenge for any refuge staff. On Lee Metcalf Refuge, the Service attempts to manage uses and other disturbances to wildlife through time and space, and a vast majority of the refuge is only open seasonally to protect migratory birds and other Federal trust species. We must provide for wildlife first, and only then, whenever compatible with this objective, can we also manage for wildlife-dependent public uses of the refuge.

Comment 4. *We recommend that a permanent group viewing blind that can accommodate up to 20 people be constructed that would overlook one of the ponds at the Refuge. This will add to the viewing pleasure for visitors without disturbing the wildlife.*

Response 4. The Service currently provides two wildlife viewing and photography blinds and will be providing two mobile blinds. In addition, waterfowl hunting Blind 2 will be converted to a seasonal, universally accessible photography blind. A blind that could accommodate 20 visitors would require a significant footprint along the refuge wetland impoundments.

Comment 5. *We do not share the vision for expansion of the visitor contact area. The Refuge is only 2,800 acres and the expansion plans take up more space which only reduces the area left for wildlife. Any expansion of facilities should take place off the Refuge.*

Response 5. The expansion would be next to the current refuge facility in an area that is already designated as a headquarters site—a disturbed area.

Comment 6. *Page 90, Wildlife viewing area—1st sentences states 4 trails, but map on page 41 show only 3 trails.*

Response 6. The trails on page 90 refer to the WVA.

Comment 7. *I like the expansion of educational programs into the schools. Great idea.*

Response 7. Thank you for your comment.

Comment 8. *Expansion of Visitor Center: Is it necessary? How many of the visitors counted actually enter the center?*

Response 8. Expanding the visitor center will allow the refuge to accommodate larger groups and provide additional areas for interpretation of refuge resources and management programs. Currently, 6,000 visitors enter the visitor contact area. Also, on many occasions this space is filled to capacity by visitors and groups.

Comment 9. *Do not enlarge the visitor center or bring in professionals to design it. This will cost a fortune and you have great displays as it is now. True, it is small, but it is friendly, homey, and reflects Stevensville's small town way of life.*

Response 9. The visitor center expansion will accommodate larger groups, many of which only stop at the contact area, and provide additional area for interpretation of refuge resources and management direction. Any structure will retain the characteristics of the refuge and the community and will be a welcoming environment.

Comment 10. *We believe a continued strong emphasis on education is essential to the long term future of [Lee Metcalf Refuge]. We also believe managing for a diversity of habitats and species provides much greater educational value than managing only for waterfowl.*

Response 10. We agree and feel we have integrated these concepts into this CCP.

Comment 11. a. *It would be nice to have a viewing platform in the parking area on the south end that can be used for photography (Hollingsworth Area).*

b. *Need additional platforms for viewing and photographing wildlife.*

c. *Page 146—An 18 to 20 foot high observation tower built on the west side of Wildfowl Lane, would afford wildlife viewers the opportunity to view the waterfowl & waterbirds using the Hollingsworth Wetland Project. As it is now there is very little opportunity to view the birds. A feasible location would be about 0.2 of a mile north of the gate entrance to the duck hunter sign in. This location is flat and construction of a three car parking would require little effort.*

Response 11a–c. We will be investigating opportunities to provide a wildlife viewing platform (that is compatible with our primary purposes) without impacting the view and experience for other visitors.

Comment 12. *I hope you continue to allow adventure races or similar events that have been held in the past. These were held in areas that the public is not normally allowed, but no wildlife seemed to be disturbed during this event. I think they served an environmental education purpose.*

Response 12. Any activities such as these will need to be deemed appropriate and compatible if they are permitted to take place on the refuge.

Comment 13. *In general plan B wants to greatly increase visitor use of the refuge. I am wondering if bringing all those extra people to observe wildlife will simply cause the wildlife the retreat further back into the areas we cannot go. Therefore you would be defeating your purpose. Instead of a wildlife refuge it might become a "people park". I am not against education and having more folks enjoy the refuge and all it has to offer—but this must be done with much discretion.*

Response 13. The refuge is constantly balancing its primary purpose of managing and protecting areas for wildlife while providing opportunities for the public to engage in compatible wildlife-dependent recreation. There are large portions of the refuge that are not accessible to the public most of the year. The objective is to provide refuge areas, particularly when migratory birds are present. We appreciate your comment and will always use much discretion when expanding refuge access.

Comment 14. *Is it possible to allow ice skating on one of the ponds when cold enough (if it wouldn't disturb the wildlife).*

Response 14. This is not considered a wildlife-dependent priority public use and could be very dangerous given the lack of suitable ice in the winter due to springs in the ponds.

Comment 15. *Please keep signs within the refuge very limited and discreet. You don't want to lose the open, wild environment with distracting signs all over. Especially for photography.*

Response 15. We agree, and any added signs will be evaluated for their value to our visitors.

Comment 16. *Page 149—Commercial Filming, Audio Recording and Still Photography—Page 150—Justification—At the end of this paragraph add—The above restrictions do not apply to these activities within the boundaries of Wildfowl Lane and county ROW [right-of-way].*

Response 16. The refuge owns the land under the county road bed and has the authority to enforce refuge regulations; however, this is difficult to enforce in right-of-way areas, including the county road.

PARTNERSHIPS AND COMMUNITY RELATIONS

Comment 1. *The refuge is a community asset and as such the input of community representation should be sought on decision that will impact the refuge. I would hope that such a philosophy would be reflected in the plan.*

Response 1. We agree, and the CCP process incorporated public involvement including requesting comments such as those found in this appendix.

Comment 2. Page 20, Special values—long list of developments on refuge. The former “Friends” partnership should be credited and referenced on the items they enabled. Without “Friends” assistance, likely the refuge would not have accomplished those items. Page 24, Visitor Services—again credit “Friends” partnership for making possible many of these facilities/services. Page 93, Kiosks—State these were made possible by the assistance of the former “Friends” partnership.

Response 2. In the history of the refuge there have been innumerable contributions to the refuge including groups and individuals. It would be difficult to list all partners without risking excluding some. We do appreciate and recognize the contribution of all partners, past and present.

Comment 3. a. I was bothered by the fact that your planning team skirted the issue of the huge cleavage the FWS [U.S. Fish and Wildlife Service] has created in the Stevensville and Bitterroot community by its handling of its relationship to the local public and friends group here.

b. Under partnerships I encourage you to work with Friends of the Refuge groups, as opposed to the status quo of not working with them.

c. The term Partnerships is mentioned at least 30 times in the document, but nowhere is a Friends Organization mentioned. Quote from The US. Fish & Wildlife Service Publication—Conserving the Future wildlife Refuges in the Next Generation—“Develop and nurture active, vibrant friends groups on every refuge”. So why is this not addressed in this CCP?

Response 3a–c. The Service is not opposed to partnerships that support the goals, objectives, and priorities of refuge management. The Service has added language to the document that in the future the refuge staff would pursue and foster a refuge advocacy group that will support refuge management priorities including the achievement of the goals and objectives described in this and other refuge planning documents.

Comment 4. A more concerted effort to recruit volunteers and non-profit wildlife groups will benefit the refuge. Volunteers from Ducks Unlimited, Pheasants Forever, Rocky Mountain Elk foundation etc. would gladly expand and improve recreational opportunity on the refuge without needing to fund additional staffing.

Response 4. We have a large group of dedicated volunteers to work on many refuge programs; however, volunteers need direction and oversight by a Service employee. This can be very time consuming, although the overall benefits are substantial and outweigh the effort. By recruiting an additional visitor services staff person, the refuge would be able to recruit and train additional volunteers that could assist with implementing the programs described in this document, offsetting costs.

Comment 5. Chapter 2 The Refuge—seem to me there should be explained the history of the [Ducks Unlimited] partnership that allowed for and accomplished the construction of many of the dams and levees for wetland creation. Likely without that partnership the FWS would not have had the funds to build these ponds, or at least not as many of them. This [Ducks Unlimited] partnership should also be mentioned again on page 21 bottom of page in “Wetland Impoundment” text. Suggest Metcalf get signs and put them up at prominent places.

Response 5. The refuge has erected signs that acknowledge the contribution of partners including Ducks Unlimited; however, signs can create visual clutter. The Service appreciates the contributions of these organizations as well as their biological expertise and commitment to the refuge. Since the refuge was established in 1964, there have been dozens of partners that have completed work on the refuge. It would be difficult to list them all in this document without risking excluding an individual or group.

OPERATIONS AND FACILITIES

Comment 1. a. The refuge is proposing to increase staff by 3.5 individuals. I suggest that with consistency in management there would be no reason for that increase in staff.

b. In general I am in favor of plans that don't expand the staffing unless the refuge were to expand in size.

Response 1a–b. One of the goals of completing a CCP is to provide consistency in management and build upon successful programs. There are new and expanding challenges to refuge management, including invasive species, contaminants, declining migratory bird species, infrastructure maintenance, and habitat restoration. Many of these issues have been ongoing and not adequately addressed. The refuge has actually lost staff members as these challenges increased. With a clearer direction and implementation of this plan, refuge habitats will improve, and the visitors will be provided quality programs. This direction will not change even if no staff members are added; however, some of the actions will require additional staff members to accomplish.

Comment 2. a. Under Alternative B “Proposed Action” solutions put forth such as hiring an assistant manager, biological technician and visitor center coordinator, improve road, professional signs, and updated buildings. How do you justify more cost to the taxpayer who is already overburdened with ever expansive Federal bureaucracy while the taxpayer becomes poorer and poorer?

b. With all the changes mentioned in Plan B, just where is the money coming from? The federal government is broke, economy is terrible. I suggest you come

up with a plan that does only what is necessary at first with long goals as the money becomes available.

Response 2a–b. Some of the objectives and strategies described in the final CCP can be accomplished using current resources—that is a benefit of this type of long-term planning. Even if the refuge doesn't receive any additional resources, particularly in this economy, this plan helps the refuge staff ensure that they are using what resources they have on the highest priority habitats, species, programs, and issues. Additional funding, including staff, will be dependent on available funds and regional priorities for the Service as stated in beginning of this document:

The CCP details program planning levels that are sometimes substantially above current budget allocations and thus are primarily for Service strategic planning purposes. The CCP does not constitute a commitment for staff increases, operation and maintenance increases, or funding for future land acquisition.

Comment 3. *With today's emphasis' on reduced Federal government funding, I don't see Metcalf refuge getting the funds to implement Alternative B, let alone maintain existing management, Alternative A. This makes renewing the "Friends" partnership more compelling. Somewhere in the text of the plan, creating a Friends partnership should be a program objective and clearly spelled out. If it is in there, I did not see it.*

Response 3. See responses to comments 3a–3c under the section above entitled "Partnerships and Community Relations." The Service has added language to the document stating that in the future, the refuge staff will pursue and foster a refuge advocacy group that will support refuge management priorities including the achievement of the goals and objectives described in this and other refuge planning documents.

Comment 4. *Further discussion justifying the need of a deputy refuge manager (admin position [at] GS–11) instead of a full-time wildlife biologist would help. Having a certified [wildlife biologist] on board could possibly negate the necessity of employing a biological science technician in addition to the seasonal biology technician and provide consistent effort in accomplishing refuge scientific conservation goals.*

Response 4. The intent is to recruit an assistant manager with a strong biological background to assist with both administrative and management activities along with the biological program. Much of the work, including controlling invasive species and monitoring, would be more appropriate for a science technician directed by this assistant and the manager.

Comment 5. *Bringing aboard a visitor services specialist to augment the duties of the current outdoor recreation planner seems a bit unnecessary in view of the*

refuge's plan to involve more volunteers to perform this task. As you are aware, one of the main goals of government is fiscal responsibility and adding a full-time GS–7/9 to staff a reception area that is busy only about three–four months of the year may not be appropriate.

Response 5. Staffing the information desk in the visitor contact area would be a very small part of the assigned work duties for a visitor services specialist. Typical assignments would include developing new programs for students, teachers, and adults; leading tours and presentations; assisting with special events; leading onsite and offsite environmental education programs for a variety of audiences; and recruiting, training, and supervising current and new volunteer staff. As described in this plan, there are many more opportunities to interact with and provide new, quality programs for the public, students, and the surrounding communities.

Comment 6. *Use the value of gravel from dikes to pay for the cost of removal (sell the gravel).*

Response 6. This is a good suggestion; however, the refuge would have to determine if this commercial use is feasible and compatible. Funding from the sale of refuge resources would be deposited into the government's general fund, rather than into the refuge budget.

Comment 7. *I am a hunter education instructor that teaches at Lee Metcalf. I am very thank full to see that you want to continue to support our efforts in teaching youth how to be safe with firearms. From what I can see in the plan I see that the support will be continuing, however there has been some question as to whether or not we will be able to continue doing the live fire exercise for our field courses on the range by pond 8. I do not see anything in the plan that addresses the continued use of that range area or the removal of the range. We only use 22's on the range and it only occurs twice a year once in the spring and once in the fall for only a few hours. I appreciate the use of the facilities for the hunter education courses and would like to ask that the continued use of the range be allowed for our live fire exercise. I would be more than willing to donate my time to remove unused structures within the range area and work on that area so it is not as visually unappealing and more aesthetically appealing to others who do not want to see that kind of thing on the refuge.*

Response 7. The refuge will continue to support and participate in hunter education programs; however, the firing range is to be closed within a year (a decision made outside the scope of this plan), so any fire range activities would have to take place off-refuge in the future.

Comment 8. Page 46—Roads & Trails—Action—Left column—Maintain 18.1 miles of existing roads, including 2.8 miles of public roads. (Wildfowl Lane) Why is this in here? The refuge doesn't maintain the county road!

Response 8. In this instance (alternative A) the word “maintain” meant that the refuge does not have any plans to reduce the number of miles of roads on the refuge. Perhaps the word “keep” would have been a better choice and less confusing.

Comment 9. Page 91—Environmental Education—[states] there is an amphitheater and an outdoor pavilion. The previous manager named it the Environmental Education Shelter and a plaque at the site bears that name. Page 92—Schools—2nd paragraph [calls it an] outdoor education shelter.

Response 9. In the final CCP the name “environmental education shelter” has been consistently used when referring to the structure behind the refuge headquarters.

Comment 10. Page 127—Facilities, Equipment and Supplies Objective. Purchase an excavator to complete proposed restoration projects. To buy an American built excavator you are looking at a cost of \$150 K to \$185K. This doesn't include all the fuel and maintenance cost, all these cost for a piece of equipment that would be used about six months out of the year at best. It would be more economical to contract with a local excavation contractor.

Response 10. We don't disagree with your comments. The refuge is currently renting and borrowing equipment as needed, but over time, purchasing this piece of equipment would be more economical. The refuge will first pursue opportunities to borrow or receive transferred equipment from other Service stations at no cost prior to purchasing any equipment.

Comment 11. Page 145. Fifth Paragraph—second line—Blind 1 is located one-third of a mile from the visitor contact area on Pond 8. Path from trail to blind is 150 feet. Sixth line—Blind 2 is located one-third of a mile from the visitor contact area. Blind 2 is located 1.0 mile from the visitor contact area. Path from trail to blind is 970 feet.

Response 11. These corrections were made in the final CCP.

FLOODPLAIN RESTORATION

Comment 1. The EPA [U.S. Environmental Protection Agency] considers the protection, improvement, and restoration of riparian and wetlands areas to be a high priority, since wetlands and riparian areas increase landscape and species diversity, and are critical to the protection of designated water uses. We support the proposed actions that would promote a more naturally

functioning aquatic ecosystem through reconnection of floodplain habitats with the Bitterroot River, and increasing opportunities for overbank and backwater flooding into and out of the floodplain. While the proposed actions would decrease lentic wetland habitats created by impounding water at the refuge, soil types and historical vegetation data suggest that several of the impoundments or ponds were once forested or consisted of native grasslands. The proposed actions would restore natural riparian habitats and expand cottonwood gallery and riverfront forest habitat for migratory birds and other wildlife.

Response 1. We agree. Thank you for your comment.

Comment 2. River and stream connectivity would be reestablished, fish passage improved, and native cold water fisheries would be enhanced through restoration of Francois Slough and North Burnt Fork Creek.

Response 2. We agree, and these long-term benefits were part of the decision to propose this restoration project.

Comment 3. Since the primary focus of the National Wildlife Refuge system was to create wetlands, the proposed action to encourage the expansion of the Bitterroot River floodplain by sacrificing ponds near the river is counter to that purpose. We would like for the Refuge to retain the current ponds, especially Ponds 11 and 12. The ponds add diversity to the Refuge. By expanding the river riparian zone, the bird diversity will decrease, and the Refuge will be adding the same habitat that exists for miles upstream and downstream from the Refuge.

Response 3. The primary focus of the National Wildlife Refuge System is to protect migratory birds and other Federal trust resources (wildlife that migrates and threatened and endangered species) and their habitats. There has never been any mandate or primary focus to create wetlands; nevertheless, this has happened on many refuges, including Lee Metcalf. The intent of creating these wetlands was to impound water for wildlife, particularly waterfowl, which has always been a priority species for the National Wildlife Refuge System. We have learned over time that impounding water at the sacrifice of native habitats was not the best and highest use of these lands, particularly refuges that are outside the Prairie Pothole Region of North Dakota, South Dakota, and eastern Montana. Historically there were few natural lentic (still, fresh-water) wetlands on Lee Metcalf Refuge and it has never been a major contributor to the continental population of waterfowl; nevertheless, over a third of the refuge is covered by wetland impoundments. Ponds 11, 12, and 13 were constructed near the migrating river channel. They are experiencing a high degree of erosion into the channel. By returning a portion of these impoundments to a stream channel,

riparian areas (such as cottonwood forests) would be restored. These forests are some of the most productive habitat in Montana and are home to a wide variety of birds, mammals, reptiles, and amphibians. In addition, the Service is proposing to retain almost all of the remaining wetland impoundments found on the refuge. In the short term, the structures will be replaced for management of these impoundments until the Service receives the funding to work with an engineer and hydrologist to reconnect Three Mile Creek to the Bitterroot River through this area. There will be a decrease in waterbird use once the structures are removed, but there will be an increase in habitat diversity and restoration of biological integrity of the historical gallery and riverfront forest.

Comment 4. *This floodplain refuge which provides a diversity of habitats for a balanced species base should continue to be managed for them but don't overlook the fact that waterfowl were a primary reason for this landscape to become preserved and this fact should not be compromised.*

Response 4. The plan does not overlook waterfowl. There is a goal and numerous objectives for managing wetland impoundments for waterbirds, including waterfowl.

Comment 5. *North Burnt Fork Creek on the Refuge: This segment of the creek has water control structures that need well-planned, consistent management. Water control structures result in temperatures and instream flow problems, unnatural water level fluctuations are likely to be slowing native riparian vegetation establishment, and are document as barriers [to] aquatic movement of fish and other species.*

Response 5. The CCP does propose to work with engineers to remove those barriers in North Burnt Fork Creek (including structures) that impede native fish movements. The long-term goal is to restore this stream section and associated riparian habitat.

Comment 6. *The plan talks about dropping the water levels on ponds to restore gallery forest. Do you know how many acres of the ponds will be converted back to this forest habitat?*

Response 6. At this time, we cannot say definitively where the water level would be, but it will be below the highest areas of that part of the floodplain. The first part of this process will be to survey the area and then determine the types of soil in this part of the impoundments to help evaluate where this restoration would be most successful. We would also use benthic maps to select the most appropriate areas to expose for planting and restoration.

Comment 7. *The preferred alternative described in the CCP Environmental Assessment recognizes the*

natural geomorphic and hydrologic processes of the Bitterroot River. Allowing these processes to function in a more natural manner within the Refuge will increase the likelihood of achieving long-term restoration of native habitats both along the river and in upland areas. Focusing on native habitat restoration will benefit a wide range of vertebrate species and in turn, attract diverse recreational interests. The NPS [National Park Service] supports this holistic, ecosystem-based approach and encourages adoption of the preferred alternative.

Response 7. That is our long-term goal—well said.

Comment 8. *I am not in favor of trying to manipulate the river to prevent it from changing its channel. That is a necessary part of a healthy river system and the long term effects of excessive channeling and diking can be seen in many other areas in a lack of fish and river biomass.*

Response 8. We agree, and we are trying to facilitate the river's more natural fluctuations within the refuge; however, this will be a slow process that will take careful planning and monitoring.

Comment 9. *I have read through much of the CCP for the Lee Metcalf Refuge and I am very impressed with the effort that has been made in this plan. I am focusing my comments on Section 5.2 and agree completely with the spirit of the strategies. I think this plan will greatly improve the ecological functions of the Refuge by restoring the natural river and flood plain functions. However, the Bitterroot River is highly manipulated both upstream and downstream of the Refuge and natural processes will never be completely restored so I believe that the Floodplain Objective 2 should take into consideration this reality.*

Response 9. We agree and have considered these factors as we developed these objectives and strategies.

Comment 10. *Page XIII—The first of at least 23 times that gallery forest is mentioned and never a definition of what a gallery forest is. Add it to the Glossary on page 129 with a definition. Also add Tame Grasses with a definition.*

Response 10. We have added definitions of these terms to the glossary.

Comment 11. *Page 30—Flood Plain Actions—transition Ponds 11, 12 and 13—or portions of these pools to riparian and gallery forest. From the Eastside Highway Pond 13 affords a spectacular view of marsh land, pool water and the Bitterroot Mountains. See reference in Exhibit—A page 7.*

Response 11. We agree that this is a good place for visitors to see the refuge from the road. The proposed restoration of this area will be visible and interpreted for visitors. Until this takes place, the Service will

be replacing or maintaining the water management structures.

Comment 12. *At approximate Mile Marker 6.8 the refuge boundary Carsonite post are 139 feet west of the edge of Eastside Hwy 203. However the four strand barbwire fence is only 36 feet from the edge of the Eastside Hwy. This discrepancy runs north for approximately 1,100 feet. The Barbwire fence should be moved back to the correct boundary. This would also allow birders & photographers the opportunity to view the Bitterroot River.*

Response 12. The recent U.S. Bureau of Land Management survey better described the boundary along this and other areas of the refuge. Moving this and other fences (which are not exactly on the refuge boundary) would not improve wildlife habitat but could provide additional public access to visitors if the refuge opens this area to public use. Current trespass onto closed areas of the refuge from this road is a problem. The Montana Department of Transportation has an expanded right-of-way in this area with plans to improve the roadway. The refuge will evaluate placing a public viewing platform in this general area. The refuge will continue to work with the Montana Department of Transportation to provide quality wildlife viewing opportunities and appropriate and compatible access.

Comment 13. *Diversity drives wildlife volume as far as I'm concerned—and the refuge offers a lot of it to be sure. But management should be aiming more aggressively toward diversification and habitat improvement. Looking at figures 7 and 19, it is readily apparent that there is quite a bit of water available in the form of ponds, sloughs, creeks and even ditches. Wildlife thrives near water. I favor alternative C because, as I read it, it has the most aggressive approach to maintaining and improving that resource and others. When I hear you talk of letting swampy areas or ponds go back to forest or grassland, I cringe. The dikes and ponds should be aggressively replaced, maintained and controlled to maximize the wetland habitats.*

Response 13. We agree that habitat diversity is very important to wildlife, and this is why the Service has proposed to enhance the diversity of the refuge habitats by restoring and enhancing riparian habitat on the refuge. This habitat type covered larger areas of the refuge at one time and is very important to a whole variety of wildlife. In addition, the majority of the wetland impoundments will also be maintained and enhanced.

Comment 14. *You speak of favoring the improvement of gallery forests. I've been a professional forester, for just short of half a century and I don't know what a gallery forest is. I have a good idea of what you are talking about but I could not find a definition any*

where in the text, perhaps I missed it, nor is it listed in the glossary. Be that as it may, those old forests were largely destroyed by the white man's agricultural movement and they need to be replaced if you want to return to the old days with refuge management. I would really recommend a large scale tree and shrub planting effort.

Response 14. We have added a definition of gallery and riverfront forest to the glossary. This plan does propose to expand this forest type, which may require planting to facilitate the natural regeneration processes.

Comment 15. *I'd like to see a significant timber stand installed all along the southeastern border of the refuge from the Wildfowl Lane on the south clear up to the Potato Cellar Pond in the north. Small stands of one to five acres could be scattered throughout the grasslands. Plans should include future intervals of addition and replacement to all of these stands to provide eventual diversification in age classes to maintain health of the stands.*

Response 15. This 15-year CCP proposes to begin restoring historically forested areas. This will be a slow process but should restore some of the natural diversity found in this part of the valley. Historically, the part of the refuge you describe was more grassland and sagebrush.

Comment 16. *The wildfire north of Johnny Houtchens old house destroyed a number of big willows and pines; these trees need to be replaced as well.*

Response 16. The big willows are a nonnative species (*Salix alba*) and are resprouting on their own. In the future, it is likely that native willow species, pines, and cottonwoods will be planted in the area as well as other native shrubs for species dependent on riparian vegetation.

WETLAND IMPOUNDMENTS

Comment 1. *On page 109, it states that "Overall, it is suspected that the refuge's past water regime has not provided the optimal habitat for target wetland species." Suspected? Shouldn't you have to prove this point rather than suspect it, particularly if you're basing decision on it? And if it's due to past mismanagement, as you say, why not suggest that we correct that mismanagement?*

Response 1. Historically, natural wetlands in this area were primarily seasonal in nature, filling with spring runoff and then slowly drying through the summer. It is well documented in the literature that seasonal drying is often desired for the management of productive wetlands (Eldridge 1990, Fredrickson 1991, Fredrickson and Reid 1988, Weller 1978) and that productivity often declines with static water level management (Kadlec 1962). Although providing important habitat, many of the wetlands have not been

historically managed for optimal habitat conditions. Many of the wetlands do not provide quality habitat for wetland-dependent species. This has decreased the health and productivity of these wetlands and in some cases, created large monocultures of cattails, which has reduced open water habitat. The preferred alternative does provide new management options for improving the health of these wetlands.

Comment 2. *The CCP/EA indicates that algal blooms have diminished the clarity and quality of refuge waters. We note that recent studies have shown that even low nutrient levels can promote excessive algal and aquatic vegetative growths leading to undesirable conditions (i.e. nitrogen and phosphorus levels well below 1 mg/L can lead to undesirable conditions). Accordingly it may be of interest to know that the State of Montana is proposing to develop numeric criteria for nutrients in surface waters to better manage nutrient levels.*

Response 2. The refuge does receive runoff and drainage from surrounding agricultural lands. We agree that this influx of nutrients may be contributing to the algal blooms and other management challenges. The State is currently monitoring the quality of surface and subsurface water flows into the refuge. We would be interested in learning more about the work the State of Montana is doing to better manage this issue.

Comment 3. *We encourage the Refuge to manage for a gradual drying in the summer and fall so as to provide mud flats for the migrating shorebirds.*

Response 3. The preferred alternative for wetland impoundment management does recommend this type of management, which will create foraging habitat for shorebirds during drawdown cycles.

Comment 4. *I sense a shifting away from providing adequate waterfowl nesting habitats and replacing with more emphasis on shorebirds. A balance for both would be preferred.*

Response 4. The refuge has always tried to provide habitat for both groups of species. Through better water level management capabilities, the Service is proposing to provide even more productive feeding, nesting, and resting areas for these and other wetland-dependent Federal trust species.

Comment 5. *Alternating the drawdown of water on ponds currently in use has a positive effect on the variety of species enjoying the landscape.*

Response 5. We will alternate drawdown and secondary treatment in the future to improve the health and productivity of the wetland impoundments.

Comment 6. *Water levels in the ponds should be maintained at a level adequate for migratory birds to rest and feed.*

Response 6. Maintaining water at static levels often decreases wetland productivity (Kadlec 1962). Natural wetlands in the mountain west dry and flood seasonally. The refuge will attempt to mimic this wet and dry cycle in the wetland impoundments to improve their health and productivity for a variety of wetland-dependent wildlife. Some wetland impoundments will also be drawn down to provide opportunities to treat large expanses of cattails that can negatively impact habitat for waterfowl and other waterbird species.

Comment 7. *Several of the ponds managed by the refuge are occupied by non-native species (i.e. largemouth bass). The refuge is the primary source of these non-native species that enter the Bitterroot River.*

Response 7. The refuge is aware of the nonnative bass population and that they do enter the Bitterroot River. The refuge is not managing these impoundments for bass. The restoration proposals and improved water level management of these impoundments should reduce the number of bass.

Comment 8. *The thermal effects of the pond network raises water temperatures at the local and potentially reach scales in the main stem Bitterroot River. Increases in water temperature, especially when climate change is occurring, are likely to favor non-native and invasive species.*

Response 8. The wetland impoundments are not natural wetlands nor are they the cold-water systems typically found in the Bitterroot Valley. These types of wetlands do favor more nonnative aquatic species. In this 15-year plan we will begin to address this issue by first returning and restoring North Burnt Fork Creek and Three Mile Creek to their historical channels. Portions of Ponds 11, 12, and 13 will also be restored back to riparian habitat. Most of the remaining wetlands will continue to be managed for the benefit of migratory birds during the life of this CCP.

Comment 9. *I think cattails must be controlled by whatever means possible without hurting the wildlife. They have really taken over a lot of pond area.*

Response 9. We agree, and the refuge has already started to address this issue by drawing down some of the ponds and treating these areas, primarily through grazing and fire. This should restore more open-water habitat, but further management will be necessary to continue to reach a desirable mix of emergent vegetation and open water.

Comment 10. *page 27—Right column 2nd paragraph where is Pond D? Not shown on the map. Right column 3rd paragraph the pool height of Ponds 8 & 10 would be*

lowered—how much lower? Again page 32,106,107, and pages 108 & 109 includes Otter Pond. Page 30—Wetland Impoundments—Actions 3rd paragraph where is Pond D? Last paragraph—Maintain Ponds 8 and 10 at a lower elevation to allow for the reestablishment of gallery forest. Page 33—third paragraph—where is Pond D? last paragraph—maintain Ponds 8 & 10 at a lower elevation to allow for the reestablishment of gallery forest.

Response 10. Pond D is actually now known as Pond 7b, which is identified on the map. We have corrected this in the final CCP. If the railroad bed was to be decommissioned and a portion removed, restoration of the gallery forest would be more probable on Otter Pond. Until this occurs, restoration of gallery forest would be challenging and probably require the relocation of levees to expose the area needed for restoration. The language reflecting this position has been added to the final document.

Comment 11. Page 43—Figure 7 Ponds and Upland Fields. Why was this map used to show the ponds when Figure 19 page 70 shows a more accurate map of the existing ponds?

Response 11. These two figures serve different purposes. Figure 7 in the draft CCP is used to note the general location and shape of the ponds and fields along with the supporting management structures. Figure 19 in the draft CCP is an accurate depiction of the ponds and classes of vegetation.

Comment 12. Potato Cellar Pond (Table 10)—Wetland impoundment target species and their habitat needs the Marbled Godwit, Long-billed Dowitcher and the American Bittern all require Mudflats, 0–4 inches of water, early July to early September. It would seem logical to maintain Potato Cellar Pond under these conditions, rather than returning it to native grasses.

Response 12. The hydrology of this impoundment is very seasonal, and it doesn't hold water very well.

Comment 13. Page 30—Transition Ponds 11, 12 & 13 or portions of these ponds to riparian and gallery forest. Again, repeated on page 104. Pond 13 affords a great view of a pond/marsh land habitat with the bitterroot Mountains in the background Development of small parking area off the Eastside Highway would create a great Wildlife Viewing Area and with some signage promote the Lee Metcalf Refuge encouraging tourist to visit the refuge. See Exhibit A Page.

Response 13. We agree that this may be a good place for visitors to observe the refuge if it can be accommodated safely with the Eastside Highway traffic. The proposed restoration of the area will be visible and interpreted for visitors. Until this takes place, the Service will be replacing the water management structures on this wetland impoundment to better

manage and treat the large expanse of cattails that have covered much of the open water in this impoundment. This will benefit long-term gallery forest and stream channel restoration projects.

Comment 14. Page 21, 960 acres and page 77, 958 acres, and page 93, 800 Acres

Response 14. The first reference to wetlands on page 21 was preceded by the word “approximately.” The acreage figure on page 93 of the draft CCP reflects those wetlands over which the refuge has adequate water level management capabilities. The acreage figure 958 is the most accurate and is used in the first reference in chapter 2 in the final CCP.

GRASSLAND AND SHRUBLAND

Comment 1. Native Vegetation Restoration—Environmental Consequences—reduction in density of upland nesting waterfowl until native species are fully established—how many years? This seems like a drastic trade off with no guarantee that the refuge would have the manpower to implement this project.

Response 1. The productivity of the dense nesting cover on the refuge has a lifespan (typically 15 years) and has deteriorated. It no longer provides adequate nesting habitat for grassland-dependent birds. The Service needs to take action to improve this habitat. The process to restore native species will be systematic and not occur all at once given the challenges of this type of restoration. The long-term objective is to restore large expanses of intact native grassland and shrubland habitat. This is a process that will extend far beyond the life of this CCP.

Comment 2. [Conflicting upland habitat acreage figures] Page 18 Bottom of photo, 1,218 acres [and on] pages 17 [and] 75 [it says] 1,186 acres

Response 2. The photograph caption has been corrected.

Comment 3. page 72. Last paragraph [states that] “Certain upland areas were converted to warm or cool-season grasses for dense nesting cover for waterfowl and two predator exclusion fences were built around some fields and a levee.” The past refuge manager ordered these fences removed in 2009.

Response 3. These fences were removed in 2010. This section has been modified in the final CCP to include that information.

Comment 4. There is way too much open grassland. I'm not opposed to grassland; I just think, especially if you are not planning to farm it, that it needs to be broken up a bit. Fields like S-1, S-2 and S-1 through I-5 which is really all one big field, the field between the golf course and Wildfowl Lane and the fields north of Pond 5A should be broken up and diversified. Some years ago the refuge blasted a number of potholes into

the landscape but I think this needs to be done much more extensively. You have quite a number of ditches and water sources available and these should be developed much more extensively. I'd love to see them routed through these grasslands and ponded up or spread out wherever possible.

Response 4. The refuge has chisel plowed and disked fields I-5, I-6, and I-7 with a goal of reducing invasive plant seeds. The plan is to seed these to grain and eventually to native grassland in order to provide nesting and hiding cover for migratory birds. Many wetland-dependent birds use uplands for nesting and foraging.

The blasting in the mid-1980s was not to create new potholes but to reopen existing impoundments that had grown in with cattails. When studying the aerial photos, one can see the refuge floodplain has scattered river channel remnants that still hold water. With an emphasis on restoration, there are no plans for creating more impoundments. The Pair Ponds created in 1988 in the higher grasslands never did hold water well because the soil conditions were not conducive to this use—emphasizing the need to let the soil types be a deciding factor on what is appropriate on that piece of land.

Comment 5. *Then shrubs and trees should be planted galore along these watercourses. I'm real glad to see the shrubs planted along Francois Slough although it would be nice to break up the eventual screen you've planted to provide glimpses of the water and habitat beyond. A good but very small example of how these meandering waterways should look can be seen, just east of the headquarters area. If these shrub and tree borders could be greatly expanded to provide cover and habitat throughout these grasslands, the bird population for one would explode.*

Response 5. The CCP proposes to increase channel and riparian habitat next to the Bitterroot River. In the past 2 years hundreds of native trees and shrubs have been planted, many along natural watercourses including Francois Slough. These plantings are a strategy for increasing gallery forest in places where the soil supports it. Through natural selection (deer, voles, and weather) we may very well end up with breaks in the screen of shrubs you describe. Removing levees along the Bitterroot River should also provide for more conducive regeneration conditions (scour and sedimentation) of willow and cottonwood in various parts of the refuge.

TARGET SPECIES

Comment 1. *On pages 100–101 of the draft plan, the wood duck is listed as a target species for improving habitat needs on the [Lee Metcalf Refuge]. There is no mention under area requirements or nesting [and] breeding improvements, on the need to dispose of the 60+ nesting boxes that were slated for removal in 2009.*

Response 1. The Service has identified the natural habitat needs of a diverse group of target floodplain species, including the wood duck, Lewis's woodpecker, willow flycatcher, Vaux's swift, brown creeper, and hoary bat. This group of species was chosen for its broad life history habitat needs. Providing habitat for this suite of species would provide the natural floodplain habitat diversity for an even broader suite of other floodplain-associated wildlife; however, monitoring would primarily focus on these target species to determine their response to floodplain management actions. If these species habitat needs are being provided and these species are present (and increasing) on the refuge, this would be a good indicator of the success of refuge management actions. Limiting monitoring programs to primarily these species would save time and resources. By choosing wood duck as a target species, the Service is signifying its long-term goal of providing trees of suitable size (rather than artificial structures) that could provide these natural nesting cavities. For wood ducks, that is trees that are typically greater than 24 inches diameter at breast height. Other species will benefit from this type of native forested habitat as well.

Comment 2. *Page 100—Target Species Selection Process Right column, 7th sentence—The final list of 16 species—see Table 9 page 101; Table 10 page 108 and Table 11 page 112 for the complete list of the 16 species.*

Response 2. Because these target species are related to different habitat types and goals, the tables are found in those sections that discuss that part of the refuge.

WILDLIFE

Comment 1. *This book goes on to talk about the vast bird populations, including the heron rookery west of the visitor center. It did not exist this year. Herons have left the refuge to nest elsewhere. Many bird populations have moved to private property for nesting and safety. Wildlife numbers are down, including geese which are usually more tolerant of people. This correlates with what photographers are telling us as wildlife sightings drop. The refuge no longer exists as portrayed in this book. The "refuge" is a recreational and dog park.*

Response 1. This is partially true; the heron rookery has fewer occupied nests this year. Nevertheless, the area next to this nesting site is currently not open to the public. It is not uncommon for these birds to select new sites, but they may return in subsequent years. The areas you are referring to are open to the public. When there are more people using these open sites, wildlife may retreat to more protected portions of the refuge; nevertheless, wildlife numbers fluctuate on all public lands. This CCP is proposing to improve the various habitats found on the refuge through managing wetland impoundments and uplands, expanding

the treatment of invasive species, and other actions. The area affected by dogs off leash is a problem and reduces this area's value to wildlife. The refuge is not a dog park, but we agree that there is an issue in this part of the refuge. We will be enforcing the leash regulation in the WVA. If visitors do not comply, dogs will no longer be permitted in this area. Another option for minimizing wildlife disturbance in the WVA is to require all visitors to remain on the trail. The Service will be looking at this option in the future.

BULL TROUT (THREATENED SPECIES) AND OTHER NATIVE SALMONIDS

Comment 1. *Bull trout and their critical habitat are affected by entrainment, fish passage, instream flows, water quality, and non-native species. As noted in the CCP the headwaters of Burnt Fork Creek harbors a substantial population of bull trout and westslope cutthroat trout that are disconnected from the Bitterroot River. The lowermost barriers in North Burnt Fork Creek and other sources of habitat degradation are on the refuge. Similarly, though a smaller stream system and possibly more problematic in regards to an ecosystem approach to restorative actions, Threemile Creek contains native westslope cutthroat trout in the headwaters and poor habitat quality on the refuge.*

Response 1. We agree with these statements, and this background information is helpful in supporting our proposed restoration efforts of these historical fish passage channels.

Comment 2. *North Burnt Fork Creek is a conveyance channel for water from the "Supply Ditch". This situation likely affects bull and cutthroat trout homing. The CCP needs to clearly state that intra-Service consultation will address the Endangered Species Act Section 7(a)1, and that all on-going "take" of bull trout will be addressed.*

Response 2. The refuge forwarded this comment to the Service's Montana Ecological Services Field Office (a branch of the Service responsible for protecting and restoring the bull trout). Intra-Service consultation occurs when Service actions affect (adversely or beneficially) listed species or designated critical habitat. The refuge's intra-Service consultation for this CCP evaluated the refuge actions proposed in this plan to determine if they may affect designated critical habitat for bull trout or other listed species that have the potential to inhabit the refuge (appendix D of the final CCP). The final determination was that the actions described in the CCP may affect, but are not likely to adversely affect, bull trout critical habitat. As noted in appendix D and this final CCP, the refuge will be consulting with the Montana Ecological Services Field Office in the future as restoration projects are being designed and implemented.

Comment 3. *Related to barrier and temperature issues is the issue of inaccessible cold water refugia on the refuge. An example is the headwaters of Barn Slough. Research continues to support the importance of barrier-free waterways and identification and management of potential refugia: "...coldwater salmonids migrate through waters during thermally stressful months of summer and most likely are able to do so by using features in the rivers that provide cold water spatially and temporally. The challenge is to ensure that these features are identified, protected, and restored.*

Response 3. We agree with these comments. Barn Slough is accessible to fish in North Burnt Fork Creek.

Comment 4. *There are several major aquatic habitat issues and concerns that are affected by management on the refuge and they need to be in the selected alternative. Most or all actions to address these issues can be implemented with existing staff, funds (including initiatives within the Service) and partnerships.*

Response 4. We are not exactly certain what actions you are referring to, but our proposals for reconnecting both Three Mile and North Burnt Fork Creek will cost additional funds to implement. We do agree that there are some initial steps that we can take without added staff and funding. We will continue to work with other partners to make these changes that support this long-term goal of reconnecting bull trout and cutthroat trout habitat from the Bitterroot River to the upper reaches of these tributaries.

Comment 5. *The CCP should highlight how the Service will lead the Bitterroot Valley toward ecosystem integrity (Section 1.2(c)1 in FWM 251, Part 052: Ecosystem Approach to Fish and Wildlife Conservation) and bull trout recovery (Endangered Species Act).*

Response 5. The refuge will continue to work with other partners in the valley to sustain and, as appropriate, restore the biological integrity of the refuge and the surrounding valley. The refuge worked with the Montana Ecological Services Field Office (a branch of the Service responsible for protecting and restoring bull trout) and other conservation partners in identifying projects in the CCP that would be beneficial to restoring bull trout habitat. There are several objectives and strategies in the plan that describe what the refuge will do to support this effort.

Comment 6. *The CCP enumerates an impressive list of the refuge's partnerships. However, the CCP needs to emphasize a commitment to actively seek and foster partnerships that promote long-term ecosystem conservation and recovery. An example is that the refuge should assert their position as an active member of the irrigation district and as a water-user to address issues associated with the irrigation, water*

conservation, and aquatic organism passage. Other irrigation groups in the valley have recently made substantial progress toward improving native fish habitat and survival and improving instream flows that benefit numerous species, and doing so in a manner with low monetary costs to the irrigation district.

Response 6. We agree, and the refuge has discussed water management in designated critical habitat for bull trout with the Service's Montana Ecological Services Field Office (a branch of the Service responsible for protecting and restoring bull trout) and other partners in the valley who are working to restore bull trout. The refuge will continue to work with Ecological Services, irrigators, and other partners to encourage long-term solutions to ecosystem recovery.

Comment 7. *It is worth noting that Trout Unlimited, Montana Trout Unlimited and its local Bitterroot Chapter have begun investing significant restoration dollars into the Burnt Fork drainage. To date, we have completed a fish passage barrier study on North Burnt Fork, installed a mile of riparian fencing on the Ellison Cattle Company, protecting the North Burnt Fork from grazing impacts and talked to numerous landowners about future projects. We look forward to working with refuge staff on projects that will once again allow native and wild salmonids access to the Burnt Fork drainage.*

Response 7. We appreciate the efforts of Trout Unlimited and others on restoring this important tributary and designated critical habitat for bull trout. The CCP proposes to improve this important habitat for native salmonids, and we look forward to working together on these types of projects of mutual interest.

Comment 8. *To bolster the CCP, any selected alternative must appropriately address [the] Endangered Species Act and other regulation and policy, in particular those related to native aquatic habitat and species management.*

Response 8. We agree and feel the plan has done this. There are no listed species on the refuge, but there is designated critical habitat for bull trout on the refuge, and there is suitable habitat for birds, such as the yellow-billed cuckoo (a candidate species). These and other listed species have been considered in this CCP and through the completion of an Intra-Service Section 7 Consultation, found in appendix D of the final CCP.

MERCURY CONTAMINATION

Comment 1. *On page 109, we get this same sort of unprofessional statement on which the FWS makes a recommendation: "Researchers from the University of Montana have been investigat[ing] the contamination of mercury on the refuge and elsewhere in Montana. It is theorized that there has been an accumulation of methyl mercury as a result of stagnant water, and*

mercury concentrations of fish on the refuge has been high (Langner et al. 2011). Theorized, not proven! [If] this is the case, if this concern is even remotely possible, why haven't immediate efforts to deal with it, such as implementing studies to prove or unprove, not theorize, conclusions on which you make management recommendation[s]? You don't make a management decision based on a theory—you do scientific research to provide real answers.

Response 1. Managers often use the best available information and knowledge combined with their professional expertise to make management decisions. They also use published literature and the best available science to guide management options. Management is also adaptable as new information and research becomes available.

The Service and other researchers have determined that there is a bioaccumulation of mercury in fish and other aquatic organisms; however, there is no definitive answer as to how the Service's management actions are or are not contributing to this. We have added some new strategies under the wetland impoundment goal in the final CCP that describe the steps the Service will take to investigate this issue. The results of this study will be used to make decisions on what changes, if any, could reduce the level of mercury accumulation in the wetland impoundments and associated aquatic species.

INVASIVE SPECIES

Comment 1. *We applaud your objective to control weeds and to reestablish native plants on the upland grasslands which will help to attract grassland bird species.*

Response 1. Thank you for your comment.

Comment 2. a. *Chemical treatment of weeds should not be allowed on the refuge. These chemicals are disruptive to life forms. Use farming, bugs, sheep, and goats instead.*

b. *I applaud your efforts to reduce non-native species. I would urge the use of nonchemical control as much as possible, in order to avoid potential effects to all wildlife.*

Response 2a–b. The Service has an obligation to address the widespread areas of invasive species on the refuge. On this and other refuges, the Service makes every attempt to use an integrated pest management approach to treat invasive species. Mechanical, cultural, or biological controls are the preferred options and can be successful. Refuge staff and volunteers spend considerable time using these nonchemical methods to control certain invasive species. In some cases it is necessary to use chemicals to treat other nonnative plants that do not respond to these methods. The Service has an approved chemical list that has gone through additional analysis beyond standards of the EPA. This chemical list is much smaller than those

that are available and used by the general public. Although these chemicals are not without side effects, most have the least known side effects and are shown to be less harmful to nontarget species.

Comment 3. *I am attaching a new study concerning the epigenetic changes the thyroid hormone and steroid hormone disrupting chemicals cause and how the changes/birth defects are passed on for several generations without another exposure to the new generations. That of course is not how it works in the real world. Each new generation of animal is exposed, so their offspring are even worse—for example the generation of humans having babies now are having babies with epigenetic changes to their brain causing autism at a much higher prevalence than the previous generation. The white-tailed deer generations now are having babies with much higher prevalence of misaligned, malformed, short scrotal sac than the generation when we did the study which is attached on the next email. I think these changes to wild vertebrates, including mammals, birds, amphibians, reptile and fish should be considered in any long term plan and especially in the environmental assessment for all wildlife refuges.*

Response 3. Invasive species hinder the Service's ability to manage the refuge's lands and waters for Federal trust species, including migratory birds and other fish and wildlife. If we had a choice to effectively treat the invasive species without chemicals at all, we would. To this end, the refuge most often chooses to use chemical-free methods to treat invasive species. However, these methods are very labor intensive and not without their own impacts on the environment. In addition, some species do not respond to these techniques, particularly those that spread by rhizomes. Some of the nonchemical methods will actually spread these species. The chemical will kill the root of these plants, preventing their spread. We appreciate your concern and the studies you provided. We would welcome any suggestions to reduce our use of chemicals; however, we cannot allow these species to spread onto new areas of the refuge and to our neighbors, so the use of a limited number of chemicals authorized for use on refuge by the Service (see previous response to comment above) must be used on occasion until more "natural" treatments are developed for some of these more challenging species.

Comment 4. *Goal of weed program, 1) reduce weeds, 2) reduce the need to spray over time, 3) develop a monitoring program that shows this.*

Response 4. We agree and have similar language in the final CCP.

Comment 5. *Exactly what would be involved when you said the plan would involve surrounding landowners? Is the government going to come in with a lot of*

stiff regulations that will cause hardships and anger with nearby refuge neighbors?

Response 5. The refuge will continue to develop its partnership with the Ravalli County Weed District to provide education to adjoining landowners on weeds and their detrimental effects on habitat and productive agricultural lands.

Comment 6. *Monitor invasive species—this term is listed at least eleven times in the Draft CCP. With the current number of staff this is probably not feasible.*

Response 6. The Service provides additional assistance for monitoring through the Invasive Species Strike Team that travels throughout Montana to map, treat, and monitor invasive species on refuges. One of the strike team leaders is currently located at the Lee Metcalf Refuge. In addition, the county employees that are funded by the refuge map, monitor, and treat invasives on the refuge, which they have done for the past 2 years. This combined effort has been very instrumental in mapping large areas of the refuge. This effort will continue to be updated and expanded and used for monitoring programs in the future to determine if treatment methods are having the desired effect and to monitor for new invaders. Having this baseline information will make any treatment and monitoring programs much more efficient and effective.

PLANNING PROCESS

Comment 1. *Ducks Unlimited biological staff involvement was overlooked in preplanning and scoping meetings over past 4 years. That is a travesty and blatant disregard. You missed the boat on your partnership vision as stated in the CCP.*

Response 1. Ducks Unlimited was on our mailing list at the start of this planning process and was given the opportunity to provide their comments during our scoping process conducted in 2009. We did not receive any comments at that time. Ducks Unlimited is a long-time partner of the National Wildlife Refuge System and valued for its knowledge and contributions to our mission; however, we are not permitted to have any private organization serve on our planning team. The Federal Advisory Committee Act prohibits the government from having closed door meetings with private individuals and organizations with the purpose of asking for their recommendations for what direction the government should take. That is why we conduct public scoping, ask for comments at the start of our processes, and sent the draft document out for review.

Comment 2. *The refuge should follow their policy and expedite the conclusion of this planning process. The Service's policy (Section 1.8 (a) in FWM 251, Planning and Management, Part 052: Ecosystem Approach to Fish and Wildlife Conservation) states: "The Service's focus is on action; planning to be completed quickly,*

and action to bring about solutions will follow immediately. The intent of the plans is to concisely identify issues and problems, solutions, and the funds and staff to implement solutions.” Key partnerships and projects have suffered during this planning process due to the refuge’s understandable reluctance to act on riparian and aquatic restoration projects until the planning process is finalized.

Response 2. The policy you are referencing is from 1996 (prior to the passage of the Improvement Act requiring the development of CCPs) and is a guide for the Ecosystem Approach to Fish and Wildlife Conservation. There is a separate policy for the development of CCPs that does not include such language; nevertheless, every effort has been made to keep this process moving forward, while ensuring that the most substantive issues were addressed. In the 48-year history of this refuge, there has never been a plan with this level of analysis, public involvement, and detail that provided for consistency in management. These types of planning efforts, particularly when other partners and the public are invited to participate, take time. We have not stopped managing the refuge while we have been working on this CCP; however, we do agree that more significant management decisions have been put on hold as we take advantage of this process, including the added expertise, to make better informed decisions through the CCP process. Fortunately we are at the end of this process and look forward to implementing the plans to restore and enhance the refuge’s riparian habitats.

Comment 3. *You have contacted only state wide media sites, in violation of the NEPA [National Environmental Policy Act of 1969] requirement that there be broad outreach.*

Response 3. In addition to statewide media contacts, the Service developed a nationwide mailing list of individuals and organizations at the start of this process, developed and mailed two planning updates to this list, held public meetings, and published a notice of intent and notice of availability in the Federal Register. Most of these outreach activities are above and beyond the Council on Environmental Quality (the agency who regulates NEPA) requirements for an environmental assessment.

Comment 4. *An EIS [environmental impact statement] needs to be prepared. An EA is cheap sloppy alternative that is not responsible enough for this out of control spending plan which this agency always picks.*

Response 4. The preferred alternative is not a major Federal action that would significantly affect the quality of the human environment within the meaning of Section 102(2)C of the NEPA. Accordingly, the preparation of an environmental impact statement is not warranted. The issues identified in this document

are not significant, nor are the proposed changes to the management of the refuge.

ALTERNATIVES

Comment 1. a. *Re-institute the original charter and management plan given the refuge at the time of its founding, focusing of actually doing what Congress mandated back in 1964 and reemphasized over the years. It is my deep conviction that recent management direction at both the local level and from the regional office FWS office in Denver has strayed from the original charter, which incidentally seemed to work well for the decades that followed establishment of the Metcalf Refuge and into which conservation groups supported that concept poured hundreds of thousands of dollars into accomplishing, and which, through the ‘mismanagement’ alleged in the CCP has enabled the FWS to stray from its original charter. The fact is that what was put in place in the years following 1964 worked for decades, and if done correctly, and with proper funding and alliance with its support groups, including the Friends of Lee Metcalf National Wildlife Refuge, would be working today. Get back to basics, adjust and accommodate changes where they’re required, but stick to those original goals and everything else will fall into place.*

b. *Migratory Bird Conservation Commission (page 17). Justification for establishing the Lee Metcalf Refuge was to provide a feeding and resting area for migratory waterfowl in a locality where some sanctuary is needed. It appears that the refuge’s desire to establish gallery forest by reducing wetlands has lost sight of the requirement set forth by the Migratory Bird Conservation Commission. Also 97.3 of the money used to purchase the refuge land was from the sale of the Migratory Bird Hunting Stamp (Duck Stamp).*

Response 1a–b. It is unclear what you are referring to as the “original charter.” The refuge was approved by the Migratory Bird Conservation Commission on December 10, 1963. The first piece of land was purchased on February 4, 1964, which established the refuge. The Migratory Bird Conservation Commission approves lands that have been identified by the Secretary of Interior for the conservation of migratory birds. The legislative purpose for Lee Metcalf National Wildlife Refuge (originally named Ravalli National Wildlife Refuge) is threefold: (1) for use as an inviolate sanctuary, or for any other management purpose, for migratory birds; (2) suitable for incidental fish and wildlife-oriented recreational development, the protection of natural resources; and (3) the conservation of endangered species or threatened species. This original purpose of managing for migratory birds, federally listed species, and incidental wildlife-oriented recreation has never changed. Since the refuge was purchased with migratory bird hunting and conservation stamp funds, many people believe that these funds

should only focus on wetland habitat for the benefit of waterfowl. However, Congress clearly states that these funds are to be used to rent or purchase properties that benefit any migratory bird. The refuge has and will continue to manage wetland impoundment habitats during the life of this CCP along with river migration, riparian habitat enhancement, and upland habitat improvements, including controlling invasive species. All of these actions support the legislative purposes for which this refuge was established.

Comment 2. *We welcome the thrust of new processes at the Metcalf, whichever CCP alternative you select, but it is my recommendation that you return direction back to the basic charge given the FWS years ago. Dig up those original plans and re-institute them as your starting point, with whatever minor adjustments you need to accommodate the changes brought on by time.*

Response 2. In the 48 years since this refuge was established the refuge has come to better understand the effects of management actions on the landscape. In addition, different species have become more imperiled (for example, bull trout) as their habitats are lost. The refuge has come to play an even bigger role in the conservation of a greater variety of species than originally envisioned. This is a result of the constant development of the Bitterroot Valley and the migration routes used by migratory Federal trust species. The refuge's management programs have and will continue to grow and evolve with this new information without losing sight of the purposes for which this refuge was established.

Comment 3. *I feel that the proposed action on alternative B is a good direction for the refuge. My only comment would be to not abandon the focus on maintaining wetland impoundments mention in alternative C. Since it[s] inception the Lee Metcalf has focused on migratory birds and would hate to see that emphasis diminished or abandoned.*

Response 3. Although the plan does call for the restoration of historical habitats currently lying under some impoundments, most of the impoundments will be maintained for the life of this CCP. This will create more habitat diversity in support of a greater number of wildlife species.

Comment 4. *We [Trout Unlimited] would like to go on record as being supportive of Alternative B (proposed action) for the following reasons:*

- *It focuses on expanding native vegetation communities*
- *An emphasis on controlling invasive species would be a priority*
- *The Bitterroot River would be allowed to periodically achieve overbank flows into the floodplain*

and backwaters facilitating its natural braided migration through the refuge

- *Water control structures on North Burnt Fork and Three Mile Creek would be removed or modified to provide connectivity for fish*
- *Ponds would be managed to more closely mimic seasonal water conditions*

Response 4. Thank you for your comments.

Comment 5. *We would discourage the refuge from adopting Alternative C as the proposed action.*

Alternative C would focus habitat management on maintaining wetland impoundments while restricting the movements of the Bitterroot River throughout the refuge (i.e. rebuild or reinforce all levees and dams). The river has been impacted its entire length by man-made levees and dams. It does not seem to us prudent for the refuge to add to this ever growing problem.

Response 5. We agree, and this is one of the reasons this alternative was not selected.

GENERAL COMMENTS

Comment 1. *The format in which this draft plan is constructed is fantastic and really lays out strategies for implementation. Goals and objectives are the backbone of the plan. My only suggestion is that when developing objectives for specific goals these objectives should contain verbiage that is measurable. The use of time frames, numbers, statistics or something tangible that would be key to the fact that the objective has been met.*

Response 1. Thank you for your comments. We feel that whenever possible, our objectives and associated strategies are measurable based on the information we had to make those decisions. We will have more specific details in the stepdown management plans.

Comment 2. *I have...been distressed by inconsistencies in management. One director comes along and wraps the refuge in barbed wire at considerable time, expense, and trouble. Then the next director comes along and removes the barbed wire at considerable time, expense, and trouble.*

Response 2. One of the values and purposes of completing this type of long-range management plan is to provide more consistency in management, including long-term goals, that will still be in place even when new staff arrive.

Comment 3. *The public was given a postmark date of April 30th to comment on the proposals prior to a final decision being made. Note on photo 1 and 2, one turn-out near the visitor center and another on Wildfowl Lane is well under way. As see in photo 3 work is already under way near the Whaley House. Wasn't the public's right to comment supposed to occur prior to work done?*

Response 3. The planning process takes a number of years. During this time, the refuge must still manage resources. The issues related to the safety of Wildfowl Lane have been ongoing, even prior to the start of this planning process. The draft CCP proposed to designate Wildfowl Lane as an auto tour route. That has yet to be done. However, the turnout you refer has been completed to improve the safety of our visitors. This project had been proposed years before the CCP was started, and recently this long standing proposal was funded. The work completed near the Whaley House was on Pond 4. This project was initiated to improve the existing dike and replace the culvert to allow us to better manage water levels, address cattail encroachment, and create a safer driving surface.

Comment 4. Under ‘issues’ (see summary xi) things are noted such as invasives species, small visitor contact area, outdated displays, inadequate public access, inadequate staff, algal and river issues. The main reason for the decline of the refuge is never identified.

Response 4. Greater details on this and other issues can be found in the issues section in chapter 2 and in various sections in chapter 4 of this final CCP. There is no one cause for the management challenges identified in this CCP.

Comment 5. We [EPA] appreciate the efforts of the U.S. Fish and Wildlife Service in carrying out planning and environmental analysis to improve management of the Lee Metcalf National Wildlife Refuge, and to enhance public awareness and support for wildlife conservation. The EPA does not object to the proposed actions.

Response 5. Thank you for your comment.

Comment 6. The old cars on the riverbank are ugly. Can they be removed?

Response 6. We agree with this statement. Many of these cars are not on the refuge. The cars were originally placed there in the late 1950s by the railroad in order to ensure that the river flowed under the trestle. The river has since and continues to remove these cars and migrate around them. At this time, the refuge does not have any plans to remove the cars that reside on refuge lands.

Comment 7. page 29—Right column last sentence—Adaptive resources management would inform this revision. What does this mean is the public informed or is this strictly a refuge decision?

Response 7. In the context of this paragraph the word “inform” could also mean “direct” or “guide.” Adaptive resource management is also defined in the glossary. The Service’s planning policy guideline on reviewing these documents states, “Review the CCP at least annually to decide if it requires any revisions. Modify

the plan and associated management activities whenever this review or other monitoring and evaluation determine that we need changes to achieve planning unit purpose(s), vision, and goals.”

The policy does not direct the refuge when to notify the public about these changes within the 15-year life of this plan; however, in the past, if the change is substantial enough, the Service has gone back to the public to inform them of the modification.

Comment 8. Follow the lead of The Friends of the Lee Metcalf National Wildlife refuge in working with the Bitter Root Land Trust to participate in implementation of protecting habitat (including the watershed) and wildlife corridors on private lands surrounding the refuge.

Response 8. The plan recommends that these types of partnerships be maintained and expanded in the future. The refuge has a long-standing working relationship with the Bitter Root Land Trust. Recently the refuge met with this organization to identify parcels along North Burnt Fork Creek that, if protected, would establish habitat corridors as well as enhance refuge resources.

Comment 9. Who will have the responsibility to approve the final CCP?

Response 9. The assistant regional director for refuges approved the compatibility determinations (appendix C of the final CCP) and the Regional Director approved the final CCP.

Comment 10. What has been progressed by the U.S. Fish and Wildlife Service is great. They work at what they know and to do to keep The Lee Metcalf National Wildlife Refuge is true and meaningful. They have the knowledge of all of the areas to bring together what they may need and be taken care of. To keep the refuge where wildlife is and NATURE—they give it exactly what it needs.

Response 10. Thank you for your comments.

Comment 11. The refuge is well taken care of and the plans to do more and keep it up and beautiful for ALL who see it and are appreciative of what they see and hear.

Response 11. Thank you for your comments.

Appendix B

Environmental Compliance

Environmental Action Statement

U.S. Fish and Wildlife Service, Region 6
Lakewood, Colorado

Within the spirit and intent of the Council on Environmental Quality's regulations for implementing the National Environmental Policy Act and other statutes, orders, and policies that protect fish and wildlife resources, I have established the following administrative record.

I have determined that the action of implementing the "Comprehensive Conservation Plan—Lee Metcalf National Wildlife Refuge" is found not to have significant environmental effects, as determined by the attached "finding of no significant impact" and the environmental assessment as found with the draft comprehensive conservation plan.



7/18/12

Stephen D. Guertin
Regional Director, Region 6
U.S. Fish and Wildlife Service
Lakewood, Colorado

Date



7/18/12

W. Dean Rundle
Refuge Supervisor
U.S. Fish and Wildlife Service, Region 6
Lakewood, Colorado

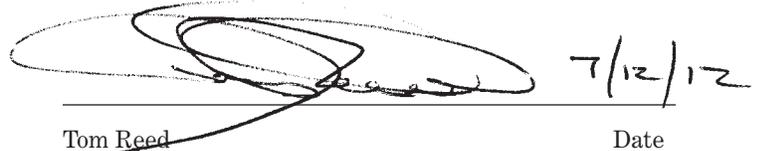
Date



7.18.12

Matt Hogan
Assistant Regional Director, Region 6
National Wildlife Refuge System
U.S. Fish and Wildlife Service
Lakewood, Colorado

Date



7/12/12

Tom Reed
Refuge Manager
Lee Metcalf National Wildlife Refuge
Stevensville, Montana

Date

Finding of No Significant Impact

U.S. Fish and Wildlife Service, Region 6
Lakewood, Colorado

Three management alternatives for the Lee Metcalf National Wildlife Refuge were assessed for their effectiveness in achieving the refuge's purposes and for their impacts on the human environment.

ALTERNATIVE A

Alternative A, the no-action alternative, would continue current management.

ALTERNATIVE B

Alternative B focuses on the expansion and restoration of native plant communities on the refuge including grasslands, shrublands, and gallery and riverfront forests. Some areas of wetland impoundments would be restored to native communities including forest and shrubland.

Refuge staff would manage and, where appropriate, restore the natural topography, water movements, and physical integrity of surface water flow patterns across the Bitterroot River floodplain. Unimpeded flow from North Burnt Fork Creek would be reconnected with flow pathways into the Bitterroot River to reduce creek water temperature, improve water and nutrient flow, and create habitat conditions conducive to native cold-water species. Additionally, a channel to the Bitterroot River would be reestablished that mimics the historical flow pattern of Three Mile Creek to create habitat conditions supporting native cold-water species and the restoration of riparian habitat. A significant focus of any restoration proposal would be controlling invasive species and preventing further spread. Grasses and shrubs native to the uplands, including the alluvial fans (that is, areas of sedimentary deposits where fast-flowing streams have flown into flatter plains), would begin to be restored to provide habitat for native wildlife including grassland-dependent migratory birds. Some wetland impoundments and U.S. Fish and Wildlife Service (nonpublic) roads would be removed or reduced in size to allow for river migration and to restore native gallery and riverfront forest for riparian-dependent wildlife. The remaining impoundments would be managed to mimic natural conditions for wetland-dependent migratory birds.

The U.S. Fish and Wildlife Service would expand and improve the refuge's compatible wildlife-dependent public use programs, in particular the wildlife observation, environmental education, and interpretation programs. The visitor contact area would be expanded into a visitor center with new displays and a combination conference room and environmental education classroom. New displays would be professionally

planned and produced. The refuge would work with Ravalli County staff to designate the county road in the refuge as an auto tour route, which would include pulloffs and some form of interpretation. A seasonal hiking trail would be added, and current trails would be improved for wildlife observation and photography. Interpretation and environmental education programs would be expanded using added staff and volunteers. All public use programs would provide visitors with a consistent message about the purposes and values of the refuge and the mission of the National Wildlife Refuge System.

The refuge staff would be expanded by 3.5 individuals to include an assistant refuge manager (one full-time equivalent), a full-time and a career-seasonal biological science technician (1.5 full-time equivalents), and a visitor services specialist (one full-time equivalent) who would serve as a visitor center manager and volunteer coordinator.

Increased research and monitoring, staff, funding, infrastructure, and partnerships would be required to accomplish the goals, objectives, and strategies associated with this alternative. Additional staff and funding would be added depending on the regional priorities for those funds allocated to the U.S. Fish and Wildlife Service for management of lands and waters within the Refuge System.

ALTERNATIVE C

Alternative C contains many of the elements found in alternative B related to expanding visitor service programs and facilities. However, habitat management would be focused on maintaining the wetland impoundments and attempting to restrict the movements of the Bitterroot River throughout the refuge. Habitat efforts would be primarily focused on providing waterfowl and other waterbird habitat.

SELECTION OF ALTERNATIVE

Based on this assessment and comments received, I have selected alternative B as the preferred alternative for implementation. The preferred alternative was selected because it best meets the purposes for which the Lee Metcalf National Wildlife Refuge was established, and it is preferable to the no-action alternative in light of physical, biological, economic, and social factors. The preferred alternative will continue to provide public access for wildlife-dependent recreation at Lee Metcalf National Wildlife Refuge (hunting, fishing, wildlife observation, photography, environmental education, and interpretation).

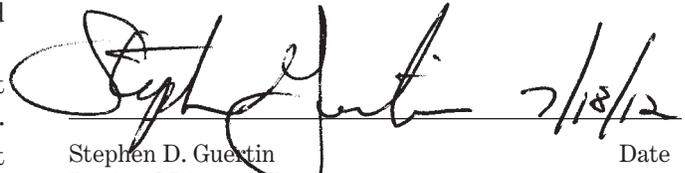
I find that the preferred alternative is not a major Federal action that would significantly affect the quality of the human environment within the meaning of Section 102(2)(C) of the National Environmental Policy Act of 1969. Accordingly, the preparation of an environmental impact statement on the proposed action is not required.

The following is a summary of anticipated environmental effects from implementation of the preferred alternative:

- The preferred alternative will not adversely impact endangered or threatened species or their habitat.
- The preferred alternative will not adversely impact archaeological or historical resources.
- The preferred alternative will not adversely impact wetlands, nor does the plan call for structures that could be damaged by or that would significantly influence the movement of floodwater.

- The preferred alternative will not have a disproportionately high or adverse human health or environmental effect on minority or low-income populations.

The State of Montana has been notified and given the opportunity to review the comprehensive conservation plan and associated environmental assessment.

A handwritten signature in black ink, appearing to read "Stephen D. Guertin", is written over a horizontal line. To the right of the signature, the date "7/18/12" is handwritten.

Stephen D. Guertin
Regional Director, Region 6
U.S. Fish and Wildlife Service
Lakewood, Colorado

Date

Appendix C

Compatibility Determinations

C.1 Refuge Information

REFUGE NAME

Lee Metcalf National Wildlife Refuge

DATE ESTABLISHED

February 4, 1964

ESTABLISHING AND ACQUISITION AUTHORITIES

Migratory Bird Conservation Act (16 United States Code [U.S.C.] 661–667e)

Refuge Recreation Act (16 U.S.C. 460k–1)

State of Montana approval under provisions of Public Law 87–383 (75 Stat. 813)

REFUGE PURPOSES

“for use as an inviolate sanctuary, or for any other management purpose, for migratory birds.” 16 U.S.C. 715d (Migratory Bird Conservation Act)

“suitable for (1) incidental fish and wildlife-oriented recreational development, (2) the protection of natural resources, (3) the conservation of endangered species or threatened species ...” 16 U.S.C. 460k–1

“the Secretary ... may accept and use ... real ... property. Such acceptance may be accomplished under the terms and conditions of restrictive covenants imposed by donors ...” 16 U.S.C. 460k–2 (Refuge Recreation Act, as amended (16 U.S.C. 460k–460k–4))

C.2 National Wildlife Refuge System Mission

The mission of the System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

C.3 Description of Uses

The following uses are evaluated for compatibility within the Lee Metcalf National Wildlife Refuge:

- hunting
- fishing
- wildlife observation and noncommercial photography
- environmental education and interpretation
- commercial filming, audio recording, and still photography
- cooperative farming and prescriptive grazing
- research and monitoring

HUNTING

Hunting is one of six wildlife-dependent priority public uses specified in the Improvement Act. Hunting occurs in two forms on the refuge: waterfowl (by shotgun) and white-tailed deer (by bow). In addition to the site-specific regulations mentioned below, State hunting regulations will apply to all Lee Metcalf Refuge lands open to hunting. Hunters may only possess and use U.S. Fish and Wildlife Service (Service)–approved, nontoxic shot shells on the refuge, and vehicle travel and parking is restricted to public roads, pulloffs, and parking areas. The refuge Web site and public use brochures provide guidance on site-specific regulations. The general hunting regulations are available from Montana Fish, Wildlife & Parks (MFWP).

Waterfowl hunting is restricted to the southeast part of the refuge. This 654-acre area of the refuge encompasses five wetlands and is closed to the general public. Waterfowl hunters access this area from one parking area. According to 2005–2009 records, fourteen blinds together accommodate an average of 965 visits per year. Waterfowl hunting is conducted during the State hunting season, which usually occurs from the first week of October through first week of January. Waterfowl hunting is available on a first-come, first-served basis except for opening weekend, during which blinds are allocated by drawing.

Archery hunters access 2,275 acres of refuge lands from five archery hunting access parking areas. According to 2005–2009 records, archery hunting for white-tailed deer draws an average of 1,030 visits annually and an average of 33 deer are harvested each

year. Deer hunting season starts in early September and ends the second week in January. In addition to providing a compatible recreational activity, deer hunting assists the refuge in managing overbrowsing of native habitats.

The comprehensive conservation plan (CCP) for the Lee Metcalf National Wildlife Refuge proposes to continue the hunting uses described above.

Availability of Resources. Hunting will be administered by the refuge staff. Currently, refuge staff does not include a dedicated or collateral duty law enforcement officer or a refuge biologist to monitor deer populations. It is anticipated that the refuge would rely on the zone law enforcement officer or staff from other refuges. Also, the regional inventorying and monitoring biologist will assist with analysis and trend monitoring.

Infrastructure in place on the refuge includes the following:

- hunt information kiosk
- five parking area and check-in stations
- 14 waterfowl blinds (2 are universally accessible)

Anticipated Impacts of Use. The hunting program on Service lands will continue to provide hunters ample quality hunting opportunities without materially detracting from the mission and goals of the National Wildlife Refuge System (Refuge System) or from the establishing purposes of refuge lands. Public use brochures and the refuge Web site will be kept up-to-date and made readily available to hunters. Hunter success and satisfaction will continue to be monitored using the hunter registration kiosk sign-in sheet along with random contacts with hunters in the field and in the refuge office.

The National Wildlife Refuge System Act of 1966 (as amended), other laws, and the Service's policy permit hunting on a national wildlife refuge when it is compatible with the purposes for which the refuge was established and acquired. Habitat that normally supports healthy wildlife populations produces harvestable surpluses that are a renewable resource. As practiced on Lee Metcalf Refuge, hunting does not pose a threat to the wildlife populations and, in some instances, is necessary for sound wildlife management. However, by its very nature, hunting creates a disturbance to wildlife and directly affects the individual animal being hunted. Nonetheless, it is well recognized that this activity has given many people a deeper appreciation of wildlife and a better understanding of the importance of conserving their habitat, which has ultimately contributed to the Refuge System mission. Furthermore, despite the potential impacts of hunting, a goal of Lee Metcalf Refuge is to provide opportunities for quality wildlife-dependent recreation. Hunting will be designed and monitored to

offer a safe and quality program and to keep adverse effects within acceptable limits.

Although hunting directly affects the hunted animal and may indirectly disturb other animals, limits on hunting access and harvest will ensure that populations do not fall to unsustainable levels. Closed areas on the refuge provide sanctuary to migratory birds during the hunting season. In some cases, hunting can be used as a management tool to control elevated populations that are negatively affecting wildlife habitat (for example, through overbrowsing).

Additional impacts from hunting include conflicts with individuals participating in wildlife-dependent, priority public uses such as wildlife observation and photography.

Determination. Hunting is a compatible use on Lee Metcalf Refuge.

Stipulations Necessary to Ensure Compatibility

- Visitors participating in hunting will be provided the Service's public use regulations, including site-specific regulations and State hunting regulations.
- Hunters will continue to use approved nontoxic shot for waterfowl hunting.
- Vehicles will be restricted to county and designated public roads and parking areas in the refuge.
- Signage and brochures will be used to provide hunters information on where and how to hunt on the refuge to ensure compliance with public use regulations.

Justification. A secondary goal of the Refuge System is to provide opportunities, when found compatible, for the public to develop an understanding and appreciation for wildlife. Hunting is identified as a priority public use in the National Wildlife Refuge System Improvement Act of 1997 (Improvement Act) and will help meet the above secondary goal with only minimal conflicts. Hunting can instill, in citizens of all ages, a greater appreciation for wildlife and its habitat. This appreciation may extend to the Refuge System, other conservation agencies, and to the individual personal land conservation ethic.

Based on anticipated biological impacts described above and in the environmental assessment (EA) that accompanied the draft CCP for Lee Metcalf Refuge, the Service has determined that hunting within the refuge will not interfere with the Service's habitat goals and objectives or purposes for which the refuge was established. Limiting access and monitoring the use will help limit any adverse effects.

Mandatory 15-year Reevaluation Date: 2027

FISHING

Fishing is one of six wildlife-dependent priority public uses specified in the Improvement Act. Fishing is

allowed within the wildlife viewing area (WVA) (145 acres), specifically along Francois Slough and the Bitterroot River. Fishing is available year-round, though limited in winter and during spring flooding. Fishing will be conducted in accordance with the rules and regulations set by the State of Montana. Additional refuge-specific regulations are printed in the refuge fishing brochure.

The CCP does not call for the implementation of any new fishing programs.

Availability of Resources. The refuge will continue to work with MFWP to conduct fish and creel surveys. The regional inventorying and monitoring biologist will assist with analysis and trend monitoring. The refuge will rely on the law enforcement officer, stationed at the refuge, and law enforcement staff from other refuges to enforce fishing regulations.

Anticipated Impacts of Use. Fishing and other human activities cause disturbance to wildlife and trampling of vegetation along the bank of rivers and streams. There will also be some mortality to those fish caught and then released. Refuge-specific regulations will assist in managing anglers and minimizing disturbance.

Determination. Fishing is a compatible use at designated fishing areas on Lee Metcalf Refuge.

Stipulations Necessary to Ensure Compatibility

- Visitors participating in fishing be provided the Service's public use regulations and State fishing regulations and limits. Rules specific to the refuge are published in the refuge fishing brochure.
- Vehicles will be restricted to county and designated public roads and parking areas.
- No boats may be used or launched at the WVA or anywhere else on the refuge, with the exception of boats launched off-refuge that then travel through the refuge on the Bitterroot River. Public fishing on the Bitterroot River by boat is restricted to below the high watermark, and boats cannot be launched onto the river from refuge lands.
- Boats, fishing equipment, and all other personal property must be removed at the end of each day.

Justification. Fishing is a priority public use identified in the Improvement Act. No long-term or significant adverse impacts of wildlife resources are expected from the primary or supporting uses. Based on the biological effects addressed above and in the EA that accompanied the draft CCP for Lee Metcalf Refuge, the Service has determined that fishing will not interfere with the Service's habitat goals and objectives or purposes for which the refuge was established.

Mandatory 15-year Reevaluation Date: 2027

WILDLIFE OBSERVATION AND NONCOMMERCIAL PHOTOGRAPHY

Wildlife observation and photography are two of six wildlife-dependent priority public uses identified in the Improvement Act. Wildlife observation and photography on the refuge are conducted at the following public use areas: (1) the WVA; (2) outside the visitor contact area; (3) the Kenai Nature Trail; and (4) Wildfowl Lane, a county road that runs through the refuge.

The WVA, located in the southwest corner of the refuge, has four trail segments that total 2.5 miles. The area is open to off-trail hiking and observation. The 0.55-mile accessible segment of the trail system is 10 feet wide and paved and has three concrete benches. The three other trail segments are soil or gravel and vary in width. The gravel parking area is three-quarters of an acre, large enough to accommodate recreational vehicles. There is also a designated paved parking area for visitors with disabilities. Additional facilities include an information kiosk, portapotties, and a shelter.

At the visitor contact area, visitors are provided a spotting scope to view waterfowl and other waterbirds and raptors on the adjacent ponds. This is one of the most popular wildlife observation and photography sites for visitors, including school groups.

The Kenai Nature Trail is 1.25 miles long. It starts at refuge headquarters and parallels the eastern edge of Ponds 6, 8, and 10. The areas immediately next to the trail are closed, so visitors must remain on the trail. The first quarter mile of this trail is asphalt and meets accessibility guidelines. Five benches and one spotting scope are positioned along this paved section of trail. The remaining trail is soil and gravel and is not considered accessible. An additional four benches, one overlook platform with spotting scope, boardwalk, two wooden bridges, and two permanent photo blinds are located along this part of the Kenai Nature Trail.

Two permanent photo blinds are located along the Kenai Nature Trail. Blind 1 is located one-third of a mile from the visitor contact area on Pond 8; it sits within 55 acres of open water and marsh land and is sheltered to the east by cottonwood and alder trees. Blind 2 is located 1 mile from the visitor contact area on approximately 85 acres of open water on Pond 10.

An "L"-shaped 2.8-mile section of Wildfowl Lane travels through the refuge on a south-central to east-central direction and has informally served as the refuge auto tour route. The southern and easternmost miles of the road are paved or covered with recycled asphalt. The remaining road is gravel. The road is wide—at least 33 feet in width—allowing motorists to pull over safely and observe wildlife.

Wildlife observation and photography will be conducted year-round at the WVA, the visitor contact area, Kenai Nature Trail, and Wildfowl Lane.

The CCP proposes to continue the above wildlife observation and noncommercial photography activities and add the following to improve opportunities for these uses:

- The refuge will work with the county to develop the 2.8 miles of Wildfowl Lane, described above, as an auto tour route, with observation sites and accompanying interpretation.
- Visitors using the Kenai Nature Trail could choose to walk on the upper bench of a small portion of the trail to access a more level walking surface.
- The Kenai Nature Trail will be extended westward using the Pond 8 dike road (near Potato Cellar Pond); it will then loop south, travel past a former residence site, and then connect to Wildfowl Lane. This trail addition measures 1.25 miles in length. The trail will be open seasonally for public use. The closure will provide refuge for migrating and nesting waterfowl and other waterbirds. This spur to the Kenai Nature Trail will provide additional opportunities for wildlife viewing and photography, environmental education, and interpretation.
- Through partnerships, the refuge will conduct an annual wildlife photography workshop highlighting how to photograph wildlife while minimizing disturbance.
- Waterfowl hunting Blind 2 will be upgraded to provide a photo blind for photographers, including those with disabilities. At least two portable photo blinds will be purchased and available for visitor use.
- Snowshoeing and cross-country skiing will be permitted on walking trails when adequate snow is available.

Availability of Resources. Wildlife observation and photography will be administered by refuge staff. The refuge will rely on the zone law enforcement officer and staff from other refuges for law enforcement. Signage and law enforcement will be used to keep visitors from crossing into areas closed to public use.

The porta-potties will be maintained twice a week, and paved trails will be sealed periodically to maintain a smooth surface.

Anticipated Impacts of Use. There will be temporary disturbance to wildlife near the WVA and along trails. This disturbance will be minimized through refuge regulations and education including brochures, signage, and staff- or volunteer-led wildlife walks that highlight the ethics of wildlife observation and photography.

Determination. Wildlife observation and photography are compatible uses on Lee Metcalf National Wildlife Refuge.

Stipulations Necessary to Ensure Compatibility

- Visitors participating in wildlife observation and photography will be strongly encouraged to follow all public use regulations.
- All users of the Kenai Nature Trail will be required to stay on the trail.
- Non-Service vehicles will be restricted to county and public access roads in the refuge.
- Viewing areas will be designed to minimize disturbance impacts on wildlife and all refuge resources while providing good opportunities to view wildlife in their natural environments.
- Visitors using permanent or portable observation and photography blinds will be provided with information on properly using these structures to minimize disturbance to wildlife, habitats, and other refuge visitors.
- Photography outside of public use sites is not allowed.
- Dogs are allowed only on leashes and only on trails in the WVA.
- Bicycles, horses, and off-road vehicles are not allowed on the refuge.

Justification. Wildlife observation and photography is a wildlife-dependent, priority public use. No unacceptable, long-term or significant adverse impacts on wildlife resources are expected from the primary or supporting uses.

Mandatory 15-year Reevaluation Date: 2027

ENVIRONMENTAL EDUCATION AND INTERPRETATION

Environmental education and interpretation are two of six wildlife-dependent priority public uses specified in the Improvement Act.

Most environmental education programs will be conducted at sites near refuge headquarters: (1) the visitor contact area, (2) Okefenokee Room, (3) environmental education shelter, (4) outdoor amphitheater, and (5) Kenai Nature Trail. The WVA will also be used for staff-led programs but even more so by self-directed environmental education partner organizations and school groups. Environmental education can be both formal and informal, and it can range from presentations to special events like festivals or fishing clinics. However, certain programming, usually special events, may involve additional refuge lands outside the headquarters area. The refuge will continue to organize and provide at least 15 on- and off-refuge annual and special events for adults and students.

The refuge has hosted an average of 2,300 students annually. Students come from communities as far as Darby to the south (approximately 40 miles) and Ronan to the north (about 85 miles). Most students are from grades 3–5. Environmental education will be conducted

year-round; however, most students visit the refuge in May, and these visits are typically limited by the individual schools to one visit per year.

Interpretation of the natural and cultural resources of the refuge and the Bitterroot Valley will be provided year-round in the same designated environmental education and wildlife observation and photography areas. Interpretation will be conducted through interpretive panels, revolving displays, videos, online materials, social media, brochures, flyers, handouts, and booklets. New displays will be professionally planned and produced.

Interpretive panels and brochures will be maintained and updated to reflect changes in information or policy and to meet the Service's graphic standards.

The CCP proposes to continue environmental education and interpretation and add the following to improve these programs:

- The Service will expand the programs and opportunities for environmental education and interpretation, reaching additional students and visitors. These programs will focus on the values and importance of the natural, historical, and cultural resources of the refuge and the Bitterroot Valley, including the refuge's efforts to maintain, enhance, and restore native plant and wildlife communities on the refuge.
- Partnerships will be developed with local universities to provide opportunities for students to conduct research and monitoring projects that are beneficial to the refuge, that help address management needs, and that provide an opportunity for students to work on the refuge and with refuge staff.
- The Service will expand opportunities to collaborate with universities to provide outdoor classrooms for students interested in the refuge, its management programs, its current issues, and the values of the Refuge System.
- A classroom and associated supplies will be added to the expanded visitor center for environmental education programs.
- The Service will continue to maintain and update the current four kiosks, including three with interpretive panels. An additional interpretive panel will be located along the river trail within the WVA explaining the migration of the Bitterroot River.
- Interpretation will be provided along the Kenai Nature Trail, within the WVA, and along the auto tour route.
- On the north end of the refuge, a kiosk will be constructed at a parking lot used by hunters; it will provide regulations as well as information on refuge purposes and resources.

Availability of Resources. The refuge's outdoor recreation planner and volunteers, supplemented by other

current Service staff, will continue to develop and lead these programs. Expanding current programs may require additional visitor services staff and volunteers.

Funding for environmental education and interpretation activities, directional signs, and brochures will be mainly supported by annual operation and maintenance money. Funding from other sources such as grants, regional project proposals, challenge cost-share agreements, and other temporary funding sources will also be sought and used as they became available.

Anticipated Impacts of Use. The bulk of environmental education and interpretation will take place in the refuge headquarters area. The use of the refuge for onsite activities by groups of teachers and students for environmental education or interpretation may impose a short-term, low-level impact on the immediate and surrounding area. Impacts may include trampling of vegetation and temporary disturbance to nearby wildlife species during the activities.

Refuge brochures, interpretive panels, and other educational materials will continue to be updated as needed to meet Service requirements. The Service will continue to promote a greater public understanding and appreciation of the refuge resources, programs, and issues through interpretive, outreach, and environmental educational programs. Presentations, both on and off Service lands, will be provided to refuge visitors, school groups, and organizations, allowing the Service to reach a broader audience. Onsite presentations will be managed to minimize disturbance to wildlife, habitat, and cultural resources.

Determination. Environmental education and interpretation are compatible uses on Lee Metcalf Refuge.

Stipulations Necessary to Ensure Compatibility. On-site activities will be held where minimal impact on wildlife and habitats would occur. The Service will review new environmental education and interpretation activities to ensure that these activities meet program and refuge management objectives and are compatible.

- Visitors participating in environmental education and interpretation programs will be provided Service regulations. Compliance with regulations will be achieved through education, signage, and law enforcement and will minimize negative impacts on refuge habitat and wildlife.
- Environmental education may be limited to reduce disturbance to wildlife, particularly during the nesting seasons. The refuge manager will evaluate and, if appropriate, approve additional environmental education sites on the basis of potential impacts on wildlife. Access should be restricted around active bird nests and during other sensitive life history phases of refuge resources. Staff or volunteer-led programs may occur in areas not open to the public;

however, the location and timing of these activities must be approved by the manager.

- Educational activities will be commonly held in the Okefenokee Room, environmental education shelter, outdoor amphitheater, WVA, and the Kenai Nature Trail. On occasion and by special use permit only, environmental education activities may occur near dikes along Ponds 8 and 10, Grube Barn, and management areas I-4 and I-5. A number of stipulations will cover special events:
 - The Bitterroot and Five Valleys Audubon Societies' bird walk activities will be held on refuge-approved dates and times and located in public use areas.
 - The Great Backyard Bird Count in mid-February—a national “citizen science” event that promotes knowledge of native birds—will take place in areas open to the public. Event activities must be approved by the refuge manager.
 - Ground Hog Day, February 2, will include information and activities that emphasize the natural history of mammals, ecology, habitat, community processes, and the Refuge System; event activities must be approved by the refuge manager, and the location of this event will be restricted to the area around the Grube Barn. Other proposed locations will need to be approved by the refuge manager.
 - Montana Junior Duck Stamp Program activities (mid-April to early May) will take place at the outdoor amphitheater and environmental education shelter. The program will highlight the integration of science with the arts. Event activities must be approved by the refuge manager.
 - The Weed Pull in May or June is a public event targeting the removal of noxious weeds, which is compatible with refuge and management purposes. Staff will work with partners employing environmental education curriculum and outreach to educate visiting public on noxious weed identification and management. Event locations must be approved by the refuge manager.
 - For the Kid's Fishing Clinic, held in both June and September, all fishing and environmental education stations will be positioned for the purpose of safety and minimizing resource disturbance. Activities will primarily be located surrounding the Refuge Headquarters area, but may occur, with issuance of a special use permit, in areas currently closed to public use. Event locations and times must be approved by the refuge manager.
 - The spring and summer Hunter Safety Courses can be held at the Okefenokee Room, Kenai Nature Trail, Grube Barn, and parts of management units I-4 and I-5 with issuance of a special use permit. Activities will be planned to ensure safety and minimize wildlife and visitor disturbance. Event activities and optional locations must be approved by the refuge manager.
- The Stevensville Audubon Christmas Bird Count is held in December or January every year. Refuge staff escort Audubon volunteers, counting and identifying all birds encountered on the refuge. Most bird identification activities will be conducted from refuge roads and dikes, minimizing wildlife disturbance; event activities and locations must be approved by the refuge manager. Unaccompanied individuals may not enter areas closed to the public without a special use permit.
- The refuge will continue to provide staff-led programs, in places and at times of day, that are not open to general public access. Typically these special programs will be planned during special celebrations such as National Wildlife Refuge Week or International Migratory Bird Day. Such events will be preplanned by the visitor services staff in the station annual work plan and publicized well in advance. Any special interpretive or wildlife observation programs offered will be open to the general public and will not be conducted for a select group.

Justification. A secondary goal of the Refuge System is to provide opportunities, when found compatible, for the public to develop an understanding and appreciation for wildlife.

Environmental education and interpretation can be used to help citizens of all ages build a land ethic and act responsibly in protecting wildlife and habitats, which in turn can enrich a person's life, provide an incentive for outdoor activity with associated health benefits, and potentially lessen the likelihood of that person violating laws protecting wildlife. Additionally, environmental education and interpretation are important tools for the refuge to provide visitors with an awareness of its purposes, values, and specific issues such as invasive species, habitat management, restoration of natural processes, and migratory bird management. These tools will provide visitors and students with a greater understanding of the mission and importance of the Refuge System to the American people.

Based on anticipated biological impacts described above and in the EA that accompanies the draft CCP for Lee Metcalf National Wildlife Refuge, the Service determines that environmental education and interpretation will not significantly detract from the Service's implementation of wildlife habitat goals and objectives, or with the purposes for which the refuge

was established. Managing areas used for conducting environmental education and interpretation, monitoring those areas, and mitigating impacts will help minimize potential adverse effects.

Mandatory 15-year Reevaluation Date: 2027

COMMERCIAL FILMING, AUDIO RECORDING, AND STILL PHOTOGRAPHY

Commercial filming is the digital or film capture of a visual image. Commercial audio recording is the capture of sound. Commercial still photography is the digital or film capture of a still image. Each of these activities is conducted by a person, business, or other entity for a market audience for use in a documentary, television program, feature film, advertisement, or similar project. It does not include news coverage or visitor use.

Lee Metcalf Refuge provides opportunities for commercial filming and still photography of migratory birds and other wildlife. Requests from commercial persons, businesses, or entities to conduct commercial activities will be evaluated on their merit in educating the public about the resources and purposes of the refuge and the Refuge System. Any issued special use permit for filming or photography will designate the specific areas that may be accessed and the activities that are allowed (refer to “Stipulations Necessary to Ensure Compatibility” below).

In rare cases the Service may permit access to areas closed to the public. The public benefit, as determined by the refuge manager, must outweigh the potential disturbance to wildlife resources.

Availability of Resources. Current staff will evaluate requests for commercial photography, filming, or audio recording. Administrative costs for reviewing applications, the issuance of subsequent special use permits, and staff time to monitor compliance may be offset by a fee.

Anticipated Impacts of Use. Wildlife filmmakers and photographers tend to create the greatest disturbance of all wildlife observers (Dobb 1998, Klein 1993, Morton 1995). While observers frequently stop to view wildlife, photographers are more likely to approach animals (Klein 1993). Even a slow approach by photographers tends to have behavioral consequences on wildlife (Klein 1993). Photographers often remain close to wildlife for extended periods of time in an attempt to habituate the subject to their presence (Dobb 1998). Furthermore, photographers with low-power lenses tend to get much closer to their subjects (Morton 1995). This usually results in increased disturbance to wildlife as well as habitat, including the trampling of plants. Handling of animals and disturbing vegetation (such as cutting plants and removing flowers) or cultural artifacts is strictly prohibited on Service lands.

Issuance of special use permits with strict guidelines and monitoring by refuge staff for compliance may help minimize or avoid these impacts. Permittees who do not follow the stipulations of their special use permits could have their permits revoked, and further applications for filming or photographing on refuge lands will be denied.

Determination. In rare circumstances, commercial filming, audio recording, and still photography will be compatible uses on Lee Metcalf Refuge.

Stipulations Necessary to Ensure Compatibility. Commercial filming or photography must (1) demonstrate a means to increase the public’s knowledge, appreciation, and understanding of the purposes of Lee Metcalf National Wildlife Refuge, the National Wildlife Refuge System, or the wildlife resources that are managed on these lands. Failure to fully demonstrate a measurable means to meet this criterion would likely result in a denial of the special use permit request.

Any commercial filming and audio recording will require a special use permit that will (1) identify conditions that protect the refuge’s values, purposes, resources, and public health and safety and (2) prevent unnecessary disruption of the public’s use and enjoyment of the refuge. Such conditions may be, but are not limited to, specifying road conditions when access would not be allowed, establishing time limitations, identifying routes of access, limiting the number of participants, and specifying the exact location participants are allowed. These conditions will be identified to prevent excessive disturbance to wildlife, damage to habitat or refuge infrastructure, or conflicts with other visitor services or management activities.

The special use permit will stipulate that imagery produced on refuge lands will be made available for use in environmental education and interpretation, outreach, internal documents, or other suitable uses. In addition, any commercial products must include appropriate credits to the Lee Metcalf National Wildlife Refuge, the National Wildlife Refuge System, and the U.S. Fish and Wildlife Service.

Still photography requires a special use permit (with specific conditions as outlined above) if one or more of the following would occur:

- It takes place at locations where or at times when members of the public are not allowed.
- It uses models, sets, or props that are not part of the location’s natural or cultural resources or administrative facilities.
- The Service would incur additional administrative costs to monitor the activity.
- The Service would need to provide management and oversight to avoid impairment of the resources and values of the site, limit resource damage, or minimize health and safety risks to the visiting public.

- The photographer intends to intentionally manipulate vegetation to create a shot (for example, cutting vegetation to create a blind).

To minimize the impact on Service lands and resources, refuge staff will ensure that all commercial filmmakers and commercial still photographers comply with policies, rules, and regulations. The staff will monitor and assess the activities of all filmmakers, audio recorders, and still photographers.

Justification. Commercial filming, audio recording, and still photography are economic uses that, if allowed, must contribute to the achievement of the refuge purposes, mission of the Refuge System, or the mission of the Service. Providing opportunities for these uses should result in an increased public awareness of the refuge's ecological importance as well as advancing the public's knowledge and support for the Refuge System and the Service. The stipulations outlined above and conditions imposed in the special use permits issued to commercial filmmakers, audio recorders, and still photographers will ensure that these wildlife-dependent activities occur with minimal adverse effects on resources or visitors.

Mandatory 10-year Reevaluation Date: 2022

COOPERATIVE FARMING AND PRESCRIPTIVE GRAZING

The Service has used cooperative farming and prescriptive livestock grazing in the past as a management tool to manage a variety of upland, riparian, and seasonal wetland habitats. These tools will be used to meet habitat objectives, control vegetative litter, promote native plant production and diversity, control the spread of invasive plant species, and help convert disturbed grasslands back to native plant species.

Cooperative farming is usually done on a share basis where the Service and the cooperator each receive a share of the crop. The Service will retain its share as standing cover for wildlife forage or in exchange for additional work from the cooperator such as invasive plant control, grass seeding, or provision of supplies such as herbicides and fence materials for habitat protection and improvement on the management unit. Any income received by the Service will be deposited in the Refuge Revenue Sharing Account. Cooperative farming will primarily be used to treat invasive species by continually farming specific areas until seedbed is reduced. Following this process, these areas will be restored to native species found on that site. The site will continue to be monitored for reinvasion.

Grazing by livestock has been a preferred management tool because the effect on habitat is controllable and measurable. Grazing may occur throughout the year as management needs dictate. For wetland units, the purpose of grazing will be to consume portions of

emergent vegetation and to break root rhizomes with hoof action. This will likely result in enhanced aeration of soils, removing portions of monotypic emergent vegetation. For upland units, grazing will be used to mimic the historical grazing patterns, most likely employing short-duration, intense grazing pressure with extended rest periods.

Fencing and controlling livestock is the responsibility of the cooperating rancher. The Service provides instruction and guidance within the special use permit for placement of fences, water tanks, and livestock supplements to ensure that sensitive habitats or refuge assets are protected. A temporary electric fence is used in most grazing applications. Current forage conditions, habitat objectives, and available water determine stocking rates in each grazing unit.

The Service will continue using cooperative farming and prescriptive livestock grazing to meet habitat objectives. Furthermore, the CCP establishes goals and objectives for specific habitat types where these tools may be used. In addition, the Service has identified target wildlife species (for example, grasshopper sparrow and marbled godwit) and their habitat requirements, which has resulted in objectives that guide these programs to achieve the habitat needs of these target species. The refuge will improve the monitoring and research programs for vegetation and wildlife to assess habitat and wildlife population responses to prescriptive livestock grazing.

Availability of Resources. Current refuge staff and funding resources are sufficient for the purposes of monitoring habitats and implementing research needs to understand the impacts of grazing on refuge habitats. One biological technician will be necessary to carry out the on-the-ground monitoring. These programs will continue to be conducted through special use permits or cooperative farming agreements, which minimize the need for staff time and Service assets to complete work. Permittees will be selected on their ability to accomplish refuge habitat goals and minimize expenditures of staff time and resources. Fencing, caring for, and all animal husbandry tasks are the responsibility of the permittee. The permittee is also responsible for keeping all animals within the management unit and preventing them from roaming at large. The Service provides direction on the placement of temporary fences, water tanks, livestock supplements, loading and off-loading panels and chutes to ensure the protection of sensitive habitats and refuge resources.

Anticipated Impacts of Use. The cooperative farming and prescriptive livestock-grazing program is used to meet habitat- and species-specific goals and objectives identified in the CCP. This program is intended to maintain and enhance habitat conditions for the benefit of a wide variety of migratory birds and other wildlife that use the refuge.

Some wildlife disturbance may occur during operation of noisy farming equipment, and some animals may be temporarily displaced. Wildlife will receive the short-term benefit of standing crops or stubble for food and shelter and the long-term benefit of having historical cropland or other poor-quality habitat converted to native grasses and shrubs. Reducing the number of invasive species and the existing seedbed will support future restoration efforts.

Some trampling of areas by livestock occurs around watering areas. It is anticipated that grazing will continue to be used to manage vegetative monocultures on a rotational basis. Grazing, as well as fire, is known to increase the nutrient cycling of nitrogen and phosphorus (Hauer and Spencer 1998, McEachern et al. 2000). Hoof action may break up the soil cap on upland fields, allowing moisture to infiltrate the soil and allowing native plant seeds to become established. However, cattle grazing would also increase the risk of invasive plants becoming established. Grazing in the spring could have adverse effects on grassland-bird nests due to trampling and loss of vegetation. In addition, the presence of livestock may disturb some wildlife species and some public users. The long-term benefits of this habitat management tool should outweigh the short-term negative effects.

Determination. Cooperative farming and prescriptive grazing as habitat management tools are compatible uses on Lee Metcalf National Wildlife Refuge.

Stipulations Necessary to Ensure Compatibility. To ensure consistency with management objectives, the Service will require general and specific conditions for each cooperative farming and grazing permit.

To minimize impacts on nesting birds and other wildlife, the refuge manager will determine and incorporate any necessary timing constraints on the permitted activity into the cooperative farming agreement or special use permit.

The cooperative farming agreement or special use permit will specify the type of crop to be planted. Farming permittees will be required to use Service-approved chemicals that are less detrimental to wildlife and the environment.

Control and confinement of livestock are the responsibility of the permittee, but the Service will continue to determine where fences, water tanks, and livestock supplements (if necessary) are placed within the management unit. Temporary electric fences are used to retain livestock within grazing cells as well as to protect sensitive habitat areas and refuge assets such as water control structures. Cooperators will be required to remove fences at the end of the grazing season.

When grazing fees are assessed, they are based on the current-year U.S. Department of Agriculture Statistics Board publication, “Grazing Fee Rates for

Cattle by Selected States and Regions.” Standard deductions for labor associated with the grazing permit may be included on the special use permit.

The refuge will monitor vegetation and soils to assess if habitat requirements of target species are being met. A minimum of one temporary biological technician is necessary to monitor and document these activities.

Justification. Habitat management needs to occur to maintain and enhance habitat for migratory birds and other wildlife in this altered landscape. When properly managed and monitored, cooperative farming and prescriptive livestock grazing can rejuvenate native grasses and help control the spread of some invasive plant species and some undesirable monoculture species like cattail. Prescriptive grazing is controlled and the results monitored (for example, vegetation monitoring) so that adjustments in the grazing program are made to meet habitat goals and objectives. The cooperative farming program will be monitored to determine the effectiveness and necessary duration and frequency of farming needed to control and reduce invasive species.

Using local cooperators to perform the work is a cost-effective method to accomplish habitat objectives. The long-term benefits of habitat restoration and management far outweigh any short-term impacts caused by grazing.

Mandatory 10-year Reevaluation Date: 2022

RESEARCH AND MONITORING

Lee Metcalf Refuge receives approximately 8–12 requests each year to conduct scientific research or monitoring on Service lands. Priority is given to studies that contribute to the enhancement, protection, preservation, and management of the refuge’s native plant, fish, and wildlife populations and their habitats. Non-Service applicants must submit a proposal that outlines the following:

- objectives of the study
- justification for the study
- detailed methodology and schedule
- potential impacts on wildlife and habitat including disturbance (short- and long-term), injury, or mortality
- description of measures the researcher would take to reduce disturbances or impacts
- staff required and their qualifications and experience
- status of necessary permits such as scientific collection permits and endangered species permits
- costs to the Service including staff time requested, if any
- anticipated progress reports and endproducts such as reports or publications

Refuge staff will review research and monitoring proposals on a case-by-case basis and issue special use permits if approved. Criteria for evaluation include, but are not limited to, the following:

- Research and monitoring that contribute to specific refuge management issues will be given higher priority over other requests.
- Research and monitoring that would cause undue disturbance or would be intrusive would likely not be approved. The degree and type of disturbance will be carefully weighed when evaluating a research request.
- Research projects that can answer the same questions yet be conducted off-refuge are less likely to be approved.
- Evaluations will determine if effort has been made to minimize disturbance through study design, including adjusting location, timing, scope, number of researchers, study methods, and number of study sites.
- If staffing or logistics make it impossible for the refuge to monitor researcher activity, this may be a reason to deny the request.
- The length of the project will be considered and agreed upon before approval. Projects will be reviewed annually.

Availability of Resources. Current resources are minimally adequate to administer research and monitoring efforts. A full-time biological science technician will assist in monitoring research proposals and projects. It is anticipated that approximately \$4,000 per year is required to administer and manage current research and monitoring projects. Coordination with a Service inventorying and monitoring biologist will be necessary to administer large or long-term projects, which generally require more in-depth evaluation of applications, management of permits, and oversight of projects. The refuge will work with this biologist to identify research and monitoring needs and work with other Service staff, universities, and scientists to develop studies that will benefit the refuge and address the goals and objectives in the CCP.

Anticipated Impacts of Use. Some degree of disturbance is expected with research activities, because most researchers enter areas and use Service roads that are closed to the public. In addition, some research requires collecting samples or handling wildlife. However, the overall impact on wildlife and habitats is expected to be minimal with research studies when special use permits include conditions to minimize those impacts.

Determination. Research and monitoring are compatible uses on the Lee Metcalf Refuge.

Stipulations Needed to Ensure Compatibility

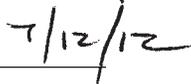
- Extremely sensitive wildlife habitats and species are sufficiently protected from disturbance by limiting research activities in these areas.
- All refuge rules and regulations are followed unless otherwise exempted by refuge management.
- Refuge staff use the criteria for evaluating research and monitoring proposals as outlined above (“Description of Use”) when determining whether to approve a proposed project on the refuge. If proposed research methods are evaluated and determined to have potential impacts on refuge wildlife or habitat, it must be demonstrated that the research is necessary for refuge resource conservation management. All projects are reviewed annually.
- Measures to minimize potential impacts will need to be developed and included as part of the project and study design. These measures, with potential modifications or additions, will be listed as conditions on the special use permit.
- The length of the project will be considered and agreed on before approval.
- Projects will be reviewed annually and any modifications made as appropriate.
- Refuge staff will monitor research and monitoring activities to ensure compliance with all conditions of the special use permit. At any time, refuge staff may accompany the researchers to determine potential impacts. Staff may determine that previously approved research and special use permits be terminated due to observed impacts.
- No unauthorized individuals may accompany the researcher without prior consent from the refuge.
- The special use permit is nontransferable from one researcher to any other individual.
- The refuge manager will have the ability to cancel a special use permit if the researcher is out of compliance or to ensure wildlife and habitat protection.

Justification. The program as described is determined to be compatible. Potential impacts of research activities on refuge resources will be minimized through restrictions included as part of the study design, and research activities will be monitored by refuge staff. Results of research projects will contribute to the understanding, enhancement, protection, preservation, and management of the refuge’s wildlife populations and their habitats.

Mandatory 10-year Reevaluation Date: 2022

C.4 Signatures

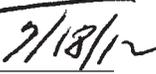
SUBMITTED:

Tom Reed, Refuge Manager
Lee Metcalf National Wildlife Refuge
Stevensville, Montana

Date

REVIEWED:

W. Dean Rundle, Refuge Supervisor
U.S. Fish and Wildlife Service, Region 6
National Wildlife Refuge System
Lakewood, Colorado

Date

APPROVED:




Matt Hogan, Assistant Regional Director
U.S. Fish and Wildlife Service, Region 6
National Wildlife Refuge System
Lakewood, Colorado

Date

Appendix D

Intra-Service Section 7 Biological Evaluation

Originating Person: Tom Reed

Date Submitted: July 12, 2012

Telephone Number: 406 / 777 5552

- I. **Service Program and Geographic Area or Station Name:** Lee Metcalf National Wildlife Refuge (Ravalli County)
- II. **Flexible Funding Program (e.g. Joint Venture, etc.) if applicable:** Not applicable
- III. **Location:** Location of the project including county, State and TSR (township, section and range): See attached map (page 2) in accompanying “Comprehensive Conservation Plan—Lee Metcalf National Wildlife Refuge.”
- IV. **Species/Critical Habitat:** List federally endangered, threatened, proposed, and candidate species or designated or proposed critical habitat that may occur within the action area.

<i>Species</i>	<i>Status</i>	<i>Relevance</i>	<i>Critical habitat</i>
Bull trout	Threatened	Historically used refuge waters to access spawning area	North Burnt Fork Creek and Bitterroot River
Yellow-billed cuckoo	Candidate	Suitable habitat present; never documented	None
Wolverine	Candidate	No suitable habitat present	None
Whitebark pine	Candidate	No suitable habitat present	None

- V. **Project Description:** Describe proposed project or action or, if referencing other documents, prepare an executive summary (attach additional pages as needed):

The proposed action is to implement ongoing actions and to execute several proposed projects over the next 15 years that support the goals, objectives, and strategies of the “Lee Metcalf National Wildlife Refuge Comprehensive Conservation Plan” (CCP) while fulfilling the goals of the National Wildlife Refuge System.

The CCP proposes to conserve natural resources by restoring, protecting, and enhancing native grasslands and riverfront and gallery forest and associated stream habitat; improving the health and productivity of the wetland impoundments; and more effectively controlling invasive species across the refuge. The CCP also proposes to develop and implement restoration actions to improve existing habitat conditions and address threats to native fish where practicable. Management operations of the refuge would likely change as new actions are implemented during the 15-year term of this CCP. A description of ongoing actions and current management operations can be found in chapter 4 of the draft CCP or alternative A of the environmental assessment (EA).

One of the new proposals is to restore in-stream habitat in North Burnt Fork Creek, which is designated as critical bull trout habitat. On September 30, 2010, the U.S. Fish and Wildlife Service (Service) designated 18,795 miles of streams and 488,252 acres of lakes and reservoirs in Idaho, Oregon, Washington, Montana, and Nevada as critical habitat for this wide-ranging native fish. The Bitterroot River and North Burnt Fork Creek are both located within this designated area. Today, the bull trout

is primarily restricted to the upper reaches of North Burnt Fork (Creek) on U.S. Forest Service land because of dammed and diverted waterflows, sedimentation, and increased water temperatures in the creek (Stringer 2009). Over time, this creek has been altered due to irrigation diversions, development, encroachment and realignment of the stream channel, increased sedimentation, and comingling of irrigation water and North Burnt Fork Creek. On the refuge portion of this creek, the Service constructed three structures by 1970 with an objective to create more pond-like habitat for waterfowl and warm-water fish (providing more fishing opportunities in the public use area).

This final CCP is proposing to remove obstructions and reestablish the North Burnt Fork Creek entrance into the Bitterroot River where it is sustainable and conducive for native salmonids. As part of this project, the Service would strategically remove water control structures, if appropriate, and other obstructions in the tributary and floodplain channels to allow fish and other aquatic animals to use this stream corridor. Removal of water control structures along the creek would deepen and narrow the streambed, allowing unimpeded flow to the Bitterroot River. This connection would encourage riparian ecological processes to continue to function. Flooding and drainage capabilities would more closely emulate natural hydrological regimes that sustained native plant communities. However, augmented irrigation water diverted into North Burnt Fork Creek upstream of the refuge greatly affects the hydrology of this creek on the refuge. These actions would restore only a small portion of this historic migration route for bull trout, but the Service would continue to work with other partners to expand these efforts to address river and stream connectivity off the refuge.

The CCP also proposes to evaluate and potentially reestablish a channel to the Bitterroot River that mimics the historical channel pattern of Three Mile Creek. Three Mile Creek is another mountain and terrace-derived tributary to the Bitterroot River. Much like North Burnt Fork Creek, this stream channel has been altered both off and on the refuge by the installation of culverts, bridge crossings, irrigation diversions, and artificial channels. This creek contributes high sediment and nutrient loads to the Bitterroot River compared to other tributaries in the Bitterroot watershed (McDowell and Rokosch 2005) and also receives augmented irrigation water off refuge. In 1984, three sediment catch pools were built on the refuge just south of Pond 11 to prevent sediment from entering and filling this impoundment. The sediment catch pools were filled to capacity in only 1 year. In 1989, as a solution to the sedimentation, the Service built Otter Pond. The refuge portion of Three Mile Creek was channeled into a bypass directly to the river. Water from Otter Pond was then siphoned under Three Mile Creek to feed Ponds 11–13. Currently, the river's mainstem is just west of this confluence, and the sediment from Three Mile Creek has created a willow-filled island within what is now considered part of North Island Slough. Restoring Three Mile Creek to its historical channel will encourage riparian ecological processes to become reestablished. Additionally, overbank flooding capabilities will improve and more closely emulate natural hydrological regimes that sustained native plant communities. The objective of the restoration proposal is to create habitat conditions supporting native cold-water species (cooler water temperature, riffles, deep pools, natural sinuosity) and the restoration of riparian habitat including gallery and riverfront forest. This may require the removal of impoundments, level ditching, spoil, and islands that obstruct the migration of this stream.

Both of these stream restoration projects would require additional engineering and hydrological expertise in order to select a restoration path that is beneficial and sustainable. Once each design is completed, a stepdown intra-Service consultation would be conducted on each proposal.

In addition to these stream restoration projects, the CCP proposes to begin removing other obstructions (levees, dams, ditching) that impede the movement of flood water across this floodplain refuge. This will restore the capability of the Bitterroot River to overflow its banks and back water up into tributaries and into other floodplain channels. Backwater flooding provides foraging habitat for pre-spawning native fish and rearing habitat for larval and juvenile fishes. Annual backwater flooding recharges water regimes in depressions and shallow floodplain wetlands that serve as productive breeding habitat for amphibians, reptiles, waterbirds, and certain mammals. Subsequent drying of floodplains concentrates aquatic prey for fledgling waterbirds. To begin reconnecting this floodplain habitat with the Bitterroot River, the Service proposes to remove levees, roads, and ditches that prohibit overbank and backwater flooding of the Bitterroot River and disrupt natural sheet flow into the central floodplain of the refuge. Many of these structures have already been eroded by the movement of the river. Once these structures

are removed, additional efforts may require assistance from engineers and hydrologists to determine which structures are continuing to impede flooding processes.

VI. Determination of Effects:

(A) Description of Effects: Describe the action(s) that may affect the species and critical habitats listed in item IV. Your rationale for the Section 7 determinations made below (B) should be fully described here.

Ongoing actions and current management operations of the refuge are not likely to adversely affect the current baseline conditions for bull trout or diminish the existing functions of the primary constituent elements that support bull trout critical habitat. Bull trout are all but absent from this stretch of the Bitterroot River and the lower reaches of North Burnt Fork Creek. A resident local population of bull trout exists in the headwaters of North Burnt Fork Creek several miles above the refuge. Both the Bitterroot River and North Burnt Fork Creek are designated critical habitat. Because of the unlikelihood of a bull trout being in the area, effects on the species from current refuge operations are indiscernible.

A concern of the Service is the likelihood that the past water management operations of the refuge may have to some degree contributed to the current degraded baseline habitat conditions in the lower reach of North Burnt Fork Creek. Given the long history of impacts on the North Burnt Fork Creek watershed—most of which have occurred (and continue to occur) upstream of the refuge—it is virtually impracticable to determine with precision the level of impact that past or current refuge operations may have or continue to have on bull trout and bull trout habitat in the area. Therefore, under the CCP, the refuge has identified several new proposed actions that, when implemented, would improve baseline habitat conditions for bull trout by addressing the habitat parameters most affected by refuge operations, mainly connectivity to the Bitterroot River and flow through water management.

The proposed actions would result in changes on the refuge that are anticipated to benefit bull trout and other native fish species. Effects on bull trout and its habitat will be assessed in subsequent Intra-Service consultations. Each individual proposed action identified in the CCP would include site-specific designs, construction elements, maintenance and operational components, as well as monitoring features to ensure that the intended outcome of improving baseline conditions for bull trout is achieved.

The stream restoration proposals would reestablish a portion of the spawning migration route within the designated critical bull trout habitat. This will be a small step to returning this threatened species to its historic passageway. An example of a proposed action to improve baseline conditions for bull trout is the removal of obstructions that inhibit river migration and overbank flooding. This project would help create and sustain communities and basic ecological functions (scouring, deposition, movement of water, native fish, and animals between the river and the floodplain) that support life cycle events and the needs of native plant, native fish, and animal communities.

There are many off-refuge obstacles to returning bull trout to its historical spawning area. The refuge is currently exploring opportunities to partner with other watershed stakeholders with an interest in improving and enhancing watershed health in the Bitterroot River system. The CCP proposes to continue to work with other partners including the State of Montana, the U.S. Forest Service, and other valley-wide conservation partners to continue and expand this process of repatriation.

A number of projects proposed under various objectives and strategies, including those listed above, would need site-specific designs before they are implemented. Complete determination of effects from such projects on bull trout and bull trout critical habitat is not feasible prior to more detailed design. Table 1 lists all goals, objectives, and strategies of the CCP that may affect bull trout; the short-term and long-term effects, when known; and whether additional stepdown consultation will be needed. Once the CCP is approved and implemented, stepdown plans will be completed for various programs. The purpose of the stepdown management plans is to provide details to Service staff for carrying out specific actions and strategies authorized by the CCP. Stepdown management plans to be developed under the CCP that may affect bull trout include water management and habitat management plans, and these will be developed under informal consultation with Ecological Services, with formal consultation to follow, if so indicated.

(B) Determination: Determine the anticipated effects of the proposed project on species and critical habitats listed in item IV. Check all applicable boxes and list the species (or attach a list) associated with each determination.

Determination

No Effect: This determination is appropriate when the proposed project will not directly or indirectly affect (neither negatively nor beneficially) individuals of listed/proposed/candidate species or designated/proposed critical habitat of such species. **No concurrence from ESFO required.** (yellow-billed cuckoo, whitebark pine, wolverine)

X

May Affect but Not Likely to Adversely Affect: This determination is appropriate when the proposed project is likely to cause insignificant, discountable, or wholly beneficial effects to individuals of listed species and/or designated critical habitat. **Concurrence from ESFO required.** (bull trout, designated critical habitat)

X

The Service has determined the proposed CCP *may affect, but is not likely to adversely affect* the threatened bull trout or its designated critical habitat.

May Affect and Likely to Adversely Affect: This determination is appropriate when the proposed project is likely to adversely impact individuals of listed species and/or designated critical habitat. **Formal consultation with ESFO required.**

May affect but Not Likely to Jeopardize candidate or proposed species/critical habitat: This determination is appropriate when the proposed project may affect, but is not expected to jeopardize the continued existence of a species proposed for listing or a candidate species, or adversely modify an area proposed for designation as critical habitat. **Concurrence from ESFO optional.**

Likely to Jeopardize candidate or proposed species/critical habitat: This determination is appropriate when the proposed project is reasonably expected to jeopardize the continued existence of a species proposed for listing or a candidate species, or adversely modify an area proposed for designation as critical habitat. **Conferencing with ESFO required.**

Signature 
Tom Reed, Manager
Lee Metcalf National Wildlife Refuge
Stevensville, Montana

Date 7/12/12

Reviewing Ecological Services Office Evaluation (check all that apply):

A. Concurrence X Nonconcurrence _____

Explanation for nonconcurrence:

B. Formal consultation required _____

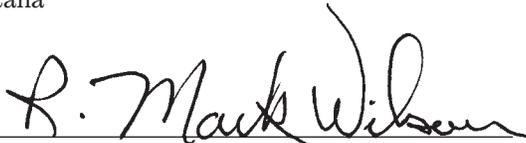
List species or critical habitat unit

C. Conference required _____

List species or critical habitat unit

Ecological Services
U.S. Fish and Wildlife Service
Helena, Montana

Signature



R. Mark Wilson, Ecological Services Supervisor
Ecological Services
Helena, Montana

Date

7-17-12

Table 1. Goals, objectives, and strategies of the Lee Metcalf CCP that may affect bull trout or bull trout critical habitat.

<i>Goals, objectives, and strategies</i>	<i>Effect (short/long)¹</i>	<i>Consultation²</i>
Goal for Bitterroot River Floodplain and Associated Wildlife (excerpt): Manage and, where appropriate, restore the natural topography, water movements, and physical integrity of surface water flow patterns across the Bitterroot River floodplain to provide healthy riparian habitats...	Restore	Complete
Floodplain Objective 1: Where channel migration of the Bitterroot River is occurring, do not inhibit the river from establishing natural flow patterns during high flow events, where appropriate, to enhance existing riparian woodlands and provide suitable restoration sites for both gallery and riverfront forest vegetation that could provide breeding, nesting, feeding, or migration habitat for target species (over the next 15 years).	Restore	Complete
Strategy: Contracting as necessary, work with engineers and hydrologists (with expertise in fluvial geomorphology) to determine and design overflow channels in the north part of the refuge (Ponds 11, 12, and 13) and remove infrastructure to allow for river movements into these channels. The design for this restoration may indicate the need for changes to Otter Pond. Revegetate exposed soils with gallery and riverfront forest species.	Unknown/ Restore	Stepdown
Strategy: Work with partners to investigate options for slowing the erosion of the WVA. All options will be evaluated based on cost, effectiveness, and impacts on the environment, including the river system.	Unknown	Stepdown
Strategy: Continue to allow seasonal flows (including backwater flooding into Francois Slough) of the Bitterroot River into and through North Island and Francois Sloughs.	Restore	Complete
Strategy: Allow and promote natural regeneration of native gallery and riverfront forests and plant native trees, shrubs, and grasses, where appropriate.	Restore	Complete
Floodplain Objective 2 (excerpt): Reconnect floodplain habitats with the Bitterroot River to allow natural overbank and backwater flooding into and out of the floodplain during high flow events to support and expand the health, diversity, and extent of the riparian woodlands... (over the next 15 years).	Restore	Complete
Strategy: Construct wide spillways in or remove artificial levees, roads, and ditches that prohibit overbank and backwater flooding of the Bitterroot River and disrupt natural sheet flow into the central floodplain of the refuge.	Restore	Complete
Strategy: Work with engineers and hydrologists, contracting as necessary, to determine and design the best methods available to remove structures, level ditching, and islands next to the river that are impeding natural overbank and backwater flooding on the refuge, including Ponds 11–13.	Unknown/ Restore	Stepdown
Strategy: Improve high water flow west of Ponds 6–10 into and through historical slough and swale channels by removing obstructions, levees, and dams in and across these drainages.	Restore	Complete
North Burnt Fork Creek Objective: Within the refuge, reconnect unimpeded flow from North Burnt Fork Creek with flow pathways into the Bitterroot River to reduce creek water temperatures, improve water and nutrient flow, create habitat conditions conducive to native cold-water species and restore riparian woodland habitat that will support target species (within 8 years).	Unknown/ Restore	Stepdown
Strategy: Based on historical channel information (photos, topographical features), establish the Burnt Fork Creek entrance into the Bitterroot River where it is sustainable and conducive for native salmonids.	Unknown/ Restore	Stepdown
Strategy: Work with an engineer and hydrologist to determine the best route for North Burnt Fork Creek to return to the river, considering the requirements of bull trout. Strategically remove water control structures and other obstructions in the tributary and floodplain channels to allow fish and other aquatic animals to use this riparian corridor.	Unknown/ Restore	Stepdown

Table 1. Goals, objectives, and strategies of the Lee Metcalf CCP that may affect bull trout or bull trout critical habitat.

<i>Goals, objectives, and strategies</i>	<i>Effect (short/long)¹</i>	<i>Consultation²</i>
Strategy: Through partnerships, encourage restoration and stream connectivity off the refuge to reestablish natural fish passage and flow pathways in the creek to its upper reaches. (Consultation on any future off-refuge actions will be conducted by those agencies developing these restoration proposals)	Restore	Complete
Strategy: Restore newly exposed banks to riparian habitat.	Restore	Complete
Three Mile Creek Objective: Reestablish a channel to the Bitterroot River that mimics the historical flow pattern of Three Mile Creek to create habitat conditions supporting native cold-water species (cooler water temperature, riffles, deep pools) and the restoration of riparian habitat.	Unknown/ Restore	Stepdown
Strategy: Develop contracts as necessary with engineers and hydrologists to determine and design the best methods available to remove structures, level ditching, and islands. Through partnerships, attempt to restore river and stream connectivity off refuge to reestablish natural fish passages and flow pathways in the creek.	Unknown/ Restore	Stepdown
Strategy: Plant and encourage native vegetation (for example, cottonwood or willow) on restored sites to prevent invasive species encroachment as Ponds 11–13 (see Floodplain Objective 2) dry up and overbank and backwater flow patterns reestablish.	Restore	Complete
Riverfront Forest Habitat Objective: Restore regenerating and sustaining mechanisms for riverfront forest communities alongside the Bitterroot River	Restore	Complete
Strategy: Remove levees, berms, and roads to allow for natural overbank and backwater flooding (see Floodplain Objective 2). These occasional flood events would scour surfaces, deposit sands, and create regeneration sites to restore and sustain riverfront forest vegetation, including cottonwood, along the margins of the Bitterroot River.	Restore	Complete
Strategy: Monitor and treat invasive species and promote and restore vegetation native to riverfront forest to provide quality habitat for target species.	Restore	Complete
Gallery Forest Habitat Objective (excerpt): Restore regenerating and sustaining mechanisms for gallery forest communities on higher floodplain elevations (natural levees and benches) in areas with sandy-loam soils, on natural levees, and on other floodplain ridges that have 2- to 5-year flood occurrence intervals...	Restore	Complete
Strategy: Reduce the size of Ponds 8 and 10 to allow for expansion of gallery forest on the west side of these impoundments, thereby reducing the amount of water diverted to these ponds.	Restore	Complete
Strategy: Plant cottonwood and ponderosa pine to expand gallery forest areas, focusing on areas with appropriate soils.	Restore	Complete
Goal for Wetland Impoundment Habitat and Associated Wildlife: Where appropriate, manage wetland impoundments to create a diversity of habitats for target waterfowl, shorebirds, and other associated native wetland-dependent species.	Restore	Complete
Wetland Impoundment Habitat Objective 1: Over the next 15 years, manage water levels on 628 acres to emulate natural and seasonal water regimes including natural increases in waterflow in the spring followed by rotational drying in the summer and fall. [Note: Consultation on this objective and pertinent strategies will be covered under the development of the Water Management Plan.]	Unknown/ Restore	Stepdown
Strategy: Maintain or replace the water management structures in Ponds 1–6, Ponds 8 and 10, and Otter Pond. The remaining wetland impoundment structures will be maintained as needed.	Maintain	Complete
Strategy: Water level management of all ponds will be changed to a more seasonal water regime that emulates natural increases in distribution and depth in spring, followed by occasional drying in summer and fall to encourage the restoration of wetland and shrub habitat. [Note: Consultation on this objective and pertinent strategies will be covered under the development of the water management plan.]	Unknown/ Restore	Stepdown

Table 1. Goals, objectives, and strategies of the Lee Metcalf CCP that may affect bull trout or bull trout critical habitat.

<i>Goals, objectives, and strategies</i>	<i>Effect (short/long)¹</i>	<i>Consultation²</i>
Strategy: Emulate long-term patterns of drier conditions in floodplain wetlands in most years including periodic complete drying in some years and occasional prolonged flooding in a few years.	Unknown/ Restore	Stepdown
Strategy: Determine the feasibility and methods for restoring the historical flow of the side channel of the Bitterroot River and Three Mile Creek through Ponds 11 through 13 to restore riparian habitat (see Floodplain Goal) and reestablish unimpeded flow to the river.	Unknown/ Restore	Stepdown
Wetland Impoundment Habitat Objective 2 (excerpt): Where appropriate, reduce the area of more permanently flooded wetland impoundments and persistent emergent vegetation to restore native plant communities, such as gallery forest... [Note: Consultation on this objective and pertinent strategies will be covered under the development of the Water Management Plan.]	Unknown/ Restore	Stepdown
Strategy: Remove levees, ditches, and water control structures from abandoned wetland impoundments to facilitate the restoration and expansion of the gallery forest (Ponds 7, 7a, 7b, and 9) and native grassland (Pair Ponds and Potato Celar Pond) habitat.	Restore	Complete
Strategy: Reduce Pond 8 and Pond 10 in size to allow for the restoration of gallery forest habitat on the west side of these impoundments.	Restore	Complete

¹ *Effects of the action are indicated, distinguishing between short- and long-term impacts.*

² *“Stepdown” indicates actions requiring additional intra-Service consultation once site-specific designs are completed.*

Appendix E

Key Legislation and Policy

This appendix briefly describes the guidance for the National Wildlife Refuge System and other key legislation and policies that guide management of the Lee Metcalf National Wildlife Refuge.

E.1 National Wildlife Refuge System

The mission of the Refuge System is to administer a national network of lands and waters for the conservation, management, and where appropriate, restoration of the fish, wildlife, and plant resources and their habitats within the United States for the benefit of present and future generations of Americans.

(National Wildlife Refuge System Improvement Act of 1997)

GOALS

- Fulfill our statutory duty to achieve refuge purposes and further the Refuge System mission.
- Conserve, restore where appropriate, and enhance all species of fish, wildlife, and plants that are endangered or threatened with becoming endangered.
- Perpetuate migratory bird, interjurisdictional fish, and marine mammal populations.
- Conserve a diversity of fish, wildlife, and plants.
- Conserve and restore, where appropriate, representative ecosystems of the United States including the ecological processes characteristic of those ecosystems.
- Foster understanding and instill appreciation of fish, wildlife, and plants and their conservation, by providing the public with safe, high-quality, and compatible wildlife-dependent public use. Such use includes hunting, fishing, wildlife observation and photography, and environmental education and interpretation.

GUIDING PRINCIPLES

There are four guiding principles for management and general public use of the Refuge System established by Executive Order No. 12996 (1996):

- **Public Use**—The Refuge System provides important opportunities for compatible wildlife-dependent recreational activities involving hunting, fishing, wildlife observation and photography, and environmental education and interpretation.
- **Habitat**—Fish and wildlife will not prosper without high-quality habitat and without fish and wildlife, traditional uses of refuges cannot be sustained. The Refuge System will continue to conserve and enhance the quality and diversity of fish and wildlife habitat within refuges.
- **Partnerships**—America’s sportsmen and women were the first partners who insisted on protecting valuable wildlife habitat within wildlife refuges. Conservation partnerships with other Federal agencies, State agencies, tribes, organizations, industry, and the general public can make significant contributions to the growth and management of the Refuge System.
- **Public Involvement**—The public should be given a full and open opportunity to participate in decisions regarding acquisition and management of our national wildlife refuges.

E.2 Legal and Policy Guidance

Management actions on national wildlife refuges and wetland management districts are circumscribed by many mandates including laws and Executive orders. Regulations that affect refuge and district management the most are listed below.

American Indian Religious Freedom Act (1978)—Directed agencies to consult with native traditional religious leaders to determine appropriate policy changes necessary to protect and preserve Native American religious cultural rights and practices.

Americans with Disabilities Act (1992)—Prohibited discrimination in public accommodations and services.

Antiquities Act (1906)—Authorized the scientific investigation of antiquities on Federal land and provides penalties for unauthorized removal of objects taken or collected without a permit.

Archaeological and Historic Preservation Act (1974)—Directed the preservation of historic and archaeological data in Federal construction projects.

Archaeological Resources Protection Act (1979), as amended—Protected materials of archaeological interest from unauthorized removal or destruction, and requires Federal managers to develop plans and schedules to locate archaeological resources.

Architectural Barriers Act (1968)—Required federally owned, leased, or funded buildings and facilities to be accessible to persons with disabilities.

Clean Water Act (1977)—Required consultation with the U.S. Army Corps of Engineers (404 permits) for major wetland modifications.

Section 404 (of the Clean Water Act)—Authorized the Secretary of the Army, acting through the Chief of Engineers, to issue permits, after notice and opportunity for public hearing, for discharge of dredged or fill material into navigable waters of the United States, including wetlands, at specified disposal sites. Required selection of disposal sites be in accordance with guidelines developed by the Administrator of the Environmental Protection Agency in conjunction with the Secretary of the Army. Stated that the Administrator can prohibit or restrict use of any defined area as a disposal site whenever she or he determines, after notice and opportunity for public hearings, that discharge of such materials into such areas will have an unacceptable adverse effect on municipal water supplies, shellfish beds, fishery areas, wildlife, or recreational areas.

Dingell–Johnson Act (1950)—Authorized the Secretary of the Interior to provide financial assistance for State fish restoration and management plans and projects. Financed by excise taxes paid by manufacturers of rods, reels, and other fishing tackle. Known as the Federal Aid in Sport Fish Restoration Act.

Emergency Wetlands Resources Act (1986)—Promoted wetland conservation for the public benefit to help fulfill international obligations in various migratory bird treaties and conventions. Authorized the purchase of wetlands with Land and Water Conservation Fund monies.

Endangered Species Act (1973), as amended—Required all Federal agencies to carry out programs for the conservation of threatened and endangered species.

Environmental Education Act of 1990—Established the Office of Environmental Education within the Environmental Protection Agency to develop and administer a Federal environmental education program. Responsibilities of the office include developing and supporting programs to improve understanding of the natural and developed environment and the

relationships between humans and their environment, supporting the dissemination of educational materials, developing and supporting training programs and environmental education seminars, managing a Federal grant program, and administering an environmental internship and fellowship program. Required the office to develop and support environmental programs in consultation with other Federal natural resource management agencies including the Service.

Executive Order No. 11644, Use of Off-road Vehicles on Public Lands (1972)—Provided policy and procedures for regulating off-road vehicles.

Executive Order No. 11988, Floodplain Management (1977)—Required Federal agencies to provide leadership and take action to reduce the risk of flood loss, minimize the impact of floods on human safety, and preserve the natural and beneficial values served by the floodplains. Prevented Federal agencies from contributing to the “adverse impacts associated with occupancy and modification of floodplains” and the “direct or indirect support of floodplain development.” In the course of fulfilling their respective authorities, Federal agencies “shall take action to reduce the risk of flood loss, to minimize the impact of floods on human safety, health, and welfare, and to restore and preserve the natural and beneficial values served by floodplains.”

Executive Order No. 11990, Protection of Wetlands (1977)—Directs Federal agencies to (1) minimize destruction, loss, or degradation of wetlands and (2) preserve and enhance the natural and beneficial values of wetlands when a practical alternative exists.

Executive Order No. 12996, Management and General Public Use of the National Wildlife Refuge System (1996)—Defined the mission, purpose, and priority public uses of the Refuge System; presented four principles to guide management of the Refuge System.

Executive Order No. 13007, Indian Sacred Sites (1996)—Directed Federal land management agencies to accommodate access to and ceremonial uses of Indian sacred sites by Indian religious practitioners, avoid adversely affecting the physical integrity of such sacred sites, and where appropriate, maintain the confidentiality of sacred sites.

Executive Order No. 13443, Facilitation of Hunting Heritage and Wildlife Conservation (2007)—Directed Federal agencies that have programs and activities that have a measurable effect on public land management, outdoor recreation, and wildlife management, including the Department of the Interior and the Department of Agriculture, to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat.

Federal Noxious Weed Act (1990)—Required the use of integrated management systems to control or contain undesirable plant species and an interdisciplinary approach with the cooperation of other Federal and State agencies.

Federal Records Act (1950)—Required the preservation of evidence of the Government’s organization, functions, policies, decisions, operations, and activities, as well as basic historical and other information.

Federal Water Pollution Control Act of 1972—Required any applicant for a Federal license or permit to conduct any activity that may result in a discharge into navigable waters to obtain a certification from the State in which the discharge originates or will originate, or, if appropriate, from the interstate water pollution control agency having jurisdiction over navigable waters at the point where the discharge originates or will originate, that the discharge will comply with applicable effluent limitations and water quality standards. Required that a certification obtained for construction of any facility must also pertain to subsequent operation of the facility.

Fish and Wildlife Act (1956)—Directed the Secretary of the Interior to develop the policies and procedures necessary for carrying out fish and wildlife laws and to research and report on fish and wildlife matters. Established the U.S. Fish and Wildlife Service within the Department of the Interior, as well as the positions of Assistant Secretary for Fish and Wildlife and Director of the Service.

Fish and Wildlife Coordination Act (1958)—Allowed the U.S. Fish and Wildlife Service to enter into agreements with private landowners for wildlife management purposes. Also required consultation with the U.S. Fish and Wildlife Service and State fish and wildlife agencies where the waters of any stream or other body of water are proposed or authorized, permitted or licensed to be impounded, diverted, or otherwise controlled or modified by any agency under a Federal permit or license. Consultation is to be undertaken for the purpose of preventing loss of and damage to wildlife resources.

Fish and Wildlife Improvement Act of 1978—Improved the administration of fish and wildlife programs and amends several earlier laws including the Refuge Recreation Act, the National Wildlife Refuge System Administration Act, and the Fish and Wildlife Act of 1956. Authorized the Secretary to accept gifts and bequests of real and personal property on behalf of the United States. Authorized the use of volunteers for Service projects and appropriations to carry out volunteer programs.

Historic Sites, Buildings and Antiquities Act (1935), known as the Historic Sites Act, as amended (1965)—Declared

a national policy to preserve historic sites and objects of national significance, including those located at refuges and districts. Provided procedures for designation, acquisition, administration, and protection of such sites and for designation of national historic and natural landmarks.

Junior Duck Stamp Conservation and Design Act (1994)—Directed the Secretary of the Interior to create a junior duck stamp and to license and market the stamp and the stamp design. The proceeds from these efforts are used to support conservation education awards and scholarships. In 2000, Congress preauthorized the Junior Duck Stamp Conservation and Design Program Act for another five years, and expanded the conservation education program throughout the United States and its territories. Since that time, all 50 states, the District of Columbia, American Samoa, and the U.S. Virgin Islands have joined the program.

Land and Water Conservation Fund Act of 1965—Provided money from leasing bonuses, production royalties, and rental revenues for offshore oil, gas, and sulphur extraction to the Bureau of Land Management, the USDA Forest Service, the U.S. Fish and Wildlife Service, and State and local agencies for purchase of lands for parks, open space, and outdoor recreation.

Migratory Bird Conservation Act (1929)—Established procedures for acquisition by purchase, rental, or gifts of areas approved by the Migratory Bird Conservation Commission.

Migratory Bird Hunting and Conservation Stamp Act (1934)—Authorized the opening of part of a refuge to waterfowl hunting and requires each waterfowl hunter 16 years of age or older to possess a valid Federal hunting stamp. Receipts from the sale of the stamp are deposited in a special Treasury account known as the Migratory Bird Conservation Fund and are not subject to appropriations.

Migratory Bird Treaty Act (1918)—Designated the protection of migratory birds as a Federal responsibility and enabled the setting of seasons and other regulations including the closing of areas, Federal or non-Federal, to the hunting of migratory birds.

National Environmental Policy Act (1969)—Required all agencies including the Service to examine the environmental impacts of their actions, incorporate environmental information, and use public participation in the planning and implementation of all actions. Required Federal agencies to integrate this act with other planning requirements and prepare appropriate documents to facilitate better environmental decisionmaking (40 CFR 1500).

National Historic Preservation Act (1966), as amended—Established policy that the Federal Government is to

provide leadership in the preservation of the Nation's prehistoric and historical resources.

National Wildlife Refuge System Administration Act (1966)—Defined the National Wildlife Refuge System and authorized the Secretary of the Interior to permit any use of a refuge, provided such use is compatible with the major purposes for which the refuge was established.

National Wildlife Refuge System Improvement Act of 1997—Set the mission and administrative policy for all refuges in the National Wildlife Refuge System. Mandated comprehensive conservation planning for all units of the Refuge System (amendment to the National Wildlife Refuge System Administration Act).

National Wildlife Refuge System Volunteer and Community Partnership Enhancement Act of 1998—Encouraged the use of volunteers to help the Service in the management of refuges within the Refuge System. Facilitated partnerships between the Refuge System and non-Federal entities to promote public awareness of the resources of the Refuge System and public participation in the conservation of those resources. Encouraged donations and other contributions by persons and organizations to the Refuge System.

Native American Graves Protection and Repatriation Act (1990)—Required Federal agencies and museums to inventory, determine ownership of, and repatriate cultural items under their control or possession.

North American Wetlands Conservation Act (1989)—Provided for the conservation of North American wetland ecosystems, waterfowl and other migratory birds, fish, and wildlife that depend on such habitats.

Pittman–Robertson Act (1937)—Taxed the purchase of ammunition and firearms and earmarks the proceeds to be distributed to the States for wildlife restoration. Known as the Federal Aid in Wildlife Restoration Act or P–R Act.

Refuge Recreation Act (1962)—Allowed the use of refuges for recreation when such uses are compatible with the refuge's primary purposes and when sufficient money is available to manage the uses.

Refuge Revenue Sharing Act, Section 401 (1935)—Provided for payments to counties in lieu of taxes using revenues derived from the sale of products from refuges.

Refuge Trespass Act of June 28, 1906—Provided the first Federal protection for wildlife at national wildlife refuges. Made it unlawful to hunt, trap, capture, willfully disturb, or kill any bird or wild animal, or take or destroy the eggs of any such birds, on any lands of the United States set apart or reserved as refuges or breeding grounds for such birds or animals by any law, proclamation, or Executive order, except under rules and regulations of the Secretary. Protected Government property on such lands.

Rehabilitation Act (1973)—Required programmatic accessibility in addition to physical accessibility for all facilities and programs funded by the Federal Government to ensure that any person can participate in any program.

Transfer of Certain Real Property for Wildlife Conservation Purposes Act of 1948—Provided that, upon termination by the Administrator of the General Services Administration, real property no longer needed by a Federal agency can be transferred without reimbursement to the Secretary of the Interior if the land has particular value for migratory birds or to a State agency for other wildlife conservation purposes.

U.S. Department of the Interior Order No. 3226 (2001)—Directed bureaus and offices of the Department to analyze the potential effects on climate change when undertaking long-range planning, setting priorities for scientific research, and making major decisions about use of resources.

Volunteer and Community Partnership Enhancement Act (1998)—Encouraged the use of volunteers to help in the management of refuges within the Refuge System. Facilitated partnerships between the Refuge System and non-Federal entities to promote public awareness of the resources of the Refuge System and public participation in the conservation of the resources and encouraged donations and other contributions.

Wilderness Act of 1964—Directed the Secretary of the Interior, within 10 years, to review every roadless area of 5,000 or more acres and every roadless island (regardless of size) within the Refuge System and National Park Service for inclusion in the National Wilderness Preservation System.

Appendix F

List of Preparers, Consultation, and Coordination

This document is the result of extensive, collaborative, and enthusiastic efforts by the members of the planning team shown below.

<i>Team member</i>	<i>Position</i>	<i>Work unit</i>
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Many organizations, agencies, and individuals provided invaluable assistance with the preparation of this CCP. The Service acknowledges the efforts of the following individuals and groups toward the completion of the plan. The diversity, talent, and knowledge contributed dramatically improved the vision and completeness of this document.

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<i>Contributor</i>	<i>Position</i>	<i>Work unit</i>
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Appendix G

Species Lists

This appendix contains the common and scientific names of animals and plants that have been recorded on Lee Metcalf National Wildlife Refuge or the surrounding Bitterroot Valley. The animal and plant lists are from refuge wildlife surveys, annual narratives (USFWS 1988–93), and the 2009 Lee Metcalf Refuge Bioblitz. Species of concern were determined from global, Federal, and State of Montana listings (Montana Natural Heritage Program 2012). In the tables below, the asterisk (*) denotes a Montana Species of Concern, and the dagger (†) denotes a species that is on the Montana Noxious Weed List (September 2011) and high priority for treatment.

CLASS AMPHIBIA

<i>Common name</i>	<i>Scientific name</i>
Frogs	
American bullfrog	<i>Rana catesbeiana</i>
Columbia spotted frog	<i>Rana luteiventris</i>
Toads and Salamanders	
Boreal toad*	<i>Bufo boreas*</i>
Long-toed salamander	<i>Ambystoma macrodactylum</i>

CLASS REPTILIA

<i>Common name</i>	<i>Scientific name</i>
Snakes	
Common garter snake	<i>Thamnophis sirtalis</i>
Terrestrial garter snake	<i>Thamnophis elegans</i>
Rubber boa	<i>Charina bottae</i>
Eastern racer	<i>Coluber constrictor</i>
Western rattlesnake	<i>Crotalus viridis</i>
Gopher snake	<i>Pituophis catenifer</i>
Turtles	
Painted turtle	<i>Chrysemys picta</i>

CLASS AVES

<i>Common name</i>	<i>Scientific name</i>
Swans, Geese, and Ducks	
Snow goose	<i>Chen caerulescens</i>
Ross's goose	<i>Chen rossii</i>
Greater white-fronted goose	<i>Anser albifrons</i>
Canada goose	<i>Branta canadensis</i>
Trumpeter swan*	<i>Cygnus buccinator*</i>
Tundra swan	<i>Cygnus columbianus</i>
Wood duck	<i>Aix sponsa</i>
Gadwall	<i>Anas strepera</i>
American wigeon	<i>Anas americana</i>

<i>Common name</i>	<i>Scientific name</i>
Eurasian wigeon	<i>Anas penelope</i>
Mallard	<i>Anas platyrhynchos</i>
Blue-winged teal	<i>Anas discors</i>
Cinnamon teal	<i>Anas cyanoptera</i>
Northern shoveler	<i>Anas clypeata</i>
Northern pintail	<i>Anas acuta</i>
Green-winged teal	<i>Anas crecca</i>
Canvasback	<i>Aythya valisineria</i>
Redhead	<i>Aythya Americana</i>
Ring-necked duck	<i>Aythya collaris</i>
Lesser scaup	<i>Aythya affinis</i>
Greater scaup	<i>Aythya marila</i>
Bufflehead	<i>Bucephala albeola</i>
Common goldeneye	<i>Bucephala clangula</i>
Barrow's goldeneye	<i>Bucephala islandica</i>
Hooded merganser	<i>Lophodytes cucullatus</i>
Common merganser	<i>Mergus merganser</i>
Red-breasted merganser	<i>Mergus serrator</i>
Ruddy duck	<i>Oxyura jamaicensis</i>
White-winged scoter	<i>Melanitta fusca</i>
Long-tailed duck	<i>Clangula hyemalis</i>
Surf scoter	<i>Melanitta perspicillata</i>
Black scoter	<i>Melanitta nigra</i>
Upland Gamebirds	
Ring-necked pheasant	<i>Phasianus colchicus</i>
Gray partridge	<i>Perdix perdix</i>
Ruffed grouse	<i>Bonasa umbellus</i>
Wild turkey	<i>Meleagris gallopavo</i>
California quail	<i>Callipepla californica</i>
Loons	
Common loon*	<i>Gavia immer*</i>
Grebes	
Pied-billed grebe	<i>Podilymbus podiceps</i>
Horned grebe*	<i>Podiceps auritus*</i>
Red-necked grebe	<i>Podiceps grisegena</i>
Eared grebe	<i>Podiceps nigricollis</i>
Western grebe	<i>Aechmophorus occidentalis</i>
Clark's grebe*	<i>Aechmophorus clarkii*</i>
Pelicans	
American white pelican*	<i>Pelecanus erythrocephalus*</i>
Cormorants	
Double-crested cormorant	<i>Phalacrocorax auritus</i>
Hérons	
American bittern*	<i>Botaurus lentiginosus*</i>
Great blue heron*	<i>Ardea herodias*</i>

<i>Common name</i>	<i>Scientific name</i>
Great egret	<i>Ardea alba</i>
Snowy egret	<i>Egretta caerulea</i>
Black-crowned night-heron*	<i>Nycticorax nycticorax</i> *
Cattle egret	<i>Bubulcus ibis</i>
Ibis	
White-faced ibis*	<i>Plegadis chihi</i> *
Vultures	
Turkey vulture	<i>Cathartes aura</i>
Hawks and Eagles	
Osprey	<i>Pandion haliaetus</i>
Bald eagle*	<i>Haliaeetus leucocephalus</i> *
Northern harrier	<i>Circus cyaneus</i>
Sharp-shinned hawk	<i>Accipiter striatus</i>
Cooper's hawk	<i>Accipiter cooperii</i>
Northern goshawk*	<i>Accipiter gentilis</i> *
Swainson's hawk	<i>Buteo swainsoni</i>
Red-tailed hawk	<i>Buteo jamaicensis</i>
Ferruginous hawk*	<i>Buteo regalis</i> *
Rough-legged hawk	<i>Buteo lagopus</i>
Golden eagle*	<i>Aquila chrysaetos</i> *
White-tailed kite	<i>Elanus leucurus</i>
Falcons	
American kestrel	<i>Falco sparverius</i>
Merlin	<i>Falco columbarius</i>
Peregrine falcon*	<i>Falco peregrinus</i> *
Prairie falcon	<i>Falco mexicanus</i>
Gyr Falcon	<i>Falco rusticolus</i>
Rails	
Virginia rail	<i>Rallus limicola</i>
Sora	<i>Porzana carolina</i>
American coot	<i>Fulica americana</i>
Cranes	
Sandhill crane	<i>Grus canadensis</i>
Plovers	
Killdeer	<i>Charadrius vociferous</i>
Semipalmated plover	<i>Charadrius semipalmatus</i>
American golden plover	<i>Pluvialis dominica</i>
Black-bellied plover	<i>Pluvialis squatarola</i>
Avocets	
American avocet	<i>Recurvirostra americana</i>
Black-necked stilt*	<i>Himantopus mexicanus</i> *
Sandpipers	
Greater yellowlegs	<i>Tringa melanoleuca</i>
Lesser yellowlegs	<i>Tringa flavipes</i>
Solitary sandpiper	<i>Tringa solitaria</i>

<i>Common name</i>	<i>Scientific name</i>
Willet	<i>Catoptrophorus semipalmatus</i>
Spotted sandpiper	<i>Actitis macularia</i>
Whimbrel	<i>Numenius phaeopus</i>
Long-billed curlew*	<i>Numenius americanus*</i>
Marbled godwit	<i>Limosa fedoa</i>
Long-billed dowitcher	<i>Limnodromus scolopaceus</i>
Short-billed dowitcher	<i>Limnodromus griseus</i>
Wilson's snipe	<i>Gallinago delicata</i>
Ruddy turnstone	<i>Arenaria interpres</i>
Wilson's phalarope	<i>Phalaropus tricolor</i>
Red-necked phalarope	<i>Phalaropus lobatus</i>
Sandpipers	
Stilt sandpiper	<i>Calidris himantopus</i>
Sanderling	<i>Calidris alba</i>
Semipalmated sandpiper	<i>Calidris pusilla</i>
Western sandpiper	<i>Calidris mauri</i>
Least sandpiper	<i>Calidris minutilla</i>
White-rumped sandpiper	<i>Calidris fuscicollis</i>
Pectoral sandpiper	<i>Calidris melanotos</i>
Dunlin	<i>Calidris alpina</i>
Baird's sandpiper	<i>Calidris bairdii</i>
Gulls and Terns	
Ring-billed gull	<i>Larus delawarensis</i>
Franklin's gull*	<i>Larus pipixcan*</i>
California gull	<i>Larus californicus</i>
Bonaparte's gull	<i>Larus philadelphia</i>
Forster's tern*	<i>Sterna forsteri*</i>
Black tern*	<i>Sterna niger*</i>
Caspian tern*	<i>Sterna caspia*</i>
Common tern*	<i>Sterna hirundo*</i>
Herring gull	<i>Larus argentatus</i>
Least tern*	<i>Sternula antillarum*</i>
Pigeons and Doves	
Mourning dove	<i>Zenaida macroura</i>
Rock dove	<i>Columbia livia</i>
Eurasian collared-dove	<i>Streptopelia decaocto</i>
Cuckoos	
Black-billed cuckoo*	<i>Coccyzus erythrophthalmus*</i>
Yellow-billed cuckoo*	<i>Coccyzus americanus*</i>
Owls	
Great horned owl	<i>Bubo virginianus</i>
Burrowing owl*	<i>Athene cunicularia*</i>
Long-eared owl	<i>Asio otus</i>
Short-eared owl	<i>Asio flammeus</i>
Northern saw-whet owl	<i>Aegolius acadicus</i>

<i>Common name</i>	<i>Scientific name</i>
Northern pygmy-owl	<i>Glaucidium gnoma</i>
Western screech-owl	<i>Megascops kennicottii</i>
Great gray owl*	<i>Strix nebulosa</i> *
Flammulated owl*	<i>Otus flammeolus</i> *
Snowy owl	<i>Bubo scandiacus</i>
Nighthawks	
Common nighthawk	<i>Chordeiles minor</i>
Swifts	
White-throated swift	<i>Aeronautes saxatalis</i>
Vaux's swift	<i>Chaetura vauxi</i>
Black swift*	<i>Cypseloides niger</i> *
Hummingbirds	
Rufous hummingbird	<i>Selasphorus rufus</i>
Calliope hummingbird	<i>Stellula calliope</i>
Black-chinned hummingbird	<i>Archilochus alexandri</i>
Kingfishers	
Belted kingfisher	<i>Ceryle alcyon</i>
Woodpeckers	
Lewis's woodpecker*	<i>Melanerpes lewis</i> *
Downy woodpecker	<i>Picoides pubescens</i>
Hairy woodpecker	<i>Picoides villosus</i>
Pileated woodpecker*	<i>Dryocopus pileatus</i> *
Northern flicker	<i>Colaptes auratus</i>
Red-naped sapsucker	<i>Sphyrapicus nuchalis</i>
Flycatchers	
Western kingbird	<i>Tyrannus verticalis</i>
Eastern kingbird	<i>Tyrannus forficatus</i>
Say's phoebe	<i>Saynoris saya</i>
Willow flycatcher	<i>Empidonax traillii</i>
Dusky flycatcher	<i>Empidonax oberholseri</i>
Hammond's flycatcher	<i>Empidonax hammondi</i>
Cordilleran flycatcher	<i>Empidonax occidentalis</i>
Least flycatcher	<i>Empidonax minimus</i>
Olive-sided flycatcher	<i>Contopus cooperi</i>
Western wood-pewee	<i>Contopus sordidulus</i>
Shrikes	
Loggerhead shrike*	<i>Lanius ludovicianus</i> *
Northern shrike	<i>Lanius excubitor</i>
Vireos	
Warbling vireo	<i>Vireo gilvus</i>
Cassin's vireo	<i>Vireo cassinii</i>
Plumbeous vireo	<i>Vireo plumbeus</i>
Red-eyed vireo	<i>Vireo olivaceus</i>
Jays, Crows, and Magpies	
Steller's jay	<i>Cyanocitta stelleri</i>

<i>Common name</i>	<i>Scientific name</i>
Clark's nutcracker*	<i>Nucifraga columbiana*</i>
Black-billed magpie	<i>Pica hudsonia</i>
American crow	<i>Corvus brachyrhynchos</i>
Pinyon jay*	<i>Gymnorhinus cyanocephalus*</i>
Common raven	<i>Corvus corax</i>
Larks	
Horned lark	<i>Eremophila alpestris</i>
Swallows	
Tree swallow	<i>Tachycineta bicolor</i>
Violet-green swallow	<i>Tachycineta thalassina</i>
Northern rough-winged swallow	<i>Stelgidopteryx serripennis</i>
Bank swallow	<i>Riparia riparia</i>
Cliff swallow	<i>Petrochelidon pyrrhonota</i>
Barn swallow	<i>Hirundo rustica</i>
Chickadees	
Black-capped chickadee	<i>Parus atricapillus</i>
Mountain chickadee	<i>Parus gambeli</i>
Nuthatches	
Red-breasted nuthatch	<i>Sitta canadensis</i>
White-breasted nuthatch	<i>Sitta carolinensis</i>
Pygmy nuthatch	<i>Sitta pygmaea</i>
Creepers	
Brown creeper*	<i>Certhia americana*</i>
Wrens	
House wren	<i>Troglodytes aedon</i>
Winter wren	<i>Troglodytes troglodytes</i>
Marsh wren	<i>Cistothorus palustris</i>
Dipper	
American dipper	<i>Cinclus mexicanus</i>
Kinglets	
Golden-crowned kinglet	<i>Regulus satrapa</i>
Ruby-crowned kinglet	<i>Regulus calendula</i>
Thrushes	
American robin	<i>Turdus migratorius</i>
Townsend's solitaire	<i>Myadestes townsendi</i>
Swainson's thrush	<i>Catharus ustulatus</i>
Hermit thrush	<i>Catharus guttatus</i>
Veery*	<i>Catharus fuscescens*</i>
Mountain bluebird	<i>Sialia currucoides</i>
Western bluebird	<i>Sialia mexicana</i>
Varied thrush*	<i>Ixoreus naevius*</i>
Thrashers, Mockingbirds, and Catbirds	
Gray catbird	<i>Dumetella carolinensis</i>
Sage thrasher*	<i>Oreoscoptes montanus*</i>
Starlings	
European starling	<i>Sturnus vulgaris</i>

<i>Common name</i>	<i>Scientific name</i>
Pipits	
American pipit	<i>Anthus rubescens</i>
Waxwings	
Bohemian waxwing	<i>Bombycilla garrulous</i>
Cedar waxwing	<i>Bombycilla cedrorum</i>
Warblers	
Nashville warbler	<i>Vermivora ruficapilla</i>
Orange-crowned warbler	<i>Vermivora celata</i>
Yellow warbler	<i>Dendroica petechia</i>
Yellow-rumped warbler	<i>Dendroica coronata</i>
Townsend's warbler	<i>Dendroica townsendi</i>
Northern waterthrush	<i>Seiurus noveboracensis</i>
Common yellowthroat	<i>Geothlypis trichas</i>
MacGillivray's warbler	<i>Oporornis tolmiei</i>
Wilson's warbler	<i>Wilsonia pusilla</i>
Black-and-white warbler	<i>Mniotilta varia</i>
American redstart	<i>Setophaga ruticilla</i>
Yellow-breasted chat	<i>Icteria virens</i>
Blackpoll warbler	<i>Dendroica striata</i>
Sparrows	
American tree sparrow	<i>Spizella arborea</i>
Clay-colored sparrow	<i>Spizella pallida</i>
Chipping sparrow	<i>Spizella passerina</i>
White-crowned sparrow	<i>Zonotrichia leucophrys</i>
Spotted towhee	<i>Pipilo maculatus</i>
Harris' sparrow	<i>Zonotrichia querula</i>
Song sparrow	<i>Melospiza melodia</i>
Lincoln sparrow	<i>Melospiza lincolnii</i>
Vesper sparrow	<i>Poocetes gramineus</i>
Fox sparrow	<i>Passerella iliaca</i>
Savannah sparrow	<i>Passerculus sandwichensis</i>
Le Conte's sparrow*	<i>Ammodramus leconteii*</i>
Swamp sparrow	<i>Melospiza georgiana</i>
Dark-eyed junco	<i>Junco hyemalis</i>
House sparrow	<i>Passer domesticus</i>
Snow bunting	<i>Plectrophenax nivalis</i>
Tanagers, Cardinals, and Buntings	
Western tanager	<i>Piranga ludoviciana</i>
Black-headed grosbeak	<i>Pheucticus melanocephalus</i>
Lazuli bunting	<i>Passerina amoena</i>
Blackbirds	
Bobolink*	<i>Dolichonyx oryzivorus*</i>
Western meadowlark	<i>Sturnella neglecta</i>
Yellow-headed blackbird	<i>Xanthocephalus xanthocephalus</i>
Red-winged blackbird	<i>Agelaius phoeniceus</i>
Brewer's blackbird	<i>Euphagus cyanocephalus</i>

<i>Common name</i>	<i>Scientific name</i>
Brown-headed cowbird	<i>Molothrus ater</i>
Bullock's oriole	<i>Icterus bullockii</i>
Common grackle	<i>Quiscalus quiscula</i>
Rusty blackbird	<i>Euphagus carolinus</i>
Finches	
House finch	<i>Carpodacus mexicanus</i>
Pine grosbeak	<i>Pinicola enucleator</i>
Evening grosbeak*	<i>Coccothraustes vespertinus*</i>
Common redpoll	<i>Carduelis flammea</i>
Pine siskin	<i>Carduelis pinus</i>
American goldfinch	<i>Carduelis tristis</i>
Red crossbill	<i>Loxia curvirostra</i>

CLASS MAMMALIA

<i>Common name</i>	<i>Scientific name</i>
Shrews	
Vagrant shrew	<i>Sorex vagrans</i>
Common (masked) shrew	<i>Sorex cinereus</i>
Yellow-pine chipmunk	<i>Tamias amoenus</i>
Bats	
California myotis	<i>Myotis californicus</i>
Western small-footed myotis	<i>Myotis ciliolabrum</i>
Western long-eared myotis	<i>Myotis evotis</i>
Little brown bat	<i>Myotis lucifugus</i>
Fringed myotis*	<i>Myotis thysanodes*</i>
Long-legged myotis	<i>Myotis volans</i>
Yuma myotis	<i>Myotis ymanensis</i>
Townsend's big-eared bat*	<i>Corynorhinus townsendii*</i>
Hoary bat*	<i>Lasiurus cinereus*</i>
Big brown bat	<i>Eptesicus fuscus</i>
Silver-haired bat	<i>Lasionycteris noctivagans</i>
Beavers	
American beaver	<i>Castor canadensis</i>
Porcupines	
Common porcupine	<i>Erethizon dorsatum</i>
Pocket Gophers	
Northern pocket gopher	<i>Thomomys talpoides</i>
Mice, Voles, and Rats	
Deer mouse	<i>Peromyscus maniculatus</i>
Meadow vole	<i>Microtus pennsylvanicus</i>
Bushy-tailed woodrat	<i>Neotoma cinerea</i>
Common muskrat	<i>Ondatra zibethicus</i>
Squirrels	
Red squirrel	<i>Tamiasciurus hudsonicus</i>
Columbian ground squirrel	<i>Spermophilus columbianus</i>

<i>Common name</i>	<i>Scientific name</i>
Northern flying squirrel	<i>Glaucomys sabrinus</i>
Eastern fox squirrel	<i>Sciurus niger</i>
Yellow-bellied marmot	<i>Marmota flaviventris</i>
Wolves, Coyotes, and Foxes	
Red fox	<i>Vulpes vulpes</i>
Coyote	<i>Canis latrans</i>
Gray wolf*	<i>Canis lupus*</i>
Cats	
Bobcat	<i>Lynx rufus</i>
Mountain lion	<i>Puma concolor</i>
Skunks	
Striped skunk	<i>Mephitis mephitis</i>
Weasels	
Short-tailed weasel	<i>Mustela erminea</i>
Northern river otter	<i>Lontra canadensis</i>
American badger	<i>Taxidea taxus</i>
Mink	<i>Mustela vison</i>
Raccoons	
Raccoon	<i>Procyon lotor</i>
Bears	
Black bear	<i>Ursus americanus</i>
Deer, Moose, and Elk	
White-tailed deer	<i>Odocoileus virginianus</i>
Moose	<i>Alces alces</i>
Mule deer	<i>Odocoileus hemionus</i>
Elk	<i>Cervus elaphus</i>

CLASS OSTEICHTHYES

<i>Common name</i>	<i>Scientific name</i>
Fish	
Largemouth bass	<i>Micropterus salmoides</i>
Pumpkinseed	<i>Lepomis gibbosus</i>
Yellow perch	<i>Perca flavescens</i>
Largescale sucker	<i>Catostomus macrocheilus</i>
Longnose sucker	<i>Catostomus catostomus</i>
Northern pikeminnow	<i>Ptychocheilus oregonensis</i>
Redside shiner	<i>Richardsonius balteatus</i>
Mountain whitefish	<i>Prosopium williamsoni</i>
Rainbow trout	<i>Oncorhynchus mykiss</i>
Brown trout	<i>Salmo trutta</i>
Brook trout	<i>Salvelinus fontinalis</i>
Bull trout*	<i>Salvelinus confluentus*</i>

CLASS PINOPSIDA

<i>Common name</i>	<i>Scientific name</i>
Pinaceae (Pine)	
Rocky Mountain juniper	<i>Juniperus scopulorum</i>
Lodgepole pine	<i>Pinus contorta</i>
Ponderosa pine	<i>Pinus ponderosa</i> v. <i>ponderosa</i>
Douglas fir	<i>Pseudotsuga menziesii</i> v. <i>glauca</i>

CLASS MAGNOLIOPSIDA

<i>Common name</i>	<i>Scientific name</i>
Aceraceae (Maple)	
Rocky mountain maple	<i>Acer glabrum</i>
Amaranthaceae Amaranth (Pigweed)	
Tumbleweed	<i>Amaranthus albus</i>
Prostrate pigweed	<i>Amaranthus graecizans</i>
Powell's amaranth	<i>Amaranthus powellii</i>
Redroot amaranth	<i>Amaranthus retroflexus</i>
Asclepiadaceae (Milkweed)	
Showy milkweed	<i>Asclepias speciosa</i>
Apocynaceae (Dogbane)	
Spreading dogbane	<i>Apocynum androsaemifolium</i>
Clasping leaved dogbane	<i>Apocynum sibiricum</i>
Balsaminaceae (Touch-Me-Not)	
Spurless jewelweed	<i>Impatiens ecalcarata</i>
Berberidaceae (Barberry)	
Oregon grape	<i>Berberis repens</i>
Betulaceae (Birch)	
Thin-leaved alder	<i>Alnus incana</i>
River birch	<i>Betula occidentalis</i>
Boraginaceae (Borage)	
Slender cryptantha	<i>Cryptantha affinis</i>
Houndstongue†	<i>Cynoglossum officinale</i> †
Blueweed†	<i>Echium vulgare</i> †
Western stickseed	<i>Lappula redowskii</i>
Corn gromwell	<i>Lithospermum arvense</i>
Wayside gromwell	<i>Lithospermum ruderale</i>
Field forget-me-not	<i>Myosotis arvensis</i>
Small flowered forget-me-not	<i>Myosotis laxa</i>
Blue forget-me-not	<i>Myosotis micrantha</i>
Common forget-me-not	<i>Myosotis scorpioides</i>
Early forget-me-not	<i>Myosotis verna</i>
Italian bugloss†	<i>Anchusa azurea</i> mill†
Scouler's popcorn-flower	<i>Plagiobothrys scouleri</i>
Cactaceae (Cactus)	
Brittle cholla	<i>Opuntia fragilis</i>

<i>Common name</i>	<i>Scientific name</i>
Callitriche (Water-Starwort)	
Northern water-starwort	<i>Callitriche hermaphroditica</i>
Water-starwort	<i>Callitriche heterophylla</i>
Pond water-starwort	<i>Campanula rotundifolia</i>
Campanulaceae (Harebell)	
Scotch harebell	<i>Campanula rotundifolia</i>
Caprifoliaceae (Honeysuckle)	
Blue elderberry	<i>Sambucus caerulea</i>
Common snowberry	<i>Symphoricarpos albus</i>
High-bush cranberry	<i>Viburnum opulus</i>
Caryophyllaceae (Pink)	
Blunt leaved sandwort	<i>Arenaria lateriflora</i>
Thyme-leaved sandwort	<i>Arenaria serpyllifolia</i>
Field chickweed	<i>Cerastium arvense</i>
Nodding chickweed	<i>Cerastium nutans</i>
Jagged chickweed	<i>Holosteum umbellatum</i>
White champion	<i>Lychnis alba</i>
Menzies' silene	<i>Silene menziesii</i>
Red sandspurry	<i>Spergularia rubra</i>
Long leaved starwort	<i>Stellaria longifolia</i>
Ceratophyllaceae (Hornwort)	
Common hornwort	<i>Ceratophyllum demersum</i>
Chenopodiaceae (Goosefoot)	
Fat hen	<i>Atriplex patula</i> v. <i>hastata</i>
Lambs quarter	<i>Chenopodium album</i>
Jerusalem oak	<i>Chenopodium botrys</i>
Maple leaved goosefoot	<i>Chenopodium hybridum</i>
Kochia/red belvedere†	<i>Kochia scoparia</i> †
Poverty weed	<i>Monolepis nuttalliana</i>
Russian thistle†	<i>Salsola kali</i> †
Compositae (Asteraceae) (Sunflower)	
Yarrow	<i>Achillea millefolium</i>
False dandelion	<i>Agoseris glauca</i>
Pearly everlasting	<i>Anaphalis margaritacea</i>
Nuttals pussy-toes	<i>Antennaria parviflora</i>
Rosy pussy-toes	<i>Antennaria microphylla</i>
Umber pussy-toes	<i>Antennaria umbrinella</i>
Common burdock	<i>Arctium minus</i>
Meadow arnica	<i>Arnica chamissonis</i>
Western absinthium †	<i>Artemisia absinthium</i> †
Biennial sagewort	<i>Artemisia biennis</i>
Northern sagewort	<i>Artemisia campestris</i> v. <i>scouleriana</i>
Tarragon	<i>Artemisia dracunculus</i>
Fringed sagewort	<i>Artemisia frigida</i>
Western mugwort	<i>Artemisia ludoviciana</i> v. <i>latiloba</i>

<i>Common name</i>	<i>Scientific name</i>
Prairie sage	<i>Artemisia ludoviciana</i> v. <i>ludoviciana</i>
Smooth aster	<i>Aster laevis</i>
Few-flowered aster	<i>Aster modestus</i>
White prairie aster	<i>Aster pansus</i>
Beggar-ticks	<i>Bidens cernua</i>
Musk thistle†	<i>Carduus nutans</i> †
Spotted knapweed†	<i>Centaurea maculosa</i> †
Oxeye daisy†	<i>Chrysanthemum leucanthemum</i> †
Hairy golden aster	<i>Chrysopsis villosa</i>
Rabbit-brush	<i>Chrysothamnus nauseosus</i>
Canada thistle†	<i>Cirsium arvense</i> †
Wavy leaved thistle	<i>Cirsium undulatum</i>
Bull thistle†	<i>Cirsium vulgare</i> †
Horseweed	<i>Conyza canadensis</i>
Cutleaf daisy	<i>Erigeron compositus</i>
Spreading fleabane	<i>Erigeron divergens</i>
Shaggy fleabane	<i>Erigeron pumilus</i>
Showy fleabane	<i>Erigeron speciosus</i>
Daisy fleabane	<i>Erigeron strigosus</i> v. <i>strigosus</i>
Field filago	<i>Filago arvensis</i>
Blanket flower	<i>Gaillardia aristata</i>
Lowland cudweed	<i>Gnaphalium palustre</i>
Gumweed	<i>Grindelia squarrosa</i>
Sunflower	<i>Helianthus annuus</i>
Nuttals sunflower	<i>Helianthus nuttallii</i>
Narrow-leaved hawkweed	<i>Hieracium umbellatum</i>
Poverty weed	<i>Iva xanthifolia</i>
Prickly lettuce	<i>Lactuca serriola</i>
Pineapple weed	<i>Matricaria matricarioides</i>
Nodding microseris	<i>Microseris nutans</i>
False-agroseris	<i>Microseris troximoides</i>
Woolly groundsel	<i>Senecio canus</i>
Groundsel	<i>Senecio indecorus</i>
Tall butterweed	<i>Senecio serra</i>
Canada goldenrod	<i>Solidago canadensis</i>
Late goldenrod	<i>Solidago gigantea</i>
Missouri goldenrod	<i>Solidago missouriensis</i>
Western goldenrod	<i>Solidago occidentalis</i>
Common sowthistle	<i>Sonchus oleraceus</i>
Marsh sowthistle	<i>Sonchus uliginosus</i>
Common tansy†	<i>Tanacetum vulgare</i> †
Smooth dandelion	<i>Taraxacum laevigatum</i>
Common dandelion	<i>Taraxacum officinale</i>
Goatsbeard/western salsify†	<i>Tragopogon dubius</i> †
Cocklebur	<i>Xanthium strumarium</i>

<i>Common name</i>	<i>Scientific name</i>
Convolvulaceae (Morning-Glory)	
Field bindweed†	<i>Convolvulus arvensis</i>
Cornaceae (Dogwood)	
Red-osier dogwood	<i>Cornus stolonifera</i>
Crassulaceae (Stonecrop)	
Lanceleaf stonecrop	<i>Sedum lanceolatum</i>
Cruciferae (Mustard)	
Pale alyssum	<i>Alyssum alyssoides</i>
Desert alyssum	<i>Alyssum desertorum</i>
Holboell's rockcress	<i>Arabis holboellii</i>
Nuttall's rockcress	<i>Arabis nuttallii</i>
Wintercress	<i>Barbarea orthoceras</i>
Hoary alyssum†	<i>Berteroa incana</i> †
Field mustard	<i>Brassica campestris</i>
Black mustard	<i>Brassica nigra</i>
Hairy false flax	<i>Camelina microcarpa</i>
Shepherd's purse	<i>Capsella bursa-pastoris</i>
Little western bittercress	<i>Cardamine oligosperma</i>
Pennsylvania bittercress	<i>Cardamine pennsylvanica</i>
Tansy mustard	<i>Descurainia sophia</i>
Woods draba	<i>Draba nemorosa</i>
Whitlow-grass	<i>Draba verna</i>
Wormseed mustard	<i>Erysimum cheiranthoides</i>
Dame's rocket	<i>Hesperis matronalis</i>
Field pepper grass	<i>Lepidium campestre</i>
Common pepper grass	<i>Lepidium densiflorum</i>
Clasping pepper grass	<i>Lepidium perfoliatum</i>
Western yellowcress	<i>Rorippa curvisiliqua</i>
Marsh yellowcress	<i>Rorippa islandica</i>
Watercress	<i>Rorippa nasturtiumaquaticum</i> v. <i>glabrata</i>
Jim hill mustard	<i>Sisymbrium altissimum</i>
Tumble mustard	<i>Sisymbrium loeselii</i>
Fanweed	<i>Thlaspi arvense</i>
Dipsacaceae (Teasel)	
Teasel†	<i>Dipsacus sylvestris</i> †
Euphorbiaceae (Spurge)	
Leafy spurge†	<i>Euphorbia esula</i> †
Corrugate-seeded spurge	<i>Euphorbia glyptosperma</i>
Thyme-leaf spurge	<i>Euphorbia serpyllifolia</i>
Ericaceae (Heath)	
White pyrola	<i>Pyrola elliptica</i>
Pinedrops	<i>Pterospora andromeda</i>
Geraniaceae (Geranium)	
Cranes bill	<i>Erodium cicutarium</i>
Bicknell's geranium	<i>Geranium bicknellii</i>

<i>Common name</i>	<i>Scientific name</i>
Small field geranium	<i>Geranium pusillum</i>
Sticky geranium	<i>Geranium viscosissimum</i>
Grossulariaceae (Gooseberry)	
Common current	<i>Ribes sativum</i>
Missouri gooseberry	<i>Ribes setosum</i>
Haloragaceae (Water-Milfoil)	
Northern water milfoil	<i>Myriophyllum sibiricum</i>
Hippuridaceae (Mares-Tail)	
Mares-tail	<i>Hippuris vulgaris</i>
Hydrophyllaceae (Waterleaf)	
Sand phacelia	<i>Phacelia linearis</i>
Hypericaceae (St. Johnswort)	
Western St. Johnswort	<i>Hypericum formosum</i> v. <i>scouleri</i>
Canada St. Johnswort	<i>Hypericum majus</i>
Goatweed/St. Johnswort†	<i>Hypericum perforatum</i> †
Labiatae (Mint)	
Hemp nettle	<i>Galeopsis tetrahit</i>
Water horehound	<i>Lycopus americanus</i>
Rough bugleweed	<i>Lycopus asper</i>
Northern bugleweed	<i>Lycopus uniflorus</i>
Field mint	<i>Mentha arvensis</i>
Wild bergamot	<i>Monarda fistulosa</i>
Catnip	<i>Nepeta cataria</i>
Purple dragonhead	<i>Physostegia parviflora</i>
Self-heal	<i>Prunella vulgaris</i>
Marsh skullcap	<i>Scutellaria galericulata</i>
Hedge nettle	<i>Stachys palustris</i> v. <i>pilosa</i>
Leguminosae (Pea)	
Canada milkvetch	<i>Astragalus canadensis</i> v. <i>mortonii</i>
Weedy milkvetch	<i>Astragalus miser</i>
Wild licorice	<i>Glycyrrhiza lepidota</i>
Velvet lupine	<i>Lupinus leucophyllus</i>
Washington lupine	<i>Lupinus polyphyllus</i>
Blue-bonnet	<i>Lupinus sericeus</i>
Black medic	<i>Medicago lupulina</i>
Alfalfa	<i>Medicago sativa</i>
White sweet-clover	<i>Melilotus alba</i>
Yellow sweet-clover	<i>Melilotus officinalis</i>
Alsike clover	<i>Trifolium hybridum</i>
Wooly clover	<i>Trifolium microcephalum</i>
Red clover	<i>Trifolium pratense</i>
White clover	<i>Trifolium repens</i>
White-tip clover	<i>Trifolium variegatum</i>
American vetch	<i>Vicia americana</i>
Common vetch	<i>Vicia sativa</i>
Slender vetch	<i>Vicia tetrasperma</i>

<i>Common name</i>	<i>Scientific name</i>
Hairy vetch	<i>Vicia villosa</i>
Lentibulariaceae (Bladderwort)	
Little bladderwort	<i>Utricularia minor</i>
Common bladderwort	<i>Utricularia vulgaris</i>
Loranthaceae (Mistletoe)	
Dwarf mistletoe	<i>Arceuthobium</i> sp.
Malvaceae (Mallow)	
Common mallow	<i>Malva neglecta</i>
Cheese weed	<i>Malva parviflora</i>
Moraceae (Mulberry)	
Hops	<i>Humulus lupulus</i>
Nymphaeaceae (Water Lily)	
Indian pond lily	<i>Nuphar polysepalum</i>
Onagraceae (Evening Primrose)	
Enchanter's nightshade	<i>Circaea alpina</i>
Fireweed	<i>Epilobium angustifolium</i>
Swamp willow-herb	<i>Epilobium palustre</i>
Annual willow-herb	<i>Epilobium paniculatum</i>
Shrubby willow-herb	<i>Epilobium suffruticosum</i>
Watson's willow-herb	<i>Epilobium watsonii</i>
Yellow evening primrose	<i>Oenothera strigosa</i>
Oxalidaceae (Wood-Sorrel)	
Yellow wood-sorrel	<i>Oxalis corniculata</i>
Plantaginaceae (Plantain)	
Ribgrass	<i>Plantago lanceolata</i>
Common plantain	<i>Plantago major</i> v. <i>major</i>
Indian wheat	<i>Plantago patagonica</i>
Polemoniaceae (Phlox)	
Narrow-leaved collomia	<i>Collomia linearis</i>
Scarlet gillia	<i>Gilia aggregata</i>
Pink microsteris	<i>Microsteris gracilis</i>
Annual polemonium	<i>Polemonium micranthum</i>
Jacob's ladder	<i>Polemonium pulcherrimum</i> v. <i>calycinum</i>
Polygonaceae (Buckwheat)	
Umbrella plant	<i>Erigonum umbellatum</i> v. <i>subalpinum</i>
Knotweed	<i>Polygonum achoreum</i>
Water smartweed	<i>Polygonum amphibium</i>
Dooryard knotweed	<i>Polygonum aviculare</i>
Water smartweed	<i>Polygonum coccineum</i>
Ivy bindweed	<i>Polygonum convolvulus</i>
Douglas' knotweed	<i>Polygonum douglasii</i> v. <i>douglasii</i>
Marshpepper	<i>Polygonum hydropiper</i>
Smartweed	<i>Polygonum hydropiperoides</i>
Willow weed	<i>Polygonum lapathifolium</i>
Spotted ladysthumb	<i>Polygonum persicaria</i>
Dotted smartweed	<i>Polygonum punctatum</i>

Common name	Scientific name
Red sorrel	<i>Rumex acetosella</i>
Curly dock	<i>Rumex crispus</i>
Seaside dock	<i>Rumex maritimus</i>
Western dock	<i>Rumex occidentalis</i>
Willow dock	<i>Rumex salicifolius</i>
Portulacaceae (Purslane)	
Narrow-leaved miners lettuce	<i>Montia linearis</i>
Miner's lettuce	<i>Montia perfoliata</i>
Purslane	<i>Portulaca oleracea</i>
Bitterroot	<i>Lewisia rediviva</i>
Primulaceae (Primrose)	
Fairy candelabra	<i>Androsace occidentalis</i>
Woodland shooting star	<i>Dodecatheon pulchellum</i>
Fringed loosestrife	<i>Lysimachia ciliata</i>
Tufted loosestrife	<i>Lysimachia thrysiflora</i>
Ranunculaceae (Buttercup)	
Western clematis	<i>Clematis ligusticifolia</i>
Sedge mousetail	<i>Myosurus aristatus</i>
Kidney-leaved buttercup	<i>Ranunculus abortivus</i>
Tall buttercup†	<i>Ranunculus acris</i> †
Water buttercup	<i>Ranunculus aquatilis</i> v. <i>capillaceus</i>
Shore buttercup	<i>Ranunculus cymbalaria</i>
Yellow water buttercup	<i>Ranunculus flabellaris</i>
Creeping buttercup	<i>Ranunculus flammula</i>
Sagebrush buttercup	<i>Ranunculus glaberrimus</i> v. <i>glaberrimus</i>
Gmelins buttercup	<i>Ranunculus gmelinii</i> v. <i>limosus</i>
Long-beaked water-buttercup	<i>Ranunculus longirostris</i>
Macouns buttercup	<i>Ranunculus macounii</i>
Bristly buttercup	<i>Ranunculus pensylvanicus</i>
Creeping buttercup	<i>Ranunculus repens</i>
Celery-leaved buttercup	<i>Ranunculus sceleratus</i>
Stiff-leaf water buttercup	<i>Ranunculus subrigidus</i>
Little buttercup	<i>Ranunculus uncinatus</i> v. <i>uncinatus</i>
Tall meadowrue	<i>Thalictrum dasycarpum</i>
Western meadowrue	<i>Thalictrum occidentale</i>
Few-flowered meadowrue	<i>Thalictrum sparsiflorum</i>
Rosaceae (Rose)	
Serviceberry	<i>Amelanchier alnifolia</i>
River hawthorn	<i>Crataegus douglasii</i>
Woods strawberry	<i>Fragaria vesca</i>
Blueleaf strawberry	<i>Fragaria virginiana</i>
Large-leaved avens	<i>Geum macrophyllum</i>
Water avens	<i>Geum rivale</i>
Prairie smoke	<i>Geum triflorum</i>
Silverweed	<i>Potentilla anserina</i>

<i>Common name</i>	<i>Scientific name</i>
Silvery cinquefoil	<i>Potentilla argentia</i>
Biennial cinquefoil	<i>Potentilla biennis</i>
Sticky cinquefoil	<i>Potentilla glandulosa</i>
Elmer's cinquefoil	<i>Potentilla gracilis</i> v. <i>elmeri</i>
Marsh cinquefoil	<i>Potentilla palustris</i>
Sulfur cinquefoil†	<i>Potentilla recta</i> †
Bitter cherry	<i>Prunus emarginata</i>
Chokecherry	<i>Prunus virginiana</i> v. <i>melanocarpa</i>
Woods rose	<i>Rosa woodsii</i>
Red raspberry	<i>Rubus idaeus</i>
Rubiaceae (Madder)	
Cleavers	<i>Galium aparine</i>
Thinleaf bedstraw	<i>Galium bifolium</i>
Northern bedstraw	<i>Galium boreale</i>
Small cleavers	<i>Galium trifidum</i>
Salicaceae (Willow)	
Lombardy poplar	<i>Populus nigra</i> v. <i>italica</i>
Quaking aspen	<i>Populus tremuloides</i>
Black cottonwood	<i>Populus trichocarpa</i>
Peach-leaf willow	<i>Salix amygdaloides</i>
Bebb willow	<i>Salix bebbiana</i>
Sandbar willow	<i>Salix exigua</i>
Geyer willow	<i>Salix geyeriana</i>
Whiplash willow	<i>Salix lasiandra</i>
Mackenzie willow	<i>Salix rigida</i>
Saxifragaceae (Saxifrage)	
Smooth fringe-cup	<i>Lithophragma glabra</i>
Small-flowered fringe-cup	<i>Lithophragma parviflora</i>
Scrophulariaceae (Figwort)	
Blue-eyed mary	<i>Collinsia parviflora</i>
Common hedge-hyssop	<i>Gratiola neglecta</i>
Dalmatian toadflax†	<i>Linaria dalmatica</i> †
Yellow toadflax†	<i>Linaria vulgaris</i> †
Monkey flower	<i>Mimulus guttatus</i> v. <i>guttatus</i>
Musk plant	<i>Mimulus moschatus</i>
Little penstemon	<i>Penstemon procerus</i>
Common mullein	<i>Verbascum thapsus</i>
American speedwell	<i>Veronica americana</i>
Water speedwell	<i>Veronica anagallis-aquatica</i>
Chain speedwell	<i>Veronica catenata</i>
Purslane speedwell	<i>Veronica peregrina</i>
Thyme-leaved speedwell	<i>Veronica serpyllifolia</i> v. <i>serpyllifolia</i>
Vernal speedwell	<i>Veronica verna</i>
Solanaceae (Nightshade)	
Henbane†	<i>Hyoscyamus niger</i> †

<i>Common name</i>	<i>Scientific name</i>
Bittersweet nightshade	<i>Solanum dulcamara</i>
Cut-leaved nightshade	<i>Solanum triflorum</i>
Umbelliferae (Parsley)	
Water hemlock	<i>Cicuta douglasii</i>
Cow-parsnip	<i>Heracleum lanatum</i>
Mountain sweet-cicely	<i>Osmorhiza chilensis</i>
Wild parsnip	<i>Pastinaca sativa</i>
Black snakeroot	<i>Sanicula marilandica</i>
Water parsnip	<i>Sium suave</i>
Urticaceae (Nettle)	
Stinging nettle	<i>Urtica dioica</i> spp. <i>Gracilis</i>
Verbenaceae (Vervain)	
Blue vervain	<i>Verbena hastata</i>
Violaceae (Violet)	
Early blue violet	<i>Viola adunca</i> v. <i>bellidifolia</i>
Marsh violet	<i>Viola palustris</i>
Bog violet	<i>Viola nephrophylla</i>

CLASS LILIOPSIDA

<i>Common name</i>	<i>Scientific name</i>
Alismataceae (Water-Plantain)	
America water-plantain	<i>Alisma plantago-aquatica</i> v. <i>americanum</i>
Narrowleaf water-plantain	<i>Alisma gramineum</i> v. <i>angustissimum</i>
Arumleaf arrowhead	<i>Sagittaria cuneata</i>
Cyperaceae (Sedge)	
Awned sedge	<i>Carex atherodes</i>
Water sedge	<i>Carex aquatilis</i>
Clustered sedge	<i>Carex arcta</i>
Slenderbeaked sedge	<i>Carex anthrostachya</i>
Golden sedge	<i>Carex aurea</i>
Bebb's sedge	<i>Carex bebbii</i>
Lesser panicled sedge	<i>Carex diandra</i>
Douglas' sedge	<i>Carex douglassii</i>
Wooly sedge	<i>Carex languinosa</i>
Slender sedge	<i>Carex lasiocarpa</i>
Kellog's sedge	<i>Carex lenticularis</i>
Nebraska sedge	<i>Carex nebrascensis</i>
Retrose sedge	<i>Carex retrosa</i>
Sawbeaked sedge	<i>Carex stipata</i>
Beaked sedge	<i>Carex utriculata</i> (c. <i>Rostrata</i>)
Inflated sedge	<i>Carex vesicaria</i>
Fox sedge	<i>Carex vulpinoidea</i>
Awned flatsedge	<i>Cyperus aristatus</i>
Shining flatsedge*	<i>Cyperus rivularis</i> *
Needle spike-rush	<i>Eleocharis acicularis</i>

<i>Common name</i>	<i>Scientific name</i>
Delicate spike-rush	<i>Eleocharis bella</i>
Common spike-rush	<i>Eleocharis palustris</i>
Hardstem bulrush	<i>Scirpus acutus</i>
Small-fruited bulrush	<i>Scirpus microcarpus</i>
Softstem bulrush	<i>Scirpus validus</i>
Poaceae (Gramineae) (Grass)	
Goat grass	<i>Aegilops cylindrica</i>
Bearded wheatgrass	<i>Agropyron canium</i> v. <i>andinum</i>
Crested wheatgrass	<i>Agropyron cristatum</i>
Thin spiked wheatgrass	<i>Agropyron dasystachyum</i>
Intermediate wheatgrass	<i>Agropyron intermedium</i>
Quack grass	<i>Agropyron repens</i>
Western wheatgrass	<i>Agropyron smithii</i>
Bluebunch wheatgrass	<i>Agropyron spicatum</i>
Redtop	<i>Agropyron alba</i> v. <i>alba</i>
Tickle-grass	<i>Agropyron scabra</i>
Shortawn foxtail	<i>Alopecurus aequalis</i>
Meadow foxtail	<i>Alopecurus partensis</i>
Common oats	<i>Avena sativa</i>
Slough grass	<i>Beckmania syzigachne</i>
Smooth brome-grass	<i>Bromus inermis</i> spp. <i>inermis</i>
Soft brome-grass	<i>Bromus mossi</i>
Cheatgrass†	<i>Bromus tectorum</i> †
Bluejoint reedgrass	<i>Calamagrostis canadensis</i> v. <i>canadensis</i>
Slim reedgrass	<i>Calamagrostis neglecta</i>
Brook grass	<i>Catabrosa aquatica</i>
Woodreed	<i>Cina latifolia</i>
Orchard grass	<i>Dactylis glomerata</i>
Canada wildrye	<i>Elymus canadensis</i>
Great basin wildrye	<i>Elymus cinereus</i>
Stinkgrass	<i>Eragrostis cilienensis</i>
Tall fescue	<i>Festuca arundinacea</i>
Six weeks fescue	<i>Festuca octoflora</i>
Northern mannagrass	<i>Glyceria borealis</i>
Tall mannagrass	<i>Glyceria elata</i>
American mannagrass	<i>Glyceria grandis</i>
Fowl mannagrass	<i>Glyceria striata</i>
Foxtail barley	<i>Hordeum jubatum</i>
Junegrass	<i>Koeleria cristata</i>
Perennial ryegrass	<i>Lolium perenne</i>
Indian ricegrass	<i>Oryzopsis hymenoides</i>
Common witchgrass	<i>Panicum capillare</i>
Reed canarygrass	<i>Phalaris arundinacea</i>
Common timothy	<i>Phleum pratense</i>
Annual bluegrass	<i>Poa annua</i>

<i>Common name</i>	<i>Scientific name</i>
Viviparous bluegrass	<i>Poa bulbosa</i>
Canada bluegrass	<i>Poa compressa</i>
Fowl bluegrass	<i>Poa palustris</i>
Kentucky bluegrass	<i>Poa pratensis</i>
Sandbergs bluegrass	<i>Poa sandbergii</i>
Green bristlegrass	<i>Setaria viridis</i>
Sand dropseed	<i>Sporobolus cryptandrus</i>
Squirreltail	<i>Sitanion hystrix</i>
Needle and thread	<i>Stipa comata</i>
Green needlegrass	<i>Stipa viridula</i>
Hydrocharitaceae (Frog's Bit)	
Canada waterweed	<i>Elodea canadensis</i>
Nuttalls waterweed	<i>Elodea nuttallii</i>
Iridaceae (Iris)	
Yellow flag iris†	<i>Iris pseudacorus</i> †
Blue-eyed grass	<i>Sisyrinchium angustifolium</i>
Juncaceae (Rush)	
Wire grass	<i>Juncus balticus</i>
Toad rush	<i>Juncus bufonius</i>
Soft rush	<i>Juncus effusus</i>
Dagger-leaf rush	<i>Juncus ensifolius</i>
Tuberous rush	<i>Juncus nodosus</i>
Slender rush	<i>Juncus tenuis</i> v. <i>tenuis</i>
Torrey's rush	<i>Juncus torrei</i>
Smooth rush	<i>Luzula hitchcockii</i>
Lemnaceae (Duckweed)	
Water lentil	<i>Lemna minor</i>
Star duckweed	<i>Lemna trisulca</i>
Great duckweed	<i>Spirodela polyrhiza</i>
Watermeal	<i>Wolffia punctata</i>
Lilaceae (Lily)	
Nodding onion	<i>Allium cernuum</i>
Asparagus	<i>Asparagus officinalis</i>
Wild hyacinth	<i>Brodiaea douglasii</i>
Starry false solomon's seal	<i>Smilacina stellata</i>
Common death camas	<i>Zigadenus venenosus</i>
Najadaceae (Water-Nymph)	
Guadalupe water-nymph*	<i>Najas guadalupensis</i> *
Potamogetonaceae (Pondweed)	
Reddish pondweed	<i>Potamogeton alpinus</i>
Large-leaved pondweed	<i>Potamogeton amplifolius</i>
Berchtold's pondweed	<i>Potamogeton berchtoldii</i>
Ribbon-leaved pondweed	<i>Potamogeton epihydrus</i>
Slender-leaved pondweed	<i>Potamogeton filiformis</i>
Illinois pondweed	<i>Potamogeton illinoensis</i>

<i>Common name</i>	<i>Scientific name</i>
Floating-leaved pondweed	<i>Potamogeton natans</i>
Fennel-leaved pondweed	<i>Potamogeton pectinatus</i>
Small pondweed	<i>Potamogeton pusillus</i>
Richardsons pondweed	<i>Potamogeton richardsonii</i>
Eel-grass pondweed	<i>Potamogeton zosteriformis</i>
Sparganiaceae (Bur-Reed)	
Narrow-leaved bur-reed	<i>Sparganium angustifolium</i>
Simple stem bur-reed	<i>Sparganium emersum</i> v. <i>multipedunculatum</i>
Typhaceae (Cat-Tail)	
Common cattail	<i>Typha latifolia</i>
Zannichelliaceae (Horned Pondweed)	
Horned pondweed	<i>Zannichellia palustris</i>

CLASS FILICOPSIDA

<i>Common name</i>	<i>Scientific name</i>
Polypodiaceae (Common Fern)	
Brittle bladder-fern	<i>Cystopteris fragilis</i>
Marsileaceae (Pepperwort)	
Pepperwort	<i>Marsilea vestita</i>

CLASS EQUISETOPSIDA

<i>Common name</i>	<i>Scientific name</i>
Equisetaceae (Horsetail)	
Common horsetail	<i>Equisetum arvense</i>
Water horsetail	<i>Equisetum fluviatile</i>
Scouring rush	<i>Equisetum hyemale</i>
Smooth scouring rush	<i>Equisetum laevigatum</i>
Marsh horsetail	<i>Equisetum palustre</i>
Shady horsetail	<i>Equisetum pratense</i>

CLASS LYCOPODIOPSIDA

<i>Common name</i>	<i>Scientific name</i>
Selaginellaceae (Clubmoss)	
Compact clubmoss	<i>Selaginella densa</i> v. <i>densa</i>

CLASS MARCHANTIOSPIDA

<i>Common name</i>	<i>Scientific name</i>
Marchantiaceae	
—	<i>Marcantia polymorpha</i>
Ricciaceae	
—	<i>Riccio carpus natans</i>

CLASS CHLOROPHYCEAE

<i>Common name</i>	<i>Scientific name</i>
Characeae (Green Algae)	
—	<i>Nostoc</i> spp.
—	<i>Hydrodictyon reticulatum</i>
—	<i>Riccia fluitans</i>
—	<i>Nitella</i> spp.
—	<i>Chara</i> spp.
—	<i>Tolypella</i> spp.

CLASS INSECTA

<i>Common name</i>	<i>Scientific name</i>
Butterflies	
Two-tailed swallowtail	<i>Papilio multicaudata</i>
Western tiger swallowtail	<i>Papilio rutulus</i>
Pale swallowtail	<i>Papilio eurymedon</i>
Western white	<i>Pontia occidentalis</i>
Cabbage white	<i>Pieris rapae</i>
Beckers white	<i>Pontia beckerii</i>
Checkered white	<i>Pontia protodice</i>
Clouded sulphur	<i>Colias philodice</i>
Sara orangetip	<i>Anthocharis sara</i>
Orange sulfur	<i>Colias eurytheme</i>
Ediths copper	<i>Lycaena editha</i>
Purplish copper	<i>Lycaena helloides</i>
Bronze copper	<i>Lycaena hyllus</i>
Western pine elfin	<i>Callophrys eryphon</i>
Gray hairstreak	<i>Strymon melinus</i>
Melissa blue	<i>Lycaeides melissa</i>
Spring azure	<i>Celastrina ladon</i>
Arrowhead blue	<i>Glaucopsyche piasus</i>
Great spangled fritillary	<i>Speyeria cybele</i>
Silver-bordered fritillary	<i>Boloria selene</i>
Mormon fritillary	<i>Spreyeria mormonia</i>
Mylitta crescent	<i>Phyciodes mylitta</i>
Northern crescent	<i>Phyciodes cocyta</i>
Field crescent	<i>Phyciodes pratensis</i>
Ediths checkerspot	<i>Euphydryas editha</i>
Satyr anglewing	<i>Polytonia satyrus</i>
Oreas anglewing	<i>Polytonia oreas</i>
Zephyr anglewing	<i>Polytonia zephyrus</i>
Mourning cloak	<i>Nymphalis antiopa</i>
Milbert's tortoiseshell	<i>Nymphalis milberti</i>
California tortoiseshell	<i>Nymphalis californica</i>
Red admiral	<i>Vanessa atalanta</i>
West coast lady	<i>Vanessa annabella</i>

<i>Common name</i>	<i>Scientific name</i>
Painted lady	<i>Vanessa cardui</i>
Lorquins admiral	<i>Limenitis lorquini</i>
Viceroy	<i>Limenitis archippus</i>
Common wood nymph	<i>Cercyonis pegala</i>
Small wood nymph	<i>Cercyonis oetus</i>
Common alpine	<i>Eregia eipsoodea</i>
Common ringlet	<i>Coenonympha ampelos</i>
Pecks skipper	<i>Polites peckius</i>
Sandhill skipper	<i>Polites sabuleti</i>
Long dash	<i>Polites mystic</i>
Common branded skipper	<i>Hesperua comma</i>
Woodland skipper	<i>Ochlodes sylvanoides</i>
Arctic skipper	<i>Carterocephalus palaemon</i>
Garita skipperling	<i>Oarisma garita</i>
Roadside skipper	<i>Amblyscirtes vialis</i>
Common sootywing	<i>Pholisora catullus</i>
Common checkered skipper	<i>Pyrgus communis</i>
Dragonflies and Damselflies	
Spotted spreadwing	<i>Lestes congener</i>
Emerald spreadwing	<i>Lestes dryas</i>
Lyre-tipped spreadwing	<i>Lestes unguiculatus</i>
Northern spreadwing	<i>Lestes disjunctus</i>
Northern bluet	<i>Enallagma annexum</i>
Boreal bluet*	<i>Enallagma boreale*</i>
Marsh bluet	<i>Enallagma ebrium</i>
Pacific forktail	<i>Ischnura cervula</i>
Western forktail	<i>Ischnura perparva</i>
Western red damsel	<i>Amphiagrion abbreviatum</i>
Canada darner	<i>Aeshna canadensis</i>
Lance-tipped darner	<i>Aeshna constricta</i>
Paddle-tailed darner	<i>Aeshna palmata</i>
Shadow darner	<i>Aeshna umbrosa</i>
Common green darner	<i>Anax junius</i>
Variable darner	<i>Aeschna interrupta</i>
California darner	<i>Rhionaeschna californica</i>
Pale snaketail	<i>Ophiogomphus severus</i>
Sinuuous snaketail	<i>Ophiogomphus occidentis</i>
Common whitetail	<i>Plathemis lydia</i>
Four-spotted skimmer	<i>Libellula quadrimaculata</i>
Eight-spotted skimmer	<i>Libellula forensis</i>
Twelve-spotted skimmer	<i>Libellula pulchella</i>
Dot-tailed whiteface	<i>Leucorrhinia intacta</i>
Hudsonian whiteface	<i>Leucorrhinia hudsonica</i>
Variiegated meadowhawk	<i>Sympetrum corruptum</i>
White-faced meadowhawk	<i>Sympetrum obtrusum</i>
Cherry-faced meadowhawk	<i>Sympetrum internum</i>

<i>Common name</i>	<i>Scientific name</i>
Saffron-winged meadowhawk	<i>Sympetrum costiferum</i>
Band-winged meadowhawk	<i>Sympetrum semicinctum</i>
Striped meadowhawk	<i>Sympetrum pallipes</i>
Black meadowhawk	<i>Sympetrum vicinum</i>
Moths	
Isabella tiger moth	<i>Pyrrharcia isabella</i>
Carpenterworm moth	<i>Cossoidea</i> spp.
Big poplar sphinx	<i>Pachysphinx occidentalis</i>
Large yellow underwing	<i>Noctua pronuba</i>
One-eyed sphinx	<i>Smerinthus cerisyi</i>
Polyphemus moth	<i>Antheraea polyphemus</i>
Catocaline moth	<i>Catocala</i> spp.
Beetles	
Blister beetle	<i>Epicauta</i> spp.
Tiger beetle	<i>Cincidela oregona</i>
Leaf beetle	<i>Chrysomelidae latreille</i>
Rifle beetle	<i>Optioservus quadrimaculatus</i>
Beetle	<i>Troposternus latoralis</i>
Tumbling flower beetle	<i>Mordellidae latreille</i>
Carrion beetle	<i>Silphidae latreille</i>
Ground beetle	<i>Pterostichus</i> spp.
Leaf beetle	<i>Systema</i> spp.
Predaceous diving beetle	<i>Platambus</i> spp.
Weevil	<i>Larinus</i> spp.
Weevil	<i>Rhinocyllus conicus</i>
Flies	
Caddisfly	<i>Parapsyche almota</i>
Caddisfly	<i>Limnephelus</i> spp.
Caddisfly	<i>Hydropsyche californica</i>
Mayfly	<i>Baetis tricaudatus</i>
Mayfly	<i>Drunella coloradensis</i>
Mayfly	<i>Ephemerella excrucians</i>
Mayfly	<i>Siphonurus occidentalis</i>
Mayfly	<i>Callibaetis pictus</i>
Mayfly	<i>Rhithrogena robusta</i>
Mayfly	<i>Ameletus similior</i>
Mayfly	<i>Sweltsa</i> spp.
Mayfly	<i>Serratella tibialis</i>
Mayfly	<i>Drunella doddsi</i>
Stonefly	<i>Claassenia sabulosa</i>
Stonefly	<i>Hesperoperla pacifica</i>
Stonefly	<i>Kogotus modestus</i>
Stonefly	<i>Isoperla</i> spp.
Stonefly	<i>Pteronarcella</i>
Deerfly	<i>Chrysops</i> spp.

CLASS GASTROPODA

<i>Common name</i>	<i>Scientific name</i>
Snails and Slugs	
Forest disc	<i>Discus whitneyi</i>
Marsh pondsnail	<i>Stagnicola elodes</i>
Mountain marshsnail	<i>Stagnicola montanensis</i>
Coeur d'Alene Oregonian	<i>Cryptomastix mullani</i>
Brown hive	<i>Euconolus fulvus</i>
Garlic glass snail	<i>Oxychilus alliarus</i>
Two-ridge rams-horn snail	<i>Helisoma anceps</i>
Big-eared radix	<i>Radix auricularia</i>
Mimic lymnaea snail	<i>Pseudosuccinea columella</i>
Glossy pillar	<i>Cochlicopa lubrica</i>
Grey fieldslug	<i>Derocerus reticulatum</i>
Idaho forestsnail	<i>Allogona ptychophora</i>
Lovely vallonina	<i>Vallonia pulchella</i>
Meadow slug	<i>Derocerus laeve</i>
Quick gloss	<i>Zonitoides arboreus</i>
Dusky arion	<i>Arion subfuscus</i>

CLASS ARACHNIDA

<i>Common name</i>	<i>Scientific name</i>
Spiders	
Western black widow	<i>Latrodectus hesperus</i>

CLASS MALACOSTRACA

<i>Common name</i>	<i>Scientific name</i>
Scuds	
Scud	<i>Hyalella azteca</i>

* Species of concern

† Montana Noxious Weed List and high priority for treatment.

Appendix H

Fire Management Program

The U.S. Fish and Wildlife Service (Service) has administrative responsibility for fire management at the Lee Metcalf National Wildlife Refuge, which covers 2,800 acres. This appendix describes the fire management program that will be implemented on the refuge.

H.1 The Role of Fire

Vegetation in the Rocky Mountains evolved under periodic disturbance and defoliation from fire, drought, floods, large herbivores, insect outbreaks, and disease. These periodic disturbances kept the ecosystem diverse and healthy and maintained significant biodiversity for thousands of years.

Historically, wildland fire played an important role in many ecosystems by stimulating regeneration, cycling nutrients, providing a diversity of habitats for plants and wildlife, and decreasing the impacts of insects and diseases. When fire or grazing is excluded from a landscape, increased fuel loading occurs due to the buildup of thatch and dead or downed trees. Increased fuel loading intensifies a fire's resistance to control, increases the potential for large-scale severe wildfires, and threatens firefighter and public safety as well as Federal and private facilities. The return of fire in most ecosystems is essential for healthy vegetation for wildlife habitats in grasslands, wetlands, and forests.

When used properly, fire can accomplish the following:

- Reduce hazardous fuel buildup in both wildland–urban interface areas and non-wildland–urban interface areas.
- Improve wildlife habitats by reducing the density of vegetation, changing the plant species composition, or both.
- Sustain or increase biological diversity.
- Improve woodland and shrubland by reducing plant density.
- Reduce susceptibility of plants to insect and disease outbreaks.
- Increase the quantity of water available for municipalities and activities that depend on wildland water supplies.

H.2 Wildland Fire Management Policy and Guidance

Based on Federal interagency policy (Fire Executive Council 2009), wildland fire is defined as any non-structure fire that occurs in the wildland including wildfire and prescribed fire. Response to wildland fire is based on consideration of a full range of fire management actions—allowing the fire to benefit the resource where possible or taking suppression action when those benefits are not attainable or important resources or adjacent lands are likely threatened.

The 1995 Federal Wildland Fire Management Policy was updated in 2001. This revised policy directs Federal agencies to achieve a balance between suppressing fires to protect life, property, and resources and prescribing fires to regulate fuels and maintain healthy ecosystems. The following are the foundational principles for Federal Wildland Fire Management Policy and have been excerpted from “Review and Update of the 1995 Federal Wildland Fire Management Policy” (National Wildfire Coordinating Group 2001):

1. Firefighter and public safety is the first priority in every fire management activity.
2. The role of wildland fire as an essential ecological process and natural change agent will be incorporated into the planning process. Federal agency land and resource management plans set the objectives for the use and desired future condition of the various public lands.
3. Fire Management Plans (FMP), programs, and activities support land and resource management plans and their implementation.
4. Sound risk management is a foundation for all fire management activities. Risks and uncertainties relating to fire management activities must be understood, analyzed, communicated, and managed as they relate to the cost of either doing or not doing an activity. Net gains to the public benefit will be an important component of decisions.
5. Fire management programs and activities are economically viable, based upon values to be protected, costs, and land and resource management objectives. Federal agency administrators are adjusting

and reorganizing programs to reduce costs and increase efficiencies. As part of this process, investments in fire management activities must be evaluated against other agency programs in order to effectively accomplish the overall mission, set short- and long-term priorities, and clarify management accountability.

6. Fire Management Plans and activities are based upon the best available science. Knowledge and experience are developed among all federal wildland fire management agencies. An active fire research program combined with interagency collaboration provides the means to make these tools available to all fire managers.
7. Fire Management Plans and activities incorporate public health and environmental quality considerations.
8. Federal, State, tribal, local, interagency, and international coordination and cooperation are essential. Increasing costs and smaller work forces require that public agencies pool their human resources to successfully deal with the ever-increasing and more complex fire management tasks. Full collaboration among federal wildland fire management agencies and between the federal wildland fire management agencies and international, State, tribal, and local governments and private entities result in a mobile fire management work force available for the full range of public needs.
9. Standardization of policies and procedures among federal wildland fire management agencies is an ongoing objective. Consistency of plans and operations provides the fundamental platform upon which federal wildland fire management agencies can cooperate, integrate fire activities across agency boundaries, and provide leadership for cooperation with State, tribal, and local fire management organizations.

The fire management considerations, guidance, and direction should be addressed in the land use resource plans (for example, the comprehensive conservation plan [CCP]). A fire management plan describes the fire management program and is a stepdown plan based on the land management plan or the habitat management plan.

H.3 Management Direction

Lee Metcalf National Wildlife Refuge will suppress human-caused fires and wildfires that threaten life and property. Appropriate suppression actions—whether aggressive, high intensity, or low intensity—will be based on preplanned analysis, executed to minimize

costs and resource losses, and consistent with land management objectives.

Prescribed fire, as well as manual and mechanical fuel treatments, will be used in an ecosystem context to protect both Federal and private property and for habitat management purposes. Fuel reduction activities will be applied in collaboration with Federal, State, private, and nongovernmental partners. For wildland–urban interface treatments, focal areas will be those with community wildfire protection plans and designated communities at risk. The only community at risk near the refuge, as identified in the Federal Register, is the community of Stevensville, Montana. The State of Montana has developed a community wildfire protection plan for all communities in Ravalli County.

All aspects of the fire management program will be conducted in a manner consistent with applicable laws, Department of Interior and Service policies, and guidance established at national, regional, and local levels. Lee Metcalf National Wildlife Refuge will maintain a fire management plan to accomplish the fire management goals described below. Wildland fire, prescribed fire, and manual and mechanical fuel treatments will be applied under selected weather and environmental conditions, monitored using scientific techniques, and refined using adaptive management.

FIRE MANAGEMENT GOALS

Fire management goals are set at national, regional, and local levels.

National Fire Management Goals

The goals and strategies of the U.S. Fish and Wildlife Service National Wildlife Refuge System Wildland Fire Management Program Strategic Plan are consistent with the following guidance:

- policies of the Department of the Interior and the Service
- direction from the National Fire Plan
- the President’s Healthy Forest Initiative
- 10-Year Comprehensive Strategy and Implementation Plan
- guidelines of the National Wildfire Coordinating Group
- initiatives of the Wildland Fire Leadership Council
- “Interagency Standards for Fire and Aviation Operations”

Regional Fire Management Goals

Priorities stated in “The Region 6 Refuges Regional Priorities FY07–11” are consistent with the vision statement for Region 6: “to maintain and improve the biological integrity of the region, ensure the ecological condition of the region’s public and private lands are better understood, and endorse sustainable use

of habitats that support native wildlife and people's livelihoods.”

Refuge Fire Management Goals and Objectives

Fire management goals and objectives are used in the planning process to help management determine which responses and activities are necessary to achieve National Fire Plan and land management goals and objectives.

The fire management goals and objectives for Lee Metcalf National Wildlife Refuge are as follows:

1. Provide for firefighter and public safety.
2. Suppress human-caused fires and wildfires that threaten life and property.
3. Reduce wildland fire risk to the community of Stevensville and other public structures and private lands through hazardous fuels reduction treatments.
4. Use wildland fire, manual treatment methods, and mechanical treatment methods to achieve habitat goals and objectives identified in this CCP using scientific techniques and adaptive resource management to monitor results.
5. Protect important migratory bird habitats and natural resource values.
6. All wildfires will receive a management response based on firefighter and public safety considerations, resource and cultural values at risk, and circumstances unique to the incident while providing for cost-effective management.
7. Prevent human-caused wildfires through public contact and education, monitoring, and hazard fuels mitigation.
8. Safely suppress all wildfires occurring within the refuge. Maintain an initial attack success rate of 95 percent or higher on wildfires occurring on Service lands.
9. Utilize Burned Area Emergency Response (BAER) or Burned Area Rehabilitation (BAR) funding as needed following wildfires.

10. Implement and monitor a rotational prescribed burn program over the life of the plan that supports the fire dependent communities within the refuge.

The refuge staff recognizes that fire can play an important role in habitat management. With an approved fire management plan, the refuge staff may use wildland fire or prescribed fire in accordance with Federal, State, and local ordinances and laws to achieve hazardous fuels reduction and resource management objectives. Strategies and tactics that consider public and firefighter safety, as well as resource values at risk, will be used. Wildfire suppression, prescribed fire methods, manual and mechanical means, timing, and monitoring will be described in detail within the stepdown fire management plans for the refuge.

On approval of this CCP, the 2010 fire management plan will be reviewed and updated as needed to meet the goals and objectives set forth by the CCP.

H.4 Fire Management Organization, Contacts, and Cooperation

Region 6 of the Service would establish a fire management organization to provide qualified technical oversight of fire management for the refuge. Fire management staffing levels would be determined by established modeling systems and based on the fire management workload of a group of refuges and possibly that of interagency partners. Workload is based on historical wildfire suppression activities as well as historical and planned fuel treatments. Fire management activities would be conducted in a coordinated and collaborative manner through the “Montana State Annual Operating Plan” and other agreements with Federal and non-Federal partners.

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