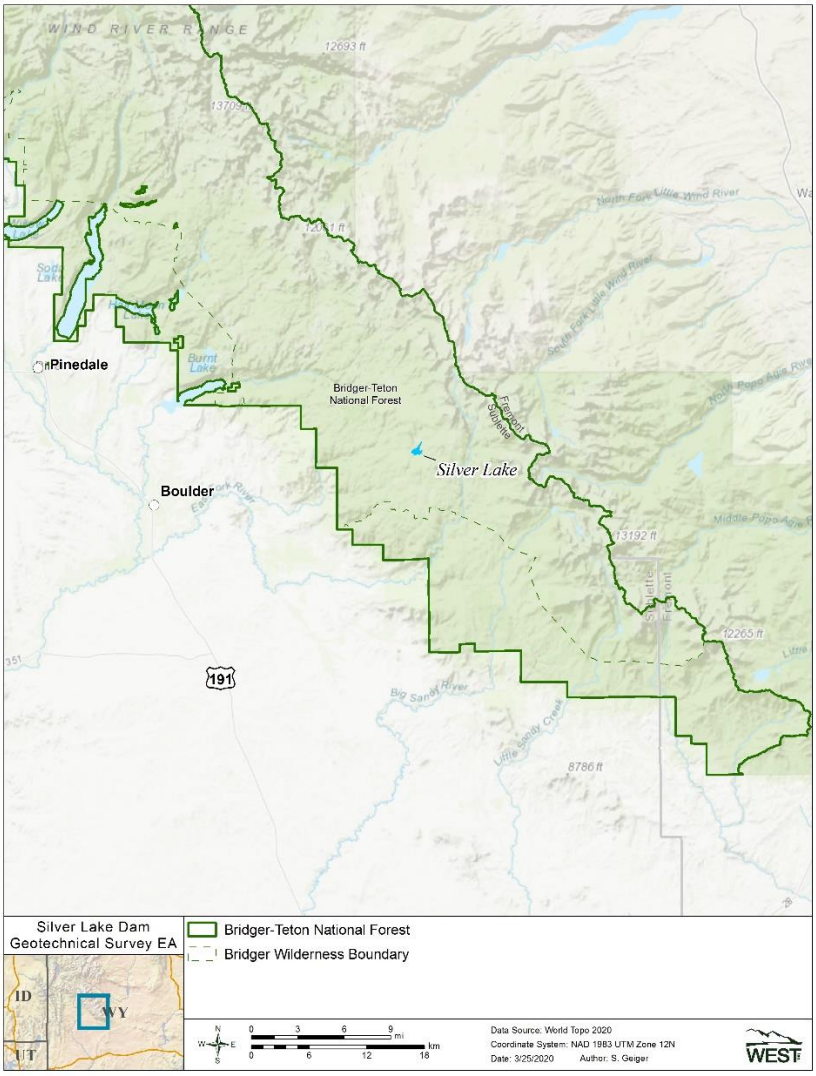
USDA

United States Department of Agriculture

# Silver Lake Dam Geotechnical Survey

## Environmental Assessment




Forest Service

Bridger-Teton National Forest

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# Contents



**Tables**



**Figures**

## Appendices

# Introduction

Silver Lake Irrigation District (SLID), working in concert with the Wyoming Water Development Commission (WWDC), the Wyoming State Engineers Office (SEO), and the USDA Natural Resources Conservation Service (NRCS), is requesting approval and authorization through a special use permit to conduct a geotechnical survey of Silver Lake Dam and potential borrow sites within the Bridger Wilderness. This testing is necessary to determine the current condition of the 1953 dam and to design potential subsequent dam rehabilitation/reconstruction needs, including availability and suitability of nearby borrow material within the Bridger Wilderness.

Silver Lake Dam and associated waterworks have been permitted, operated, and maintained at Silver Lake since 1924, prior to Wilderness designation. The Silver Lake Irrigation District holds two valid State of Wyoming water rights for irrigation and stock water, and is currently permitted by the US Forest Service (USFS) to operate and maintain the dam and associated structures.

Bridger-Teton National Forest (BTNF) is proposing to approve the geotechnical survey at the Silver Lake Dam and associated proposed borrow sites, including a previously used borrow site. These actions would be implemented on the Pinedale Ranger District of the BTNF.

BTNF has prepared this environmental assessment (EA) to determine whether to complete an environmental impact statement or a finding of no significant impact (FONSI). The NRCS is a cooperating agency on this EA.

## Proposed Project Location

The project area is located within the Bridger Wilderness, approximately 4.7 miles from the wilderness boundary. Silver Lake is at an elevation of nearly 10,000 feet. The project boundary (Figure 1) includes the area where geotechnical survey activities would occur, totaling approximately 72 acres. The proposed borrow areas include the previously used borrow area when the current earthen dam was constructed in 1953, as well as an area between the high and low water marks of Silver Lake near the dam and along the southern shore. The project boundary also includes the portion of the access route within the wilderness boundary (approximately 4.7 miles, or 56 acres), which is the same access route previously used during the last dam repair in the 1950's.

# Need for the Proposal

A geotechnical survey is needed in order to complete reconstruction/rehabilitation design alternatives for the existing embankment and outlet works. Future dam modifications would then be proposed and analyzed to address dam safety concerns and to improve functionality of the water works. Standard engineering practice for dam evaluations include geologic mapping, embankment material classification, borrow area material classification/composition, identification of dam foundation strength properties, seismic deformation analysis, and static slope stability analysis.

It is important to obtain reliable data prior to considering reconstruction/rehabilitation of the dam to avoid data gaps and reduce uncertainties in future phases of dam reconstruction/rehabilitation. Completing adequate geological tests prior to developing reconstruction/rehabilitation plans will help to more accurately estimate site disturbances, reduce over-conservatism in the final designs and uncertainties during reconstruction, and make for a more efficient reconstruction/rehabilitation project in the future with fewer environmental and social impacts.

The current earthen dam has not been altered since 1953 and has substantially deteriorated, likely requiring reconstruction/rehabilitation to (1) mitigate the potential for an uncontrolled breach, which would be hazardous to the public and resources downstream, and (2) address deficiencies in the inlet and outlet structures (waterworks) to allow the SLID to use its existing State of Wyoming water rights.

The dam is currently in non-compliance with Wyoming State Engineer's Office and U.S. Forest Service requirements. The Safety of Dams Division of the Wyoming State Engineer's Office has classified the dam as High Hazard. Modeling shows a downstream resident would be impacted in the event of an uncontrolled breach. Previous dam inspections have documented a high degree of mature trees and other vegetative growth on the dam embankment, with seepage, erosion, and sink holes along the northern abutment toe (Photo 1). These issues present public safety and environmental concerns downstream in the event of an uncontrolled breach. In addition, the upstream end of the corrugated metal pipe conduit has sustained damage from the deteriorating concrete of the outlet works structure. A piece of concrete that has been dislodged is now protruding into the pipe, partially blocking the outlet flow (Photo 2). The outlet structure for this reservoir has deteriorated and has shifted (possibly due to erosion), resulting in the inability to operate the structure as originally designed (Photo 3).

The proposed action would meet Bridger-Teton National Forest Land and Resource Management Plan Goal 1.3: Water quality and quantity are retained or improved for local uses (a) Protect municipal, agricultural, and other potable water supplies, and ensure that management activities do not cause deterioration in water-flow timing, quality, or quantity.

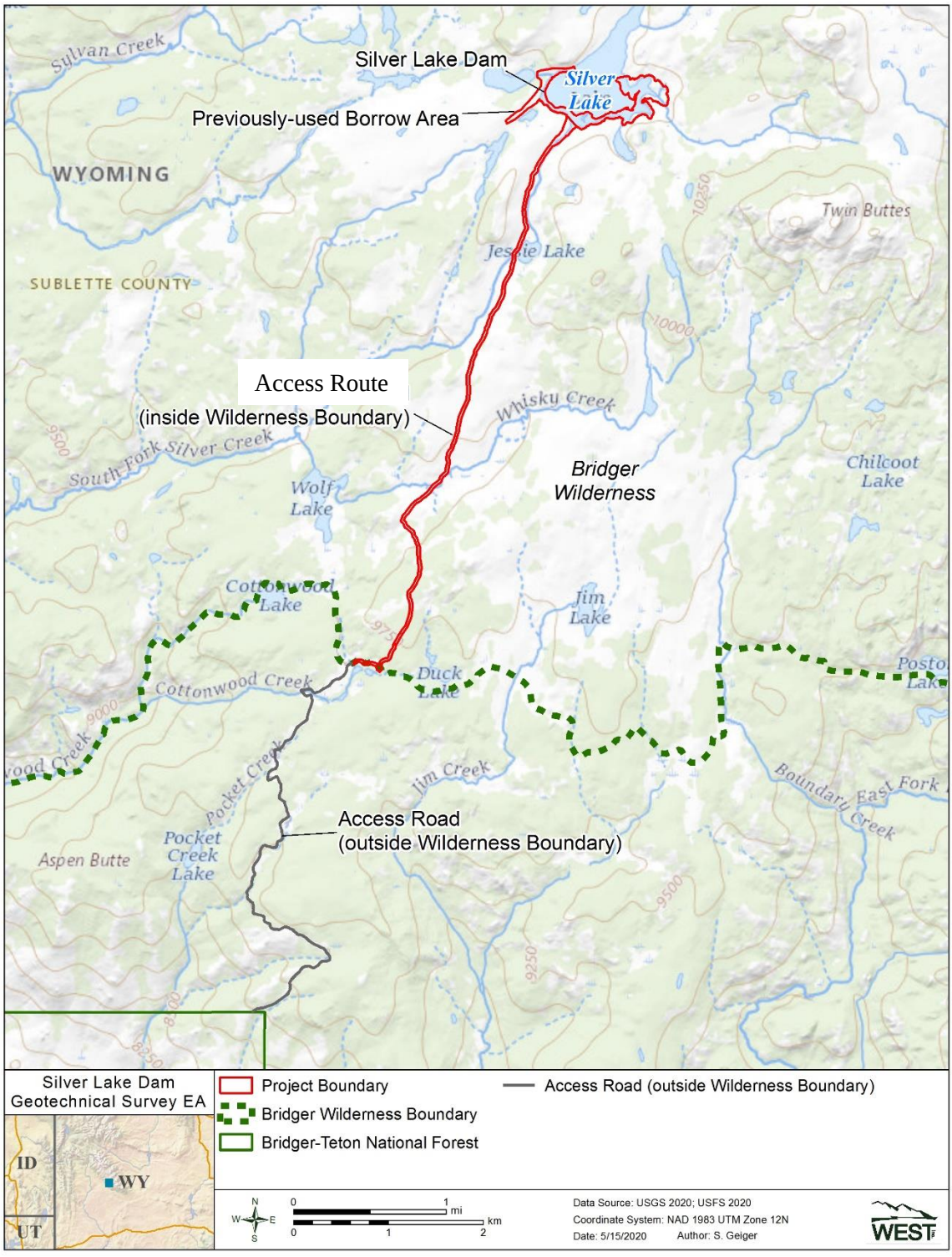


**Figure 1. Vicinity map.**

**Photo 1. Embankment crest – mature trees on crest and slope.**

**Photo 2. Damaged corrugated metal pipe.**

**Photo 3. Damaged outlet works inlet structure.**

# Proposed Action and Alternatives

## Proposed Action

The Forest Service is proposing to approve SLID, which is working with the Wyoming Water Development Commission (WWDC), Wyoming State Engineers Office (SEO), and the Natural Resources Conservation Service (NRCS), to conduct a geotechnical survey at the Silver Lake Dam, located within the Bridger Wilderness. The geotechnical survey would include core samples taken on the dam and testing of proposed borrow material areas. The dam's waterworks would also be stabilized.

### Dam Core Samples

To achieve adequate information regarding the condition of the dam, a core sampling depth of 34 to 50 feet is needed to determine the physical properties of the dam foundation. These minimum testing requirements have been confirmed by the SEO and supported by the Forest Service Region 4 Dam Engineer. Core samples would be taken at four locations; the four proposed core sampling locations are shown in Figure 2. The outside diameter of each bore hole would be approximately eight inches. A hollow-stem augur drilling platform (CME-850 or equivalent) would be used. Hollow-stem auguring is the recommended method of drilling in most areas of an embankment dam because no fluid is added to the auger column, it doesn't pressurize the embankment, and no potential for hydrologic fracturing exists (USDI Bureau of Reclamation 2014). The CME-850 (or equivalent) is designed for use in remote locations. Due to the weight of the machine and power capabilities, the required dam core sampling depth of 50 feet at the dam crest can be achieved. Approximately 50 samples, weighing an estimated five pounds each (250 pounds total) would be removed from the dam and packed out via pack stock for analysis. All boring holes would be backfilled with grout to preserve the structural integrity of the dam.

### Borrow Material Test Pits

The proposed borrow material sites include the previously used borrow area southwest of the dam and an area between the high and low water marks of Silver Lake near the dam and along the southern shore. Ten test pit locations are proposed (Figure 3). At the borrow material test pit sites, source material tests need to be a minimum depth of 8 to 12 feet. Each test pit would be approximately 4 feet wide by 20 feet in length. Test pits would be dug using a CAT 312 (or equivalent) to a maximum depth of 13 feet. This depth meets or exceeds the 8 to 12 foot requirement because the specified equipment has a maximum depth of 13 feet due to boom length. Approximately five bulk samples weighing 50 pounds each (250 pounds total) would be removed and packed out via pack stock for analysis. The objective is to ascertain whether or not on-site borrow material is suitable for reconstruction/rehabilitation of the embankment and associated filter design for the dam. The test holes would be filled and re-contoured to Forest Service specifications prior to the contractor leaving the site.

### Repair Work

While the geotechnical survey equipment and personnel are onsite, they would also stabilize the concrete inlet structure and remove the piece of concrete that partially blocks the outlet pipe (Photo 2). The CAT 312 excavator would be used to reposition dislodged boulders located in close proximity to the concrete outlet structure in an effort to temporarily stabilize the concrete inlet structure.

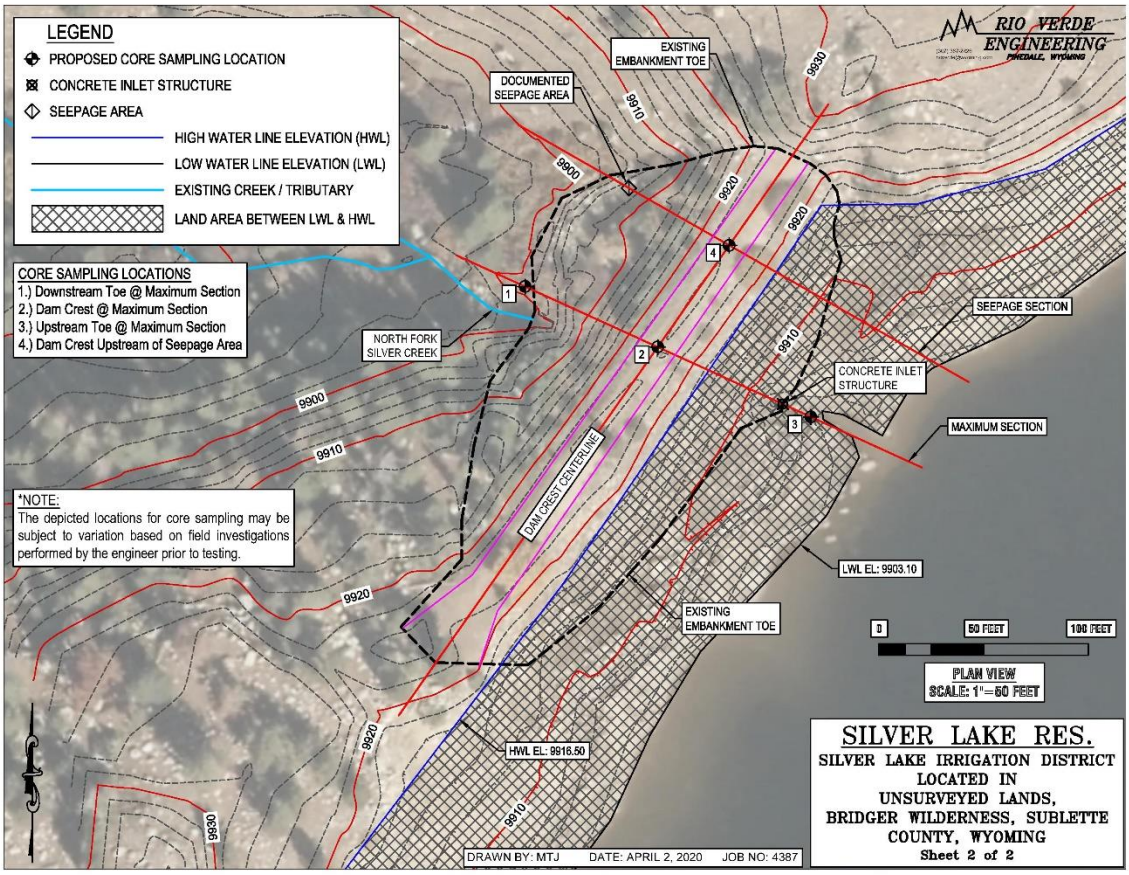


**Figure 2. Proposed Core Sampling Locations – Silver Lake Dam.**

## Rehabilitation

The excavator would be used to rehabilitate the project site and access route within the Wilderness boundary as needed per Forest Service specifications, including areas where minor erosion has been identified from the 1953 motorized access.

No re-seeding is proposed in the wilderness due to the potential for accidental introduction of non-native species. The disturbance areas are expected to re-seed themselves due to their relatively small size (e.g., the test pits would each disturb an area approximately 80 square feet plus the adjacent area where soil that is dug out of the pit is temporarily placed).

## Project Timing and Duration

The geotechnical survey would occur in late summer or fall, when the reservoir level and soil moisture are lowest (between late August and mid-October). The estimated project duration within wilderness is three days, including mobilization of equipment, personnel, and supplies to and from the project site. The project could extend for several days due to unplanned events (e.g. equipment failure).

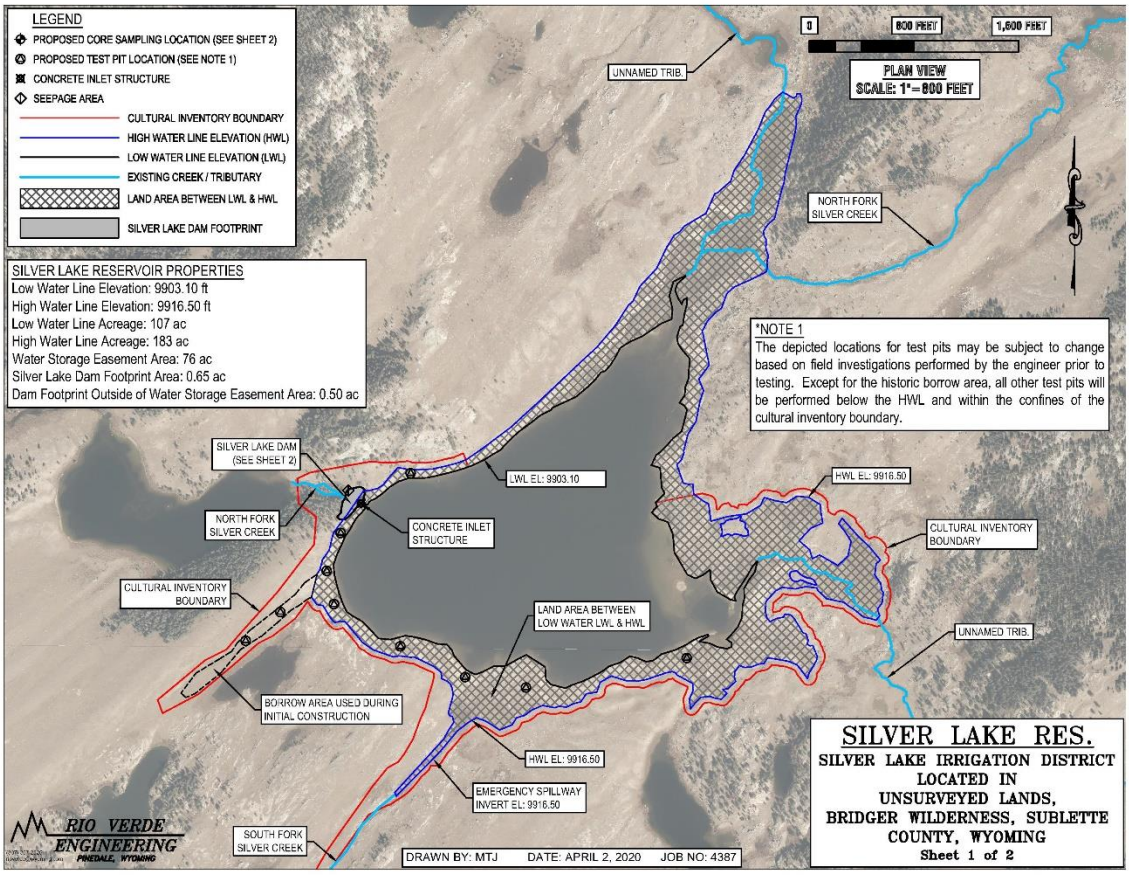


**Figure 3. Proposed Test Pit Locations for Borrow Material.**

## Project Access

The project area would be accessed on County Road 23-127 through private property and state land, then onto Bridger-Teton National Forest road #37-874, locally known as the "Pocket Creek Road" or "Wolf Lake Road" to the Bridger Wilderness boundary. At the boundary, access would follow the original route used during the initial dam construction in the 1920's and the dam replacement in the 1950's. This portion of the access route follows parts of Forest Service trail #7108 and has the appearance of a moderately used horse/hiking trail intermixed with braided cow trails (Photos 4 and 5).

## Equipment and Personnel

During initial mobilization, a tracked CME-850 Drill Rig, a tracked Cat 312 excavator, personnel, and pack horses would be staged at the end of Pocket Creek Road outside the wilderness boundary. This staging area would avoid nearby Cottonwood Creek, tributaries to Cottonwood Creek, or any associated riparian or wetland areas. Personnel would include 11 – 13 individuals as follows: two drill rig operating technicians, one excavator operator, one WWDC project manager, one NRCS manager, one project engineer, three geological engineers (two persons for field evaluation work and one person for test pit location guidance and sampling), and two wranglers with approximately 11 head of pack and riding stock.

During initial mobilization, personnel, fuel, camping gear, food, grout, motorized trash pump/hose, other supplies, and appurtenant equipment would be transported to the Bridger Wilderness boundary by means

of three UTV's in two successive round trips. Approximately 11 horses and two tracked units (CME-850 Drill Rig and Cat 312) would also be brought to the staging area via Pocket Creek Road. Once all parties, equipment, and horses have met at the staging area, equipment would be evaluated for any necessary maintenance/repairs. Any issues would be attended to at the staging area and the drill rig and excavator would be re-fueled before entering the wilderness. The project engineer and one geological engineer would travel to the dam site on foot to evaluate the work site and determine and stake locations for drilling and test pit sites prior to the testing equipment arrival.

**Photo 4. Original access route within Bridger Wilderness**


**Photo 5. Original access route within Bridger Wilderness**

Non-equipment operating personnel would hike to the dam site with day packs. The remaining gear, food, supplies, fuel, and grout (excepting those items to be carried on the tracked vehicles) would be transported by horse to Silver Lake Dam. The tracked drill rig and excavator would follow the previously used access route to the dam site, with slight deviations if determined necessary by the Forest Service to minimize tree and/or ground disturbance along the access route. The motorized trash pump and emergency repair equipment would be transported on the excavator. Once supplies are off-loaded from the horses at the dam site, they would be returned to the staging area outside the wilderness boundary for standby until the demobilization operation begins. If the horses require supplemental feed, wranglers would abide by regulations for weed-free feed. It is estimated to take one 12-hour day to mobilize equipment from the wilderness boundary to the dam site (4.7 miles).

Camping and overnight equipment storage would occur at a Forest Service designated location on-site. All current wilderness regulations would be followed.

## Best Management Practices

- Noxious weed control – all vehicles will be pressure-washed prior to entering the BTNF.
- To prevent the spread of aquatic invasive species, vehicles and equipment will be cleaned, drained, dried, and inspected prior to entering the BTNF.
- Disturbed areas from boring and test pits will be regraded to match the adjacent ground.
- Test pits will be backfilled with the excavated material.

- Topsoil will be segregated during excavation and placed over disturbed ground within the limits of the excavation.
- Wet areas will be avoided when possible. If rutting or other damage occurs along the access route, the ground will be regraded to match the adjacent ground.
- A public information plan will be developed to notify outfitters, hunters and other recreationists of the timing, duration, and expected disturbance during the geotechnical survey.

# Alternatives Considered but Eliminated from Detailed Study

A Minimum Requirements Analysis (MRA) for the proposed geotechnical survey was completed because it would involve use of motorized or mechanized equipment within the Bridger Wilderness. The Wilderness Act prohibits use of motorized or mechanized equipment within wilderness except "…as necessary to meet minimum requirements for the administration of the (wilderness) area for the purpose of this Act".

Silver Lake Dam – Geotechnical Survey MRA analyzed four alternatives (including the proposed action). A fifth alternative was considered, but not further analyzed. The five alternatives include:

**Table 1. Alternatives Analyzed and/or Considered in the MRA**

| Alternative | Reason Brought Forward or Eliminated |
|---|---|
| Tracked Drill Rig and Excavator Driven to Project Site | This alternative was selected through the MRA process and brought forward for analysis in the EA as the proposed action because it fully meets testing requirements as confirmed by the Wyoming SEO and the USFS R4 Regional Dam Engineer. Proposed testing methods are in compliance with the April 2014 Bureau of Reclamation's *Guidelines for Drilling and Sampling in Embankment Dams.* |
| No Action | This alternative would not meet minimum testing requirements and was therefore not selected. |
| Non-motorized/Hand Tool Testing | This alternative would not meet minimum testing requirements and was therefore not selected. |
| Tracked Drill Rig & Excavator Transported by Helicopter | No drill rigs capable of drilling in embankment dams to the required minimum depth were found that could be transported by helicopter at 10,000 feet elevation. This alternative was therefore not selected. |
| Motorized Access During Winter | Accessing the project site by driving tracked equipment over snow during the winter was not analyzed in the MRA because of significant low temperatures (+/- -50° F), variable snow depths and quality, and overall remoteness of the project site. |

Because alternatives were considered in the MRA, including a no action alternative, and only the proposed action (Tracked Drill Rig and Excavator Driven to Project Site, Table 1) was found to fully meet the testing requirements, no other alternatives are considered for detailed study in this EA.

# Environmental Impacts

## Issues

This section includes the issues that have been identified for detailed analysis because the impacts of the proposed action may be related to potential significance or the ability to meet the purpose and need of the project. The following issues were identified through the public scoping process and interdisciplinary (ID) team (see Appendix A); these issues are analyzed to determine the potential for significance:

**Table 2. Scoping and ID Team Issues Identified for Detailed Analysis.**

| Issue | Party |
|---|---|
| Wilderness | ID Team |
| Recreation | ID Team |
| Soils | WGFD, ID Team |
| Wetlands and Waterbodies | WGFD, ID Team |
| Vegetation | WGFD, ID Team |
| Wildlife and Fish | WGFD, ID Team |
| Special Status Species | ID Team |
| Cultural Resources | ID Team |

ID Team – BTNF Silver Lake Geotechnical Survey Interdisciplinary team
WGFD – Wyoming Game and Fish Department

## Impacts

### Proposed Action

This section discloses the environmental impacts of the proposed action.

#### Wilderness and Recreation

The proposed action would take place within the Bridger Wilderness. The Bridger Wilderness is one of the highest used and most complex wilderness areas within the nation, with 75-80 percent of its annual use originating from out-of-state and 3 percent from out of country. Visitor use within the Bridger Wilderness is highest between July and August, moderate from September to October, and low throughout the remainder of the year due to lack of plowed access during the winter. The Wolf Lake/Pocket Creek entrance and Silver Lake receive low use during the summer, and moderate use during the fall hunting season. Wolf Lake Outfitters has a fall Outfitter-guide Assigned Site located at the end of Pocket Creek Road near the wilderness boundary, which is used to access hunting opportunities within this area of the Bridger Wilderness.

The Wilderness Act of 1964 prohibits the use of motorized or mechanized equipment inside congressionally designated wilderness except "…as necessary to meet minimum requirements for the administration of the (wilderness) area for the purpose of this Act". There are no special provisions identified in wilderness legislation for the Bridger Wilderness either through the 1964 Wilderness Act, or subsequent 1984 Wyoming Wilderness Act, that specifically allow for use of motorized or mechanized equipment.

A Minimum Requirements Analysis (MRA) for the proposed geotechnical survey was completed in March of 2020 to evaluate alternatives for conducting this survey within the Bridger Wilderness.

As part of the MRA, valid existing rights and requirements of other legislation were considered. Silver Lake Dam and associated water works have been permitted, operated, and maintained at Silver Lake since 1928, prior to the 1964 Wilderness designation. SLID holds two valid State of Wyoming water rights for irrigation and stock water (Permit #3970 and #5769) and is currently permitted by the Forest Service to operate the dam and maintain the associated structures. Action within Bridger Wilderness is necessary to satisfy these valid existing rights. Furthermore, the dam has been reclassified as a High Hazard Dam and action is necessary to determine the current condition and meet the requirements of the National Dam Safety and Security Action of 2002.

The MRA process also considered whether action is necessary to preserve one or more of the five qualities of wilderness character, including: untrammeled, undeveloped, natural, solitude/primitive/ unconfined, and other features of value. The action is not necessary to preserve any of these five qualities of wilderness character.

Because of the valid existing water rights and requirements of the National Dam Safety and Security Action of 2002, the MRA determined that administrative action in the wilderness is necessary even though the action does not preserve the five qualities of wilderness character. Other direction regarding water supply, dams, and dam safety are provided in the following (see the MRA for details):

- National Dam Safety Program Act of 1996 (33 U.S.C. 467-467j)
- Bridger-Teton NF Land and Resource Management Plan
- Bridger Wilderness Action Plan
- Forest Service Manual (FSM) 2323.43(d) – Existing Water Development Structures (Inside Wilderness)
- FSM 7502 – Objectives
- FSM 7503.1 – Actions Required for Deficient Dams
- FSM 7524 – Review and Approval of Proposed Projects
- Forest Service Handbook (FSH) 2709.11 – Special Use Permit
- Wyoming State Engineers Office W.S.41-3-7 through 41-3-318

### *Direct and Indirect Effects*

The direct and indirect impacts of the proposed action related to the five qualities of wilderness character mentioned above include the following:

- *Untrammeled Quality*: Using motorized equipment inside the wilderness to manipulate existing soil at the dam site is a trammeling action. The existence of the Silver Lake Dam affects the untrammeled quality of the wilderness because the dam results in manipulation of water resources for human benefit. However, a permitted dam and associated structures have existed at Silver Lake since 1928, prior to wilderness designation, so this alternative does not change the long-term Untrammeled Quality.
- *Undeveloped Quality*: The use and presence of a motorized drill rig, excavator, trash pump, and various motorized repair equipment within the wilderness would directly impact the undeveloped

quality of the wilderness. The impact would be short-term (three days) and localized to the project area and access route. The dam itself would remain in place, so the long-term condition of Undeveloped Quality would not change.

- *Natural Quality*: Use of motorized equipment for this project would have a short-term direct negative impact to the natural quality of the wilderness. The transportation of the tracked drill rig and excavator is expected to have a minor direct impact because the equipment is tracked with a ground pressure of 4.5 pounds per square inch (psi) or less. The equipment would only be driven in and out when soil is dry and would only use the previously used route, which is currently used by hikers, horseback riders, and livestock. The access route crosses two creeks within the wilderness (Whiskey Creek and South Fork Silver Creek), which might be dry during the late summer/fall when the equipment would be transported. Approximately 0.5 acres of ground disturbance would occur at the project site, including the dam and borrow area. The excavator would be used to rehabilitate any impacts along the access route, including the stream crossings, helping to mitigate short-term vegetation and soil effects. Impacts to the natural quality would be minor, site specific, and estimated to last one to three years with effective rehabilitation efforts.

- *Solitude/Primitive/Unconfined Quality*: Seeing or hearing motorized equipment for the three-day project period (including transportation of the equipment) would have a negative effect on the wilderness experience relative to remoteness.

- *Other Features of Value*: Other features of value were rated as "not applicable" in the MRA and would not be impacted by the proposed action.

As described above, four wilderness qualities would be directly, negatively impacted by the geotechnical survey. Impacts to the untrammeled quality, undeveloped quality, and solitude/primitive/unconfined quality would be short-term, lasting three days while equipment is within the wilderness. Impacts to the natural quality could last one to three years, depending on how long it takes disturbed soil and vegetation to return to existing condition. The intensity, or severity, of the impacts of the geotechnical survey on the wilderness is low because most of the impact would occur over a three-day period and the project area is expected to return to existing conditions within one to three years. The existing condition includes the permitted dam and associated structures that have existed at Silver Lake since 1928, prior to wilderness designation. SLID holds two valid State of Wyoming water rights for irrigation and stock water and is currently permitted by the Forest Service to operate the dam and maintain the associated structures. The Deputy Regional Forester, through the MRA process, determined that action within Bridger Wilderness is necessary to satisfy these valid existing rights.

The proposed action would have a direct, negative effect on recreation in the wilderness, including outfitter-guide operations. The expectation of solitude while in the Wilderness would not be met for recreation users within earshot of the proposed action for the short period of the project duration. Effects on recreation users, such as hikers, hunters, and outfitter-guides, would be minimized through a public information effort to inform users of the project, including the timing, duration and expected disturbances.

Brook trout were stocked in 1926 (the year the original dam was constructed) and continue to provide a popular fishery. The proposed action would not directly affect the fishery, but the fishing experience during the three-day project would indirectly affect the fishing experience due to the noise and activity. Effects would be minimized through a public information effort to inform anglers of the project, including the timing and duration of the project and the expected disturbances.

### *Cumulative Impacts*

Cumulative impacts are those impacts on the environment that result from the incremental impact of the proposed action when added to other past, present, and reasonably foreseeable future actions. Relevant past actions include the original construction of Silver Lake Dam in 1928 and the associated Special Use Permit granted by the Forest Service to Silver Lake Reservoir Company (now SLID), the reconstruction of the dam in 1953, and the designation of the Bridger Wilderness in 1964, which encompassed Silver Lake Dam. Current actions include recreational use of the project area, primarily by hikers, hunters, and anglers. A reasonably foreseeable future action is work on Silver Lake Dam. Data gathered from the proposed geotechnical survey would be used to determine viable options for Silver Lake Dam, which could include rehabilitation/reconstruction, intensive maintenance, or a controlled breach, if conditions or costs for reconstruction/rehabilitation are found to be prohibitive.

Some impacts to the Bridger Wilderness and associated recreation from the geotechnical survey and present and likely future action at the dam would not be cumulative, occurring at the time and place of the action. For example, impacts to untrammeled quality, undeveloped quality, and solitude/primitive/unconfined quality. Impacts to the natural quality of the wilderness have the potential to be cumulative, for example rutting or soil compaction from large equipment could be additive. Similarly, the disturbed areas from the geotechnical investigation would be additive to the disturbed area resulting from the future work on the Silver Lake Dam. While disturbance from both the geotechnical investigation and the future work on the dam would be rehabilitated, the disturbed areas may remain noticeable for several to many years because natural reseeding is a slow process at high elevation and dependent upon climatic conditions. Therefore, there would be a slight impact to the natural quality of the wilderness in this area for years, but it would eventually return to previous conditions.

### *Forest Plan Compliance*

These effects would occur within Bridger-Teton National Forest Land & Resource Management Plan Desired Condition Class 6C. Applicable wilderness resource management prescriptions, standards, and guidelines include:

> Recreation Prescription: The primary management strategy is to use the minimum amount of tools, equipment, or structures needed to accomplish site-specific work and those that least degrade wilderness values.
>
> Non-Recreation Special-Use Permit Standard: No additional non-recreation special –use permits wil be authorized and existing permits will be phased out unless they are specifically provided for in law or regulation.
>
> Facilities Prescription: Facilities are kept to a minimum and removed from the Wilderness when no longer needed.
>
> Management Prescription 6C: Management emphasis in Wilderness is to provide for the protection and perpetuation of essentially natural biophysical conditions. Solitude, a low level of encounters with other users, and little evidence of past use are important.

The proposed project would comply with Forest Plan and Bridger Wilderness Action Plan direction. The dam is a previously permitted structure with State water rights and is considered necessary for continuation of agricultural water for the Silver Lake Irrigation District, and the proposed action was analyzed and selected as the minimum tool for meeting geotechnical testing parameters.

## Soils

### *Direct and Indirect Effects*

Direct negative effects of the proposed action on soils include the potential for compaction and erosion due to the heavy equipment used to drill the core samples in the dam and excavate test pits at potential borrow material locations and the transport of the equipment to and from the project site. Less than 0.5 acres of direct soil disturbance would occur at the dam and borrow areas due to core sampling and test pits.

The proposed action includes several features to minimize negative impacts to soils. Both the drill rig and excavator would be tracked, with a ground pressure of 4.5 pounds per square inch (psi) or less to minimize soil compaction on route to/from the project area. The geotechnical survey would take place in late summer or early fall when soil moisture levels are lowest, which minimizes soil compaction, rutting, and disturbance from driving the equipment to the site and operating the equipment. In the wilderness, the two tracked vehicles and approximately 11 horses used to transport equipment and personnel travelling on foot would use the previously used-route (except when avoiding wetlands – see Waterbodies and Wetlands section), which is currently used by hikers, horseback riders, and livestock, to avoid new areas of soil compaction and rutting. The four bore holes would be backfilled with grout to preserve the structural quality of the dam, and the ten test pits would be refilled with the same soil that was removed at each test pit and re-contoured to Forest Service specifications. Topsoil would be segregated during excavation and placed over disturbed ground within the limits of the excavation. The excavator would be used to rehabilitate any impacts along the access route, as needed to mitigate soil compaction impacts.

The intensity, or severity, of the impacts of the geotechnical survey on soils is low because of the project features that minimize soil impact and the short-term nature of most of the impacts, which would occur primarily over a three-day period.

### *Cumulative Impacts*

The cumulative impacts to soils of the proposed action when added to past actions (the original construction of the dam in 1928 and the reconstruction in 1953) and present actions (recreational use of the access route by hikers and horseback riders and livestock use) are related to soil compaction and rutting along the access route and in the project area around the lake. Additional compaction and rutting could occur from the reasonably foreseeable future action of some type of work on the dam.

As shown in Photos 4 and 5, some ruts are visible along the access route from past and present actions. Portions of the access route currently have the appearance of a moderately used horse/hiker trail, intermixed with braided cow trails. The proposed action would use the same route as previous actions that caused visible rutting, but the incremental impact of the proposed action would be minimized because of the use of tracked vehicles for the heavy equipment and the timing of the project when the soil would be dry and not as susceptible to rutting as wet soil. The use of up to 11 horses for the transport of gear and supplies and personnel travelling on-foot, however, would add incrementally to the rutting caused by other horses and hikers that use the route presently. Although the excavator would be used to rehabilitate impacts along the access route, as needed, to mitigate soil compaction impacts from past and present actions including the proposed action, these same areas could be impacted again in the reasonably

foreseeable future for some type of work on the dam, i.e., rehabilitation/reconstruction, intensive maintenance, or a controlled breach.

Past actions that impacted/disturbed soil at the project area at the lake include the original and most recent dam construction in 1953 and the use of borrow material from the area southwest and adjacent to the dam for the construction (Figure 1). Compared to that project, the soil disturbance for the geotechnical survey is minimal and two of the test pits would be in the previously used borrow area, minimizing new soil disturbance.

## Wetlands and Waterbodies

An aquatic resource inventory was conducted within the project boundary shown in Figure 1. The project boundary includes the access route within the Bridger Wilderness and the area where geotechnical survey activities would occur. Aquatic resources refer to waterbodies and wetlands regulated under the Clean Water Act.

Twenty wetlands, seven open waters (i.e., lake or pond), and nine streams were identified and delineated within the project boundary. Seven wetlands were identified along the shoreline of Silver Lake; one was identified below the existing dam; and twelve were identified along the proposed access route. Two types of wetlands were found: palustrine scrub-shrub and palustrine emergent. Open waters include Silver Lake, along with four other ponds within the original water level, and two ponds along the proposed access route. Streams include four unnamed tributaries to Silver Lake, North Fork Silver Creek, South Fork Silver Creek, Whiskey Creek, an unnamed tributary to Whiskey Creek, and an unnamed tributary to Cottonwood Creek. A portion of South Fork Silver Creek has been altered to serve as an overflow spillway. Figures 4 a– d show the wetlands and waterbodies that could be affected by the proposed action; the aquatic resource inventory includes all mapped features. The Wyoming Department of Environmental Quality, Water Quality Division, classifies all surface waters located within the boundaries of congressionally designated wilderness as Class 1.

### *Direct and Indirect Effects*

#### Wetlands

The original access route within the Wilderness avoids all but four of the twelve wetlands along the access route. As can be seen on Google Earth, where the access route enters the Wilderness, it passes through the edge of two of these four wetlands (Figure 5). It is likely that by the end of the summer or early fall, the access route in these areas would be dry. If not, the project equipment would divert from the route to the north and avoid these wetlands. The access route crosses a third wetland approximately 1/3 mile southwest of Whiskey Creek. As can be seen on Google Earth, the road crosses less than 30 feet of this wetland and the terrain appears rocky (Figure 6). It is likely that the two tracked vehicles and the horses and hikers could cross this wetland with no or minimal impact in the late summer/early fall. The fourth wetland crossed by the access route is on the south side of Whiskey Creek. A Google Earth image from June 28, 2014 shows the route passing though standing water, but images from July 4, 2009 and July 10, 2006, both show the area as dry (Figures 7 a-c). Because this area appears dry by July, it is likely to be dry in late summer and early fall and the wetland is less than 15 feet where the road crosses, therefore, wetland impacts are unlikely.

When the equipment reaches Silver Lake, it would turn west toward the dam. Core samples and test pits would take place at the locations indicated in Figures 2 and 3. Four core samples would be taken at the

dam, and ten test pits would be excavated at the previously used borrow area and along the south shore of the lake. None of this work would take place in any of the delineated wetlands. The project engineer onsite would have a map of the delineated wetlands and would micro-site the test locations to avoid wetlands if needed.

Most wetlands would be avoided by the equipment used for the proposed action and therefore not be directly impacted, except for two that would be crossed by equipment enroute to the project area. Because of the timing of the project, these wetlands would likely be dry and the intensity of impact would be minimal. The heavy equipment would be tracked, minimizing the ground pressure when crossing these areas. A permit from the U.S. Army Corps of Engineers is not needed for wetlands because none will be dredged or filled. If conditions are unexpectedly wet due to rain or snow, extra care will be taken to avoid track pivoting and associated rutting/disturbance. Laying mats down for crossings that are unexpectedly wet would not add additional protection because of the already low ground pressures associated with the tracked vehicles.

### Waterbodies

The project equipment, horses, and personnel would enter the BTNF on Pocket Creek Road (see Figure 1). This road follows an intermittent tributary of Pocket Creek (according to the USGS topographic map – Pocket Creek Lake quadrangle) for approximately one mile and crosses Cottonwood Creek before it enters the Bridger Wilderness. Project engineers have been on this road and no issues are anticipated with the equipment passage on this road. No direct impacts to waterbodies are anticipated.

When the road enters the Bridger Wilderness, it crosses an unnamed intermittent tributary to Cottonwood Creek (Figure 4f), perennial Whiskey Creek and an unnamed intermittent tributary (Figure 4e), and South Fork Silver Creek where it exits Jessie Lake (Figure 4c). The Raid Lake USGS topographic map shows South Fork Silver Creek as perennial, but the aquatic resource inventory report indicated it is intermittent. Google Earth images (Figures 7 a-c) show the Whiskey Creek crossing, which appears shallow and narrow. Based on the July images (Figures 7b and 7c), the crossing could be nearly dry in late summer or early fall. Similarly, the South Fork Silver Creek could be dry in late summer or early fall, as indicated by a July 4, 2009, Google Earth image (Figure 8). The project engineers describe both of these crossings as sandy or granular in nature; disturbance of sandy and/or rocky crossings would cause minimal siltation compared to other types of substrate. Crossing Whiskey Creek and South Fork Silver Creek with two tracked vehicles could cause localized sedimentation when the vehicles pass if water is present, but this direct impact would be temporary and minor. When the equipment is leaving the project site, the excavator would be used to rehabilitate the access route, including waterbody crossings, as needed per Forest Service specifications, including areas where minor erosion has been identified from the 1953 motorized access. The U.S. Army Corps of Engineers has indicated that a permit is not required for these waterbody crossings.

When the equipment reaches Silver Lake, the drill rig would be used on the dam to drill four core samples (see Figure 2). The dam is located on North Fork Silver Creek and the U.S. Army Corps of Engineers has indicated a permit is needed for this work. SLID is in the process of securing the permit. The excavator would be used to excavate eight test pits between the high and low water marks of Silver Lake along the south and southwestern shore of the lake (see Figure 3). Excavations would only take place above the current water level on dry ground, but below the high-water mark. This area would be dry and exposed during excavation and the project engineer would be onsite to ensure no excavated material is placed in Silver Lake. Excavation of the test pits would have no direct impacts to Silver Lake. Because this work would take place below the ordinary high-water mark where the U.S. Army Corps of Engineers has jurisdiction, a permit is needed for this work and SLID is in the process of securing the permit.

Excavated material would be replaced in the pits once the samples are secured and the area would be re-contoured. When Silver Lake is refilled to the high water mark the following spring, the test pits would not be evident. Prior to leaving, the excavator would be used to rehabilitate the project site as needed per Forest Service specifications.

Overall, the intensity of impact to waterbodies would be temporary and minor because of the timing of the project when conditions are likely to be dry or, if not dry, streams are likely to be at annual low water levels. If water is not present, impacts such as sedimentation would not occur due to project equipment and activity; otherwise impacts would be temporary and minor. Furthermore, the excavator would be used to re-grade areas if needed to minimize impact.

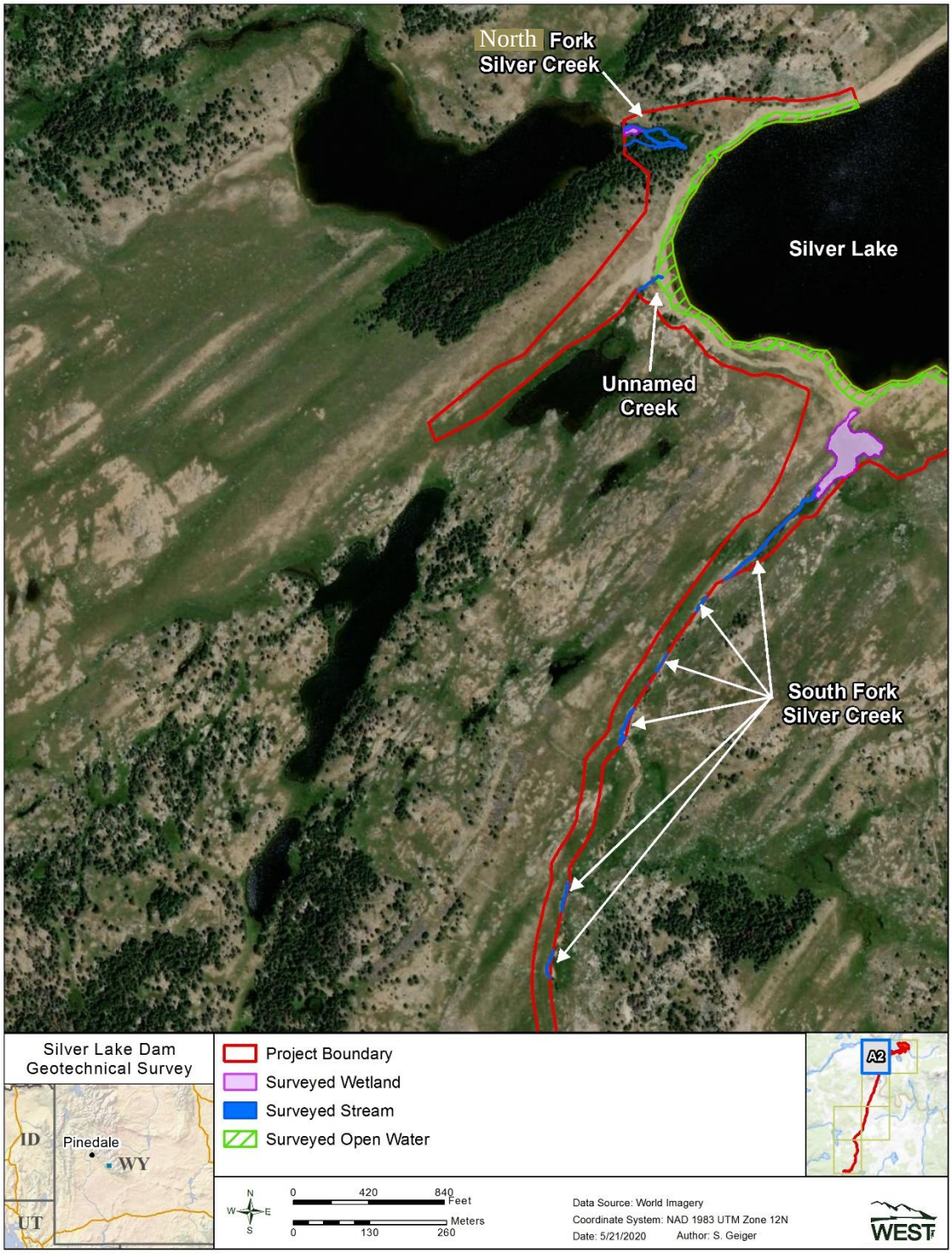


**Figure 4a. Wetlands and Waterbodies in the Project Boundary (1 of 4).**


**Figure 4b. Wetlands and Waterbodies in the Project Boundary (2 of 4)**


**Figure 4c. Wetlands and Waterbodies in the Project Boundary (3 of 4).**

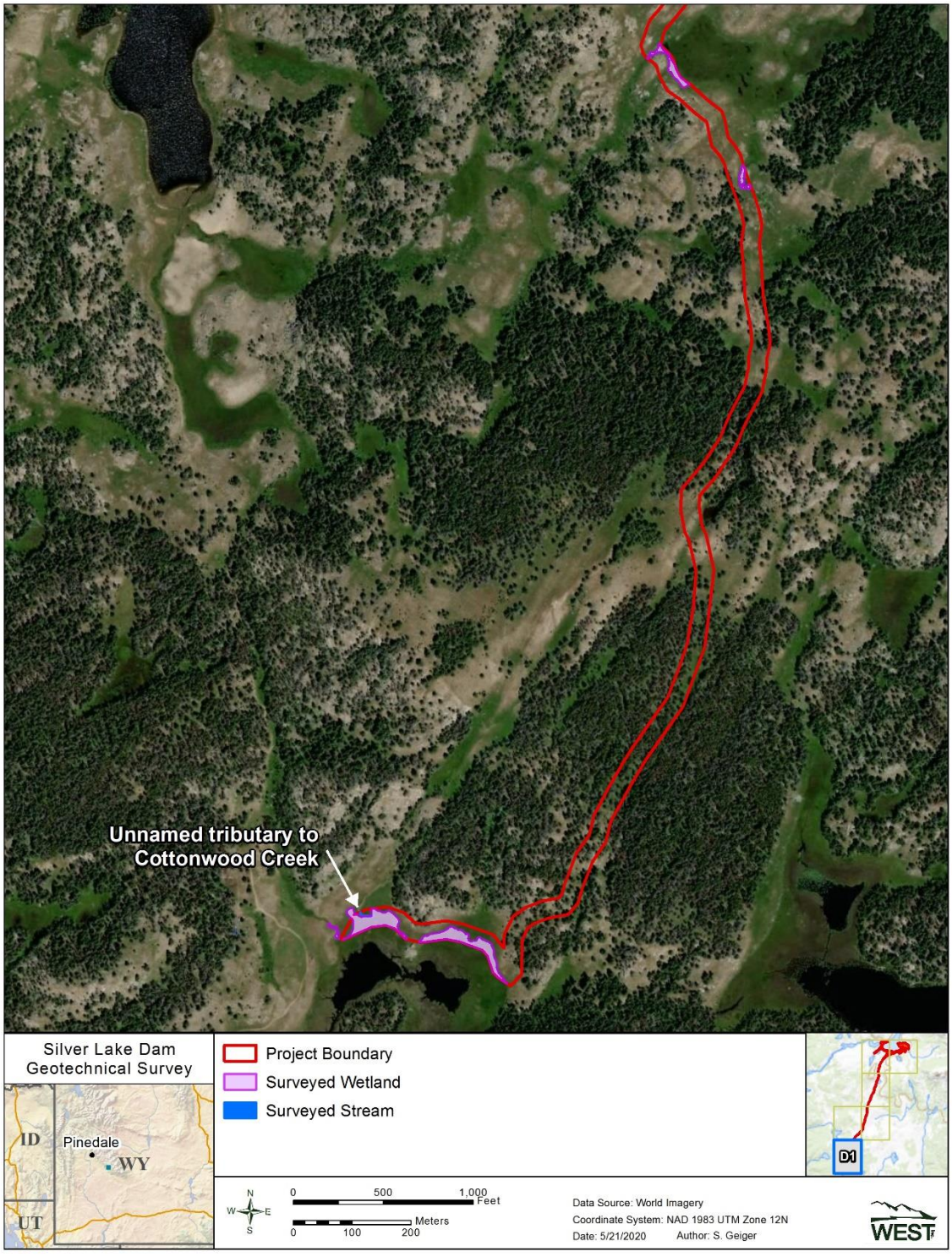


**Figure 4d. Wetlands and Waterbodies in the Project Boundary (4 of 4).**

*Note: in the following Google Earth images, the access route corridor is depicted by the red lines and the delineated wetlands within the corridor are shown in light purple. The original access route can often be seen faintly in these images.*

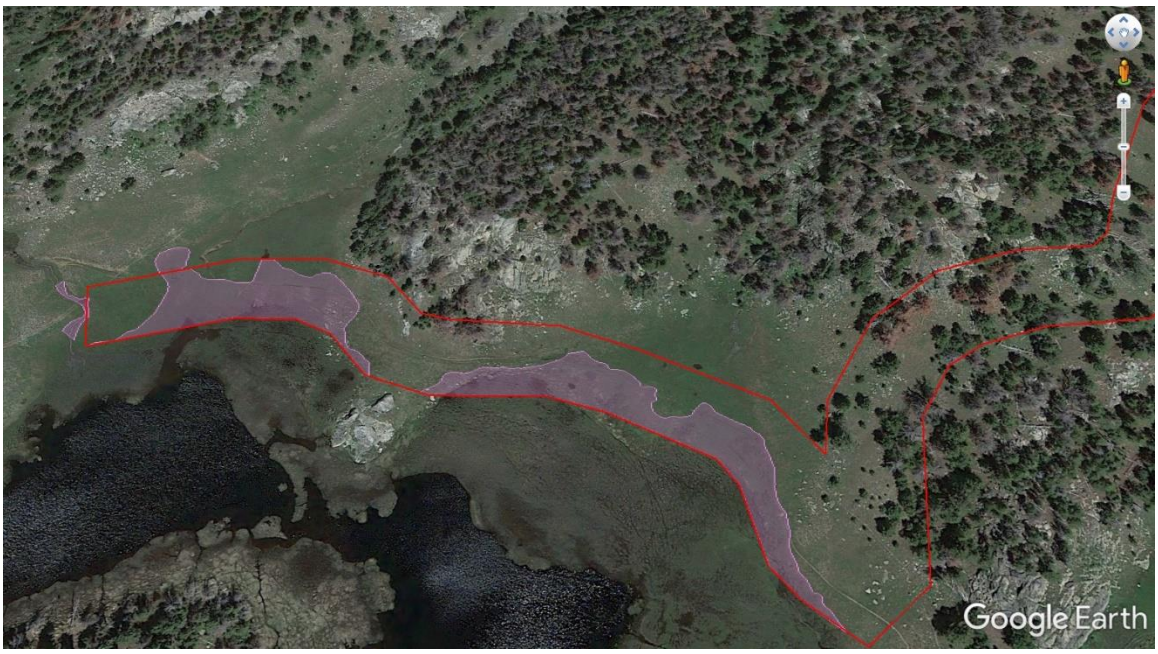


**Figure 5. Google Earth image showing access route passing through two wetlands near the Wilderness boundary and the opportunity to avoid the wetlands if necessary to the north.**


**Figure 6. Google Earth image showing the short crossing of a wetland approximately 1/3 mile southwest of Whiskey Creek and the associated rocky terrain.**


**Figure 7a. Wetland on the south side of Whiskey Creek; image date is June 28, 2014.**

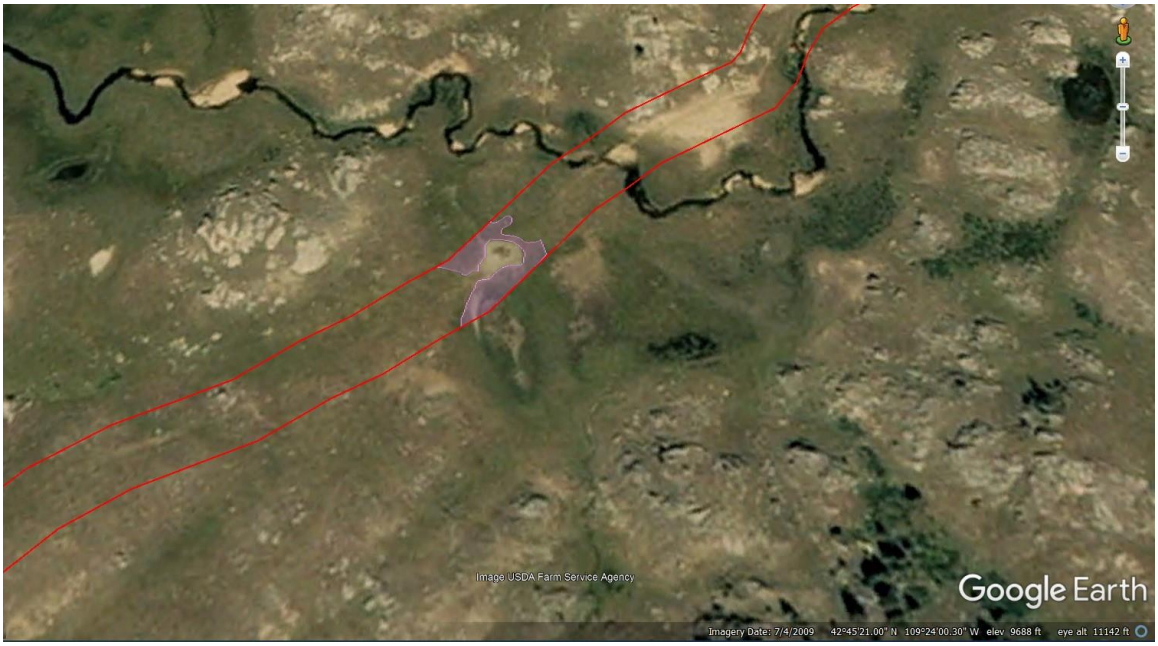


**Figure 7b. Wetland on the south side of Whiskey Creek; image date is July 4, 2009.**

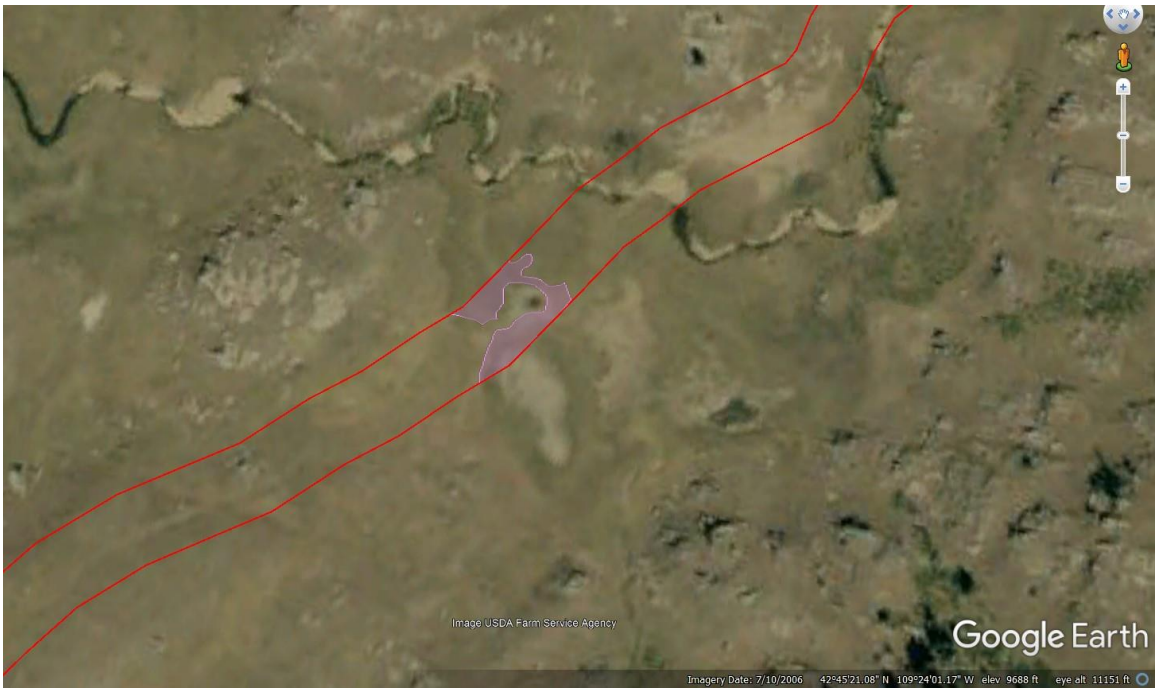


**Figure 7c. Wetland on the south side of Whiskey Creek; image date is July 10, 2006.**

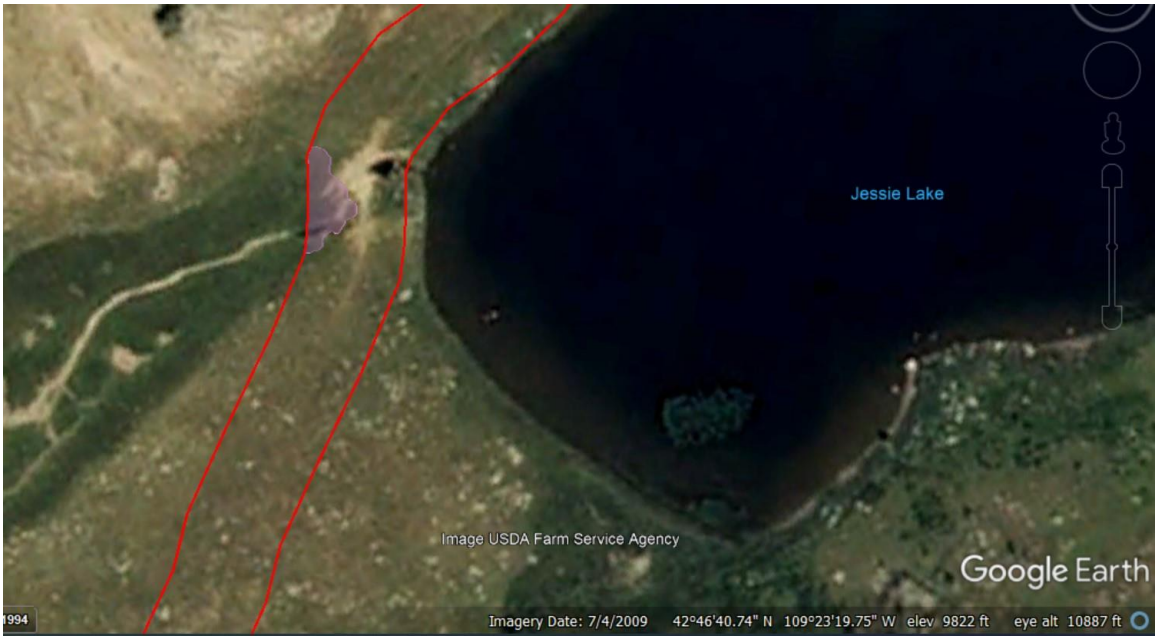


**Figure 8. South Fork Silver Creek where it exits Jessie Lake and crosses the access route; image date is July 10, 2006.**

### *Cumulative Impacts*

Past dam construction in 1928 and reconstruction 1953 changed the natural condition of Silver Lake and any adjacent wetlands at the time. The 1964 designation of the Bridger Wilderness set aside the area for preservation and protection in its natural condition, including wetlands and waterbodies. The proposed action would generally avoid wetlands and waterbodies or cause temporary and minor impact due to the dry time of year. Other present actions, such as recreational use of the project area, also minimally impact these resources. Past and present actions have resulted in a route, as described in the Project Access section, that passes by and through wetlands. Because of the Wilderness designation, administrative actions are rare and human use is relatively low compared to use of other public lands that are not designated Wilderness, therefore the cumulative impacts to wetlands and waterbodies are expected to be minor.

The reasonably foreseeable action of some type of work on the dam, such as rehabilitation/reconstruction, intensive maintenance, or a controlled breach has the potential to affect wetlands and other waterbodies. However, the cumulative effect of the proposed action on wetlands and waterbodies, when added to the effect of future work on the dam, would be minimal/minor because the proposed action would have minimal/minor effects.

## Vegetation

### *Direct and Indirect Effects*

Direct effects of the proposed action on vegetation are removal of vegetation during excavation of test pits and trampling or crushing of vegetation by project equipment, supplies, horses, and personnel. Since eight of the ten test pits would be located between the high and low water marks of Silver Lake, vegetation impacts are expected to be minimal at these sites since they are minimally vegetated because they are under water for much of the growing season (Photos 6a & 6b). Vegetation would be removed during excavation of the two test pits at the previously used borrow area (Figure 1). Each test pit would be approximately 4 feet wide by 20 feet in length (80 square feet), so impact to vegetation would be minor (160 square feet total). Vegetation adjacent to the pits would be temporarily buried by the material excavated from the test pits; this material would be used to refill the pits once samples are secured. Topsoil would be segregated during excavation and placed over disturbed ground within the limits of the excavation. The excavator would be used to re-contour the test pits when sampling is complete but re-seeding would not be done due to risk of introduction of weed seed. Over time, these areas would be naturally reseeded from adjacent vegetation.

Other vegetation, primarily grasses and forbs but also some shrubs and trees, would be trampled or crushed by use of equipment at the project site, staging of gear and supplies, and camping. Some trampling or crushing of vegetation could also occur when equipment, horses, and personnel on-foot are enroute to and from the project site. The access route is vegetated except for a single track in most locations and multiple trail braiding in some sections. Trampling or crushing of vegetation is a temporary impact and most will spring back when the equipment and personnel leave. Horses would be used to transport gear and supplies, but once supplies are off-loaded from the horses at the project site, they would be returned to the staging area outside the wilderness boundary for standby until the demobilization operation begins. This minimizes the effect of 11 horses trampling and eating vegetation within the wilderness.

An indirect effect to vegetation from the proposed action could be the introduction and/or spread of noxious weeds. The proposed action includes best management practices to minimize the potential of

introducing noxious weeds, such as cleaning all equipment and supplies prior to entry into the wilderness, but even with pressure-washing equipment a slight risk of weed introduction is still present.

**Photo 6a. South shore of Silver Lake September 2019**

**Photo 6b. South shore of Silver Lake September 2019**

### *Cumulative Impacts*

The past actions associated with dam construction in 1928 and reconstruction in 1953 would have had similar impacts to vegetation as the proposed action, plus a long-term change to vegetation at the reservoir itself. The 1964 Bridger Wilderness designation set aside the area for preservation and protection in its natural condition, including vegetation. The proposal includes temporary vegetation removal, crushing, and a risk of weed introduction. Other present actions, such as recreational use of the Wilderness including the project area, might also impact vegetation, by trampling, crushing, and the introduction of noxious weeds. Because of the Wilderness designation, administrative actions are rare and human use is relatively low compared to use of other public lands that are not designated wilderness, therefore the cumulative impact to vegetation is minor. However, if weeds are introduced and spread the cumulative impact would be greater.

The reasonably foreseeable action of some type of work on the dam, such as rehabilitation/reconstruction, intensive maintenance, or a controlled breach has the potential to affect vegetation. However, the cumulative effect of the proposed action on vegetation, when added to the effects from future work on the dam would be minimal because the proposed action would have minimal effects.

## Fish and Wildlife

Based on input provided during the scoping process (see Appendix A), the primary wildlife concerns are related to fish and amphibians. According to the Wyoming Game and Fish Department (WGFD) in their April 14, 2020 comment letter, Silver Lake is an important and popular recreational lake. Brook trout were stocked in 1926 (the year the original dam was constructed) and continue to provide a popular fishery. Brook trout were observed in Silver Lake and several perennial streams along the access route during the 2019 biological resource inventory for special status species for the proposed project. Any effects to the brook trout fishery are disclosed in the recreation section. Silver Creek is one of the few streams in the region that supports a population of flannelmouth suckers. Juvenile suckers were found in this drainage in 2006. Other native fish species found in Silver Creek include mottled sculpin and mountain sucker.

The flannelmouth sucker is a species of concern, according to the Wyoming Natural Diversity Database (WYNDD), and a species of greatest conservation need according to WGFD. It is considered regionally vulnerable and vulnerable to apparently secure globally according to Heritage Rankings by NatureServe and reported in WYNDD (WYNDD 2020).

Amphibians have been found during various inventories in nearby watersheds (Zumpf et al. 2014). No field work was conducted specifically looking for amphibians for this project, so their presence is assumed.

### *Direct and Indirect Effects*

The proposed action is expected to have few and minor direct and indirect impacts to fish or wildlife. The core sampling would occur on the dam embankment and not affect fish or their habitat. Similarly, two of the ten test pit excavations (those in the previously used borrow area) would not occur in any aquatic habitat and therefore not affect fish or amphibians. The other eight test pit excavations would occur on the south and southwest shore of Silver Lake between the high and low water marks (Figure 3). As shown in Photos 6a and 6b, these excavations would not directly affect the lake, nor the fish that inhabit the lake.

At the time of year the geotechnical survey would take place (late summer or early fall), it is possible that amphibians that are present at Silver Lake would have begun to hibernate. Aquatic frogs, for example, that typically hibernate under water (Emmer 1997) would not be affected by the project. Terrestrial

species usually burrow below the frost line in burrows or cavities during hibernation and could be present along the shoreline. Individuals that occur along the shoreline during the test pit excavations could be directly impacted due to pit excavation or the tracked equipment as it moves along the shoreline or near wetlands enroute to the project site. Risk to individual amphibians from pit excavation itself is low because less than 0.02 acre would be disturbed (each test pit would be 80 square feet, so eight pits would affect 640 square feet of shoreline). Movement of equipment could cause direct impacts, including mortality, if individuals are unable to move out of the way of equipment. Indirect effects include modification to habitat due to soil compaction.

Wildlife that are likely to occur in the project area, including some mammals, birds, and amphibians, may avoid the project area during the geotechnical survey due to the noise of the machinery and associated activity. However, this avoidance would be temporary and short-lived, as the project is proposed to last approximately three days.

Fish and other aquatic species in the two perennial streams (Whiskey Creek and South Fork Silver Creek) that would be crossed by equipment coming to and from the project site are unlikely to be impacted. Equipment would be crossing at a time of year when water levels are likely to be low and stream impacts would be minimized. Fish would likely avoid the crossing areas due to the noise, vibration, and activity, including the flannelmouth sucker, which are known to occur in Silver Creek. Direct negative impacts are unlikely.

Due to the equipment crossing two perennial streams (Whiskey Creek and South Fork Creek), the contractors conducting the work will be informed to abide by state statute and Wyoming Game and Fish Commission regulations to prevent the spread of aquatic invasive species. They would use best management practices that include cleaning, draining, drying, and inspection of equipment prior to entering a Wyoming water.

### *Cumulative Impacts*

The cumulative impacts of the proposed action on wildlife would be minimal. Past actions associated with the original construction of the dam in 1920s and reconstruction of the dam in the 1950's temporarily disrupted wildlife. The 1964 designation of the Bridger Wilderness set aside the area for preservation and protection in its natural condition, which provides a protected area for wildlife. The proposed action would be a temporary disruption to wildlife that inhabit the Wilderness. Other present actions also cause temporary disruption, such as recreation use, particularly hunting. A reasonably foreseeable future action is some type of work on Silver Lake Dam. Data gathered from the proposed geotechnical survey would be used to determine viable options for Silver Lake Dam, which could include rehabilitation/reconstruction, intensive maintenance, or a controlled breach, if conditions or costs for reconstruction/rehabilitation are found to be prohibitive. This would be another temporary disruption to wildlife, but separate in time from the proposed action impact.

## Special Status Species

Special status species includes those listed as threatened, endangered, or proposed for listing under the Endangered Species Act and those listed as Regional Sensitive Species by the Forest Service. Designated critical habitat is also evaluated. Migratory birds protected under the Migratory Bird Treaty Act and the Bald and Golden Eagle Protection Act are also considered.

The project area is within the Upper Colorado River Basin, which is within the area of influence for four endangered fish: humpback chub, bonytail chub, Colorado pikeminnow, and razorback sucker. Formal interagency consultation under Section 7 of the Endangered Species Act is required for projects that may

lead to depletions of water from any system that is a tributary to the Colorado River. Silver Creek is a tributary to the Colorado River, however, this project would have no depletion in flow and have no effect on the Colorado River endangered fish species and their critical habitat.

Colorado River cutthroat trout are native to the Green River basin, but Silver Lake and its drainages are not within their historically identified range (Hirsch et al. 2013), therefore no direct or indirect impacts are anticipated.

A biological resource inventory was conducted in September 2019 (Appendix B). For plants, only those identifiable at the time of the survey (nine species) were searched for and recorded. For wildlife species, visual and audial observations were recorded incidentally.

### *Direct and Indirect Effects*

Determinations of effect for special status species are based on the Endangered Species Act and the BTNF Plan. Effects of the proposed action on special status species are summarized in Table 3. The codes used in Table 3 are defined as follows:

*Federally Listed Species:*
**NE*** - No Effect
**NLAA** - Not Likely to Adversely Affect
**LAA** - Likely to Adversely Affect

*Proposed Species*:
**NE*** - No Effect
**NLJ** - Not likely to jeopardize continued existence or adversely modify proposed critical habitat
**LJ** - Likely to jeopardize continued existence or adversely modify proposed critical habitat

*Forest Service Sensitive Species:*
**NI *** - No Impact
**MI**- May impact individuals but is not likely to cause a trend to federal listing or loss of viability across the forest
**LI -** Likely to result in a trend to federal listing or loss of viability across the forest
**BE -** Beneficial Effect

*Migratory Birds:*
**NI*** - No Impact
**MINA** - May impact individuals but will not affect the population across the forest
**MA** - May affect the population across the forest

***Criteria for 'No Effect' and 'No Impact'**

Assessments made in this worksheet, with respect to wildlife, fish, and plants, were done in consideration of available information on species distributions and habitat using one or more of the following: topo maps, GIS coverages, Wyoming Natural Diversity Database, aerial photos, field reconnaissance, previous surveys, as well as published scientific information. If the project was determined to have **no effect** or **no impact,** this determination was based on one or more of these following criteria:

1. The species is not known to occur in the District and/or it is unlikely to occur in or near the project area.
2. Habitat for the species is not present in the project area.
3. Habitat for the species is present, but the species is rare in the area, at low-densities, and/or only incidentally occurs; and the project would not have any direct, indirect, or cumulative effects on this species.
4. Habitat for the species is present, the species occurs or may occur in the project area, but the project would not have any direct, indirect, or cumulative effects on this species.
5. Current survey was negative for plant and habitat (Botanical Resources)

## Forest Plan Direction

Effects on Ability to Meet Forest Plan Direction
**BI** - Potential Beneficial Impact
**NI** - No Impact or Neutral (no discernable positive or negative effect)
**PI** - Potential Negative Impact, but not enough to measurably or substantially detract from meeting Forest Plan Goals, Objectives, and Standards
**SI** - Potentially Substantial Negative Impact on the ability to meet Forest Plan Goals, Objectives, and Standards

**Table 3. Special Status Species Determinations**

| Species (Updated Dec 2018) | Status | Determination | NE/NI Criteria | | Forest Plan Direction | Comments if Needed |
|---|---|---|---|---|---|---|
| Grizzly Bear *(Ursus arctos horribilis)* | T | NE | 3 | | NI | |
| Canada Lynx *(Lynx Canadensis)* | T | NE | 1 | | NI | |
| Lynx Critical Habitat | Desig. | NE | 2 | | NI | Not in designated critical habitat |
| Yellow-billed Cuckoo *(Coccyzus americanus)* | T | NE | 1 | | NI | |
| Yellow-billed Cuckoo-- Critical Habitat | Desig. | NE | 2 | | NI | Not in designated critical habitat |
| North American Wolverine *(Gulo gulo luscus)* | P | NE | 3 | | NI | |
| Common Loon *(Gavia immer)* | S | MI | | | NI | Individuals could occur in the project area |
| Trumpeter Swan *(Cygnus buccinator)* | S | MI | | | NI | Individuals could occur in the project area |
| Harlequin Duck *(Histrionicus histrionicus)* | S | NI | | 4 | NI | |
| Bald Eagle *(Haliaeetus leucocephalus)* | S | MI | | | NI | Observed during biological resource inventory effort |
| Northern Goshawk *(Accipiter gentilis)* | S | MI | | | NI | Individuals could occur in the project area |
| Peregrine Falcon *(Falco peregrinus)* | S | NI | | 4 | NI | |
| Greater Sage Grouse *(Centrocercus urophasianus)* | S | NI | | 2 | NI | |
| Flammulated Owl *(Psiloscops flammeolus)* | S | MI | | | NI | Individuals could occur in the project area |
| Great Gray Owl *(Strix nebulosa)* | S | MI | | | NI | Individuals could occur in the project area |

| | | | | | | |
|---|---|---|---|---|---|---|
| Boreal Owl *(Aegolius funereus)* | S | MI | | | NI | Individuals could occur in the project area |
| N. Three-toed Woodpecker *(Picoides dorsalis)* | S | MI | | | NI | Individuals could occur in the project area |
| Migratory birds | - | MINA | | | | No direct effects on migratory birds |
| Bighorn Sheep *(Ovis Canadensis)* | S | NI | | 4 | NI | |
| Fisher *(Pekania pennanti)* | S | NI | | 4 | NI | |
| Spotted Bat *(Euderma maculatum)* | S | MI | | | NI | Individuals could occur in the project area |
| Townsend's Big-Eared Bat *(Corynorhinus townsendii)* | S | NI | | 4 | NI | |
| Columbian Spotted Frog *(Rana luteiventris)* | S | MI | | | NI | Individuals could occur in the project area |
| Western Toad *(Anaxyrus boreas)* formerly Boreal Toad *(Bufo boreas)* | S | MI | | | NI | Individuals could occur in the project area |
| Kendall Warm Springs dace (*Rhinichthys osculus*) | E | NE | 2 | | | |
| Colorado River Cutthroat Trout (*Oncorhynchus clarki pleuriticus*) | S | NI | | 4 | NI | |
| Bonneville Cutthroat Trout (*Oncorhynchus clarki utah*) | S | NI | | 2 | NI | |
| Yellowstone Cutthroat Trout (*Oncorhynchus clarki bouvieri*) | S | NI | | 1 | NI | |
| Northern Leatherside (*Lepidomeda copei*) | S | NI | | 1 | NI | |
| Bonytail chub (*Gila elegans*) | E | NE | 1 | | | |
| Humpback chub (*Gila cypha*) | E | NE | 1 | | | |
| Colorado pike minnow (*Ptychocheilus lucius*) | E | NE | 1 | | | |
| Razorback sucker (*Xyrauchen texanus*) | E | NE | 1 | | | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Pallid sturgeon (*Scaphirhynchus albus*) | E | NE | 1 | | | |
| Flannelmouth sucker | SGCC | MI | | | | Individuals could occur in the project area |
| Pink Agoseris (*Agoseris lackschewitzii*) | S | NI | | 4 | NI | |
| Sweet-flowered rock jasmine (*Androsace chamaejasme ssp. Carinata*) | S | NI | | 1 | NI | |
| Meadow Milkvetch (*Astragalus diversifolius var. diversifo*lius) | S | NI | | 2 | NI | |
| Starveling Milkvetch (*Astragalus jejunus var. jejunus*) | S | NI | | 2 | NI | |
| Payson's Milkvetch (*Astragalus paysonii*) | S | NI | | 2 | NI | |
| Scalloped moonwort (*Botrychium crenulatum*) | S | NI | | 5 | NI | |
| Peculiar moonwort (*Botrychium paradoxum*) | S | NI | | 1 | NI | |
| Seaside Sedge (*Carex incurviformis*) | S | NI | | 4 | NI | |
| Black and Purple Sedge (*Carex luzulina var. atropurpurea*) | S | NI | | 5 | NI | |
| Wyoming tansymustard (*Descurainia incana spp. incana*) | S | NI | | 2 | NI | |
| Rockcress Draba (*Draba densifolia var. apiculata*) | S | NI | | 4 | NI | |
| Narrowleaf Goldenweed (*Ericameria discoidea var. linearis*) | S | NI | | 4 | NI | |
| Wooly daisy (*Erigeron lanatus*) | S | NI | | 2 | NI | |
| Payson's Bladderpod (*Lesquerella paysonii*) | S | NI | | 5 | NI | |
| Threerank humpmoss (*Meesia triquetra*) | S | NI | | 4 | NI | |
| Naked-stemmed Parrya (*Parrya nudicaulis*) | S | NI | | 2 | NI | |
| Creeping Twinpod (*Physaria integrifolia var. monticola*) | S | NI | | 2 | NI | |

| | | | | | | |
|---|---|---|---|---|---|---|
| Whitebark Pine (*Pinus albicaulis*) | S | NI | | 5 | NI | |
| Greenland Primrose (*Primula egaliksensis*) | S | NI | | 4 | NI | |
| Weber's Saussurea (*Saussurea weberi*) | S | NI | | 5 | NI | |
| Soft Aster (*Symphyotrichum molle*) | S | NI | | 2 | NI | |

The special status species listed above (Table 4) with a "MI" or "May Impact" determination include birds, a bat, two amphibians, and one fish. The geotechnical survey would take place after the nesting season for birds. If individual birds are present at Silver Lake during the proposed activity, they might be temporarily displaced and avoid the disturbance and move to other nearby similar habitat for the duration of the project, but nests and fledglings would not be affected. The spotted bat roosts in cliff and stony outcrops; such habitat would not be disturbed by the proposed action. Individual spotted bats could use the project area for foraging, and if present during the geotechnical survey, they might be temporarily displaced and avoid the disturbance and move to other nearby similar habitat for the duration of the project. Individual Columbian spotted frogs or western toads could occur along the shoreline of Silver Lake during the test pit excavations and could be directly impacted due to pit excavation or the tracked equipment as it moves along the shoreline or near wetlands en route to the project site. Risk to individuals from pit excavation itself is low because less than 0.02 acre would be disturbed (each test pit would be 80 square feet, so eight pits would affect 640 square feet of shoreline). Movement of equipment could cause direct impacts, including mortality, if individuals are unable to move out of the way of equipment. Indirect effects include modification to habitat due to soil compaction. Flannelmouth sucker are known to occur in Silver Creek. Project equipment would be crossing Silver Creek at a time of year when water levels are likely to be low and stream impacts would be minimized. Flannelmouth sucker would likely avoid the crossing areas due to the noise, vibration, and activity. Direct negative impacts are unlikely but they could be temporarily displaced during creek crossings.

### *Cumulative Impacts*

The cumulative impacts of the proposed action on special status species would be minimal. The 1964 designation of the Bridger Wilderness set aside the area for preservation and protection in its natural condition, which provides a protected area for many current special status species. The proposed action and other present actions, primarily recreation, and reasonably foreseeable actions such as dam work would not affect or is unlikely to affect special status species viability, and therefore would not contribute to cumulative effects.

## Cultural Resources

A Class III cultural inventory of the project boundary (Figure 1) was conducted in September 2019 (WAS 2020). All of the work for the geotechnical survey would occur within this project boundary, including the core samples at the dam, pit excavations at the previously used area and along the southern shore of Silver Lake, as well as the access route within the Wilderness. The inventory resulted in the relocation of three previously recorded sites and the identification and recordation of one newly identified site and one isolated resource. The location and a description of these sites is not disclosed in this EA for their protection.

### *Direct and Indirect Effects*

Two of the previously recorded sites are recommended not eligible for nomination to the National Register of Historic Places (NRHP) and the proposed undertaking would result in no historic properties affected because they are not eligible. No further work is recommended. The third previously recorded site is recommended eligible for nomination to the NRHP under Criteria A. The eligible site is located approximately 25 m from the proposed access route. The use of the proposed access route would not impact the site and the setting of the site would not be altered by the overland route of equipment. Thus, there would be no historic property affected and no further work is recommended.

The newly identified site is recommended not eligible for nomination to the NRHP and the undertaking would result in no historic properties affected. No further work is recommended.

Per Forest Service regulations, the isolated resource is not eligible, therefore there is no effect.

BTNF has initiated consultation with the Wyoming State Historic Preservation Officer (SHPO) for concurrence with these findings.

### *Cumulative Impacts*

The cumulative impacts of the proposed action on cultural resources are not expected. The 1964 designation of the Bridger Wilderness sets aside the area for preservation and protection in its natural condition, which may provide some protection for cultural resources therein. However, the wilderness designation does not inherently protect sites. Increasing pedestrian traffic via this project increases the chances of looting sites. A reasonably foreseeable future action is some type of work on the dam, such as rehabilitation/reconstruction, intensive maintenance, or a controlled breach has the potential to affect wetlands and other waterbodies. The cumulative effect of the proposed action, when added to the effect of future work on the dam, would not be significant because the proposed action would not affect historic properties.

# Agencies Consulted

The Forest Service consulted the following federal and state agencies during the development of this EA:

USDA Natural Resources Conservation Service (NEPA cooperating agency status)

Wyoming Game and Fish Department

Wyoming Water Development Commission

Wyoming State Historic Preservation Officer

U.S. Army Corps of Engineers

# References

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Zumpf, W.E., Z. Walker, and D. Keinath. 2014. Western Amphibian Monitoring Initiative. State Wildlife Grant Final Completion Report. Prepared for Wyoming Game and Fish Department, Cheyenne, WY.

# Appendix A
# Consideration of Comment for the Silver Lake Dam Geotechnical Survey

# Consideration of Comments for Silver Lake Dam Geotechnical Survey

## Scoping Period

The Scoping period for the Silver Lake Dam Geotechnical Survey started on 3/15/2020. The Responsible Official requested comments back within 30 calendar days. While comments may be submitted at any time, for the purposes of this Scoping period, comments were accepted through 4/15/2020.

The scoping notice was sent to 366 recipients of the GovDelivery mailing list, as well as the Sublette County Board of Commissioners and the Wyoming Game and Fish. The GovDelivery mailing list is included in the project record.

## Parties Responding to Scoping

**Table 2: Parties that Responded**

| Name | Acronym | Project File Document Name |
|---|---|---|
| Wyoming Game and Fish Department | WGFD | WER 14407.00_Signed Letter.pdf |

# Comment Analysis & Response

Comments were reviewed by the interdisciplinary team (ID team) to determine if issues or concerns were raised that demonstrated a clear cause-effect relationship and if recommendations/remedies were suggested that would address the issue/concern. Issues raised by multiple parties are listed once. If comments were supportive in nature and provided no issues/concerns or recommendations, they are not analyzed further in this document but are included in the project record.

**Table 3: Comment Analysis & Response**

| ISSUE/CONCERN (PARTY/IES ACRONYM) | RECOMMENDATION/ SUGGESTED REMEDY | RESPONSE | REMARKS AND/OR PROJECT RECORD CITATIONS |
|---|---|---|---|
| **Wetlands/Waterbodies/Riparian Areas** | | | |
| #1: Road and trail construction and Improvements could negatively affect streams, wetlands, riparian habitat (WGFD) | Avoid wet meadows and minimize stream channel crossings and use in riparian areas | Analysis supplemented, improved or modified | Aerial images were added to the analysis to show how wetlands would be avoided and stream crossings minimized; Figures 5 – 8, pp. 22 – 24. |
| #2: Equipment staging areas could negatively affect streams, wetlands, riparian habitat (WGFD) | Avoid perennial and ephemeral drainages and activities in riparian and aquatic areas | Proposed action modified | The proposed action was modified to clearly state that the staging area would avoid perennial and ephemeral streams and associated riparian and wetland areas; see "Equipment and Personnel" section p. 7. |
| **Wildlife** | | | |
| #1: Amphibians, fish, and wildlife could be negatively affected by silt loading to streams and destruction of riparian and wetland habitat and function (WGFD) | Avoid wet meadows and minimize stream channel crossings and use in riparian areas | Analysis supplemented, improved or modified | Aerial images were added to the analysis to show how wetlands would be avoided and stream crossings minimized; Figures 5 – 8, pp. 22 – 24. The analysis identifies that the timing of the proposed action (late summer or early fall) minimizes wetland and stream impacts because soil moisture and water levels would be low at that time of year (pp. 27 – 28). |
| #2: Unpredictable flows in North Fork Silver Creek negatively affect native fish species in the drainage (WGFD) | Maintain minimum flow in North Fork Silver Creek | Comment considered but no changes needed | The proposed action is for a geotechnical survey only; no flow changes in North Fork Silver Creek would result from the proposed action. |

| ISSUE/CONCERN (PARTY/IES ACRONYM) | RECOMMENDATION/ SUGGESTED REMEDY | RESPONSE | REMARKS AND/OR PROJECT RECORD CITATIONS |
|---|---|---|---|
| #3: The spread of aquatic invasive species could violate state statute and Wyoming Game and Fish Commission Regulation (WGFD) | Equipment must be cleaned, drained, and dried and inspected (if from out-of-state) prior to contacting a Wyoming water | Proposed action modified | Best management practices were added to the proposed action to address the prevention of the spread of aquatic invasive species (pp. 9 – 10). |
| **Vegetation and Soils** | | | |
| #1: Stock holding areas could negatively affect vegetation and soils (WGFD) | Hold or hobble stock in less sensitive areas | Proposed action modified | The proposed action states that the stock holding area would be outside the wilderness; see "Equipment and Personnel" section p. 7. |
| #2: Supplemental stock feed could violate regulations for weed-free seed (WGFD) | Supplemental feeding should be weed-free. | Proposed action modified | The proposed action has been modified to state that supplemental feed for stock would abide by regulations for weed-free feed; see "Equipment and Personnel" section p. 9. |
| #3: Weeds and invasive species could be introduced in disturbed areas (WGFD) | Reseed with native vegetation | Comment considered but no changes needed | The proposed action states that no reseeding would occur due to the risk of introduction of non-native species; see "Rehabilitation" section, p. 6. |