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Agriculture

Forest
Service

**Intermountain
Region**

Environmental Assessment for the Atwood Dam Repair Project Ashley National Forest

Roosevelt Ranger District, Duchesne County, Utah

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Chapter 1 - Purpose and Need for the Proposal

The USDA Forest Service has prepared this Environmental Assessment (EA) in compliance with the National Environmental Policy Act (NEPA), the Forest Plan, and other relevant federal and state laws and regulations. The purpose of an Environmental Assessment is to furnish enough site-specific information related to the environmental effects of the proposed action so that the Responsible Official can determine whether or not there are significant environmental impacts and if an Environmental Impact Statement is necessary. The NEPA process enables the Responsible Official to make decisions with an understanding of the proposal's environmental consequences and allows the USDA Forest Service to disclose to the public, the nature and potential consequences of proposed actions.

1.1 Document Structure

The Environmental Assessment is organized into five parts:

Purpose and Need for this Project: Chapter 1 includes information on the background and history of the project proposal. Chapter 1 also presents the purpose and need for the project, and provides a description of the project area location. This section also details how the USDA Forest Service informed the public of the proposal and how the public responded.

Comparison of Alternatives, including the Proposed Action: Chapter 2 provides a detailed description of the proposed action, as well as a no-action alternative for comparison purposes. Chapter 2 provides a description of the activities that would be completed as a part of this project. Chapter 2 concludes with a detailed set of design criteria, which is an integral part of the proposed action.

Environmental Consequences: Chapter 3 describes the environmental effects of implementing the proposed action. This analysis is focused on the issues and concerns identified through the public comment period and scoping; as well as requirements of other laws and policies. This document was developed using a resource-based analysis. A resource-based analysis contains only those resources which either could be affected from the proposed action, or are required by law or regulation to evaluate. Issues are defined as cause and effect relationships, which link actions to environmental effects (Forest Service Handbook, 1909.15, Section 12.41). During the scoping portion of this project, no issues were identified by the Responsible Official. Therefore, there was not a need to develop an additional action alternative. Chapter 3 contains a discussion on the resources effects analysis including a short discussion on the affected environment of each resource.

Interdisciplinary (ID) Team Members and Persons Consulted: Chapter 4 provides a list of preparers and staff consulted during the development of this EA. Chapter 4 also provides a list of other agencies and tribal organizations that were involved in the scoping process.

Appendices: The appendices include project maps as well as a literature cited section to support the analyses presented in the EA.

A reduction of paper as specified by 40 Code of Federal Regulations (CFR) 1500.4 has been an important consideration in the preparation of this EA. Additional documentation is located in the project record (e.g., a compilation of documents prepared for this project), which can be reviewed upon request. This document, as well as the scoping letter and other information, is also available on the Ashley National Forest web page at Atwood Dam Repair Project Webpage.

1.2 Background and History

In August of 1921, a Special Use Permit was granted to Dry Gulch Irrigation Company to build dams, canals, and head gates for the purpose of storing water in Lake Atwood. The ditch and timber head gate structures were consequently constructed in 1921. An impoundment structure was constructed in 1933, and then increased in height in 1949 and 1950. The dam was then reconstructed to its current state in 1952, which creates a storage capacity of approximately 2,500 acre feet.

In 1929, the irrigation company applied for and received approval from the State of Utah for an application to appropriate water for irrigation from Lake Atwood (Water Right #43-5); the water right was finalized in 1963.

In 1984, the creation of the Utah Wilderness Act designated the High Uintas Wilderness. At the time of the Act, the Dry Gulch Irrigation Company had a valid special use permit in-place to maintain and operate the dam at Lake Atwood.

In August of 1996, Dry Gulch Irrigation Company applied for a Ditch Bill easement[1] for the dam on Lake Atwood; the water system met the criteria of Public Law 99-545 and is currently awaiting the issuance of the easement. The issuance of the easement is currently in process and is planned to be issued concurrently with the temporary special use permit for the needed repair work.

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[1] *A Ditch Bill easement is a permanent easement for water conveyance systems located on National Forest lands and is authorized by the Ditch Bill Act (P.L. 99-545), commonly known as the 'Colorado Ditch Bill'. Granting a Ditch Bill easement is not a discretionary action when the criteria have been met.*

From the time of the reconstruction of the dam in 1952, water seepage was first reported in 1995. This seepage has been monitored and measured annually through the use of a small steel weir. In about 2009, approximately six years ago, seepage flows increased substantially and appeared to be transporting finer sediment through the embankment. In 2012, the Utah Dam Safety board issued an order to Dry Gulch Irrigation Company to repair the dam or they would be prohibited from storing water in Lake Atwood, due to the continued degradation of the dam and the possibility of dam failure. If repairs to the dam are not made in 2015, the State of Utah Engineers Office could issue a no storage order and Dry Gulch Irrigation Company would not be allowed to store water in lake Atwood.

1.3 Overview of Project Area

Atwood Dam is located in the High Uintas Wilderness on the Roosevelt Ranger District, within the Ashley National Forest. The project area is located in the E1/2 of Section 14, T4N, R4W, USM, within Duchesne County, Utah (see Figure 1).

The proposed project area is approximately 160 total acres in size. The main project area includes the dam, areas adjacent to the dam, and the associated areas for the workers camp site, showers, and a latrine for a total of approximately five acres. The horse grazing area would encompass approximately 155 acres, and would include several different forage areas, with limits of a one mile radius from the main project area of the dam site and camp. The size of this grazing area would allow movement of the stock for their benefit and the benefit of the resource. (See Maps 1 and 2 in Appendix A which more clearly illustrate the project area and the project activities).

The project area consists of mountainous terrain and is in close proximity to King's Peak - Utah's highest point, and Mount Emmons. Lake Atwood drains to Atwood Creek which is a tributary of the Uinta River.

The project area can be accessed from the south via the Uinta Trailhead, and from the north via the Henry's Fork Trailhead.

Lake Atwood is is not located within a municipal watershed. There are no research natural areas, or special interest areas within the project area.

1.4 Purpose and Need for Proposal

The purpose of this project is to respond to the applicant's request for authorization to repair Atwood Dam by issuing a temporary two-year special use permit. This short-term special use permit would allow the irrigation company to repair the dam, in conjunction with their ditch bill easement being issued. The ditch bill easement would be issued concurrently with this temporary permit for the repair of the dam.

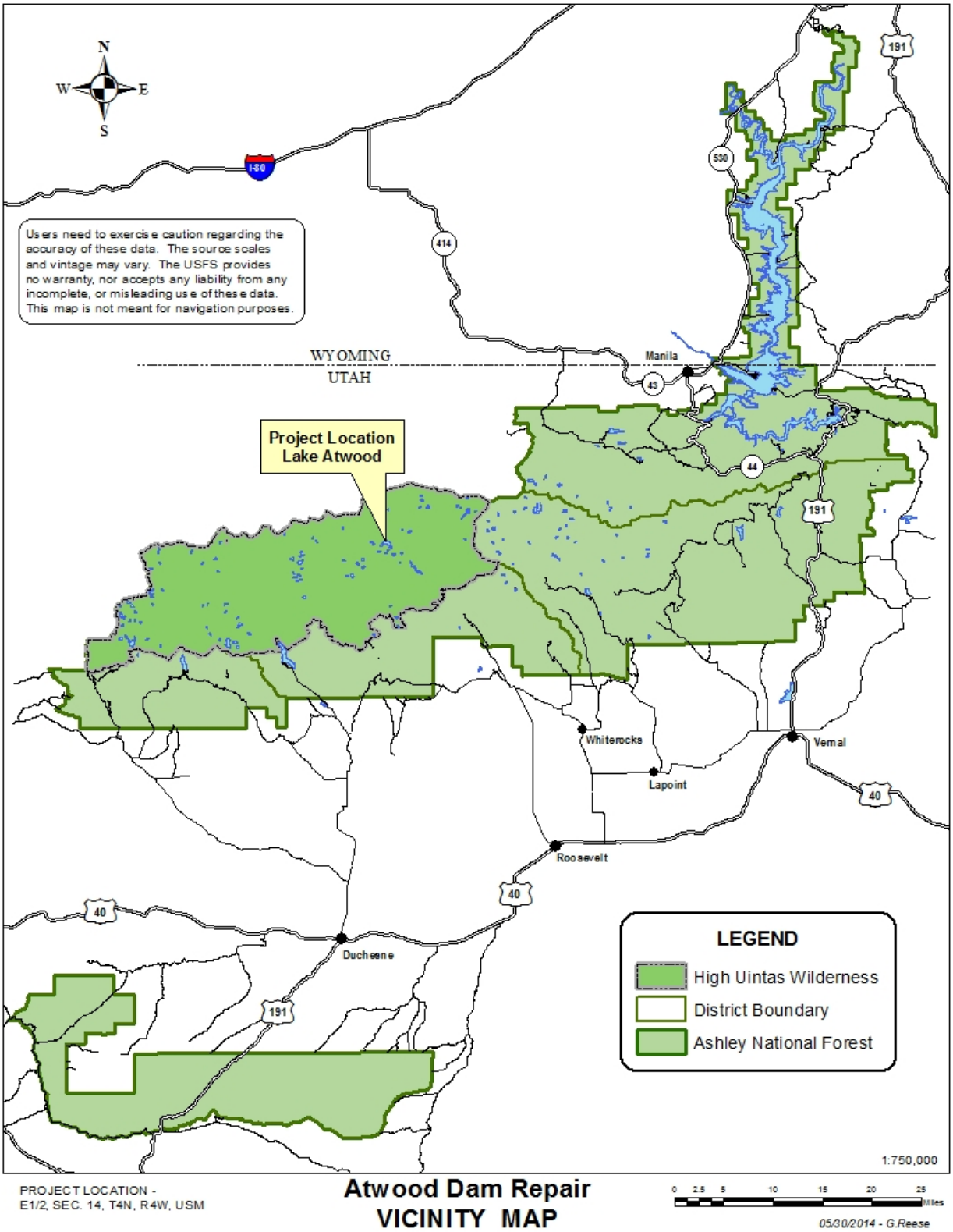

Figure 1 - Lake Atwood and Project Vicinity Map

To minimize impacts to the wilderness, transport of heavy equipment and supplies would be accomplished via helicopter thus eliminating impacts that would be associated with road construction. The Minimum Requirements Decision Guide (MRDG) has been used to develop the appropriate actions that are the minimum necessary for the work to occur in the wilderness, yet accomplish the project objective within the time frame allowed. The MRDG has helped to identify the number, size and type of equipment needed as well as the appropriate flight path for the equipment to be shuttled into the wilderness.

There are multiple needs that would be addressed with this project. The first stems from the Ashley's Land and Resource Management Plan (Forest Plan) objective to "assure the safety of all dams, canals, bridges, and utilities" (p. IV-53), which is in place to assure safety to the public and provide protection of the natural resource. The second is to meet the need of the irrigation company and their shareholders so they will have a continued supply of irrigation water. The leaks now threaten the integrity of the dam, requiring its repair. According to the Utah Dam Safety standards, without these repairs, the dam will have a 'no storage' order placed on it, forcing Dry Gulch Irrigation Company and its shareholders to go without irrigation water from this valued source.

Finally, the safety of the dam is in question if the repairs are not addressed. Even if a 'no storage' order were in effect (the gate would be locked open to allow full water flow), the dam structure may still be at risk of failure from spring melt because the dam can still hold water even with the head gate open. If failure were to occur, this could cause considerable downstream resource damage and public safety concerns.

1.5 Proposed Action

To achieve the purpose and need listed above, the following proposed action includes:

The Issuance of a short-term (two-year) special use permit to authorize the needed repair of the dam, during which time the ditch bill easement will also be issued. The issuance of this short-term special use permit would allow the following actions.

1. Installation of an impermeable liner within the core of half of the dam. This would involve removal of the upstream side of the south half of the dam, installation of an impermeable liner, then replacing the removed portion of the dam back over the top of the liner.
2. Construction of new toe drains on the downstream side of the dam. This wouldinvolve digging a trench along the entire toe of the dam and placing a perforated pipe along with gravel and sand in the trench to drain the water that seeps through the dam to a central location where the water wouldflow through a measuring device, then flow into the stream. The trench would be backfilled and not visible at the surface.

3. Lining the existing concrete outlet works with a new pipe and grouting the annular space between the new pipe and the existing concrete outlet works. The existing wet well would be disabled and filled with grout.
4. Installing a new head gate on the face of the dam at the inlet to the outlet works and installing a new stem along the face of the dam and new wheel.
5. Placing fill on the crest of the dam to fill in irregularities due to settlement. This would create an even elevation along the entire crest of the dam
6. Installing a flume in the outlet channel to measure flows from the dam, and installing a staff gage measuring device on the upstream side of the dam to measure the water in the lake.
7. Removing borrow material from below the high water mark for the repair of the dam, depending on its suitability. If the borrow material is found to be unsuitable, the material would then be taken from the existing borrow areas located on the north and south ends of the dam, which were previously used during the construction of the original dam.

The work on the dam, after completion, would not increase the impoundment of water or change the size of the dam. The work would require one field season (June through September of 2015) to complete the repair to the dam; however, the special use permit would cover two years in the event that work cannot be accomplished during the first field season, this would allow for the work to take place the following field season.

There would be an estimated six to eight people working at the site from June through September, they would be transported to the site via pack animal, along with the needed supplies and food. Additional food and supplies would also be transported via pack animal at a minimum regular weekly basis. The workers would camp near the work site in approved campsite locations. There would be up to four horses on location, near the work site for use in the event of an emergency.

Heavy equipment and construction materials would be transported via helicopter to the work site. Flights would occur for approximately two to three days in June/July (weather dependent), to transport the equipment and construction materials in, then again for one to two days in September, to transport the equipment out. This would require the temporary closure of system trails and roads that are directly affected by the flight path. During the time of equipment and supply transport, the heavy lift helicopter would not land in the wilderness, it would sling load the equipment and supplies, placing them on the dam or within the temporary work area. A light helicopter may be used for personnel transport and in the case of an emergency, requiring landing. The temporary work area would be located south of the dam, within the existing borrow site.

The flight staging area would be located in Bennion Park, with flights going to Lake Atwood from this location. The flight path is approximately 12 miles in length and would travel in a northwesterly direction, crossing Forest Trail 044. Forest Road (FR) 305 which accesses Bennion Park and FR 305A beyond Bennion Park would be closed to public access as well as Forest Trails 044 and 043 during flight operation to safe guard the public (see Appendix A, Map 2, for an illustration of the flight path).

1.6 Process and Decision Framework

This EA has been developed in response to an application for a temporary two year special use permit to authorize repairs to the Lake Atwood Dam. This permit was submitted by Dry Gulch Irrigation who owns and operates the dam. The Responsible Official for this project is John R. Erickson, the Forest Supervisor for the Ashley National Forest.

This project was initiated in April 2014 and uses an interdisciplinary approach that integrates physical, biological, and other science resource areas to analyze the project area and identify any areas that have potential resource concerns.

An ID Team of resource specialists has assessed the potential effects and consequences of implementing the proposed action for the project area. This EA documents the analyses that relate to the proposed action, relative to the specific resources within the project area. The proposed action is designed to protect and maintain the natural resources within the project area, and adhere to the standards set forth in the Forest Plan.

The ID Team and Responsible Official have considered Forest Plan goals, objectives, standards, guidelines, and management practices, together with public concerns. The ID Team evaluated the affected area, developed the proposed action which includes a list of design criteria, evaluated environmental consequences, and analyzed the proposed action through a resource-based environmental analysis, which is documented in this environmental assessment, and its associated project record. From this analysis and the supporting Project Record, the Responsible Official will determine:

- Whether the proposed action will proceed or not at all;
- Whether or not the proposed action requires a Forest Plan amendment; and
- Whether an Environmental Impact Statement is necessary.

1.7 Public Involvement

Public participation helps identify concerns and issues with a proposed action released during the scoping period. This input is essential for the Forest Service to develop a proposed action, which meets the purpose and need for the project, and is responsive to the concerns of the public. This information enables the Responsible Official to make decisions with an understanding of their environmental consequences. The public

participation process also allows the Forest Service to disclose the nature and potential consequences of the proposed activities on National Forest System lands.

Scoping Process

A scoping letter explaining the purpose and need for action, as well as the location and description of the proposed action, was sent to 54 interested and affected parties on June 5, 2014. The scoping documents were also posted on the Ashley's internet web page and listed in the Forest's Schedule of Proposed Actions (SOPA). The SOPA is sent out quarterly to 31 individuals.

One comment was received which was supportive of the project.

Tribal Input:

The Forest Service shares in the United States' legal responsibility and treaty obligations to work with federally-recognized Tribes on a government-to-government basis to protect the Tribes' ceded territory rights on lands administered by the Forest Service. As such, the policies of the Forest Service toward federally recognized tribes are intended to strengthen relationships and further tribal sovereignty through fulfilling mandated responsibilities.

The scoping documentation was sent to four Ute tribal representatives. No comments were received from the Ute tribe during the scoping period.

Other Agencies:

The scoping documentation was sent to local government agencies. These included Duchesne County Commissioners; the Uintah County Commissioner; the Uintah County Public Lands Specialist; the Utah State Historic Preservation Office; and the Utah Division of Wildlife Resources.

Public Notice and Comment Periods

As described in the cover letter accompanying this EA, there is an opportunity to provide your input during a 30-day comment period on the proposed action disclosed in this document. The cover letter attachment also provides information on how to provide comment. To gain standing to object to this project, interest or comment must be received during this 30-day comment period. This period will begin upon release of a legal notice publication in the *Vernal Express* newspaper.

1.8 Forest Plan Consistency

The development of this EA is based on direction contained in the Forest Plan, the National Forest Management Act (NFMA) and its implementing regulations (36 CFR 219), and NEPA and its regulations (40 CFR 1500-1508). The EA is tiered to the Ashley's Forest Plan, its Final Environmental Impact Statement, and Record of

Decision. This EA is tiered to these documents as permitted by NEPA (40 CFR 1502.20). These documents are available upon request and also located on the internet at Ashley Forest Plan Webpage.

The Forest Plan has a wide variety of goals and objectives to achieve a balanced use of the Ashley. If the Responsible Official chooses an alternative that is not consistent with current direction, a Forest Plan amendment must be conducted before the alternative is implemented. The action alternative discussed in this EA is consistent with the Forest Plan.

Management direction for the Ashley National Forest is decided in the Forest Plan. The Forest is divided into Management Areas (MAs), which have specific standards and guidelines for managing resources.

The Atwood Dam project area being analyzed is in management area (MA) "i" – High Uintas Wilderness. The management prescription for MA "i" is under the direction of the Utah Wilderness Act of 1984. "This prescription is designed to provide for the management, administration, and protection of roadless areas that were classified under the Wilderness Act of 1984" (p. B-20 of the Forest Plan FEIS). Pertinent standards and guidelines include:

- Maintenance of dams, weirs, and stabilization improvements permitted within limits of Utah Wilderness Act of 1984. No new storage or transmission facilities (p. IV-24)
- Inspect all dams as scheduled to assure compliance with engineering specifications. Unsafe or unserviceable dams will be reconstructed to approved standards, placed under specific limitations, or removed from service, and suitable site rehabilitation will be required prior to permit termination (p. IV-53).

Management is also under the direction of Forest Service Manual 2320, which states that for existing water development structures, "if needed and in the public interest, or a part of a valid existing right, permit maintenance or reconstruction of existing structures that does not change the location, size, or type, or which would not increase the storage capacity of a reservoir." The proposed action meets these criteria.

The management area for the flight staging area located outside of the wilderness in Bennion Park is: "d" – High forage production and livestock utilization and "n" – range of resource uses and outputs. Commodity production modified for amenity production. The project activities outside the wilderness are consistent with these management areas.

Large-scale issues of management direction established in the Forest Plan are outside the scope of this analysis and will not be addressed in this EA.

Chapter 2 – Alternatives

2.1 Developing Alternatives

Section 102 (e) of NEPA states that all Federal agencies shall, “study, develop, and describe appropriate alternatives to recommend courses of actions in any proposal which involves unresolved conflicts concerning alternative uses of available resources.” Two alternatives were developed and analyzed in detail. These alternatives include the No Action alternative (Alternative 1) and the proposed action (Alternative 2). The range of alternatives developed has been deemed reasonable based on information known to date and the range of public comments received during the scoping period.

Issues serve to highlight the effects or unintended consequences that may occur from the proposed action, providing opportunities during the analysis to explore alternative ways to meet the purpose and need for the proposal while reducing adverse effects. Issues are used to highlight direct cause and effect relationships between the proposed action and Forest resources.

Concerns are questions raised in public scoping that were determined not to require detailed analysis, because they either are already decided by other laws and regulations, or because impacts that could be caused by the proposed action are not anticipated. In some instances, concerns can be addressed through implementation of Forest Plan direction, project stipulations, or clarification of the project’s intent.

Because no issues or concerns were brought forward in scoping during the comment period, and design criteria have been developed to reduce or eliminate effects, there was not a need to develop an additional action alternative.

2.2 Best Available Information

The information presented in this EA is based on the best available information. An important consideration is that the exact location and amount of any activities could vary upon implementation. Field surveys by project specialists were crucial in calculating and analyzing the data used in resource evaluations. Calculations are based on skilled interpretations of aerial photos and maps; application of professional judgment from observations and evaluation of data; and information acquired from review of relevant, scientific literature. New information may present itself in the process that would require implementation strategies to be altered. Approximating some numbers, such as acres, or miles of road, allows flexibility to adapt to the information collected from more intensive field review. The information in this EA is also based on the best available scientific literature.

2.3 Alternatives Considered

Alternative 1 - No Action Alternative

The No Action alternative was developed in response to NEPA requirements [40 CFR 1502.14(d)]. This alternative serves as a baseline for evaluating and comparing the effects related to the proposed action. Under Alternative 1, a temporary permit to repair the dam would not be issued, and as such, the dam would not be repaired. Therefore, no ground disturbing activities would occur, no helicopters would be needed for transport of equipment, and no construction related activities would occur within the wilderness. Current activities, such as wilderness recreation would continue within the project area.

Alternative 2 – Proposed Action

The proposed action consists of issuing a temporary (2 year) special use permit to the Dry Gulch Irrigation Company so that repairs can be made to the Lake Atwood Dam. Although the repairs are not a Forest Service action, issuing the temporary permit to allow repair is integral to issuing the ditch bill easement which allows the operation and maintenance of the dam. Because of that, the elements related to the repair of the dam will be analyzed as a part of this EA.

Repair of the Lake Atwood dam is anticipated to begin in the summer of 2015 and be completed by early fall of 2015. Since this project is located several miles within the wilderness, it would be necessary to use a helicopter as well as pack animals for the transport of equipment and supplies. This Alternative was designed to use the least amount of helicopter trips as practical and to do repairs by hand whenever possible. The proposed action will be described in the following sequence:

1. Helicopter Use and Transport;
2. Stock Animal Trips and Needs;
3. Work Crew Campsite;
4. Dam Repair Specifics; and
5. Materials Needed.

Helicopter Use and Transport

The helicopter operation would require a specific staging area located in Bennion Park, which is located approximately 3.5 miles outside of the High Uintas Wilderness. The specific helicopter type is known as a heavy lift helicopter, see Figure 3 illustrates an example of a heavy lift helicopter from a previous project. Approximately 20 to 25 trips are anticipated to haul equipment and supplies to Lake Atwood in a two to three day period. After construction were finished, it would take approximately 10 to 15 trips in the fall to remove equipment and supplies from the project site within a one to two day period. The staging area is illustrated in Appendix A, Map 2, and also in Figure 2,

below. The staging area would provide for refueling for the helicopter in addition to staging the supplies needed for the project. Bennion Park is accessed by (FR) 305, off of FR 117. Forest Roads 305 and 305A would be closed for one to two weeks during the month of June for mobilization and packaging of equipment and supplies in preparation for the flights into Lake Atwood. The road would also need to be closed for a week after project completion to transport equipment and materials from the site. Forest Trails 043 and 044 would be closed for public safety during the helicopter phase of the project; this would consist of approximately two to three days for mobilization, and then again for one to two days for demobilization when the project is completed. The air route from Bennion Park to Lake Atwood is approximately 12 miles long, and would take about 10 minutes of flight time each way to complete a delivery of supplies. Under normal operating flight conditions (good weather, proper equipment functioning, etc.), the helicopter would not have to touch down and land within the Wilderness.

Figure 2 - Bennion Park Flight Loading and Staging Area

Figure 3 - Heavy Lift Helicopter.

Stock Animal Trips and Needs

Pack animals (horses and mules) are an essential part of this project. They would be used to assist in packing in supplies for the project itself, and then as support to the work crew that would be on the project site. For the entire length of the project, pack animals would be needed to haul in tools, camping equipment, and other supplies. During the construction phase of the project itself pack trips would bring in supplies to the crew (food, clean clothes, and other personal supplies) at approximately seven to 10 day intervals. The total number of round trips for pack stock is estimated to be about 20 trips. There would be approximately eight pack animals in a pack string, however this could fluctuate some depending upon the needs of the project. The pack trips would originate at the Uinta Trailhead.

In addition to the pack animals that would be travelling into and out of the project area, up to four horses would be kept at the project area. These animals would be utilized in the event a crew member had to leave the project site or there was a medical condition necessitating the quick removal of a crew member. These horses would

require approximately 155 acres, near the project work site for foraging. Certified weed free hay and feed would also be brought in for the animals.

Campsite

The repair work would require approximately six to eight people on site to complete the project. Work crews would be camped at a base camp located close to the worksite near Lake Atwood dam (at an existing campsite that has already been hardened from previous recreational use, if possible). A safety shower would be installed at the work site and an estimated two additional showers would be installed at the base camp to provide individual privacy.

The work crew would use the “Leave No Trace” ethics with respect to the base camp. These items include the following:

- Keep campsites small; be mindful of spreading impact beyond the established, hardened site.
- Concentrate use on existing trails and campsites.
- Focus activity in areas where vegetation is absent.
- Camp and carry out camp activities only on durable surfaces, including established trails and campsites, rock, gravel, dry grasses, or snow.
- Protect riparian areas by camping at least 200 feet from lakes and streams.
- No open fires within ¼ mile of any lake (no wood would be gathered within ¼ mile of any lake in the Atwood Basin).

Also, consistent with Leave No Trace ethics, human sanitary needs would be attended to with a pit toilet. A pit toilet would be constructed and applicable standards and guidelines would be followed to minimize impacts to wilderness, soils, historic, and cultural resources, and hydrologic resources. Should it prove impracticable to use a pit toilet, or resource impacts could not be avoided, one of three other waste management options would be utilized. These options include a self-contained portable composting toilet, an incineration toilet, or a Pett dry toilet system with “Wag Bags”, which is a disposable human waste solidifying and neutralizing system that allows for easy packing and is approved for landfill disposal.

Some campsite rehabilitation may be necessary following the project. This would be done using standard practices appropriate to wilderness campsites:

- Any rocks, logs, or woody debris moved while the campsite was occupied would be replaced to their original locations.

- Additional rocks, logs, or woody debris would be placed in areas where impacts may have caused a “use” that may give it the appearance of being part of the established, hardened site.
- “Iceberged” rocks may be placed in some areas around the perimeter to discourage expansion of the site.
- If necessary, aeration of the soil and reseeding (in conjunction with the above actions) would also be done in areas areas immediately adjacent to the site.

Dam Repair Specifics

Dam Crest Restoration

There are portions of the dam crest that have either lost material over time or were never built to the correct height. As part of this project, the entire dam crest would be raised to the same exact elevation; this would require adding up to 12 inches of fill material in different locations along the dam crest, giving the entire dam a freeboard of five feet above the lake surface. The dam crest is illustrated in Figure 4.

Figure 4 - View of Atwood Dam Crest.

Headgate Rehabilitation

The current wet well design of the dam is not working as intended because of the age and deterioration of its components. The following items are proposed to rehabilitate the headgate: Remove the riprap from the area used for this part of the project and create a stockpile;

- The existing wheel box would be cut below the surface of the dam and demolished. The wheel structure would be preserved and later attached to the new wheel box and used as an air vent cover (see Figure 5 below). From any distant inspection, the wheel structure would look nearly identical to the existing one;

Figure 5 - Existing Historic Crank Wheel

- The existing concrete inlet structure would be cut and demolished to make room for the new structure;
- Approximately 97 feet of 24 inch diameter high-density polyethylene (HDPE) pipe would be fitted through the existing concrete waterway;
- The resulting curved empty space would be pressure grouted;

- The remainder of the wet well would be back filled and covered over;
- A new inlet and gate structure would be made using about eight cubic yards of concrete, a 24 inch sluice gate and two trash racks;
- The gate stem and vent pipe would be installed up the face of the dam and would be hidden by riprap;
- A new concrete wheel box would be constructed near the location of the original wheel box; and
- The stockpiled riprap would then be replaced.

Several skid steers and mini excavators would be utilized to do this part of the project. It would not be possible to install the 24 inch diamter pipe without motorized equipment as 97 feet of pipe weighs about 3,400 pounds. The sluice gate weighs approximately 1,200 pounds and would need to be lifted into place.

Cutoff Trench

The south side of the dam has been leaking for some time, and as a result, a small stream has developed. A small steel weir was placed to measure the amount of leakage. To address this problem, a trench would be dug through the face of the south half of the dam and a 60 millimeter thick pond liner would be installed. The details are described below.

- An approximately 400 foot long, 36 foot wide area on the face of the dam would be cleared of riprap. The riprap would be stockpiled below the cleared area so it can easily be replaced after the trench is finished. The 36 foot wide area would allow sufficient area to have a trench on the dam face, a ten foot wide temporary work area, and still allow room to place the removed soil to the side and not mix the riprap and the native soil.
- A 13 foot deep(measured from the crest of the dam), four foot wide trench (bottom width of trench) would be dug with a one to one slope on the downstream side and a two to one slope on the upstream side.
- An eight ounce, non-woven, geotextile would be laid beneath a 20 foot wide by 60 milliliter pond liner.
- The pond liner would be covered with two feet of select fill and the rest of the trench would be filled with common fill.
- If bedrock is uncovered, the pond liner would be laid over the top of the bedrock.

- The area would then be covered with the stockpiled riprap and additional riprap would be placed near the top of the dam where the depth of the riprap is too thin.

Mechanized equipment would make this part of the project less complicated and straight forward. Without the use of mechanized equipment, this phase of the project would take months and compaction of the dam would never be achieved. Improper dam compaction would violate dam safety regulations and could result in dam failure.

Toe Drain:

Two toe drains would be placed on the downstream face of the dam to mitigate and measure any water that is still coming through the dam. The individual parts of this phase are listed below.

- The top soil would be stripped and stockpiled from the work area on the downstream face of the dam.
- A trench with a depth of up to six feet would be dug on either side of the outlet works. The total trench length would be nearly 560 feet.
- An eight inch drain pipe would be placed in the trench surrounded by up to three-inch drain rock.
- The drain pipe and drain rock would be wrapped in a geotextile to prevent clogging of the drain system. The trenches would then be backfilled and compacted.
- A weir box would be placed at the discharge end of each of the two sections of pipe. The weir box would be set up to measure the outflow and have a one foot sump to monitor if any fine particles were being pushed through the dam.
- The topsoil would be replaced.

Motorized equipment would allow for a quick and effective trenching and compacting of the toe drain.

Cutthroat Flume

A 72-inch steel cutthroat flume would be installed a short distance from the dam outlet, so the lake discharge can be easily and accurately measured.

Materials Needed

The proposed actions would require the following materials, which are normally not allowed within a wilderness area due to their mechanized nature. These include the following: (2) Bobcat T650 Loaders, (2) Fork attachments, (2) Concrete Mixer attachments, (2) Cat 305E Mini Excavators with cabs and thumbs, (1) Hydraulic Hammer Attachment, (1) Vibratory Plate Compactor Attachment, (1) Grout Plant, (2)

Generators, (2) Air Compressors, (2) Trash Pumps, (1) Oxyacetylene Torch, and (1) 200 Amp Welder Generator as well as fuel to power this equipment.

Besides the above materials, many large or heavy items would need to be flown in to the job site. These materials are estimated to include about 53,400 pounds of Quikrete, 40,680 pounds of Cement, a 72 inch steel cutthroat flume, over (30) 20 foot long lengths of various diameter pipes, a 24 inch sluice gate, (2) trash racks, (2) weir boxes, fuel containment materials, over 5,000 pounds of liners and geotextiles, and various other heavy or odd shaped items that would be difficult or impossible to pack in by stock animals.

2.4 Design Criteria

Design criteria are integral to reducing impacts of the project on the resources. As such design criteria are a part of the proposed action. Without the design criteria in place, the environmental consequences in Chapter 3 would have different results. The design criteria are organized according to resource areas.

Water and Soil Resources

1. Mechanical approach to the stream channel to construct the flume shall use the north side of the channel for access. The north side of the channel is slightly higher, more rocky, and supports a willow dominated plant community that is less prone to impacts than the south side of the channel that supports a subalpine meadow community.
2. Construction on the north side of the outlet channel shall avoid clearing or removing brush including willows. The vegetation can serve as an organic buffer to prevent impacts on soil and the stems and roots shall be left as intact as possible to facilitate revegetation post construction.
3. Mechanical equipment using the assigned north access route would both enter and exit on the same path (as determined by the Forest Service) to limit impacts to soil and riparian resources.
4. Livestock waste shall be broken up and scattered when camp/livestock areas are vacated or moved. This would prevent waste piling and speed decomposition of the material. Waste shall be kept the recommended 200 feet from all water sources in the wilderness (High Uintas Wilderness Restrictions).
5. If the contractor decides to excavate the top fine earth layer from the lake bottom, this shall be reserved and spread on the upper portion of the south staging area at the end of the construction period. This material has more silt, clay and organic matter than the existing soil in that area and would promote revegetation.
6. Follow engineering blueprint plans to install silt fence (sediment fence) before construction begins, along the entire dam toe-slope and in the river near the

channel outlet. This will prevent sediment movement to the channel and protect the water quality flowing down Atwood Creek.

7. Follow the engineering blueprint plans to install rip-rap within a rip-rap apron to line the area from both weir boxes to the stream channel, lining the channel at their outlets. The rip-rap shall armor the channel area and prevent headcutting or erosion.
8. Refuel and service equipment only in designated staging areas. These areas shall be located to prevent contamination of streams and wetlands by fuels and other chemicals.
9. Transport and store fuel and other petrochemicals in leak-proof, labelled, and approved containers.
10. Store fuels and other petroleum products in safe locations and at least 100 feet from surface water. These sites shall have an impermeable liner and impervious berms so they can contain any spilled material. A spill kit shall be kept onsite when heavy equipment is operating in the vicinity of riparian areas or live water.
11. Do not drain used oil, fuel, antifreeze or other materials into the soil or bury any chemicals on site. Excess fuels and other supplies must be airlifted out of the area.
12. Camping areas and areas where livestock are corralled or tethered shall be at least 200 feet from any source of water (High Uintas Wilderness Restrictions).
13. Pit toilets onsite shall keep all waste at least 200 feet from any water source and bury waste at least 8 inches deep (High Uintas Wilderness Restrictions). Latrines shall be filled in after completion of the project.
14. Have a contingency plan to follow in the event of a petrochemical spill. This plan shall include who to contact in the event of a spill and may include having absorbent or neutralizing materials on hand with literature that describes spill cleanup or containment procedures.

Recreation

15. Helicopters shall avoid flying directly over trails, other than as necessary to cross the trail.
16. All refuse and garbage shall be properly stored in Forest Service approved bear proof containers and packed out and disposed of properly.
17. Open campfires and firewood gathering are not allowed within ¼ mile from Lake Atwood or other lakes in the basin. Wood used for cooking or heat shall be collected beyond ¼ mile from any lake in the Atwood basin.
18. Campsites shall be located 200 feet or more from other occupied campsites.

19. Latrines shall be located at least 200 feet from campsites.
20. Camp areas will be kept clean and free of litter at all times, e.g. cigarette butts, hay twine, foil, etc.
21. Nailing and wiring to live trees is prohibited. Shims will be used to protect live trees from thin rope.
22. Soapy water will be dumped at least 200 feet from any water source. A sump hole for gray water disposal will be at least 1' deep and filled in and naturalized at the end of the project period.
23. No permanent structures shall be constructed within the campsite.
24. Staging areas, fuel storage and containment area, and camping site will be identified prior to initiation of the project.
25. Post signs at trailheads, on Forest Service website, and at Forest Service offices in early season to alert potentially affected users. Distribute information through local media on the trail and area closures that are in affect.
26. Install additional drainage structures on Trail 043, particularly in the Roberts Pass area.
27. Schedule the use of helicopters to weekdays whenever possible.
28. Post construction zone signs at the project site to alert potentially affected users.
29. Forest Service Trails 043 and 044 shall be closed in the areas affected by the helicopter operations while transporting supplies.
30. Lake Atwood Dam and the project work site would be closed for the duration of the project.
31. Transport of equipment and supplies for staging for the helicopter operations to Bennion Park shall occur during weekdays.
32. A wilderness ranger shall perform periodical campsite visits to determine if mitigation measures are being followed properly.

Wilderness

33. Food scraps shall be burned or buried; all other garbage, debris and waste must be packed out of the wilderness.
34. Movement of equipment shall be limited to only that area to be disturbed in the construction plans.
35. Contaminated soils (spills, oil drips, etc.) shall be removed from the Wilderness.
36. Ruts caused by equipment shall be leveled.

Heritage

37. The existing wheel structure may be removed during construction, but shall be replaced in approximately the same location and incorporated into the new crank shaft wheel structure. The original wheel structure would no longer be a functioning part of the dam, but shall remain as a visual component of the dam in order to maintain the visual integrity of the dam.
38. The gate stem and vent pipe crank shaft on the upstream face of the dam shall be covered with riprap to reduce visibility of this non-historic component. The new inlet gate would be covered with untreated metal trash racks to visually mimic the historic inlet works
39. The staff gage measuring device will be of a similar type and similar material as historically used on other period dams of the area, in order to maintain the historic appearance of the dam.
40. Avoid damaging the historic debris within the existing borrow area. Flag and avoid the historic implements.
41. Maintain the historic integrity of the dam to every extent possible.

Range

42. Utilization of forage species in dry meadows shall be 40% or less.
43. To keep within the allowable use standards, a four inch residual stubble height is required in riparian areas following grazing.
44. If utilization of the entire 155 acres is met, pack and riding stock handlers would either move stock outside the one mile radius to graze, or feed stock with certified weed-free hay, pellets, and/or grain.
45. Stock shall be rotated to different grazing areas to reduce the impact to vegetation and soils.
46. Grazing is prohibited in the Chain Lakes Basin.
47. Upon death within the National Forest of any stock used in this operation, the Permit Holder shall dispose of the carcass in a suitable manner more than 200 feet from any water.
48. Where salt for pack and saddle stock is provided, mixing with grain will be the preferred method. Salt also could be in block form, but must be secured off the ground in a waterproof container, located away from other camps, trails and live water, and removed when livestock are removed.

49. Stock will not be tied to trees for longer than two hours; hitch lines or hitch racks shall be provided where necessary. Manure shall be scattered at a minimum of 200 feet away from water.

50. Only stock necessary for each trip will be permitted. No excess stock will be permitted, except for the trip duration if an animal becomes injured during use.

51. Stock must be ridden or led, not permitted to run loose on trails or travel routes (except where safety requires).

52. Stock shall be tied to an overhead line when tethered for extended periods.

Wildlife

53. Flights shall maintain an elevation of 1,000 feet above trees to avoid disturbance to raptors and other wildlife, unless safety dictates otherwise.

Invasive Plants

54. In order to reduce transport of noxious weed seeds or plant materials to the project site, machinery shall be washed before transport.

55. Certified weed-free hay, pellets, and/or grain would be required for horses and mules, if livestock feed is transported onto the Forest.

Air Quality

56. Dust control shall be abated with water from Lake Atwood when dust is visible during construction work where dust is likely to occur; such as moving soil around at the dam site.

Chapter 3 – Affected Environmental and Environmental Consequences

3.1 Introduction

This chapter describes the affected environment, and presents the effects analyses related to the concerns identified and legal requirements. This chapter also provides the foundation for the scientific and analytic basis for comparison of Alternative 1 and Alternative 2. Detailed information on the effects analysis is located in the project record and contained within individual resource reports.

3.2 Hydrology

Affected Environment

Watershed Setting

The project area is entirely located within the Atwood Creek-Uinta River 6th-level watershed with an area of about 36,696 acres. Elevations in the watershed range from approximately 8,220 feet where Atwood Creek drains into the Uinta River to 13,437 feet at Mount Emmons in the headwaters, with the project area located in different elevations with the crest of the dam at approximately 11,030 feet. Figure 6 presents and illustration of the watershed boundary.

Climate data indicates that precipitation amounts are highest from November through February, when most of the precipitation is received in the form of snow. Precipitation, generally in the form of rain, and is lowest from June through August.

Watershed Condition

Based on the Forest Service Watershed Condition Classification (WCC) system (USFS, 2011), the Atwood Creek-Uinta River is a Class 1 watershed exhibiting high quality relative to its natural potential condition. Table 1 describes the rating given to the 12 indicators representing the underlying ecological functions and processes that affect both soil and hydrologic functions.

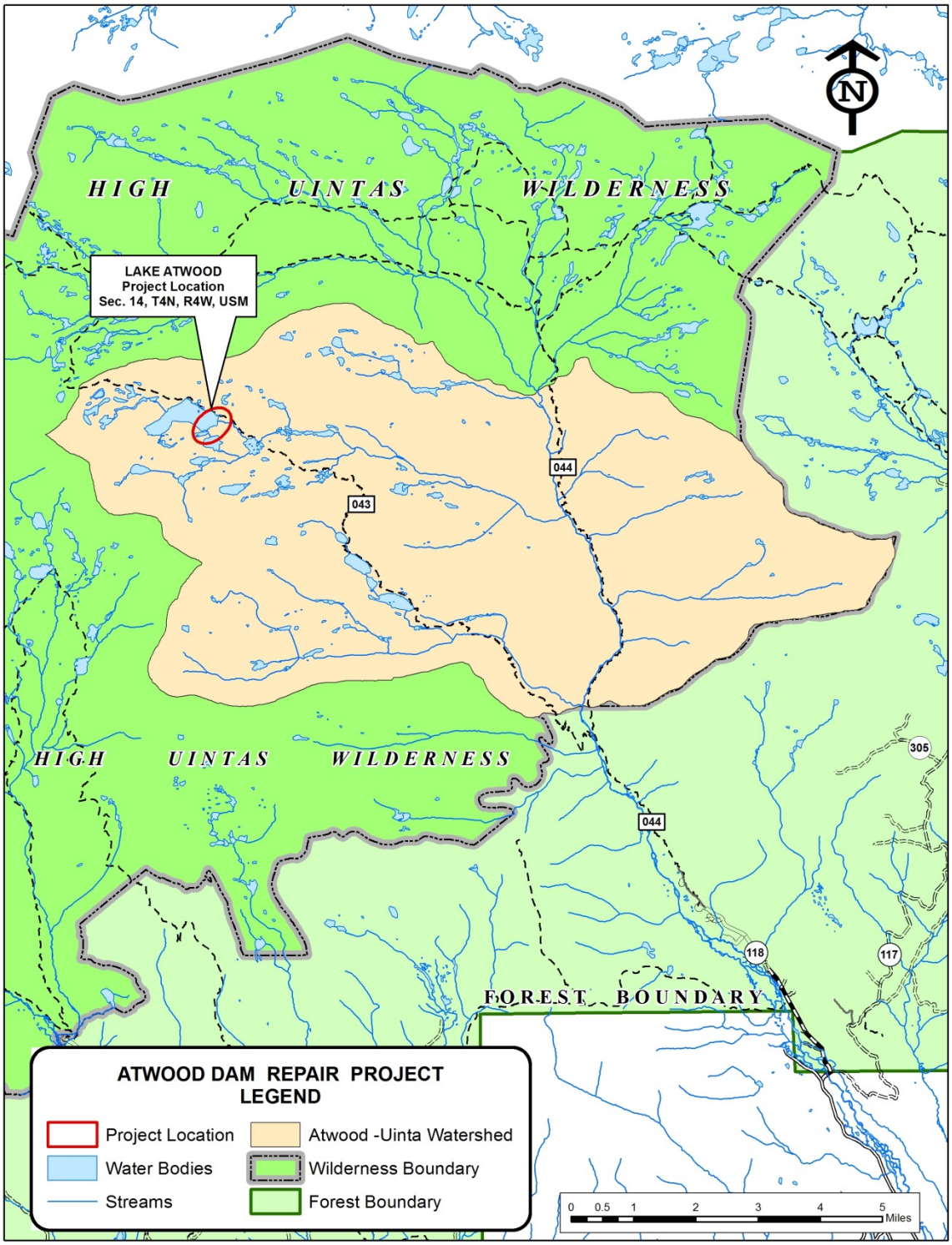

Figure 6 - Watershed Map for the Atwood-Uinta Watershed.

Table 1 - Watershed Condition Indicators for the Atwood Creek-Uinta River Watershed

Resource Element	Resource Indicator
Water Quality	Good
Water Quantity	Fair
Aquatic Habitat	Good
Aquatic Biota	Fair
Riparian/Wetland Vegetation	Good
Roads and Trails	Poor
Soils	Good
Fire Regime or Wildfire	Fair
Forest Cover	Good
Rangeland Vegetation	Good
Terrestrial Invasive Species	Good
Forest Health	Fair

Water Quality

Water bodies in Utah are assigned classifications depending on their beneficial uses. Streams within the project area are considered Class 2B, Class 3A, and Class 4 waters. According to the Utah Department of Environmental Quality (DEQ), Class 2B waters are for secondary contact recreation and include activities such as boating, wading or similar activities. Class 3A waters have protected cold water species of game fish and other cold water aquatic life including the necessary aquatic organisms in their food chain. Waters of the State that are protected for agricultural use are classified as Class 4 and include irrigation of crops and stock watering (Utah, 2008).

There are no 303(d) listed streams within, or adjacent to the project area (Utah, 2014b). 303(d) listed waters are those water resources that are not meeting their designated beneficial uses. The closest downstream water quality monitoring site is located approximately seven miles away on the Uinta River above Rock Creek. This site is located within the Atwood Creek-Uinta River watershed. Water quality was sampled only one day in 2003, therefore it shows an inconclusive value. The project is not located within a local municipal watershed.

Floodplains, Riparian and Wetlands

Riparian vegetation and areas of standing water beyond the streambank environment were observed along Atwood Creek downstream from the dam. It appears both leaks coming from the dam and natural groundwater seepage feed these vegetative communities. The toe of the dam to the north of the Atwood creek appears to hold seasonal pools also containing aquatic vegetation. These plant communities had no

surface water at the time of visit (in a drought year), however wet conditions were likely earlier in the year or in a year with heavy monsoons or winter snowpack (Plunkett, 2014). An area of approximately 0.6 acres with riparian vegetation beyond the streambank environment was mapped south of Atwood Creek below the dam (Figure 7).

Figure 7 - Main Wetland Area Boundary South of Atwood Creek Below the Dam.

Channel Condition and Streamflow

Atwood Creek is perennial (always flowing) and the only stream within the project area. The portion of Atwood Creek within the project area has a cobble and boulder dominated channel bed with moderate confinement and slope gradients in the three to four percent range. Banks are well vegetated and with high rock content, with approximately 40 percent or more of the bank material composed of cobble and boulders (Plunkett, 2014).

USGS stream gauge data does not exist for Atwood Creek. The closest gauging station is approximately 16 miles downstream in the Uinta River below the power plant

diversion in Neola, UT. Data from this station shows a close representation of the river system's behavior. Spring runoff in the project area generally begins in early April. High streamflows are controlled primarily by snowmelt runoff with a snowmelt peak occurring in early June. Low flows generally start in late fall and persist through the winter months, with the lowest flows occurring in February. Flows in Atwood Creek are regulated by the dam. A dam release schedule was not found on record. However, in conversation with Scott Bingham, Civil Engineer on the Forest, it is believed that the Dry Gulch Irrigation Company opens the dam around July of each year and closes it in September or October, depending on that years water yield.

Direct and Indirect Effects

In order to evaluate the effects of the alternatives on water resources, certain indicators were chose to determine the impacts. Those indicators include the amount of sediment in the water resource, equipment entry and sediment, and changes to the stability of both the streambank and streambed.

Alternative 1 – No Action

Under the no action alternative, the safety of the dam is in question if the repairs are not addressed. Even if a 'no storage' order were in effect (the gate would be locked open to allow full water flow), the dam structure may still be at risk of failure from spring melt because the dam can still hold water even with the flood gate open. If failure were to occur, this could cause downstream resource damage including, channel scour and increased sediment delivery with long-term turbidity pulses as sediment gets flushed out. Large amounts of sediment, mostly finely sized, would settle in floodplains, wetlands and riparian areas, potentially altering the structure and spatial extent. Increases in the sediment input would result in a decrease of energy available for erosion, deposition of sediment, channel widening, and a decrease in bankfull depth. These changes in turn could result in modifications to water quality and aquatic habitat.

Alternative 2 – Proposed Action

Potential direct effects would be primarily ground disturbance related to mechanical equipment, temporary equipment route, workers campsite, dam toe-drain, and in-channel flume installation. Potential indirect effects include, but are not limited to, altering water quality from human and animal waste. Resource effects are illustrated in Table 2.

Table 2 – Hydrological Resource Indicators, Measures, and Effects For Alternative 2.

Resource Element	Resource Indicator	Measure	Proposed Condition (Alternative 2)
Water quality	Sediment and turbidity	Potential sedimentation and increased turbidity	Minor and negligible
Floodplain, Wetlands and Riparian Areas	Equipment entry and sediment	Area impacted (acres)	<0.1
Channel Function	Changes in streambed and streambank stability	Channel area impacted (acres)	<0.1

Water Quality

Increased sediment and turbidity in Atwood Creek are the potential direct effects that would be primarily associated with the construction of the Cutthroat flume. These items would be used to measure the lake discharge and ground disturbing activities.

Turbidity is the measure of relative clarity of a liquid. It is an optical characteristic of water and is an expression of the amount of light that is scattered by material in the water when a light is shined through the water sample. The higher the intensity of scattered light, the higher the turbidity. Material that causes water to be turbid includes clay, silt, finely divided inorganic and organic matter, algae, soluble colored organic compounds, plankton, and other microscopic organisms (http://water.usgs.gov/edu/turbidity.html).

Atwood Creek has a cobble and boulder dominated channel bed and well-vegetated banks with high rock content. Increases in sediment and turbidity are expected to be minor due to the lack of fine sediment in the form of sands and silts, as most of it settles in the reservoir and does not get transported pass the dam. Foltz, et. Al. (2013) measured turbidity (sediment content) changes while replacing culverts with bridges in Idaho. This scenario is similar to the proposed flume installation as both involve in-channel work. Foltz, et. Al. (2013) also noted that peak turbidity values occurred when the excavator was physically in the creek or when the excavator was moving stream bed rocks or placing vegetation on the creek banks. For the Atwood flume, the channel would be either at a trickle or dry during construction resulting in little to no sediment capture and transport. Due to the nature of the dam, flow would be reestablished slowly as the dam gate opens. A minimal increase in sedimentation and turbidity is possible and could impact a short distance of channel downstream of the flume location, with effects diminishing further downstream. Provided that design criteria 6 is followed, the in-channel work would not be expected to exceed Utah State standards or other water quality standards.

The route chosen for equipment access relative to Atwood Creek and Lake Atwood is especially important, as the trail prism can intercept overland and subsurface flow, conveying this water across the relatively impermeable running surfaces to concentrate at discrete discharge points. Therefore, trails often become conduits of water and sediment and can result in increased sediment delivery to water bodies. It is estimated that machinery accessing the worksites would create a trail path of approximately six feet wide. This path would be established along existing high rock content surfaces, which would support the equipment with little rutting. Wet soils and wet conditions would be avoided by conducting the proposed work during the drier months of the year, between June and September. Additionally, design criteria 1 through 3 were established to limit impacts to soil and riparian resources from heavy equipment.

Potential indirect effects to water quality include, but are not limited to, staging areas, campsites, horse resting/grazing areas, and associated human and animal waste. Chemical contamination in staging areas from heavy equipment maintenance and refueling, and equipment routes from heavy equipment movement can potentially reach live water or settle in the channel bed and alter water quality. Design criteria 8 through 11 were established to limit impacts to water quality from heavy equipment.

The work crew would use the “Leave No Trace” ethics with respect to the base camp, which was described earlier in Chapter 2 of this document (p. 14).

An estimated 155 acres of horse grazing area would result in accumulation of animal waste. Design critera 4 would require scattering livestock waste to promote faster decomposition and 12 would concentrate human and livestock activities away from water. Human sanitary needs would be attended to with pit toilet. A pit toilet would be constructed and applicable standards and guidelines would be followed to minimize impacts to wilderness, soils and hydrologic resources. Design criteria 13 would require the pit toilet to be located at least 200 feet from any water source. Should it prove impracticable to use a pit toilet, or resource impacts could not be avoided, one of three other waste management options would be utilized. These options include a self-contained portable composting toilet, an incineration toilet, or a Pett dry toilet system with “Wag Bags”, which is a disposable human waste solidifying and neutralizing system that allows for easy packing and is approved for landfill disposal. Campsite rehabilitation may be necessary following the project. This would be done using standard practices appropriate to wilderness campsites, which was previously described in Chapter 2 of the document (p. 15).

Through the implementation of these, along with BMPs and project design features, Clean Water Act, State water quality standards, and beneficial uses would be met. Direct or indirect effects to water quality under this alternative would be minor and negligible.

Floodplain, Wetlands and Riparian Areas

Specific project design features have been developed to protect floodplain, wetlands and riparian areas from ground disturbance and potential water quality impacts. Mechanical equipment would not be allowed in wetland areas. Operations in the dryer months would reduce the likelihood of encountering wet conditions. Access to the stream channel would require crossing through floodplain and riparian habitat affecting approximately less than 0.1 acres, which is the distance from the dam crest to the proposed flume location (approximately 80 feet) multiplied by the width of the equipment trail (approximately six feet). The high rock content of these areas would likely support the equipment with little rutting. Other than the section of bank displaced by installation of the weir, riparian vegetation would be left in place (no scraping or construction), and readily recover and sprout new growth.

Dam leaks and natural groundwater seepage have created vegetative communities below the dam. The proposed work to reduce leakage at the dam could have potential indirect effects on the extent of wetland vegetation. Monitoring is recommended to determine whether stopping the leakage at the dam (and placement of drainage trenches) reduces the spatial extent of this wetland environment. It is expected that groundwater supply would continue and the majority of this area would remain after the dam repairs have been completed (Plunkett, 2014).

Best Management Practices (BMPs), (listed in Appendix A of the hydrologist report), and project design criteria 1 through 3 would be expected to protect any of the very limited floodplain, wetland and riparian areas disturbance within the project area. Hence, the direct or indirect effects under this alternative would be minor and negligible.

Channel Function

A stream system's channelfeatures, including streambed and streambank stability, reflects the existing balance between stream flow, sediment input, and stream bed/bank composition. If one of these components varies, there is a corresponding change with the other two. Water discharge through the proposed dam toe weirs can potentially erode the channel. Design criteria 7 requires armoring the channel area and prevent headcutting or erosion. The proposed streambed and streambank changes to accommodate the Cutthroat flume involve an area of less than 0.1 acres or approximately 16 feet of channel length by 18 feet of channel and bank width. The overall channel gradient would be maintained and changes in sediment loads are not expected. Atwood Creek has a cobble and boulder dominated channel bed and well-vegetated banks with high rock content, providing stability to the proposed actions. Under these conditions and with the project design features, direct or indirect effects from changes to stream channel morphology and function, would be minor and negligible.

Cumulative Effects

Spatial and Temporal Context for Effects Analysis

Effects analysis for this project considers direct, indirect and cumulative effects. Spatially, for these effects the bounds is the same: the boundaries of the 6th level watershed where any repairs, trails or other project-associated activities would occur. This level of analysis was selected as it provides an adequate scale for determining potential effects. If a larger scale were used, the amount of area tends to dilute potential effects, and when smaller scales are used the amount of area is too limited in scope.

The temporal scope for watershed effects is estimated to be from 1995 until 2018. The date of the first reported leak in the dam is 1995. This is the time when past effects from the leak would have been initiated The scope continues to year 2018, which is approximately three years after project implementation (estimated to be 2015) and the estimated amount of time for effects from this project to stabilize and be no longer perceptible in nature. For short term effects, the temporal scope can range from hours to a few days after treatment.

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Cumulative effects arise from the incremental impact of an action when added to other past, present, and reasonably foreseeable actions. There are no present or foreseeable future actions within the spatial scale of the Atwood Dam Repair project area. There are expected to be minor direct and indirect effects to water quality, floodplain, wetlands, and riparian areas and channel function from the Atwood Project. These effects are expected to be within the natural variability of the system; therefore no cumulative effects to these resources are expected from this project. There are no effects to cumulative watershed resources in Atwood Creek-Uinta River watershed, therefore the Watershed Condition Class class would remain unchanged post project implementation.

Summary of Effects

The design of this project is such that minimal effects to watershed resources are expected from Alternative 2, as discussed above. Possible effects to water quality, riparian areas and stream channel depend upon the extent and intensity of the ground disturbances. Effects on water quality may include increases in sedimentation and turbidity with subsequent channel aggradation. Some of the riparian and floodplain areas may be compacted and disturbed, but the effect would be minor. Design features and BMPs all contribute to the prevention of sediment delivery to streams and impacts to riparian areas or wetlands. The amount of actual sediment delivery is

expected to be negligible. Therefore streams, riparian areas and wetlands are expected to experience minimal, short-term and insignificant effects.

3.3 Soils

Affected Environment

Atwood Dam is within the High Uintas Wilderness and the Roosevelt Ranger District. The elevation of the project area ranges from approximately 11,000 to 11,050 feet with the dam spillway listed at 11,030 feet. The landscape is derived from glacial processes. Steep mountains are flanked by talus slopes and boulder fields and broad glacial basins; and valleys contain deposits of lateral moraines, numerous lakes, and small meadows. Vegetation at this elevation is dominated by Engelmann spruce/grouse whortleberry forest stands and subalpine meadows with plane-leaf willow as the common shrub species.

Soils reflect the parent material, vegetation patterns, and climate. Uinta Mountain quartzite is the dominant parent rock and weathers into soils that are acidic (high in silica), often skeletal and coarse-textured, and poorly developed. Areas of glacial scour correspond with areas of shallow to moderately deep soils, and areas of glacial deposition have moderately deep to deep soils. Concave slope positions typically support meadow communities where finer earth materials and more organic materials have collected and developed into soils with organic surfaces that exhibit signs of wetness and saturation. Numerous seeps and springs are present where glacial deposits are shallow to moderately deep over bedrock. At this high elevation, soil climate is defined as cold and wet. This soil climate may account for the rapid decomposition and low accumulation of forest litter, and the ability for plant communities to recover from disturbance. The project areas around Atwood Dam are within a glacial valley with a general 0-15% slope gradient, and there are no indications of landslide hazards or other mass wasting events.

All project areas except for borrow sites are on stable slopes, with low (0 to ≤ 5%) bare soil surface cover. Native plant communities are supported and no noxious or invasive plant species was observed in the field assessment. Detrimental soil disturbance is absent except for microsite pockets and soil condition is uniformly satisfactory.

Bennion Park: This area is outside the wilderness, approximately 15 miles southeast of Atwood Dam within the Roosevelt Ranger District. The proposed staging area would use an approximate 0.1 mile section of FR 305 and approximately 0.5 acres (total) of meadow flanking the road. Soils at this location are very shallow (less than 10 inches) to shallow (10-20 inches) over bedrock. Bare soil is less than five percent and unvegetated areas are covered with gravel-sized rock fragments. The plant community reflects the low available water with a dominant cover of sheep cinquefoil.

No wet meadow areas or sensitive (hydric) soils are in the proposed staging area (Huber, 2014). The existing condition in the area is stable, and supports the native plant community.

Outlet, Weir and Flume Construction Areas: The stream channel at the current outlet is approximately 10 feet wide and the channel banks are stable with an estimated 40 percent cobble and boulder-sized rock fragments that should reduce mechanical impacts (Plunkett, 2014).

The existing streambank conditions include no evidence of bank erosion or compaction, and the banks have effective surface cover with no bare soil visible. The banks are well vegetated with sedges, grasses, and plane-leaf willow.

Meadows Below the Dam: The meadow areas directly below the dam support native vegetation and have a satisfactory soil condition with no indications of erosion or compaction and less than five percent bare soil surface cover. The area north of the outlet channel is slightly higher, rockier, and has a substantial canopy of plane-leaf willow adjacent to the channel. The meadow south of the outlet has a subalpine meadow community with pockets that are extremely saturated. The meadow contains numerous seeps and springs and some areas have a three to five percent cover of moss. Both the Forest Ecologist and the Forest Hydrologist determined the meadows receive water only in part from dam seepage: natural flow and seeps in the meadows would maintain the current plant communities after project completion (Huber, 2014) (Plunkett, 2014).

Borrow Areas: Past dam construction excavated the glacial drift on both sides of the current dam crest. Most of the north and south borrow areas remain devoid of vegetation with extremely gravelly, sandy-textured soils and areas of exposed bedrock. These borrow areas are consolidated and stable and have minor sheet and rill erosion. Most borrow material would come from inside the receded lakebed and the excavation would not impact soil and watershed resources.

Proposed Camp Site and Horse Forage Area: The proposed camp site area is just south of the dam and between Atwood and Allred Lakes. This is a dry meadow area with some Engelmann spruce and subalpine fir. The camp site provides sufficient space for the duration of the project, maintains 200 feet distance from the lake, and has a zero to five percent slope gradient. Soil condition was evaluated to be satisfactory with minor sheet erosion and a few pockets with slight compaction. The camp area has effective surface cover and supports a native plant community of forbs and grasses.

Forage area needed for mules and horses is estimated to utilize up to 155 acres of meadow areas that are within a one mile radius of the work site (Huber, 2014). One of the potential pasture areas is just south of the proposed campground. This area has

proven resilient to common pasture use and monitoring in 2011 recorded 100 percent surface cover of vegetation.

Spillway: The current spillway from Lake Atwood flows south to Allred Lake. This was a natural channel before the dam was built and water flows increased. The upper (northern) portion of the spillway has very shallow soil (less than 10 inches) over flat quartzite bedrock. As the spillway moves south toward Lake Allred the slope gradient increases and it divides into numerous channels within meadow and plane-leaf willow communities. Most channels are rill-sized (19 inchs or less in depth) and some wider and deeper gully channels have formed. Some headcutting and piping below the turf has occurred, but erosion is naturally checked once the channel reached bedrock or boulders at a shallow to moderately deep soil depth. The area was evaluated to be stable with satisfactory soil condition, and indicated there was no need to create a new spillway outlet.

Soil condition and soil quality factors were used to evaluate the current status of soils in the project area and to evaluate potential impacts of the proposed action on the soil resource. Soil condition noted the existing and potential development of soil erosion and soil compaction from the project. Both soil erosion and soil compaction are used in the region as indicators of detrimental soil disturbance. Soil quality evaluation focused on effective ground cover and the health of perennial plant communities. Ground cover provides stability and resistance to soil loss and ground cover from plants provides key nutrients for the soil. The distribution and productivity of the perennial plant communities reflects the health of the soil resource.

Direct and Indirect Effects

Alternative 1 – No Action

Under the no-action alternative repairs to Atwood Dam would not take place. Existing conditions in all areas associated with dam construction would receive no additional impacts. The existing soil condition and soil quality recorded during the July 2014 field review would remain.

Trends that would continue under the no-action alternative are continued seepage along the dam and increased saturation of soils in the meadow areas as a result. The likelihood of the dam outlet failing and releasing a large volume of water would increase without the dam repairs. If the dam failed, soil erosion and soil deposition would occur within the Atwood Creek channel and in the adjacent floodplain. Soil and vegetation could be buried, flooded, or removed by the flow. Effective ground cover and surface soil would be lost and soil quality and vegetation productivity reduced due to impacts.

Alternative 2 – Proposed Action

Direct effects from the proposed action are soil displacement, soil compaction, and loss of vegetation productivity. Soil displacement would result from heavy equipment use including taking borrow material, excavating the trench along the dam footslope, and any excavation required to install the weirs, flume, and outlet. Additional soil displacement would result from repeated passes of the heavy equipment in work sites and in the corridors to reach project areas, impacting the meadow areas on both sides of the outlet channel. Displacement of soil leaves it prone to erosion, damages soil structure, and mixes soil material so the original surface “A” horizon is diluted or lost. Mixing of soil horizons alters the soil physical, chemical and biological properties and can result in reduced ability to support vegetation. The soil material excavated from the south staging area and adjacent hillslope represents soil lost to the area for the purpose of needed fill material. The rocky nature of the soils and the design criteria in place would reduce impacts and the soils are expected to regain stability within a year. Sensitive, wet meadow soils would have minimal impact due to the planned access for much of the construction using the north side of the channel. Where wet soils are displaced they are expected to restabilize and revegetate within one growing season due to high precipitation of the area and the vigor of the perennial plant communities.

Soil compaction would result from the weight and vibration of heavy equipment, the staging of supplies and the use of helicopters to move supplies. Human foot traffic in and between project areas can also add to compaction, and the area of the campsite and forage pasture would be impacted from human and pack animal use. Compaction alters the soil structure and porosity and can result in bare soil and increased surface runoff. Compacted soil can restrict plant root growth and may have reduced vegetation productivity. Much of the project area has a potential for compaction. Impacts are expected to be reduced by the high rock content of the soils, sandy-textured soils in the dam toeslope and Bennion Park areas, and by design criteria of the project. Equipment impacts would be reduced by using track mounted equipment and by using road and past areas for staging supplies and helicopter flights.

Vegetation in the project area would be impacted by heavy equipment passes and soil excavation, the impacts of supply storage and human and animal traffic, and by using meadow areas for pasture. The area where vegetation is excavated is minimal: most vegetation impacts would include compression and the vegetation should recover given the high precipitation and existing soil and vegetation condition. Forest monitoring studies for the project area indicate the native plant communities have not sustained long-term damage from past dam construction, or recreational use for campsites and pasture.

Indirect effects from the proposed action are soil erosion, reduced effective ground cover, and loss of vegetation productivity. Soil erosion could result after initial soil

disturbance as a result of reduced plant canopy cover, loss of plant root support and reduced effective ground cover provided by litter (mainly moss and lichens). Areas where soil is compacted would be more prone to surface runoff and erosion due to reduced water infiltration. Areas where the soil is displaced by excavation or equipment traffic would be prone to increased erosion due to the loss of vegetation and soil structure. Soil erosion removes the most fertile and biologically active surface horizons and can result in reduced vegetation productivity.

Effective ground cover would be reduced in areas that have damaged (trampled) or removed vegetation and where secondary erosion removes protective litter and coarse woody debris. The dam toeslope, a portion of the outlet channel, and portions of meadows flanking the outlet channel would have some impacts to ground surface cover. Impacts to effective ground cover should be short-term (one year or less) due to the high vegetation cover of the overall area.

Vegetation productivity would be impacted where soil erosion results in reduced soil function for supporting vegetation- including physical support, hydrologic function and the ability to retain and cycle nutrients. Vegetation productivity could be reduced along the toeslope trench and the stream bank areas impacted by construction. Any reduction in the plant community is expected to be short-term (one year or less), due to the high plant productivity of the area and monitoring studies that indicate resilience to disturbance.

Tables 3 and 4 below summarize direct and indirect effects of the proposed action (Alternative 2).

Table 3 – Soil Resource Direct Effects for Alternative 2

Indicator	Cause of Soil Disturbance	Area and Area Footprint	Degree of Disturbance
Soil Displacement Mechanical	Soil excavation to bury pipeline, install weirs, outlet, and flume. Repeated passes of track equipment for access. Excavating area for borrow material.	Dam toeslope: 0.2 acres Meadow, stream channel area: 0.4 acres South staging and hillslope area: 0.95 acres	Highest disturbance for 570 feet of trench to bury perforated pipe. No long-term (less than one year) impacts expected for any area.
Soil Compaction	Soil compaction due to weight and vibration of track equipment; helicopter landing, supply staging; foot traffic, horse traffic, campsite use	Bennion Park: 0.5 acres Dam toeslope: 0.2 acres Meadow, stream channel area: 0.4 acres South staging/work site: 0.85 acres Horse pasture area: 155 acres Campsite: 4 acres	Highest compaction in meadows where soils are finer textured and often hydric. No long-term impacts expected for any area.

Indicator	Cause of Soil Disturbance	Area and Area Footprint	Degree of Disturbance
Vegetation Productivity	Construction that tramples or removes vegetation. Use of vegetation for forage. Camp/supply objects on top of vegetation.	Meadow, stream channel area: 0.4 acres Horse pasture area: 155 acres Campsite: 4 acres	Highest impacts to vegetation from track equipment in meadow. No long-term impacts expected in any area.

Table 4 – Soil Resource Indirect Effects for Alternative 2

Indicator	Cause of Soil Disturbance	Area and Area Footprint	Degree of Disturbance
Soil Displacement Erosion	Erosion due to reduced vegetation (reduced canopy cover, root support, litter as cover). Erosion due to compaction. Erosion due to excavation disturbance.	Dam toeslope: 0.2 acres Meadow, stream channel area: 0.4 acres Horse pasture area: 155 acres Campsite: 4 acres	Meadow area most susceptible to erosion. No long-term (less than one year) impacts expected in any area.
Effective Ground Cover	Reduced effective ground cover due to construction damage/removal of vegetation.	Dam toeslope: 0.2 acres Meadow, stream channel area: 0.4 acres	Highest loss of cover along dam toeslope in area where vegetation/soil removed for trench. No long-term impacts expected for any area.
Vegetation Productivity	Reduced vegetation productivity due to soil erosion loss: soil quality reduced to support vegetation.	Dam toeslope: 0.2 acres Meadow, stream channel area: 0.4 acres	No long-term impacts expected for any area.

Cumulative Effects

Spatial and Temporal Bounds for Effects Analysis

The spatial extent of analysis for the soil resource corresponds with the hydrology resource and defines spatial extent as the area within the boundaries of the 6th level watershed. The approximate 0.5 acre area of Bennion Park where outside staging would occur would also be added, but impacts would be absent to minimal in that area.

The temporal bounds of analysis go back 62 years and extend to 10 years into the future. These bounds were chosen because the dam was built to its current capacity in 1952, permanently altering the natural soil condition in that area, and after ten years, it is anticipated that soils and vegetation from the construction impacts would be completely stabilized and revegetated fully. This area has also demonstrated full recovery from the initial dam construction and periodic dam maintenance that involved even greater levels of ground disturbance than the proposed action.

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Recreation use of the project area spans historic, present, and foreseeable future time spans. Recreation impacts include use of the area for camping, animal forage, and as a route corridor to other areas within the Uintas Wilderness. The July 2014 review included several areas of campsites that have been used since the 1950's, and areas of common forage use and found no evidence of detrimental soil disturbance. Very small pockets of soil sheet erosion and soil compaction were noted but their extent was less than a half acre and did not indicate disturbance that altered soil condition or quality. Therefore, recreation use would not add cumulatively to impact soil resources.

No cumulative effects are expected when combined with the proposed action from past, present, or foreseeable projects because the effects are very small in extent, or there are no other ongoing projects or anticipated projects within or adjacent to the project area.

Summary of Effects

The no-action alternative (Alternative 1) would result in no impacts associated with the Atwood Dam repairs, including construction areas, corridors to work areas, staging areas, borrow sites, or impacts from workers camping on site and horses requiring pasture area. The non-action alternative has the potential for impacts on the soil and greater watershed resources if the outlet should fail, releasing a large volume of water. Impacts expected from dam failure include scouring and erosion of the Atwood Creek channel and the surrounding floodplain, soil erosion and deposition to an unknown extent downstream of the outlet, and flooding and damage to the plant communities in the watershed corridor. Soil quality is highly dependent on the biologically active surface horizons and would likely be detrimentally disturbed due to surface erosion, soil and debris deposition, saturation of soils, loss of effective ground cover, and damage to the plant communities.

The proposed action (Alternative 2) would result in impacts within the identified project related areas that have an approximate 161 acre extent (see Table 2). Impacts would include: soil displacement from construction work and excavation; soil compaction from equipment weight and vibration, helicopter landings, supply storage, camping,

and human and pack animal traffic; loss of effective ground cover from vegetation being trampled or removed in construction and meadow vegetation used for forage; and soil erosion caused by compaction, reduced effective cover, and soil displacement.

Minimal impacts on the soil resources are expected from the proposed action. The design criteria and best management practices associated with the proposed action limit detrimental disturbance to soils. Given the documented resilience of the area in several Range-ecology monitoring studies, and the uniformly satisfactory soil condition noted in the field review, what impacts may occur to the soil resources are predicted to be short term, or approximately one year before indications of returning soil stability and revegetation occur. All mechanical impacts are minimal when assessed. The helicopters would be landing on the dam crest; the south staging area; a section of FR 305 and potentially on the adjacent meadow that is shallow to bedrock. These sites are inherently stable and resistant to impacts due to the consolidated and rocky nature of their surfaces. The two mini excavators and skid steers that would be used for construction are track mounted with minimal compaction impacts. Areas where soil would be excavated or displaced by construction are expected to resist erosion because of their high rock content. The plane-leaf willows that are abundant along the banks of the outlet creek and within pockets of the meadows to be disturbed are resistant to disturbance and re-sprout from the roots. Other vegetation is expected to recover rapidly from disturbance due to the high precipitation zone of the project and the existing soil and vegetation condition. As a result, there would be no significant effects to soil resources from the proposed action.

3.4 Recreation and Roadless

Affected Environment

The project area is located in the Uinta Mountains in the Uinta River Drainage within the High Uintas Wilderness (HUW). The HUW was created on September 28th, 1984; and is comprised of around 276,175 acres on the Ashley National Forest and about 180,530 acres on the Uinta Wasatch Cache National Forest for a total of approximately 456,705 acres. The HUW was created from the existing High Uintas Primitive Area and other lands that qualified for wilderness evaluation according to National Forest Management Act regulation 219.7. The High Uintas Primitive Area was created on April 27, 1931 under the Secretary of Agriculture Regulation L-20.

The main crest of the Uinta Mountains runs east to west for more than 60 miles rising above the Wyoming Basin on the north and the Uintah Basin on the south. From the mountain range crest, secondary ridges extend north and south forming glacial basins which contain hundreds of lakes, streams, and meadows. The Uinta Mountain rise from 7,500 feet at the lowest point to 13,528 feet at the summit of Kings Peak, offering

diverse habitat for a wide variety of flora and fauna as well as numerous recreational opportunities, with an extensive network of about 545 miles of trail within the HUW.

The Lake Atwood Area is a moderately used wilderness destination, primarily used for backpacking, stock pack trips, and fishing in the summer months of mid-June through early September. In 2005, the Atwood Basin Area was identified as one of 18 areas within the High Uintas Wilderness where campfires and firewood collection are prohibited within ¼ mile of lakes because of many years of heavy campfire use and slow rates of natural recovery. Forest Trails 044 and 043 are moderately used. Forest Trail 044 begins at the Uinta Canyon Trailhead and accesses the northern portion of the Uinta Drainage as well as Painter Basin at the foot of Kings Peak. Forest Trail 043 begins at the Sheep Bridge crossing of the Uinta River, 3.5 miles from the Uinta River Trailhead and 0.5 miles from the wilderness boundary. The Bennion Park area is located one mile west of the Elkhorn Loop Road - FR 117 on the northwest end of Pole Mountain is moderately used for RV dispersed camping, mainly from July to September.

The Recreation Opportunity Spectrum for the The Lake Atwood Dam project location is classified as primitive (P) and the Bennion Park Helispot is classified as semi-primitive motorized (SPM). The Primitive classification is characterized because the area is an essentially unmodified, natural environment of fairly large size. Interaction between users is very low and evidence of other users is minimal. The area is managed to be essentially free from evidence of human-induced restrictions and controls, and motorized use is not permitted. The Semi-Primitive Motorized classification is characterized because the area as a predominately natural or natural-appearing environment of moderate-to-large sized. Concentration of users is low, but there is often evidence of other users. The area is managed in such a way that minimum on-site controls and restrictions may be present, but are subtle and motorized use is permitted. Table 5 illustrates the resource indicators and the current conditions of the project area.

Neither Lake Atwood nor Bennion Park are located within Inventoried Roadless Areas.

Table 5 – Recreation Resource Measures, and Effects For the Alternative 1.

Resource Element	Resource Indicator	Measure	Existing Condition (Alternative 1)
Recreation Opportunity Spectrum Class - Primitive	Human induced restrictions and controls	No human induced controls are evident	Lake Atwood Dam has been in existence in its current state since 1952. No other evidence of human controls in the analysis area.

Resource Element	Resource Indicator	Measure	Existing Condition (Alternative 1)
	User Interactions	Low level of user interactions	Light to Moderate Use in the vicinity of Atwood Dam and on Trails 044 and 043 depending on time of year and day of the week.
Recreation Opportunity Class –Semi-Primitive Motorized	Human induced restrictions and controls	Minimal human induced controls	Bennion Park has few human induced controls. The controls existing are the operational maintenance level 2 roads through the area.
	User Interactions	Low level of user interactions but evidence of other users.	Light use in the Bennion Park Area depending on time of year and day of the week.

Direct and Indirect Effects

Alternative 1

Current recreational opportunities would remain the same with Alternative 1. As a result, there would be no direct or indirect effects of the project on recreation. However, the dam would not be repaired and a no storage order would be issued. By not repairing the dam, there would be the possibility of a future dam failure and an associated high water release event in which Forest Trails 043 and 044 could experience significant damage and endanger visitors to the area.

Alternative 2

Access to Lake Atwood would be closed for public use during the equipment transportation phase of the project; this could affect camping and fishing opportunities for forest visitors. However, once transportation of equipment was completed, access to the area around Lake Atwood would resume. The area around the dam itself would be closed to the public for the duration of the project. Temporary closure of two to three days would occur in June and one to two days in September for Forest Trails 043 and 044 during the helicopter equipment transport portion of the project. During these periods, wilderness visitors would be required to select an alternative route to their planned destination or select an alternate destination.

Approximately three miles of the Uinta River Trail 044 and 12 miles of the Atwood-Chain Lakes Trail 043 would be used by pack stock to transport tools, camping

equipment, food, and other personal supplies. A total of about 20 pack trips (round trips) with approximately eight pack animals for each trip would be necessary for the completion of the project. Once the project were underway, pack trips would occur at approximately seven to 10 day intervals; although this could vary depending on the needs of the construction crew. This would be an increase in trail use compared to what recreationists normally encounter. The heavy trail use would also cause increased trail erosion. This impact would be addressed by installing additional drainage structures on the trail before the project begins.

During preparation for helicopter operations and during the actual helicopter operations in June and September, dispersed camping activities would be affected in the Bennion Park Area, off of FR 305 and 305A. It would be necessary to transport the project equipment and supplies several days before helicopter operations, therefore the Bennion Park Area would be closed to dispersed camping for one to two weeks in June and again in September for about one week. The Elkhorn Loop Road - FR 117 is a narrow winding road which is open to ATV traffic. One-way distances from the forest boundary to Bennion Park are approximately 7.5 miles from the Uinta side of Pole Mountain and 16.5 miles from the Elkhorn side. Transport of equipment and supplies to Bennion Park in preparation of helicopter operations could create safety concerns on the road due to the increased vehicle traffic mixed with ATV use on the Elkhorn Loop Road. This would be addressed through signage and equipment transport on weekdays.

Indirect effects could include increased use in other areas of the wilderness, but with the moderate use of Lake Atwood and the many other destination lakes in the area there would be little effect on the recreational experiences of visitors. No other indirect effects would occur after completion of the project.

The closure of the Bennion Park area for up to two weeks in June and again in September for about one week would increase use in other dispersed camping areas in the Pole Mountain areas. The Bennion Park area experiences low to moderate use depending on the day of the week. The potential distribution of dispersed camping from Bennion Park to other dispersed camping areas in the area would have a negligible impact on recreation resources and visitor experience. Table 6 summarizes the effects of Alternative 2 on the resource indicators.

Table 6 – Recreation Resource Indicatorsand Effects for Alternative 2.

Resource Element	Resource Indicator	Measure	(Alternative 2)
Recreation Opportunity Spectrum Class - Primitive	Human induced restrictions and controls	No human induced controls are evident	Lake Atwood Dam would continue to exist. The Lake Atwood dam construction area would be closed to public use during the months of the project.
	User Interactions	Low level of user interactions	The sections of trails 043 and 044 leading to Lake Atwood would see substantially more use increasing user interactions to beyond what would normally be found. The Lake Atwood Area dam site would be closed to public use during the months of the project. Sections of trails 043 and 044 would be closed for 2 – 3 days in June and 1-2 days in September for helicopter operations.
Recreation Opportunity Class –Semi-Primitive Motorized	Human induced restrictions and controls	Minimal human induced controls	The existing human induced controls in the Bennion Park area would remain the same.
	User Interactions	Low level of user interactions but evidence of other users.	The Bennion Park area would be closed to public use for up to 2 weeks in June and up to one week in September, before and during helicopter operations.

Cumulative Effects

Spatial and Temporal Bounds of Effects Analysis

The spatial scope for recreation resources cumulative effects is the Lake Atwood Basin between Roberts Pass and Trail Rider Pass, which includes Lake Atwood, Roberts Lake, Allen Lake, Carrot Lake, B-29 Lake, Lake George Beard Lake, as well as Bennion Park and the areas of the Forest accessed by FR 305 and 305A. The

Lake Atwood Basin area was selected because it provides an adequate scale for analysis of cumulative effects to recreation resources. The spatial bounds for the Bennion Park helispot and staging area were selected because the proposed activities and effects would be confined to that area.

The temporal scale of cumulative effects analysis for recreation resources is from 1984 to 2015. This period begins at the designation of the High Uintas Wilderness in 1984 to the end of the project implementation period. This period was chosen because at the time of the wilderness designation regulations were implemented against motorized transportation or mechanized equipment use in the area and the recreational opportunities have not changed in the area since that time. Upon the completion of the project, the closure of the Lake Atwood construction area would be lifted and recreational opportunites would resume as they had prior to the project implementation.

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis.

Cumulative effects are from the incremental impact of an action when added to other past, present, and reasonably foreseeable actions. There are no present or foreseeable future actions within the spatial scale of the Lake Atwood basin that would affect the ROS classification of Primitive. Recreational activities, fishing, backpacking, stock pack trips, and camping would continue in the Lake Atwood Basin Area as before the project and use levels would not change in relation to completion of the proposed dam repair project. Evidence of human controls from the exisiting dam will remain present, however the dam was in existence prior to the establishment of the High Uintas Wilderness and the designation of the Primitive ROS classification. The function of the dam would not change following project completion, and would remain a human control at the same level as prior to the project.

The Lake Atwood and Chain Lakes areas are moderately used wilderness trip destination areas. The effects on the portions of Trails 043 and 044 would be increased trail use from pack strings transporting supplies to and from the project site. User interactions on the sections of Trails 043 and 044 leading to the Lake Atwood project area would increase beyond the “low levels of human interaction” during the project period but would return to the previous state upon project completion. No other actions besides routine trail maintenance are planned in the foreseeable future on Trails 043 and 044 leading to Lake Atwood.

There are no present or foreseeable actions in the Bennion Park area that would affect the ROS classification of Semi-Primitive Motorized. The area of the forest that can be accessed by FR 305 and 305A would be closed for one to two weeks in June and one week in September for helicopter operations, outside of which recreational

activities would be able to continue unchanged. There would be no additional human controls implemented in the area beyond those currently existing and human interactions would remain low upon completion of helicopter operations. Therefore, cumulative effects on recreation would not be anticipated as a result of this project.

Summary of Effects

If Alternative 1 were selected, recreational activities would not change, but the possibility of a dam failure with this alternative presents visitor safety issues as well as potential damage to the trail system downstream of the lake.

If Alternative 2 were chosen there would be some impacts to recreation because of the closure of the dam area, access restrictions during equipment transport, and increased trail use. However, these impacts would occur for the approximately three month project period and would be removed upon completion of the project. Effects to recreation would be minimal because alternative recreation sites are available in the surrounding areas that contain comparable recreational opportunities. There would also be impacts to recreation during helicopter operations with the closure of the Bennion Park area and segments of Trails 044 and 43. User interactions would increase during the project period with the number of pack trips that are necessary for the initial campsite and camp resupply. Bennion Park would be closed to public use for one to two weeks prior to the beginning of helicopter operations in June and up to one week at the conclusion of the project in September.

In summary, although short term impacts (three months) to recreation resources would occur with Alternative 2, the failure of the dam and the related visitor safety issues associated with Alternative 1 of not repairing the dam is not preferable. Additionally through following the recommended design criteria, the proposed project would conform to the objectives standards and guidelines in the Ashley National Forest Plan. Therefore Alternative 2 is preferred.

3.5 Wilderness

Affected Environment

Atwood Basin, including Lake Atwood, lies in the eastern half of the High Uintas Wilderness (HUW) making up a portion of the Uinta River drainage. The HUW is part of the National Wilderness Preservation System (NWPS), which was created by the Wilderness Act of 1964 (PL88-577) and was designated wilderness by the Utah Wilderness Act of 1984 (PL 98-428). Approximately 465,000 acres were designated.

This basin is approximately 3,000 acres in size and, besides Lake Atwood, it also contains Allred Lake, Allen Lake, Carrot Lake, B-29 Lake, Roberts Lake and Lake George Beard. Most use is concentrated around these fishable lakes. Most of the

present Wilderness use occurs on less than 10% of the total area (Ashley NF Forest Plan 1986, p. IV-7).

Atwood Basin receives a moderate amount of use for the HUW; visits to the basin by Forest Service personnel during July 2013 and July 2014 (typically high use periods in the HUW) noted very light visitor use. Visitors to the basin typically access it from the Uinta Canyon Trailhead (approximately 16 miles).

Most use occurs from mid-June through early September. Due to early snows and poor trail and pass conditions in the fall, hunting use is light. The Atwood Basin meets most of the fundamental parameters of high quality wilderness resource area. There are exceptional opportunities for primitive recreational experiences and opportunities for solitude. It is typical of the quiet backcountry that one expects in a wilderness setting – free of noise other than from nature's activities. Natural processes predominate in the area, and the imprint of human activity is relatively unnoticed (with the exception of the reservoir itself) and there are good opportunities for meeting other valuable purposes for which wilderness areas were established including scientific study, scenic beauty, educational opportunities and historical values.

The area has some wilderness detractions, primarily the human-made reservoir, and some scars upon the landscape from borrow areas used in the initial construction of the reservoir. However, the reservoir isconsidered a historical structure, and there are other associated historical items in the vicinity including old tools (fresno scrapers) and remains of a cabin occupied at the time of reservoir construction. These structures were present prior to the area being designated Wilderness. Overall, wilderness values are high.

The High Uintas Wilderness (HUW) Management Plan separated the Wilderness into Desired Condition Classes based on the amount of human visitation, existence of structures, and permitted livestock grazing. Several factors are considered when classifying an area of wilderness including it's degree of being untrammeled, natural, undeveloped, it's opportunities for visitors to find solitude or primitive unconfined recreation, and other features of scientific or historic values. Table 7 illustrates those factors (resource indicators) as they exist for the current condition.

<u>Untrammeled</u>

The 'untrammeled' character of wilderness is diminished by human manipulation of water (storage and timed releases) within Lake Atwood and downstream from the lake. This situation was present prior to Atwood Basin being first considered as Wilderness and then being designated Wilderness in 1984.

The rest of the basin remains untrammeled in character. The 'untrammeled' wilderness character beneath the proposed flight path is also intact.

Table 7 - Wilderness Resource Indicators and Measures for the Existing Condition.

Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Existing Condition (Alternative 1)
1. Untrammeled	Operation and maintenance of a reservoir (Lake Atwood). Storage and regulated release of water.	Diminished in the vicinity of Lake Atwood and will continue as long as reservoir is operational, however, undiminished in the rest of the basin. Undiminished along flight path.
2. Natural	Displacement of wildlife and vegetation within Atwood Basin. The size of Lake Atwood has been enlarged though human actions. Visitors tend to concentrate around fishable lakes.	Aquatic, vegetation, and wildlife systems are impacted in the vicinity of Lake Atwood, the dam, and downstream of the dam, however, basically intact in the rest of the basin. Insignificantly impacted along flight path.
3, Undeveloped	Human caused disturbances to the natural visual resource Structures, vegetation clearing, ground disturbances.	Diminished in the vicinity of Lake Atwood (dam, cabin, discarded materials), however, undiminished in the rest of the basin and along the proposed flight path.
4. Solitude or Primitive and unconfined recreation	Intrusive noises from outside sources. Facilities for human conveniences, or use manipulation. Distance to the wilderness boundary, motorized travel ways, developed fire rings, restrooms, designated campsites	Outstanding opportunities.

Resource Indicator (Quantify if possible)	Measure (Quantify if possible)	Existing Condition (Alternative 1)
Other Features of Value	Historical Remnants Lake Atwood dam with its outlet works The cabin used during construction of the dam Remnants of discarded equipment and trash	Remnants still quite visible to the public.

Naturalness

Fluctuations of water levels, variations in shorelines of naturally occurring alpine lakes typically change less than that of a manmade reservoir over the same amount of time. As water is drained from Lake Atwood, a bare shoreline is increasingly exposed as the water level lowers. The old shore line of the original Lake Atwood was flooded when the dam was constructed in 1933. Plant and animal species dependent on naturally occurring shorelines were displaced from Lake Atwood when the dam was finished and the water levels came up. As long as the reservoir is operated, this wilderness character will continue to be impacted in the immediate vicinity of Lake Atwood but is quite intact in the rest of the basin.

Over the years, the disturbed soils from construction of the dam have stabilized and are less prone to create a dust cloud. The clarity of the air in the basin is also clear. Along the proposed flight path, the 'natural' wilderness character remains intact and not subject to the operation of the reservoir.

Undeveloped

Lake Atwood dam was first constructed in the 1933 and last modified in 1952. Including the dam, there is still an old cabin and remnants of trash from that time period. This 'developed' condition was present prior to Atwood Basin being considered for and later being designated a Wilderness.

Along the proposed flight path, the only occurrence of modern human occupation are the foot trails constructed and maintained for access through the wilderness.

Solitude and Primitive Recreation

Because of its location well within wilderness boundaries (about 13 miles), Atwood Basin has outstanding opportunities for visitors to get away from the sights and sounds of activities associated with outside the wilderness. There are no facilities that decrease self-reliance. Visitation is light to moderate.

Other Features of Value

Water storage and control structures were first constructed in the 1920's and then altered or enlarged at various times up until 1952. This was all accomplished prior to the area being designated Wilderness. The outlet works which control the amount of water being released through the dam are also still in place and in operating condition. A cabin which was also constructed some time during this period is also still standing although it is showing its age (roof leaking, etc.).

Direct and Indirect Effects

Those factors mentioned just above are used to compare the effects between alternatives and to determine the level of effect the proposed action could have on the wilderness and to what extent.

Alternative 1 – No Action

No repairs on the dam would be completed. Over time the potential for the dam to fail could increase. The lake would still retain water in the late spring and early fall because the inflow of water would exceed the possible outflow from the outlet works. Since the lake is quite large at about 205 acres, a storage capacity of 2,699 acre-feet, and a maximum depth of over 20 feet, the probability exists for extensive damages that would occur specifically to the stream channel and fisheries downstream from a large volume of water rushing at high velocities downhill.

Impacts to the existing level of 'untrammeled' wilderness character would remain about the same. Water would continue to back up into the lake and would be released at a rate dependent on downstream agricultural needs.

'Natural' ecological systems would remain at current conditions unless a catastrophic dam failure occurred with significant risk of damage to downstream resources. Lake Atwood is not a natural lake and does not fluctuate in natural behavior since it is used as a storage reservoir.

Over time, nature would reclaim the areas scarred from the construction of the dam back in the 1930's. The old cabin will eventually rot away and vegetation will eventually recover the disturbed ground. However it has been over 90 years since the dam was constructed and these sites are still evident. The 'undeveloped' standard for wilderness will remain impacted for the foreseeable future.

Visitors to the area would still find outstanding opportunities for solitude and to enjoy a primitive and unconfined recreation experience.

The dam and associated facilities were first constructed starting in the 1920's and finishing in 1952. The outlet works which control the amount of water being released through the dam are also still in place and in operating condition. The cabin which

was also constructed at the same time is also still standing although it is showing its age (roof leaking, etc.).

Alternative 2 – Proposed Action

If Alternative 2 were selected, there would be changes to wilderness characteristics associated with the project. Changes to wilderness characteristics would be limited to the period of time involved with the repair project (approximately 120 days). During this period, the area directly in the vicinity of the dam, and at a decreasing amount farther from the dam, a visitor would be impacted by the existing and project generated effects to trammeling. Once the visitor leaves Atwood Basin, this impact would also be left behind. The project would not increase the negative impact the dam and associated disturbed ground already has on the area. The effects of the proposed action on wilderness characteristcs are described below.

Untrammeled

The untrammeled character of Wilderness would be reduced in the vicinity of Lake Atwood and in surrounding basin during short construction period. The water level will be drawn down as far as possible exposing large portions of the lake's shore line. Up until the point the water level has reached its lowest level, water velocities below the dam will be increased; all human manipulation. Human activities around the work site would be constant during the 120 day project period; wildlife use of the area could also be displaced.

Once construction is completed, the level of this character would return as before construction and would remain undiminished in the rest of the basin.

Overflights by the helicopter at the beginning (20-25 trips in 2-3 days) and at the end (10-15 trips for 1-2 days) of the project would dominate the skies above the flight path. The impacts could be considered minimal since the area would be closed to visitors. Wildlife may be displaced but only for those few days the helicopter is in the air, if at all.

Naturalness

Man's influence on the natural character of Wilderness would spread beyond the lake and the dam because of the noise, dust, and sight of construction activities, potentially throughout the entire basin and along the flight path of the helicopter. Naturalness would be diminished during the construction period (about 120 days).

Once the project is completed, the natural character would return to pre-project levels within a matter of weeks if not days.

Undeveloped

The undeveloped character would not change. This quality is already impacted by the dam, the old cabin, and discarded remnants of the dam's construction. No new facilities would be added to the area. The new outlet works would be incorporated into the old outlet works which are being preserved for historical value.

Solitude and Primitive Recreation

The activity required for the repair of the reservoirs would generate considerable noise and dust, and therefore affect the visitor's wilderness experience. Opportunities for solitude would be compromised for one to one and a half miles from the reservoir site. Noise travels fairly long distances in the normally silent backcountry, and winds and breezes can carry dust and smoke, from the equipment, fairly long distances. The mountain ridges forming the sides of Lake Atwood Basin would contain these impacts and provides a buffer to the surrounding areas against these disturbances. Lake Atwood Basin is approximately six square miles in size.

A visitor's opportunity for solitude within Lake Atwood Basin would be impacted from the noise and dust that would be generated from the repair activities However, this impact would last for the duration of the project and return to pre-project levels immediately upon completion of the repair work and would not extend into the rest of the HUW.

The ability to find solitude in the area beneath the flight path would be reduced during the days that equipment would be flown into the site and when it would be flown out at the conclusion of the project. However, that ability would return in between the flight periods and after the last flight out. It is important to point out that Trails 43 and 44 would be closed during the scheduled flights so no impacts would be felt on the trail footprints.

However, the ability to find solitude or primitive and unconfined recreation opportunities with the High Uintas Wilderness is still high when considering the area being impacted by the construction project relative to the size of the Wilderness as a whole (161 acres related to 456,000 acres or about 0.03% of the entire Wilderness).

Other Features of Value

The features of historic value would be preserved. The dam would have been repaired but would appear as it was prior to repairs being made.

Cumulative Effects

Spatial and Temporal Bounds of Effects Analysis

The spatial bounds of analysis include the 160 acre (five acres for the construction and campsite, and 155 acres for grazing) project area in the Atwood Basin. In

addition, the three miles of the Uinta River Trail and 12 miles of the Atwood-Chain Lakes Trail located within the wilderness are also included in the spatial bounds. These areas were used because that is the location of the project activities and potential effects within the wilderness.

The temporal bounds of analysis include the span of time for the implementation of the proposed action because that is when the effects of the proposed action would take place.

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis.

There would be no cumulative effects from implementation of Alternative 1 because there would no direct or indirect effects from that alternative.

There are no past or future activities that when combined with the proposed action would create a cumulative effect because the effects from the proposed action would be confined to the length of time during project implementation.

Expected activities that would be concurrent with the proposed action include use by other wilderness visitors of approximately two to three groups of campers each week (two to four individuals per group). The effects from these actions would be an additional four to 12 individuals in the basin each week. However, the visitor use in that portion of the wilderness would be expected to be less than normal visitation because the project would be posted at the beginning of the Uinta Trail and also through a press release prior to the beginning of the project. Additionally, the proposed action would occur on about 160 acres or 0.035 percent of the entire wilderness. There are numerous other lakes, and the majority of the wilderness away from the Atwood Basin that would be available for recreation and wilderness use. Because visitor use is expected to be less, and because the project effects would be confined to those three to four months of construction, no significant cumulative effects are expected as a result of the proposed action.

One's opportunity to find quality wilderness values (untrammeled, natural, undeveloped, solitude, and unconfined primitive recreation) remains high considering the small amount of affected area in relation to the amount of unaffected area remaining in the High Uintas Wilderness. The affects are also temporary, limited to one summer.

Summary of Effects

Alternative 1 - No Action

The dam on Lake Atwood, and associated structures, were already constructed prior to the reservoir and the surrounding area being designated Wilderness. The permit authorizing construction and maintenance of the dam is still in place. Wilderness

designation did not nullify the permit. Impacts to wilderness character were taken into account prior to designation. The wilderness character will always be diminished somewhat as long as these structures are in place.

There is a possibility of the dam to fail with this alternative. Immediately downstream, damage to the stream banks and surrounding lowlands could be significant. Depending on the time of year, this could also be a major safety issue where the stream is in close proximity to a hiking trail.

Alternative 2 – Proposed Action

The impacts to the wilderness character would be intensified during the construction period (about 120 days) but would revert back to existing conditions once construction were completed. The dam would still remain, and remnants of the old borrow site and cabin would be left for historical purposes.

In summary, the impacts to the wilderness character would be increased temporarily but would revert to pre-construction levels within a season. While there would be localized impacts to the wilderness characteristics, these impacts would not be significant when compared to the wilderness as a whole. Table 8 summarizes the effects between both alternatives.

Table 8 - Summary of Wilderness Effects for Both Alternatives.

Indicator/Measure	Alternative 1	Alternative 2
Untrammeled	No new structures would be constructed nor would existing structures be repaired. The flow of water would continue to be controlled by man thus continuing to diminish Wilderness's untrammeled character.	The dam would be repaired. Impacts to the untrammeled character would be the same as for Alternative 1 except during the construction period (120 days). During the construction period, camping, hiking, fishing, etc., in Atwood Basin would be informally controlled by the activity and noise of operating equipment, visitors just won't want to be there. At the start of the project (two days) and at the completion of the project (two more days) two hiking trails would be formally closed. The untrammeled character during this period would definitely be impacted but only temporarily.

Indicator/Measure	Alternative 1	Alternative 2
Natural	The existing reservoir would continue to operate, water levels would continue to fluctuate as water is stored and then released as it has done since first being constructed in 1933. The denuded shore line would grow as water levels fall with adverse effects to riparian functions. A potential dam failure would cause damage to downstream ecosystems.	Same as Alternative 1 except no potential for dam failure. During the 120 day construction period, the wilderness ecological systems would not be substantially free from the effects of modern civilization. The sights, sounds, dust, and smells associated with construction equipment, would permeate the basin. Wildlife sensitive to this would move out of the basin if they can or adjust their lives around the disturbances. This should only last during the 60 day construction period and be only a temporary impact.
Undeveloped	All existing structures would remain.	Same as Alternative 1. Construction activities require equipment. The site and sounds of working equipment is associated with development. This additional impact to this character would be limited to the 120 day construction period, only temporary.
Solitude or primitive and unconfined recreation.	Opportunities would remain high.	Same as Alternative. Opportunities would be greatly diminished during the 120 day construction period. Sounds of equipment would impact the entire basin. Camping opportunities would still be present but not with a feeling of solitude.
Other Features of Value	Historic remnant would be untouched	Same as Alternative 1 except that the dam is going to be repaired. The appearance once repairs are made would be very similar to the existing appearance.

3.6 Heritage

Affected Environment

Lake Atwood Dam was constructed 1921 under a permit from the U.S. Forest Service. Since the mid-1990s, Atwood Dam has developed a leak. Over time, minimal maintenance has been completed on the dam which has allowed the dam to maintain its historic integrity. The dam is an example of early 20th century irrigation practices which allowed the development of agriculture and communities in the Uinta Basin. Even though Lake Atwood Dam maintains historic significance, water is seeping through the dam which could begin to undermine the structural integrity of the dam.

Because of its age, Lake Atwood Dam is a historic structure that meets the criteria for listing on the National Register of Historic Places under the National Historic Preservation Act of 1966 as amended. The Forest is required to take into account how the proposed project may affect the historic dam. Cultural Resources may be identified as those resources either directly or indirectly related to the material life ways of a cultural group or groups as specified by the Code of Federal Regulations 36 CFR 296.3. Cultural resources may refer to sites, areas, buildings, structures, districts, and objects which possess scientific, historic, and social values.

Cultural resources are sensitive and irreplaceable resources that can be affected by a variety of activities and actions. The value of a cultural resource is intrinsic and relates to the educational, historical, cultural, aesthetic, and architectural properties of the resource.

In order to measure the effects to cultural resources, the Forest must take into account the nature, extent, and degree of the effect and determine if the effect will be “adverse” as defined in 36 CFR 800.5. An adverse effect is defined as any activity that “may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association” (36 CFR 800.5(a)(1)).

Cultural Resource indicators for this project are effects to National Register Eligible Sites within the area of potential effect for the project. Effects can be characterized as “potential effects,” “direct adverse effects,” and “indirect adverse effects”. The resource measure is the number of sites in each of these resource indicator categories. For this project, the dam is the only cultural site being evaluated for effects.

Direct and Indirect Effects

Alternative 1

Alternative 1 would have no direct adverse effects to cultural resources. However, this alternative could indirectly cause and adverse effect by allowing the dam to continue to deteriorate which could result in failure. The failure of the dam and subsequent erosion from the impounded water would severely damage the historic integrity of the dam. If the dam were abandoned because it could no longer be allowed to impound water, this could also potentially result in an indirect adverse effect because of natural erosional processes which would also deteriorate the dam over time. Table 9 illustrates the potential effects from the implementation of Alternative 1.

Table 9 – Cultural Resource Indicators, Measures, and Effects for.

Resource Element	Resource Indicator	Measure	Existing Condition (Alternative 1)
Cultural Resource Site	Potential Effects	# of cultural Sites	1
Cultural Resource Site	Direct Adverse effects	# of cultural Sites	0
Cultural Resource Site	Indirect Adverse Effects	# of cultural Sites	1

Alternative 2

The actions proposed in Alternative 2 could have direct adverse effects to the one cultural resource affected by the project (historic Lake Atwood Dam). Table 10 illustrates a summary of the potential effects from Alternative 2.

Table 10 - Cultural Resource Inidcators, Measures, and Effects from Alternative 2.

Resource Element	Resource Indicator	Measure	Alternative 2
Cultural Resource Site	Potential Effects	# of Sites within the Project Area	1
Cultural Resource Site	Direct Adverse effects	# of Sites with Potential **Direct** Adverse Effects	1
Cultural Resource Site	Indirect Adverse Effects	# of Sites with Potential **Indirect** Adverse Effects	0

The components of the proposal that could adversely affect the historic integrity of the dam include:

- The dam crest restoration;
- Headgate rehabilitation which includes removal of the existing historic wheel well, placement of a new wheel well on the crest of the dam, placement of gate

stem and vent pipe on the face of the dam, and installation of a new headgate on the inlet;
- The cutoff trench;
- The toe drains;
- The Cutthroat Flume;
- The water level gage; and
- The staging and excavation of local borrow materials.

However, the potential effects that could result from the above components of the project are addressed and reduced through design criteria 37-41 (see Chapter 2, p. 22 of this document), and as a result of the proposed action, there are no adverse effects anticipated to the historic integrity of the dam.

Cumulative Effects

Spatial and Temporal Bounds of Analysis

The spatial bounds of analysis include the project area in the vicinity of the dam and construction site because this is the area that could be most impacted from project activities. The temporal bounds of analysis for past activities include the initial construction of the dam from 1921 to the present, and the future temporal bounds include 50 years into the future because the historic integrity of the dam increases over time.

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

There are no past, present, or reasonably foreseeable activities that when combined with the proposed action would contribute cumulatively to effects. As such there are no cumulative effects anticipated from the implementation of Alternative 2.

Summary of Effects

If Alternative 1 were implemented, there would be no direct effects to the historic integrity of Lake Atwood Dam. However, there could be potential indirect effects to the structure from either dam failure, or continued deterioration of the dam if no repairs were made.

Alternative 2 would generate some effects to the historic aspect of the dam, specifically from the alteration of the wheelbox and the replacement of old equipment with new equipment, and installation of the crankshaft on the face of the dam. However, these potential effects have been addressed in design features 37-41 and keep the level of effects from becoming adverse.

As a result, Alternative 2 would be preferable to Alternative 1 because the integrity of the dam would be preserved and not allowed to deteriorate.

3.7 Terrestrial Wildlife

Affected Environment

The vegetation (wildlife habitat) around Atwood Dam consists of high mountain meadows (wet and dry) amongst a spruce fir forest. Willow occurs along the stream below the dam and grasses, forbs, and sedges make up the majority of vegetation in the meadows. The majority of the vegetation around the staging area at Bennion Park consists of dry meadows, lodgepole pine, and pockets of spruce/fir. Vegetation along the Uinta Canyon trail consists of wet and dry meadows, some willow, aspen, lodgepole pine, and spruce/fir. Wildlife habitat in the area appears to be in good condition and a variety of wildlife species were observed during the site visit in 2014 and surveys in 2011 and 2014. Additionally, vegetative communities in the area are considered to be at desired condition or trending towards desired condition. This is based on the numerous vegetative study sites (Huber 2014).

Wildlife species found during site visits and wildlife surveys in 2011 and 2014 included elk, deer, moose, three-toed woodpecker, Lincoln's sparrow, golden eagle, and a variety of other song birds. The American robin, gray jay, and dark-eyed junco seemed to be the most prevalent. Small mammals observed included chipmunk, squirrel, pika, and snowshoe hare.

Endangered, Threatened, and Proposed Species

The USDepartment of Interior Fish and Wildlife Service (FWS) Website provides a list of Threatened and Endangered species and Proposed and Candidate (TEPC) species for the counties in which the Forest resides (Duchesne, Uintah, Daggett, and Wasatch Counties). This list was accessed on August 18th, 2014. Table 11 below lists those TEPC species that occur, may occur, or have habitat that occurs within these counties.

Table 11 - Listed, Proposed (P), Candidate (C), Threatened (T), and Endangered (E) Wildlife Species of Daggett, Duchesne, Wasatch, and Uintah Counties of Utah.[1]

SPECIES	STATUS	HABITAT USE AND LOCAL DISTRIBUTION	REFERENCES
BIRDS			
Western yellow-billed cuckoo	C	Nests in lowland riparian habitats (typically in cottonwood/willow habitats) with dense understory vegetation, usually within 100m of water. In Utah, nesting habitat is thought to occur between 2500-6000' elevation. There are no records of occurrence on the Ashley, but suitable habitat may exist in the low elevation portions of stream and glacial canyons where cottonwood trees are found in combination with conifers and aspen.	USDAForest Service 2006b.

SPECIES	STATUS	HABITAT USE AND LOCAL DISTRIBUTION	REFERENCES
Mexican spotted owl	T	Historic range exists in the BLM-managed Tavaputs Plateau south of the Uintah Basin. Two males have been confirmed on nearby Dinosaur National Monument; also located in Desolation Canyon on at least two occasions. Typical habitat on the Colorado Plateau (Utah) and southern Rocky Mountains (Colorado) is steep-sided canyons containing pockets of usually coniferous overstory trees mixed with smaller Gambel oak and box elder trees. In So. UT owls have not been found above 7200' (cutoff for suitable habitat considered 8000'). Suitable habitat may exist in the Stream Canyon and possibly Glacial Canyon landtype associations. Surveys have been done, but there are no locations recorded on the Ashley. The FWS believes that the northern extent of the Mexican spotted owl range is Nine Mile and Argyle Canyons which are on the southern end of Duchesne County.	USDA Forest Service 2006b. USF&WS 2011, USF&WS 2014
Greater sage grouse	C	Sage grouse populations are allied closely with sagebrush habitats. Sagebrush habitats are important for the survival of nesting and wintering sage grouse.	USDA Forest Service 2006, USDI F&WS 2010c.
MAMMALS			
Canada lynx	T	Mesic mid- to high-elevation forests including Engelmann spruce, subalpine fir, lodgepole pine and possibly Douglas fir. Uses aspen when it is mixed with or adjacent to suitable conifer forests. Needs areas of dense understory cover and/or thickets of young trees for foraging, mature forests with large amounts of coarse woody debris for denning. Abundance and population persistence linked to snowshoe hare populations; red squirrels are secondary prey.	USDA Forest Service 2006b.
Black-footed ferret	E	Black-footed ferret distribution is coincident with prairie dog colonies. Habitat is therefore restricted to open or slightly brushy areas at relatively low elevations in the western U.S. An experimental population was recently established in Uintah County southeast of Vernal, UT on lands managed by the BLM; this species does not presently occur anywhere else in Utah. Habitat may exist on the Flaming Gorge NRA. No other portions of the Ashley NF appear to be suitable habitat for this species.	USDA Forest Service 2006b.

[1] U.S. Fish and Wildlife Service species and habitat list for Utah, as of August 2014. Terrestrial wildlife species only.

All of the species in Table 11 above have been reviewed as to whether they or their habitat exists within or near the project area. Table 12 contains the species and their expected occurrence within or near the project area.

Table 12 - USFWS Endangered, Threatened, Proposed, and Candidate Species Occurrence Within Or Near the Project Area.

Species	Occurrence Within Or Near The Project Area	Basis for occurrence determination
Canada lynx	Present	Habitat is present near the project area.
Mexican spotted owl	Absent	No suitable habitat; refer to the Biological Assessment in the project record for more information.
Black-footed ferret	Absent	No suitable habitat; refer to the Biological Assessment in the project record for more information.
Western yellow-billed cuckoo	Absent	No suitable habitat; refer to the Biological Assessment in the project record for more information.
Greater sage grouse	Absent	No suitable habitat; refer to the Biological Assessment in the project record for more information.

Of the above species in Table 12, the Canada lynx, may occur or have habitat within or near the project area. As such the effects analysis will be confined to that species.

Direct and Indirect Effects

In order to compare and contrast the two alternatives, and to determine the potential impact of the proposed action on the Canada lynx, the effects of noise, habitat loss, pack stock, and presence of humans have been evaluated.

Alternative 1 – No Action

There would be no effects anticipated on the Canada lynx from Alternative 1 since no construction activities would occur.

Alternative 2 – Proposed Action

Project work would occur at the dam, the outlet, in the lake bed, and at an old borrow site. Therefore, the project would not remove or change any lynx habitat to an unsuitable condition. There would be some noise disturbance associated with the project. The noise disturbance may cause temporary avoidance of the area by lynx. However, this noise disturbance is temporary and therefore would not result in any lasting effects to lynx. Additionally, the likelihood of individual lynx being exposed to noise disturbance produced from implementation of the project is very low given that there are likely very few, if any lynx, on the Ashley NF other than the occasional

wandering transplant from Colorado at this point in time. Therefore, these noise disturbances are not likely to adversely affect lynx.

Even if an individual were on the Forest and thus 'exposed' to elements of the proposed project, the effects to an individual lynx via habitat loss or disturbance are expected to be negligible based on the following reasons:

- There would be no habitat loss and the project is therefore unlikely to impede movement of lynx within and through lynx management areas on the Forest, or impede the ability of a lynx to procure sufficient food, often a limiting factor;
- A lynx disturbed by human activity associated with the project may temporarily be displaced or may habituate to the activity, neither outcome of which is likely to alter the likelihood this individual will procure prey; and
- Activities related to these actions would occur during the summer and would avoid the more stressful periods (denning and winter foraging periods) for lynx and would not result in snow compaction activities (Reudiger 2000).

Helicopter flights would maintain an elevation of 1,000 feet above the trees, thus reducing effects to wildlife, including lynx. Helicopter flights and the use of staging areas would occur two to three days at the beginning of the project and for one to two days at the end of the project. Thus disturbance from helicopter flights would be of a very short duration and is unlikely to have any effect to lynx.

Grazing by pack stock would be for one season and would be restricted to the few meadows near Atwood Lake (see Appendix A, Map 1). Grazing is currently restricted to 40% in the wilderness and grazing from pack stock associated with the project would comply with this standard. Thus grazing by pack stock would not incur any more grazing than is already permitted in the area. Thus, pack stock grazing is unlikely to have lasting negative effects to lynx or their prey species. Additionally, use of the trail by project related packstock is unlikely to effect lynx since the disturbance would be the same type that currently occurs along this trail and since this trail is a popular trail that currently receives moderate use. Thus, use of the trail by project related packstock is unlikely to incur disturbance to wildlife than what normally occurs.

Cumulative Effects

Spatial and Temporal Bounds of Analysis

The spatial bounds of analysis to determine cumulative effects to Canda lynx include three Lynx Analysis Units (LAUs). An LAU, is a subwatershed that approximates a female's home range. Atwood Dam and part of the trail occurs in the Uinta LAU (LAU 13) and contains about 30,228 acres of lynx habitat. The Bennion Park staging area occurs in the Pole Mountain LAU (LAU 15) and contains approximately 23,743 acres of habitat. The lower part of the Uinta Canyon trail occurs in Uinta Canyon LAU (LAU

14) and contains about 17,344 acres of lynx habitat (See Figure 8 below). This area was selected as the cumulative effects area, because it is large enough to capture the effects to Canada lynx in adjacent areas to the project area and because it provides consistency with the cumulative effects analysis for Canada lynx that may be cumulatively effected by the project.

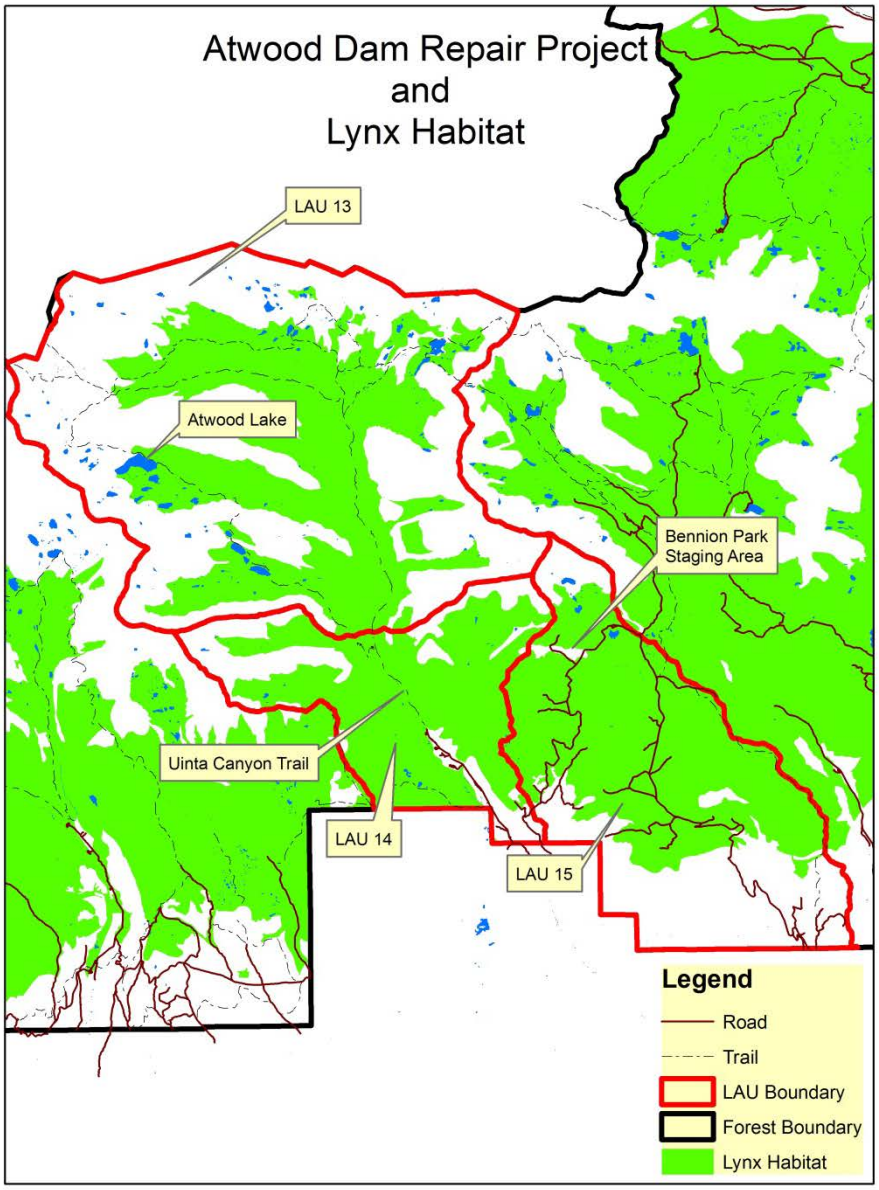

Figure 8 - Lynx Analysis Units In or Near the Project Area.

The temporal boundary for cumulative effects to Canada lynx is 10 years prior to implementation of the project to three years after project completion. This temporal boundary was selected because it is long enough to capture effects to Canada lynx prior to the project and long enough to monitor wildlife response to activities

associated with the project. Considering cumulative impacts that have occurred in the last 10 years is also consistent with the 2007 Northern Rockies Lynx Management Direction (NRLMD).

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Cumulative impacts in LAU 13 would be limited to recreational use (campers, backpackers, hunters, and fisherman). It is likely that these uses would be displaced to other areas of the Wilderness during project implementation and would very few of these activities would occur in the area simultaneously with the project. Also, since these activities have little impact on the Canada lynx in the Wilderness, and since project activities in the area would be short in duration (one summer), the magnitude of the combined affect to the Canada lynx from these uses (if they did occur simultaneously with the project) would be similar to the effects discussed in the direct and indirect effects section. Additionally, the majority of noise disturbance would be from work on the dam and the outlet. Thus, noise would be isolated and centralized, which further reduces the likelihood of adverse impacts to lynx. As discussed above, the likelihood of individual lynx being exposed to any element of the project or any cumulative activity is very low given that there are likely very few, if any lynx, on the Ashley NF.

Cumulative impacts to lynx in LAU's 14 and 15 include firewood gathering, timber harvest, wildfire, prescribed fire, grazing, roads, off-highway vehicle use, camping, hiking, biking, hunting, fishing, horseback riding, sightseeing, and wildlife viewing.

Project activities (pack stock use along the Uinta Canyon trail and the helicopter staging area) in these LAU's would have very little disturbance to wildlife. Pack stock use is unlikely to add any additional disturbance to lynx and other wildlife than normally occurs. The staging area would be used for helicopter flights for two to three days at the beginning and one to two days at the end of the project. This is a relatively short duration of disturbance. Since, these disturbances would have minimal effects to lynx, adding these disturbances to the cumulative activities in the area would also have minimal effects to lynx. Additionally, the areas would be closed to the public during helicopter flights, thus reducing the amount of human activity in the area during use of the staging area.

Given the discussion above, the cumulative activities in LAU's 13-15 combined with the project are unlikely to have measureable lasting effects to Canada lynx. As a result, there would be no cumulative effects of other activies that when combined with the proposed action would create an adverse impact for the Canada lynx.

Summary of Effects

It is determined that the project “may affect, but is not likely to adversely affect” the Canada lynx. This determination is based on the above discussion which suggests the following; the project would have no direct, indirect, or cumulative effects to lynx habitat, project implementation would be for one summer season, the project would avoid the critical time periods for lynx, noise disturbances from project work would be isolated, helicopter flights would of short duration, lynx rare in the Uintas (if they occur at all) and are unlikely to occur near the project or be effected by elements of the project.

Based on the above discussion and rationale in this section, the following determinations are made:

- It is determined that either alternative for the Atwood Dam Repair Project would have “no effect” to the yellow-billed cuckoo, Mexican spotted owl, greater sage grouse, and black-footed ferret.
- It is also determined that Alternative 2 for the Atwood Dam Repair Project “may affect, but is not likely to adversely affect” the Canada lynx and its habitat.

Forest Service Region 4 Sensitive Species

The USDA Forest Service has developed policy requirements for the designation of sensitive plant and animal species (Forest Service Manual (FSM) 2670; Supplement 2600-94-2). The Regional Forester's sensitive species list identifieds species only when they meet one or more of the following three criteria:

- The species is declining in numbers or occurrences and evidence indicates it could be proposed for federal listing as threatened or endangered if action is not taken to reverse or stop the downward trend;
- The species' habitat is declining and continued loss could result in population declines that lead to federal listing as threatened or endangered if action is not taken to reverse or stop the decline; and
- The species' population or habitat is stable but limited.

Fifteen species of mammals and birds are listed as a Regional Forester's sensitive species and are known or suspected to occur on the Ashley NF. Of all 15 species, eight are likely to occur (see Table 13) within the project area, or have habitat in or near the project area, or be affected; directly, indirectly or cumulatively by implementation of the proposed action. (For a detailed explanation as to how these determiniations are made, please refer to the Biological Evaluation in the project record.) These species are the spotted bat, Townsend’s big-eared bat, wolverine, boreal owl, great gray owl, flammulated owl, three-toed woodpecker, and northern goshawk.

Table 13 - USDA Forest Service Sensitve Species Occurrence Within or Near the Project Area.

Species	Status	Occurrence in Project Area	Basis for occurrence determination
Peregrine falcon	S	Absent	There are no peregrine falcon eyeries within or near the project area.See Footnotes 1, 2, and 3 below.
Spotted bat	S	Present	Habitat is present within or near areas that may be affected by activities associated with the project.
Townsend's big-eared bat	S	Present	Habitat is present within or near areas that may be affected by activities associated with the project.
Bald eagle	S	Absent	Sightings of bald eagles have occurred in the Uintas, but they have been determined to be migrants passing through the area. No bald eagles have been documented near Atwood Basin or any part of the project area. The project would likely be completed by the time (fall) any migrating bald eagles may happen to migrate through the area.See Footnotes 1, 2, and 3 below.
Boreal owl	S	Present	Habitat is present within or near the project area.
Great gray owl	S	Present	Habitat is present within or near the project area.
Flammulated owl	S	Present	Habitat is present within or near areas that may be affected by activities associated with the project.
Three-toed woodpecker	S	Present	Habitat is present within or near the project area.
Northern goshawk	S	Present	Habitat is present within or near areas that may be affected by activities associated with the project.
Common loon	S	Absent	See Footnotes 1, 2, and 3 below.
Trumpeter swan	S	Absent	See Footnotes 1, 2, and 3 below.
Pygmy rabbit	S	Absent	See Footnotes 1, 2, and 3 below.
Bighorn sheep	S	Absent	Habitat is present near the project area, but bighorn sheep are not present.See Footnotes 1, 2, and 3 below.

Species	Status	Occurrence in Project Area	Basis for occurrence determination
Wolverine	S	Present	Habitat is present within or near the project area.
Sage grouse	S	Absent	See Footnotes 1, 2, and 3 below. Also refer to the Biological Assessment prepared for this proposed action.

[1]*Suitable habitat is absent or lacking vital components in the action area.*

[2]*No elements of a species' primary habitat or life requisites would be changed by the proposed action.*

[3]*No environmental changes (noise, modification of food web, reduction in cover or shelter structures, etc.) created by the proposed action could be identified which would negatively or detrimentally affect a species, its individual members or its habitat.*

Direct and Indirect Effects

In order to compare and contrast the two alternatives, and to determine the potential impact of the proposed action on sensitive species, the effects of noise, habitat loss, pack stock, and presence of humans have been evaluated.

Alternative 1 – No Action

Under this alternative, there would be no project work and therefore there would be no disturbances to wildlife.

Alternative 2 – Proposed Action

<u>Spotted Bat and Townsend's Big-eared Bat</u>

This project would not affect any caves, would not affect the hibernacula, and would not occur during the hibernation period for these species. Therefore, the project would have no impact to these bat species winter hibernation areas. The project work at the dam, as well as the Bennion Park Staging area, would occur above the elevational limits (Oliver 2000) for these species. Therefore actual project work on the dams, use of the Bennion Park staging area, and grazing by pack stock would not affect these bat species. The only habitat for these bat species that could be affected by activities associated with the project would be foraging habitat along the Uinta Canyon trail. However, this is a popular recreation trail for backpackers and horse stock. Therefore the use of this trail by pack stock for the project would be the same type of disturbance that currently occurs along this trail. Also since this is a popular recreation trail, use of the trail by pack stock for the project is likely to be negligible to wildlife considering the use that it currently receives. Additionally, use of the trail by project pack stock would occur during daylight hours, which would avoid the foraging period for bats. As a result, it is determined that the project may impact spotted bats and Townsend's big-

eared bats, but would not cause a trend toward their federal listing or cause a loss of viability to the population of these species.

Flammulated Owl

Since project activities on the dam and the Bennion Park staging area occur above the elevation where typical flammulated owl habitat would be found, activities associated with actual work on the dam and the Bennion Park staging area would not affect this species. Helicopter flights are also likely to be over areas that do not contain flammulated owl habitat. Thus helicopter flights are unlikely to affect the flammulated owl. The proposed project would have minimal effects to this species habitat because it largely occurs at an elevation and in habitat where this species would not occur. The habitat for the flammulated that could be affected by activities associated with the project would be foraging habitat along the Uinta Canyon trail. However, this is a popular recreation trail for backpackers and horse stock. Therefore the use of this trail by pack stock for the project would be the same type of disturbance that currently occurs along this trail. Also since this is a popular recreation trail, effects to wildlife from the use of the trail by pack stock for the project would be negligible considering the use that it currently receives. Because the proposed project does not occur in flammulated owl habitat and because pack stock use in habitat would have only minimal effects, if any at all, to this species, it is determined that the project may impact individual flammulated owls, but would not cause a trend toward their federal listing or cause a loss of viability to the population of this species.

Great Gray Owl

The project area occurs at the southern most extent of this species range, and because this species is considered a rare resident of the Uintas, the potential of this species actually occurring near the project area is low. If by chance any great gray owls are using habitat near the project area, noise disturbances from project activities could disturb individuals. However, the majority or all of the project activities would likely occur after the nesting season for this species and is thus unlikely to be affected during this period. Additionally, helicopter flights would remain 1,000 feet above the trees, thus reducing the amount of disturbance to wildlife during flights. Flights would also be of short duration. Grazing by pack stock near Atwood Lake would be restricted to nearby meadows and up to four horses would be retained at the project site. This could affect forage for prey species. However, horses and pack stock from recreation use the meadows for grazing. Grazing by horses kept onsite during the project would incur similar disturbances to wildlife and would unlikely to have additive effects to wildlife. Also, grazing is currently restricted to 40% in the wilderness and grazing from packstock associated with the project would comlpy with this standard. Thus grazing by packstock would not incur any more grazing than is already permitted

in the area. Therefore grazing is unlikely to have negative impacts to this owls prey species.

Because the occurrence of this species near the project areas would be rare, the proposed project having minimal effects to this species habitat, the majority of project activities being conducted after the nesting and fledgling period, project noise disturbances (including helicopter flights) in the area being short in duration (ones season), and helicopter flights being 1,000 feet above the trees and two to three days at the beginning and one to two days end of the project (short duration), it is determined that the project may impact individual great gray owls, but would not cause a trend toward their federal listing or cause a loss of viability to the population of this species.

Boreal Owl

The project would not remove any habitat. Work would occur in previously disturbed sites (the dam, in the lake bed, and in old existing burrow sites. Noise disturbances from project activities have the potential to disturb wildlife. However, the majority of project activities would occur after the fledgling period and therefore would be unlikely to affect any nesting owls. Additionally, nesting and foraging boreal owls have been documented to be tolerant of human and mechanical activities and their response to such activities seem indifferent (USDA Forest Service 1994). Therefore, nesting and foraging boreal owls are not likely to be displaced as a result of increased noise in the area from project activities (including helicopter flights). Grazing by pack stock near Lake Atwood would be restricted to nearby meadows with up to four horses retained at the project site. Horses and pack stock from recreation already use the meadows for grazing. Grazing by project pack stock would incur similar disturbances to wildlife and is unlikely to have additive effects to wildlife. Also, grazing is currently restricted to 40% in the wilderness and grazing from packstock associated with the project would comlpy with this standard. Grazing by packstock would not incur any additional grazing than what is already permitted in the area. Therefore grazing is unlikely to have negative impacts to this owls prey species.

Because the proposed project would have no effect to this species habitat, the majority project activities being conducted after the fledgling period, this species being tolerant of human and mechanical disturbances, project noise disturbances (including helicopter flights) in the area being short in duration (one season), and helicopter flights being 1,000 feet above the trees and limited in duration, , it is determined that the project may impact individual boreal owls, but would not cause a trend toward their federal listing or cause a loss of viability to the population of this species.

Three-toed Woodpecker

The project would not remove any habitat. Work would occur in previously disturbed sites (the dam, in the lake bed, and in old existing borrow sites. Grazing by pack stock would have no effect to this species. Noise from project activities may affect habitat near the project area. However three-toed woodpeckers have been documented to be very tolerant of human activities, and human disturbance is not considered a threat to their populations (Leonard 2001). Therefore, nesting and foraging three-toed woodpeckers are not likely to be disturbed or displaced as a result of increased noise from project activities, including helicopter flights. Because the proposed project would have no effect to this species habitat; a large portion of project activities being conducted after the fledgling period; this species being tolerant to human disturbances; project noise disturbances (including helicopter flights) in the area being short in duration (one season); and helicopter flights being 1,000 feet above the trees and for a short duration; it is determined that the project may impact individual three-toed woodpeckers, but would not cause a trend toward their federal listing or cause a loss of viability to the population of this species.

Northern Goshawk

Goshawk habitat is limited near Lake Atwood, so project activities at the dam and the outlet stream, as well as grazing by pack stock are unlikely to affect goshawk habitat. Goshawk habitat does occur lower in the Atwood Basin and in Uinta Canyon. However, surveys in the Atwood Basin in 2011 and 2014 did not detect any goshawks. There is a goshawk territory in lower Uinta Canyon near the trail that pack stock for the project would use. However, this is a popular recreation trail for backpackers and horse stock. Therefore the use of this trail by pack stock for the project would be the same type of disturbance that currently occurs along this trail. Also since this is a popular recreation trail, effects to goshawks from the use of the trail by pack stock for the project would be negligible considering the use that it currently receives. Also, if this territory is inactive in 2015, there would be no impacts to this territory from project implementation. Flights in general could disturb goshawks. However, the flight path is not anticipated to occur over this area. Also, flights would remain 1,000 feet above the trees and the flight path to the project sites would be in the opposite direction from the territory. Furthermore, the flights would last a short duration. Therefore, based on the above discussion it is determined that the project may impact individual goshawks, but would not cause a trend toward their federal listing or cause a loss of viability to the population of this species.

Wolverine

The project would not remove any wolverine habitat. Wolverine are rare on the Forest. Noise disturbances from project activities would occur through the season. If by chance a wolverine was near or in the project area, they may exhibit an avoidance

of this area during the duration of the project. However, this project would last one season and it would be expected that habitat in this area would be available to this species the following season. Also, since wolverines are considered rare in the Uintas, it is unlikely that an individual would wander into Atwood Basin during project implementation. Because the diet of wolverine is carrion, it is unlikely that grazing would have any measureable effect to wolverine, if one happened to occur in the area.

Since the proposed project would have no effect to this species habitat, the wolverine being rare on the Forest, and project noise disturbances in the area being short in duration (one season), it is determined that the project may impact individual wolverine, but would not cause a trend toward their federal listing or cause a loss of viability to the population of this species.

Cumulative Effects

Spatial and Temporal Bounds of Analysis

The cumulative effects area for terrestrial sensitive species from the proposed project will be the boundaries of Lynx Analysis Units 13-15 (see Figure 8 above). A Lynx Analysis Unit, or LAU, is a subwatershed that approximates a female's home range. Atwood Dam and part of the trail occurs in the Uinta LAU (LAU 13), the Bennion Park staging area occurs in the Pole Mountain LAU (LAU 15), and the lower part of the Uinta Canyon trail occurs in Uinta Canyon LAU (LAU 14). This area was selected as the cumulative effects area, because it is large enough to capture the effects to wildlife in adjacent areas to the project area and because it provides consistency with the cumulative effects analysis for wildlife species that may be cumulatively affected by the project.

The temporal boundary for cumulative effects is 10 years prior to implementation of the project to three years after project completion. This temporal boundary was selected because it is long enough to capture effects to wildlife prior to the project and long enough to monitor wildlife response to activities associated with the project.

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis.

Cumulative impacts in LAU 13 would be limited to recreational use (campers, backpackers, hunters, and fisherman). It is likely that these uses would be displaced to other areas of the Wilderness during project implementation and would very few of these activities would occur in the area simultaneously with the project. Also, since these activities have little impact on sensitive species in the Wilderness, and since project activities in the area would be short in duration (one summer), the magnitude of the combined affect to sensitive species from these uses (if they did occur simultaneously with the project) is likely to be very similar to the effects discussed in the direct and indirect effects sections for these species. Additionally, the majority of

noise disturbance would be from work on the dam and the outlet. As a result, noise would be isolated and centralized, which further reduces the likelihood of adverse impacts to wildlife. Therefore, these cumulative activities in this LAU combined with the project are unlikely to have measureable lasting effects to wildlife.

Cumulative impacts to wildlife in LAU's 14 and 15 include firewood gathering, timber harvest, wildfire, prescribed fire, grazing, roads, off-highway vehicle use, camping, hiking, biking, hunting, fishing, horseback riding, sightseeing, and wildlife viewing.

Project activities (pack stock use along the Uinta Canyon trail and the helicopter staging area) in these LAU's would have very little disturbance to wildlife. Pack stock use is unlikely to add any additional disturbance to the area than normally occurs. The staging area would be used for helicopter flights at the beginning for two to three days and one to two days at the end of the project. This is a relatively short duration of disturbance. Since, these disturbances would have minimal effects to wildlife it is likely that adding these disturbances to the cumulative activities in the area would also have minimal effects to wildlife. Additionally, the areas would be closed to the public during helicopter flights, thus reducing the amount of human activity in the area during use of the staging area. The work in the area may also discourage recreationists from using Atwood Basin, which would further reduce disturbances in the area.Because of this, these cumulative activities in these LAU's combined with the project are unlikely to have measureable lasting effects to wildlife.

Given the discussion above, there would be no cumulative effects of other activies that when combined with the proposed action would rise to the level of significance and create and adverse effect on sensitive species.

Summary of Effects

In summary, it is determined that the Atwood Dam Repair project, would have no impact on the peregrine falcon, pygmy rabbit, common loon, trumpeter swan, sage grouse, bighorn sheep, and bald eagle. It is also determined that the project may impact individuals, but would not lead towards a trend of federal listing or cause a loss of viability to the populations of the spotted bat, Townsend's big-eared bat, great gray owl, boreal owl, flammulated owl, three-toed woodpecker, northern goshawk, and wolverine.

Management Indicator Species

The National Forest Management Act requires that the Forest Service provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area to meet overall multiple-use objectives. To help meet this statutory goal of diversity, the Forest Service published planning regulations in 1982 which provide that fish and wildlife habitat shall be managed to maintain viable populations

of existing native and desired non-native vertebrate species in the planning area. These animal species are known as management indicator species (MIS). Table 14 below identifies the MIS that were designated on the Ashley National Forest in 1985.

Table 14 - Management Indicator Species For Terrestrial Wildlife on the Ashley National Forest And Habitat In the Project Area.

MIS	Vegetation Community	Habitat Present in Project Area?
Red-naped sapsucker	Deciduous woodlands	Yes, along Uinta Canyon trail.
Warbling vireo	Deciduous woodlands	Yes, along Uinta Canyon trail.
Northern goshawk	Old growth timber	Yes, along Uinta Canyon trail.
Golden eagle	Cliffs/rock	Yes
Lincoln's sparrow	Riparian shrub	Yes
Song sparrow	Riparian shrub	Yes
Sage grouse	Sagebrush	No
White-tailed ptarmigan	Alpine meadow	No. Habitat is located 2+ miles to the north west of the project. The helicopter flight is not located over this species habitat. It is unlikely that this species would be affected by any of the proposed project activities.
Species of Economic Value		
Rocky Mountain elk	Various	Yes
Mule deer	Various	Yes

A comprehensive review of these species life's requirements, population trends, and habitats occupied by these species on the Forest can be found in the March 2006, Ashley National Forest's Report titled Life Histories and Population Analysis for Management Indicator Species of the Ashley National Forest; hereafter mentioned in this document as the "MIS Report". Analysis contained in that report is incorporated by reference in this document as "USDA Forest Service 2006".

Additionally, a review of monitoring, inventories, and population trends for these species from March 2006 to December 2012 can be found in the Roosevelt/Duchesne Ranger District Terrestrial Wildlife Monitoring Report March 2006-December 2012, hereafter mentioned in this document as the "Christensen 2013 Monitoring Report". Information contained in that report is incorporated by reference in this document as "Christensen 2013".

As indicated in the table above, there are eight terrestrial species of MIS that may be present or have habitat in the project area. These are the northern goshawk, golden eagle, song sparrow, Lincoln's sparrow, red-naped sapsucker, warbling vireo, Rocky Mountain elk, and mule deer. There is no sage grouse habitat within or near the

project area, and white-tailed ptarmigan are unlikely to be impacted by the project, therefore these species will not be evaluated in this document. For a discussion on the northern goshawk, refer to the Region 4 Senstive Species discussed previously.

Direct and Indirect Effects for Golden Eagle, Lincoln's Sparrow, Red-naped Sapsucker, and Warbling Vireo

In order to compare and contrast the two alternatives, and to determine the potential impact of the proposed action on the Golden Eagle, Lincoln's Sparrow, Red-naped Sapsucker, and Warbling Vireo, the effects of noise, habitat loss, pack stock, and presence of humans have been evaluated.

Alternative 1 – No Action

There would be no direct or indirect effects to any of these species from Alternative 1 because there would be no construction work, and no increased trail use.

Alternative 2 – Proposed Action

Red-naped sapsucker and warbling vireo habitat do not occur anywhere near Atwood Dam and would not be affected by project activities in the area. Habitat for these species is located along the lower part of the Uinta Canyon trail, which would be used by project pack stock. However, this is a popular recreation trail for backpackers and horse stock. Therefore the use of this trail by pack stock for the project would be the same type of disturbance that currently occurs along this trail. Also since this is a popular recreation trail, effects to these specieis from use of the trail by pack stock for the project is likely to be negligible considering the use that the trail currently receives. The staging area does not occur near these species habitat and the helicopter flight path is unlikely to fly over these species habitat, thus these species are not anticipated to be effected by helicopter flights. Therefore, effects to red-naped sapsuckers and warbling vireos from project activities would be negligible.

Although habitat for the golden eagle, Lincoln's sparrow, and song sparrow occur near Atwood Dam, project work at the Dam would not remove any habitat for either of these species. Work in the outlet immediately below the dam may remove some willow (Lincoln's sparrow and song sparrow habitat). However, the amount of willow that would be removed would be minimal compared to the amount of willow along the stream. As a result, the direct effects to Lincoln's sparrow and song sparrow habitat (willow) would be minimal.

Noise disturbances from project work have the potential to affect wildlife in the area. However, project work would be isolated to the area around the dam and would only last one season. Consequently, extended effects to golden eagles, Lincoln's sparrows, and song sparrows are unlikely to occur. Studies have mixed results, with some studies showing golden eagles disturbed by nearby disturbance and other

studies showing golden eagles are not disturbed (Kochert 2002). However, it is common knowledge that foraging golden eagles frequent roadsides to feed on carrion, and appear not to be too disturbed by human activities associated with roads, and therfore may not be disurbed by the project activities. Song sparrows do not appear to be affected by human associated noise disturbances, but Lincoln's sparrows have been known to abandon nests (Arcese et. al. 2002 and Ammon 1995). Therefore, Lincoln's sparrows may be more sensitive to noise disturbance than song sparrows. If noise associated with the project causes nest abandonment, it is possible that renesting could be attempted. Additionally, the abandonment of a few nests in the area for one season is unlikely affect the population trend of either of these sparrows.

Helicopter flights have the potential to affect golden eagles, Lincoln's sparrow and song sparrows. However, flights would remain 1,000 feet above the trees to reduce the effects to these wildlife species. Also, flights and use of the staging area at Bennion Park would be of short duration as previously described. Thus, given the short term nature of these flights and use of the staging area, effects to wildlife from these activites are anticipated to be minimal.

The effects from the camp and packstock are anticipated to be negligble. The camp would not increase disturbance to the area any more than what normally occcurs in the area from recreationists. Grazing from horses would be restricted to the few meadows near Atwood Lake, and would unlikely result in different effects than normally occurs from recreational stock use. Also, grazing is currently restricted to 40% in the wilderness and grazing from packstock associated with the project would comlpy with this standard. Thus grazing by packstock would not incur any more grazing than what is already permitted in the area.

Based on the discussion above, it is determined that implementation of the project may impact individuals, but would not affect the trend of golden eagle, Lincoln's sparrow, song sparrow, red-naped sapsucker, or warbling vireo populations on the Forest or impair the ability of the Forest to provide well-distributed habitat for these species.

Direct and Indirect Effects for Elk and Mule Deer

In order to compare and contrast the two alternatives, and to determine the potential impact of the proposed action on elk and mule deer, the effects of noise, habitat loss, pack stock, and presence of humans have been evaluated.

Alternative1 – No Action

There would be no direct or indirect effects to either elk or mule deer from Alternative 1 because there would be no construction work, and no increased trail use.

Alternative 2 – Proposed Action

The project would not remove any elk or mule deer habitat. Ground disturbance from the project would occur on the dam, borrow sites, lake bed, and stream channel where very little habitat, if any at all, occurs. Noise disturbances from project activities may displace elk and deer from the immediate area of project activities. It is likely that there is adequate habitat in adjacent areas in Atwood Basin and in the Uinta drainage for temporarily displaced elk and deer. Given the amount of habitat in the Uinta drainage, it would be unlikely for all habitat in the drainage to be already occupied by elk and deer. This possible avoidance of the area by elk and deer is not anticipated to affect habitat use patterns by these species since the project would only occur during one season. Additionally, project activities do not occur in winter habitat and would not occur during the critical winter period. Also, project work would occur after the calving and fawning season for these species.

Disturbance to elk and deer from pack stock and the campsite would be negligible. Grazing by horseskept at the project site would be restricted to meadows near Lake Atwood and would not have any additional effects to elk and deer forage than would normally occur from grazing by recreational stock. Additionally, grazing is currently restricted to 40% in the wilderness and grazing from packstock associated with the project would comlpy with this standard. Grazing by packstock would not incur any more grazing than what is already permitted in the area. Likewise, the campsite is likely to induce the same disturbance to elk and deer that normally occurs from recreational use.

Because the proposed project would have minimal direct effects to these species habitat and likely cause only minimal avoidance of the project area, project activities being conducted after the calving and fawning season, project noise disturbances being short in duration, and ample habitat in the drainage for displaced individuals, it is determined that implementation of the project may displace and impact individuals, but would not affect the trend of elk and mule deer populations on the Forest or impair the ability of the Forest to provide well-distributed habitat for these species.

Direct and Indirect Effects for US F&WS Birds of Conservation Concern and Utah Partners in Flight Priority Species (Migratory Birds)

In order to compare and contrast the two alternatives, and to determine the potential impact of the proposed action on migratory birds, the effects of noise, habitat loss, pack stock, and presence of humans have been evaluated.

Alternative1 – No Action

There would be no direct or indirect effects to migratory birds from Alternative 1 because there would be no construction work, and no increased trail use.

Alternative 2 – Proposed Action

The prairie falcon and black-rosy finch would not be affected by any aspect of the project, except potentially byr helicopter flights. However, these flights would maintain an elevation of 1,000 feet above the trees to reduce noise disturbance to wildlife. The helicopter may not be able maintain 1,000 feet above the bollie/pass, but will stay as close to 1,000 feet as possible. Additionally, helicopter flights would occur for a short duration and flights over the bollie/pass would be quick events. Therefore, it is unlikely that project helicopter flights would have lasting effects to the prairie falcon or the black-rosy finch.

The project would not remove habitat for the broad-tailed humming bird or the Cassin's finch. Disturbance from the campsite, grazing from pack stock, and use of the trail by pack stock would not induce any more disturbance to these species than normally occurs in any given year from recreational activities. Disturbance to these species from the project would be from noise associated with project activities and the Dam, outlet, and staging area. These effects would be similar to those discussed for the Lincoln's sparrow, song sparrow, and golden eagle in the section above. This section concluded that the project may impact individuals, but would not affect trends in their populations. This conclusion would be the same for the broad-tailed humming bird and the Cassin's finch for the same reasons discussed in the section above.

Cumulative Effects

Spatial and Temporal Bounds of Analysis

The cumulative effects area for terrestrial MIS and migratory birds from the proposed project will be the boundaries of Lynx Analysis Units 13-15 (see Figure 8 above). A Lynx Analysis Unit, or LAU, is a subwatershed that approximates a female's home range. Atwood Dam and part of the trail occurs in the Uinta LAU (LAU 13), the Bennion Park staging area occurs in the Pole Mountain LAU (LAU 15), and the lower part of the Uinta Canyon trail occurs in Uinta Canyon LAU (LAU 14). This area was selected as the cumulative effects area, because it is large enough to capture the effects to wildlife in adjacent areas to the project area and because it provides consistency with the cumulative effects analysis for wildlife species that may be cumulatively affected by the project.

The temporal boundary for cumulative effects is 10 years prior to implementation of the project to three years after project completion. This temporal boundary was selected because it is long enough to capture effects to wildlife prior to the project and long enough to monitor wildlife response to activities associated with the project.

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Cumulative impacts in LAU 13 would be limited to recreational use (campers, backpackers, hunters, and fisherman). It is likely that these uses would be displaced to other areas of the Wilderness during project implementation and would very few of these activities would occur in the area simultaneously with the project. Also, since these activities have little impact on MIS and migratory bird species in the Wilderness, and since project activities in the area would be short in duration (one summer), the magnitude of the combined effect to sensitive species from these uses (if they did occur simultaneously with the project) is likely to be very similar to the effects discussed in the direct and indirect effects sections for these species. Additionally, the majority of noise disturbance would be from work on the Dam and the outlet. Thus, noise would be isolated and centralized, which further reduces the likelihood of adverse impacts to wildlife. Thus, these cumulative activities in this LAU combined with the project are unlikely to have measureable lasting effects to wildlife.

Cumulative impacts to wildlife in LAU's 14 and 15 include firewood gathering, timber harvest, wildfire, prescribed fire, grazing, roads, off-highway vehicle use, camping, hiking, biking, hunting, fishing, horseback riding, sightseeing, and wildlife viewing.

Project activities (pack stock use along the Uinta Canyon trail and the helicopter staging area) in these LAU's would have very little disturbance to wildlife. Pack stock use is unlikely to add any additional disturbance to the area than normally occurs. The staging area would be used at the beginning and end of the project for helicopter transport of materials for a short period of time as previously described. Since, these disturbances would have minimal effects to wildlife it would be likely that adding these disturbances to the cumulative activities in the area would also have minimal effects to wildlife. Additionally, the areas would be closed to the public during helicopter flights, thus reducing the amount of human activity in the area during use of the staging area. These cumulative activities in these LAU's combined with the project are unlikely to have measureable lasting effects to wildlife.

Given the discussion above, it is determined that implementation of the project combined with the above cumulative effects may impact individuals, but would not affect the trend of management indicator species or migratory birds on the Forest or impair the ability of the Forest to provide well-distributed habitat for these species.

Summary of Effects

The white-tailed ptarmigan and sage grouse do not have habitat in or near the project activities and therefore would not be effected by implementation of the proposed project. In summary, it is determined from the above analysis that implementing the Atwood Dam Repair Project may impact individuals, but would not affect the trend of

Lincoln's sparrow, song sparrow, northern goshawk, golden eagle, red-naped sapsucker, warbling vireo, Rocky Mountain elk, and mule deer populations on the Forest or impair the ability of the Forest to provide well-distributed habitat for these species. It is also determined from the above rationale that implementing the Atwood Dam Repair Project may temporarily impact individuals, but would not adversely effect US Fish and Wildlife Service Birds of Conservation Concern (Migratory Birds) or Utah Partners in Flight Priority Species, specifically the broad-tailed hummingbird, Cassin's finch, prairie falcon, and black-rosy finch. Table 15 illustrates the summary of effects for the proposed action.

Table 15 - Terrestrial Wildlife Effects Summary.

Species	Classification	Effect from Proposed Action
Red-naped sapsucker	MIS	May impact individuals, but would not effect the trend in population.
Warbling vireo	MIS	May impact individuals, but would not effect the trend in population.
Northern goshawk	MIS	May impact individuals, but would not effect the trend in population.
Golden eagle	MIS	May impact individuals, but would not effect the trend in population.
Lincoln's sparrow	MIS	May impact individuals, but would not effect the trend in population.
Song sparrow	MIS	May impact individuals, but would not effect the trend in population.
Sage grouse	MIS	No effect.
White-tailed ptarmigan	MIS	No effect. Habitat is located 2+ miles to the north west of the project. The helicopter flight is not located over this species habitat. It is unlikely that this species would be affected by any of the proposed project activities.
Rocky Mountain elk	Species of Economic Importance	May impact individuals, but would not effect the trend in population.
Mule deer	Species of Economic Importance	May impact individuals, but would not effect the trend in population.
Broad-Tailed Hummingbird	US Fish and Wildlife Service Birds of Conservation Concern (Migratory Birds) or Utah Partners in Flight Priority Species	May impact individuals, but would not effect the ability of the Forest to provide habitat for this species and is unlikely to affect their population.
Cassin's Finch	US Fish and Wildlife Service Birds of Conservation Concern (Migratory Birds) or Utah Partners in Flight Priority Species	May impact individuals, but would not effect the ability of the Forest to provide habitat for this species and is unlikely to affect their population.

Species	Classification	Effect from Proposed Action
Prairie Falcon	US Fish and Wildlife Service Birds of Conservation Concern (Migratory Birds) or Utah Partners in Flight Priority Species	May impact individuals, but would not effect the ability of the Forest to provide habitat for this species and is unlikely to affect their population.
Black-Rosy Finch	US Fish and Wildlife Service Birds of Conservation Concern (Migratory Birds) or Utah Partners in Flight Priority Species	May impact individuals, but would not effect the ability of the Forest to provide habitat for this species and is unlikely to affect their population.

3.8 Fisheries and Aquatics

Affected Environment

The proposed project is located within the High Uintas Wilderness. This wilderness area was designated by the United States Congress in 1984. The Atwood Basin is located in the headwaters of the Uinta River drainage and just below the crest of the Uinta Mountain range at an elevation of approximately 11,000 feet. Conditions observed during the site visit included very stable, well-vegetated stream banks with low levels of sediment in the stream channel downstream of the lake and the proposed project area. Overall, habitat conditions for cutthroat trout and aquatic macroinvertebrates are excellent within the proposed project area and Atwood Creek downstream.

The lake and stream provide habitat to an abundant brook trout population. Golden trout are also stocked into Atwood Lake by the Utah Division of Wildlife Resources. Currently, because of the need to repair the dam, the water level of Lake Atwood is very low. As a result, there is extensive barren muddy shoreline between the full pool lake level and the current lake level. Atwood Creek, downstream of the proposed project area, contains a population of Colorado River cutthroat trout.

Currently, there is very low to no sediment delivered to the stream channel directly below the dam and the proposed project area. Desired conditions are currently being met, as the stream substrate is very clean and the surrounding riparian area is functioning well to minimize sediment reaching the stream channel. In addition, Lake Atwood serves as a sediment sink; trapping sediment delivered by waters entering the lake. Furthermore, the stream banks within and downstream of the proposed project area are very stable. Streamside vegetation is very well established and functioning at desired conditions to maintain bank stability.

Endangered, Threatened, and Proposed Species

The FWS maintains the current list of threatened, endangered, proposed, and candidate species that receive protection under the Endangered Species Act. Terrestrial wildlife and plant species were analyzed in a separate Biological

Assessment (project record), and discussed previously above in this document. There are four fish species listed for Duchesne County that have habitat adjacent to the Ashley National Forest which may be impacted by activities on the Forest. A description of these species, their suitable habitat, and determination of impact is found in Table 16.

Table 16 - Endangered, Threatened, Proposed, and Candidate Species Listed for Duchesne County and the Ashley National Forest.

Species	Status	Habitat Use and Local Distribution
Bonytail *Gila elegans*	Endangered	Specific habitat requirements of the bonytail are not well known because the species was extirpated from most of its historic range prior to extensive fishery surveys. It is a very rare species in the Colorado River Basin, with only a few individuals having been found in the last decade (USFWS, 2002d). Very low numbers may occur in the Gray Canyon of the Green River, which is approximately 65 miles south of the Project. Critical habitat has been designated for this species within Duchesne County, Utah in the Green and Duchesne Rivers. Suitable aquatic habitats that the bonytail would utilize are not present in the vicinity of project activities. There would be no water depletion from the Upper Colorado River Basin as a result implementing the proposed project. Therefore the Project would have ***"No Affect"*** on the bonytail.
Colorado pikeminnow *Ptychocheilus lucius*	Endangered	The range of the Colorado pikeminnow is restricted to the Upper Colorado River basin, upstream of Glen Canyon Dam (USFWS, 2002a). Adult Colorado pikeminnow use a variety of habitat types, depending on time of year, but mainly utilize shoreline runs, eddies, backwater habitats, seasonally flooded bottoms, and side canyons. They are most abundant in the upper Green River (between the mouth of the Yampa River and head of Desolation Canyon) and lower Green River (between the Price and San Rafael Rivers) (USFWS, 2002a). Critical habitat has been designated for these species in the Green River in Carbon, Emery, and Grand Counties. Suitable aquatic habitats that the Colorado pikeminnow would utilize are not present in the vicinity of project activities. There would be no water depletion from the Upper Colorado River Basin as a result of implementing the proposed project. Therefore the Project would have ***"No Affect"*** on the Colorado pikeminnow.

Species	Status	Habitat Use and Local Distribution
Humpback chub *Gila cypha*	Endangered	Suitable habitat for this fish species is characterized by a wide variety of riverine habitats, especially canyon areas with fast currents, deep pools, and boulder habitat (USFWS, 2002c). This species originally inhabited the main stem of the Colorado River from what is now Lake Mead to the canyon areas of the Green and Yampa River Basins. Currently, the species appears to be restricted to the Colorado River at Black Rocks and Westwater Canyon of the Green River, and Yampa Canyon of the Yampa River (USFWS, 2002c). Suitable aquatic habitats that the humpback chub would utilize are not present in the vicinity of project activities. There would be no water depletion from the Upper Colorado River Basin as a result of implementing the proposed project. Therefore the Project would have ***"No Affect"*** on the humpback chub.
Razorback sucker *Xyrauchen texanus*	Endangered	This species inhabits warm water reaches of large rivers in areas that include deep runs, eddies, backwaters, and flooded off channel environments (USFWS 2002b). The largest population is known to occur in the upper Green River between the confluence of the Yampa River and the confluence of the Duchesne River. Adult suckers also occur in the Colorado River near Grand Junction, Colorado, although numbers are very low (USFWS, 2002b). Critical habitat has been designated for this species in the Green River in Carbon, Duchesne, Emery, Uintah, and Grand Counties. Suitable aquatic habitats that the razorback sucker would utilize are not present in the vicinity of project activities. There would be no water depletion from the Upper Colorado River Basin as a result of implementing the proposed project. Therefore the Project would have ***"No Affect"*** on the razorback sucker.

Direct and Indirect Effects

Both alternatives would have no impact on the species identified in Table 15 above because there is no suitable habitat in the project area, and as such no direct or indirect effects are anticipated to this species.

Cumulative Effects

There would be no cumulative effects associated with either alternative. In order to have cumulative effects, there must be direct or indirect effects; since there are no direct or indirect effects expected from either alternative, there would be no cumulative effects.

Summary of Effects

There would be no effects from either alternative because there is no known habitat for the Bonytail, Colorado pikeminnow, Humpback chub, or Razorback sucker in the project area.

Forest Service Region 4 Sensitive Species

The USDA Forest Service has developed policy requirements designation of sensitive plant and animal species (Forest Service Manual (FSM) 2670; Supplement 2600-94-2). The Regional Forester's sensitive species list contains taxa only when they meet one or more of the following three criteria, which were previously identified in the Region 4 Sensitive Species section for terrestrial wildlife on page 56 of this EA.

One fish and two amphibian species are listed as sensitive by the R4 Regional Forester on the Ashley National Forest. These include the Colorado River cutthroat trout (Oncorhynchus clarki pleuriticus), Columbia spotted frog (Rana luteventris) and the Boreal toad (Bufo boreas boreas). These species are further described in Table 17 below.

Table 17 - Habitat Use and Local Distribution for Regional Forest Senstive Species (RFSS) Evaluated for the Lake Atwood Dam Repair Project.

Species	Habitat Use and Local Distribution
Colorado River cutthroat trout *Oncorhynchus clarki pleuriticus*	This species is dependent on perennial, cool, water with moderate to high water quality. Atwood Creek, downstream of the proposed project area, contains a population of Colorado River cutthroat trout. The activities of the proposed project, which include identified design features and mitigation measures, would have **No Impact** on Colorado River cutthroat trout populations and their habitat within the project area or downstream.

Species	Habitat Use and Local Distribution
Boreal toad *(Bufo boreas boreas)*	The boreal toad inhabits western Canada and much of the western (especially northwestern) United States. It occurs throughout most of Utah, and can be found in a variety of habitats, including slow moving streams, wetlands, desert springs, ponds, lakes, meadows, and woodlands. Boreal toads are noted to be relatively independent of water compared to other amphibians, but must re-hydrate daily (Hogrefe et al. 2005). Because of this, they are highly terrestrial and typically migrate to breeding sites, deposit egg strands, and return to upland burrows. The boreal toad, which is inactive during cold winter months, may either dig its own burrow in loose soil or use the burrows of other small animals. Additionally, burrows represent critical microhabitats for boreal toad and other amphibians, especially in warmer drier climates (Hogrefe et al. 2005). Adults feed on numerous types of small invertebrates, such as ants, beetles, and grasshoppers, whereas larvae (tadpoles) filter algae from the water or feed on detritus. The breeding season of the western toad varies, depending on geographic location. There are no known Boreal toad populations within or near the proposed project area. In addition, activities associated with the proposed project are not expected to affect suitable boreal toad habitat. Therefore, the proposed Lake Atwood Dam Repair project is expected to have **No Impact** on Boreal toad populations or their habitat.

Species	Habitat Use and Local Distribution
Columbia spotted frog (*Rana luteiventris)*	The Columbia spotted frog range from southeast Alaska through Alberta, Canada, and into Washington, Idaho, Wyoming, Montana, and disjoint areas of Nevada and Utah. In Utah, isolated Columbia spotted frog populations exist in the West Desert and along the Wasatch Front. Habitat degradation and loss have led to declines in many of these populations, especially those along the Wasatch Front, resulting in the inclusion of the species on the *Utah Sensitive Species List.* With a goal of recovering the Columbia spotted frog, several government agencies, including Forest Service Region 4, are working cooperatively under a Conservation Agreement to eliminate or significantly reduce the threats facing the species. The Columbia spotted frog breeds as early in the spring as winter thaw allows, with eggs hatching in 3-21 days, depending on temperature. The species seems to prefer isolated springs and seeps that have a permanent water source, although individuals are known to move overland in spring and summer after breeding. During cold winter months, spotted frogs burrow in the mud and become inactive. Adult frogs eat a wide variety of food items, ranging from insects to snails, whereas tadpoles eat algae, plants, and small aquatic organisms. The dorsal (back) coloration of the spotted frog ranges from light brown to gray, with varying degrees of spotting. Ventral (belly) coloration ranges from red to yellow. There are no known populations of spotted frogs within or near the proposed project area. In addition, activities associated with the proposed project are not expected to affect suitable habitat. Therefore, because there are no known populations of spotted frogs within or near the proposed project area, the proposed Lake Atwood Dam Repair project is expected to have **No Impact** on Columbia spotted frog populations or their habitat.

Colorado River Cutthroat Trout

Colorado River cutthroat trout (CRCT) are the only trout species endemic to this area (Behnke 1992). The CRCT is managed under a multi agency conservation strategy and agreement, which was implemented for protection and conservation of CRCT. Colorado River cutthroat trout currently retain its status as a sensitive species on the Regional Foresters Sensitive Species List.

Boreal Toad and Columbia Spotted Frog

Currently, there are no known populations of boreal toad or Columbia spotted frog within or near the proposed project area. In addition there are no known populations of these amphibian species on the Ashley National Forest (ANF). However, historical

records indicate that boreal toads were once present in many locations on the Uinta Mountains within the ANF. Historical specimens were collected or reported from the Lake Fork River, Spirit Lake, Whiterocks River, Uintah River, and “Uinta Mountains” within the ANF (Day et al. 1997).

In 2009, Utah Division of Widlife Resources (UDWR) crews observed two adult boreal toads in the Burnt Fork Drainage on the north slope of the Uinta Mountains within the High Uintas Wilderness on the Uinta-Wasatch-Cache National Forest(UWCNF). Two adult and several juvenile boreal toads were observed and photographed by UDWR and UWCNF crews conducting fisheries surveys in the Little West Fork Duchesne River drainage on the south slope of the Uinta Mountains during the 2009 field season (Matt Breen – UDWR pers. comm. 2010). The nearest known spotted frog population occurs in the Provo River drainage and the Heber Valley (Bailey et al. 2006). There are no known populations of boreal toad or Columbia spotted frog or suitable habitat for these species within or near the proposed project area.

Direct and Indirect Effects

In order to compare and contrast the two alternatives, and to determine the potential impact of the proposed action on the Colorado River cutthroat trout, the effects of potential sediment release from construction activities were evaluated.

Alternative1 – No Action

Under the no action alternative, Lake Atwood dam would potentially fail if no action was taken to repair the dam. This would result in resource damage as a result of extensive flooding and scouring of the stream channel. Large amounts of sediment would be flushed into Atwood Creek and the Uinta River drainage. Stream banks would be scoured and become unstable and the stream would no longer provide quality habitat for cutthroat trout.

Alternative 2 – Proposed Action

The activity that would result in direct effects to Colorado River cutthroat trout habitat would be from the installation of the measuring flume in the outlet stream channel. This action would involve excavating a section of the stream channel to allow the installation of the measuring flume. This would effectively change the substrate in the localized area from the current rubble/cobble substrate to a metal plate substrate. This impact would be localized within the excavated installation area and would not be expected to effect the ability of the outlet stream channel within and downstream of the proposed project area to provide quality habitat to Colorado River cutthroat trout.

The proposed ground-disturbing activities, including the installation of an impermeable liner, new toe drains on the dam, placing fill on the crest of the dam and a new stream flow measuring flume in the outlet stream, would result in potential indirect effects to

Colorado River cutthroat trout habitat as a result of sediment reaching the outlet stream channel. The low levels of sediment produced would be transported through the system and would not have measureable effects on Colorado River cutthroat trout spawning habitat.

Implementation of the design criteria identified above in Chapter 2, would greatly minimize or eliminate these potential indirect effects of sediment delivery to the outlet stream. This potential sediment delivery would only occur during the construction period and the time it takes for localized disturbed vegetation and soil to stabilize. This time period is expected to be less than three years following the installation. These effects are expected to be negligible and short in duration. Therefore, activities of the proposed action are expected to have no effect on the quality of habitat for Colorado River cutthroat trout at the completion of the proposed repair project.

There are no known populations of boreal toad or Columbia spotted frog within or near the proposed project area, and therefore, there would be no direct or indirect effects to these species.

Cumulative Effects

Because direct or indirect effects to the CRCT or its habitat are not anticipated with the implementation of the design criteria (specifically 1-3 and 6-7) identified in Chapter 2 of this EA, no cumulative effects would result from the proposed action. In order to have cumulative effects, direct and indirect effects must be present.

Since there are no direct or indirect effects anticipated to the boreal toad or Columbia spotted frog, there would be no cumulative effects from either alternative.

Summary of Effects

Because there are no known populations of boreal toad or Columbia spotted frog within or near the proposed project area there would be no direct, indirect or cumulative effects to these species. Therefore, activities associated with the proposed Lake Atwood Dam Repair project are expected to have **No effect** on boreal toad, Columbia spotted frog or their habitat.

Direct and indirect effects to Colorado River cutthroat trout habitat are not expected with the implementation of design criteria, and as a result there would also be no cumulative effects from the proposed action. As a result, there would be **No effect** on Colorado River cutthroat trout populations or habitat from the proposed action.

Management Indicator Species

The National Forest Management Act requires that the Forest Service provide for the diversity of plant and animal communities based on the suitability and capability of the specific land area to meet overall multiple-use objectives. To help meet this statutory

goal of diversity, the Forest Service published planning regulations in 1982 which provide that fish and wildlife habitat shall be managed to maintain viable populations of existing native and desired non-native vertebrate species in the planning area.

Cutthroat trout are used as a Management Indicator Species (MIS) for the Ashley National Forest to indicate overall health of the aquatic ecosystem. Cutthroat trout are the only native trout in Utah. Most of the remaining populations of cutthroat trout are restricted to small, fragmented headwater drainages (CRCT Conservation Team 2006). Lake and streams within the Swift Creek sub-drainage contain populations of cutthroat trout and brook trout.

Macroinvertebrates are also used by the Forest as MIS to indicate overall health of the aquatic ecosystem. Biotic Condition Indices (BCI), derived from macroinvertebrate samples, are used to evaluate stream potential based on macroinvertebrate community tolerance levels and certain water quality parameters.

The species of macroinvertebrates identified in Table 18 were chosen as MIS for the following reasons:

1. The wide range of conditions they monitor;
2. Their relatively large size which facilitates identification;
3. Their limited mobility restricts them to a particular environment; and
4. They have a lifespan of months or years which allows for response to impacts over time.

Table 18 - Macroinvertebrates chosen as MIS for the Forest, habitat requirements and description of habitat quality indication.

Species	Requirements/Description
Mayfly *Epeorus sp.*	Requires good water quality and good instream habitat. Must have a resident population.
Stonefly *Zapada sp.*	Depends upon allochthanous leaf litter for nutrients. Relative numbers generally indicate riparian habitat quality or quantity.
Mayfly *Ephemerella doddsi*	Requires good water quality and good instream habitat. Relative numbers can indicate habitat quality.
Mayfly *Ephemerella inermis*	Moderately tolerant to sediment. Good red-flag species when their numbers increase.
Dipteran Chironomidae	Highly tolerant to multiple forms of pollution. Particularly tolerant to sedimentation. Often dominate the community when pollution is severe.

These species are but a sample of the species considered when aquatic macroinvertebrate samples are collected for evaluation of the aquatic ecosystem. The

Forest has been collecting macroinvertebrate data on major streams since 1987. Therefore baseline information is available. Current data is compared to baseline data to monitor changes in the habitat. The development of species/habitat relationships of fish and wildlife is identified as an objective in the Forest Plan with the associated guideline to maintain all streams for a biotic condition index (BCI) of 75 or above.

Direct and Indirect Effects

Alternative 1 – No Action

Under the no action alternative, Lake Atwood dam would potentially fail if no action was taken to repair the dam. This would result in resource damage as a result of extensive flooding and scouring of the stream channel. Large amounts of sediment would be flushed into Atwood Creek and the Uinta River drainage. Stream banks would be scoured and become unstable and the stream would no longer provide quality habitat for cutthroat trout.

Alternative 2 – Proposed Action

The activity that could result in direct effects to cutthroat trout and macroinvertebrate habitat would be from the installation of the measuring flume in the outlet stream channel. This action would involve excavating a section of the stream channel to allow the installation of the measuring flume. This would effectively change the substrate in the localized area from the current rubble/cobble substrate to a metal plate substrate. This impact would be localized within the excavated installation area and would not be expected to effect the ability of the outlet stream channel within and downstream of the proposed project area to provide quality habitat to cutthroat trout and macroinvertebrate populations.

However, implementation of the design criteria (1-3 and 6-7) identified in Chapter 2 above, would greatly minimize or eliminate these potential indirect effects of sediment delivery to the outlet stream. This potential sediment delivery would occur during the construction period and the time it takes for localized disturbed vegetation and soil to stabilize. This time period is expected to be less than three years following the installation. These effects are expected to be negligible and short in duration. The low levels of sediment produced would be transported through the system and would not have a measureable effect on cutthroat trout and macroinvertebrate habitat. Therefore, activities of the proposed action are expected to have no effect on the quality of habitat for cutthroat trout or aquatic macroinvertebrates at the completion of the proposed repair project.

Cumulative Effects

Because direct or indirect effects to cutthroat trout and macroinvertebrates or their habitat are not anticipated with the implementation of the design criteria (specifically 1-

3 and 6-7) identified in Chapter 2 of this EA, no cumulative effects would result from the proposed action. In order to have cumulative effects, direct and indirect effects must be present.

Summary of Effects

Implementation of the proposed action is expected to have no direct effects to cutthroat trout or aquatic macroinvertebrates, as discussed above, with the implementation of design criteria (1-3, and 6-7). The incorporation of identified design criteria would minimize the potential for sediment entering the stream as a result of project activities. Because of this, sediment levels are expected to be negligible and undetectable. Therefore, it is determined that the proposed Atwood Dam Repair project would not contribute to a negative trend for cutthroat trout or macroinvertebrates on the Ashley National Forest.

3.9 Botanical Resources

Endangered, Threatened, and Proposed Species

Spiranthes diluvialis, or commonly known as Ute ladies-tresses is located within the Intermountain west, and has also been identified along the Green River from Little Hole (east of Dutch John) to the Ashley National Forest boundary.

Spiranthes diluvialis has also been found in the Uinta River drainage below the National Forest, but has not been found and is not expected to be found above the boundary. Studies and surveys within the project area indicate that *Spiranthes diluvialis* is not present and is not expected to be found. Based on this, there would be no effect to Threatened or Endangered plant species or their habitat from either alternative. The Atwood Dam Repair Project is expected to have no effect to *Spiranthes diluvialis* plants or populations.

Forest Service Region 4 Sensitive Species

The Ashley National Forest is divided up into ecological units consisting of landtypes. The presence of Sensitive Plants has been correlated with these Ecological Units at the Landtype Association and/or Landtype level.

The project area is located in the Alpine Moraine 5 (AM5) Landtype. No sensitive plant has been found in the AM Landtype Association. The project area does not contain habitat for sensitive plant species. Bennion Park is located in the Trout Slope (TS4) landtype. Cypripedium fasciculatum, commonly known as clustered lady's slipper, is known to grow on the (TS4) landtype, but is not found in nor adjacent to the open meadow of the Bennion Park staging area. The project or staging areas do not contain habitat for sensitive plant species .

Based on this information, the Atwood Dam Repair Project is expected to have no "No Impact" to sensitive plants. Best available science indicates this determination is made with high level of certainty.

3.10 Noxious Weeds

Affected Environment

Land surface disturbance can heighten the potential of the establishment and spread of noxious weeds if their seeds are present. The dam repair at Atwood Lake would require land disturbances that would ordinarily heighten the establishment and spread of noxious weeds. However, numerous monitoring studies at elevations greater than 10,000 feet have indicated that noxious weed species known to Utah and surrounding states are not viable. The elevation of Lake Atwood is approximately just above 11,000 feet and is about 10,575 feet at the Bennion Park staging area. . The existing plant communities at the project site and the staging area are dominated by native plants that have a moderate to high value for watershed protection. Presently the ground cover exceeds 85 percent of potential and the plant communities are stable.

In order to evaluate the effects of the proposed action on the potential establishment of non-native invasive plants, a visual indicator of presence or absence is used to determine if noxious plants were introduced to the project or staging areas. Presently, there are no noxious weeds in the project or staging areas..

Direct and Indirect Effects

Alternative 1 – No Action

Under Alternative 1, noxious weed seeds or plant materials would not be transported to Lake Atwood Lake machinery and needed horse and mule stock. Therefore there would be no direct or indirect effects from the implementation of Alternative 1 if it were chosen. Because a cumulative effect requires a direct or indirect effect as a precursor, there would be no cumulative effects as a result of Alternative 1.

Alternative 2 – Proposed Action

Under Alternative 2, the potential of noxious weed seeds or plant materials being transported to Atwood Lake by machinery and support stock presence would be greater than Alternative 1, but the potential for establishment and spread of noxious weeds would be almost negligible because of the high elevation of Lake Atwood. The introduction of weeds would also be negligible at the Bennion Park staging area because the staging area is located at approximately 10,575 feet above sea level.

Cumulative Effects

Spatial and Temporal Bounds of Analysis

The spatial boundaries of potential establishment and spread of noxious weeds are the sub-alpine meadows suitable for grazing located within one mile radius of the project site and the trail that originates from the Uinta Trailhead. The spatial boundaries of potential establishment and spread of noxious weeds by machinery is at the dam site and at the staging area at Bennion Park.

Since a permit to repair the dam would not exceed two years, the potential establishment and spread of noxious weeds proposed under Alternative 2 would not exceed the two year period.

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

In regards to noxious weeds, there are no past, present or reasonably foreseeable activities whose effects would overlap with the spatial and temporal boundaries of the proposed action effects. As such, there are no cumulative effects.

Summary of Effects

There would be no known effects from the implementation of Alternative 1 since no repair work of the dam would occur. Alternative 2 would have little to no effect on the spread and establishment of noxious weeds since known noxious weeds do not demonstrate viability at Atwood Lake and other comparable sites.

3.11 Air Quality

Affected Environment

The High Uintas Wilderness air quality is generally excellent. The exception would be when smoke from wildfires decreases visibility from either local or distant sources, and usually occurs during the summer months. Visibility, an air quality related value (AQRV) for wilderness areas, is indicative of air quality as impaired views or haze are usually the first indication of pollution. Air quality in the wilderness is monitored qualitatively via a camera located on Lake Fork Mountain in the Duchesne Ranger District and the data becomes available the following year.

The project area and the surrounding Utah Counties (Duchesne, Daggett, Summit and Uintah) are in an attainment or unclassifiable areas. Attainment is defined by having no criteria pollutants in violation of the national ambient air quality standards (NAAQS), (see project record for current NAAQS table). Any one of the six criteria pollutants: carbon monoxide, nitrogen dioxide, ozone, lead, particulate matter (PM), and sulfur dioxide, can place an area in nonattainment status for that pollutant. Section 107(d)(1)(A)(iii) of the CAA defines unclassifiable areas as areas that cannot

be classified as attainment or nonattainment on the basis of available information. The classification of attainment or unclassifiable was recommended for Duchesne County where the project is taking place. Nonattainment areas are located mainly along the Wasatch Front. Nonattainment is achieved by exceeding a NAAQS for one or more criteria pollutants.

Greenhouse gases are gases that trap heat in the atmosphere causing what is known as the “greenhouse effect”; this effect helps to make the Earth habitable. If there are fewer greenhouse gases in the atmosphere cooler temperatures prevail, while conversely, more greenhouse gases increase temperatures and are associated with climate change. Table 19 illustrates the criteria pollutants and the exisiting condition within the project area.

Table 19 – Air Quality Resource Indicators for the Existing Condition.

Resource Element	Resource Indicator	Measure	Existing Condition*
Criteria Pollutants	Carbon Monoxide (CO)	Tons/Year	18,313.7
	Nitrogen Dioxide (NO_2)	Tons/Year	6.9
	Particulate Matter ($PM_{2.5}$ and PM_{10})	Tons/Year	7976.8
	Sulfur Dioxide (SO_2)	Tons/Year	159.3
	Volatile Organic Compounds (VOCs)	Tons/Year	58,089.6
Greenhouse Gases	Carbon Dioxide (CO_2)	Tons/Year	223,609.3
	Methane (CH_4)	Tons/Year	137.8
	Nitrous Oxide (NO_x)	Tons/Year	11,472.4

**From EPA Emissions Inventory 2011 for Duchesne County (USEPA 2013).*

The following effects discussion will evaluate the effects of the proposed action on measurement indicators which are used to determine the magnitude of impact.

The first resource indicator would be to stay in attainment for air quality. Desired conditions for criteria pollutants and therefore air quality would be to stay in attainment and minimize increases in the NAAQS. The existing condition is based on the 2011 year emissions inventory, which are updated by the USEPA every three years. The emissions from this project will be compared with the 2011 emissions.

If an area is in nonattainment or maintenance for a pollutant the General Conformity Rule is in effect. This rule limits emissions to 100 tons per year (TPY) (depending on the severity of the nonattainment status) and is considered de minimis or very minor. Emissions from this project would need to be at or below 100 TPY level to be considered de minimis.

The second resource indicator is the impact of the project on greenhouse gases. Greenhouse gas emissions do not stay in the area where they are produced; they mix readily in the atmosphere and move around globally. Depending on the gas, they can last from days to centuries in the atmosphere. Carbon dioxide, methane and nitrous oxide are the three greenhouse gas emissions associated with the equipment being used with carbon dioxide being the most abundant.

Direct and Indirect Effects

Alternative 1

Alternative 1 would not generate any direct or indirect effects because there would be no actions taking place to repair the dam. As such, there would be no cumulative effects.

Emissions from equipment, dust, and livestock would not add to existing background air quality because the dam would not be repaired, and greenhouse gases would not be added to the atmosphere from this project if it did not take place. Failure of the dam would not have an effect on air quality; it is unlikely any emissions would result from such a failure for either criteria pollutants or greenhouse gases.

Alternative 2

For Alternative 2, the direct effects would come from pollutants that are emitted directly from the mechanical equipment, including a crane-type helicopter, which would be used to repair the dam. Emissions such as PM10 and PM2.5, carbon monoxide, volatile organic compounds (VOCs), and nitrogen dioxide would be expected from these sources. Some PM of both sizes would be introduced during soil moving activities that create dust which can be mitigated with water application. During cement mixing fine dust is localized around the mixer; exposure to the operator is minimized by wearing protective eyewear and a mask. Water from Lake Atwood would mitigate dust from soil disturbance. Trail dust would be localized to the area of the trail since livestock cannot travel at the speed of vehicles nor do they weigh as much. Speed and weight increase dust from dirt roads.

Indirect effects occur when pollutants formed somewhere else, but the precursors are emitted at the work site. Particulate Matter 2.5 can form as a secondary particle when gases react in the air and VOCs are precursors to ground ozone formation which can harm ecosystems as well as human health. Greenhouse gases emitted at the work

site become a global concern as they mix readily, move around in the atmosphere, can have a very long lifespan, and add to the already existing greenhouse gases in the atmosphere. Table 20 summarizes the effects of Alternative 2 on the air quality resource indicators.

Table 20 – Air Quality Resource Effects for Alternative 2.

Resource Element	Resource Indicator	Measure	Emissions from this project
Criteria Pollutants	Carbon Monoxide (CO)	Tons/Year	3.75
	Nitrogen Dioxide (NO_2)	Tons/Year	These are included in NO_x
	Particulate Matter ($PM_{2.5}$ and PM_{10})	Tons/Year	0.10
	Sulfur Dioxide (SO_2)	Tons/Year	0.08
	Volatile Organic Compounds (VOCs)	Tons/Year	0.17
Greenhouse Gases	Carbon Dioxide (CO_2)	Tons/Year	46.92
	Methane (CH_4)[1]	Tons/Year	[1]NA
	Nitrous Oxide (NO_x)	Tons/Year	1.69

[1]Methane emissions from vehicles are considered minor for mobile sources and were not included in GHG emissions (USEPA, 2014).

The levels of emissions from the project are from calculations provided in 'A Desk Guide for NEPA Air Quality Analyses' for the equipment used to repair the dam. The helicopter emissions are from the Swiss Federal Office of Civil Aviation (FOCA) using emissions from a large three engine air crane. The actual aircraft used for lifting equipment to the site is not known at this time; it could vary from a large aircraft to a smaller craft with similar lifting abilities. Availability varies greatly during the summer months when this type of aircraft is in high demand for fighting fires. Emissions are all well below the de minimis amount of 100 tons per year, but the table used did not provide sulfur emissions.

Particulate matter (PM), both 2.5 and 10 would be generated by livestock use on dusty trails, moving and exposing soil at the dam site, and cement mixing, these emissions are not included in the emissions table for this project.

Greenhouse gas emissions are from the equipment used at the site. Section 202(a) of the Clean Air Act was updated on January 14, 2010; this update added six greenhouse gases to the list of pollutants that endanger public health and welfare and

future generations. These gases are: carbon dioxide, methane, nitrous oxide, hydrofluorocarbons, perfluorocarbons and sulfur hexafluoride which are known greenhouse gases which can ultimately contribute to climate change.

Cumulative Effects

Spatial and Temporal Context for Effects Analysis

The spatial boundary for analyzing the cumulative effects to air quality is Duchesne County as this is where the project is taking place. Temporal boundaries are confined to the months when the project takes place which is expected to be June through September. Effects from emissions would be only while the equipment is in operation for NAAQs pollutants.

Greenhouse gases stay in the atmosphere for a long time from hundreds to thousands of years depending on the gas. Greenhouse gases are defined by their global warming potential (GWP) based on CO_2equivalents (CO_2e). Not all gases are created equal in their global warming potential; CO_2 has a GWP of 1, CH_4 has a GWP of 21 or 21 CO_2e, and N_2O has a GWP of 300, or 300 CO_2e. Any greenhouse gas emissions are added to existing atmospheric gases for Duchesne County.

Although greenhouse gases move through the atmosphere and readily become part of the global pool, the USEPA keeps track of emissions by county to account for national scale reporting of greenhouse gases so accounting for emissions for this project was confined to the county boundary also.

Past, Present, and Reasonably Foreseeable Activities Relevant to Cumulative Effects Analysis

Past, present and future activities on forest lands in Duchesne county that could have an effect on air quality include oil and gas development on the South Unit which contribute to past, present and future emissions; this is the biggest source of ongoing emissions on the forest. Travel on dirt roads impacts air quality in the form of fugitive dust at present and into the future. Two planned transmission lines traversing Duchesne County and parts of the forest would produce emissions over a limited time during construction. Table 21 quantifies the cumulative effects for the proposed action.

Table 21 – Air Quality Resource Indicators and Measures for Cumulative Effects.

Resource Element	Resource Indicator	Emissions This Project Tons Per Year	Emissions Duchesne County Tons Per Year	Percent of Duchesne County Emissions
Criteria Pollutant	Carbon Monoxide (CO)	3.75	18,313.7	0.0204
	Nitrogen Dioxide[1] (NO_2)	- -	6.9	- -

Resource Element	Resource Indicator	Emissions This Project Tons Per Year	Emissions Duchesne County Tons Per Year	Percent of Duchesne County Emissions
	Particulate Matter ($PM_{2.5}$ and PM_{10})	0.10	7976.8	0.0012
	Sulfur Dioxide (SO_2)	0.08	159.3	0.0502
	Volatile Organic Compounds (VOCs)	0.17	58089.6	0.00029
Greenhouse Gases	Carbon Dioxide (CO_2)	188.33	223,609.3	0.084
	Methane (CH_4)[2]	- -	137.8	- -
	Nitrous Oxide (NO_x)	1.69	11472.4	0.015

[1]*Nitrous Dioxide emissions are included with Nitrous Oxide emissions.*

[2]*Methane emissions from vehicles are considered minor and were not included in GHG emissions (USEPA, 2014).*

The emissions from this project compared to background data from Duchesne County in 2011 are nominal for criteria pollutants, as they are all well below the de minimis level of 100 TPY. The greenhouse gas emissions from this project are well below the county emissions and well below the PSD BACT 75,000 TPY emission requirement.

Summary of Effects

Alternative 1 would not create any effects to air quality. While Alternative 2 would create some emissions, the impact would be negligible given the short amount of time (120 days) the repair of the dam would require, and the small amount of the emissions expected from the equipment being used to complete the project.

Chapter 4 – List of Contributors and Agencies and Individuals Informed or Consulted

4.1 Contributors

USDA - Forest Service

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- Helen Kempenich, Physical Scientist
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- Kathy Paulin, Planning, Heritage, Recreation, and Information Staff Officer
- Jeff Rust, Forest Archeologist

4.2 Other Agencies, Governments, and Individuals Informed or Consulted

- Utah State Historic Preservation Office
- Utah Division of Wildlife Resources
- Dry Gulch Irrigation Company
- Duchesne County
- Uintah County

4.3 Tribal Units of Government and Tribal Organizations

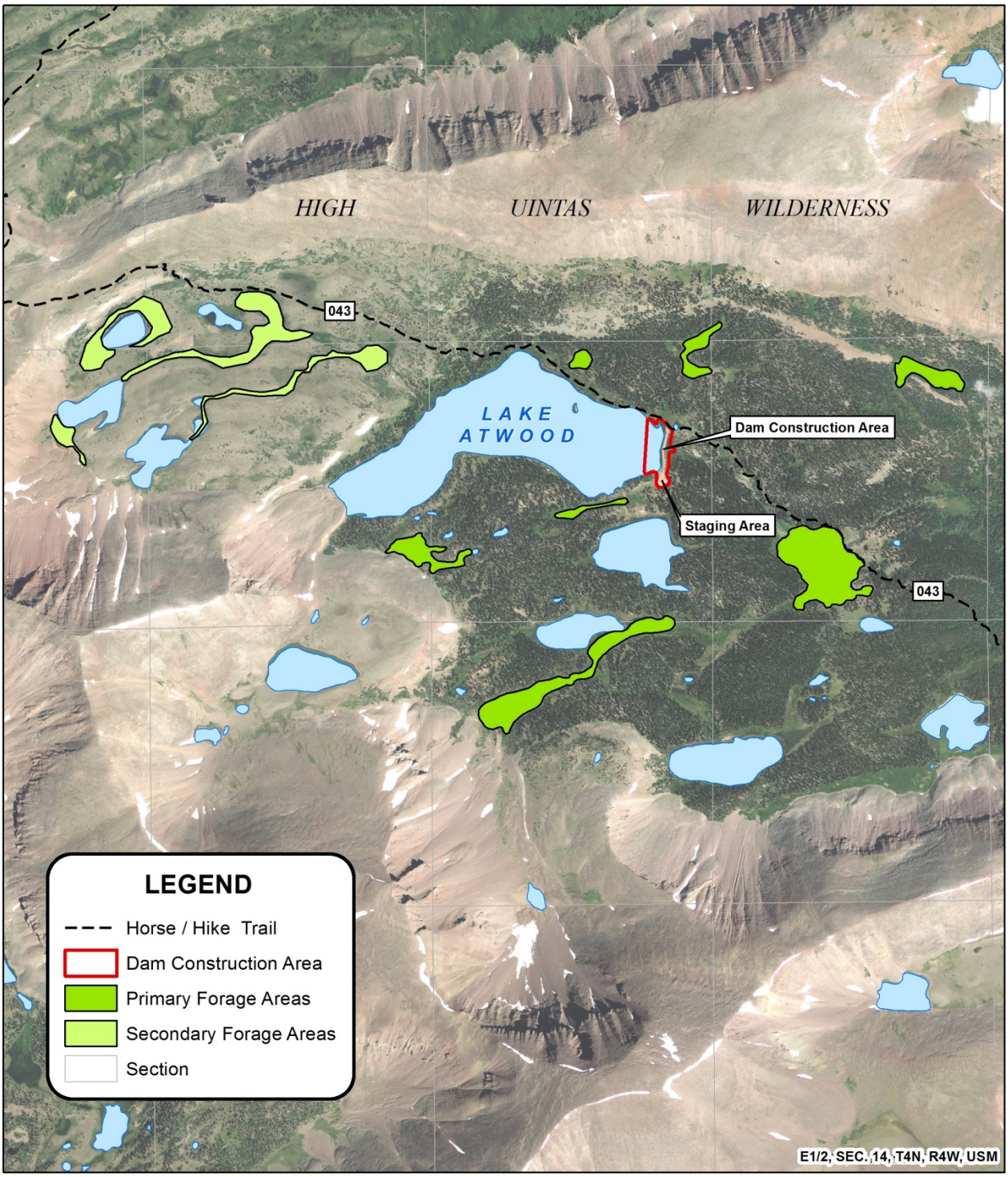
- Ute Tribe

Appendix A – Maps

MAP 1

Atwood Dam Repair Project
PROJECT AREA MAP

Users need to exercise caution regarding the accuracy of these data. The source scales and vintage may vary. The USFS provides no warranty, nor accepts any liability from any incomplete, or misleading use of these data. This map is not meant for navigation purposes.

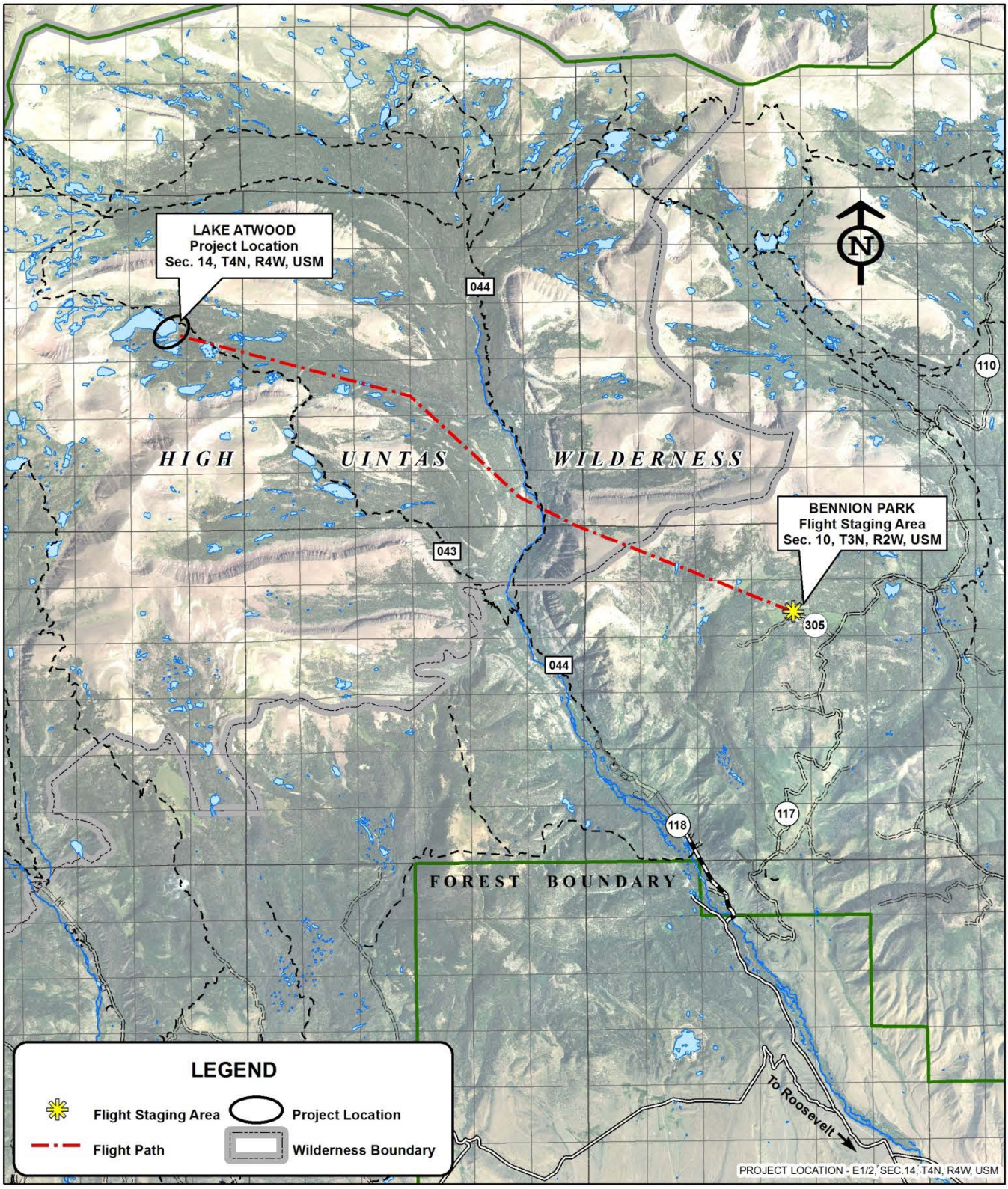


10/22/2014 - G.Reese 1:28,000

0 0.2 0.4 0.6 0.8 1 Miles

MAP 2
Atwood Dam Repair Project
FLIGHT PATH & LOCATION MAP

User needs to exercise caution regarding the accuracy of these data. The source scales and vintage may vary. The USFS provides no warranty, nor accepts any liability from any incomplete, or misleading use of these data. This map is not meant for navigation purposes.



10/28/2014 G.Reese 1:140,000

0 0.5 1 2 3 4 5 Miles

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