Environmental Assessment

Lost Trail National Wildlife Refuge
Pleasant Valley Road Relocation and
Stream and Wetland Restoration Project

Marion, Montana

Submitted To:

U.S. Fish and Wildlife Service
National Bison Range
Moiese, Montana 59824

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Western Federal Lands
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Acronyms and Abbreviations

AASHTO	American Association of State Highway and Transportation Officials
BA	Biological Assessment
BMP	Best Management Practice
CCP	Comprehensive Conservation Plan
CFR	Code of Federal Regulations
CMP	Corrugated Metal Pipe
CSKT	Confederated Salish and Kootenai Tribes
DOT	Department of Transportation
DSL	Digital Subscriber Line
ES	Ecological Services Division
EA	Environmental Assessment
EPA	Environmental Protection Agency
ESA	Endangered Species Act
FHWA	Federal Highway Administration
FLAP	Federal Lands Access Program
IPM	Integrated Pest Management
MAP-21	Moving Ahead for Progress in the 21st Century Act
MFWP	Montana Fish, Wildlife & Parks
MPC	Montana Power Company
NEPA	National Environmental Policy Act
NRCS	Natural Resources Conservation Service
Refuge	Lost Trail National Wildlife Refuge
SADT	Summer Average Daily Traffic
SAFETEA-LU	Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users
SHPO	State Historic Preservation Office
USFWS	U.S. Fish and Wildlife Service

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Executive Summary

The National Environmental Policy Act of 1969 (NEPA) requires that all projects that are carried out by a federal agency, or which involve federal funding, require a federal permit, or occur on federal land must consider the effects of their actions on the quality of the human environment. NEPA established a mandate for federal agencies to consider the potential environmental consequences of their proposals, document the analysis in determining these consequences, and make this information available to the public for comment prior to implementation. This Environmental Assessment (EA) is part of the NEPA process. The proposed project, the purposes and need, and potential environmental effects are summarized below. The development and screening process for the alternatives yielded two alternatives, both of which are analyzed in this EA.

An EA is prepared to determine whether a proposed action has the potential to significantly affect the quality of the human environment (40 CFR § 1508). The general steps for an EA are as follows:

- Conduct a fact-finding and issue-discovery (scoping) process to define the project;
- Select alternatives for consideration in the EA;
- Prepare an EA (this document);
- Circulate the EA for review and public comment; and
- Prepare a Finding of No Significant Impact (FONSI) if the EA reveals no potential to significantly affect the quality of the human environment; or prepare an Environmental Impact Statement if there is a potential to significantly affect the quality of the human environment.

Decisions made concerning this project are ultimately the responsibility of the U.S. Fish and Wildlife Service and are based on input from the Federal Highways Administration, Natural Resources Conservation Service, Flathead County, as well as other local, state and federal agencies, and the public.

The Proposed Action Alternative would implement management recommendations considered in the Lost Trail National Wildlife Refuge Comprehensive Conservation Plan (USFWS 2005). The Proposed Action Alternative would restore Pleasant Valley Creek and wetlands on the Lost Trail National Wildlife Refuge. Restoration work would include removing on-stream fish barriers, reconstructing stream channels, improving fish passage conditions at roadway crossings, and restoring and enhancing riparian and floodplain functions associated with Pleasant Valley Creek. To facilitate restoration actions, a portion of Pleasant Valley Road would be relocated. Restoration and road relocation actions are described in this EA.

Chapter 1 Purpose and Need for Action

1.1 Refuge Background

The Lost Trail National Wildlife Refuge (Refuge) is located in the west-central portion of Flathead County, Montana, approximately 25 air miles west of Kalispell and 20 miles northwest of the town of Marion (Figure 1-1). Encompassing 9,225 acres in Pleasant Valley, the Refuge contains wetlands, lush riparian corridors, uplands dominated by prairie and tame grasses, and temperate forests dominated by lodgepole pine and Douglas-fir (USFWS 2005). Pleasant Valley Creek runs through the Refuge from the north to the southwest, and Dahl Lake and the surrounding wetlands are the most expansive wetland environments at the Refuge.

In 1999, the Refuge was established as the 519th refuge in the National Wildlife Refuge System managed by the U.S. Fish and Wildlife Service (USFWS). The establishment of much of the Refuge was the result of a mitigation settlement between Montana Power Company (MPC), the Confederated Salish and Kootenai Tribes (CSKT), and USFWS. The Refuge was created as the result of a settlement for habitat and wildlife losses on the Flathead Waterfowl Production Area, attributed to past and future operations of Kerr Dam (USFWS 2005). During the acquisition period, the NRCS, in conjunction with MPC, acquired a Wetland Reserve Program (WRP) easement on 1,770 acres of the ranch. This easement will help facilitate restoration actions described for the Proposed Action Alternative (USFWS 2005). A hydroelectric-generating facility on the Flathead River, Kerr Dam is located approximately 2.5 miles southwest of the southern end of Flathead Lake, the largest naturally occurring freshwater lake west of the Mississippi River. The southern half of the lake, as well as the generating facility, is located within the exterior boundary of the Flathead Indian Reservation.

The National Wildlife Refuge System Improvement Act requires that a Comprehensive Conservation Plan (CCP) be developed for every refuge in the National Wildlife Refuge System by 2012 (USFWS 2005). In September 2005, USFWS completed a CCP describing how the Refuge will be managed through 2020 to fulfill its congressionally designated purposes. The CCP was the result of an Environmental Assessment (EA) that evaluated alternatives for the management of the Refuge (USFWS 2005) and was implemented pursuant to the National Environmental Policy Act (NEPA).

The outcomes and recommendations of the CCP included the following:

- Restoration of native vegetation, especially prairie grasses and forest;
- Restoration of the natural hydrology of Dahl Lake, Pleasant Valley Creek, and wetlands; and
- Control of invasive plants.

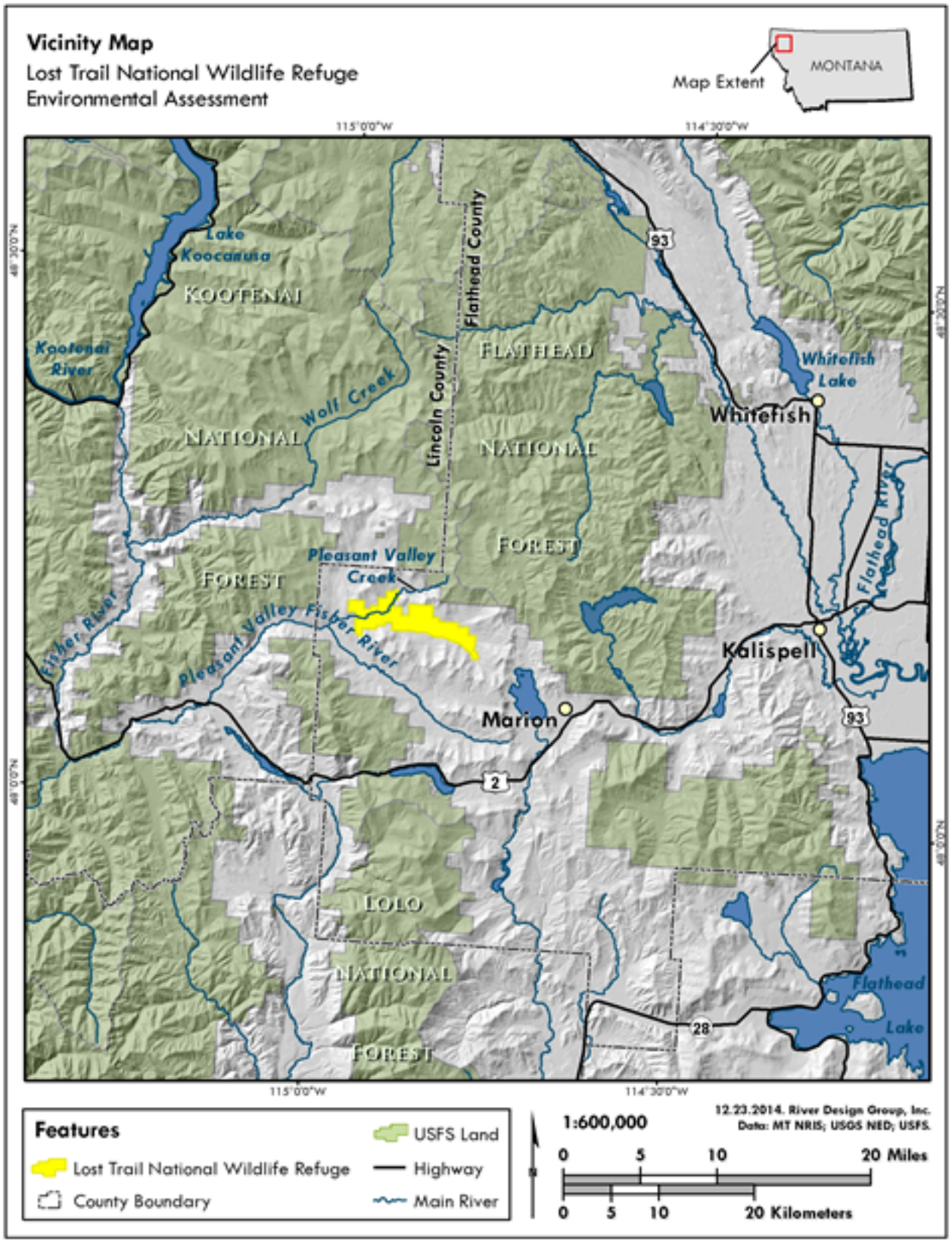

Figure 1-1. Lost Trail National Wildlife Refuge project vicinity map.

Additional outcomes and recommendations of the CCP included (USFWS Division of Refuge Planning: http://www.fws.gov/mountain-prairie/planning/ccp/mt/ltr/ltr.html):

- Focus habitat management on special status species, especially federally listed species and other wildlife for which the Refuge provides essential habitat;
- Remove all interior fencing that obstructs wildlife movement;
- Improve the quality of interpretive panels and build a visitor contact station; and
- Ensure adequate protection and interpretation of the abundant cultural resources in the refuge.

The CCP also identified the desire and need to protect known cultural resources and to coordinate with the state to identify and catalog unknown cultural resources. Providing for compatible public use was also identified as a major goal of the plan, with a focus on prioritizing wildlife-dependent uses including hunting, fishing, wildlife observation, wildlife photography, interpretation, and environmental education.

1.2 Purpose and Need for Action

Prior to establishment of the Refuge, lands were used primarily for cropland, livestock grazing, and agriculture. These historical land use practices significantly altered wetland and aquatic resources within the Refuge. Wetlands within the Refuge have been impacted by water impoundments, irrigation diversions, wetland drains, and infrastructure including the Great Northern Railroad and Pleasant Valley Road. The Great Northern Railroad traversed through Pleasant Valley from 1892 to 1904, and following closure of the railroad line, Pleasant Valley Road was constructed and currently follows the railroad grade. Pleasant Valley Creek through the Refuge was straightened and channelized along the railroad, lowering the groundwater table and resulting in loss of wetland hydrology. The altered structure and function of Pleasant Valley Creek has also resulted in losses to native aquatic species habitat as well as recreational fishing opportunities. In addition, historical land use practices have resulted in non-native, invasive and/or weedy plant establishment in many wetland and upland areas at the Refuge.

Historical land use and transportation infrastructure continues to impact stream and wetland habitat at the Refuge. The purpose and need for identifying a preferred action alternative at the Refuge is to address limiting factors to aquatic and wetland habitat, natural stream and wetland hydrology, and compatible public use. Restoration of native vegetation, and restoration of the natural hydrology of Dahl Lake, Pleasant Valley Creek, and wetlands are two of the primary recommendations of the CCP. These goals would be addressed through the implementation of the Proposed Action Alternative identified in this EA, with emphasis on the restoration of the natural hydrology of Pleasant Valley Creek and wetlands.

In 2011, USFWS commissioned a conceptual restoration plan for the Refuge that identified specific actions necessary to restore the natural hydrology of Pleasant Valley Creek, unnamed tributaries, and associated wetlands and aquatic habitat features. The restoration plan

recommended treatments to reconnect Pleasant Valley Creek with the historical floodplain surface. One of the primary recommendations was to relocate a portion of Pleasant Valley Road located in historical wetlands and floodplains of Pleasant Valley Creek to upland, non-wetland areas. Presently the road is subject to seasonal saturation resulting from high groundwater and spring flooding of Pleasant Valley Creek. The plan indicated that relocating the road outside of the Pleasant Valley Creek floodplain and wetlands would be required to allow for a full palate of restoration actions to be implemented on Pleasant Valley Creek and wetlands.

In 2013, Flathead County in cooperation with the Refuge and Natural Resources Conservation Service (NRCS), prepared and submitted a grant proposal to the U.S. Department of Transportation Federal Lands Access Program to relocate a portion of Pleasant Valley Road. In 2014, Flathead County received notice that the grant was approved. Referred to as the Pleasant Valley Road Relocation, MT Flathead 543(1), the grant provides improved public access and safety to the Refuge and National Forest System land, while facilitating the restoration of Pleasant Valley Creek and wetlands at the Refuge (Flathead County et al. 2013).

1.3 Decision to be Made by the Responsible Official

The decision to be made by the responsible official, the Regional Director, Assistant Regional Director, or Regional Chief of the National Wildlife Refuge System, will be to authorize the restoration and improvements in the Refuge as proposed, vary the design to meet the purpose and need, or to defer any action at this time. Authorization of this project would require that designs meet all USFWS standards and applicable laws, and that necessary permits and approvals are obtained from the U.S. Army Corps of Engineers, Montana Department of Environmental Quality, and Montana Department of Fish, Wildlife & Parks.

1.4 Scoping

Pursuant to NEPA, USFWS is required to solicit comment on the proposed action and range of alternatives. An open house will be hosted by USFWS staff to present the plan and solicit public comment.

Chapter 2 Alternatives

This section provides a description of the alternatives. Two alternatives are being considered, including the No Action Alternative and the Proposed Action Alternative. The Purpose and Need for Action, including addressing main recommendations of the CCP, would be satisfied with the Proposed Action Alternative. No other action alternatives are presented for consideration in this EA.

2.1 No Action Alternative

The CCP recommends habitat restoration to restore the natural hydrology of Pleasant Valley Creek and Refuge wetlands. The existing WRP easement also offers opportunity to protect, restore, and enhance wetlands on the Refuge, and will help facilitate restoration actions described for the Proposed Action Alternative (USFWS 2005).Under the No Action Alternative, no restoration actions would occur and existing stream channels and wetlands would remain in degraded conditions. Existing drainage ditches would not be reclaimed, and fish passage conditions would not be improved at critical locations including Upper and Lower Moose Ponds and Ray's Pond. The existing Pleasant Valley Road would remain in its current alignment and no road improvements would be made to the current road base or drainage features. USFWS would continue to manage the Refuge and associated natural resources as it has in the recent past. Upland and forested areas of the Refuge would continue to be managed to maintain vegetative conditions for nesting waterfowl, osprey, eagles, and big game species. Integrated pest management (IPM) would continue to be applied to upland areas on the Refuge. The No Action Alternative does not address the deficiencies identified in the Purpose and Need for Action, nor would it meet the recommendations of the CCP.

2.2 Proposed Action Alternative

The Proposed Action Alternative would address the management considerations described in the CCP, including:

- Addressing habitat needs for fish and wildlife with management priority directed towards species most impacted by degraded conditions including beaver, moose, and species of concern such as bull trout, westslope cutthroat trout, and redband trout;
- Restoring wetlands, including wetland hydrology and vegetation, to historical conditions;
- Restoring streams to historical channels and/or functions;
- Restoring fish habitat and improving fish passage conditions in tributary channels;
- Restoring native vegetation to floodplains; and
- Enhancing compatible public use, especially priority wildlife-dependent uses.

One of the primary goals of the CCP was to ensure compatible public uses would be enhanced or expanded including opportunities for hunting, fishing, wildlife observation, wildlife photography, interpretation, and environmental education. The existing WRP easement also offers opportunity to protect, restore, and enhance wetlands on the Refuge, and will help facilitate restoration actions described for the Proposed Action Alternative (USFWS 2005). The Proposed Action Alternative restores aquatic and wetland habitat for wildlife, which also benefits the wildlife-dependent compatible public uses at the Refuge. Furthermore, the Proposed Action addresses safety, public access, and maintenance issues associated with Pleasant Valley Road by relocating a 3.03 mile section of the existing road, constructing vehicle parking lots and pullouts, installing interpretive panels, installing traffic control signs, improving road drainage, and surfacing on approximately 9.4 miles of road which includes the sections of roadway that would be reconstructed.

Specific actions included under the Proposed Action Alternative are described in the following sections. Stream and wetland restoration actions are dependent on the removal and relocation of 3.03 miles of Pleasant Valley Road from Pleasant Valley Creek floodplain and wetland areas to uplands. Road removal and relocation would occur in two phases. A majority of stream and wetland restoration work, including the Dahl Lake outlet reclamation, Pleasant Valley Creek channel and floodplain restoration, streambank and streambed treatments, revegetation treatments, fish passage improvements, and a portion of drainage ditch reclamation and wetland restoration would occur following Phase 1 of the Pleasant Valley Road removal and relocation. A portion of drainage ditch reclamation and wetland restoration would also occur concurrent with and following Phase 2 of the Pleasant Valley Road removal and relocation.

2.2.1 Pleasant Valley Road

Pleasant Valley Road, a Flathead County-maintained road, traverses east-to-west for approximately 6.6 miles through the Refuge and serves as the primary public access route to the Refuge and adjacent National Forest System and private lands. The road provides access for a variety of public uses within the Refuge, including hunting, wildlife observation, photography, interpretation, and environmental education. It also serves as an important linkage route between several county roads located north, south and west of the Refuge. Flathead County currently maintains the road through the Refuge. Traffic volumes are estimated to peak around 210 Summer Average Daily Traffic (SADT) with average annual volumes of 40 to 50 vehicles per day (Flathead County et al. 2013).

The Proposed Action would relocate 3.03 miles of road from wetlands and floodplains to upland areas, allowing for the restoration of Pleasant Valley Creek and wetlands on the valley bottom. The Proposed Action would also address ongoing maintenance issues associated with the 6.6 mile section of Pleasant Valley Road on the Refuge. The road is a substandard driving surface containing potholes, washboards, exposed subgrade and loose gravel. Currently, there are numerous public safety and maintenance issues related to the location of the road relative to Pleasant Valley Creek and wetland areas, as well as unsuitable road base material that result in seasonal saturation of the road prism due to high groundwater and spring flooding of Pleasant Valley Creek. This condition persists on the 3.03 miles of road located in the valley bottom of

the Refuge. Flood water occasionally overtops the road surface, resulting in rutting, surface erosion, settling and general instability of the road sub-base material and road prism. During summer and fall when use increases, airborne dust causes safety concerns due to reduced visibility on the entire 6.6 mile section of road. The Proposed Action would relocate the 3.03 miles of road from the valley bottom to upland areas, and apply safety improvements such as improved sight lines, signs, uniform road widths, and increased culvert capacity. The purposes of these improvements are to provide reliable access to public land, lower maintenance costs associated with a stable road bed and reduced frequency of grading, and to restore the structure and function of wetland areas and stream channels adjacent to the current Pleasant Valley Road location. All changes to the road alignment will require an updated easement with NRCS, along with a road maintenance agreement between the Refuge and Flathead County.

Figure 2-1 includes a map of the existing and Proposed Action Alternative road alignments through the affected portion of the Refuge. The road would be removed and relocated in two project phases. Figure 2-2 includes a photograph of Phase 1 and Phase 2 existing Pleasant Valley Road and drainage ditches.

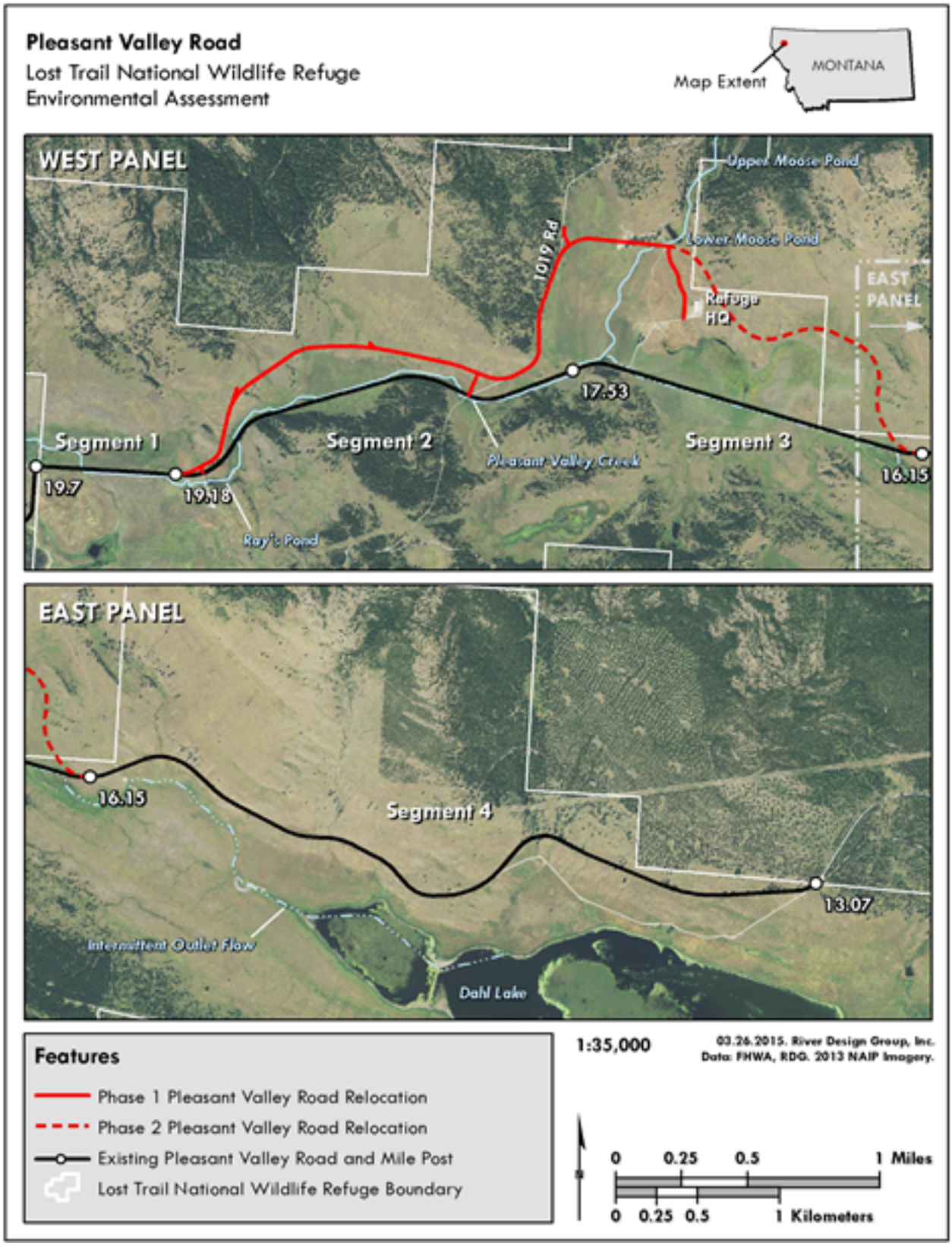

Figure 2-1. Existing and proposed Pleasant Valley Road alignments by road relocation phase.

Figure 2-2. The existing Pleasant Valley Road and drainage ditches, showing sections of Phase 1 and Phase 2 road obliteration areas.

Phase 1 Pleasant Valley Road Removal and Relocation

Phase 1 road removal and relocation actions would be completed in 2016, prior to the implementation of stream and wetland restoration actions. Approximately 1.65 miles of Pleasant Valley Road would be relocated from the valley bottom to upland areas (see Figure 2-1). Road improvements and relocation actions for Phase 1 would be funded through a Federal Lands Access Program (FLAP). The FLAP was created by the Moving Ahead for Progress in the 21st Century Act (MAP-21) to improve access to federal lands. The program is directed towards public highways, roads, bridges, trails, and transit systems that area under state, county, town, township, tribal, municipal, or local government jurisdiction or maintenance, and provide access to federal lands. Program funds were secured by the Refuge and Flathead County in 2013.

Entire Road Length through Refuge

- Apply traffic control signing.

Segment 1: Mile Post 19.70 to Mile Post 19.18

- Add six inches crushed aggregate surface;
- Reconstruct flat bottom ditches (turnpike); and
- Replace existing undersized culvert with stream simulation culvert to improve stream conveyance capacity and fish passage conditions.

Segment 2: Mile Post 19.18 to Mile Post 17.53

- Relocate road to north slope outside of sensitive wetland areas;
- Design road to AASHTO Guidelines for Geometric Design of Very Low-Volume Local Roads (2001) {ADT≤400} standards including 24 foot top width and aggregate surface (12 inch select borrow base and 6 inch crushed aggregate surfacing);

- Install cross culverts;
- Relocate utilities underground, adjacent to the new road alignment;
- Install vehicle turnouts;
- Widen and apply crushed aggregate surfacing to a portion of 1019 Road;
- Replace existing undersized culverts with stream simulation culverts to improve stream conveyance capacity and fish passage conditions;
- Construct Refuge Headquarters access road (north of the headquarters); and
- Decommission existing road and coordinate removal with restoration planning to ensure both actions support a desired restoration outcome.

Segments 3 and 4: Mile Post 17.53 to Mile Post 13.07

- Add up to six inches of crushed aggregate surfacing.

Phase 2 Pleasant Valley Road Removal and Relocation

Phase 2 would include the removal and relocation of approximately 1.38 miles of the existing Pleasant Valley Road from the valley bottom to adjacent upland areas within the Refuge. Phase 2 actions and improvements would be completed as funding becomes available through the FLAP program. As shown on Figure 2-1, Phase 2 would address Road Segment 3 from Mile Post 17.53 to Mile Post 16.15. Similar to Phase 1 activities, the road would be relocated from sensitive wetland areas to the north on upland slopes, allowing for the restoration of Pleasant Valley Creek, floodplains, and associated wetlands. Actions specific to Phase 2 are summarized below.

- Relocate Segment 3 road to north slope outside of sensitive wetland areas;
- Design road to AASHTO Guidelines for Geometric Design of Very Low-Volume Local Roads (2001) {ADT≤400} standards including 24 foot top width and aggregate surface (12 inch select borrow base and six inch crushed aggregate surfacing);
- Install cross culverts; and
- Decommission existing road and coordinate removals with restoration planning to ensure both actions support a desired restoration outcome.

2.2.2 Dahl Lake Outlet

Figure 2-4 includes a map of the Refuge and the various restoration activities that would be implemented under the Proposed Action Alternative. Restoration of Dahl Lake outlet would occur following Phase 1 Pleasant Valley Road removal and relocation. Dahl Lake is the principal hydrologic feature in the eastern portion of the Refuge and includes approximately 1,035 acres of open water and emergent wetland habitats (USFWS 1982). Within the drainage area of Dahl Lake are six intermittent creeks that terminate or become undefined as they exit onto the valley floor. The outlet channel of Dahl Lake is artificial and was constructed and outfitted with a water control structure to allow irrigators to back up water into the surrounding meadows for flood irrigation (USFWS 2005). The structure was operated to time the release of water for the purposes of supporting agricultural operations downstream of the lake. Figure 2-3 includes photographs of Dahl Lake in the vicinity of the outlet.

Figure 2-3. View looking southeast at Dahl Lake (left) and the Dahl Lake outlet ditch (right).

The NRCS has an easement on the Refuge where the outlet structure was historically located. In 2005, the NRCS and USFWS completed a restoration project to restore wetland hydrology and the historical footprint of the open water and emergent wetland complex at Dahl Lake. The project consisted of filling the existing outlet drainage ditch and re-establishing historical lake elevations. Under the Proposed Action Alternative, approximately 5,300 feet of remaining ditch draining Dahl Lake would be filled and re-contoured to match existing topography. Prior to filling the ditch, wetland sod mats would be salvaged from the ditch and temporarily stockpiled. After the ditch is filled, sod mats would be placed on raw fill to provide immediate cover and erosion control. The intent of this action would be to restore wetland hydrology to areas that were historically wetlands.

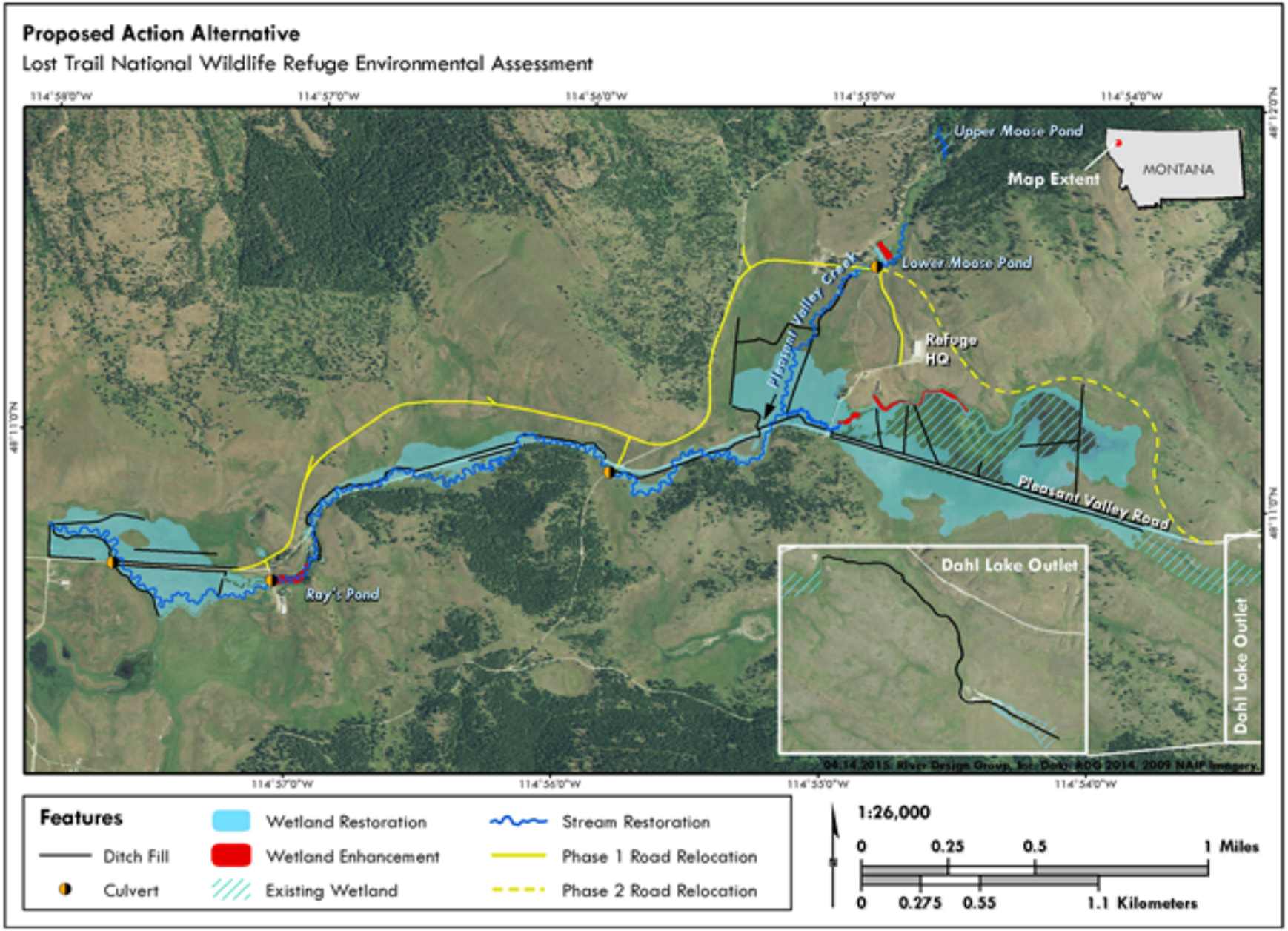

Figure 2-4. Restoration actions under the Proposed Action Alternative.

2.2.3 Pleasant Valley Creek Channel and Floodplain Restoration

The Proposed Action Alternative would restore Pleasant Valley Creek through the implementation of a variety of restoration actions (Figure 2-4), following Phase 1 Pleasant Valley Road removal and relocation actions. Road decommissioning would be coordinated with restoration planning to ensure both actions support a desired restoration outcome. Figure 2-5 provides a typical cross-section exhibit illustrating Proposed Action Alternative design concepts. Approximately 5.7 miles of Pleasant Valley Creek would be restored under the Proposed Action Alternative. To the greatest extent practical, historical channel alignments would be reactivated particularly in the middle and lower reaches of the Refuge. Restoration actions would be implemented in six reaches, as shown on Figure 2-6. Restoration actions specific to each reach are described in the following section. Detailed drawings and restoration plans for the Proposed Action Alternative are available from USFWS at the Refuge.

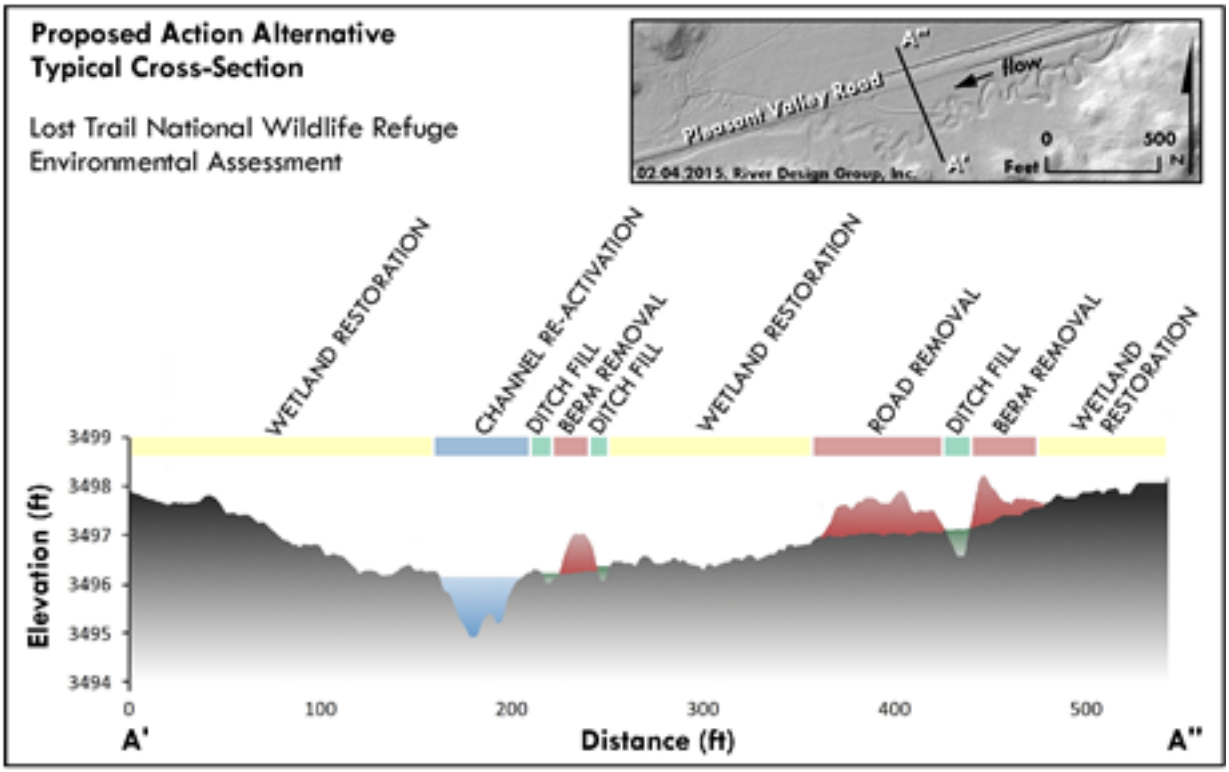

Figure 2-5. Typical cross-section illustrating Proposed Action Alternative design concepts.

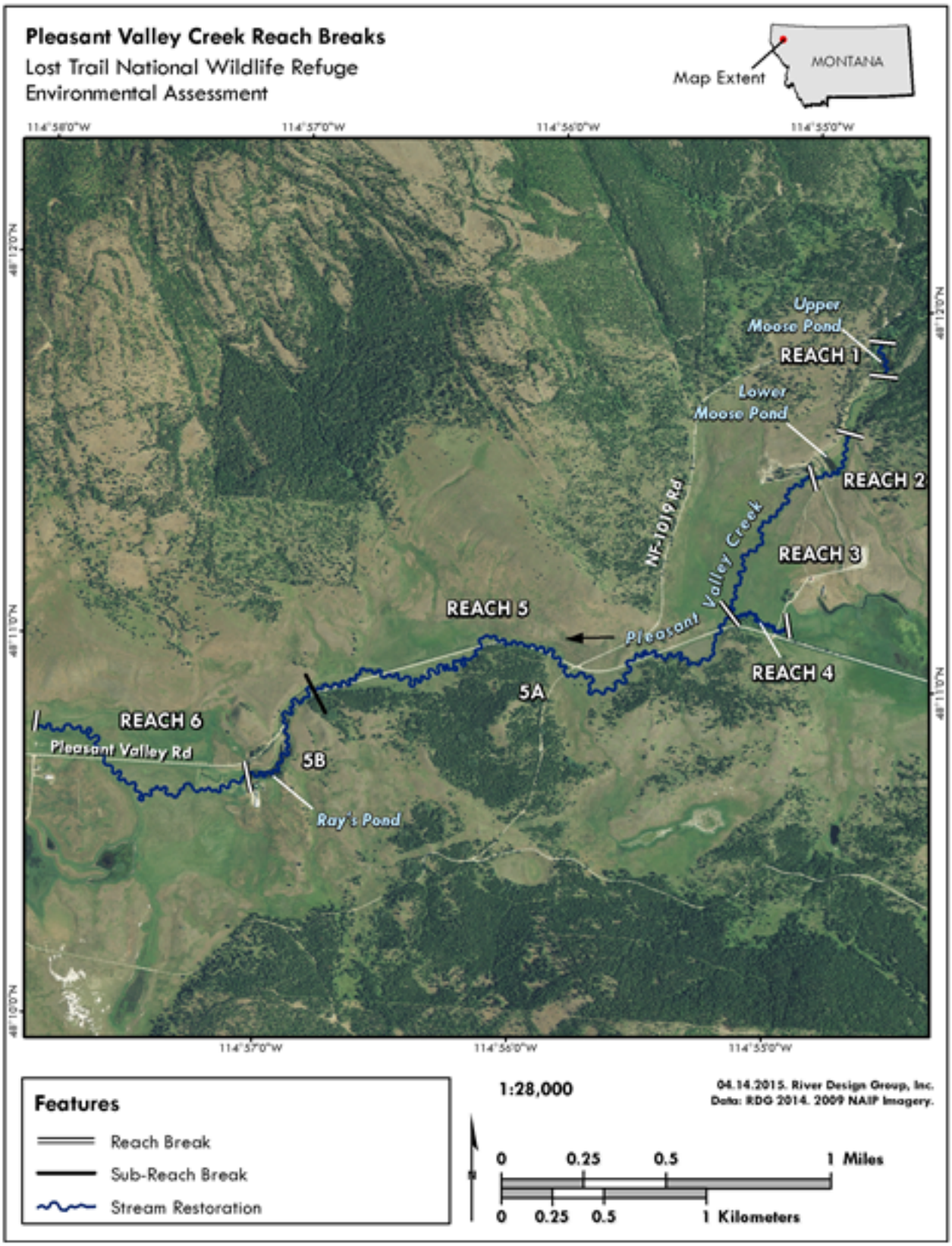

Figure 2-6. Pleasant Valley Creek reach break delineation.

Reach 1 – Upper Moose Pond

The Proposed Action Alternative would restore Pleasant Valley Creek to a more natural condition in Reach 1. As described in Section 3, an earthen embankment was constructed across the Pleasant Valley Creek floodplain in the mid-1900s creating a 1.4 acre on-stream pond and complete fish passage barrier. Restoration actions in Reach 1 would remove the embankment and water control structure, and convert the 1.4 acre pond to a natural channel and floodplain system. If westslope cutthroat trout (*Oncorhynchus clarki lewisi*) are discovered in Reach 1 upstream of Upper Moose Pond, the Proposed Action Alternative would include the option to install a low profile on-stream fish passage barrier to prevent hybridization with non-native fish species.

Under the Proposed Action Alternative, approximately 650 feet of Pleasant Valley Creek would be restored to conditions emulating a moderately entrenched, riffle-pool, gravel bed B4 stream type (Rosgen 1996) with a connected and well vegetated floodplain. Channel and floodplain design criteria are summarized in Table 2-1. Figure 2-7 includes photographs of Upper Moose Pond and the outlet water control structure.

Table 2.1. Channel and floodplain design criteria for Reach 1 (in feet).

Dimension	Feature		
	Riffle	Run	Pool
Area	7.0	7.4	10.5
Width to Depth Ratio	9.1	n/a	n/a
Bankfull Width	8.0	7.0	9.6
Average Depth	0.9	1.1	0.7
Maximum Depth	1.1	1.5	2.6
Average Floodplain Width	32.0		
Bankfull Discharge (cfs)	20.0		
Average Reach Slope (ft/ft)	0.011		

Figure 2-7. View of Upper Moose Pond and outlet control structure.

Channel and floodplain restoration actions would terminate approximately 35 feet downstream of Upper Moose Pond. Restoration treatments are described in Sections 2.2.4 and 2.2.5.

Reach 2 – Lower Moose Pond

Reach 2 includes approximately 1,375 feet of channel and floodplain upstream and downstream of Lower Moose Pond. The Proposed Action would restore Pleasant Valley Creek in Reach 2 to a meandering, riffle pool, gravel bed C4 stream type (Rosgen 1996) with a vegetated floodplain corridor. The reach was channelized in the mid-1900s and is currently entrenched and disconnected from the floodplain. Similar to Reach 1, an earthen embankment was constructed in the mid-1900s to impound water for irrigation purposes. The embankment converted Pleasant Valley Creek to a 1.2 acre open water, emergent, and forested wetland complex in Reach 2, fragmenting fluvial connectivity with upper and lower Pleasant Valley Creek. Under the Proposed Action Alternative, the size of the wetland and pond complex would be reduced to accommodate restoration of Pleasant Valley Creek. The wetland and pond complex would be isolated from Pleasant Valley Creek and enhanced to increase wetland functions and values including habitat for waterfowl and nesting birds. Wetland and pond enhancement would include varying the depth of the open water component and enhancing the emergent wetland fringe through grading. Channel and floodplain design criteria are summarized in Table 2-2.

Table 2.2. Channel and floodplain design criteria for Reach 2 (in feet).

Dimension	Feature		
	Riffle	Run	Pool
Area	9.0	9.5	13.5
Width to Depth Ratio	9.1	n/a	n/a
Bankfull Width	9.0	7.9	10.9
Average Depth	1.0	1.2	0.8
Maximum Depth	1.2	1.7	3.0
Average Floodplain Width	32.0		
Bankfull Discharge (cfs)	20.0		
Average Reach Slope (ft/ft)	0.007		

The existing roadway crossing downstream of Lower Moose Pond is an undersized corrugated metal pipe (CMP) that creates a fish passage barrier. Under the Proposed Action Alternative, the CMP would be removed and replaced with a conveyance structure that would improve aquatic organism passage and replicate the proposed channel geometry adjacent to the crossing. The structure would incorporate engineered streambed materials to simulate natural channel conditions to facilitate water and sediment conveyance as well as fish passage.

Channel and floodplain restoration would terminate approximately 40 feet downstream from Lower Moose Pond at the start of Reach 3. Restoration treatments are described in Sections 2.2.4 and 2.2.5.

Reach 3 – Upper Pleasant Valley Creek

Reach 3 includes Pleasant Valley Creek from the outlet of Lower Moose Pond downstream to the confluence with Reach 4 located west of the Refuge headquarters access road (Figure 2-5).

Encompassing approximately 4,375 feet of Pleasant Valley Creek, this reach was channelized and ditched to drain the wetlands and maximize agricultural production. The Proposed Action Alternative would restore Pleasant Valley Creek in Reach 3 to a meandering, riffle pool, gravel bed C4 stream type (Rosgen 1996). The existing channel and extensive ditch system would be filled to raise the groundwater table. The combined actions of restoring the stream channel and filling the ditch system would restore wetland hydrology particularly in the lower reach where the valley transitions from a confined to unconfined morphology coinciding with a decreasing down valley slope. Channel and floodplain design criteria are summarized in Table 2-3. Restoration treatments are described in Sections 2.2.4 and 2.2.5.

Table 2.3. Channel and floodplain design criteria for Reach 3 (in feet).

Dimension	Feature		
	Riffle	Run	Pool
Area	10.0	10.5	15.0
Width to Depth Ratio	9.1	n/a	n/a
Bankfull Width	9.5	8.3	11.4
Average Depth	1.0	1.3	0.9
Maximum Depth	1.3	1.8	3.1
Average Floodplain Width	40.0		
Bankfull Discharge (cfs)	25.0		
Average Reach Slope (ft/ft)	0.01		

Reach 4

Under the Proposed Action Alternative, a new stream channel would be constructed to connect the large 52 acre emergent wetland complex located to the south and east of the Refuge headquarters to Reach 3 of Pleasant Valley Creek. To emulate the likely historical conditions in Reach 4, as depicted in the 1893 General Land Office map, the channel would begin at the outlet of a constructed shallow open water wetland complex and meander west approximately 1,900 feet to the confluence with Reach 3. A low width to depth ratio, gravel dominated, run pool E4 stream type (Rosgen 1996) would be constructed with a broad, vegetated floodplain. Similar to Reach 3, multiple drainage ditches were constructed in the emergent wetland complex upstream from Reach 4 to drain the wetlands and would be filled to restore wetland hydrology. Channel and floodplain design criteria are summarized in Table 2-4. Restoration treatments are described in Sections 2.2.4 and 2.2.5.

Table 2.4. Channel and floodplain design criteria for Reach 4 (in feet).

Dimension	Feature		
	Riffle	Run	Pool
Area	4.0	4.2	6.0
Width to Depth Ratio	4.0	n/a	n/a
Bankfull Width	4.0	3.5	4.8
Average Depth	1.0	1.2	0.8
Maximum Depth	1.3	1.7	3.0
Average Floodplain Width	20.0		
Bankfull Discharge (cfs)	5.0		
Average Reach Slope (ft/ft)	0.0003		

Reach 5 – Middle Pleasant Valley Creek

Reach 5 begins at the confluence of Reach 3 and Reach 4 and extends approximately 11,400 feet west to the outlet of Ray's Pond. The reach contains two sub-reaches; Sub-reach 5A and Sub-reach 5B (Figure 2-5). Reach 5 was channelized in the late 1800s during construction of the Great Northern Railroad and Pleasant Valley Road. Large drainage ditches were constructed adjacent to Pleasant Valley Road to drain the wetlands. The relict meander scars of Pleasant Valley Creek are evident on the landscape in the reach and infer that the historical channel meandered uninterrupted through the valley. The historical channel was characterized by a highly sinuous, meandering stream type (Figure 2-8). The meander geometry suggests a channel planform that was likely supported by a woody vegetation component adjacent to the channel.

Under the Proposed Action Alternative, Pleasant Valley Creek would be reconstructed within the limits of the relict meander scars to the greatest extent feasible, facilitated by the previously implemented Phase 1 Pleasant Valley Road removal and relocation actions. The most probable stream type would be a low gradient, highly sinuous, low width to depth ratio, riffle pool, gravel bed E4 stream type (Rosgen 1996) developed within a broad, vegetated floodplain.

As described in Section 3, the valley in Reach 5B was graded and filled with material excavated from the adjacent hillslopes in order to level out the valley grade for construction of the Great Northern Railroad. Excavation of the valley would be required to transition the floodplain and provide sufficient floodplain capacity to route flood flows. A minimum floodplain width of 50 feet would be established and the potential stream type would be similar to Reach 5A with a slightly higher width to depth ratio. Channel and floodplain design criteria for Reach 5 are summarized in Table 2-5.

Table 2.5. Channel and floodplain design criteria for Reach 5 (in feet).[1]

Dimension	Feature		
	Riffle	Run	Pool
Area	22.0	23.1	33.0
Width to Depth Ratio	8.9	n/a	n/a
Bankfull Width	14.0	12.2	16.8
Average Depth	1.3	1.9	1.3
Maximum Depth	2.0	2.7	4.7
Average Floodplain Width	50.0		
Bankfull Discharge (cfs)	35.0		
Average Reach Slope (ft/ft)	0.0006		

[1] Values reported are for Reach 5A.

Figure 2-8. Historical meander scars and decadent willows in Reach 5A.

Ray's Pond, located in the lower end of Reach 5B was constructed in the early 1900s to impound water for irrigation. The impoundment consists of an earthen dam and outlet control structure that regulates pond water surface elevations (Figure 2-9). The aging infrastructure is structurally compromised, functions as a fish passage barrier, and fragments fluvial connectivity between Reach 5 and Reach 6. The Proposed Action Alternative would remove the earthen dam, convert Ray's Pond to a functional stream channel and floodplain, and incorporate a roadway crossing structure that meets fish passage criteria. The stream type would be a low gradient, sinuous, riffle pool, gravel bed C4 stream type (Rosgen 1996) developed within a broad, vegetated floodplain.

Figure 2-9. View of Ray's Pond up-valley and the existing outlet control structure.

One additional roadway crossing structure would be replaced in Reach 5, as shown in Figure 2-4. The existing CMPs are aging and undersized and do not meet fish passage criteria. Proposed roadway crossing structures would be designed to improve aquatic organism passage and to replicate the proposed geometry of the channel. The structure would incorporate natural streambed sediment to maintain hydraulic and sediment transport conditions characteristic of a natural channel.

Reach 6 – Lower Pleasant Valley Creek

The Proposed Action Alternative would restore approximately 5,850 feet of Pleasant Valley Creek from the outlet of Ray's Pond to the western boundary of the Refuge. The existing channel was straightened and is currently entrenched and disconnected from the floodplain resulting in streambank erosion and impaired aquatic habitat conditions. Restoration actions would restore a low width to depth ratio, meandering, riffle pool, gravel bed E4 stream type (Rosgen 1996) and reactivate the historical floodplain and drained wetland surface. The existing channel would be filled or plugged to floodplain elevation to raise the groundwater, and portions of the existing channel would be converted to off-channel shallow emergent water wetlands.

Channel and floodplain design criteria for Reach 6 are summarized in Table 2-6.

Table 2.6. Channel and floodplain design criteria for Reach 6 (in feet).

Dimension	Feature		
	Riffle	Run	Pool
Area	27.0	28.4	40.5
Width to Depth Ratio	8.3	n/a	n/a
Bankfull Width	15.0	13.1	18.0
Average Depth	1.8	2.2	1.5
Maximum Depth	2.3	3.1	5.4
Average Floodplain Width	60.0		
Bankfull Discharge (cfs)	45.0		
Average Reach Slope (ft/ft)	0.0005		

The existing roadway crossing structure located at the west end of the Refuge in Reach 6 is undersized and structurally compromised. Under the Proposed Action, the CMP would be designed to improve aquatic organism passage and to replicate the proposed geometry of the channel in Reach 6. The structure would incorporate natural streambed sediment to maintain hydraulic and sediment transport conditions characteristic of a natural channel.

2.2.4 Streambank and Streambed Treatments

Under the Proposed Action Alternative, constructed channels in Reaches 1-6 would be treated to provide short term planform stability while floodplain vegetation develops. Streambanks are intended to be deformable once floodplain vegetation has matured sufficiently such that vegetation can begin to function as a morphological control. To accomplish this long-term

deformability, streambanks would be constructed using native material such as alluvium, wood, sod mats, shrub transplants, and dormant cuttings including willow, dogwood and alder. Treatments would also be implemented to add instream complexity and overhead cover for aquatic species and organisms.

Streambeds would be designed and constructed to mimic naturally occurring streambeds. In general, the primary channel would be designed to convey the estimated bankfull or effective discharge, with a connected floodplain to accommodate flood events. At the reach scale, Pleasant Valley Creek would be constructed with an undulating streambed profile with stream gradients generally shallower in the pools and steeper in the riffles. Streambed treatments would add aquatic habitat complexity to Pleasant Valley Creek and increase the amount of habitat to support various life stages of fish with an emphasis on maximizing connection between the channel and floodplain, and sustaining sediment transport and hydraulic characteristics of the restored stream reaches.

Vegetated Wood Matrix

The intent of the vegetated wood matrix structure is to provide site conditions directly along the channel that are suitable for growing riparian vegetation. The vegetated wood matrix would provide bank strength in the short-term until mature riparian vegetation establishes and provides long-term streambank stability. The structure also provides channel margin roughness and near-bank aquatic habitat complexity. Two types of vegetated wood matrix structures would be used. The Type 1 structure would be used in zones of low to moderate shear stress along the channel planform including outside meander streambanks, and riffle and run channel units. The structure would be used in sequence with other streambank treatments and include a constructed toe comprised of alluvium and wood. The Type 2 structure would provide similar function to the Type 1 structure but would be used in zones of low shear stress, or passive margins. The Type 2 structures would not require a constructed toe for stability and would be placed along inside meander streambanks (e.g. point bars and meander cores) to increase channel boundary roughness and support riparian vegetation establishment.

Large Wood Matrix

The intent of the large wood matrix structure would be to provide short-term streambank protection and stabilization by re-directing flow away from the channel margins, dissipating energy, reducing near-bank stress, and maintaining lateral scour pools. The structure would also provide bank strength to support riparian vegetation establishment along outside meander streambanks. The structure would incorporate several tiers of brush and small diameter wood to increase channel margin roughness and provide near-bank aquatic habitat complexity. The structures would include a constructed toe comprised of alluvium to provide stability, and would be used in sequence with other streambank structures including the vegetated wood matrix.

Constructed Riffle

The intent of the constructed riffle is to provide vertical channel stability in the short-term until Pleasant Valley Creek can naturally form a stable channel streambed that is deformable and

responds to varied flow and hydraulic conditions while maintaining hydrologic connection with the floodplain. The structure is comprised of graded alluvium. Varied substrate would promote diverse flow paths, provide energy dissipation, and create high quality habitat features for fish and other aquatic organisms. Habitat features would include higher gradient riffles and runs, and lower velocity features including pools and glides.

2.2.5 Revegetation Treatments

Under the Proposed Action Alternative, revegetation treatments would be implemented to improve riparian and wetland functions in all six reaches of the project area. The following revegetation treatments would be incorporated:

- Salvage and transplant of high quality wetland sod;
- Salvage and transplant of high quality wetland plugs;
- Salvage and transplant of high quality riparian shrubs;
- Containerized plant installation;
- Invasive species control; and
- Application of floodplain micro-topography treatments.

Salvage and Transplant of High Quality Wetland Sod

The Proposed Action Alternative would substantially increase channel length of Pleasant Valley Creek. To the greatest extent practical, constructed streambanks would be built using wetland sod mats harvested from the relict meanders in Reach 5. Prior to excavation of the channel, sods would be removed and temporarily stockpiled for use in streambank treatments. Approximately six acres of wetland sod would be harvested and used to establish streambank vegetation. To the extent practical, streambanks would be constructed using sod that consists of diverse, native wetland species. Non-desirable grass species would be mechanically stripped and replaced with wetland sods in conjunction with the streambank restoration structures described in Section 2.2.4.

Salvage and Transplant of High Quality Wetland Plugs

The intent of the wetland plug salvage and transplant treatment is to establish locally sourced populations of herbaceous wetland plant species in newly constructed floodplain areas. Wetland plugs would be planted in low surfaces within floodplains, where microtopography treatments are applied to floodplain surfaces that lack roughness elements and vegetation. Reach 5B provides a good example of where this treatment would be utilized, as the removal of fill material necessitates floodplain construction. Wetland plugs would mostly be harvested from areas within construction extents, however appropriate donor sites outside of construction areas would be identified if additional herbaceous wetland plants are needed during restoration.

Salvage and Transplant of High Quality Riparian Shrubs

The Proposed Action Alternative proposes to decommission approximately three miles of the existing Pleasant Valley Road and fill and reclaim approximately 47,000 feet (8.9 miles) miles of existing drainage ditch. Portions of existing drainage ditches currently support woody riparian vegetation, mainly willow species, with an emergent wetland vegetation understory. While a majority of the shrubs are mature and decadent, younger shrubs would be prioritized for salvage and transplant. Riparian shrubs would be incorporated in streambank treatments. Mature and decadent riparian shrubs, as well as any available pine trees from the old rock pit quarry, would also be harvested and incorporated in vegetated wood matrix structures, and used in floodplain micro-topography treatments.

Containerized Plant Installation

The objective of containerized plant installation throughout floodplains and wetlands is to establish diverse native plant assemblages throughout the Refuge, supplementing the natural colonization of plants as well as wetland sod, wetland plug, and riparian shrub salvage and transplant actions. Much of the native vegetation that was historically within the landscape at the Refuge has been removed by land clearing and altered by cattle grazing. While the removal of cattle disturbance and a return of the land to a more natural state would result in natural vegetation recruitment to previously impacted areas over time, the introduction of diverse native species through containerized plant installation is necessary to jump-start ecological recovery. The natural ecological site potential for portions of the active floodplains and wetland areas at the Refuge is an herbaceous wetland (beaked sedge) habitat type, common in Montana adjacent to low gradient streams in wide valley bottoms (Hansen et al. 1995). Other riparian areas demonstrate willow-dominated ecological site potentials, including a Geyer Willow/Beaked Sedge Habitat Type (Hansen et al. 1995).

Historically, woody vegetation was present in patches along alluvial stream channels throughout the Refuge, particularly in areas that were subject to fluvial disturbance such as scour and deposition. To support restoration goals, woody plants would be incorporated along newly constructed stream channels. One to five gallon containerized shrubs would be planted within a 25 foot wide buffer on both sides of Pleasant Valley Creek for an approximate cover of 30 percent woody riparian vegetation. Woody planting would be focused on outside meander bends and would be integrated with streambank structures. Herbaceous wetland vegetation salvage and transplanting would supplement shrub planting in floodplain environments. All containerized plants would be protected from browse using fencing strategies. Weed mats would be installed on individual plants to provide a competitive advantage to aggressive non-native grasses, especially reed canarygrass (*Phalaris arundinacea*). Because of the dense herbaceous vegetation, some plants would be protected with rodent protection around the base to prevent girdling or cutting of the stems by voles and other rodents that occupy meadow habitats.

Invasive Species Control

The Refuge is mandated through federal policy to control or eradicate nonnative species. The Refuge would continue to monitor the presence of nonnative species including noxious weeds

and apply treatment to aggressive weeds that threaten native plant revegetation efforts. Noxious weeds observed on the Refuge include Canada thistle (*Cirsium arvense*), spotted knapweed (*Centaurea maculosa*), orange hawkweed (*Hieracium aurantiacum*), meadow hawkweed (*Hieracium caespitosum*), houndstongue (*Cynoglossum officinale*) and sulfur cinquefoil (*Potentilla recta*).

Reed canarygrass is also a problem invasive species at the Refuge due to its ability to form dense monotypic stands that reduce species diversity. Currently, reed canarygrass is widespread throughout the project area and eradication is not feasible. To the greatest extent practical, existing stands of reed canarygrass adjacent to the proposed new channel would be mechanically removed and replaced with high quality wetland sod mats. Sod mats that contain a high percentage of reed canarygrass or other noxious weeds would be used to fill and reclaim drainage ditches. Access routes and staging areas would not be located in areas where noxious weeds, in particular Canada thistle and spotted knapweed, are present. The spread of noxious weeds would be controlled during construction to the greatest extent practical. If deemed necessary, heavily infested patches would be controlled with herbicide or solarization treatments.

Continued monitoring and treatment of noxious weeds would be a component of the Proposed Action.

2.2.6 Drainage Ditch Reclamation

Approximately 47,000 feet (8.9 miles) of drainage ditches would be re-graded and filled in order to elevate the water table and improve the overall functions and values of existing wetlands. Most of the drainage ditch reclamation would occur following Phase 1 Pleasant Valley Road removal and relocation, including Dahl Lake outlet, and ditches associated with and in the vicinity of Reach 2, Reach 3, Reach 5, and Reach 6 of Pleasant Valley Creek (Figure 2-6). Ditches associated with and in the vicinity of Phase 2 Pleasant Valley Road removal and relocation would be reclaimed concurrent with or following Phase 2 road work. Prior to placing fill, existing high quality sods would be salvaged and temporarily stockpiled. Following placement and compaction of fill, sod mats would be placed to stabilize raw fill and control erosion. Depending on final earthwork quantities, some existing ditches would be converted to open water wetlands or shaped into shallow seasonal wetlands aligned with the natural topography of the surrounding ground. The estimated number of acres that would be restored or enhanced as a result of this action is summarized under Section 3.

2.2.7 Wetland Restoration

Implementation of the Proposed Action Alternative would result in approximately 221 acres of wetlands restored at the Refuge. Wetland restoration would be achieved through existing road obliteration, Pleasant Valley Creek channel and floodplain restoration, and drainage ditch reclamation. Road removal would occur in two phases, Pleasant Valley Creek channel and floodplain restoration would occur following Phase 1 of the road removal and relocation, and drainage ditch reclamation would occur following Phase 1, as well as during and following Phase 2 road removal and relocation. While providing many benefits to the aquatic and riparian

habitat and the ecosystem as a whole, the actions are also designed to restore wetlands throughout the Refuge.

Historical wetland conditions at the Refuge differ drastically from current conditions. Prior to railroad and road construction and land modifications to convert large areas of the Refuge to a working cattle ranch in the early 1900s, wetlands covered a large portion of the valley bottom. The Great Northern Railroad and subsequent Pleasant Valley Road construction bisected large wetland areas, and ditching of both wetland flow and Pleasant Valley Creek along roadsides resulted in a general lowering of groundwater tables and drying of wetland areas. Further, wetland drainage ditches were constructed to draw out hydrology from wetlands, for the purpose of converting wetlands to upland cattle and hay pasture.

The objective of wetland restoration in the Proposed Action Alternative is to restore Pleasant Valley wetlands to their pre-disturbance state. The restoration of Pleasant Valley Creek and its associated floodplain environments, and the fill of wetland drainage ditches, would restore groundwater connectivity and hydraulic flux in historical wetland areas that are currently uplands. The restoration actions would also improve wetland hydrology in the existing wetlands, which are remnants of the larger, pre-disturbance wetland areas. The obliteration and relocation of Pleasant Valley Road to upland areas would further improve wetland structure and function, resulting in improved lateral connectivity of wetland environments across the landscape.

2.2.8 Fish Passage Improvements

Under the Proposed Action Alternative, four existing roadway crossing structures would be replaced. Hydraulic structures would be designed to improve aquatic organism passage and to replicate the proposed geometries of the channels in Reach 2, Reach 3, Reach 5 and Reach 6. Structures would incorporate natural streambed sediment to maintain hydraulic and sediment transport conditions characteristic of a natural channel.

Chapter 3 Affected Environment and Environmental Consequences

This section provides a description of existing conditions of the affected environment at the Refuge, and presents the environmental consequences of both the No Action Alternative and the Proposed Action Alternative. Consequences from the implementation of alternatives are in the following three categories:

- **No/negligible impact:** The alternative has no or a negligible impact on the environmental resource, and implementation of the alternative would not significantly alter the existing condition of the resource.
- **Adverse impact:** The alternative has a negative effect on the environmental resource, and implementation of the alternative would degrade the existing condition of the resource.
- **Beneficial effect:** The alternative has a positive effect on the environmental resource. The resource would be enhanced or would benefit from the implementation of the alternative.

In addition, adverse impacts and beneficial effects can further be described as minor, moderate, or major. Minor adverse impacts would affect the resource in a minor capacity, and mitigation would likely not be necessary as the resource would be expected to recover from the impact and permanent losses would not occur. Moderate adverse impacts on an environmental resource would likely require some mitigation measures to compensate for negative impacts or losses to the resource. While some recovery is expected, the resource would not return to the pre-alternative implementation condition without intervention. Lastly, a major adverse impact to an environmental resource would require mitigation measures as recovery of the resource would not occur without intervention and permanent losses to the resource would be expected.

3.1 Air Quality

3.1.1 Existing Conditions

The project area is located in Montana Airshed 2 as defined by the Montana/Idaho Airshed Group. Air quality is regulated under the Flathead County Air Pollution Control Program. The purpose of the policy is to require the use of all available practicable methods to reduce, prevent and control air pollution in Flathead County. The project area is located outside of the Kalispell Air Pollution Control District. Ambient air quality is not currently measured at the Refuge. It is expected that low ambient concentrations of particulate pollutant would occur in this area based on nearby uses, condition of the existing Pleasant Valley Road travel surface, and lack of dust abatement in general. Air quality issues in the area are related to existing vehicle traffic on Pleasant Valley Road and adjacent spur roads, slash burning by adjacent land management agencies, and wildfires in the vicinity of the Refuge. Air quality and emissions presently meet

standards established by the Environmental Protection Agency (EPA) and Montana/Idaho Airshed Group.

The methods used to analyzed the potential effects of the proposed actions on air quality included the timing of construction, duration of construction, the associated Best Management Practices (BMPs) that would be employed during ground-disturbing activities, and long-term benefits of the road improvements that would be made under the Proposed Action Alternative.

3.1.2 Effects of the No Action Alternative on Air Quality

Under the No Action Alternative, existing air quality would remain unchanged and there would be no additional impacts to air quality. Wildfire and natural resource management activities on the Refuge and adjacent lands that affect air quality would continue. Improvements to Pleasant Valley Road would not be implemented and short-term increases in airborne dust emissions would continue to persist during high use traffic periods.

3.1.3 Effects of the Proposed Action Alternative on Air Quality

Under the Proposed Action Alternative, construction activities would increase airborne dust, but levels are not anticipated to exceed air quality standards. An increase in pollutant emissions is expected as a result of heavy equipment activity. The construction-related emissions would be temporary and localized with levels not anticipated to exceed air quality standards. Work would be performed during established work hours to minimize any direct and indirect effects on neighboring properties or visitors to the Refuge. In addition, BMPs would be applied to mitigate any potential impacts to air quality. Available technologies including the use of watering, mulching, and/or applying surfactants to existing native/gravel roads would be used where appropriate to minimize dust emissions. In general, these impacts would be localized and temporary.

3.2 Wetlands

3.2.1 Existing Conditions

Within the project area, a total of 107 acres of wetlands were documented in a routine wetland delineation conducted for the Refuge (Figure 3-1 on page 33, RDG 2014). Wetlands at the Refuge are classified as Palustrine Emergent, Palustrine Scrub-Shrub, Palustrine Forested, and Palustrine Open Water wetlands, with 92.9, 0.6, 0.5, and 6.0 acres, respectively (RDG 2014). The Palustrine system includes all freshwater wetlands dominated by hydrophytic plant species, and pond areas less than 20 acres in size with a maximum water depth of 6.6 feet (Cowardin et al. 1979). Open water wetlands within the project area at the Refuge consist exclusively of man-made features, including Upper and Lower Moose Ponds, Ray's Pond, and a stockwater pond located to the south of the refuge headquarters (Figure 3-1). In addition, riverine environments classified as Waters of the U.S. account for 7.4 acres, and include intermittent and perennial ditches and the perennial Pleasant Valley Creek flowing from Upper Moose Pond south and west to the western boundary of the refuge (Figure 3-1, RDG 2014). The wetland delineation project

area does not encompass Dahl Lake or land east of Dahl Lake, nor does it include a large open water and emergent wetland complex on the southwest of the refuge or any other isolated wetland areas within the Refuge but outside the extents of the project area.

Emergent wetland areas are dominated by herbaceous hydrophytic plants. Dominant species found in these environments include common beaked sedge (*Carex utriculata*), bigleaf sedge (*Carex amplifolia*), Bebb's sedge (*Carex bebbii*), common spikerush (*Eleocharis palustris*), baltic rush (*Juncus balticus*), reed canarygrass, and creeping meadow foxtail (*Alopecurus arundinaceus*). Other common introduced pasture grass species dominate many portions of emergent wetland communities. Scrub-shrub wetlands are identified where 30% or more of total plant cover at a wetland consists of woody shrub species. Willow (*Salix*) species dominate these environments, including Bebb willow (*Salix bebbiana*), Geyer's willow (*Salix geyeriana*), and Booth's willow (*Salix boothii*), and thinleaf alder (*Alnus incana*) in shrub form may also be present. Forested wetlands are identified at wetlands where 30% or more total plant cover consists of woody tree species, including thinleaf alder, ponderosa pine (*Pinus ponderosa*), and lodgepole pine (*Pinus contorta*) (RDG 2014).

Hydric soil is apparent throughout emergent, scrub-shrub, and forested wetlands, and while a majority of wetland soil is loamy in texture, a large area of peat, a true organic soil type, is found at the largest contiguous emergent wetland on site. Redoximorphic features in the soil are almost always present at some depth at Refuge wetlands. Wetland hydrology is also always present at delineated wetland sites at the Refuge. Common indicators of wetland hydrology include the presence of surface water, a water table within 12 inches of the soil surface, and soil saturation within 12 inches of the soil surface (RDG 2014).

Wetlands within the Refuge have been extensively modified by historical land use practices. The extent and quality of wetlands has been reduced through railroad and road infrastructure and land modifications for cattle ranching, grazing, and haying operations. Construction of the Great Northern Railroad through the Refuge occurred in the late 1800s. Along with the construction, a large proportion of Pleasant Valley Creek flowing through the Refuge was ditched, resulting in stream and floodplain disconnection and a general lowering of groundwater tables which adversely affected adjacent emergent and scrub-shrub wetlands. Following railroad decommissioning in 1904, part of Pleasant Valley Road was built on top of the railroad grade. Wetland environments continue to be impacted by the transportation infrastructure as it often bisects historical wetland environments.

Wetlands at the Refuge were also ditched and drained in the early 1900s for the purpose of converting wetlands to cattle and hay pasture. Irrigation canals were built during the same time and also function as wetland drains. Groundwater tables and wetland hydrology are especially sensitive to ditching, and the lowering of water tables throughout the Refuge resulted in a vastly different wetland landscape than historical conditions. Existing wetlands today are remnants of more expansive wetlands present on-site in the 1800s prior to large scale land modifications. While much of the historical wetland area is characterized by hydrophytic vegetation and hydric soil, wetland hydrology is absent due to extensive land modifications. Dahl Lake and the surrounding emergent marsh wetland environment were especially modified in the early 1900s

with the construction of a large ditch at the downstream (west) end of the lake, which accommodated Dahl Lake flow west through the Refuge. Restoration of the Dahl Lake environment in the 2000s has resulted in the expansion of the lake to near-historical extents, and the resultant groundwater table increase is aiding the recovery of the emergent marsh wetland component.

3.2.2 Effects of the No Action Alternative on Wetlands

Under the No Action Alternative, no additional impacts to wetlands would occur. Wetland environments would continue to be affected by the existing road infrastructure which often bisects historical wetland areas. Not only influencing the physical structure and location of wetlands at the Refuge, the function of wetlands especially as wildlife habitat is also diminished with road traffic through wetlands. In addition, roads are effective vectors for nonnative invasive plant species introductions, and traffic on Pleasant Valley Road would continue to contribute invasive plants and noxious weeds to wetlands within the Refuge.

The ditched Pleasant Valley Creek would continue to be disconnected from historical floodplains, minimizing riparian wetland area. The wetland drainage ditch network would continue to effectively draw hydrology out of wetlands and keep a portion of historical wetland area as upland pasture. The continued presence of wetland drainage ditches and the maintenance of Pleasant Valley Creek as a ditch would result in the persistence of a lower groundwater table environment than would naturally occur in the area. As wetlands are often sustained by high groundwater levels, the altered hydrology resulting from the preservation of wetland and creek ditches throughout the Refuge would result in the continuance of wetlands as remnant features of more expansive historical wetlands.

3.2.3 Effects of the Proposed Action Alternative on Wetlands

Implementation of the Proposed Action Alternative would have a major beneficial effect on wetlands within the Refuge. Restoration of Pleasant Valley Creek, including the re-establishment of stream and floodplain connection, would restore riparian wetland communities along the floodplain corridor. Subsequently, revegetation of the floodplain with native shrub and emergent species would allow a shift to a shrub-dominated wetland community in a large proportion of the floodplain, which is the probable historical condition prior to land modifications and cattle grazing. While directly affecting wetlands on newly-connected floodplains, restoration of the creek would also raise groundwater levels in the valley bottom and result in the restoration of wetland hydrology to adjacent historical wetlands.

A three mile portion of Pleasant Valley Road would be relocated to an upland location, and the old road bed would be decommissioned with elevations matching the historical valley bottom wetlands. The restored Pleasant Valley Creek would meander uninterrupted through the historical meander pattern that was active prior to creek ditching associated with railroad and road construction. Marginally upland areas on the valley bottom currently lacking wetland hydrology, which historically supported wetlands as evidenced by the presence of wetland

vegetation and wetland soil or relict wetland soil features, would likely return to wetlands as hydrology is restored.

Approximately 47,000 lineal feet of ditch, which includes wetland drainage ditches, irrigation canals, roadside ditches, the ditched outlet of Dahl Lake, and the ditched Pleasant Valley Creek, would be filled. These actions, along with restoration of Pleasant Valley Creek and the relocation of a portion of Pleasant Valley Road, would result in approximately 221 acres of restored wetlands, not including area classified as Waters of the U.S. Table 3.1 provides a summary of wetlands by type as well as the projected wetland acreage, and Figure 3.1 illustrates existing and projected wetland distribution within the project area at the Refuge.

Table 3.1. Existing and projected wetland area under the Proposed Action Alternative.

Wetland Type	Existing (acres)	Projected (acres)	Change (acres)	Change (%)
Emergent	92.9	292.2	199.3	215
Scrub-shrub	0.6	26.1	25.5	4,250
Forested	0.5	0.1	-0.4	-80
Open Water	6.0	2.8	-3.2	-53
Riverine (Waters of the U.S.)	7.4	8.6	1.2	16
Total	**107.4**	**329.8**	**222.4**	**207 %**

Wetland restoration would occur in areas that are currently upland but were wetland prior to land modifications. The majority of wetlands restored at the Refuge would be Palustrine Emergent Wetlands, with hydrophytic herbaceous plant species dominating the vegetation. Native shrub planting would occur along the Pleasant Valley Creek floodplain in conjunction with the stream restoration, resulting in a Palustrine Scrub-Shrub wetland component on floodplain environments. Some filled roadside ditches would also support scrub-shrub wetlands where willow communities currently exist. Wetland enhancement would occur on approximately four acres. The man-made Lower Moose Pond and Ray's Pond would be converted from open water to emergent wetland. The old stockwater pond to the south of the refuge headquarters would be enhanced by adjusting pond depths and removing the upland dredge spoil berm on the south edge of the pond.

Minor adverse impacts to existing wetlands would occur in association with drainage ditch fill placement. Currently, most drainage ditches are riverine features bracketed by narrow emergent wetlands. While the placement of fill material would impact these wetlands, a full recovery is expected to occur with time as wetland hydrology is restored, soils are inundated or saturated for a long enough period of time for hydric soil indicators to develop in the upper portion of soil, and wetland vegetation is re-established on fill material surfaces. In addition, all available high quality wetland vegetation sod would be stripped from ditches prior to fill placement and positioned on top of ditch fill, accelerating wetland recovery. A permanent loss to wetlands through drainage ditch filling is not expected to occur.

Overall, the structure and function of wetlands at the Refuge would significantly benefit from implementation of the Proposed Action Alternative. The total area and biodiversity of wetlands would increase, as would floodwater attenuation and storage, and the filtration of nutrients, sediment, and pollutants in the system (RDG 2014). Other beneficial impacts of the Proposed Action on wetlands include an improvement in wildlife habitat and aesthetics and recreational opportunities for human populations.

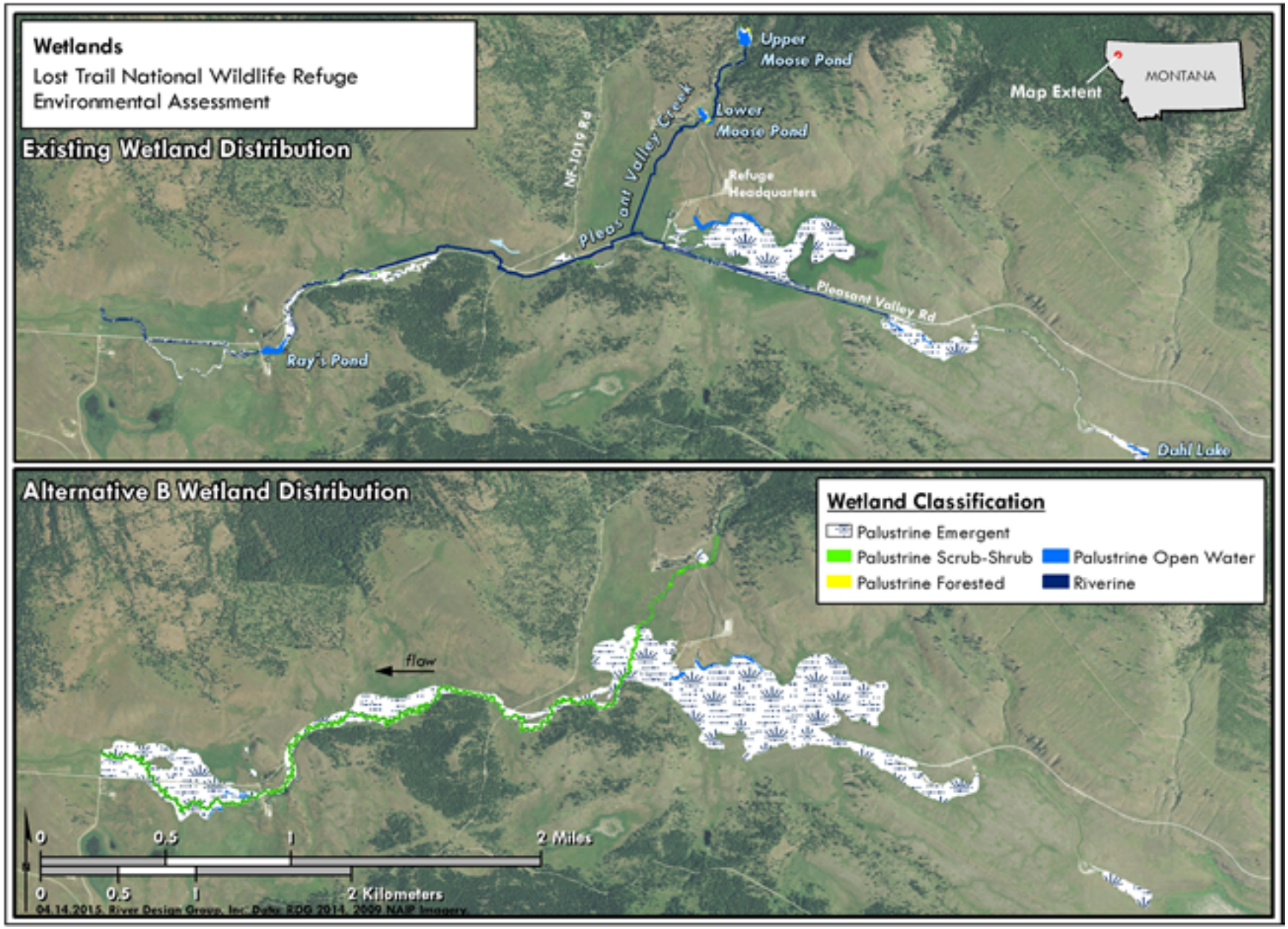

Figure 3-1. Distribution of wetlands under existing conditions and with implementation of the Proposed Action Alternative.

3.3 Stream Channels and Fisheries

3.3.1 Existing Conditions

The Refuge is located in a long, narrow east to west trending valley formed by continental glaciation. Pleasant Valley Creek is the principal stream and aquatic resource and drains a watershed area of approximately 53 square miles, originating in the Salish Mountains north of the Refuge headquarters. Pleasant Valley Creek is joined by the Meadow Creek ditch, which drains from the west end of Dahl Lake. The ditch was partially reclaimed by the NRCS in 2005 to restore the hydrology of Dahl Lake located in the eastern portion of the Refuge. Pleasant Valley Creek flows west and drains into the Pleasant Valley Fisher River, a tributary to the Fisher River.

In the 1890s and early 1900s, a majority of Pleasant Valley Creek was diverted into a series of constructed drainage ditches to accommodate construction of the Great Northern Railroad and to drain the vast wetland complexes for the purpose of improving agricultural production. These actions shortened Pleasant Valley Creek by approximately 44%, or 10,940 feet (2.1 miles), resulting in channel entrenchment, floodplain disconnection, and impaired stream channel morphology.

Prior to USFWS acquiring the Refuge in 1999, lands within the Refuge were primarily used for livestock grazing and agriculture. Grazing was concentrated in riparian and wetland areas adjacent to Pleasant Valley Creek which displaced a majority of the native riparian vegetation. As described in Section 2, undersized culverts and irrigation impoundments at Ray's Pond and Lower and Upper Moose Ponds also impact fish passage throughout the Refuge. On-stream impoundments impair fluvial processes including the transport of flow and sediment from the upper headwaters to the middle and lower reaches of Pleasant Valley Creek.

Surveys conducted by Montana Fish, Wildlife & Parks (MFWP) in the Pleasant Valley Fisher River drainage between 1993 and 2000 reported that brook trout (*Salvelinus fontinalis*) and redside shiner (*Richardsonius balteatus*) were the only species sampled in the area of the Refuge. Downstream of the Refuge, species captured included brook trout, mountain whitefish (*Prosopium williamsoni*), redside shiner, large scale sucker (*Catostomus macrocheilus*), northern pike minnow (*Ptychocheilus oregonensis*), longnose dace (*Rhinichthys cataractae*), and torrent sculpin (*Cottus rhotheus)*. No cutthroat species were captured in the samples.

Primary limiting factors affecting fisheries include water temperature and simplified aquatic habitat conditions resulting from ditching and land use practices. Ponding and channeling of water have decreased stream depth and length, and extensive sections of streambank are denuded of native vegetation, leading to increased water temperature and siltation. Pleasant Valley Creek does not currently support native fish species including redband trout (*Oncorhynchus mykiss gairdnerii*), westslope cutthroat trout (*Oncorhynchus clarki lewisi*), or bull trout (*Salvelinus confluentus*) (Hensler 2001). According to USFWS, it is probable that redband trout historically occurred in Pleasant Valley Creek, but current water temperature is limiting and excessive

sedimentation from land use practices and channel erosion limit the availability of suitable habitat. According to MFWP, Pleasant Valley Creek affects downstream water quality in the greater Pleasant Valley Fisher River drainage by introducing warm water and sediment which can impact the native cold water fishery.

3.3.2 Effects of the No Action Alternative on Stream Channels and Fisheries

Under the No Action Alternative, stream channels on the Refuge would continue to function in a degraded state. Historical floodplain surfaces would remain disconnected from Pleasant Valley Creek, and aquatic habitat conditions would remain impaired. Existing impoundments at Ray's Pond and Lower and Upper Moose Ponds, and undersized culverts, would continue to impact fish passage and fluvial processes in Pleasant Valley Creek. Existing ditches conveying Pleasant Valley Creek would continue to enlarge and deepen which would further alter wetland hydrology and add sediment to the stream system. Lack of cover and shade to the channel would persist, further contributing to downstream water quality impairment in the Pleasant Valley Fisher River drainage.

3.3.3 Effects of the Proposed Action Alternative on Stream Channels and Fisheries

Implementation of the Proposed Action Alternative would have a major beneficial effect on stream channels and fisheries within the Refuge. In the short term, restoration actions would set the stream and floodplain system on a trajectory of self-sustaining ecological processes that support multiple functions including maintaining clean water, regulating stream temperatures, minimizing sediment inputs, improving aquatic habitat, and restoring drained historical wetland complexes. The restoration plan would restore approximately 30,222 feet (5.7 miles) of Pleasant Valley Creek using a variety of restoration techniques and treatments. Stream length would increase by 56% compared to existing conditions. Re-establishing functioning stream channels with improved riffle and pool habitat features would significantly improve native fish habitat in the project area. Constructing narrower stream channels with vegetated streambanks would help moderate water temperatures and mitigate downstream impacts to the native coldwater fishery in the Pleasant Valley Fisher River drainage. In addition to these benefits, reconnecting floodplain surfaces with Pleasant Valley Creek would facilitate the restoration of approximately 221 acres of wetlands on the Refuge.

3.4 Floodplains

3.4.1 Existing Conditions

Surface hydrology and groundwater tables have been significantly altered in Pleasant Valley due to railroad and road construction and historical land use practices. The largely ditched Pleasant Valley Creek is currently characterized by entrenchment and floodplain disconnection. Minimal floodplain surfaces exist to dissipate flood energy, leading to further scour and stream incision over time. Floodplains in the project area are currently limited to approximately 8 acres, and where they exist, occur as narrow bands that bracket the channel. Prior to land modifications at the Refuge, a majority of Pleasant Valley Creek floodplains included shrub species in the

overstory, as indicated by the presence of decadent willow shrubs lining the historic channel pattern in Reach 5. Currently, floodplains at the Refuge are dominated by the invasive reed canarygrass and other non-native pasture grasses, limiting the function of remaining floodplains.

3.4.2 Effects of the No Action Alternative on Floodplains

Under the No Action Alternative, floodplain extent, structure, and function would continue to be limited. Pleasant Valley Creek would continue to be disconnected from historical floodplains, and floodplain area would gradually decrease as Pleasant Valley Creek continues to incise and further disconnect from floodplain environments.

3.4.3 Effects of the Proposed Action Alternative on Floodplains

The Proposed Action Alternative would have a major beneficial effect on floodplains within the Refuge. An increase from 8 acres to approximately 61 acres of Pleasant Valley floodplains would occur following restoration, as the stream is connected to historical floodplain areas. The restoration of riparian shrub communities to floodplains would further augment the natural function of floodplains at the Refuge. Beneficial effects to aquatic, riparian, and wetland habitats would be considerable, including overall improvements to Pleasant Valley Creek water quality. Floodplains play an important role in stream shading, flood water dissipation, sediment settling and storage, and excess nutrient filtration. The implementation of the Proposed Action would ensure a natural, dynamic, and complex relationship between Pleasant Valley Creek and floodplain environments, improving aquatic and riparian habitat as well as water quality.

3.5 Water Quality and Beneficial Uses

3.5.1 Existing Conditions

The Montana Department of Environmental Quality classifies all surface water on the Refuge as B-1. Waters classified B-1 are to be maintained suitable for drinking, culinary, and food processing purposes after conventional treatment; bathing, swimming, and recreation; growth and propagation of salmonid fishes and associated aquatic life, waterfowl and furbearers; and agricultural and industrial water supply. Water quality in Pleasant Valley Creek is currently impaired from increased temperatures which affect the salmonid fishery and other aquatic organisms. Higher than average sediment loading and siltation resulting from bank erosion and a lack of streambank vegetation also negatively impact aquatic life. These impairments are a consequence of the ditching of Pleasant Valley Creek, disconnection of the stream and floodplain environment, land clearing for agricultural and grazing land use practices, and continued cattle grazing at the refuge for most of the 1900s.

3.5.2 Effects of the No Action Alternative on Water Quality and Beneficial Uses

The No Action Alternative would have no effect on water quality and beneficial uses associated with Pleasant Valley Creek and other aquatic resources on the Refuge. Pleasant Valley Road would continue to be actively maintained in its current alignment. Pleasant Valley Creek would

remain channelized and on-stream impoundments would continue to impact fluvial processes and fish passage.

3.5.3 Effects of the Proposed Action Alternative on Water Quality and Beneficial Uses

Implementation of the Proposed Action would have a major beneficial effect on water quality and beneficial uses. Increases to floodplain and wetland area throughout the refuge would improve flood water retention, sediment storage, and nutrient cycling, resulting in improved water quality in Pleasant Valley Creek. Fish passage would be improved with the removal of on-stream impoundments, and growth and propagation of salmonids and other aquatic life would increase along with the increase of diverse in-stream habitat including pool and riffle sequences. Stream shading provided by riparian vegetation and lower channel width to depth ratios would further improve conditions for the cold water fishery by reducing temperatures. In addition, approximately 3.03 miles of Pleasant Valley Road would be decommissioned and re-routed to upland areas, decreasing road impacts to stream and wetland environments such as fine sediment inputs, and improving water quality, wildlife habitat, as well as recreational opportunities throughout the Refuge.

3.6 Geology

3.6.1 Existing Conditions

The geology of the Refuge and surrounding area is characterized by the Belt Supergroup (Figure 3-2). The sedimentary rock formations were deposited during the Mesoproterozoic Era between 1,470 and 1,400 million years ago in the Precambrian Eon (Evans et al. 2000). One of the largest, deepest, and most exposed ancient rock formations on earth's surface, the basin was exposed by the continental plate collision and uplift that formed the Rocky Mountain chain around 80 million years ago. The Prichard Formation of the Belt Supergroup is the most prominent geologic formation at the project site (Figure 3-2), and is the lowest unit of the Belt Series (Cressman 1985). Up to 20,000 feet thick, the Prichard Formation is an accumulation of sediments mainly comprised of sandstones and mudstones (Cressman 1985).

Glaciation during the Quaternary Period, starting approximately 2.58 million years ago and lasting to the present, has shaped Pleasant Valley. Along with smoothing of the Belt Supergroup rocks, glaciers left behind lateral and terminal moraines in the valley during the glacial retreat which occurred beginning with the transition to the Holocene Epoch roughly 12,000 years ago (Ross et al. 1995, Raines and Johnson 1996). These moraines can be seen throughout the Refuge as unconsolidated masses of boulders, cobbles, pebbles and sand. Glacial retreat also formed Dahl Lake, a kettle lake created by glacial meltwater. In addition, deposits of alluvium are present throughout Pleasant Valley, and consist of unconsolidated silt, sand, and gravel shaped and deposited by flowing water. Glacial lake deposits are seen to the north and south of the Refuge (Raines and Johnson 1996).

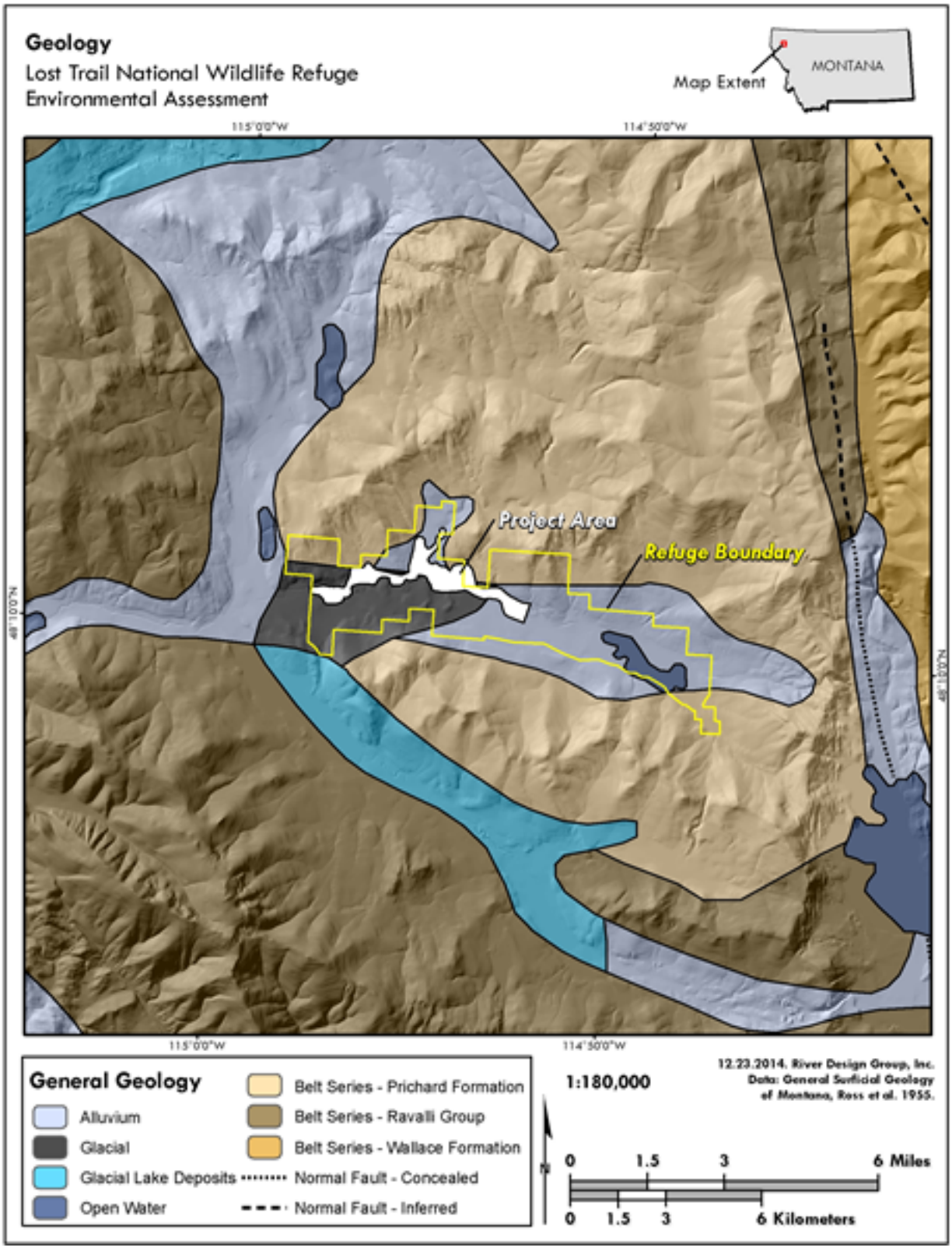

Figure 3-2. General surficial geology of the project area.

3.6.2 Effects of the No Action Alternative on Geology

The No Action Alternative would have no impact on Refuge geology.

3.6.3 Effects of the Proposed Action Alternative on Geology

Implementation of the Proposed Action Alternative would have negligible impacts on Refuge geology. The restoration of Pleasant Valley Creek would result in a negligible impact to alluvial deposits in areas where the restored channel is constructed outside the historical channel pattern. However, a majority of channel restoration would consist of redirecting stream flow from ditches to historical channel patterns currently on the landscape. New road construction would have the potential to disturb alluvial and glacial subsurface deposits, however the effects are minimal and would be mitigated through design of the road alignment and elevations. Roadway design would include design strategies to mitigate and avoid any potential impacts to Refuge geology. Other actions of the Preferred Alternative would have no effect on underlying geology.

3.7 Soils

3.7.1 Existing Conditions

The U.S. Department of Agriculture Natural Resources Conservation Service (NRCS) has mapped eight major soil units within the project area at the Refuge (Figure 3-3). Much of the valley bottom consists of Meadowpeak-Blacklake-McGregor complex soils, mostly characterized as silt loams and loams with parent materials of alluvium, organic matter over alluvium, and volcanic ash over alluvium and/or lacustrine deposits (NRCS 2010). The Blacklake component includes mucky peat in the top 14 inches of the soil profile, an organic soil type. Depth to water table ranges from 0 to 24 inches below soil surface (NRCS 2010). Another notable soil unit in the valley bottom is Barzee mucky peat, a true organic soil type that is very poorly drained and has depth to water of 0 to 12 inches below the surface (NRCS 2010). Mucky peat is classified as a hydric soil and its presence in the top of a soil profile is a good indicator of wetland conditions at a site.

Other notable mapped soil units within the project area at the Refuge include the Lostpraire-Whitebear complex, the Whitebear-Dahlake complex, the Blackcreek-McGregor-Tallcreek complex, the Perma-Quast-Totelake complex, and the Finleypoint-Haskillpass-Wimper complex. Most are silt to loam textures, with sands and gravel components common at eskers and glacial outwash plains (NRCS 2010). Depth to water table for these soil units is between 24 and 48 inches on valley bottoms, and greater than 80 inches on hillsides with 4 to 15 percent slopes (NRCS 2010).

Especially at valley bottom locations throughout the refuge, parent materials of soils reflect the glacial history of the valley and volcanism of the Northwest U.S. Fluvial processes also shaped a large portion of the soils at the Refuge. Volcanic ash over glaciolacustrine or lacustrine deposits, volcanic ash over alluvium, lacustrine deposits, alluvium, or till derived from quartzite are parent materials of many of the soils mapped in the project area (RDG 2014, NRCS 2010).

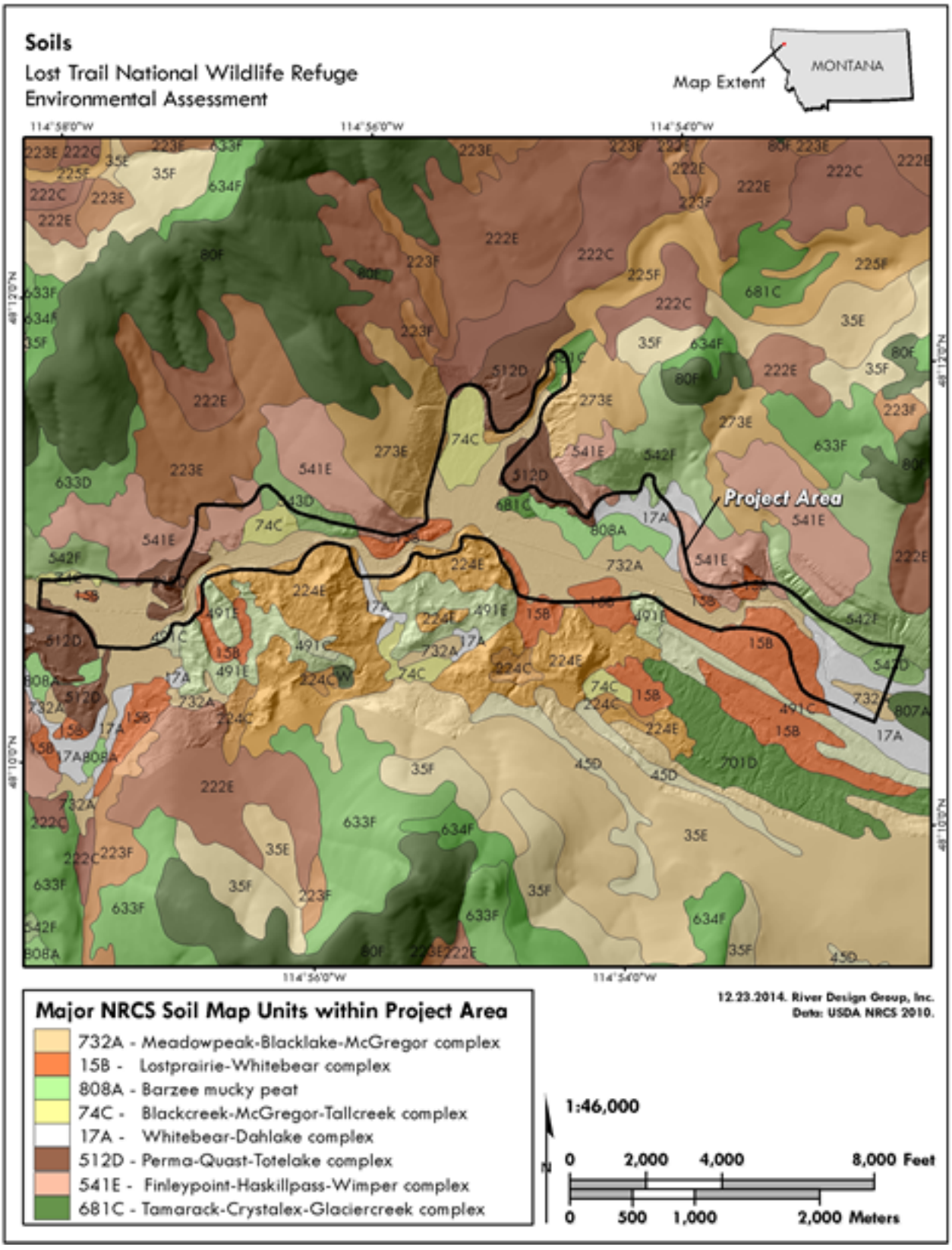

Figure 3-3. NRCS Soil Map Units within the project area and vicinity.

3.7.2 Effects of the No Action Alternative on Soils

The No Action Alternative would have no impact on soils throughout the Refuge.

3.7.3 Effects of the Proposed Action Alternative on Soils

Implementation of the Proposed Action Alternative would have minor to moderate impacts, as well as moderate beneficial effects on soils within the project area. While much of the stream restoration consists of reactivating the historical channel pattern that was active prior to land modifications, new channel and floodplain construction would also occur. This action would result in some disturbance of the Meadowpeak-Blacklake-McGregor complex soils where the channel is constructed. Similarly, soils at Lower Moose Pond and Ray's Pond would be disturbed as the shallow ponds are converted to emergent wetland features with an active stream channel meandering through each. Any soil disturbance and displacement associated with stream restoration, however, would be minor and soils are expected to fully recover from the impact.

Soil disturbance would also occur in association with the 47,000 lineal feet of ditches proposed to be filled as part of Proposed Action Alternative implementation. For the majority of ditches, ditch excavation soil is present on-site, and ditches would be filled with the material originally excavated during ditch construction. Approximately 11.1 acres of soils would be restored, resulting in a beneficial effect to soils as pre-disturbance conditions are realized.

Approximately 13.8 acres of existing road surfaces would be reclaimed and converted to upland and wetland soils under the Proposed Action. Soils are expected to fully recover from road reclamation activities, and a beneficial effect to the resource would occur as road and railroad bed material is removed and historical valley bottom and wetland elevations are re-established.

Road building activities would have a moderate impact on upland soils where the new road prism is established, as soil displacement would occur within the footprint of the new roadway. Approximately 35.7 acres of upland soil would be impacted under the Proposed Action. In addition, minor short-term impacts to soils would occur in temporary construction impact areas, including material staging areas and access routes. Best Management Practices would be employed during construction to minimize the temporary displacement and erosion of soils, including avoidance of sensitive soils and wetland areas, installation of silt fences, and other reasonable soil and water conservation practices. Soils are expected to fully recover as construction equipment and materials are removed and the areas reclaimed.

3.8 Vegetation

3.8.1 Existing Conditions

The majority of the project area lies within the Northern Rocky Mountain lower montane, foothill and valley grassland ecosystem, located in the Pleasant Valley lowlands and foothills (Figure 3-4). Native bunchgrasses such as bluebunch wheatgrass (*Pseudoroegneria spicata*), intermediate wheatgrass (*Agropyron intermedum*) and Idaho fescue (*Festuca idahoensis*) are common throughout this ecosystem, which occurs at low to mid elevations mountains and mountain valleys in the Northwest U.S. (Aycrigg et al. 2013). However, nonnative pasture grasses dominate most foothill and valley grasslands within the project area, including Kentucky blue grass (*Poa pratensis*), common Timothy grass (*Phleum pratense*), field meadow foxtail (*Alopecurus pratensis*), quack grass (*Elymus repens*), and creeping bentgrass (*Agrostis stolonifera*), all common pasture grasses and palatable cattle feed likely introduced to the area during cattle ranching operations (RDG 2014). Shrub species occupy less than 30% of total plant cover in the grassland ecosystem, and often include shrubby cinquefoil (*Potentilla fruticosa*), and common snowberry (*Symphoricarpos albus*).

Reed canarygrass and creeping meadow foxtail (*Alopecurus arundinaceus*) dominate many of the emergent wetland environments at the Refuge. Both species are nonnative introduced grasses which are palatable to livestock. Reed canarygrass is especially invasive in wetland environments and has formed monocultures in many wet meadow locations within the Refuge. It spreads by underground rhizomes as well as by seed, and outcompetes native wetland vegetation for light, water, and nutrients. Creeping meadow foxtail often co-exists with reed canarygrass, and is much more palatable to livestock as well as wildlife than reed canarygrass. Other wetland species include native and introduced sedges, rushes, and forbs. Wetland vegetation is described in detail in Section 3.2.1.

The project area occupies the lowland valley that is surrounded by Northern Rocky Mountain dry-mesic and mesic montane mixed conifer forest. Dominant forest overstory vegetation includes ponderosa pine (*Pinus ponderosa*), lodgepole pine (*Pinus contorta*), western larch (*Larix occidentalis*), and Douglas fir (*Pseudotsuga menziesii*). Black cottonwood (*Populus trichocarpa*), quaking aspen (*Populus tremuloides*), and willow (*Salix*) species also occur in and in the vicinity of riparian areas. Forests on the south of the Refuge include mainly lodgepole pine, while northern portions of the refuge are often dominated by ponderosa pine and western larch (RDG 2014). Common forest understory composition includes kinnikinnick (*Arctostaphylos uva-ursi*) and creeping Oregon-grape (*Berberis repens*), as well as grasses and shrubs also present in the surrounding grassland ecosystem.

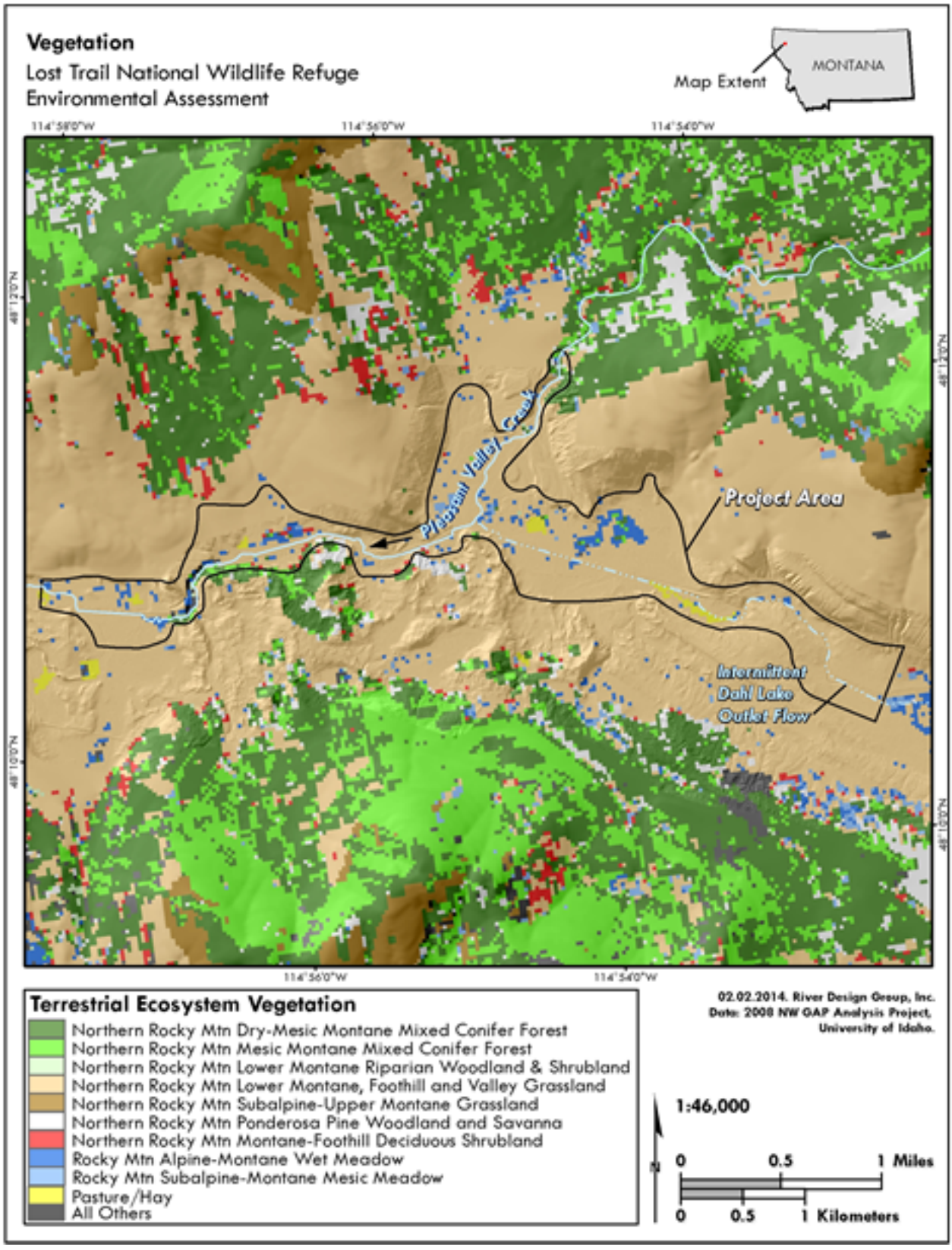

Figure 3-4. Terrestrial ecosystem vegetation of the project area and vicinity.

3.8.2 Effects of the No Action Alternative on Vegetation

The No Action Alternative would have no impact on vegetation within the Refuge. Wetland vegetation would continue to be adversely impacted by the existing drainage ditch network, which draws water out of wetlands and keeps a portion of historical wetland area as upland pasture. Upland grassland vegetation would continue to exist as a mixture of native and nonnative grasses and shrubs, and tree species, especially lodgepole pine, would continue to encroach into lowland grasslands.

3.8.3 Effects of the Proposed Action Alternative on Vegetation

Implementation of the Proposed Action Alternative would have a major beneficial effect on wetland vegetation as described in Section 3.2.3. A moderate adverse impact would occur on upland vegetation where the new road prism is constructed and in materials staging areas and haul routes. Forest vegetation would not be affected as all construction associated with the Proposed Action Alternative would occur outside of forest ecosystems.

The new road would traverse through Northern Rocky Mountain lower montane, foothill, and valley grassland. Nonnative as well as native grasses would be affected, as well as shrubby areas within upland swales. Grasslands dominated by the native bluebunch wheatgrass and Idaho fescue, and the nonnative pasture grasses Kentucky blue grass, quack grass, and creeping bentgrass would be permanently impacted by the constructed road prism. Swale features dominated by shrubby cinquefoil would be impacted by a larger road footprint as additional fill material placement would be necessary to accommodate the road traversing through depressional areas. These swale features result from ephemeral water flow especially during high precipitation events, which last for short periods of time and likely do not occur in all years (RDG 2014).

Temporary adverse impacts to upland vegetation would also occur within construction materials staging areas and on temporary access routes used for the road construction, stream restoration, and wetland restoration portions of the Proposed Action Alternative. All staging areas and access routes would be located such that minimal impacts to environmental resources would occur. These areas would be fully reclaimed following construction activities and seeded with appropriate native grassland species, and permanent losses to vegetation would not occur with appropriate management of the temporarily impacted areas.

3.9 Waterfowl

3.9.1 Existing Conditions

Waterfowl often use open water and emergent wetland environments for breeding, migration, and wintering habitat, and are dependent on a wide range of environmental conditions to fulfill habitat requirements. Necessary to successful wetland utilization by waterfowl is the availability of high quality wetland habitat, which includes a diversity of plant species available for forage and cover, a variety of standing water depths, and the absence of disturbance. Some waterfowl nest in upland areas adjacent to wetland habitat, thus the availability of high-quality upland habitat is also essential for many species (Fredrickson and Reid 1988).

Much of the wetlands and adjacent uplands at the Refuge are degraded due to historical land use practices and invasive plant species introductions. As discussed in Section 3.2.1, existing wetlands are remnants of more expansive wetlands present in Pleasant Valley prior to land modifications. Even with the large-scale habitat modifications and disturbance, however, a large number of waterfowl has been documented utilizing wetland and riparian habitats at the Refuge. The following species have been observed at the Refuge since its inception: Snow Goose (*Chen caerulescens*), Canada goose (*Branta canadensis*), Trumpeter Swan (*Cygnus buccinator*), Tundra Swan (*Cygnus columbianus*), Wood Duck (*Aix sponsa*), Gadwall (Anas strepera), American Wigeon (Anas Americana), Mallard (*Anas platyrhynchos*), Blue-winged Teal (*Anas discors*), Cinnamon Teal (*Anas cyanoptera*), Northern Shoveler (*Anas clypeata*), Northern Pintail (*Anas acuta*), Green-winged Teal (*Anas carolinensis*), Canvasback (*Aythya valisineria*), Ring-necked Duck (*Aythya collaris*), Lesser Scaup (*Aythya affinis*), Bufflehead (*Bucephala albeola*), Common Goldeneye (*Bucephala clangula*), Barrow's Goldeneye (*Bucephala islandica*), Hooded Merganser (*Lophodytes cucullatus*), Ruddy Duck (*Oxyura jamaicensis*), Common Loon (*Gavia immer*), Pied-billed Grebe (*Podilymbus podiceps*), Horned Grebe (*Podiceps auritus*), Red-necked Grebe (*Podiceps grisegena*), Eared Grebe (*Podiceps nigricollis*), and Double-crested Cormorant (*Phalacrocorax auritus*). A few are Montana species of concern and discussed further in Section 3.10 below.

3.9.2 Effects of the No Action Alternative on Waterfowl

The No Action Alternative would have no effects on waterfowl at the Refuge. Wetlands would continue to be impacted by wetland drainage ditches and lowered water tables. Wetland habitat available for waterfowl breeding, migration, and wintering would persist as smaller fragments of the historical wetland area at the Refuge, proving less overall area and biodiversity than was historically present.

3.9.3 Effects of the Proposed Action Alternative on Waterfowl

The Proposed Action Alternative would have a major beneficial effect on waterfowl populations. With the implementation of restoration actions including road relocation, drainage ditch filling, creek restoration and floodplain and creek connection, a general rise in groundwater levels would expand wetland area to near-historical extents. Over time, wetland habitat has the potential to increase from a total area of 107 acres to an area of 330 acres at the Refuge, providing 221 additional acres of wetland habitat for waterfowl species than currently exists. Most of the increases to wetland area would be to emergent wetland environments. Wetlands would be allowed to recover naturally following groundwater table increases, and the time to wetland recovery would depend especially on the restored hydrologic regime and future climate conditions.

While open water wetland areas with emergent fringe environments are often preferred by waterfowl species, emergent wetlands provide important forage and breeding grounds for many marsh birds. In addition, both shallow and deep emergent wetlands would be restored as a result of the Proposed Action Alternative implementation. Deep emergent wetlands are usually inundated by six inches to three or more feet of standing water during the growing season (Shaw

and Fredine 1971), providing inundated habitat with ample food sources for waterfowl to utilize. In addition, previous Dahl Lake restoration actions have increased waterfowl and shorebird populations at the Refuge. Implementation of the Proposed Action Alternative would lead to a further increase in shorebird use of the Dahl Lake environment.

3.10 Species of Concern, Threatened and Endangered Species and Critical Habitat

3.10.1 Existing Conditions

Many plant and animal species which are on the Montana Species of Concern List are found at the Refuge. Montana species of concern are native species of plants or animals classified as at-risk due to declining populations in Montana (MT NHP and MT FWP 2015). Designation as a species of concern is based on the Montana status rank and is not a regulatory classification (MT NHP and MT FWP 2015). Some of the Montana species of concern are also listed as threatened under the Endangered Species Act (ESA). An ESA threatened species is likely to become endangered in the near future, while an endangered species is at risk for extinction throughout all or a portion of its range (USFWS 2013). Both ESA listed threatened and endangered species are protected federally, however most of the legal protections and prohibited actions against listed species apply only to ESA endangered species. In addition, the ESA affords the designation of critical habitat to areas of land which are critical to the conservation of an ESA listed species. Critical habitat may not necessarily be currently occupied by the species, however they contain biological or physical features that are essential to the conservation of the species (USFWS 2013).

Four plant species that occur at the Refuge are currently listed as Montana species of concern. These include bigleaf sedge (*Carex amplifolia*), hutchinsia (*Hornungia procumbens*), scalepod (*Idahoa scapigera*), and Spalding's catchfly (*Silene spaldingii*) (Lesica 2014). Only bigleaf sedge and Spalding's catchfly are found within the project area at the Refuge. Bigleaf sedge is found in locations along the ditched Pleasant Valley Creek, as well as in some isolated wetland locations. Spalding's catchfly is found primarily in upland meadow and prairie habitats surrounding the project area (Figure 3-5). Spalding's catchfly was originally discovered in 2003 on the Refuge (MT NHP 2005). In general, the rare plant is found in open, mesic (moist) grassland communities at elevations ranging from 1,200 to 5,300 feet, usually in deep, productive loess soils (USFWS 2005). Spalding's catchfly is also listed as an ESA threatened species. No critical habitat designations have been made for the rare plant.

Three animal species that may occur in the vicinity of the Refuge are listed as both Montana species of concern and ESA threatened species. These include Canada lynx (*Lynx canadensis*), grizzly bear (*Ursus arctos*), and bull trout (*Salvelinus confluentus*). Canada lynx has designated critical habitat in the mountains directly surrounding the Refuge. Grizzly bear range includes Pleasant Valley, as a male, collared grizzly bear has been documented crossing the Refuge in the spring of 2012. Bull trout and other native species of concern including westslope cutthroat trout have not been documented in Pleasant Valley Creek, however they do occur in the larger Pleasant Valley Fisher River watershed and have the possibility of inhabiting Pleasant Valley Creek in the future. The Fisher River is also designated critical habitat for bull trout.

Many bird species documented at the Refuge are listed as Montana species of concern. None are on the ESA Threatened or Endangered Species List. However the federal status of one bird species, Black-backed Woodpecker (*Picoides arcticus*), is under review. Montana bird species of concern at the Refuge include Trumpeter Swan, Barrow's Goldeneye, Hooded Merganser, Common Loon, Horned Grebe, Black Tern (*Chlidonias niger*), Forster's Tern (*Sterna forsteri*), Great Gray Owl (*Sterna forsteri*), Broad-tailed Hummingbird (*Selasphorus platycercus*), Rufous Hummingbird (*Selasphorus rufus*), Brown Creeper (*Certhia Americana*), American White Pelican (*Pelecanus erythrorhynchos*), Great Blue Heron (*Ardea herodias*), White-faced Ibis (*Plegadis chihi*), Golden Eagle (*Aquila chrysaetos*), Peregrine Falcon (*Falco peregrines*), Lewis's Woodpecker (*Melanerpes lewis*), Black-backed Woodpecker (*Picoides arcticus*), Pileated Woodpecker (*Hylatomus pileatus*), Clark's Nutcracker (*Nucifraga Columbiana*), Tennessee Warbler (*Oreothlypis peregrine*), Gray-crowned Rosy-finch (*Leucosticte tephrocotis*), Cassin's Finch (*Haemorhous cassinii*), and Evening Grosbeak (*Coccothraustes vespertinus*). In addition, while the Golden Eagle and Bald Eagle (*Haliaeetus leucocephalus*) are not ESA listed threatened or endangered species, they are special status species and federally protected under the Bald and Golden Eagle Protection Act of 1940. Both Bald and Golden Eagles have nested on and/or along the Refuge boundary, with young raised on the Refuge.

In addition, the Refuge contains one of the largest known breeding populations of boreal toad (*Bufo boreas*) in western Montana (Hossack and Honeycutt 2015). The toad is listed as a Montana species of concern, however it is not ESA listed. Most boreal toads are detected in wetland areas outside the immediate project area at the refuge, however a limited number have been found at Upper and Lower Moose Ponds and Ray's Pond in the past.

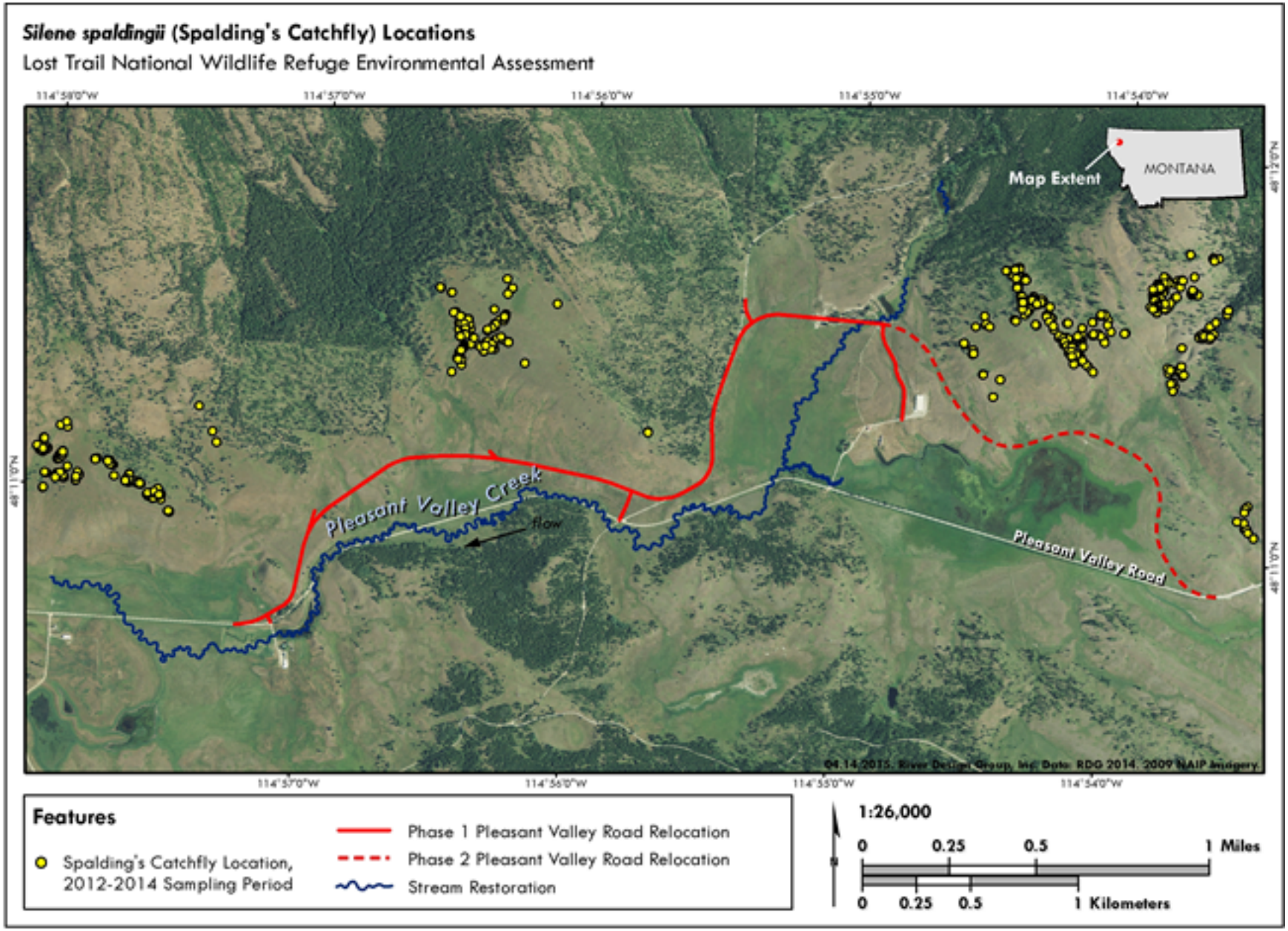

Figure 3-5. Spalding's Catchfly locations as documented in the 2012-2014 sampling period.

3.10.2 Effects of the No Action Alternative on Species of Concern, Threatened and Endangered Species and Critical Habitat

Under the No Action Alternative, no habitat restoration actions would occur, and therefore no impacts to species of concern, critical habitat, or ESA listed threatened and endangered species would occur within the Refuge.

3.10.3 Effects of the Proposed Action Alternative on Species of Concern, Threatened and Endangered Species and Critical Habitat

Plant Species

Implementation of the Proposed Action would have negligible impacts on Montana plant species of concern including bigleaf sedge and Spalding's catchfly. Bigleaf sedge is found in locations along the ditched Pleasant Valley Creek. Under the Proposed Action Alternative, prior to construction, bigleaf sedge would be identified, harvested, and incorporated in constructed streambanks and floodplains, as described in Section 2. Minor, short-term impacts to bigleaf sedge may result, but the impacts are considered temporary and the long-term expectation is for bigleaf sedge to expand into restored floodplain areas throughout the Pleasant Valley Creek floodplain in response to improved hydrologic conditions.

The Proposed Action is unlikely to impact existing populations of Spalding's catchfly on the Refuge. The USFWS Ecological Services Division (ES) has been consulted and a Biological Assessement (BA) will be completed to fully evaluate project impacts to Spalding's Catchfly. As shown on Figure 3.5, the proposed re-alignment of Pleasant Valley Road would traverse upland areas located to the north of the existing road alignment. Spalding's catchfly locations from 2012-2014 sampling period are also noted on Figure 3.5. As shown, the proposed roadway design avoids impacting existing populations of Spalding's catchfly and is generally located below the elevation where Spalding's catchfly would be expected to occur. To mitigate any potential impacts to Spalding's catchfly, individual plants located in close proximity to the roadway disturbance would be flagged prior to construction, and additional surveys would be conducted. If additional plants are identified within the disturbance limits of the proposed roadway, the Refuge would reinitiate consultation with USFWS ES regarding avoidance alternatives or mitigation requirements. Intra-Service Section 7 consultation will be conducted prior to implementing the Proposed Action Alternative.

Animal Species

The Proposed Action Alternative would have negligible impacts on the ESA threatened species Canada lynx and grizzly bear and their critical habitat. While Canada lynx critical habitat has been designated in mountainous regions surrounding the refuge, it is unclear to what extent the species utilizes Pleasant Valley. Grizzly bear critical habitat has not been designated in the vicinity of the Refuge, however a grizzly bear has been documented at the Refuge and Canada lynx could occupy the Refuge as part of their range. Temporary impacts from construction activities could disturb the large mammals in the short-term, and measures would be

implemented to reduce the potential for animal-human conflicts. Storage and disposal of food, refuse, construction materials, petroleum products, human waste and other possible attractants in an animal conscious manner would be a requirement in any construction contract at the site, to reduce the potential for impacts to large mammals. However, the long-term beneficial effects to riparian and wetland habitats from the Proposed Action Alternative implementation could benefit Canada lynx and grizzly bear populations. The ESA threatened bull trout, while not currently documented in Pleasant Valley Creek, could expand its range to the Refuge especially as migration barriers are eliminated. Increased diverse aquatic habitat, water quality, and stream shading would further improve habitat conditions for bull trout in Pleasant Valley Creek as well as downstream in the Fisher River, which has been designated bull trout critical habitat.

The Proposed Action Alternative would have beneficial effects on the Trumpeter Swan, Barrow's Goldeneye, Hooded Merganser, Common Loon, Horned Grebe, Black Tern, Forster's Tern, Great Gray Owl, Broad-tailed Hummingbird, Rufous Hummingbird, Brown Creeper, American White Pelican, Great Blue Heron, White-faced Ibis, Golden Eagle, Peregrine Falcon, Lewis's Woodpecker, Black-backed Woodpecker, Pileated Woodpecker, Clark's Nutcracker, Tennessee Wrbler, Gray-crowned Rosy-finch, Cassin's Finch, and Evening Grosbeak, all Montana species of concern. Minor to moderate beneficial effects would occur to bird species that utilize riparian habitats, and a major beneficial effect would occur to waterfowl species as wetland habitat is substantially increased at the Refuge. Both Bald and Golden eagles could also benefit from improved riparian habitat conditions.

Minor adverse impacts to boreal toads, a Montana species of concern, would occur as a result of the Proposed Action Alternative implementation. Most of these impacts would be temporary impacts to toad habitat, as additional open water and inundated emergent wetland features would be created and would offset losses of boreal toad habitat at Upper and Lower Moose Ponds and Ray's Pond. However, boreal toads have not been documented at Upper and Lower Moose Ponds and Ray's Pond since 2007 (Hossack and Honeycutt 2015). Most boreal toads documented at the Refuge were outside of the immediate project area, including at Dahl Lake, and would be unaffected or would benefit from increased habitat area as a result of the Proposed Action Alternative implementation.

3.11 Historic and Archaeological Resources

3.11.1 Existing Conditions

USFWS conducted a file search of the State Historic Preservation Office's (SHPO) site and manuscript files for known cultural resources and surveys. The file search identified three cultural resource investigations conducted in the sections where Phase 1 road construction activities would take place under the Proposed Action. One of the reports is architectural (Lewis 2002), while the others are archaeological investigations (Lewis 2001, Roulette and Wilt 2001). Resources recorded during the investigations included two ranch houses (24FH0964, 24FH0965) and a log building (24FH0966). The buildings are associated with two historic ranches in the area.

The current Pleasant Valley Road was originally a section of the Great Northern Railway (24FH350; CSKT 2000). In the winter of 1891, Charles Haskell set out to locate a route for the Great Northern Railway between Kalispell and the Kootenai River (USFWS 2015). The following year, construction of the railway was complete. In 1908 the track through the Refuge was torn up (Wakefield 1998) and the open grade transformed to an unimproved roadway. A field inventory conducted by USFWS in 2014 found no cultural resource features associated with the railroad. The original railroad bed no longer has integrity as the track was removed, re-graded, and made into a county road.

3.11.2 Effects of the No Action Alternative on Historic and Archaeological Resources

The No Action Alternative would have no effect on cultural resources and would require no further work or consultation with SHPO.

3.11.3 Effects of the Proposed Action Alternative on Historic and Archaeological Resources

The Proposed Action Alternative would decommission and obliterate approximately three miles of the existing Pleasant Valley Road. The existing road grade would be fully removed to accommodate restoration of the Pleasant Valley Creek channel and floodplain. The segment of Pleasant Valley Road impacted by the Phase 1 road reconstruction activities under the Proposed Action does not have distinguishing historical engineering features nor is there any specific association with distinguished persons (USFWS 2015). Features generally associated with a railroad grade were removed in 1908 and later the road bed was modified for use as a county road. Based on these findings, USFWS has determined that the Proposed Action would have no adverse effect to 24FH350. SHPO concurred, indicating the Proposed Action would have no adverse effect to historic properties, specifically 24FH350.

USFWS has initiated consultation for Phase 2 road reconstruction activities. A field inventory and cultural resource inventory is scheduled to be completed in 2015 or 2016 prior to construction activities.

3.12 Recreation

3.12.1 Existing Conditions

The Refuge is currently open to a variety of recreational uses including wildlife observation, wildlife photography, hiking, interpretation, environmental education, and hunting. The existing Pleasant Valley Road and the NF-1019 Road provide opportunities for wildlife observation and photography throughout the year, however inadequate pullouts and access for recreational uses were identified as issues during project scoping. Off-road Refuge areas are accessible to the public by foot, cross-country skis and snowshoes (USFWS 2005). The Refuge has the potential for providing environmental education opportunities throughout the year, especially as it within close proximity to Kalispell schools and other schools in the area. In addition, the Refuge Headquarters includes a visitor center where interpretive signs are located, as well as information

on animal species frequenting the Refuge, and a herbarium with a comprehensive plant species collection. Hunting for deer, elk, mountain grouse, and turkey has been permitted on some areas of the Refuge since 2002 (USFWS 2005). Fishing is not currently permitted on the Refuge, due to the absence of a healthy fishery in Pleasant Valley Creek, and the ongoing wetland restoration program (USFWS 2005).

3.12.2 Effects of the No Action Alternative on Recreation

Recreational opportunities would not be affected under the No Action Alternative. The Refuge would continue to serve the public with opportunities for wildlife observation and photography, hiking, interpretation and environmental education, and hunting.

3.12.3 Effects of the Proposed Action Alternative on Recreation

Implementation of the Proposed Action Alternative would result in minor to major beneficial effects, as well as temporary moderate adverse impacts on recreation. Wildlife observation and photography opportunities would increase as a result of increased wildlife utilizing restored riparian shrub habitat and wetland habitat. While three miles of Pleasant Valley Road would be relocated from the valley bottom to upland areas, most of the restored wetland areas would be visible from the new road location. All restored wildlife habitat would be accessible by foot. In addition, new interpretive signs would be located along the newly constructed road, and the stream and wetland restoration project would provide a unique educational opportunity to observe, document, and study the restoration and rehabilitation of aquatic and terrestrial habitat in a previously degraded system.

Temporary moderate adverse impacts to hunting and other recreation would occur, resulting from decreased access through Refuge lands during Pleasant Valley Road removal and relocation construction activities. Some road closures would be in effect during construction for efficient and safe roadway operation for both the public and the contractor. Timed closures may occur daily, weekly, seasonally, and by location to minimize impacts on the public. The longest anticipated road closure is one to two weeks, to accommodate for the re-routing of Pleasant Valley Road to the new road alignment or the installation of culverts, and would be scheduled during non-peak visitation time. During hunting season, public access through the construction zone would occur with no more than a 60 minute cumulative delay on Pleasant Valley Road. Local agency, landowner, and recreational user needs would be accommodated during construction when possible. A public information plan detailing potential road closures and delays would be made available to the public via the Refuge website and other local media or posting locations.

Hunting opportunities would remain largely unchanged over the long term, however a small change in the size of the No Hunting Zone south of Pleasant Valley Road would occur, due to Pleasant Valley Road relocation. Additionally, an increase to hunted species in restored riparian areas could result from the implementation of the Proposed Action Alternative. As fishing is not currently allowed on Refuge land, the Proposed Action would have a major beneficial effect on recreational fishing. As fish habitat is restored and fish passage is improved throughout Pleasant

Valley Creek, fishing opportunities would increase. USFWS may permit recreational fishing at the Refuge once fish populations have rebounded and an appropriate fishery resource plan is drafted.

3.13 Invasive and Nonnative Plants and Animals

3.13.1 Existing Conditions

The Refuge contains many nonnative plants, some of which are invasive and/or on the Montana noxious weed inventory list. Most of the nonnative plant species are commonly found in pastures, hayfields, and roadsides in Montana; their presence is not surprising given the history of land use and land modifications at the Refuge. Active management of noxious weed species is ongoing at the Refuge, and includes chemical and biological suppression of noxious weed communities to reduce prevalence and diminish seed sources.

Noxious weeds present at the project area at the Refuge include Canada thistle (*Cirsium arvense*), musk thistle (*Carduus nutans*), spotted knapweed (*Centaurea maculosa*), sulfur cinquefoil (*Potentilla recta*), tansy ragwort (*Jacobaea vulgaris*), houndstongue (*Cynoglossum officinale*), common toadflax (*Linaria vulgaris*), oxeye daisy (*Leucanthemum vulgare*), and meadow buttercup (*Ranunculus acris*) (RDG 2014, Lesica 2014). Canada thistle and spotted knapweed are especially prevalent in disturbed areas throughout the refuge. Spotted knapweed can be found in near-monoculture at the earthen impoundments at Upper and Lower Moose Ponds. Canada thistle is widespread around both pond locations, and can also be found in near-monoculture on the earthen embankment to the south of the old stockwater pond south of the Refuge Headquarters, as well as in indiscriminate locations throughout the project area. Roadsides and parking areas also harbor large concentrations of both spotted knapweed and Canada thistle, and few musk thistle can be found along roadsides as well. Sulfur cinquefoil is found in valley bottom locations, and tansy ragwort, houndstongue, common toadflax, meadow buttercup and oxeye daisy are present especially in historic pasture locations throughout the refuge.

Many other invasive plants that are not noxious weed species are present throughout the project area at the Refuge. Bull thistle (*Cirsium vulgare*), great mullein (*Verbascum thapsus*), curly dock (*Rumex crispus*), field sowthistle (*Sonchus arvensis*), cleavers (*Galium aparine*), common dandelion (*Taraxacum officinale*), creeping bentgrass (*Agrostis stolonifera*), Kentucky bluegrass (*Poa pratensis*), meadow foxtail, creeping meadow foxtail, quackgrass, smooth brome (*Bromus inermis*), and reed canarygrass are some of the invasive plants found throughout the project area. Most are commonly found in pastures and disturbed areas in Montana. Most of the invasive grass species were likely introduced as pasture grasses for cattle feed during ranching operations at the Refuge.

Reed canarygrass is a particularly invasive and aggressive wetland grass that spreads through underground rhizomes as well as seed, and proliferates and displaces native vegetation especially in wet environments. It spreads fluently and tolerates a wide range of environmental conditions such that it has become ubiquitous in wetland and riparian environments throughout the

Northwest U.S. including in Montana. At the refuge, reed canarygrass is found in monoculture along most drainage ditches, and in a 12 acre area to the south of Pleasant Valley Road, southwest of the Refuge headquarters. Other large reed canarygrass concentrations can be seen at Dahl Lake, its outlet, and wetlands downstream of the Dahl Lake outlet. Other plants found at the Refuge that are not native to Montana but are not considered invasive in their ranges include intermediate wheatgrass, common Timothy grass, and common wormwood.

Nonnative animal species present at the Refuge include brook trout (*Salvelinus fontinalis*) which occupy broad habitat ranges in Montana. Nonnative bird species that frequent the Refuge include gray partridge (*Perdix perdix*), wild turkey (*Meleagris gallopavo*), Eurasian collared-dove (*Streptopelia decaocto*), European starling (*Sturnus vulgaris*), and house sparrow (*Passer domesticus*). All above bird species are exotic to Montana but are not considered invasive species.

3.13.2 Effects of the No Action Alternative on Invasive and Nonnative Plants and Animals

Implementation of the No Action Alternative would have no additional effects on invasive and nonnative plant and animal species. Pleasant Valley road would continue to be a vector for invasive plant species transport throughout wetland and stream habitats. Depending on the magnitude and efficacy of active weed management at the refuge, an increase in noxious weed species abundance could result from the No Action Alternative.

3.13.3 Effects of the Proposed Action Alternative on Invasive and Nonnative Plants and Animals

Impacts to invasive and nonnative plants and animals are described from an ecosystem perspective, for example a decrease in invasive plant species occurrence would be a beneficial effect to the ecosystem. The Proposed Action Alternative would have both minor adverse impacts and beneficial effects on nonnative and invasive plants. Adverse impacts would depend on active weed management actions. While the relocation of Pleasant Valley Road from the valley bottom to upland areas would decrease the spread of invasive plants to wetlands and riparian habitats, the new road would serve as a transportation vector for invasive plants to the upland environment. The construction of new vehicle pullouts and interpretive areas could have an adverse impact on noxious weeds, especially to spotted knapweed as the noxious plant is already prevalent throughout upland areas at the Refuge. Continued active noxious weed management through the existing Refuge noxious weed management program would be mitigation for any adverse impacts, and would ensure spotted knapweed infestations are kept to a minimum at new roadside and vehicle pullout locations. In addition, during construction activities, heavy equipment and vehicles would be cleaned to remove noxious weed propagules and dirt prior to entry into the Refuge.

As drainage ditches bracketed by reed canarygrass-dominated berms are filled, native wetland plants would be planted to replace reed canarygrass to the extent possible, resulting in beneficial effects to the nonnative grass from an ecosystem perspective. Similarly, as Pleasant Valley Creek

is restored and the ditched creek alignment is abandoned, reed canarygrass would be somewhat reduced by physical removal and planted and seeded native species competition. Density of other nonnative and invasive plants, especially nonnative pasture grasses, would be reduced in areas where restoration actions would result in vegetation removal, as a diverse native species community would be planted and seeded in its place.

Beneficial effects to nonnative animals (adverse impacts from an ecosystem perspective) would occur with the implementation of the Proposed Action Alternative. Brook trout would benefit from the increased quantity and quality of aquatic habitat provided with the restored Pleasant Valley Creek. Increases in riparian shrubby vegetation and resting cover, stream and floodplain connectivity, and a wide variety of available habitat for both juvenile and adult fish would benefit nonnative fish populations. Nonnative bird populations would also benefit from the increased riparian shrub habitat. The gray partridge, wild turkey, Eurasian collared-dove, European starling, and house sparrow would take advantage of willow shrubs and trees planted along the floodplain corridor, for resting and nesting purposes.

3.14 Transportation

3.14.1 Existing Conditions

Pleasant Valley Road provides primary public access to the Refuge. The road traverses approximately 6.6 miles through the Refuge and is maintained by Flathead County. Portions of the existing Pleasant Valley Road were constructed through historical wetland and floodplain areas, and with unsuitable materials that are subject to seasonal saturation resulting from high groundwater and spring flooding of Pleasant Valley Creek. Flood waters occasionally overtop and inundate the road surface, resulting in rutting, washboard surface, exposed subgrade, surface erosion, settling and general geotechnical instability of the road sub-base material and road prism. During the summer and fall when use increases, airborne dust can cause significant safety concerns due to reduced visibility. Additional safety concerns are related to a lack of safe vehicle pullouts and traffic control signs.

3.14.2 Effects of the No Action Alternative on Transportation

Under the No Action Alternative, no road improvements or road relocations would occur and segments of the existing Pleasant Valley Road would continue to be influenced by its proximity to wetlands and floodplains. During high groundwater and spring flooding events, road segments would continue to saturate resulting in rutting, washboard surface, exposed subgrade, surface erosion, and settling of the road sub-base. These effects would continue to impact adjacent wetlands and water quality associated with Pleasant Valley Creek.

3.14.3 Effects of the Proposed Action Alternative on Transportation

Implementation of the Proposed Action Alternative would have a major beneficial effect on transportation. Approximately three miles of the road would be relocated from valley bottom locations subject to high groundwater and spring flooding events, to upland locations, and

reconstructed with appropriate materials and road design standards. Road drainage features including relief culverts, select borrow base and crushed aggregate surfacing would improve upon current road conditions. In addition to the 3.03 miles of road relocation, an additional 3.5 miles of Pleasant Valley Road would be improved by the addition of crushed aggregate surfacing. The entire Pleasant Valley roadway through the Refuge would benefit from a stable road bed requiring less frequent grading than the current roadway, as well as traffic control signing, new pullouts, parking areas, and interpretive overlooks.

3.15 Public Services, Utilities and Easements

3.15.1 Existing Conditions

Flathead County road and Bridge Department is responsible for the maintenance of Pleasant Valley Road on the Refuge. The road is the primary ingress and egress route to the Refuge from the east. Power is provided by an overhead transmissions line and a digital subscriber line (DSL) is buried within the existing road right-of-way.

3.15.2 Effects of the No Action Alternative on Public Services, Utilities and Easements

The No Action Alternative would have no effect on public services, utilities and easements on the Refuge.

3.15.3 Effects of the Proposed Action Alternative on Public Services, Utilities and Easements

The Proposed Action Alternative would have a negligible impact to existing public services and utilities on the Refuge. Under the Proposed Action Alternative, approximately 1.65 miles of power line and DSL line would be buried as part of the Phase 1 Pleasant Valley Road removal and reconstruction activities. Utility trenches would be excavated and the lines placed within the limits of the new road right-of-way.

Prior to implementation of Phase 1 and Phase 2 road construction activities, a new right-of-way would be acquired by Flathead County to encompass the new roadway (approximately 4.63 miles). The legal tasks for easement creation would require deeds to be signed by all affected parties and would be filed with the Flathead County Clerk and Recorder. Prior to Phase 2 Pleasant Valley Road removal and relocation commencing, the Refuge would coordinate required easements with the Montana Department of Natural Resources and Conservation.

3.16 Economics

3.16.1 Existing Conditions

The Refuge is a destination outdoor recreation area for a variety of uses including hunting, wildlife observation and photography, interpretation, and environmental education. A majority of the lands in Pleasant Valley are open to the public for these uses, including National Forest System lands, State of Montana lands, and Plum Creek Timber Company lands. Pleasant Valley

Road also provides access to Island Lake, a fishing access site owned and operated by Montana Fish, Wildlife and Parks.

Flathead County is one of the fastest growing counties in Montana. The 2010 Western Governor's Association report named outdoor recreation an "overlooked economic giant" in the west generating annual spending of 256 billion dollars and supporting 2.3 million jobs. According to the Institute for Tourism and Recreation Research at the University of Montana, out of state visitors to Flathead County spent $214 million dollars in 2011. Major expenditure categories included gas (22.9%), retail (21.0%), restaurant/bar (23.1%) and lodging (11.0%). In 2009, non-resident travelers to the Glacier region, which includes Flathead Valley, spent over $309 million dollars. Top activities included driving (79%), nature photography (59%), day hiking (57%), and wildlife watching (56%) (Institute for Tourism and Recreation Research 2012).

3.16.2 Effects of the No Action Alternative on Economics

Under the No Action Alternative, no road improvements or road relocations would occur and segments of the existing Pleasant Valley Road would continue to lack road surface drainage and BMPs. Improvements intended to increase public access to the Refuge would not be implemented, and there would be no effect on economics.

3.16.3 Effects of the Proposed Action Alternative on Economics

Implementation of the Proposed Action Alternative would have a beneficial effect on economics. Goals established in the CCP would be attained, including a major goal of providing quality wildlife-dependent recreational and educational opportunities for persons of all abilities to learn, understand, and enjoy the Intermountain ecosystem of northwestern Montana; its associated fish, wildlife and plants of the Refuge; and the National Wildlife Refuge System in a safe and compatible manner (USFWS 2005).

With a large and fast-growing recreation economy, the Refuge and surrounding Federal and State lands have the potential to experience a significant increase in visitation with the implementation of the Proposed Action. The Refuge and adjacent lands provide the very uses that have been identified by the University of Montana as the top activities generating economic growth in Flathead and Glacier counties. The proposed Pleasant Valley Road realignment, vehicle pullouts, and parking areas would increase access to areas currently only accessible by foot travel. The actions would increase recreational opportunities for all users and visitors to the Refuge. Economic activity both during and after construction would generate significant dollars for the local and regional economy through lodging, bar and restaurant activity, purchases of hunting and fishing supplies, gas, and hunting and fishing licenses. In addition, implementation activities of the Proposed Action would directly benefit the local economy by providing jobs to local contractors over a two to three year construction period.

3.17 Visual Aesthetics

3.17.1 Existing Conditions

While the Refuge is only a 50 mile drive from the city of Kalispell, Montana, it is a fairly remote National Wildlife Refuge and provides unique vistas of scenery and wildlife. It is a peaceful refuge for wildlife and visual aesthetics reflect the serenity. Few structures impede natural views, including the Refuge Headquarters, the Jackson House south of the Refuge Headquarters, and the Orr-Gardiner Ranch House towards the west of the Refuge. The two ranch houses provide recent human settlement context to Pleasant Valley and are also eligible for nomination to the National Register of Historic Places. Other cultural views of interest at the Refuge include Native American petroglyphs, grave sites, and teepee rings from the pre-European settlement era.

Natural features dominate Refuge views. The unique geologic features of the Belt Supergroup sedimentary rock formations and glacial features including lateral and terminal glacial moraines punctuate the landscape. Dahl Lake and the surrounding wetland environment is a natural viewpoint; it attracts wildlife and can be a visual centerpiece of the Refuge. Wetlands to the west, closer to the Refuge Headquarters and within the project area, provide distinctive emergent marsh environments and views of wildlife for nature observers. Hillsides dominated by grasses and small shrubs often present overlooks of Pleasant Valley, and lodgepole pine, ponderosa pine, and western larch forests surrounding the valley provide wildlife habitat as well as a striking visual contrast between grassland and forest ecosystems. During the autumn months, western larch is easily recognized in forest views as the deciduous needles turn color in response to the changing seasons.

Visual aesthetics are currently impacted by Pleasant Valley road which bisects the valley and historical wetland and riparian ecosystems. Dust from vehicle traffic and overhead power lines can impede views, and disturbances to wildlife in wetlands resulting from traffic are an impediment to wildlife observation opportunities. Views of nature are also modified as a result of the history of grazing and agricultural land use throughout the Refuge. Pleasant Valley Creek exists largely as a straightened ditch and is an unnatural hydrologic feature. Disconnection of the creek and historical floodplain environments, and lower groundwater tables resulting in decreased wetland area also affect the visual aesthetics of the Refuge.

3.17.2 Effects of the No Action Alternative on Visual Aesthetics

The No Action Alternative would have no additional impacts on visual aesthetics at the Refuge. Pleasant Valley Road and overhead power lines would continue to impact views of wetlands and wildlife. Agricultural and grazing land use scars would persist and continue to affect surface and groundwater hydrology, in turn affecting the visual aesthetics of natural ecosystems and wildlife at the refuge.

3.17.3 Effects of the Proposed Action Alternative on Visual Aesthetics

The Proposed Action Alternative would have a major beneficial effect on visual aesthetics at the Refuge in the long term. As 3.03 miles of Pleasant Valley Road are relocated and reclaimed, and existing overhead power lines associated with 1.65 miles of the existing Pleasant Valley Road are removed, sensitive wetlands and riparian areas would rebound and traffic disturbances to wildlife in the valley bottom would decrease, leading to increased wildlife and nature viewing opportunities. Restoration of Pleasant Valley Creek, shrub-dominated floodplains, and wetlands throughout the Refuge would beneficially impact Refuge views by providing natural vistas of the landscape, including a meandering stream channel, native riparian vegetation, and expansive emergent wetland environments. Ecological restoration would also encourage increased wildlife use of the Refuge, benefitting wildlife viewing.

Temporary moderate adverse impacts to visual aesthetics would occur with construction associated with the implementation of the Proposed Action Alternative. Refuge views would be diminished for approximately two to three years during the construction season, resulting from road decommissioning and reclamation activities, road construction, and stream and wetland restoration project construction. In addition, temporary minor adverse impacts to visual aesthetics would occur along the newly restored Pleasant Valley Creek, as the riparian area would be fenced to exclude ungulates and relieve grazing pressure on newly planted native plants in the floodplain. Exclosure fencing would be temporary to allow plantings to establish, and would be in place for a minimum of three years following construction. All adverse impacts to visual aesthetics would be temporary, and the resource is expected to fully recover from construction-related impacts within three to five years.

Chapter 4 Cumulative Effects

This section provides a description of the cumulative effects of both the No Action and Proposed Action Alternatives. Cumulative effects are defined as those which result "from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (Federal or non-Federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time" (40 CFR 1508.7).

Previous sections of this Environmental Assessment described the effective scale for evaluating cumulative effects associated with both the No Action Alternative and the Proposed Action Alternative. Although the majority of cumulative impacts from these past and future actions are beneficial to the Refuge and its resources, implementation of the Proposed Action would add to the minor and moderate temporary impacts to air quality, soils, invasive and nonnative plants, recreational opportunities, wetlands, channels and fisheries, and cultural and historic resources. These impacts are individually minor or temporarily moderate, but are not expected to be collectively major or significant because the actions are separated in both time and space. A majority of the actions have not and would not happen simultaneously and are separated by considerable distance so as to negate the effects. The impacts of the proposed project would be added to past actions and planned future actions on the Refuge.

Stream, wetland, and riparian resources would benefit significantly from implementation of the Proposed Action Alternative. The proposed road relocation and road improvements would facilitate stream and wetland restoration, and would remedy ongoing safety concerns, increase access to the Refuge, and expand recreational opportunities for all users.

Table 4-1 summarizes the cumulative effects for the No Action and Proposed Action Alternatives.

Table 4.1. Cumulative effects analysis by Alternative.

Resource	No Action Alternative	Proposed Action Alternative
Air Quality	No impact on air quality.	Moderate beneficial effects, and temporary minor adverse impacts on air quality. Construction activity would result in minor and temporary adverse impacts on air quality, as increases in airborn dust would occur.
Wetlands	No additional impact on wetlands. Wetlands would continue to persist in a degraded state, influenced by altered hydrology resulting from wetland drainage ditches and the ditched Pleasant Valley Creek, which have lowered groundwater tables throughout the Refuge.	Major beneficial effects and temporary minor adverse impacts on wetlands. Major beneficial effects would occur with restoration of stream and floodplain connection, riparian wetland communities, riparian scrub-shrub communities, and emergent wetland communities. 47,000 feet of ditch would be filled, and three miles of Pleasant Valley Road would be relocated from historical wetland areas to uplands. Restored wetland hydrology would result in 221 acres of restored wetland habitat. Minor and temporary adverse impacts to wetlands would occur with drainage ditch fill placement, however a full recovery is expected with time as wetland hydrology is restored and a permanent loss to wetlands in drainage ditches is not expected.
Stream Channels and Fisheries	No additional impact on stream channels and fisheries. Stream channels would continue to function in a degraded state. Aquatic habitat and fish passage would remain impaired by on-stream impoundments, undersized culverts, above average sediment contributions, and lack of stream cover and shade.	Major beneficial effect on clean water, aquatic habitat, stream temperature regulation, minimizing sediment inputs, and restoring drained historical wetland complexes. Approximately 30,222 feet of Pleasant Valley Creek would be restored. Stream length would increase by 56% compared to existing conditions. Native fish habitat would significantly improve.
Floodplains	No additional impact on floodplains. Pleasant Valley Creek would continue to be disconnected from historical floodplains, and floodplain area would continue to decrease as a result of stream incisement.	Major beneficial effect on floodplains, as Pleasant Valley Creek is re-connected with historical floodplain areas. Increase from 8 acres to approximately 61 acres of floodplains would occur, and riparian shrub communities on floodplains would be restored.
Water Quality and Beneficial Uses	No impact on water quality and beneficial uses.	Major beneficial effect on water quality and beneficial uses. Expansion of floodplain and wetland area would improve flood water retention, sediment storage and nutrient cycling, resulting in water quality improvements. Improved fish passage and fish habitat conditions would occur including stream shading, leading to benefits on salmonid fish and other aquatic organisms. Road impacts to streams would be minimized, improving water quality, wildlife habitat, and recreational opportunities.

Table 4.1. Cumulative effects analysis by Alternative.

Resource	No Action Alternative	Proposed Action Alternative
Geology	No impact on geology.	Negligible impacts on geology. Alluvial deposits where Pleasant Valley Creek is constructed outside the historical channel pattern would be minimally impacted, and new road construction has the potential to disturb alluvial and glacial subsurface deposits.
Soils	No impact on soils.	Moderate beneficial effects and moderate adverse impacts on soils. Moderate beneficial effects on soils would occur with 13.8 acres of road bed material removal from valley bottom locations and 11.1 acres of ditch reclamation, resulting in restoration of wetland and upland soils. Soil disturbance from channel construction and conversion of open water to emergent wetlands would be minor and soils would fully recover from the impact. Road construction would result in moderate adverse impacts, with 35.7 acres of upland impacted by the new road footprint. Minor, temporary impacts would occur on soils in materials staging areas and temporary construction access routes.
Vegetation	No additional impact on vegetation. Wetland vegetation would continue to be adversely impacted by lowered groundwater tables.	Major beneficial effects and moderate adverse impacts on vegetation. A major beneficial effect to wetland and riparian vegetation would occur. A moderate adverse impact on upland vegetation would occur where the new road prism is constructed, and a temporary moderate adverse impact to vegetation would occur in materials staging areas and access routes.
Waterfowl	No additional impact on waterfowl.	Major beneficial effects on waterfowl. Wetland area would be restored to near-historical extents, providing 221 additional acres of wetland habitat for waterfowl than currently exist. Both shallow and deep emergent wetlands would provide waterfowl forage and breeding ground.
Species of Concern, Threatened and endangered Species and Critical Habitat	No impact on species of concern, threatened and endangered species and critical habitat.	Negligible impacts on bigleaf sedge (MT species of concern) and Spalding's catchfly (MT species of concern and ESA threatened species). Negligible impacts on Canada lynx and grizzly bear (ESA threatened species) and critical habitat. Moderate beneficial effects to bull trout (ESA threatened species) critical habitat with stream temperature improvements. Beneficial effects on 24 MT bird species of concern including trumpeter swan, with restoration of riparian and wetland habitat. Minor adverse impacts on the boreal toad (MT species of concern), mostly temporary habitat impacts.
Historical and Archaeological Resources	No impact on historical and archaeological resources.	No impacts on the Great Northern Railway track or to historic properties at the Refuge from Phase 1 implementation. Consultation

Table 4.1. Cumulative effects analysis by Alternative.

Resource	No Action Alternative	Proposed Action Alternative
		for Phase 2 implementation has been initiated, with field inventory work scheduled prior to construction.
Recreation	No impact on recreation.	Minor to major beneficial effects, and temporary moderate adverse impacts on recreation. Benefits include increased wildlife observation and photography opportunities, new interpretive signs, and increased educational opportunities to study ecological restoration in action. Major beneficial effect to fishing as fish habitat is restored and fish passage is improved, and recreation fishing may be permitted following restoration. Temporary moderate adverse impacts from road closures related to road removal and relocation construction activities.
Invasive and Nonnative Plants and Animals	No impact on invasive and nonnative plants and animals.	Minor adverse impacts and beneficial effects on invasive and nonnative plants and animals from an ecosystem perspective. Adverse impacts are dependent on continued Refuge weed management actions. A reduction in the spread of weeds at the valley bottom, a beneficial effect, from reduction in road length may be offset by an increase in the spread of weeds, an adverse impact, to upland areas where the new road traverses. New roadside pullouts could also provide new disturbed ground for noxious weed establishment. Density of nonnative pasture grasses would be reduced in stream and floodplain restoration areas. Nonnative fish and bird populations would benefit (adverse impact from an ecosystem perspective) from increased diverse aquatic and riparian habitat.
Transportation	No additional impact on transportation. Pleasant Valley Road conditions would continue to deteriorate, resulting from lack of road surface drainage and BMPs, and rutting, surface erosion, and settling of the road sub-base.	Major beneficial effect on transportation. Three miles of Pleasant Valley Road would be relocated and reconstructed with Flathead County standards, increasing travel safety and efficiency. Road drainage features, large diameter base rock and crushed aggregate surface would improve road conditions. The entire Pleasant Valley Road through the refuge would be treated with crushed aggregate surfacing.
Public Services, Utilities and Easements	No additional impact on public services, utilities and easements.	Beneficial effect on public services, utilities and easements as the 3.03 miles of power line and fiber optics line would be upgraded and removed from wetlands and the floodplain of Pleasant Valley Creek.
Economics	No additional impact on economics.	Beneficial effect on economics as increased opportunities for recreation would result in an increased number of visitors to Flathead County. The projected economic activity would generate significant dollars for the local and regional economy during and following

Table 4.1. Cumulative effects analysis by Alternative.

Resource	No Action Alternative	Proposed Action Alternative
		implementation of the Proposed Action through increased expenditures on lodging, bar and restaurant activity, purchases of hunting and fishing supplies, gas, and hunting and fishing licenses.
Visual Aesthetics	No additional impact on visual aesthetics.	Major beneficial effects and temporary moderate adverse impacts on visual aesthetics. Beneficial effects would occur from removal of Pleasant Valley Road and overhead power lines from historical wetland and riparian areas. Stream and wetland restoration actions would benefit visual aesthetics by providing natural views of the landscape, and encouraging increased wildlife use of the Refuge, benefitting wildlife viewing opportunities. Temporary moderate adverse impacts would occur with construction activities, and with a temporary ungulate exclosure fence around floodplains. Visual aesthetics are expected to fully recover from construction-related impacts.

Chapter 5 De Minimis Section 4(f) Determination

The Lost Trail National Wildlife Refuge (Refuge) is located in the west-central portion of Flathead County, Montana, approximately 25 air miles west of Kalispell and 20 miles northwest of the town of Marion (Figure 1-1). Encompassing 9,225-acres, the Refuge contains wetlands, lush riparian corridors, uplands dominated by prairie and tame grasses, and temperate forests dominated by lodgepole pine and Douglas-fir (USFWS 2005).

The Federal Highway Administration (FHWA) in partnership with the U.S. Fish and Wildlife Service (USFWS) is proposing to relocate Pleasant Valley Road in order to provide reliable all weather access, lower maintenance costs, and restore stream and wetland functions within the Refuge. Before the Refuge was established, lands were used primarily for cropland, livestock grazing, and other agricultural purposes. Historical land use practices significantly altered wetland and aquatic resources within the Refuge. Wetlands within the Refuge have been altered by water impoundments, irrigation diversions, wetland drains, and infrastructure including Pleasant Valley Road. Primary impacts to wetland resources in the project area are related to wetland draining for conversion of wetland to agricultural and ranch land, and the channelization and straightening of Pleasant Valley Creek which lowered the water table resulting in loss of wetland hydrology.

In 2011, USFWS commissioned a conceptual restoration plan for the Refuge that identified specific actions necessary to restore the natural hydrology of Pleasant Valley Creek, unnamed tributaries, and associated wetlands and aquatic habitat features. The restoration plan recommended treatments to reconnect Pleasant Valley Creek with the historical floodplain surface. One of the primary recommendations was to relocate a portion of Pleasant Valley Road located in historical wetlands and floodplains of Pleasant Valley Creek to upland, non-wetland areas. The plan indicated that relocating the road outside of the Pleasant Valley Creek floodplain and wetlands would be required prior to any restoration actions being implemented on Pleasant Valley Creek.

In 2013, Flathead County in cooperation with the Refuge and Natural Resources Conservation Service (NRCS), prepared and submitted a grant proposal to the U.S. Department of Transportation Federal Lands Access Program to relocate a portion of Pleasant Valley Road. In 2014, Flathead County received notice that the grant was approved. Referred to as the Pleasant Valley Road Relocation, MT Flathead 543(1), the grant provides improved public access and safety to the Refuge and National Forest System land, while facilitating the restoration of Pleasant Valley Creek and wetlands at the Refuge (Flathead County and USFWS 2013).

A three mile segment of Pleasant Valley Road is located within a series of degraded wetlands on the Refuge. This segment of road was constructed with unsuitable native materials that are subject to seasonal saturation resulting from high groundwater and spring flooding of Pleasant Valley Creek. During most years, flood waters overtop and inundate the road surface, resulting

in rutting, surface erosion, settling and general instability of the sub-base material and road prism. Safety concerns that would be addressed by this road relocation include: exposed subgrade that has caused several accidents by both visitors and employees of the Refuge, lack of vehicle pull-offs, and airborne dust in the summer.

The Department of Transportation (DOT) Act of 1966 included a special provision - Section 4(f) - which stipulates that FHWA and other DOT agencies cannot approve the use of land from publicly owned parks, recreational areas, wildlife and waterfowl refuges, or public and private historical sites unless the following conditions apply:

- There is no feasible and prudent avoidance alternative to the use of land; and
- The action includes all possible planning to minimize harm to the property resulting from such use;

  Or,
- FHWA determines that the use of the property will have a *de minimis* impact.

The Lost Trail National Wildlife Refuge is determined to be a 4(f) resource.

Congress recently amended Section 4(f) when they enacted the Safe, Accountable, Flexible, Efficient, Transportation Equity Act: A Legacy for Users (SAFETEA-LU) (Public Law 109-59, enacted August 10, 2005). Section 6009(a) of SAFETEA-LU added a new subsection to Section 4(f), which authorizes the FHWA to approve projects that use a Section 4(f) resource without analysis of feasible and prudent avoidance alternatives. However, FHWA must make a finding that such uses would have *de minimis* impacts upon the Section 4(f) resource.

Impacts of a transportation project on a park, recreation area, or wildlife and waterfowl refuge that qualifies for Section 4(f) protection may be determined to be *de minimis* if:

- The transportation use of the Section 4(f) resource, together with any impact avoidance, minimization, and mitigation or enhancement measures incorporated into the project, does not adversely affect the activities, features, and attributes that qualify the resource for protection under Section 4(f);
- The officials with jurisdiction over the property are informed of FHWA's intent to make the *de minimis* impact finding based on their written concurrence that the project will not adversely affect the activities, features, and attributes that qualify the property for protection under Section 4(f); and
- The public has been afforded an opportunity to review and comment on the effects of the project on the protected activities, features, and attributes of the Section 4(f) resource.

Comments may be submitted to Lost Trail National Wildlife Refuge through the Environmental Assessment public review process.

Chapter 6 Consultation and Coordination

6.1 List of Preparers

The following personnel were consulted during the development of this EA:

Beverly Skinner	Wildlife Biologist, USFWS Lost Trail NWR
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Brant Loflin	Zone Archaeologist, USFWS
Bill Sparklin	Regional Invasive Species Biologist, USFWS Benton Lake NWR Complex
Kevin Shinn	Manager/Federal Wildlife Officer, USFWS Lost Trail NWR
Dean Vaughan	Biologist, USFWS Partners for Fish & Wildlife Program
Michael Traffalis, PE	Project Manager, Federal Highway Administration
Steven Morrow	Environmental Protection Specialist, Federal Highway Administration
Michael Madar, PE	Highway Design, Federal highway Administration
Jeff King	Project Leader, USFWS National Bison Range Complex
Selita Ammondt, GISP	GIS Analyst/Wetland Ecologist, River Design Group, Inc.
John Muhlfeld	Project Manager/Hydrologist, River Design Group, Inc.
Troy Brandt	Fisheries Biologist, River Design Group, Inc.
Gary Decker	Hydrologist, River Design Group, Inc.
Jessica Bush	Review and Compliance Officer, State Historic Preservation Office

6.2 Pertinent Laws, Executive Orders, and Regulations

National Environmental Policy Act of 1969, as amended: The National Environmental Policy Act (NEPA) requires federal agencies to integrate environmental values into their decision making processes by considering the environmental impacts of their proposed actions and reasonable alternatives to those actions.

Executive Order 11990: Protection of Wetlands: In furtherance of the National Environmental Policy Act of 1969, as amended (42 U.S.C. 4321 *et seq.*), in order to avoid to the extent possible the long and short term adverse impacts associated with the destruction or modification of wetlands and to avoid direct or indirect support of new construction in wetlands wherever there is a practical alternative.

Executive Order 11988: Floodplain Management: Requires federal agencies to avoid to the extent possible the long and short term adverse impacts associated with the occupancy and modification of floodplains and to avoid direct and indirect support of floodplain development wherever there is a practicable alternative.

De Minimis Section 4(f): The intent of the Section 4(f) Statute 49 U.S. C Section 303, and the policy of the Federal Highway Administration, is to avoid transportation use of historic sites and publicly owned recreational areas, parks, and wildlife and waterfowl refuges. Section 4(f) only applies to transportation use and therefore the *de minimis* evaluation was only performed for the roadway component of this project.

Endangered Species Act of 1973: Provides for the conservation of the ecosystem upon which endangered species and threatened species depend and provides a program for the conservation of such endangered species and threatened species.

Fish and Wildlife Act of 1956: Under this act, the Secretary of the Interior is authorized to take such steps required for the development, management, conservation and protection of fish and wildlife resources including but not limited to research, development of existing facilities, and acquisition by purchase of exchange of land and water.

National Wildlife Refuge Administrative Act of 1966: Defines the National Wildlife Refuge System, and authorizes the Secretary of the Interior to permit any use of an area provided such use is compatible with the major purpose for which the refuge was established.

National Wildlife Refuge Improvement Act of 1997: Expands on NWRS Administration Act of 1966 by providing organic legislation for the National Wildlife Refuge System, and significant additional guidance on management and public use of the Refuge System.

Archaeological Resource Protection Act of 1970: Protects irreplaceable archaeological resources on Federal lands which are 100 years or older.

National Historic Preservation Act of 1966: Authorizes the National Register of Historic Places, establishes the Advisory Council on Historic Preservation, and grants power to the Council to review Federal undertakings that affect historic properties.

Title 50 of the Code of Federal Regulations: Implements numerous laws and executive orders concerning wildlife, including administration of National Wildlife Refuges.

Montana Stream Protection Act (SPA 124 Permit): Any agency or subdivision of federal, state, county, or city government proposing a project that may affect the bed and banks of any stream in Montana. The purpose of the law is to protect and preserve fish and wildlife resources. The law is administered by the Montana Department of Fish, Wildlife and Parks.

Federal Clean Water Act (404 Permit): Any person, agency, or entity, either public or private, proposing a project that will result in the discharge of placement of dredged or fill material into waters of the United States. "Waters of the United States" include lakes, rivers, streams, wetlands, and other aquatic sites. The purpose of the law is to restore and maintain the chemical, physical, and biological integrity of the nation's waters. The U.S. Army Corps of Engineers has regulatory review and enforcement functions under the law.

Short-term Water Quality Standard for Turbidity (318 Authorization): Any person, agency, or entity, both public and private, initiating construction activity that will cause short term or temporary violations of state surface water quality standards for turbidity. The purpose of the law is to provide a short term water quality turbidity standard for construction activities, to protect water quality, and to minimize sedimentation. The law is administered by the Montana Department of Environmental Quality.

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