United States Department of the Interior

Bureau of Land Management

Environmental Assessment
DOI-BLM-ID-I010-2012-0076-EA

IDI-5853
Phillips Water Facilities Right-of-Way Amendment and Renewal
Williams Creek

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1. INTRODUCTION

Background:

Two irrigation diversions have been constructed on public land that diverts the majority of Williams Creek water to agricultural fields to the south and west of the drainage on private land. The upper diversion was constructed prior to FLPMA. It is recognized through the 1866 Ditch Act and is not subject to regulations found at 43 CFR 2800 which governs rights-of-way. This structure diverts water into an open ditch which flows approximately .8 miles to a second diversion which is authorized as a FLPMA right-of-way (ROW) under BLM serial number IDI-5853.

Williams Creek is occupied habitat for a population of bull trout, (*Salvelinus confluentus).* Bull trout are a federally listed threatened species. Because Williams Creek only has limited connection to the Little Lost River, the creek has a virtually isolated population of bull trout. Williams Creek has not been designated as critical habitat bull trout.

Type of Actions:

Issuance of a Right-of-Way (ROW) Grant Renewal and Amendment.

Grants would authorize the proposed replacement of diversion structures, installation of a fish screen, installation of a road crossing culvert and placement of an above ground water pipeline.

Purpose of and Need for Proposed Action:

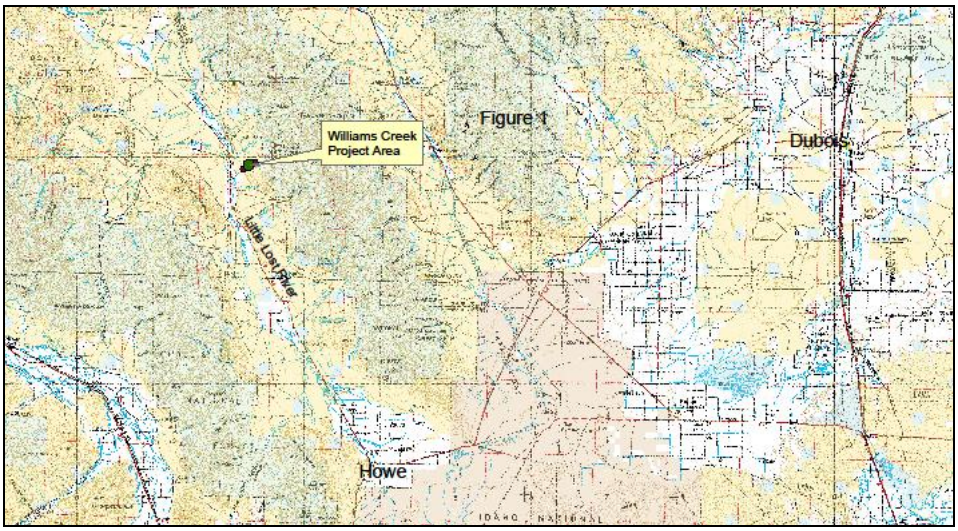
The FLPMA right-of-way (ROW) under BLM serial number IDI-5853 expired on November 22, 2007. On March 3, 2010, the ROW holder, Billie Phillips applied for a renewal for continued use of the irrigation diversion and pipeline on public land. At the time of construction of both diversions, the bull trout was not a listed species. Because of this neither of the diversions was required to be screened to prevent the entrainment of bull trout. Due to the listing of the bull trout, the ROW on the lower diversion authorized under FLPMA would need to be screened in order to be compliant with Endangered Species Act. Because this would still create an entrainment potential between the upper and lower diversions, the Phillips' have agreed to allow the screen at the upper diversion and assume maintenance responsibilities.

Location of Proposed Action:

See Fig. 1 – Project Location Map. The project area is located at the lower end of the Williams Creek drainage land entirely administered by the BLM. The ROW for the existing diversion and pipeline are located in SE¼NW¼ and the NE¼SW¼ of section 10,
T. 9 N., R. 27 E., the diversion/screen project is located in the SW¼SW¼ of section 2,
T. 9 N., R. 27 E., and the culvert installation site would be located NW¼SE¼ of section 2, T. 9 N., R. 27 E., Boise Meridian, Idaho.

The Williams Creek drainage is approximately 25 miles north of the town of Howe and on the east side of the Little Lost River watershed. The upper end of the Williams Creek drainage is managed by the U.S. Forest Service.

Figure 1. Project Location Map.



Conformance With Applicable Land Use Plan:

The proposed action is in conformance with the *Little Lost-Birch Creek Management Framework Plan (1981)*. The MFP provides overall guidance for the management of natural and cultural resources and issuance of rights-of-ways on public lands. The processing of right-of-way applications is addressed in the RMP under the "Standard Operating Procedures" section (page 47).

Relationship to Statutes, Regulations or Other Plans:

The subject application was made in accordance with Title V of the Federal Land Policy and Management Act of 1976 as amended (43 U.S.C. 1761) and the regulations found in 43 CFR 2800. These regulations would govern the granting of the ROW (if approved), determination of cost reimbursement, determination of the rental value, and the compliance and monitoring requirements.

Right-of-way decisions become effective upon approval by the authorized officer (43 CFR 2801.10 (b)).

Section 7(a)(1) of The Endangered Species Act of 1973 (ESA) and it's amendments, in consultation with the U.S. Fish and Wildlife Service, directs federal agencies, as appropriate, to utilize their authorities to further the purposes of the ESA by carrying out conservation programs for listed species. Section 7(a)(2) requires every Federal Agency, to insure that any action it authorizes, funds, or carries out, is not likely to jeopardize the continued existence of any species or results in the destruction or adverse modification of critical habitat.

Decision to be Made:
The Upper Snake Field Manager is the authorized officer responsible for the decisions regarding management of public lands within the proposed ROW amendment and renewal project area. Based on the results of the National Environmental Policy Act (NEPA) analysis, the authorized officer would issue a determination of the significance of the environmental effects and whether an environmental impact statement (EIS) would be required. If the authorized officer determines that it is not necessary to prepare an EIS, the environmental assessment (EA) will provide information for the authorized officer to make an informed decision as to whether not to amendment and renew the ROW grant allowing for the construction, operation, maintenance and termination of the existing diversion and pipeline, and the fish screen. If granted, which mitigation measures requirement would be prescribed for this use of public land.

The Authorize Officer would also be the decision maker for the fence and culvert construction and maintenance. The decision would also indicate construction and maintenance responsibilities for these structures.

2. DESCRIPTION OF PROPOSED ACTION AND ACTION ALTERNATIVES:

Alternative A - Proposed Action
The proposed action is to renew Billie Phillips's diversion and pipeline ROW located in Butte County. In order to authorize the renewal and ensure bull trout are not being entrained associated with this ROW, the BLM would construct a diversion fish screen at the upper diversion as identified under Location. Once constructed the holder would be responsible for the maintenance of the fish screen, the existing diversions and pipeline.

The present upper diversion, which consists of two head gates and tarp dams, would be replaced by a concrete structure with a head gate, a fish screen and an overflow. The diversion leads to a ditch that flows to the lower diversion and then into the irrigation system. The overflow would allow any excess water to flow in the original channel of Williams Creek. The new concrete diversion structure would be approximately 6' long, 30" wide and 18" high. An over flow would be constructed to allow water to flow into the lower section of the Williams Creek channel when water was not being diverted in to the ditch. A "Pump-Rite" L500 linear fish screen would be put in the Williams Creek channel. The screen is approximately 10 feet long and is 11" in diameter. It has a 20 gauge perforated stainless steel screen with .075" screen openings. This screen meets N.M.F.S. (National Marine Fisheries Service) screening criteria. The screen would be placed in 14" of water. An 8" "L" adaptor would be attached to the screen and would run through the head gate via an 8" pipe. The 8" pipe would then run across the road. The pipe would be covered with fill in the road prism. Approximately 6 cubic yards of fill would be needed. Irrigation water would then flow through 200' of 8'' pipe to build up head to allow the screen to work properly. The pipe would be put into the existing channel and would not be covered. This would be accomplished by hand. The lower end of the pipe would run into the irrigation ditch. This section of pipe would be constructed so that in the future it could attach to additional pipe and to the irrigation system below the lower diversion. The area of disturbance would be approximately 0.02 acres.

All construction activities will be conducted outside of the migratory bird nesting season (April 1 to June 30) to minimize the potential impacts to nesting birds (Sullivan et al. 2009).

The ROW would be amended to include the upper diversion structure, the ditch to the second diversion, the lower diversion and the buried pipeline to the private land boundary. The area around each diversion would be approximately 50 feet by 50 feet or 0.06 acres each (0.12 acres for both diversions). The ROW for the ditch and pipeline would be approximately 7,030 feet in length and 30 feet in width, encumbering 4.84 acres more or less. The total ROW would be **4.96 acres**.

Alternative B

This alternative would include all of the actions in Alternative A. In addition to issuing the ROW and installation of the screen, a culvert would be installed at the upper stream crossing. For the culvert installation, two 20-feet lengths of a 73" wide by 55" high corrugated metal pipe would be used. Because the culvert would be completed with natural channel bed materials inside the bottom of the culvert, a 125 feet long stream diversion would be constructed around the road crossing in a narrowly cut channel, and underlain with fabric. About 30 cubic yards of rock, gravels and silt would be excavated for this diversion, temporarily stockpiled, then replaced back in this diversion channel once the culvert installation is complete.

In the stream channel, about 12 cubic yards (1 foot deep) of the channel bed would be excavated, temporarily stockpiled, then later placed inside the culvert once the culvert pieces were installed and joined. After the culvert is installed, the diversion channel would be re-diverted to the channel, and the diversion channel would be backfilled. About 75 cubic yards of soil and rock would be used for fill over the culvert and for both the uphill and downhill road approaches, taken from the adjacent hillside approximately 20 yards to the north of proposed culvert location. The fill would be obtained by removing only loose surface material. The road fill would be placed, compacted and smoothed, and the borrow area would be smoothed out and prepared for reseeding. About 20 cubic yards of angular rock (10 cubic yards on either end of the culvert) would be used for surrounding stability and energy dissipation of the road and bank. If the rock could not be found on the surface near the construction site, rock would be brought in from off site. Work would primarily be done by a track excavator. The area of disturbance would be approximately 100 feet by 100 feet or 0.23 acres.

The total time of installation would be approximately 5 days. Appendix A includes guidelines found in the "Conservation Measures Applicable To Programmatic Activities (As Identified in the Assessment) Stream Crossing Replacement and or Removal Programmatic Consultation" which would be followed.

This alternative would include the construction of a 30-foot by **500-foot barbed wire fence (approximately 0.5 acre) that would protect the upper diversion, fish screen, and upstream riparian-wetland**. The fence would be constructed in accordance with BLM wildlife specifications in the following manner. Fence posts would be placed no more than 16 feet apart from one another. The bottom strand would be smooth wire set at least 18-inches off the ground to provide adequate clearance for deer, pronghorn antelope, and other wildlife to pass under the fence without getting tangled. The middle and top strands of the fence would be barbed wire. The top wire would be no more than 38 inches above ground level; the mid-wire would be no

less than 12 inches below the top wire. The fence would be flagged with durable vinyl makers every 4 feet, between each post, to make it more visible to wildlife.

All construction activities will be conducted outside of the migratory bird nesting season (April 1 to June 30) to minimize the potential impacts to nesting birds (Sullivan et al. 2009).

The ROW would be issued as described in Alternative A with the additional .05 acres for the exclosure fence for a total of **5.46 acres**.

Alternative C

This alternative would include all of the actions in Alternative A and B and would also include amending the ROW to allow for the construction and maintenance of an 8-inch above ground pipeline. The pipe would be in placed in the existing ditch to capture the water from the upper diversion and deliver water to the lower diversion and pipe diversion. The pipeline would create a closed system from the upper diversion to the agricultural fields on private land. Extra water from the stream at the upper diversion would bypass over the diversion and into the original channel when not being used for irrigation purposes. The total length of the pipe from the upper diversion to the lower one would be approximately 4,200 feet or .8 miles, the width would be approximately 30 feet, encumbering 2.89 acres more or less. Construction of the pipeline would be done by hand and maintained by the holder.

The area around each diversion would be approximately 50 feet by 50 feet or 0.06 acres each (0.12 acres for both diversions). The ROW for the pipelines would be approximately 7,030 feet in length and 30 feet in width, encumbering 4.84 acres more or less. The total ROW would be **4.96 acres**.

Alternative D

The No Action Alternative includes denial of the ROW renewal for the lower irrigation diversion. The diversion structure and buried pipeline would be removed from public land. A fisheries screen and new head gate would not be constructed on the upper diversion. The upper diversion would continue to act as a barrier to fish and the potential for entrainment between the upper diversion and the private land would remain. The holder would not be able to use their water right to its full potential.

Water would likely flow in the original channel to just below the road crossing and then down and old ditch to a channel that borders private and public land. Overtime there may be a possibility that the water would make its way to the Little Lost River. A culvert on the upper road crossing would not be installed and erosion would continue to occur at the crossing which would likely add sediment to the stream. The fence at upper diversion section of the stream would not be constructed.

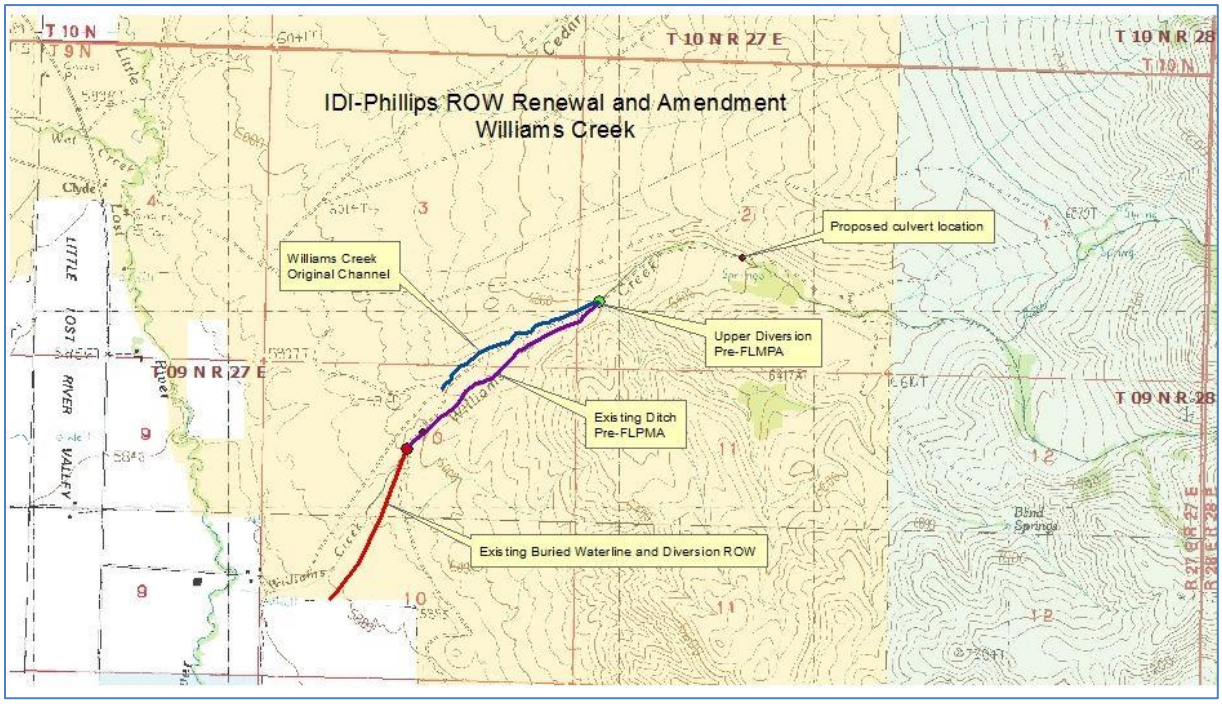
3. AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

General Setting:

The project area is located in the Little Lost Valley approximately 27 miles northeast of Howe, Idaho. More specifically the project area is along Williams Creek. The elevation in the project area is between 6200 feet and 6400 feet. The terrain is a gradual slope. The project area supports a sagebrush upland vegetation community. The sagebrush steppe community is comprised of mainly Mountain Big Sagebrush as the dominant component of the shrub overstory. The understory of these communities is often comprised of bluebunch wheatgrass, Idaho fescue, and rabbit brush

The existing irrigation diversions and pipeline are located within the BLM's Williams Creek Allotment. The cattle allotment authorizes approximately 57 AUMs with a season of use for two weeks between May 14 and June 13. Historically and currently, the project area has been used primarily for wildlife habitat, livestock grazing, agricultural purposes and recreational use. There is no indication that these current land uses are likely to change, either in type or intensity, in the foreseeable future.

Figure 2. Project Area Map



Critical Elements of the Human Environment:

The results of the site-specific assessments indicate that not all of the resources considered are present or would be directly or indirectly affected by any of the alternatives described in Chapter 2. Only those resources that are present and affected are discussed in the following narratives

Table 1. Resources Considered in the Analysis.

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Resource	Not Present	Present Not Affected	Present Affected	Rationale
Access		X		Access would remain the same.
Air Quality		X		The project is not anticipated to impact Air Quality
Areas of Critical Environmental Concern (ACEC's)	X			Proposed Project is not within the bounds of an ACEC
Cultural Resources	X			Programmatic consultation under the National Historic Preservation Act of 1966 (as amended) has been conducted in accordance with the BLM National Programmatic Agreement and the implementing Protocol agreement between Idaho BLM and the Idaho State Historic Preservation Office (ID-SHPO). A Class III Inventory was conducted within the Area of Potential Effect (APE). No historic properties eligible for listing on the National Register of Historic Places (NRHP) were identified as a result of the inventory.
Economic and Social Values	X			Not impacted
Environmental Justice	X			The proposed action and no action would not affect these populations as described under Executive Order 12898 of 2/11/1994.
Existing and Potential Land Uses		X		Existing Uses would remain the same or would not be impacted by the proposed project
Fisheries			X	Impacts are disclosed under Environmental Consequences
Floodplains			x	Impacts are disclosed under Environmental Consequences
Forest Resources	X			None present
Invasive, Non-Native Species			X	Impacts are disclosed under Environmental Consequences
Mineral Resources	X			None present
Migratory Birds			X	Impacts are disclosed under Environmental Consequences
Native American Religious Concerns		X		Issuance of the right-of-way and cons is not expected to impact Native American Religious Concerns.
Paleontological Resources	X			There are no known paleontological resources located in the project area.
Prime and Unique Farmlands	X			There are no prime or unique farmlands located within or near the proposed project area.
Soils			X	Impacts are disclosed under Environmental Consequences
Threatened, Endangered, and Sensitive Plants	X			There are no threatened, endangered, or sensitive plants or their habitat within the proposed project area.
Threatened, Endangered, and Sensitive Animals			X	Impacts are disclosed under Environmental Consequences

Table 1. Resources Considered in the Analysis.				
Resource	Not Present	Present Not Affected	Present Affected	Rationale
Threatened, Endangered, and Sensitive Fish			X	Impacts are disclosed under Environmental Consequences
Range Resources		X		The construction of the stream crossing and installation of the screen would have minimal impact on livestock management in the area. The proposed construction and maintenance of the road would not decrease available forage in the Williams Creek Allotment
Recreational Use		X		Recreational Use is anticipated to remain the same.
Tribal Treaty Rights and Interests		X		The proposed project is not anticipated to interfere or conflict with Tribal Treaty Rights or Interests.
Vegetation			X	Impacts are disclosed under Environmental Consequences
Visual Resources		X		A Visual Contrast Rating was completed and the proposed project meets the objectives of a VRM Class III.
Wastes, Hazardous and Solid	X			None present
Water Quality (Surface and Ground)			X	Impacts are disclosed under Environmental Consequences
Wetland and Riparian Zones			X	Impacts are disclosed under Environmental Consequences
Wild and Scenic Rivers	X			None present
Wild Horse and Burro HMAs	X			There are no wild horse and burro HMAs in the region.
Wilderness	X			There are no wilderness areas or WSAs within or near the proposed project area.
Wildlife			X	Impacts are disclosed under Environmental Consequences

Water Resources (Stream Channel/Floodplain and Water Quality)

Affected Environment

Williams Creek is a small, perennial spring-fed stream draining out of the Lemhi Mountains and flowing towards the Little Lost River about a mile and a quarter below the Clyde Administrative Site. The stream does not presently flow to the Little Lost River because of historical and existing irrigation diversions. This stream has been inventoried and monitored by both the Ecological Solutions Group (ESG) and BLM by the Proper Functioning Condition (PFC) method (http://www.ecological solutionsgroup.com/) for stream channel and floodplain characteristics, for the three reaches totaling 1.06 miles on public lands, as shown in Table 1. The latest assessment for channel and floodplain characteristics was completed on May 19, 2010. These three reaches are above the upper irrigation diversion; below this diversion the water is diverted into a ditch to the lower diversion, where it is piped to private agricultural lands.

Williams Creek is a Rosgen B4 stream type, with average slopes around 3%-4% (Rosgen, D. and L. Silvey, 1998). The B4 stream type is typically a foothill or mid-slope, relatively stable channel that is primarily composed of a gravel bed, and is not a high sediment supply stream channel. The stream channel is roughly 4.5 feet wide at bankfull and does not have a well-developed floodplain due to the lack of high flows and the channel slope. Based on a limited set of flow measurements (n=12; 1994-2002), flows are estimated to range from 0.75 cfs to 2.0 cfs (see Appendix B, Upper Williams Creek at Upper Road Crossing). Above the upper road crossing the watershed area is estimated to be 6 square miles, and the bankfull, 25-year event, 50-year event, and 100-yr. events are estimated at 1.3 cfs, 12.6 cfs, 17.1 cfs and 22.2 cfs, respectively (Hortness, J. and C. Berenbrock, 2003; Berenbrock, C. 2002).

Table 2. Channel Characteristics on Williams Creek in 2010

Reach (Upstream to downstream)	**Miles**	**Streambank Rootmass Protection**	**Human-caused Bare Ground**	**Streambank Structurally Altered**	**Human Physical Alterations to the Rest of the Polygon**	**Stream Channel Incisement**
1	0.28	PFC*	FAR**	PFC	PFC	PFC
2	0.21	PFC	PFC	PFC	PFC	PFC
3	0.57	FAR	FAR	FAR	PFC	FAR

* = Proper Functioning Condition; ** = Functioning-At-Risk

Some streamflow and grab sample water quality data are shown for Upper Williams Creek at the upper road crossing below the USFS boundary in Appendix 1. These results show high quality, cool, spring flow water. Williams Creek is not on Idaho DEQ's 2010 Section 303(d) list of water quality limited streams.

Environmental Consequences

Alternative A

This alternative would have a slight sediment impact to Williams Creek while installing the diversion structure and fish screen, but would have virtually no remaining sediment impacts to the stream after installation. These actions would have only a temporary impact to the channel and floodplain, during construction only. The stream would continue to have erosion and sediment input from the low water crossing, because the culvert would not be installed.

Alternative B

There would be a slight sediment impact to Williams Creek while installing the diversion structure and fish screen limited to the construction period only. There would be some sediment transported to Williams Creek due to the culvert installation project on the upper road crossing. However, this impact again would only be throughout construction (estimated to be one week). The construction of a 30-foot by 500-foot barbed wire to protect the upper diversion, fish screen, and upstream riparian-wetland has the potential over time (estimated 2-5 years) reach 3 (from Table 1 above) to achieve PFC for all five stream channel/floodplain characteristics. As an indirect impact, the fencing which would exclude grazing would likely improve bank stability by allowing riparian vegetation to become more densely populated along the banks.

Alternative C
Impacts to water resources would be basically the same under this alternative as Alternative B. The added pipeline section from the upper diversion to the lower diversion would decrease erosion and sediment in the ditch. The pipe would maximize conveyance of water to the private land for irrigation purposes. With the water in the pipe there would be less evaporation of the water than in the open ditch.

Alternative D
Under this alternative there would be no impact to the channel/floodplain or water quality from installing the road culvert, diversion structure and fish screen, installing the protective fence and installing the pipeline from the upper diversion to the lower diversion, because these actions would not take place. Sediment would continue to enter Williams Creek from the upper, eroding low water crossing.

Fisheries and Special Status Fisheries

Affected Environment
Williams Creek has a resident population of bull trout. Bull trout were listed as a federally threatened species in November 1, 1999 (64 FR 58910). Throughout its range, the bull trout is threatened by the combined effects of habitat degradation, fragmentation and alterations associated with: dewatering, road construction and maintenance, mining, and grazing; the blockage of migratory corridors by dams or other diversion structures; poor water quality; incidental angler harvest; entrainment (a process by which aquatic organisms are pulled through a diversion or other device) into diversion channels; and introduced non-native species (64 FR 58910). In addition Williams Creek is occupied by shorthead sculpin (*Cottus confuses*).

Threats to the bull trout population in Williams Creek include habitat degradation, fragmentation and alterations associated with: dewatering, and grazing; the blockage of migratory corridors by diversion structures; and entrainment into diversion channels. Due to the lack of connection to the Little Lost River the resident population of bull trout in Williams Creek is isolated from the fluvial population found in the rest of the Little Lost River drainage. This fluvial population has access from the Little Lost River to Sawmill Creek, Wet Creek and Summit Creek. In addition many of the tributaries to Sawmill Creek and Wet Creek are also occupied with by bull trout.

Bull trout are the only salmonid found in Williams Creek. Their populations are stable with most of the fish found in the upper reaches of BLM and USFS administered parts of the stream. The majority of bull trout spawning has been observed on the USFS portions of the stream. The diversion of the majority of flow from Williams Creek for irrigation for seven months removes water from the lower stream channel further restricting the chance of connection with the Little Lost River. The recovery plan for the Little Lost River bull trout population identifies the evaluation of the feasibility of reconnecting Williams Creek with the Little Lost River. With the chance of hybridization being low in Williams Creek, the connection with the Little Lost River may increase the likelihood of bull trout hybridization with brook trout population in the river.

The absence of a fish screen on the upper diversion creates a potential for entrainment of bull trout in the irrigation ditch. When water is allowed to return to the original channel at the end of

the irrigation season fish in the ditch between the upper diversion and the lower one do not have access back into Williams Creek and water quantities and food availability in the ditch would not be able to sustain them through the non-irrigation season.

The ford crossing above the diversion is a contributor of sediment to Williams Creek. The discharge in Williams Creek is low, but sediment deposited in the creek does not flush through quickly. An increase in sediment to a stream can impact fish in a number of ways. Suspended sediment in the stream can inhibit respiration by irritating gills, the tissues that allow the transfer of oxygen to the blood of fish. Suspended sediment can also affect feeding and movement behavior by increasing instream turbidity, juveniles are most affected. Increased sediment can also modify channel configuration by accumulating and filling pools. It can also hamper spawning and incubation by covering spawning substrates and then not allowing the interstitial flow of water through the spawning substrate. Flow through the gravels provides oxygen to developing embryos and removes carbon dioxide and waste materials and without it egg development can be slowed or halted. Excessive fine sediment can also hamper fry emergence by trapping them in the gravel. Lastly fine sediment can also inhibit macro invertebrate production which can reduce food supplies for fish.

Environmental Consequences

Alternative A
The renewal and amendment to the existing ROW, which includes the rebuilding of the upper diversion and screening the pipe leading to the ditch to the lower diversion should protect bull trout and other fish species from entrainment in the ditch when irrigation season ends. The present ford configuration at the upper road crossing would continue to be a sediment source that could impact fisheries and other aquatic species as described in the Affected Environment discussion.

Alterative B
The impacts from the ROW renewal and screen implementation would be the same as Alternative A. The installation of the culvert could produce an increase in short term sediment delivery to the stream. Using mitigation measures found in Appendix A should minimize impacts during construction. In the long term however a reduction in sediment should occur from the installation of the culvert. Construction of the fence to protect the diversion and screen will help to assure the effectiveness of the structures to prevent fish entrainment in the existing ditch. The fence will also reduce sediment introduction in the area enclosed in the fence by reduce bank alteration. Because spawning takes place in the upper reaches of the creek and the installation of both the screen and culvert are before spawning occurs there should be no impact on spawning.

Alternative C
Impacts to fisheries from ROW renewal, diversion and screen implementation, fence construction and culvert installation should be the same as Alternative B. Placing the water in a pipe from the upper diversion connecting to the downstream pipeline could lead to more water being left in the stream to flow down the original stream channel. When water is not used in the irrigation system the bypass at the diversion would let water flow into the original channel. This could create new fisheries habitat and may assist in the development of riparian vegetation.

Alternative D
The continuation of the present unscreened irrigation system would continue to allow entrainment of fisheries in the irrigation ditch between the two diversions. This could lead to an unauthorized take of bull trout which would be in violation of the Endangered Species Act. The present ford configuration would continue to be a sediment source that could impact fisheries and other aquatic species as described in the Affected Environment discussion. Water not being used for irrigation during the irrigation season will continue to be bypassed to the ditch area below the lower diversion and will seep into the ground providing no useable habitat for fish.

Invasive, Non-Native Species

Affected Environment
Noxious weed monitoring and treatment records for the public lands within the Williams Creek Allotment report occurrences of isolated pockets of Canada thistle (*Cirsium arvense)*. Canada thistle occurs along Williams Creek in the Williams Creek Pasture. The Upper Snake Field Office actively inventories, monitors, and treats occurrences of invasive non-native species within the field office area using the Standard Operating Procedures outlined in the Programmatic Environmental Assessment for Integrated Weed Management for the Upper Snake Field Office and Pocatello Field Office (ID-310-2008-EA-43).

Environmental Consequences

Alternative A
The potential impacts of invasive, non-native species found in the allotment include degradation of native habitat. Seeds of undesirable species may be dispersed by wind, water, animals, or humans. Under Alternative A, ground disturbance activities would result in increased opportunity for the establishment or expansion of invasive, non-native species in the short term. However, with continued integrated weed management, long term impacts would be minimal.

Alternative B
The potential short term impacts would be somewhat higher under Alternative B, compared to Alternative A, due to the increased level of disturbance and the use of equipment for culvert placement which increase the potential of introduction of weed seeds. While short term impacts may be somewhat higher, long term impacts, similar to Alternative A, would be minimal due to ongoing integrated weed management practices.

Alternative C
Potential impacts would be similar to Alternative B.

Alternative D
Under Alternative D no new ground disturbing activities would be permitted and presence on invasive, non-native species would remain at current levels.

Vegetation

Affected Environment

There are three primary ecological sites in the Williams Creek Allotment: Wyoming big sagebrush / bluebunch wheatgrass ecological site, black sagebrush / bluebunch wheatgrass, and low sagebrush / bluebunch wheatgrass ecological sites. Other common species across the allotment include green rabbitbrush (*Chrysothamnus viscidiflorus*), shadscale (*Atriplex confertifolia),* Nuttals saltbrush (*Atriplex nuttallii*), Sandberg bluegrass (*Poa secunda*), squirreltail (*Elymus elymoides*), Indian ricegrass (*Achnatherum hymenoides*), needle and thread grass (*Hesperostipa comata*), and western wheatgrass (*Pascopyrum smithii*). Average annual production of the native plant communities in the allotment are highly variable depending on the amount and timing of precipitation, among other factors. Annual production varies from 300 lbs/acre in unfavorable years, 400 lbs/acre in average years, to 700 lbs/acre in favorable years based on Natural Resource Conservation Service (NRCS) ecological site descriptions.

Alternative A
A small amount of native vegetation outside of the riparian zone may be impacted during implementation of Alternative A. During construction, equipment would likely remove or otherwise impact vegetation on less than one-quarter acre in the immediate proximity of construction and would have no long term impact on the ecological sites in the general area.

Alternative B
Impacts would be similar to Alternative A, though on larger area would be impacted with the inclusion of the upstream culvert placement. Less than one acre would be impacted in the immediate proximity of the construction and would have no long term impact on the ecological sites in the general area.

Alternative C
Impacts would be similar to Alternative B.

Alternative D
Under Alternative D, no additional construction would take place therefor there would be no short term impacts on vegetation. As in the above alternative, ecological sites would be maintained in the long term in their present condition in the general area of the project.

Wetlands and Riparian Zones

Affected Environment
The project area encompasses approximately 0.6 perennial miles of Williams Creek in its natural channel above the upper pre-FLPMA diversion, and consists of approximately 0.6 acres of riparian-wetland vegetation occupied by quaking aspen (Populus tremuloides), water birch (Betula occidentalis), willow (Salix spp.), Nebraska sedge (Carex nebrascensis), Rocky Mountain juniper (Juniperus spp.), woods rose (Rosa woodsii), currant (Ribes spp.), Baltic rush (Juncus balticus), cinquefoil (Potentilla spp.), stinging nettle (Urtica dioica), cattail (Typha latifolia), columbine (Aquilegia spp.), pussy-toes (Antennaria spp.), Kentucky bluegrass (Poa pratensis), watercress (Nasturtium officinale), and yarrow (Achillea lanulosa). The BLM-administered area below the upper diversion is comprised of approximately 1.25 miles of an ephemeral natural channel (also referred to as the original channel in this document), which only receives water outside of the irrigation season, and thus is devoid of riparian-wetland vegetation.

In addition, the ditch below the upper diversion contains approximately 0.8 miles of a sporadic artificial wetland dominated by Rocky Mountain juniper, water birch, woods rose, currant, Baltic rush, Kentucky bluegrass, cinquefoil, pussy-toes, and yarrow. The occurrence of invasive species noxious weeds, primarily Canada thistle (Cirsium arvense), comprises less than 1% of the 0.6-mile natural channel above the upper diversion, while occupying approximately 10% of the 0.8-mile ditch below the diversion.

The overall condition of the riparian-wetland vegetation along the reach above the upper diversion is properly functioning as per an allotment assessment completed by BLM personnel in 2010. The riparian-wetland vegetation along the ditch below the upper diversion was found to be nonfunctional during the 2010 assessment, and was later removed from further consideration as a riparian-wetland area as a result of its artificial nature and lack of continuous vegetation associated with riparian-wetland areas.

Environmental Consequences

Alternative A

Under Alternative A, a concrete diversion structure and an over flow would replace the two head gates and tarp dams at the upper diversion, a fish screen would be installed, and an overflow would be constructed to allow delivery of excess water into the ephemeral natural channel of Williams Creek. No more than 10 feet of riparian-wetland vegetation (approximately 0.02 acres) would be removed during construction of the diversion structure, fish screen, and overflow. Approximately four feet of the impacted area (approximately 0.008 acres) would recover in three to five years, while approximately six feet of riparian-wetland vegetation (approximately 0.012 acres) within the impacted area would be permanently removed. Currently, much of the water sinks in the ditch before it reaches the pipeline below the lower FLPMA diversion.

Installation of a 200-foot, eight-inch pipe below the fish screen would result in improved efficiency of irrigation water delivery between the upper and lower diversions, thus increasing the potential for some excess water that may be delivered to the ephemeral Williams Creek channel below the upper diversion and resulting in reestablishment of a riparian-wetland area along at least a portion of this reach, particularly during the fall and winter months outside the irrigation season. However, the area between the lower end of the 200-foot pipe and the lower FLPMA diversion would remain in the open ditch and water would continue to eventually sink along the ditch. As a result, very little excess water is expected to be available for delivery to the ephemeral channel.

Impacts to riparian-wetland vegetation would be higher compared to Alternative C, which would protect approximately 0.5 acres of riparian-wetland habitat with a fence and would install a pipeline from the upper diversion to the lower diversion, thus eliminating water loss in the ditch and potentially allowing more water delivery to the ephemeral channel. In addition, impacts would be higher compared to Alternatives B and C, which would include installation of a culvert at the upper road crossing to reduce erosion and introduction of invasive species/noxious weeds along Williams Creek. Impacts would be lower compared to Alternative D, which would not implement any new projects to improve irrigation water delivery, reduce erosion, or protect structures and resources.

Alternative B
Impacts to riparian-wetland vegetation under Alternative B would be similar to those described under Alternative A. However, a culvert would be installed at the upper stream crossing. At the new culvert location, a six-foot wide ribbon of herbaceous riparian-wetland vegetation (approximately 0.012 acres) would potentially be removed or displaced along the 125-foot long temporary diversion channel. However, this area would be backfilled with native materials following construction, and recovery of the affected riparian-wetland vegetation would occur in one to two years. Construction of the culvert would remove, kill, or displace approximately 60 feet of existing woody and herbaceous riparian-wetland vegetation (approximately 0.12 acres). However, approximately 20 feet of vegetation (approximately 0.04 acres) would re-establish in three to five years following construction, resulting in a permanent net loss of approximately 40 feet of riparian-wetland vegetation (approximately 0.08 acres). Although some permanent loss of riparian-wetland vegetation would occur as a result of culvert construction, streambank-destabilizing erosion from the current road crossing would cease, thus allowing for long-term maintenance of the channel and associated riparian-wetland vegetation. Long-term protection and maintenance of riparian-wetland vegetation adjacent to and below the road crossing would be the same as Alternative C, but would be higher compared to Alternatives A and D, which would not install a culvert.

This alternative would include the construction of a 40-foot by 500-foot barbed wire fence (approximately 0.5 acre) that would protect the upper diversion and fish screen. As a secondary impact, the fence would include protection of associated riparian-wetland vegetation from uses such as recreation and livestock grazing. As a result, this 0.5-acre riparian-wetland area would maintain proper functioning condition more readily compared to adjacent unfenced areas. Protection of riparian-wetland vegetation would be the same as Alternative C, but higher compared to Alternatives A and D, which would not include construction of a fence.

Overall, impacts to riparian-wetland vegetation would be lower compared to Alternative A, which would not include installation of a culvert at the upper road crossing or construction of a protective fence at the upper diversion. Similarly, impacts would be lower compared to Alternative D, which would not construct any projects to reduce erosion, improve efficiency of water delivery, or protect structures and resources, thereby decreasing the potential for recovery of riparian-wetland vegetation along the ephemeral Williams Creek channel. Impacts would be higher compared to Alternative C, which would allow more efficient delivery of excess water to the ephemeral reach of Williams Creek, thus resulting in the greatest potential for reestablishment of native riparian-wetland vegetation.

Alternative C
Impacts to riparian-wetland areas under Alternative C would be similar to those described under Alternative B. However, a pipeline would be installed from the upper pre-FLPMA diversion to the lower FLPMA diversion, where it would tie into an existing pipeline for water delivery to a private agricultural operation. The sparse, artificial wetland along the existing 0.8-mile ditch would die out. However, improved efficiency of irrigation water delivery would eliminate the water loss that is currently occurring in the ditch, and excess water would flow in the ephemeral Williams Creek channel below the upper diversion, particularly during the fall and winter outside the irrigation season. This would potentially result in reestablishment of a riparian-wetland area

along at least a portion of this reach, and the potential also exists for water to eventually flow into the Little Lost River via the natural (original) channel and/or via an overrun channel. Recovery of the natural channel to a functioning riparian-wetland area would occur to a greater extent compared to Alternatives A, B, and D, which would all continue to result in some level of water loss in the ditch and consequently, less delivery of water to sustain a riparian-wetland area in the ephemeral reach of Williams Creek. Alternative C would offer the greatest increase in efficiency of water delivery, particularly to the ephemeral channel. Therefore, overall impacts to riparian-wetland vegetation would be lower compared to Alternatives A, B, and D.

Alternative D
Under Alternative D (No Action), the projects proposed under Alternatives A, B, and C would not be constructed. As a result, a portion of the water flowing in the ditch below the upper diversion would continue to sink, and little or no excess water would be delivered to the ephemeral reach of Williams Creek. However, the sparse artificial wetland in the ditch would persist, and it may expand below the lower diversion following removal of the existing pipeline. The ephemeral Williams Creek channel below the diversion would continue to be completely dewatered during the irrigation season. Consequently, reestablishment of riparian-wetland habitat in this reach would not occur. Erosion from the upper road crossing would continue, and the streambank would continue to destabilize, thus resulting in greater long-term loss of riparian-wetland vegetation. In addition, continued erosion has the potential to deposit seeds of invasive species/noxious weeds or other undesirable herbaceous species downstream, thus resulting in alterations to the vegetative community. Riparian-wetland impacts would be higher compared to Alternatives A, B, and C, which would improve efficiency of water delivery and thus, increase the potential for recovery of riparian-wetland vegetation along the ephemeral reach. In relation to the upper road crossing, impacts would be higher compared to Alternatives B and C, but the same as Alternative A. In relation to protection of riparian-wetland areas through fencing, impacts would be the same as Alternative A, but higher compared to Alternatives B and C, which would construct a protective fence around the upper diversion, fish screen, and upstream riparian-wetland area.

Soil Resources

Affected Environment
The soils within the Williams Creek drainage where the current ROW exists are mapped by the Natural Resource Conservation Service (NRCS) Butte County Area Survey (2009) as Sparmo silt loams and Zer gravelly loams. The slopes of the soil map units range from 1-4%.
The soils in this area have been disturbed by the development of the road and the current diversion structure. A majority of the disturbance area (except the road) has become r-evegetated, though there are still a few areas of bare ground, particularly at the stream crossing and around the current diversion structure. These areas are vulnerable to erosion, particularly at the stream crossing where the soil can be eroded by vehicle use.

Alternative A
Under Alternative A approximately 0.02 acres of disturbance would occur due to the removal of the current diversion structure, the installation of the new diversion structure, and the installation of buried pipe. Soils will be at increased risk of erosion during removal/installation activities.

Once the soils within the footprint of the road have been re-compacted erosion rates should return to background levels. The potential for erosion to occur around the new diversion structures should return to background levels once the soils become re-vegetated. Erosion would continue to occur at the Williams Creek crossing due to vehicle use.

Alternative B
Under Alternative B impacts to the 0.02 acres of disturbed soils due to the removal of the current diversion structure, installation of the new diversion structure, and installation of pipe would be the same as discussed under Alternative A.

In addition, approximately 0.23 acres would be disturbed due to the installation of a culvert at the Williams Creek crossing. Installation of the culvert will include the excavation of approximately 75 cubic yards of soil and rock from the adjacent hill side. The material that would be removed would only be loose surface material, not stable, vegetated soil. Until the installation of the culvert is completed, approximately 5 days, the soil within the disturbance footprint would be vulnerable to erosion. Once the culvert is installed and the material surrounding the culvert has been compacted the risk of erosion would be reduced. As this area becomes vegetated the potential for erosion to occur would continue to diminish.

Under Alternative B approximately 0.5 acres would be fenced in order to protect the upper diversion and the riparian vegetation. Fencing this area will protect the soil in this area from disturbances that may cause erosion.

Alternative C
Impacts to the soil resource under Alternative C would be similar to those discussed under Alternative B. The additional construction of the above ground pipeline within the existing ditch would have negligible impacts on the soil.

Alternative D
Under Alternative D the soil would be disturbed due to the removal of the existing diversion structure and buried pipeline. Erosion potential of this disturbance would be increased until the area is re-vegetated. Erosion would continue to occur at the Williams Creek crossing due to vehicle use.

Migratory Birds; Threatened, Endangered, and Sensitive Animals; and Wildlife Resources

Affected Environment
A wide variety of migratory birds inhabit sagebrush-steppe and riparian habitats, which are both found within this project area in the Williams Creek Allotment. Some of these species include the sage thrasher, sage sparrow, Brewer's sparrow, green-tailed towhee, loggerhead shrike, and Bullock's oriole. Sagebrush-steppe birds that require sagebrush as nest sites benefit from intact mature sagebrush stands, which are present in Williams Creek Allotment. Approximately 0.6 acres of riparian vegetation are found along Williams Creek within the project area. Riparian vegetation attracts a greater number and variety of bird species, primarily those that feed on insects, during migration than during the breeding season (Knopf et. al. 1988). Riparian habitats support the highest bird diversity of any western habitat type and covers less than 1% of the landscape in Idaho (Ritter 1998). Heath and Ballard (2003) found the riparian width and/or

percent riparian habitat was positively correlated with breeding bird species diversity within the arid region of the eastern Sierra Nevada. Migratory birds that require riparian habitat and that may use Williams Creek Allotment include the willow flycatcher, yellow warbler, Wilson's warbler, ruby-crowned kinglet, and the blue grosbeak. Other migratory birds may use riparian zones for foraging, nesting, and cover from predators. The composition and structure of the surrounding vegetation and land uses adjacent to riparian ecosystems can influence distribution and occurrence of most bird species. Inventory and monitoring data are limited or absent for many migratory bird species, including sagebrush obligates, within the Williams Creek Allotment. Little is known about their population status or trends.

The allotment is also used during different seasons by migratory raptors such as the rough-legged hawk, ferruginous hawk, Swainson's hawk, northern harrier, red-tailed hawk, prairie falcon, and golden eagle. The pattern and amount of habitat cover may determine foraging habits of raptors, with some raptors being successful in areas with increased cover and other species being successful with increased bare ground (Baker and Brooks 1981).

All data known to the Upper Snake Field Office, including data from U.S. Fish and Wildlife Service (USFWS), Idaho Department of Fish and Game (IDFG), and the Idaho Natural Heritage Program has been considered to identify any plant or animal species currently listed under the Endangered Species Act (ESA). There are no endangered species within the Williams Creek Allotment. However there is one threatened species, the bull trout, and one candidate species, the greater sage-grouse.

Table 3 is a list of special status species that have been identified as occurring or potentially occurring within the allotment. BLM includes the following as special status species:

1) Species officially listed or proposed for listing as threatened or endangered under the ESA or candidates for listing as threatened or endangered under the ESA.
2) Species listed by a State in a category such as threatened or endangered implying potential endangerment or extinction.
3) Species designated by the BLM State Director as sensitive.

The probability of species occurring and rationale for occurrence are listed. Species not occupying seasonal ranges or not expected to occur within the Williams Creek Allotment are not discussed in the assessment.

Table 3- Special Status Species and Occurrence within Williams Creek Allotment

Species	Status[a]	Occurrence	Rationale
Bull Trout (*Salvelinus confluentus*)	T	Present	Breeding habitat present
Greater Sage-grouse (*Centrocercus urophasianus*)	C	Present	PPH/PGH
Pygmy rabbit (*Brachylagus idahoensis*)	S	Potential	Potential habitat present
Prairie falcon	S	Present	Forages throughout

Species	Status[a]	Occurrence	Rationale
(*Falco mexicanus*)			allotment. Nesting areas not identified
Ferruginous hawk (*Buteo regalis*)	S	Present	Breeding habitat. Nest sites identified within allotment
Brewer's sparrow (*Spizella breweri*)	S	Present	Potential breeding habitat present
Sage sparrow (*Amphispiza belli)*	S	Present	Potential breeding habitat present

Status Codes: S=BLM; C=Candidate Species; T=Threatened Species

On March 23, 2010 the US Fish and Wildlife Service determined that listing of the greater sage-grouse range-wide was warranted but precluded by higher listing priorities (75 FR 55). The Special Status Species Management Manual states that, "All Federal candidate species, proposed species, and delisted species in the 5 years following delisting will be conserved as Bureau sensitive species" (DOI-6840, 2008). Habitat for sage-grouse within the BLM is currently managed under Instruction Memorandum No. 2012-043 - Greater Sage-Grouse Interim Management Policies and Procedures and the Conservation Plan for Greater Sage-Grouse in Idaho (ISGAC 2006). Currently considered a Candidate species by the USFWS, greater sage-grouse are strongly correlated with the distribution of sagebrush habitats as they depend on a variety of shrub steppe habitats throughout their life cycle, and are considered obligate users of several species of sagebrush (USFWS 2010). Sage-grouse require large tracts of relatively continuous sagebrush cover throughout the entire year (Pehrson and Sowell 2011), and they exhibit strong site fidelity to seasonal habitats (USFWS 2010). However, during the late brood-rearing season sage-grouse will also utilize wet meadow and riparian habitat adjacent to sagebrush cover to search for forbs and insects.

The Williams Creek Allotment is considered breeding, late-summer brood-rearing, and winter habitat for sage-grouse. The proposed project area, however, is mostly considered late brood-rearing habitat and most sage-grouse observations in the allotment are along Williams Creek and Horse Creek during mid and late summer. Sage-grouse are also observed within the allotment during the winter period. The proposed project area is completely within Preliminary Priority Habitat. In general, the Preliminary Priority Habitat (PPH) designation is based on sage-grouse populations as identified in *Sage-grouse Priority and General Areas in Idaho* (USDI-BLM 2011, and Makela and Major 2011). In particular, PPH is based on combined high male lek attendance, high lek density and high lek connectivity. Impacts in these areas result in impacts to sage-grouse population centers and movement corridors.

Pygmy rabbits are sagebrush obligate species inhabiting dense, tall stands of big sagebrush growing on deep, friable soils that allow them to dig extensive burrow systems (Janson 2002). Landscape features include alluvial fans and hillsides, swales within rolling topography, floodplains, brushy draws, riparian channels, edges of rock and lava outcroppings, and mima mounds (IDFG 2005). The area may provide potential habitat for the pygmy rabbit, however none have been documented within the allotment.

Prairie falcons inhabit dry environments of western North America where cliffs or bluffs punctuate open plains and shrub-steppe deserts (Steenhof 1998). Prairie falcon use of the area is likely flying, perching, foraging and migration.

Ferruginous hawks are large grassland raptors that breed in the shrub-steppe and semi-arid regions of western North America (Olendorff 1993). Their density and productivity are closely associated with cycles of prey abundance with mammals being the primary prey source during breeding season although birds, amphibians, reptiles, and insects are also taken (Dechant et al. 2002, Woffinden and Murphy 1989). Habitat degradation due to agriculture and overgrazing has been reported as a threat to the species' survival in North America (Leary et al. 1998). Natural features in the area provide potential foraging habitat for this species, and historical nesting sites have been documented within the allotment.

Brewer's sparrows breed in shrub steppe, transitions between shrub steppe and shortgrass prairie, and semi-desert shrub steppe habitats (Walker 2004). Brewer's sparrows are gleaners, consuming small insects, gleaned from foliage and bark of shrubs or dwarf trees and seed taken from the ground (Rotenberry et al. 1999). Reduced occupancy, nest success and season-long productivity in fragmented shrub steppe habitats suggest smaller patches of habitat are of marginal suitability (Walker 2004). Brewer's sparrows are known to occur in the area but have not been documented within the allotment.

Sage sparrows are dependent on stands of sagebrush for nest sites, food, and cover (Vander Haegen 2003). They prefer semi-open habitats with evenly spaced shrubs 3-6 feet high (Martin and Carlson 1998) and are found more frequently in extensive areas of continuous sage (Vander Haegen 2003). Sage sparrows are ground foragers that eat insects, spiders, seeds, small fruits and succulent vegetation (Martin and Carlson 1998). Sage sparrows are known to occur in the area but have not been documented within the allotment.

Other wildlife species utilizing habitats in the allotment include raptors, small land birds (resident and migratory), upland game birds, small mammals, reptiles, amphibians, and invertebrates. The Williams Creek Allotment also contains crucial winter range for a variety of big game animals including pronghorn, mule deer, and elk. Big game animals will utilize riparian habitat for access to drinking water, browse vegetation during the winter months and herbaceous vegetation during the spring and summer months. Riparian habitat may also be occasionally be used by other wildlife and special status species, including sagebrush obligates, for access to drinking water, cover, and foraging.

Currently, the upper reaches of Williams Creek (portion above the upper pre-FLPMA diversion) support approximately 0.6 acres of riparian-wetland vegetation. The riparian vegetation consists mostly of quaking aspen, water birch, Rocky Mountain juniper, woods rose, currant, Baltic rush, cinquefoil, stinging nettle, cattail, columbine, pussy-toes, Kentucky bluegrass, willow, Nebraska sedge, watercress, and yarrow. This vegetative community provides potential habitat for a wide variety of migratory birds, special status species, and other wildlife species. The adjacent uplands consist of sagebrush-steppe habitat with scattered juniper present. The irrigation ditch running from the upper diversion to the lower diversion (approximately 0.8 miles) supports only sporadic artificial riparian habitat dominated by Rocky Mountain juniper, water birch, woods

rose, currant, Baltic rush, pussy-toes, and yarrow. Although some riparian vegetation can be found along the ditch, this area has been removed from consideration as a riparian-wetland area because of its artificial nature and lack of continuous vegetation associated with riparian-wetland habitat. Therefore it has very limited potential, if any, to provide foraging, cover, or nesting riparian habitat for migratory birds and other wildlife species. However, although the ditch does not provide riparian habitat it does provide available surface water (during irrigation season) for migratory birds, special status species, and other wildlife species. The natural channel below the pre-FLPMA diversion is approximately 1.25 miles in length. This channel only receives water when it is not being used for irrigation, and is devoid of any riparian-wetland vegetation.

Environmental Consequences

Alternative A

Under the Alternative A, the two head gates and tarp dams at the upper diversion would be replaced by a concrete diversion structure and a head gate. A fish screen would be installed at the diversion, and an over flow would be constructed to allow water to flow into the original channel of Williams Creek when not being diverted into the ditch.

The installation of a new diversion, head gate, and over flow would improve the efficiency of the irrigation system. This may allow for more water to flow into the original channel, which could aid in the potential re-establishment of riparian habitat in this reach. Re-establishment of riparian vegetation would result in an increase in the amount of riparian habitat available for foraging and cover for a wide variety of wildlife species, and also increase the amount of nesting habitat available for migratory birds. It is expected that some riparian vegetation would be damaged and/or removed during the construction phase. Human activity associated with the construction may cause some wildlife species to become temporarily displaced, or even cause some birds to abandon their nest sites, although the potential is limited. However, the disturbance would be minimal (approximately 0.02 acres) and short-lived. It is expected that, with no additional disturbance needed, the disturbed area would re-establish in three to five years. The construction should have relatively minimal impact on sagebrush obligate species (i.e. greater sage-grouse, pygmy rabbit, Brewer's sparrow, sage sparrow, etc.), as all disturbance would be confined to a small area in the riparian zone. The construction activities will be conducted outside of the migratory bird nesting season (April 1 to June 30) to minimize the potential impacts to nesting birds (Sullivan et al. 2009).

When compared to Alternative D, Alternative A would improve the efficiency of the irrigation system and potentially provide more water to the original channel of Williams Creek. This alternative would improve the efficiency of the irrigation system to the same degree as Alternative B; however it would not have the additional impacts to wildlife associated with the installation of a new fence and culvert under Alternative B. Alternative A would also provide additional access to open water for migratory birds and other wildlife species when compared to Alternative C. However, Alternative A would result in more water loss than Alternative C, and therefore limit the re-establishment of riparian vegetation in the original channel of Williams Creek. The increase and re-establishment of riparian vegetation along this original channel would be the most beneficial impact to migratory birds, special status species, and other wildlife species.

Alternative B
Impacts to migratory bird, special status species, and other wildlife habitat under Alternative B would be similar to those described under Alternative A. In addition to the installation of a new diversion, head gate, and fish screen; a culvert would be installed at the upper stream crossing. Installation of the culvert would also include creating a temporary diversion channel approximately 125 feet in length. Additionally, under Alternative B a fence would be constructed around the upper diversion and fish screen.

Construction of the temporary diversion ditch would include potentially removing or displacing riparian vegetation from an area six feet in width and 125 feet in length (approximately 0.017 acres). This would result in the direct loss of 0.017 acres of riparian habitat that would otherwise be available as potential nesting, cover, and foraging habitat. However, this area would be backfilled with native materials following construction of the culvert, and it is expected that the riparian vegetation within the disturbed area would recover naturally within one to two years.

Construction of the culvert would require the removal or displacement of approximately 0.12 acres of existing riparian vegetation. Additionally, backfilling around the culvert would require the excavation of approximately 75 cubic yards of material from the hillside directly north of the stream crossing. The excavation would encompass a surface area of up to 0.25 acres of sagebrush-steppe habitat. These actions would result in the direct loss of approximately 0.12 acres of riparian habitat and 0.25 acres of sagebrush-steppe habitat that would otherwise be available to various wildlife species for potential nesting, cover, and foraging. It is expected, however, that approximately 0.04 acres of the riparian vegetation would naturally re-establish in three to five years while the remaining 0.08 acres would be permanently removed. The loss of 0.25 acres of sagebrush-steppe habitat would impact sagebrush obligate species (i.e. greater sage-grouse, pygmy rabbits, sage sparrow, etc.) which rely on sagebrush for cover and forage. However, following the excavation from the hillside, the borrow area will be prepared and re-seeded with native vegetation. Therefore, this impact would not be permanent and would be alleviated as the re-establishment of vegetation occurs. Ample sagebrush-steppe habitat would remain intact directly adjacent to the project area and would be available for nesting, cover, and foraging. Installation of a culvert would remove the impacts of streambank erosion associated with the current road crossing and provide for long-term stabilization of the streambank. Stabilization of the streambank would increase the amount of riparian vegetation available to various wildlife species to use as potential nesting, cover, and foraging habitat. Approximately 20 cubic yards of angular rock will be removed from the surface of the surrounding area and used to provide stability to the culvert. Removing rocks from the surface will cause very minimal disturbance and no significant impacts to migratory bird, special status species, and other wildlife habitat.

A new fence would be constructed approximately 40 feet in width by 500 feet in length, to exclude livestock and prevent damage to the upper diversion and fish screen. Direct impacts to migratory bird species from fencing would include increased perches for hunting, singing, and territorial displays which may increase fitness and mating potential. However, it may also increase the number of available perches for potential predators. Direct impacts to other wildlife, particularly big game species, include negatively affecting movement patterns as fences may pose as barriers. Further impacts to migratory birds, special status species, and other wildlife

would be the potential for fence collisions or becoming entangled which may result in injury or possible mortality. As mentioned in the project design, all fences would be built in a manner which will allow for easier passage and reduce the influence of fences on wildlife movement. Additionally, the top strand will be marked with reflective markers to make the fence more visible to wildlife and reduce the risk of collision. Impacts associated with excluding livestock use of this area (approximately 0.5 acres) would include more readily maintaining proper functioning condition of the riparian habitat. This may increase the amount of forage and cover available for use by various wildlife species, and increase the amount of available nesting habitat for migratory birds. It may also prevent potential disturbance from livestock to bird species nesting within the riparian habitat.

Human activity associated with the construction activities may cause some wildlife species to become temporarily displaced, or even cause some birds to abandon their nest sites, although the potential is limited. The construction activities will be conducted outside of the migratory bird nesting season (April 1 to June 30) to minimize the potential impacts to nesting birds (Sullivan et al. 2009).

Impacts to migratory bird, special status species, and other wildlife habitat would be greater under Alternative B when compared to Alternative A. Both alternatives would improve the efficiency of the irrigation system; however Alternative B would include additional impacts to wildlife associated with the construction of the fence and culvert. Although this alternative would provide more access to open water compared with Alternative C, it would not improve the efficiency of the irrigation system to the same degree and therefore not provide as much flow to the original channel.

Alternative C

Impacts to migratory bird, special status species, and other wildlife habitat under Alternative C would be similar to those described under Alternative B. Additionally, under Alternative C a pipeline would be installed between the upper diversion and the lower diversion. The pipeline would carry all of the water for the irrigation system, and would be installed along the bed of the current ditch. This would cause the small amount of riparian vegetation that is present along the irrigation ditch to die off, reducing the amount available to various wildlife species. It would also remove approximately 0.8 miles of available surface water (during irrigation season) for migratory birds, special status species, and other wildlife species. Although open water would be removed from the ditch, access to open water at Williams Creek would be no more than 0.8 miles from any point on the ditch. Installing a pipeline would drastically increase the efficiency of the irrigation system and eliminate water loss from causes such as saturation, etc. The increased efficiency would then increase the potential for excess water to flow into the original channel of Williams Creek, which would aid in the re-establishment of riparian habitat. Additionally, the irrigation ditch was surveyed during a 2013 field visit and no sign of sage-grouse use and only very little use by mule deer was observed. With the irrigation ditch no longer carrying water on the surface, it may increase the amount of potential burrowing habitat for pygmy rabbits.

Impacts associated with human activity during construction would be similar to those described under Alternative B.

Impacts to migratory birds, special status species, and other wildlife species would be the most beneficial under Alternative C, when compared to Alternatives A, B, and D. Alternative C would result in the most efficient irrigation system, which in-turn would result in the largest amount of water flowing into the original channel of Williams Creek. This would maximize the potential for riparian vegetation to re-establish in this reach. The benefits of re-establishment, or an increase, of riparian vegetation would out-weigh the negative impacts associated with this alternative.

Alternative D (No Action)
Under Alternative D, the projects proposed under the other alternatives would not be constructed. Water will continue to flow through the current diversion and into the irrigation ditch. This will continue to support the minimal amount of riparian vegetation present along the ditch, and it will provide available access to 0.8 miles of open water for migratory birds, special status species, and other wildlife species (during the irrigation season). However, it will also continue to keep the original channel devoid of any water during the irrigation season, and the re-establishment of riparian habitat in this reach would not occur.

Impacts to migratory birds, special status species, and other wildlife species would be greater under Alternative D when compared to Alternatives A, B, and C. Alternatives A, B, and C would improve the efficiency of the irrigation system, while Alternative D would eliminate the potential to re-establish riparian vegetation along the original channel of Williams Creek.

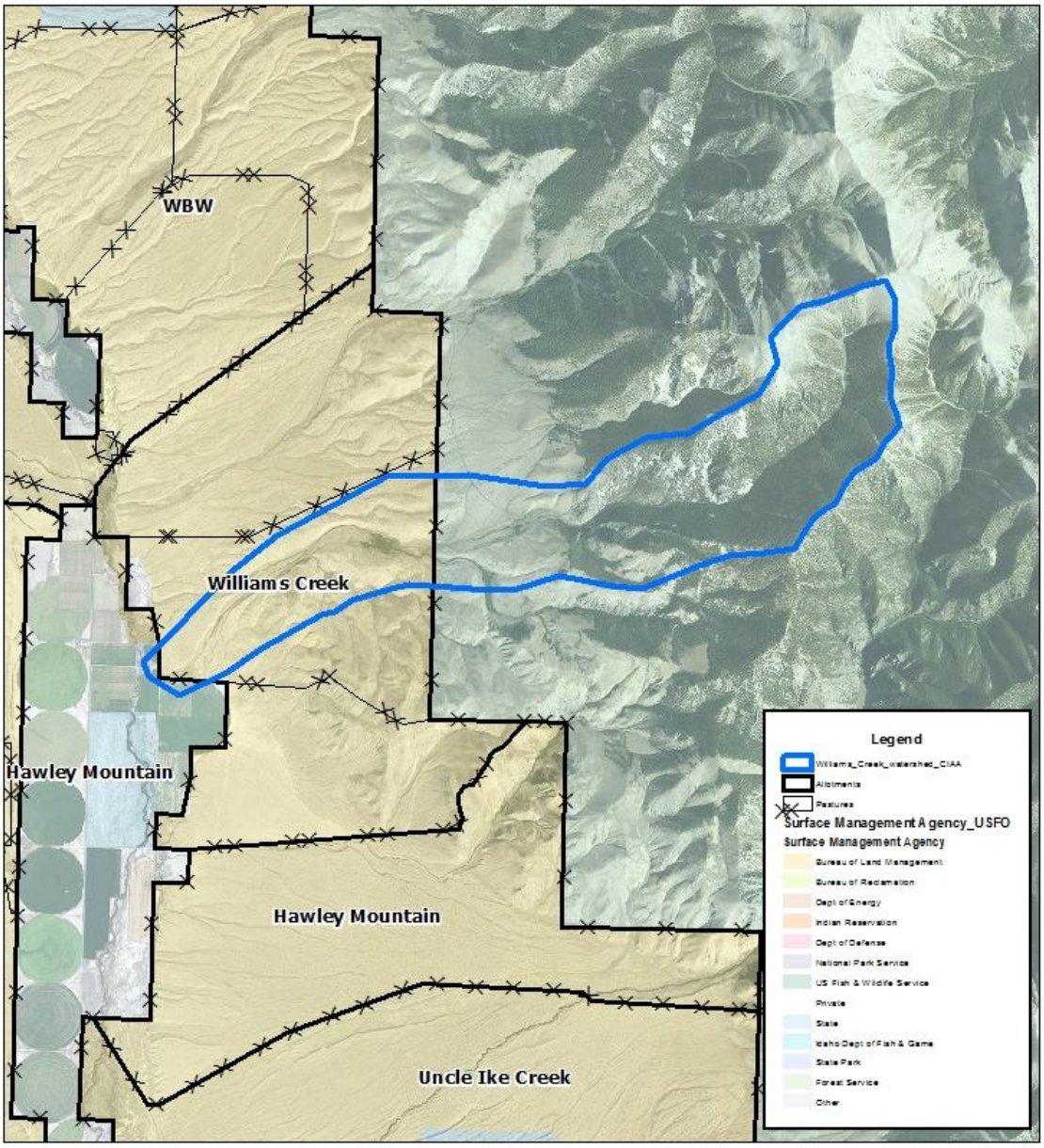
4. CHAPTER 4 - CUMULATIVE IMPACTS

This section of the document discloses the incremental impact that Alternatives A, B, C, and D are likely to have when considered in the context of impacts associated with past, present, and reasonably foreseeable future actions that have occurred, or are likely to occur, in the area.

The Cumulative Impact Assessment Area (CIAA) for this analysis includes the Williams Creek watershed (Figure 3). The CIAA contains approximately 3,230 total acres and includes portions of Butte County. The CIAA includes only the area within the Williams Creek watershed because Williams Creek does not connect with the Little Lost River, and because the scope of the actions proposed would not extent beyond these boundaries. Table 5 describes the surface management status for lands within the CIAA.

Table 4– Surface Management Status within the CIAA	
Bureau of Land Management	910 acres
Private Property	30 acres
United States Forest Service	2290 acres

Figure 3 - Cumulative Impact Analysis (CIAA)



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Map Projection: NAD 1983 UTM Zone 12N

Map Created: 6/11/2014

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Past and Present Actions

Past and present actions identified for the Williams Creek watershed which have impacted the natural environment to varying degrees include agricultural development, urban development, irrigation diversions, infrastructure such as roads and fences, livestock grazing, and dispersed recreation. Table 6 summarizes actions which have occurred within the CIAA based on agency documents and GIS analysis.
Private property makes up approximately 2% of the land base in the CIAA, and the majority of that property is in agricultural production. Agricultural development has remained static as a result of the limited private land base in the CIAA. Infrastructure development (i.e., roads and fences), livestock production, and dispersed recreation have also remained static.

Table 6. Past & Present Actions in the CIAA.	
Type of Activity	
Agricultural Development	
Land in Agricultural Production	*25 acres*
Urban Development	
Lands developed for residential or industrial use	*5 acres*
Infrastructure	
Roads	*9 miles*
Recreation Facilities	*Recreational facilities in the CIAA include undeveloped campsites.*
Fences	*1 mile*
Livestock Grazing	
Total Acres Grazed	*910 acres of the Williams Creek BLM Allotment.* *2,290 acres of the Williams Creek Forest Service Allotment*
Condition of Public Lands as Measured under Idaho Standards for Rangeland Health (ISRH)	*The Williams Creek Allotment, within which the CIAA resides, is currently not meeting standards due to livestock grazing. Management changes have since been implemented.*

Reasonable Foreseeable Future Actions

Reasonably foreseeable future actions include continuation of the past and present actions as described above. The level and character of agricultural development, infrastructure development, livestock production, and dispersed recreation are anticipated to remain consistent into the foreseeable future. Populations within the CIAA are expected to remain static in near future. Besides the actions proposed in this EA, no known infrastructure projects are proposed within the CIAA.

Impacts Associated with Past, Present, and Reasonably Foreseeable Actions

Past and present actions have resulted in varying degrees of impact to the resources considered in the analysis. Observable impacts are higher for agricultural development and infrastructure which have resulted in direct habitat loss, alteration, and/or fragmentation of the natural environment. Assuming an average impact width of 12 feet relative to roads, 4 feet relative to fences, including the acres identified as agricultural and urban development, approximately 44 acres or 1.4% of the CIAA has been impacted. These actions have altered or removed the native vegetation communities and introduced non-natural elements of form, line, and color that have altered and would continue to alter the characteristics of the visual landscape.

Unmanaged livestock (horses, cows, and sheep) grazing in the first half of the 20th century likely resulted in altered ecological conditions in the Williams Creek watershed. Use was historically higher adjacent to available water with limited use in the uplands. As livestock grazing became more carefully managed, the ecological health of the rangelands and riparian areas improved. Since the majority of the land within the CIAA is public land, the condition of the vegetation communities on BLM-administered public lands authorized for grazing have all been assessed through ISRH. All 910 acres of BLM-administered lands in the CIAA were determined to not be meeting all applicable standards, and livestock grazing was identified as a contributing factor.

Activities that occur on public and private lands, such as agricultural practices; infrastructure development; recreational use such as camping, hunting, and ATV use; and livestock grazing management affect wildlife use patterns, the quantity and quality of habitats, and population health. Many species of wildlife including birds, bears, and big game require large intact habitats for their continued survival. Development of infrastructure and conversion of native habitats fragment the landscape reducing their value for some species, though other species may benefit from such development. While many wildlife species are mobile and have general habitat needs which may be met under a combination of the cover types or activities in the CIAA, several species of concern have more restrictive habitat requirements.

Bighorn sheep habitat, as identified and mapped by IDFG, occurs on approximately 2,416 acres in the Williams Creek watershed. The majority of this habitat (2,291 acres; 95%) is found on USFS lands administered by the Salmon/Challis National Forest, with approximately 125 acres or 5%, on BLM-administered lands. Habitats are generally intact, with a relatively small amount of infrastructure development in place relative to the CIAA.

The U.S. Fish and Wildlife Service issued a final rule listing the Columbia River population of bull trout (*Salvelinus confluentus*) as a threatened species under the Endangered Species Act on June 10, 1998 (63 FR 31647). The Williams Creek watershed forms part of the range of the Columbia River distinct population segment in which bull trout have been observed. Within the CIAA, there is approximately 5.3 miles of identified habitat (1.1 miles on BLM-administered land and 4.2 miles on Forest Service land). The bull trout population in Williams Creek is isolated from any other bull trout populations in the Little Lost River watershed due to Williams Creek not being connected to the river. This has also kept any other trout species from competing or hybridizing with the bull trout in Williams Creek.

The U.S. Fish and Wildlife Service (USFWS) identified primary and other threats to Greater sage-grouse in its 12-Month Findings for Petitions to List the Greater Sage- Grouse (*Centrocercus urophasianus*) as Threatened or Endangered (USFWS 2010). The primary cause of sage-grouse population decline identified by the USFWS was fragmentation of sagebrush habitats due to: habitat conversion for agriculture or urbanization, infrastructure within sagebrush habitats (powerlines, communication towers, fences, roads, railroads, etc.), wildfire and energy development (specifically roads and energy related infrastructure). Other important threats included: inadequate regulatory mechanisms, invasive plants (annual grasses and noxious weeds), climate change, collisions (with fences, powerlines, etc.), conifer invasion, contaminants, disease (West Nile virus), poorly managed livestock grazing, hunting, mining, predation, prescribed fire/vegetation treatments, recreation (OHV use), and water developments (USFWS 2010). It is often the cumulative impact of various disturbances that have the greatest effect on sagebrush ecosystems, rather than any single disturbance (Knick et al. 2011).

Sage-grouse Preliminary Priority Habitats (PPH) are those areas of highest conservation value due to high male lek attendance, high lek density, and high lek connectivity (Makela and Major 2011). There are approximately 828 acres of PPH within the Williams Creek watershed CIAA. Preliminary General Habitats (PGH) are habitats occupied by sage-grouse not contained within PPH. PGH areas are characterized by lower lek densities that may serve as important connectivity corridors between PPH (Makela and Major 2011). There are approximately 86 acres of PGH within the CIAA. Table 7 lists the area of PPH and PGH impacted by the identified past and present actions described in Table 6.

Table 7 – Influence of Identified Actions on Sage Grouse PPH and PGH

	Infrastructure	**Livestock* Grazing**
PPH Acres	7.3	828
% of all PPH Acres	<1%	26%
PGH Acres	1.5	86
% of all PGH Acres	<1%	3%

* Actions describe areas identified as not meeting ISRH and livestock grazing management was determined to be the primary factor.

Sage-grouse within the CIAA are part of a larger population known as the Snake-Salmon-Beaverhead population. A population viability analysis for the Snake-Salmon-Beaverhead population was completed by Garton et al. (2011). The viability analysis factored in known current and historic anthropogenic factors and included sage-grouse meta-populations within the CIAA. Garton et al. (2011) found that the Snake-Salmon-Beaverhead population had a 0%-27% chance of falling below population viability levels (≥500 male sage-grouse) in the next 100 years.

No new primary threats have been identified, such as conversion of sage-grouse habitat for agriculture and urbanization. No other types of infrastructure (roads, energy development, etc.) are proposed on public lands in the CIAA. In addition, no such plans or proposals are identified for nearby lands under other ownerships (private, USFS, DOE or State of Idaho lands) in the CIAA. Invasive species and wildfire continue to be threats that cannot be anticipated in

frequency or intensity. Managing for healthy habitats in the CIAA provides the most protection against invasive species and resiliency to disturbances such as wildfire. PPH are comprised of areas that have the highest conservation value for maintaining sustainable sage-grouse habitats. Additional disturbances (e.g. new infrastructure development) are less likely to be implemented in PPH areas without adequate mitigation in the future (BLM 2011).

Cumulative Impacts

Alternative A

Alternative A would contribute very little to the collective impacts associated with past, present and reasonably foreseeable future actions. An existing irrigation diversion would be replaced by a concrete structure with a head gate, a fish screen, and an overflow that would allow excess water to flow into the original channel of Williams Creek. In addition, 200 feet of pipe would be installed below the fish screen. . The number of road miles within the area would not increase as a result of implementing Alternative A. The number of riparian acres in PFC or in an upward trend would remain about the same. Establishment of additional riparian-wetland vegetation may occur as a result of overflow into the original Williams Creek channel, but this would have little collective impact within the CIAA. The number of upland acres being maintained or improved to ensure the proper functioning of ecological processes and continued productivity and diversity of native plant species would remain the same. The amount of suitable habitat for wildlife species, including special status species that occur in the Williams Creek watershed would remain about the same.

Impacts to water quality would be minor and temporary, as the headgate and fish screen are installed, and the overflow channel begins to flow and becomes scoured-out. After a season or two, more bank-stabilizing vegetation would anchor the banks and result in less fine sediment in the channel. Impacts to water quality from the headgate and fish screen would diminish after construction.

Soils would only be temporarily disturbed during removal/installation of diversion structures and installation of the pipe line. The project area accounts for less than 1% of the CIAA and would not measurably contribute to soil loss or degradation during disturbance activities.

The cumulative impacts from the ROW renewal and screen implementation to bull trout and other fisheries would be the same as described in environmental consequences. Overall they would be beneficial to bull trout and other fisheries.

For migratory birds, the proposed action would contribute minimally to the collective impact associated with past, present and reasonably foreseeable actions. The amount of suitable habitat for wildlife species that occur in the CIAA would remain nearly the same with a slight loss, 0.4 acres, due to the implementation of this alternative. The Proposed Action would not substantially alter the current or expected future conditions of natural resources in the CIAA.

Alternative B

Alternative B would contribute very little to the collective impacts associated with past, present and reasonably foreseeable future actions. This alternative would include all the same actions as Alternative A, as well as installation of a new culvert at the upper stream crossing of Williams Creek and the construction of a 40-foot by 500-fot barbed wire fence to protect the upper diversion and fish screen. The fence would add approximately 0.2 miles to the one mile of fence currently within the CIAA. The number of road miles within the area would not increase as a result of implementing Alternative B. The number of riparian acres in PFC or in an upward trend and establishment of additional riparian-wetland vegetation would be similar to Alternative A, but this would have little collective impact within the CIAA. The number of upland acres being maintained or improved to ensure the proper functioning of ecological processes and continued productivity and diversity of native plant species would remain the same. The amount of suitable habitat for wildlife species, including special status species that occur in the Williams Creek watershed would remain about the same.

Cumulative Impacts for water quality and soils would be the same as described under Alternative A.

The cumulative impacts from the ROW renewal, screen implementation, fencing the screen and culvert installation to bull trout and other fisheries would be the same as described in environmental consequences. Overall they would be beneficial to bull trout and other fisheries.

Alternative C

Alternative C would contribute very little to the collective impacts associated with past, present and reasonably foreseeable future actions. This alternative would include all the same actions as Alternatives A and B, as well as construction of an 8-inch above-ground pipeline within the existing ditch to increase the efficiency of delivering water from the upper diversion to the lower diversion. Construction of a 40-foot by 500-fot barbed wire fence to protect the upper diversion and fish screen would add approximately 0.2 miles to the one mile of fence currently within the CIAA. The number of road miles within the area would not increase as a result of implementing Alternative C. The number of riparian acres in PFC or in an upward trend would be similar to Alternatives A and B, but the increased efficiency of water delivery to the diversions would allow for more overflow into the original Williams Creek channel, thus resulting in more establishment of riparian-wetland vegetation. However, this would have little collective impact within the CIAA. The number of upland acres being maintained or improved to ensure the proper functioning of ecological processes and continued productivity and diversity of native plant species would remain the same. The amount of suitable habitat for wildlife species, including special status species that occur in the Williams Creek watershed would remain about the same.

Impacts to water quality would be minor and temporary, as the headgate, culvert, 8-inch pipeline and fish screen are installed, and the overflow channel begins to flow and becomes scoured-out. After a season or two, more bank-stabilizing vegetation would anchor the banks and result in less fine sediment in the channel. Impacts to water quality from the headgate, culvert, 8-inch pipeline and fish screen would diminish after construction.

Cumulative Impacts for soils would be the same as Alternative A.

Cumulative impacts to fisheries from ROW renewal, diversion and screen implementation, fence construction and culvert installation should be the same as Alternative B. Placing the water in a pipe from the upper diversion could create new fisheries habitat and may assist in the development of riparian vegetation by allowing water to enter the original channel when irrigation is not occurring.

Alternative D

Alternative D would contribute very little to the collective impacts associated with past, present and reasonably foreseeable future actions. This alternative would not construct any projects to reduce erosion, improve efficiency of water delivery, or protect structures and resources. The number of road miles within the area would not increase as a result of implementing Alternative D. The number of riparian acres in PFC or in an upward trend would stay the same. The number of upland acres being maintained or improved to ensure the proper functioning of ecological processes and continued productivity and diversity of native plant species would remain the same. The amount of suitable habitat for wildlife species, including special status species that occur in the Williams Creek watershed would remain about the same.

Under this alternative no projects are constructed, so minor and temporary sediment impacts would not occur due to construction. However, because of the lack of a culvert, continued soil erosion at the upper crossing to Williams Creek would occur during vehicle use and precipitation events.

Soils would only be temporarily disturbed during the removal of the diversion structure and pipe line. The project area accounts for less than 1% of the CIAA and would not measurably contribute to soil loss or degradation during disturbance activities.

The continuation of the present unscreened irrigation system would continue to allow entrainment of fisheries and impacts described in environmental consequences.

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Appendix A CONSERVATION MEASURES APPLICABLE TO PROGRAMMATIC ACTIVITIES (As Identified in the Assessment) Stream Crossing Replacement and or Removal Programmatic Consultation

1. Site Preparation.

Typical Methods. Site preparation includes the following typical actions: Riparian buffer areas and boundaries of staging areas, stockpile areas, and other locations where impacts are expected would be designated and flagged. Existing disturbed locations would be used wherever possible (for example, road prisms). Areas of sufficient size would be cleared if sufficient staging or stockpile areas do not exist. Excavated material from clearing would be stored in the stockpile area. Machinery, equipment, and materials would be stored in the staging area. Where needed, sediment barriers or silt fences would be placed around disturbed areas to prevent erosion into the stream channel and road ditches.

Impacts. If staging and stockpile areas are cleared, topsoil would be exposed to potential erosion.

2. Excavation of Road Fill and Diversion Channel.

Typical Methods. Road fill would be excavated around the culvert to just above wetted perimeter in preparation for dewatering procedures. However, sometimes dewatering is conducted before any excavation. Excavating equipment would typically work from the road fill without disturbing water flow or sidecasting material into stream channels.

In some cases, project design will call for a pipe or side-channel diversion to carry diverted streamflow from a diversion point around the project site to a location downstream of the project site. (See Section H.3. Dewatering of Construction Site). However, should the project design call for an excavated, lined channel to dewater the project area, rather than a pipe or side-channel diversion, an excavation would be required from the diversion point, through the floodplain, and down to a re-entry point below the project site. Excavation would be conducted with minimal impact to the live channel.

Excavated material from road fills would be stored at a designated stockpile site for use in site rehabilitation, or hauled to a permanent waste area. Excavated material from diversion channels would be stored at the designated stockpile site, which would be subject to erosion control measures, for use in filling the excavated channel after the stream is re-watered or other site rehabilitation actions. Machinery may cross streams only at designated temporary crossings (recommended by the Culvert Design Team).

Impacts. The road fill material around the culvert and road prism, and excavated channel, would be exposed to potential erosion. Stream channel substrate would be disturbed if machinery enters a stream. Aggregate construction impacts would likely include the staging

and stockpile areas, road fill around the culvert, excavated diversion channel, designated crossings, and possibly the road prism crossing the floodplain.

3. Dewatering of Construction Site.

Typical Methods. *Dewater Construction Site.* Prior to constructing a water diversion at the project site, a fish biologist or appropriate designee will conduct or direct an inspection of the stream in the vicinity of the construction site, and install block nets at the start of the diversion channel (see Section II.C. Design Parameters, and Section II.F. Mitigation Measures – Fish).

The dewatering structure is typically a temporary dam built just upstream of the project site with rock or sand bags filled with clean gravel, and covered with plastic sheeting. A portable bladder dam or other diversion technologies constructed of non-erodible material may be used to contain stream flow; however, mining of stream or floodplain rock cannot be used for diversion dam construction. In most cases, a pipe would carry the stream flow from the diversion dam around the project site to a location immediately downstream of the construction zone. The length of the dewatered stream channel would vary, depending on the width of the road prism at the stream crossing. It may be necessary to have temporary equipment access through the riparian area to the site of the dewatering structure. Fish may be allowed to move downstream through the diversion when it is determined that entrapment will not occur (determined by a fisheries biologist).

Dewatering will be accomplished slowly with a crew on hand to capture and move stranded fish and other aquatic organisms that appear as the water level drops at the construction site. Pumping of diverted water may occur to facilitate dewatering, as long as screening, velocity, and water disposal parameters are met (see Section II.F.6.d.ii). Standard fish handling procedures (Section II. F.3) will be used to minimize handling stress.

Reroute Streamflow. Should the project be designed so that total dewatering is not necessary, stream flow would be rerouted to one side of the existing channel with diversion structures, such as sandbags, portable bladders, or other diversion technologies constructed of non-erodible materials used to contain stream flow (not stream or floodplain rock and sediment). Likely conditions in which in-channel rerouting would occur are when the stream channel is wide enough to accommodate rerouting and the diversion path—including a pipe or one side of the existing channel—is essentially non-erosive. When used, this method would typically be associated with the construction of open-bottomed arches and bridges.

Impacts. *Dewater Construction Site.* The access to the stream edge and diversion construction may impact a narrow cross section of riparian area, removing vegetation and exposing bare soil to erosion. The stream channel between the diversion inlet and outlet would be dewatered, and the diversion structure may act as a temporary barrier to fish passage. Effects to fish are described in Section VI. Effects to Fish. The length of stream being dewatered would vary, depending on the width of the road prism at the stream crossing. Therefore, aggregate construction impacts include the exposed staging and

stockpile areas, road fill at the crossing, dewatered stream channel, constructed diversion channel, designated crossings, and possibly the road prism crossing the floodplain.

Reroute Streamflow. The stream flow between the diversion inlet and outlet would be rerouted to one side of the existing channel. Effects to fish are described in Section VI. Effects to Fish. The length of stream reroute would vary, depending on the width of the road prism at the stream crossing. Therefore, aggregate construction impacts include the exposed staging and stockpile areas, road fill at the stream crossing, dewatered stream channel, designated stream crossings, and possibly the road prism crossing the floodplain.

7. Construction of New Structure

See Table 5 for relevant required mitigation measures.

Typical Methods. All actions described under this construction phase would occur within the dewatered channel segment. Headwalls may be applied to the culvert, arch, and bridge construction phases, outside of bankfull widths. Riprap placement for structure protection, and where needed to achieve passage objectives and maintenance of channel features, would be approved by the Culvert Design Team.

Culvert Placement and Backfill – Culvert-bedding material would be placed and shaped, the culvert would be assembled and placed in position, and fill would be placed around it in successive layers to begin the reconstruction of the road prism. Machinery would typically operate from the road fill and cross streams at dewatered areas, temporary bridges, or at designated temporary crossings (Section II.F6.c). I f part of the design, flood relief culverts would be installed at this time. Concrete may be poured to provide bedding for squashed culverts in some instances. Culverts would then be embedded with appropriate substrate from offsite locations, or suitable material would be used from a project stockpile. Properly sized and sorted substrate would be placed and compacted in lifts inside the culvert to the designed height.

Impacts. All construction for each of the above activities would occur in areas already impacted by earlier construction phases. In cases where flood relief culverts are required, isolated segments of the road prism within the floodplain would be disturbed. Therefore, aggregate construction impacts would include the exposed staging and stockpile areas, road fill at the crossings, dewatered stream channel, designated crossings, and possibly the road prism crossing the floodplain.

8. Removal of Diversion

Typical Methods. The restoration of stream flow to the work site would involve the removal of the in-water diversion structures. The diversion dam and water routing equipment would be removed. Heavy machinery or individuals - operating from the bank or within the channel - may be used to remove diversion structures.

Impacts. Stream channel substrate may be disturbed with the removal of the diversion dam. Restored stream flow would flush out substrate fines within the formerly dewatered area, resulting in increased but short-lived sedimentation. Effects to fish are described in Section VI. Effects to Fish. Aggregate construction impacts would now include the exposed staging and stockpile areas, road fill at the crossing, the formerly dewatered stream channel, designated crossing, and possibly the road prism crossing the floodplain.

9. Backfill to Road Surface

Typical Methods. Completion of road fill and surfacing may include construction of headwalls (if part of the design), placing fill in thin lifts over the culvert or open-bottomed arch to top of subgrade using backfill material from stockpiling or outside sources, and final construction of road surface.

Impacts. All construction activities for each of the crossing structures would occur in areas already impacted by earlier construction phases. Most, if not all, work will occur on the road prism.

10. Site Rehabilitation

Typical Methods. Site rehabilitation after construction generally would include establishing long-term erosion protection measures using boulder-sized riprap, plantings, erosion control fabric, seed, and mulch. Road fill erosion protection measures, such as boulder-sized riprap, plantings, erosion control fabric, seed, and mulch, may be placed where needed. Any stockpiled woody debris would be scattered and placed outside of the stream channel. Woody debris may be placed within the stream in the project vicinity, if recommended by the Culvert Design Team to be a habitat component of the area. Equipment and excess supplies would then be removed, work storage areas cleaned, and temporary erosion control materials removed. If required to reduce erosion, impacted areas would be seeded and/or planted.

Impacts. All actions are intended to be necessary to the restoration and would be confined to areas impacted throughout the project.

11. Maintenance

Typical Methods. Large wood that has accumulated at the inlet of a culvert, open-bottomed arch, or bridge and is determined to obstruct fish passage or pose threats to the crossing's integrity would be removed and placed immediately downstream of the outlet. When access permits, and where appropriate, large wood would be placed within the bankfull channel. Machinery used to remove and place large wood would normally operate from the road prism. If not possible, a temporary access to the stream channel or within the stream channel

may be necessary. In most cases, maintenance activities would usually be completed in two days or less. Armoring of structures, and revegetation are included within this category.

Impacts. The stream channel would be disturbed if machinery crosses a stream or where large woody debris removal results in mobilization of sediments. Effects to fish are described in Section IV. Effects to Fish. Aggregate impacts will likely include the staging and stockpile areas, and designated crossings.

Table 5. Applicable mitigation measures for typical construction phases for programmatic stream crossing structure replacement and removal activities.

	Site Preparation	Excavation of Road Fill and Diversion Channel	Dewatering of Construction Site	Removal of Culvert	Reconstruction of Channel	Construction of Trail Ford	Construction of New Structure	Removal of Diversion	Backfill to Road Surface	Site Rehabilitation	Maintenance
F1. Buffers	Y	Y		Y	Y	Y	Y	Y	Y	Y	Y
F2. Low-water Work Windows		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
F3. Fish Avoidance		Y	Y								
F4. Pollution Control Measures											
a. Clean Water Act	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
b. Spill Prevention, Containment, and Reporting	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
c. Minimize Exposure to Equipment Fuel/Oil Leakage	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
F5. Aquatic Invasive Control Measures	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
F6. Erosion Control Measures											
a. Minimize Site Preparation Impacts	Y										
b. Minimize Earthmoving-related Erosion		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
c. Minimize Temporary Stream Crossing Sedimentation		Y	Y	Y	Y	Y	Y	Y	Y	Y	Y
d. Minimize Sedimentation Through Dewatering		Y			Y	Y					
e. Flow Re-								Y			

	Site Preparation	Excavation of Road Fill and Diversion Channel	Dewatering of Construction Site	Removal of Culvert	Reconstruction of Channel	Construction of Trail Ford	Construction of New Structure	Removal of Diversion	Backfill to Road Surface	Site Rehabilitation	Maintenance
introduction											
f. Site Rehabilitation				Y						Y	

Mitigation Measures

F1. Buffers. The Culvert Design Team (CDT) will recommend site-specific riparian buffers for specific activities to avoid delivery of sediment or contaminants to streams (see F4, F5, and F6). The CDT may designate buffers of different widths for different activities such as site preparation, equipment work areas, equipment staging areas, equipment fueling and maintenance areas, earthmoving, and stockpile areas. These widths may vary due to presence of occupied or unoccupied habitat, perennial or intermittent channels, floodplain width, riparian characteristics, size of stream, depth of stream valley, and other site-specific characteristics. For administrative units still within PACFISH/INFISH direction, all equipment fueling, maintenance, and staging areas will be outside of riparian habitat conservation areas (RHCAs) unless no other option is available. When no option is available, the CDT will consult with Level 1 Teams to identify adequate avoidance and minimization measures for the site.

F2. Low-water Work Windows. All projects will be conducted during low flow conditions, which typically occur from late summer through fall (specific low flow periods will be determined by a hydrologist). The State of Idaho stream alteration permit will provide in-channel work window suggestions to avoid adverse effects to ESA-listed fish species for specific locations. All projects will be completed within one work season.

F3. Fish Avoidance. A fish biologist or designee will conduct all of the following fish survey evaluations and work area clearing operations. Once those evaluations are completed it is not necessary for a fish biologist to be on site during all project actions.

A fish biologist will direct or conduct a planning survey of the project stream during project planning to determine if ESA-listed fish species inhabit the project area. If the stream is intermittent, the planning survey will be conducted when water is in the channel. If the project stream in the general vicinity of the project site is found to be occupied by ESA-listed fish species or is within 600 feet upstream of occupied habitat, instream work should be conducted only during low flows and/or within the recommended in-channel work windows identified in stream alteration permits, using all fish avoidance and other mitigation measures listed below.

If the stream in the general vicinity of the project site is found to be occupied by ESA-listed fish species, a fish biologist or designee will conduct a pre-work survey of the project site

again, immediately prior to any instream work. Should migrating adults, spawning listed fish, or their redds be observed within the area that would be directly mechanically disturbed or disrupted by project actions or 600 feet downstream, the project does not fit within these programmatic BA guidelines (see section II.D: Excluded Projects). The CDT will coordinate with the Level 1 Team on a recommended course of action, which could include initiation of site-specific consultation. This potential delay will be built into contract language for instream project activities.

During the pre-work survey, should non-spawning, non-migrating listed fish be observed within the area (or 600 feet downstream) that would be directly mechanically disturbed or disrupted by project actions, the CDT will determine whether passive movement of fish can be achieved by slow dewatering, or whether less passive methods to clear the project site of fish should be used. Passive movement of fish can usually be achieved by slow dewatering in steeper channels, and less passive methods are rarely used in culvert projects on the Payette National Forest (Dave Burns, Payette National Forest fisheries Biologist, McCall, Idaho, personal communication). Should less passive methods be warranted, a fish biologist will attempt to clear the area of fish before the site is dewatered and the flow is bypassed. This could be accomplished by a variety of methods, including seining, dipping, or electroshocking, depending on specific site conditions. Under normal conditions, block nets will be installed, fish will be captured and relocated, streamflow will be diverted around the project area, and block nets will be removed all in the same day. On very rare occasions, block nets may remain in the stream overnight when the fish capture and diversion activities require additional time to complete. All handling of fish, using any method, will be conducted by or under the direction of a fisheries biologist, using methods directed by the following:

- NMFS Guidelines for Electrofishing Waters Containing Salmonids Listed Under the Endangered Species Act (NMFS 2000, see Appendix F)
- NMFS steelhead collection permits (if applicable)
- Idaho Department of Fish and Game section 6 cooperative agreement (or Nevada equivalent)

F4. Pollution Control Measures

a. Follow State Water Quality Guidelines (Clean Water Act). Project actions will follow all provisions of the Clean Water Act (CWA) and provisions for maintenance of water quality standards as described by Idaho Department of Environmental Quality (IDEQ) (or its Nevada equivalent). Programmatic projects will be in compliance with all applicable state and Federal laws and processes (*e.g.*, Section 404 permits). CDT engineers and/or hydrologists will summarize specific pertinent guidelines for each project.

The CWA requires States to set water quality standards sufficient to protect designated and existing beneficial uses. In Idaho, "Sediment shall not exceed quantities.....which impair designated beneficial uses. Determinations of impairment shall be based on water quality monitoring and surveillance and the information utilized as described in Section 350" (Idaho Administrative Procedures Act (IDAPA) 58.01.02 .200.08). In Idaho State Water Quality Standards for Aquatic Life (Section 250), “Turbidity shall not exceed background turbidity by more than 50 nephelometric turbidity units (NTUs) instantaneously (at any point in time) (IDAPA Idaho Code 58.01.02.350.01.a). In Section 350 (Rules Governing Nonpoint Source Activities), "Best management practices should be designed, implemented, and maintained to provide full protection or maintenance of beneficial uses. Violations of water quality standards which occur in spite of implementation of best management practices will not be

subject to enforcement action. However, if subsequent water quality monitoring and surveillance .....indicate water quality standards are not met due to nonpoint source impacts , even with the use of current best management practices, the practices will be evaluated and modified as necessary by the appropriate agencies in accordance with the provisions of the Administrative Procedures Act" (IDAPA 58.01.02.350.01.a).

b. Spill Prevention, Containment, and Reporting. All vehicles carrying fuel will have specific equipment and materials needed to contain or clean up any incidental spills at the project site. Equipment and materials will be specific to each project site, and can include spill kits appropriately sized for specific quantities of fuel, shovels, absorbent pads, straw bales, containment structures and liners, and/or booms. Storing and refueling areas will be located in staging areas away from streams in areas where a spill would not have the potential to reach live water. Containment structures may be necessary if prevention of spilled material from reaching live water cannot be assured. All pumps and generators used within PACFISH/INFISH RHCAs (for administrative units operating within PACFISH/INFISH direction), or riparian conservation area (RCA) equivalents (for administrative units within the SWIEG), will have appropriate spill containment structures and/or absorbent pads in place during use.

Should quantities of stored fuel for a project exceed 660 gallons in a single tank; or exceed 1,320 gallons for all storage combined; contractors and agency operators will be required to have a standard Environmental Protection Agency (EPA) written Spill Prevention Control and Containment (SPCC) Plan onsite, which describes measures to prevent or reduce impacts from potential spills (from fuel, hydraulic fluid, etc.) (40 CFR 112, Oil Pollution Act relating to SPCC Plans).

For all culvert projects which involve fuel storage and refueling actions conducted under this BA, a written spill plan is required. This spill plan shall be developed, recommended and/or approved by the CDT (or members thereof). The plan will contain a description of the specific hazardous materials, procedures, and spill containment that will be used, including inventory, storage, and handling.

Federal and Idaho state regulations regarding spills will be followed: Any spills resulting in a detectable sheen on water shall be reported to the EPA National Response Center (1-800-424-8802). Any spills over 25 gallons will be reported to the IDEQ (1-800-632-800) (or Nevada equivalent), and cleanup will be initiated within 24 hours of the spill.

c. Minimize Exposure to Heavy Equipment Fuel/Oil Leakage. Methods to minimize fuel/oil leakage from construction equipment into the stream channel include the following:

i. All equipment used for instream work will be cleaned of external oil, grease, dirt and mud; and leaks repaired; prior to arriving at the project site. All equipment will be inspected by the Contracting Officer's Representative (COR) before unloading at site. Any leaks or accumulations of grease will be corrected before entering streams or areas that drain directly to streams or wetlands.

ii. Equipment used for in-stream or riparian work (including chainsaws and other hand power tools) will be fueled and serviced in an established staging area (site-specifically recommended by CDT). When not in use, vehicles will be stored in the designated staging area. The staging area should be in an area that will not deliver fuel, oil, etc. to streams.

iii. Oil-absorbing floating booms, and other equipment such as pads and absorbent "peanuts" appropriate for the size of the stream, will be available on-site during all phases of construction. For very small streams with few pools or slack water, booms may not be

effective. More pads and straw bales to anchor booms may be necessary. Booms will be placed in a location that facilitates an immediate response to potential petroleum leakage.

F5. Aquatic Invasive Control Measures. Many streams have invasive aquatic species such as the New Zealand Mudsnail and Whirling Disease. Many of these species are practically invisible to the naked eye and impossible to detect if attached to heavy equipment. To ensure that equipment is not contaminated, any visible plants, mud and dirt will be removed by washing any equipment likely to come into contact with water offsite, well away from streams. Equipment will be dried thoroughly after decontamination.

Programmatic projects that would facilitate brook trout expansion into occupied bull trout habitat will not be included under this BA. Projects in streams known or suspected to contain non-native, invasive, competitive fish species (*e.g.*, brook trout) that would not facilitate brook trout expansion into occupied bull trout habitat, will require evaluation by the CDT during project planning. CDTs will discuss individual situations with Level 1 Teams. Discussions between the two teams will evaluate the applicability of individual projects in conforming to this BA at that time.

F6. Erosion Control Measures

a. Minimize Site Preparation Impacts

i. Site clearing, staging areas, access routes, and stockpile areas will be recommended by the CDT in a manner that minimizes overall disturbance, minimizes disturbance to riparian vegetation, and that precludes erosion into stream channels.

ii. If trees need to be removed to facilitate culvert or bridge placement, they will be stockpiled for use in channel rehabilitation.

iii. When the CDT recommends that sediment barriers are necessary, barriers will be placed around potentially disturbed sites to prevent sediment from entering a stream directly or indirectly, including by way of roads and ditches.

iv. A supply of erosion control materials (*e.g.* silt fence and straw bales) will be kept on hand to respond to sediment emergencies. Sterile straw or certified "weed free" straw will be used to prevent introduction of noxious weeds.

b. Minimize Earthmoving-Related Erosion

i. Additional sediment or erosion control barriers (additional to those recommended above, in Section F6.a.iii.) may be recommended by the CDT once construction commences. These could include Sedimat, straw bale retentions, and off-channel sediment settling ponds. In-channel sediment abatement barriers will capture sediment that is liberated during rewatering of dewatered channels, barriers will be removed, and captured sediment will be disposed of so it is not reintroduced into stream channels. Such barriers will be maintained throughout the related construction and removed only when construction is complete and erosion control is assured.

ii. Instream rocks or bedrock within occupied habitat should be broken without blasting, using non-explosive alternatives such as Betonamit (www.betonamit.co.za/). This noiseless, shock-free, non-toxic product is poured into pre-drilled holes and after a few hours exerts tremendous expansive pressure such that even the hardest rock will be broken into smaller more manageable pieces. This alternative has been analyzed and approved in other programmatic consultations within the analysis area (USDA FS and USDI BLM 2003, Supplement to Programmatic BA for Road Maintenance on Public Lands Administered by the Salmon-Challis Forest, and BLM Salmon, Challis, and Idaho Falls Field Offices in the Upper Salmon River Basin and Lost River Subbasin).

However, it may be impossible in advance to determine if impenetrable rock, resistant to non-explosive alternatives, will be encountered within necessary excavation depths in occupied habitat. Impenetrable rock may only be discovered after onsite excavation actually begins, and may be resistant to non-explosive alternatives. Should this be the case, instream explosive blasting within occupied (but dewatered) habitat is covered by the proposed action, with the following mitigations. Blasting will occur in dewatered or dry channels only, and only outside of the following buffer restrictions, which are based on the weight of explosive charge. The following buffer restrictions, which apply to single shots of a given weight of explosive or single shots in a multiple charge if each shot is separated by an eight millisecond or longer delay, have been analyzed (Wright and Hopky 1998) and determined to protect fish from both swimbladder effects and egg disturbances, and have been approved in other programmatic consultations within the analysis area (see BAEffects Section VI.B.) (USDA FS and USDI BLM 2003). Buffer widths apply to the distance between the blasting activity and the nearest occupied stream bypass entrance or exit.

According to the buffers, a charge of 2.0 pounds requires an 80 foot buffer, which would ensure that effects do not extend outside of the dewatered section of channel (average 175 feet). Assuming the charge would be located in the middle of the dewatered area, effects would not be anticipated beyond 80 feet on either side of the charge, therefore effects would remain within the dewatered area. This BA does not cover the extension of the dewatered area for the sole purpose of increasing the available buffer in order to accommodate larger charge weights. If a larger charge and therefore longer dewatered area is needed to complete the action, or if explosives are necessary within the buffers, the Level 1 Team will be consulted on a recommended course of action.

Buffers for use of explosives in unoccupied habitats in perennial and intermittent channels in occupied watersheds. From USDA FS and USDI BLM 2003.

Explosive Charge Weight (pounds)	Distance from stream necessary to protect fish from swimbladder effects and egg disturbances (feet)
0.5	30
1.0	50
2.0	80
5.0	120
10.0	170
25.0	270
100.0	530
500.0	1180

iii. The CDT will delineate construction impact areas on project plans. Work will be confined to the minimum area necessary to complete the project.

iv. A supply of erosion control materials (*e.g*., silt fence and straw bales) will be used to respond to sediment emergencies. Sterile straw or "weed free" certified straw bales will be used to prevent introduction of noxious weeds.

v. All project operations will cease, except efforts to minimize storm or high flow erosion, under precipitation and high flow conditions that result in uncontrollable erosion in the construction area.

vi. Native streambed materials may be conserved and stockpiled above the bankfull elevation for later use in channel rehabilitation and filling culverts. To prevent contamination from fine soils, these materials will be kept separate from other stockpiled material which is not native to the streambed. If a bridge or arch is being constructed, there may be no need to newly disturb native materials.

c. Minimize Temporary Stream Crossing Sedimentation

i. Stream channels in occupied habitat will be dewatered prior to heavy equipment operating within project sites.

ii. Existing roadways or travel paths will be used to access or cross streams whenever reasonable.

iii. In unoccupied habitats only, equipment will only enter the flowing water portion of the stream channel at designated temporary stream crossings (recommended by an aquatic specialist from the CDT).

iv. Temporary crossings will not increase risks of channel re-routing due to high water conditions (unoccupied habitats only).

v. Temporary crossings shall be minimized and conducted at right angles to the main channel where possible (unoccupied habitats only).

vi. Should the CDT determine during planning that the stream bottom needs further protection from channel disturbance and subsequent temporary sediment, temporary stream crossing structures such as rubber mats or temporary bridges may be implemented.

d. Minimize Sedimentation through Dewatering

i. In-channel project sites will be dewatered and completely bypassed prior to excavation.

ii. Any water intake structure (pump) authorized under this proposed action will have a fish screen installed, operated and maintained in accordance with NMFS fish screen criteria (NMFS 1995, and Appendix F)
iii. Flow will be diverted with pumps or structures such as cofferdams, constructed of non-erodible material, such as sandbags, bladder bags, or other means that divert water. Diversion dams will not be constructed with material mined from the stream or floodplain.
iv. The temporary bypass system may be constructed with non-erodible material, such as a pipe or a plastic-lined channel, both of which will be sized to accommodate the predicted peak flow rate (including possible storm intensities) during construction. In cases of channel rerouting, water may be diverted to one side of the existing channel.
v. Flow will be dissipated at the outfall of the bypass system to diffuse erosive energy. The outflow will be placed in an area that minimizes or prevents damage to riparian vegetation. If the diversion inlet is not screened (to allow for downstream passage of fish), the diversion outlet will be placed in a location that facilitates safe reentry of fish into the stream channel (a fish biologist will oversee these measures).
vi. When necessary, water from the de-watered work area will either be pumped to a temporary storage and treatment site, or into upland areas, to allow subsequent filtration through vegetation prior to water reentering the stream channel.

e. Flow Reintroduction

i. In perennial channels, the reconstructed stream channel will be "pre-washed" into a reach equipped with sediment capture devices such as Sedimat, prior to reintroduction of flow to the stream.
ii. In perennial streams, the construction site will be rewatered slowly to prevent loss of surface water downstream as the construction site streambed absorbs water and to minimize a sudden increase in turbidity.
iii. In-channel sediment abatement barriers such as Sedimat will capture sediment that is liberated during rewatering of dewatered channels, barriers will be appropriately cleaned out and removed, and captured sediment will be disposed of so it is not reintroduced into stream channels. Such barriers shall be maintained throughout the related construction and removed only when construction is complete and erosion control is assured.

f. Site Rehabilitation

i. Upon project completion, project-related waste will be removed. Rehabilitation of all disturbed areas will be conducted in a manner that results in conditions similar to pre-work conditions through spreading of stockpiled materials (large woody debris), seeding, and/or planting with native seed mixes or plants. If native stock is not available, soil-stabilizing vegetation (seed or plants) will be used that does not lead to propagation of exotic species.
ii. For culvert removal or bridge projects, the stream channel cross-section and gradient will be reconstructed within the area formerly occupied by a culvert in a manner that reflects more natural conditions found upstream and downstream. Large wood and/or boulders may be placed in the reconstructed stream channel and floodplain (with approval by the CDT) (See Opinion Section 1.2.2, Design Parameters).
iii. No herbicide application will occur as part of the permitted action.
iv. When deemed necessary by the CDT or aquatic specialist, compacted access roads, staging areas, and stockpile areas will be mechanically loosened
v. Trees will be retained at project sites wherever possible. In-stream or floodplain rehabilitation materials such as large wood and boulders will mimic as much as possible

those found in the project vicinity. Such materials may be salvaged from the project site or hauled in from offsite but cannot be taken from streams, wetlands, or other sensitive areas (See Opinion Section 1.2.2, Design Parameters).

vi. Trees (greater than 8 inches diameter at breast height [dbh]) will not be felled in the riparian area for site rehabilitation purposes unless necessary for safety. If necessary for safety, trees may be felled toward the stream and left in place or placed in the stream channel or floodplain when recommended by the CDT.

vii. Site rehabilitation activities (with the exception of further years' seeding and revegetation) will be completed prior to the end of the current field season.