

**U.S. Department of the Interior
Bureau of Land Management**

**Environmental Assessment
DOI-BLM-ID-B010-2012-0027-EA**

**Weiser-Galloway Right-of-Way and Geologic
Investigation**

May 2012

U.S. Department of the Interior
Bureau of Land Management
Four Rivers Field Office
3948 Development Avenue
Boise, ID 83705



Table of Contents

1.0	Introduction.....	1
1.2	Purpose of and Need for Action.....	2
1.3	Location and Setting.....	2
2.0	ALTERNATIVES.....	5
2.1	Alternative A - No Action.....	5
2.2	Alternative B – Issuance of a short-term Right-of-Way to the BOR for Geologic Testing and Analysis (Proposed Action).....	6
2.2.1	Storage Area.....	6
2.2.2	Access Routes.....	6
2.2.3	Drill Site Preparation.....	8
2.2.4	Boring.....	8
3.0	AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES.....	9
3.1	Water Quality.....	9
3.1.1	Alternative A - No Action.....	10
3.1.2	Alternative B - Proposed Action.....	10
3.2	Ground Water.....	11
3.2.1	Alternative A - No Action.....	11
3.2.2	Alternative B - Proposed Action.....	12
3.3	Terrestrial Resources.....	12
3.3.1	Alternative A - No Action.....	12
3.3.2	Alternative B - Proposed Action.....	12
3.4	Recreation.....	13
3.4.1	Alternative A - No Action.....	13
3.4.2	Alternative B - Proposed Action.....	13
3.5	Special Status Species.....	14
3.5.1	Alternative A - No Action.....	15
3.5.2	Alternative B - Proposed Action.....	16
3.6	Cultural Resources.....	17
3.6.1	Alternative A - No Action.....	17
3.6.2	Alternative B - Proposed Action.....	17
3.7	Soils.....	18
3.7.1	Alternative A - No Action.....	18
3.7.2	Alternative B - Proposed Action.....	18
3.8	Air Quality.....	18
3.8.1	Alternative A - No Action.....	19
3.8.2	Alternative B - Proposed Action.....	19
3.9	Cumulative Effects.....	19
4.0	COMPLIANCE WITH APPLICABLE ENVIRONMENTAL LAWS AND REGULATIONS.....	20
4.1	National Environmental Policy Act.....	20
4.2	Endangered Species Act.....	20
4.3	National Historic Preservation Act.....	20

5.0	COORDINATION, CONSULTATION, AND PUBLIC INVOLVEMENT	21
5.1	Agency Consultation and Coordination	21
5.2	Public Involvement	22
6.0	REFERENCES	22

FIGURES

Figure 1	– Overview of the Weiser River/Galloway dam geologic testing project area.	4
Figure 2	– Detailed view of the proposed testing area showing the BLM land boundary.	5
Figure 3	– Overview of site plan for geologic testing at Weiser River/Galloway dam site.	7
Figure 4	– The CME-850X track carrier mount with drill rig attached.	9
Figure 5	– Looking across the Weiser River at boring location D3 (right bank-near bank) and D4 (left bank-far bank, note road/levee between river and the irrigation canal).	11
Figure 6	– Corps and Bureau of Reclamation Staff inspecting the project area from the Weiser River National Recreation Trail.	14

TABLES

Table 1	- Species that may occur in the area potentially affected by this action	15
Table 2	- Designated critical habitat in the area potentially affected by this action.	15
Table 3	- Special Status Plant Species	15

1.0 Introduction

The Idaho Water Resources Board through the Idaho Department of Water Resources (IDWR) proposes to perform geologic investigations and analysis at seven locations along an approximate east and west axis perpendicular to the Weiser River canyon 13.5 miles above the confluence with the Snake River, near the city of Weiser, Washington County, Idaho (Figure 1 and 2). Under an existing Planning Assistance to States (PAS) agreement between the U.S. Army Corps of Engineers, Walla Walla District (Corps), the Corps developed a drilling plan. The IDWR and the Corps subsequently decided that the U.S. Department of the Interior, Bureau of Reclamation (BOR) was the most appropriate agency to provide actual drilling services, as the BOR had resources stationed locally, thus reducing costs to the project.

The lands where the proposed geological analysis and investigation would occur are on federal land managed by the U.S. Department of the Interior, Bureau of Land Management (BLM). Portions of the access roads to the site will also cross private lands. The BLM is preparing this EA to address access by BOR and IDWR personnel. The Corps would have access to such lands by way of the rights-of-way acquired by BOR. The Corps will also be on-site during drilling to provide technical assistance and oversight. The Corps will produce a final report of the findings provide by the BOR, and recommendations concerning the geologic suitability of the project area.

Water storage on the Weiser River and at the Galloway site (described below) has been studied for decades. The Corps first received a study authorization resolution for the Galloway Project from the U.S. Senate Public Works Committee in 1954; and in 1965 the Department of the Interior identified and approved the withdrawal of specified lands for the project area and classified such lands as Power Site #455 under Public Land Order 3793 (Federal Register Notice, 17 August 1965, page 10894). In 2008, the Idaho Water Resources Board (IWRB) was directed by the Idaho Legislature through House Joint Memorial 8 to investigate water storage projects statewide, including the Weiser-Galloway Project.

The Weiser-Galloway Gap Analysis, Economic Evaluation and Risk-Based Cost Analysis Project (Gap Analysis), completed in March 2011 by the Corps as part of the PAS, was a comprehensive review of earlier studies of the potential Galloway Dam and Reservoir site by the Corps from 1983-1994. It provided an analysis of gaps in information in the earlier studies and incorporated events, knowledge and information affecting Idaho and the Snake River Basin that have developed since the earlier studies were performed. Its focus was on the future water supply and management needs of Washington and Adams Counties, the City of Weiser, the State of Idaho, and the Weiser and Snake Rivers. It was designed to inform decision makers of critical gaps that need to be addressed before deciding whether to move forward with comprehensive new environmental, engineering and economic feasibility studies. The Gap Analysis was accomplished through a partnership between the IWRB and the Corps.

The Weiser-Galloway Gap Analysis identified 181 gaps in information in earlier studies. One of the primary gaps identified in the study: the need to determine the safety, suitability and integrity of geologic structures at the potential dam and reservoir site. This project is an interagency effort. The project is located on BLM controlled land (Figure 1), and the BOR will be

completing the geotechnical testing and analysis. The Corps will complete any additional laboratory analysis of the samples, and produce a final report addressing the issues identified in the Gap Analysis (2011).

This Environmental Assessment (EA) was prepared in accordance with the Council on Environmental Quality (CEQ) *Regulations for Implementing the Procedural Provisions of the National Environmental Policy Act (NEPA)* (Title 40 of the CFR Parts 1500-1508). The objective of the EA is to determine the magnitude of the environmental impacts of the proposed action. If such impacts are not significant, a Finding of No Significant Impact (FONSI) would be issued and would proceed with the federal action. If the environmental impacts are significant according to the CEQ's criteria (40 CFR 1508.27), an Environmental Impact Statement (EIS) would be prepared before a decision is reached to implement the proposed action. Applicable laws under which these impacts will be evaluated include NEPA, the Endangered Species Act, the Clean Water Act, the Clean Air Act, the U.S. Fish and Wildlife Coordination Act, and the National Historic Preservation Act.

1.2 Purpose of and Need for Action

BLM Purpose and Need - The purpose of this action is to respond to an application submitted by the Bureau of Reclamation (BOR), United States Department of the Interior (DOI), and to ensure that this use of public lands occurs in a manner consistent with the National Environmental Policy Act of 1969 (NEPA); Title V of the Federal Land Policy and Management Act of 1976 (FLPMA); The Endangered Species Act of 1973 (ESA); the National Historic Preservation Act of 1966 (NHPA); the Cascade Resource Management Plan (RMP); and all applicable regulations in 43 Code of Federal Regulations (CFR) Part 2800.

The need for the action is established by the BLM's responsibility under the FLPMA, which authorizes the use of public land for the public interest

Corps and BOR Purpose and Need - The Proposed action is intended to conduct a geologic investigation and analysis to determine the safety, suitability and integrity of the geologic structures at what has been identified as a potential dam and reservoir site. Previous geotechnical investigations in 1983 identified geologic structures including clays, tuffs, and ash that are all problematic for placement of a dam at this location. *The Weiser-Galloway Gap Analysis, Economic Evaluation and Risk-Based Cost Analysis Project* (Gap Analysis), completed in March 2011, was a comprehensive review of earlier studies of the potential Galloway Dam and Reservoir site by the Corps from 1983-1994. This study identified a number of missing data "gaps" that needed to be addressed to further the study of the area as a potential dam site. One of the primary data gaps was the need to verify and expand on the earlier geologic study. There is a need to verify the presence of these potential structural weaknesses and identify seepage potential for the dam and reservoir site and locate and analyze faults within the geologic structures, and determine how they would affect the structural viability of a dam at this site.

1.3 Location and Setting

The project area is located at approximately river mile 13.5 on the Weiser River. The Weiser River basin, itself, is an irregular-shaped drainage area of about 1,660 square miles. It is located between latitudes 44 and 45 degrees north, and longitudes 116 and 117 degrees west. Its

headwaters are in the Seven Devils Range on the west and north, and in the West Mountains to the east. The Little Salmon River Basin lays to the north, and the Payette River Basin to the east and south, and minor stream basins to the west, all of which drain directly, or indirectly into the Snake River. The basin's north/south length is about 110 miles, with a maximum east/west width of approximately 36 miles.

The immediate project area lies within a narrow canyon of the Weiser River. The elevation of the river at the project location is approximately 2200 feet above sea level (asl). The canyon in the immediate project area rises to almost 3000 feet asl in the project area, although all of the work described in this EA will occur below elevations of 2800 feet asl. Annual average air temperatures range from 20° F in winter, to 90° F in summer. Average annual precipitation ranges from 10-12 inches per year. Nearly 70 percent of all precipitation falls during the October-March period. Average annual snowfall is about 25 inches. The driest months are July and August with less than 0.5 inches of precipitation each month.

The geology of the project area is late Tertiary in origin. Bedrock within the project area is dominated by wide spread basalt flows that covered much of western Idaho during the Miocene. Later geological formative process included sedimentary deposits associated with volcanic activity, and deposits derived from lake and stream activity. The most recent materials are alluvium of glacial and colluvial origins. The potential boring locations are dominated by xeric grassland, which includes rock outcrops, grasses, and shrubs. On the rolling hills in the surrounding area the dominant grass species is medusahead wildrye, an introduced and noxious annual grass. On steep well-drained soils, cheat grass is another introduced annual grass which is dominant. The project area is part of the "Columbia Basin:Weiser Unit" (Ertter and Moseley 1992) and the area was historically dominated by the bluebunch wheatgrass/big sagebrush biome. Native grasses including squirreltail, bluegrasses, Idaho fescue, basin wildrye, and wheatgrasses also occur, particularly in steep rocky sites where grazing, fire, and other disturbances have not eliminated them (USACE 1989). Sagebrush (including *Artemisia tridentata* and *Artemisia rigida*) is the most common shrub with bitterbrush occurring within more moist areas.

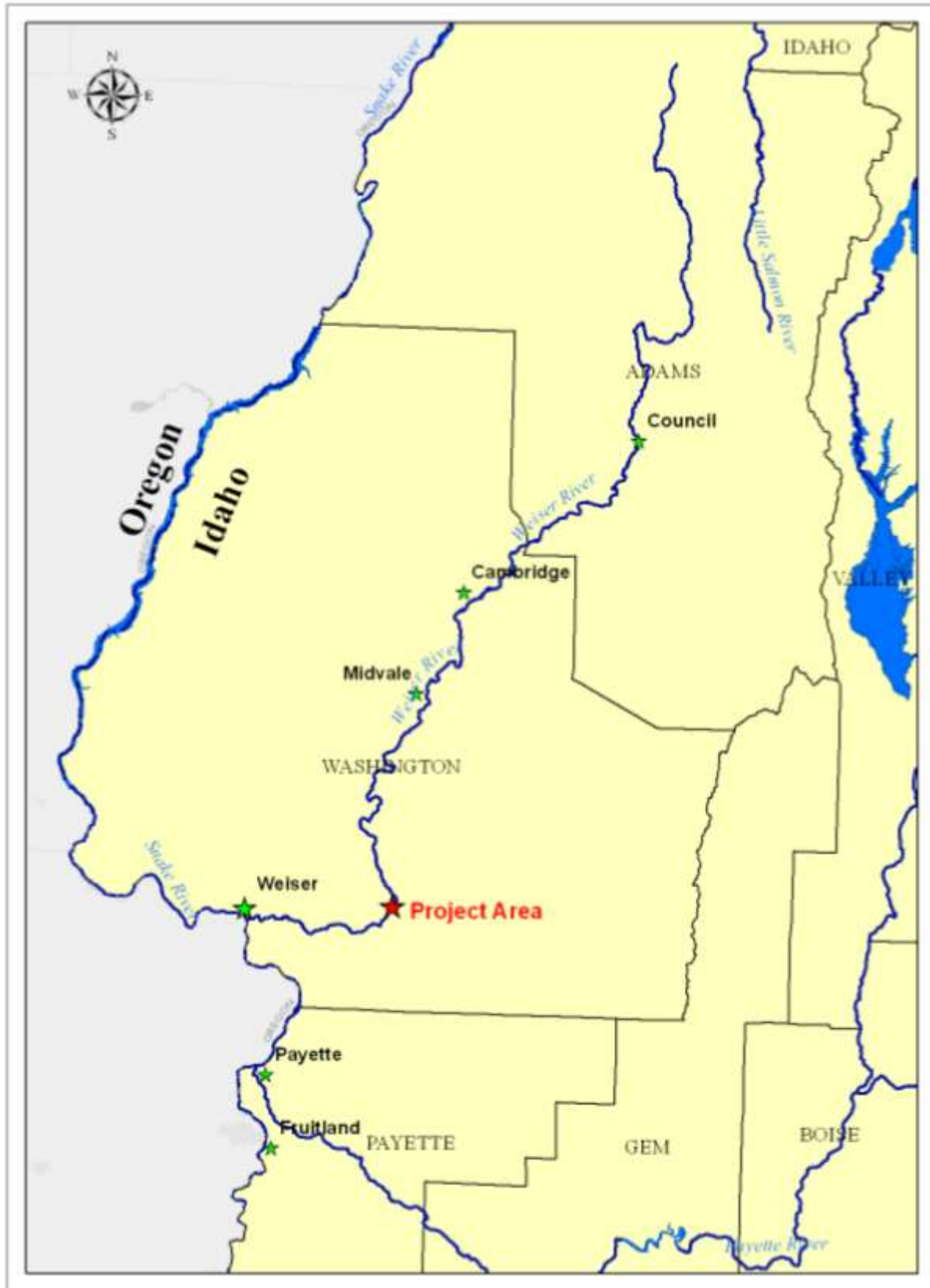


Figure 1 – Overview of the Weiser River/Galloway dam geologic testing project area.

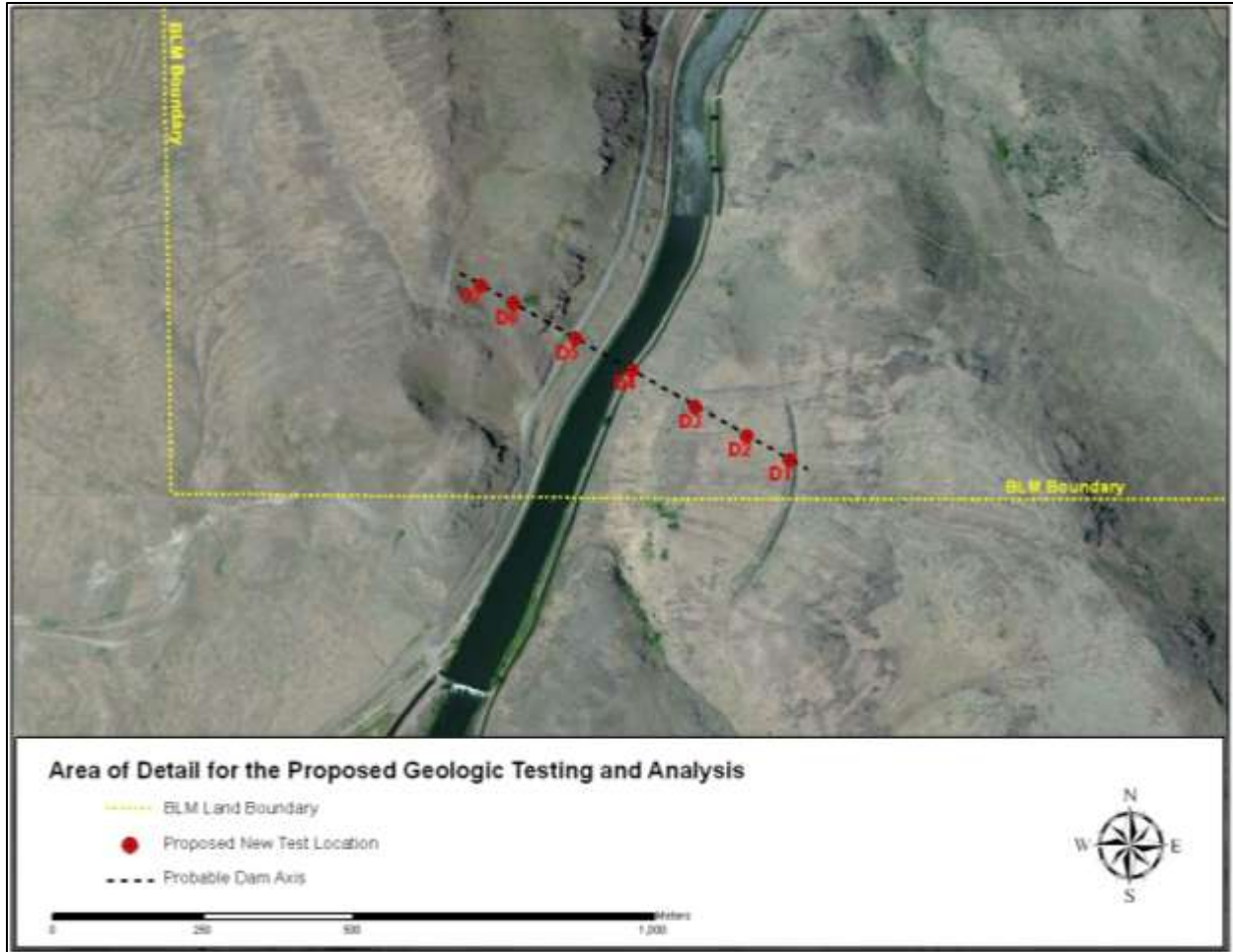


Figure 2 – Detailed view of the proposed testing area showing the BLM land boundary.

2.0 ALTERNATIVES

Two alternatives are evaluated in this EA, the no action alternative and the geological testing and analysis/preferred alternative. The geological testing and analysis/preferred alternative is the only alternative that meets the needs of the data gap identified in the earlier study. NEPA requires analysis of the no action alternative. This alternative sets the baseline from which to compare other alternatives. The no action alternative does not mean there would be no environmental effects from this alternative.

2.1 Alternative A - No Action

Under the no action alternative BLM would not issue a right-of-way across public lands for the purpose of completing a geological testing. The BOR would not complete geological testing of the axis of the potential Galloway Dam site on the Weiser River. Failure to do the testing The Corps would also not address one of the primary gaps identified in the Gap Analysis, and research into the proposed Galloway Dam site would not proceed.

2.2 Alternative B – Issuance of a short-term Right-of-Way to the BOR for Geologic Testing and Analysis (Proposed Action)

The BLM would issue a short-term right-of-way, not to exceed one year, to the Bureau of Reclamation for the purpose of completing geologic testing and analysis. The right-of-way would authorize BOR access across as is described in the following Sections.

The proposed action alternative the Corps would address one of the primary gaps in information identified in the Gap Analysis; specifically, the need to determine the safety, suitability and integrity of geologic structures at the potential dam and reservoir site. This geologic investigation and analysis would include identifying an area for equipment storage, establishing access for equipment and people, preparing each of the proposed drilling sites, and finally drilling out cores that would be analyzed in a lab setting. The work is anticipated to take approximately four months, and would begin in June of 2012.

2.2.1 Storage Area

An adjacent landowner would provide use of a shed, located to the south of the project area. This shed would function as the daily project staging area. The drilling equipment would remain on-site at the drill location being explored, but other equipment, including all-terrain vehicles used for daily access to the site, would be stored in the shed.

2.2.2 Access Routes

Access to the various drilling locations would occur primarily on existing vehicle trails, all of which are identified in Figure 3. Portions of the access routes are sufficient in their current state. Others would require some improvements. Areas identified in Figure 3 as needing improvement would be scraped using a medium sized bulldozer. The maximum width of the road to be improved would not exceed 14 feet. Approximately 1.2 miles of road on the right bank (west side), and 0.6 miles of road on the left bank (east side), are within the areas in need of some improvement. At the maximum road width this equates to approximately two acres on the right bank (west side), and approximately one acre on the left bank (east side). These portions of the trails are eroded, overgrown, or large rocks have fallen and come to rest on the road. On the right bank (west side) the access road, after reaching the top of the hill, would require relatively more extensive road work than other areas. Areas requiring road improvements would be rehabilitated according to BLM standards and the success of the rehabilitation effort would be subject to approval by the BLM.



Figure 3 – Overview of site plan for geologic testing at Weiser River/Galloway dam site.

2.2.3 Drill Site Preparation

Preparation of each of the drill sites would require cutting using the same medium sized bulldozer to provide a level surface for the drill rig. An area of approximately 0.1 acres, or 65 feet by 65 feet, at boring locations D2, D3, D6, and D7 would be leveled using a bulldozer, for a total of approximately 0.5 acres. Boring location D1, D4, and D5 would all be done along existing trails or roads where the drill rig can be parked on the road (Figure 3). The areas around boring locations D6 and D7 would require the most cutting to achieve a level surface because of slope in this area. The road would have to be level, and because of the steep slope toward the river this may require as much as four feet of soil to be cut on the uphill side to create a level road, and for the road to be as much as 14 feet wide. This additional site preparation work would not affect more than 0.5 acres. All roads between drill sites D6 and D7 would be rehabilitated according to BLM standards and the success of the rehabilitation effort would be subject to approval by the BLM.

2.2.4 Boring

Boring would be completed using a three inch diameter drill bit (with no more than a four inch total diameter for the holes). The borings would be done using a Central Mine Equipment Company, CME-850X Track Carrier Mount (Figure 4). The CME-850X has an overall length of 23 ft 7 in, and maneuvers on a pair of 33 inch wide tracks. The approximate weight of the rig is 26,000 lbs. Pickup truck carrying additional drilling equipment would also be on-site, and the crew would access the project site daily on all-terrain vehicles (four wheelers). The bore holes would be between 150 and 300 feet in depth. At each of the bore hole locations water would be pumped into the holes to remove loose material dislodged by the boring bit. This water would come from the Weiser River. A continuous flow of water would be maintained on site via a 25 gallon per minute (gpm) pump. A T-valve would be used to establish a tap that can be used as necessary, otherwise all water would be immediately returned to the river via a close-loop system. Water would be stored at each drilling location in a 150 gallon tank. Water pumped into the hole would be allowed to disperse onto the ground, with the exception of water at boring location D4. This location is close to the river and an adjacent canal so a containment system would be used to capture the water so it can be disposed of away from the river. Water, under pressure, would also be used to test the permeability of surrounding geology at the conclusion of each boring. Finally, each bore hole would be filled using a mixture of water and cement up to the surrounding ground level. At the completion of each bore hole requiring site leveling (D2, D3, D6, and D7) would be rehabilitated according to BLM standards and the success of the rehabilitation effort would be subject to approval by the BLM.



Figure 4 – The CME-850X track carrier mount with drill rig attached.

3.0 AFFECTED ENVIRONMENT AND ENVIRONMENTAL CONSEQUENCES

This section describes the existing affected environments (existing condition of resources) and evaluates predicted environmental effects on the resources for each alternative. Although only relevant areas are specifically evaluated for effects, the BLM did consider all resources in the proposed project area and made a determination as to which ones to evaluate. The following resource areas were evaluated: Water Quality, Ground Water, Terrestrial Resources, Recreation, Threatened and Endangered Species, Cultural Resources, Soils, Air Quality, and Cumulative Effects. It was determined that it was not necessary to evaluate Aesthetics/Visual Quality, Aquatic Resources, Climate, or Socioeconomics as implementation of the proposed action would not impact these resources.

3.1 Water Quality

The water quality of the Weiser River in the vicinity of river mile 13.5 is generally poor. The water quality conditions are influenced by severe stream bank erosion and livestock use occurring in the area. High water temperatures and low flows in the mid- to late summer contribute to decreased dissolved oxygen levels (especially at night). The river in the project vicinity also experiences a high load of suspended solids (and consequently, nutrients). Bacterial levels have been reported high, especially during low flows, due mostly to livestock input (as

indicated by fecal coliform/fecal streptococca ratios) from riparian usage, runoff from rangelands, and irrigation return flow (USACE 1989).

Crane Creek, which enters the Weiser River approximately three miles above the current project area, also contributes to degraded water quality conditions. Crane Creek Reservoir is a shallow irrigation storage impoundment on Crane Creek, and was found to have the highest turbidity level of 85 lakes in Idaho surveyed in 1981 (Milligan et al. 1983). Crane Creek exhibits high temperature, low dissolved oxygen, and high algal productivity in the summer. It also contributes significant quantities of heavy metals, particularly mercury. During normal flow releases, water quality impairments associated with Crane Creek Reservoir contribute to water quality issues in the Weiser River.

Past water monitoring on the Weiser River has resulted in the listing of the river within the project area under Section 303d of the Clean Water Act. This has resulted in the establishment of total maximum daily loads (TMDLs) for temperature, suspended sediment, total phosphorous, and bacteria (including fecal coliform and *Escherichia coli*).

3.1.1 Alternative A - No Action

There would be no change to water quality in the Weiser River under the No Action alternative. Water Quality conditions would continue to be poor within the Weiser River.

3.1.2 Alternative B - Proposed Action

No effects are anticipated to the water quality of the Weiser River as a result of the Proposed Action. Six of the seven individual component actions are far enough from the river that any runoff would likely infiltrate the soil before reaching the river. Water is used during the boring/drilling process to lift loose material from the bore hole. It would take approximately 2000 gallons of water at each hole to remove debris. This would result in a minimal outflow onto the surrounding surface, and all but one of the holes is far enough away from the river to assure that the water would infiltrate the surrounding soil before reaching the river. The one exception is bore/drill hole D4. This boring location is located on a terrace between the river and a parallel irrigation canal (Figure 3). A containment system would be deployed at this location so that all of the water used can be disposed of in an upland location to prevent any additional turbidity in the Weiser River. The proposed containment system would consist of a “silt sock” to capture all solids as water comes out of the hole. Finally, the pressure testing at the conclusion of each bore hole involves putting water, under pressure, into the holes. Again, with the exception of drilling location D4, all of the holes are a sufficient distance from the river to ensure no increased turbidity. The containment system would also be necessary for this phase of testing at hole D4. The pump used to bring water from the river to the boring sites would be a small 25 gallon per hour pump. All water that is not used on site would immediately flow back to the river through the closed-loop system. Furthermore, the amounts of water used during boring, and the continuous flows within the pump system, are not sufficient to result in anything more than a negligible increase to water temperature. None of the proposed actions would result in detectable increases to any of the TMDLs based on dissolution within flows in the river.

Implementation of the geologic testing and analysis would not be expected to have an effect on water quality. All potential runoff from road improvements and from drilling would infiltrate the

surface prior to reaching the river, or would be captured in a containment system. All water returned as ‘not used’ is clean water contained within the closed-loop system.

3.2 Ground Water

Ground water occurs in all the geologic units of the Weiser River Basin. Within the project area ground water resources primarily occur within fracture zones within local basalts of the Columbia River Basalt Group. The ground water occurs in fractures, joints and breccias zones of the basalt beds, and within the interlayered sand and gravel beds. Ground water in sedimentary rock aquifers is generally confined or semiconfined in all parts of the Weiser River basin, except for the lowlands adjacent to the city of Weiser, where water-table conditions exist. Ground water in the basin is derived from precipitation falling within the uplands, and some recharge may occur as a result of infiltration derived from streams, canals, ditches, and irrigated fields via percolation (USDA-NRCS 2006; Young et al. 1977). There are wells in the vicinity of the project area. The only well within one mile of the project location is approximately 0.75 miles upstream. This well is associated with a Weiser River Trail restroom facility. All other wells are a mile or more from the current project location. There are an additional three wells upstream and four more downstream within a two mile radius.



Figure 5 – Looking across the Weiser River at boring location D3 (right bank-near bank) and D4 (left bank-far bank, note road/levee between river and the irrigation canal).

3.2.1 Alternative A - No Action

There would be no change to ground water resources under the No Action alternative. While ground water levels fluctuate, and are subject to natural and unnatural factors, the current state of

ground water resources within the Weiser River basin would not change under the No Action alternative.

3.2.2 Alternative B - Proposed Action

Drilling for geologic testing and evaluation would likely encounter fractures in the bed rock that contain ground water, resulting in minor effects to discreet pockets of ground water. The drilling of the holes would not result in fluctuation of ground water levels as the formations that hold water are discreet, and intersecting one of these features would not result in any widespread loss of water table levels. The existing quality of ground water would also not be affected, as equipment introduced into the holes is cleaned before use, and the boring action returns most of the water back to the surface. Also, because of the discontinuous nature of ground water deposits, and the distance to known wells within the project area, any existing ground water contaminants already present in the river water, and introduced into the ground water as a result of the project, would not be anticipated to have an effect on ground water conditions.

3.3 Terrestrial Resources

The project location is on both sides of a narrow canyon of the Weiser River. The potential boring locations are dominated by xeric grassland, which includes rock outcrops and shrubs (USACE 1990). On rolling hills in the surrounding area, the dominant species is medusahead wildrye, an introduced and noxious annual grass. On the steep, well-drained soils, cheat grass is another introduced annual grass which is dominant. Native grasses including squirreltail, bluegrasses, Idaho fescue, basin wildrye, and wheatgrasses also occur, particularly in steep rocky sites where grazing, fire, and other disturbances have not eliminated them (USACE 1990). The area is also frequented by both mule deer and elk, as well as a number of other species of smaller birds and animals.

3.3.1 Alternative A - No Action

There would be no change to terrestrial resources in the Weiser River under the No Action alternative. Terrestrial resources would continue to be dominated by non-native, invasive species, and the area would continue to be used by native faunal species.

3.3.2 Alternative B - Proposed Action

The proposed action would have short-term, minor effects to terrestrial resources, especially during preparation of the individual drill sites not located along established roads. Additional disturbances during the improvements to the access routes would also have minor, short-term effects, but these areas would be rehabilitated after project completion and the access routes would not be open to the public. Almost all of the proposed improvements are to existing, but overgrown trails. The disturbances could lead to the removal of some native grass species, and additional growth of non-native grass species in the area. Leveling and prep-work at each of the boring locations could also create the additional effect of removing native species, and establishment of non-native species, but the areas are relatively small, and a mixture of native grass seeds would be hand broadcast at each of the locations at the completion of each boring. Additionally, the native seed mix broadcast on sloped areas where disturbances occur would include *Lomatium grayii* (desert parsley), a commonly occurring species in the area, and a forage plant for the Southern Idaho Ground Squirrel. The Bureau of Land Management (BLM) would establish the parameters of the native seed mixes.

The preferred alternative would also have minor, short-term effects to local mule deer (*Odocoileus hemionus*) and Rocky Mountain elk (*Cervus elephus*) by increasing disturbance in the area to the animals, causing them to temporarily avoid the areas of effect. These effects are expected to be minor, as areas adjacent to the affected area provide suitable habitat.

3.4 Recreation

The Weiser River National Recreation Trail runs alongside the right bank of the Weiser River through the project area. The trail follows a former Union Pacific rail line and right-of-way. The trail is used by individual recreationalists, as well as larger organized events such as bicycle and wagon rides. Numerous game species including mule deer, elk, pheasants and Hungarian partridges were also observed during a site visit, as was evidence of hunting in the project area.

3.4.1 Alternative A - No Action

There would be no change to recreation in this area of the Weiser River under the No Action alternative. Use of the Weiser River National Recreation Trail and hunting in the surrounding area would continue.

3.4.2 Alternative B - Proposed Action

The proposed action would result in no effects to hunting, and only minor, short-term effects to recreation as a result of the proposed geologic testing and analysis. The geologic testing is anticipated to take approximately four months to complete, and is tentatively scheduled to be completed by September 2012. As this time period does not coincide with most hunting seasons, no effects would occur to this recreational activity. The only minor, short-term effects to recreation as a result of the proposed action would result from the two water lines at the Weiser River National Recreation Trail (to create the closed loop system). These lines will be buried, using shovels and other hand tools, up to one foot deep across the crest of the trail. Two side-by-side 3-inch PVC conduits would be buried within the trail to avoid any obstacles that hoses laying across the surface might create. This is being done at the request of the Friends of the Weiser River Trail. This would only be the case while work was occurring on the right bank, and signs urging caution, or emergency cones would need to be deployed near the lines to alert hikers and bicyclists to the presence of the intake and return hoses that would be present on the trail.

Implementation of the geologic testing and analysis would have a minor, short-term effect to recreation within the project area. Particularly from the potential dangers associated with running hoses across the Weiser River National Recreation Trail (Figure 5).



Figure 6 – Corps and Bureau of Reclamation Staff inspecting the project area from the Weiser River National Recreation Trail.

3.5 Special Status Species

On February 2, 2012 the reviewed the current list of threatened, endangered, candidate, and special status species that pertain to the area affected by this action for Washington County, Idaho. The compiled species lists are shown in the following tables. Critical habitat designations are shown in Table 2. Although historically they likely occurred in the area, bull trout and Snake River Physa Snails are not found in the Weiser River in the area of the proposed borings. The current project area is also considered too far south to be within the range of the Northern Idaho Ground Squirrel and the Wolverine. Trees of the *Pinus* genus do not occur in the immediate project area. Finally, Table 3 contains Idaho BLM Special Status Plants (BLM 2011c).

Table 1 - Threatened, Endangered, or Candidate Species that may occur in the affected area

Species	Scientific Name	Status
Bull Trout	<i>Salvelinus confluentus</i>	Threatened
Northern Idaho Ground Squirrel	<i>Spermophilus brunneus brunneus</i>	Threatened
Snake River Physa Snail	<i>Haitia (Physa) natricinia</i>	Endangered
Greater Sage Grouse	<i>Centrocercus urophasianus</i>	Candidate
Southern Idaho Ground Squirrel	<i>Spermophilus brunneus enemicus</i>	Candidate
Wolverine	<i>Gulo gulo</i>	Candidate
Whitebark Pine	<i>Pinus albicaulis</i>	Candidate

Table 2 - Designated critical habitat in the area potentially affected by this action.

Designated Species
Bull Trout (none in action area)

Table 3 - Idaho BLM Special Status Plants

Species	Scientific Name	Status Ranking
Aase's Onion	<i>Allium aaseae</i>	High Endangerment (T2)
Malheur Princeplume	<i>Stanleya confertiflora</i>	High Endangerment (T2)
Snake River Goldenweed	<i>Haplopappus uniflorus</i>	Moderate Endangerment (T3)
Malheur Cryptantha	<i>Cryptantha propria</i>	Species of Concern (T4)
American Wood Sage	<i>Teucrium canadense</i>	Species of Concern (T4)

On September 29, 2011, a non-game biologist from IDFG, and their expert in ground squirrels, surveyed the area around possible drill locations on the west side of the Weiser River. IDFG staff indicated that there appeared to be activity from multiple rodent species (i.e., marmots, kangaroo rats, gophers, voles). Staff from the USFWS Boise office confirmed the IDFG staff findings on October 18, 2011. USFWS staff determined that the evidence suggests that there is a reasonable probability that southern Idaho ground squirrels do live at the site. On April 3, 2012, the Corps and the IDFG ground squirrel expert surveyed the west side of the project location, along the proposed road location, up to the boring locations. A small cluster of Southern Idaho Ground Squirrel burrows were identified immediately adjacent to the corral, with at least three burrows in the road way. Because there are no planned improvements to the road in this spot, and because the squirrels are typically underground during the months of June and July, IDFG staff did not believe that there would be any impact to the squirrels. An individual Southern Idaho Ground Squirrel was observed at the same location standing above a burrow about 20 yards east of the road. Another cluster of burrows was found above what would be the western most drill location, but not within an area of proposed disturbance. Some burrows were found just below the slope, and an individual Southern Idaho Ground Squirrel was seen running amongst the rocks on the slope.

A site visit was conducted on April 4, 2010 with the Bureau of Land Management (BLM) staff, Corps staff, representatives of the Shoshone-Paiute Tribes, and a biologist from IDFG. The Tribe had expressed concerns about sage grouse, however, IDFG staff confirmed that the nearest sage grouse leks were in the vicinity of Midvale, Idaho. IDFG dismissed any concern of effects to sage-grouse associated with this project.

3.5.1 Alternative A - No Action

There would be no effects to threatened, endangered, candidate, or special status species in this area of the Weiser River under the No Action alternative. Threatened and endangered species are not anticipated to occur in the project area, and this would not change under the No Action alternative.

3.5.2 Alternative B - Proposed Action

The proposed action would result in no effects to threatened and endangered species. However, minor effects are anticipated to candidate species, and species of special concern (Tables 1 and 3).

The proposed geologic testing and analysis would have minor effects on candidate species as defined by the Endangered Species Act of 1973, specifically the Southern Idaho Ground Squirrel. The Idaho Fish and Games (IDFG) list of “species of greatest conservation need” includes the Southern Idaho Ground Squirrel (IDFG 2005). Surveys within the immediate project area conducted by the U.S. Fish and Wildlife Service (USFWS) and the IDFG have definitively identified the presence of Southern Idaho Ground Squirrel within the immediate project area. Implementation of the geologic testing and analysis would affect the Southern Idaho Ground Squirrel (*Spermophilus brunneus enemicus*) and other burrowing mammals in localized areas of drilling and road improvement. Drilling into burrows, vibratory disturbance from drilling, establishing drilling pads, road work, road construction, or cross-country vehicle travel all have the potential to affect burrowing mammals and could include disturbance of burrow locations, collapsing of burrows, or collision with animals causing direct injury or death.

Whitebark Pine has not been identified within the project area. Surveys done in support of this project failed to identify any *Pinus* species within the immediate study area. Also, based on studies of both Greater Sage Grouse and Wolverine habitat, neither is anticipated to occur within the immediate project area.

The concern for potential effects to Greater Sage Grouse (*Centrocercus urophasianus*) arose as a result of comments from the Shoshone-Paiute Tribes. A Coordination Act Report was published in 1985 (USFWS 1985) and amended in 1989 (USFWS 1989). At the time of the report, “IDFG and BLM biologists [were] not aware of sage-grouse currently in [the] vicinity” of the confluence of Crane Creek and the Weiser River, although sage-grouse were “common in sagebrush vegetation to the east of the project area” (USFWS 1985).

IDFG’s “species of greatest conservation need” also includes the Greater Sage Grouse (IDFG 2005). The 2006 Conservation Plan for the Greater Sage Grouse in Idaho (Idaho Sage-grouse Advisory Committee 2006) included some threats and conservation measures that could affect this project. These include infrastructure development and human disturbance. Infrastructure development includes linear features such as roads. A 10 km (6.2 mile) buffer is applied along each side of major roads. However, roads associated with the proposed action do not meet the plan’s definition of major roads. Increased human access would be short term, and limited to project-related activities. The roads would not be open to the public and would be rehabilitated upon project completion. All-terrain vehicle use would be short term, and limited to project-related activities. Furthermore, geospatial data (Knick and Connelly 2011) indicates that the species is spatially separated from the proposed action, so collisions and vehicle-related juvenile mortality would not likely occur. However, it should be noted that the affected area was likely historic sage-grouse habitat, and areas containing sagebrush to the east of the affected area could possibly support sage grouse if areas between the affected area and current habitat were restored or reconnected.

Human disturbance does have the potential to affect both Southern Idaho Ground Squirrel and Greater Sage Grouse habitat. Human disturbance includes disturbance from all-terrain vehicles. Examples of specific effects include increased human presence, noise, ground disturbance, spread of weed seeds, direct damage to sagebrush plants and other vegetation, and risk of human-caused wildfire, but the effects would be short term, and limited to project-related activities. There is the potential for propagation of non-native plants in areas of ground disturbance, and invasive species control measures would be implemented to minimize the effects. The specific habitat rehabilitation treatments would be established by the right-of-way documents issued from the BLM, and would include measures that meet the most recent BLM guidance for habitat, including the current Greater Sage-Grouse Interim Management Policies and Procedures (BLM 2011a) and the BLM National Greater Sage-Grouse Land Use Planning Strategy (BLM 2011b).

Some of the non-listed, and non-candidate species of special concern identified for the project area are listed in Table 3. Surveys were not conducted for these plants species, but all of them may occur within the project area. Because of the scope of work it is anticipated that short-term, minor effects would occur to these species.

3.6 Cultural Resources

Archaeological evidence indicates a high likelihood of cultural resources within the Weiser River Valley. Previous studies have identified sites spanning from the earliest hunters and gatherers to arrive on the North American continent through recent historical times. Ethnographic accounts also indicate habitation within the project area by numerous aboriginal groups including the Northern Paiutes and Northern Shoshoni, as well as the presence of other groups including the Nez Perce, Cayuse, and Umatilla. Historically, the first recorded Euroamerican visitors to the Weiser River were the west bound overland Astorians led by Wilson Price Hunt in November 1811. Numerous other fur hunting expeditions travelled through the region in the following decades so that by the 1830s the area had been fairly well documented. The first Euroamerican settlement of the area commenced with the establishment of a ferry boat landing on the Snake River at the mouth of the Weiser River in 1863. The following year a general store was established by Thomas Galloway and Woodson Jeffries, and in 1866 a freightline began operating between Weiser and the mines near Silver City. The settlement of Weiser was well established by 1870, although it was not incorporated until 1887. The Oregon Short Line (eventually renamed the Union Pacific Railroad) reached Weiser in 1884, and in 1899 a second railroad, the P,I&N was built up the Weiser River valley to Meadows.

3.6.1 Alternative A - No Action

There would be no expected effect on cultural resources in the project area under the No Action alternative. No cultural resources have been identified within the project area.

3.6.2 Alternative B - Proposed Action

There would be no effect on cultural resources in the project area under the proposed action alternative. No cultural resources have been identified within the project area. A survey along the banks of the Weiser River in 1983 and a more recent survey of the probable dam axis, and locations of proposed geotechnical investigation and analysis recorded no previously unknown cultural resources.

3.7 Soils

The most common soils within the project area belong to the Bakeoven-Reywat-Rock Out Crop series. The Reywat soils are the deepest soils of the series. They are found on 30-60 percent, and consist of colluviums derived from basalt or quartz-monzonite. Typically, these soils are no more than 20 inches deep, and the typical profile consists of 0-6 inches of very stony loam, 6-19 inches of very gravelly clay loam, and 19-29 inches of unweathered bedrock. The Bakeover soils are nearly identical, but typically are shallower (not more than 10 inches deep). The “Rock Out Crop” portion of the soil series is characterized by areas where the bedrock is exposed at the surface. All of these soils are well drained, and have a low carrying capacity. On the right bank (west side), a portion of the project area also contains the Gem-Reywat complex. This complex includes the Gem series soils which occur on slopes of 30-65 percent. The Gem soil consists of loess up to 40 inches deep, and the profile is dominated by up to 10 inches of a very stony clay underlain by clay over bedrock. It is well drained and has a low water carrying capacity. Moving onto the less steep area of the right bank (areas where the right bank access road would be) the resident soils consist of the Deshler-Agerdelly Complex, found in areas of 8-30 percent slope. This soil is composed of a silty clay that can be up to 40 inches deep over bedrock. It is well drained, and has a low water carrying capacity.

3.7.1 Alternative A - No Action

During the different surveys, including surveys for cultural and biological resources, areas of erosion were not noted within the project area. Under the No Action alternative erosion would continue to be a negligible issue within the project area.

3.7.2 Alternative B - Proposed Action

Under the Proposed Action the potential exists for proposed disturbances to create erosion of soils. The most common soils within the boring areas are the Gem, Bakeoven, and Reywat soils. Both of these soils are described as having a “very severe” potential for erosion by water. However, because the work described in this EA would occur during summer, rainfall is not anticipated to be sufficient to cause erosion prior to project rehabilitation. The use of water during the actual boring process would result in minor, short-term effects from erosion. Close monitoring of erosion during boring, and the use of silt fences or straw bales would be necessary to control erosion during the boring process. The access roads within the project area will occur within the Bakeover and Reywat soils, as well as the less steep Deshler-Agerdelly Complex soils. These soils are composed of a silty clay, and where the road improvements are located it is anticipated that the clay soils will harden in the sun, and with the less severe slopes in the area, will experience only minor effects from erosion.

3.8 Air Quality

The two most pertinent air quality issues to the immediate project area include fugitive dust and vehicle emission. The Idaho Department of Environmental Quality defines fugitive dust as particulate matter consisting of very small liquid and solid particles. The most common source of fugitive dust is disturbance from earth moving activities. Vehicle emissions can consist of a number of types of particulate matter, including smoke, soot, dust, fly ash, fumes, and liquid droplets. These forms of particulate matter that are derived from vehicle emissions have the potential to create issues with breathing and respiratory function.

3.8.1 Alternative A - No Action

Under the No Action alternative no increases to air quality conditions from fugitive dust or vehicle emission are anticipated for the project area.

3.8.2 Alternative B - Proposed Action

Under the Proposed Action short-term, minor increases to both fugitive dust and vehicle emissions would occur. However, these increases that result from the limited number of vehicles needed for the Proposed Action, including the all-terrain vehicles used to access the site daily will be negligible. All of these vehicles would be late model, and have modern emission control systems.

3.9 Cumulative Effects

The NEPA and the CEQ regulations implementing the Act require federal agencies to consider the cumulative effects of their actions. Cumulative effects are defined as, “the impact on the environment which results from the incremental impact of an action when added to other past, present and reasonable foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions” (40 CFR § 1508.7). Cumulative effects can result from individually minor, but collectively significant actions taking place over a period of time.

Past and ongoing actions in the project area have resulted in the current condition described in the above sections. These activities include, but are not limited livestock grazing, agriculture on private lands, and wildland fire. These are all expected to continue through the scope of the proposed action. Due to the limited duration of the proposed action (one year), there were not any reasonably foreseeable future actions, beyond the ongoing, identified. This analysis utilizes a spatial scope of 2560 acres, roughly represented by Boise Idaho Meridian Township 11 North, Range 4 West, Sections 25, 26, 35, and 36. While natural and cultural resources do not always adhere to political and surveyed boundaries, this analysis area is appropriate as the direct and indirect effects of the proposed action would not be expected to extend beyond such.

Implementation of the geological testing and analysis would not result in any significant cumulative effects. Past impacts to the area have caused degradation of the environment, specifically the proliferation on non-native grasses such as cheat grass and medusahead wildrye caused by fire suppression and historic grazing.

Direct disturbances by the project work would have minor short-term effects to threatened, endangered, and special status species, but rehabilitation of the road ways would alleviate the potential for long-term cumulative effects, particularly the continued propagation of invasive species. The BLM would establish a one year right-of-way for the project, with the expectation that all rehabilitation efforts would be completed to BLM standards within that one year time frame.

The right-of-way stipulations that would require rehabilitation of any ground disturbance would reduce and mitigate the effects of the proposed action into the future. Effects to SIDGS and other wildlife species would continue to occur as a result of activities on private and adjacent

public lands. It is reasonable to assume, given the long-term nature of these activities, that terrestrial wildlife species have grown accustomed to these activities and the proposed action would have only a slight incremental effect to them.

The continued use of roads created for the work also presents the potential for cumulative effects, but because access to the site requires crossing private land, and because the road improvements are being rehabilitated, the improvements to the existing system of trails is not anticipated to increase vehicle traffic into the area, which might otherwise have created cumulative effects.

No other potential cumulative actions or effects were identified.

4.0 COMPLIANCE WITH APPLICABLE ENVIRONMENTAL LAWS AND REGULATIONS

4.1 National Environmental Policy Act

The National Environmental Protection Act (NEPA) provides a commitment that Federal agencies will consider the environmental effects of their actions. This environmental assessment (EA) was prepared pursuant to regulations implementing the NEPA (42 U.S.C. 4321 et seq.). Completion of this EA and signing of a Finding of No Significant Impact (FONSI), if applicable, fulfills the requirements of NEPA.

4.2 Endangered Species Act

The Endangered Species Act (ESA) of 1973 established a national program for the conservation of threatened and endangered fish, wildlife and plants and the habitat upon which they depend. Section 7(a)(2) of the ESA requires Federal agencies to consult with the USFWS and NMFS, as appropriate, to ensure that their actions are not likely to jeopardize the continued existence of endangered or threatened species or adversely modify or destroy their critical habitats. Section 7(c) of the ESA and the Federal regulations on endangered species coordination (50 CFR §402.12) require that Federal agencies prepare biological assessments of the potential effects of major actions on listed species and critical habitat.

A determination has been made that this action, as proposed, would have *no effect* for all species listed as threatened or endangered and their critical habitats designated under the ESA. Although candidate species are not afforded protection under the ESA, the determination was made that the proposed action may affect, but is not likely to adversely affect, Southern Idaho Ground Squirrel, a candidate species. Negative effects would be minimized through implementation of conservation measures. The proposed action would have *no effect* on Greater Sage-Grouse.

4.3 National Historic Preservation Act

The National Historic Preservation Act (NHPA) of 1966 as amended directs federal agencies to assume responsibility for all cultural resources under their jurisdiction. Section 106 of NHPA requires agencies to consider the potential effect of their actions on properties that are listed, or are eligible for listing, on the National Register of Historic Places (NRHP). The NHPA implementing regulations, 36 Code of Federal Regulations (CFR) Part 800, requires that the federal agency consult with the State Historic Preservation Officer (SHPO), Tribes and interested

parties to ensure that all historic properties are adequately identified, evaluated and considered in planning for proposed undertakings.

The determination was made that this action, as proposed, would result in *no adverse effect to historic properties*. A summary report entitled *Archaeological Survey and Determination of Effect for Proposed Geotechnical Investigations along the Weiser River, Washington County, Idaho (PM-EC-2012-0098)* was provided to the Idaho SHPO, the Shoshone-Paiute Tribes of the Duck Valley Reservation, the Shoshone-Bannock Tribes of the Fort Hall Reservation, the Confederated Tribes of the Umatilla Indian Reservation, and the Nez Perce Tribe.

5.0 COORDINATION, CONSULTATION, AND PUBLIC INVOLVEMENT

5.1 Agency Consultation and Coordination

On September 29, 2011, a non-game biologist from IDFG, and their expert in ground squirrels, surveyed the area around possible drill locations on the west side of the Weiser River. IDFG staff indicated that there appeared to be activity from multiple rodent species (i.e., marmots, kangaroo rats, gophers, voles). Staff from the USFWS Boise office confirmed the IDFG staff findings on October 18, 2011. USFWS staff determined that the evidence suggests that there is a reasonable probability that southern Idaho ground squirrels do live at the site. On April 3, 2012, the same IDFG ground squirrel expert surveyed the west side of the project location, along the proposed road location, up to the boring locations. A small cluster of Southern Idaho Ground Squirrel burrows were identified immediately adjacent to the corral, with at least three burrows in the road way. Because there is no planned improvements to the road in this spot, and because the squirrels are typically underground during the months of June and July, IDFG staff saw no issue with these burrows. An individual Southern Idaho Ground Squirrel was observed at the same location standing above a burrow about 20 yards east of the road. Another cluster of burrows was found above what would be the western most drill location, but not within an area of proposed disturbance. Some burrows were found just below the slope, and an individual Southern Idaho Ground Squirrel was seen running amongst the rocks on the slope. IDFG staff took GPS location data at both of the spots where the individual SIGS were observed. Other burrows located in the roads and drill sites were attributed to voles, and are not of concern to IDFG.

A site visit was conducted on April 4, 2010 with BLM Staff, BOR Staff, representatives of the Shoshone-Paiute Tribes, and a different staff member of the IDFG. The Tribe had expressed concerns about Sage Grouse. IDFG staff confirmed that the nearest Sage Grouse leks were in the vicinity of Midvale, Idaho, but not at the proposed project location. IDFG dismissed any concern of effects to sage-grouse associated with this project.

Consultation was also initiated with the Idaho SHPO, the Shoshone-Paiute Tribes of the Duck Valley Reservation, the Nez Perce Tribe, and the Confederated Tribes of the Umatilla Indian Reservation in a letter dated December 30, 2011, in accordance with the NHPA. Subsequently, consultation also occurred in a meeting hosted by the BLM and the Shoshone-Paiute Tribes on March 15, 2012 and a follow up meeting on April 19, 2012. At that time the Shoshone-Paiute Tribes reviewed a draft finding of no adverse effect to historic properties. The Shoshone-Paiute

Tribes requested additional information be added to the report, and were able to ask a number of questions about the project. As a result of the March 15 meeting, and at the request of the Shoshone-Paiute Tribes, the April 4, 2012 site visit occurred. A final determination of no adverse effect to historic properties was provided to the Idaho SHPO, the Shoshone-Paiute Tribes, the Nez Perce Tribes, and the Confederated Tribes of the Umatilla Indian Reservation in a report entitled *Archaeological Survey and Determination of Effect for Proposed Geotechnical Investigations along the Weiser River, Washington County, Idaho (PM-EC-2012-0098)* (Hall 2012).

The review of this EA was also completed in cooperation with the Army Corps of Engineers and the Bureau of Reclamation. Representatives of both agencies reviewed a draft of the EA.

5.2 Public Involvement

In cooperation with the BLM and the Corps, the Idaho Water Resources Board (IWRB) held meeting with adjacent landowners (some of which will be providing access to the project area), the Friends of the Weiser River Trail, and representatives from the local communities. Additionally, all proceedings of the IWRB are public and meeting minutes and agendas are available online.

The Friends of the Weiser River Trail were concerned with the projects potential disruption to visitors along the trail. In accordance with the access agreement between them and the BOR, the hoses crossing the trail will be covered in such a way as to not impede travel along the trail.

No other comments or issues were brought forth.

6.0 REFERENCES

- Bureau of Land Management. 2011a. Greater Sage-Grouse Interim Management Policies and Procedures. Memorandum No. 2012-043.
- Bureau of Land Management. 2011b. BLM National Greater Sage-Grouse Land Use Planning Strategy. Memorandum No. 2012-044.
- Bureau of Land Management. 2011c. Idaho BLM Special Status Plants. September 2011.
- Ertter, Barbara and Bob Moseley. 1992. Floristic Regions of Idaho. Journal of the Idaho Academy of Sciences. Vol. 28, No. 2.
- IDFG (Idaho Department of Fish and Game). 2005. Idaho Comprehensive Wildlife Conservation Strategy. Idaho Conservation Data Center, Idaho Department of Fish and Game, Boise, ID. <https://fishandgame.idaho.gov/public/wildlife/cwcs/>
- Hall, Scott M. 2012. Archaeological Survey and Determination of Effect for the Proposed Geotechnical Investigations along the Weiser River, Washington County, Idaho (PM-EC-2012-0098). Walla Walla District, US Army Corps of Engineers. Ms on File.

- Idaho Sage-grouse Advisory Committee. 2006. Conservation Plan for the Greater Sage-grouse in Idaho. <http://fishandgame.idaho.gov/public/wildlife/sageGrouse/conservPlan.pdf>
- Knick, S. T., and J. W. Connelly (editors). 2011. Greater Sage-Grouse: ecology and conservation of a landscape species and its habitats. Studies in Avian Biology Series (vol. 38), University of California Press, Berkeley, CA. <http://sagemap.wr.usgs.gov/monograph.aspx#CAdata>
- Milligan, J.H., R.A. Lyman, C.M. Falter, E.E. Krumpke, and J.E. Carlson. 1983. Classification of Idaho's Freshwater Lakes. Research Project Completion Report. University of Idaho, Idaho Water Resources Research Institute. Moscow.
- U.S. Army Corps of Engineers. 2011. Weiser-Galloway Analysis, Economic Evaluation, and Risk-Based Cost Analysis Project: Final Report with Appendices. Prepared for the Idaho Water Resources Board.
- U.S. Army Corps of Engineers. 1989. Preliminary Report Volume 1 – Main Report: Galloway Dam and Reservoir Weiser River, Idaho: Weiser River Basin Interim, Upper Snake River and Tributaries. Walla Walla District Corps of Engineers. Walla Walla, Washington.
- U.S. Department of Agriculture, Natural Resources Conservation Service. 2006. Watershed Protection Plan-Environmental Assessment, Accelerated Land Treatment for Water Quality, Southern Washington County Watershed, Washington County, Idaho.
- U.S. Department of Agriculture, Natural Resources Conservation Service. ND. Soil Survey of Adams-Washington Area, Idaho; Parts of Adams and Washington Counties.
- U.S. Fish and Wildlife Service. 1985. Weiser River-Galloway Project. Upper Snake River and tributaries study: detailed evaluation. Coordination Act Report. Boise Field Office, Boise Idaho.
- USFWS (U.S. Fish and Wildlife Service). 1989. Weiser River -Galloway Project. Upper Snake River and tributaries study: detailed evaluation. Amendment to the Coordination Act Report. Boise Field Office, Boise Idaho.
- Young, H.W., W.A. Harenberg, and Harold R. Seitz. 1977. Water Information Bulletin No. 44.: Water Resources of the Weiser River Basin, West-Central Idaho. United States Geological Survey in cooperation with the Idaho Department of Water Resources.