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





U.S. Department of the Interior Bureau of Land Management Worland Field Office

October 2019 BLM/WY/PL-20/002+1440 Estimated total cost associated with developing and producing this EIS and ROD: \$925,657

RECORD OF DECISION ALKALI CREEK RESERVOIR PROJECT

United States Department of the Interior Bureau of Land Management Worland Field Office Worland, Wyoming

October 2019

RECORD OF DECISION FOR THE ALKALI CREEK RESERVOIR PROJECT

LEAD FEDERAL AGENCY:

APPLICANT:

APPLICATION REFERENCE NUMBER:

Bureau of Land Management

Wyoming Water Development Office

WYW-165353

RESPONSIBLE OFFICIALS:

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SUMMARY

This document constitutes the record of decision (ROD) of the U.S. Department of the Interior, Bureau of Land Management (BLM) for the Alkali Creek Reservoir Project (project) proposed by the State of Wyoming through the Wyoming Water Development Office (WWDO). This ROD outlines the BLM's decision, under the National Environmental Policy Act (NEPA), for the project to identify the selected alternative from the alternatives analyzed in detail in the May 2019 *Alkali Creek Reservoir Project Final Environmental Impact Statement* (final EIS) (BLM 2019a) and subject to the specified mitigation measures described in this ROD. The BLM's authorities are limited to the components of the project that occur on BLM-managed federal lands.

The findings in the final EIS are based on an open, collaborative, and robust process among the scientists, resource specialists, and regulatory staff of the BLM, U.S. Army Corps of Engineers (USACE), and other cooperating agencies; the NEPA contractor; and the participating public. This process resulted in a final EIS that, consistent with NEPA, provides an adequate, detailed analysis of the environmental impacts of the applicant's proposal and a reasonable range of alternatives (including the No Federal Action) to inform and support all federal reviews and authorizations of the BLM, USACE, and the other federal cooperating agencies, for the proposed project.

CONTENTS

Record of Decision for the Alkali Creek Reservoir Projectv
Summaryi
Background1
Project Purpose and Need
Authorities1
Agency Decision
Mitigation2
Alternatives
Alternatives Analyzed in Detail
No Federal Action
Proposed Action9
Modified Proposed Action10
Alternatives Considered but Not Carried Forward for Detailed Analysis11
Environmentally Preferred Alternative
Management Considerations
Rationale for the Decision
Public Involvement
Final Agency Authorization
Protest and Appeal Opportunities14
Standards for Obtaining a Stay (43 CFR 4.21(b))14
Signature14
References

Attachments

Attachment 1.	Memorandum of Agreement
Attachment 2.	Wyoming Department of Environmental Quality Water Quality 401 Certification and
	Monitoring and Adaptive Management Plan
Attachment 3.	Comments on the Final Environmental Impact Statement and Agency Responses

Figures

-		
Figure	1. Location of Alkali Creek Reservoir	3

BACKGROUND

The Wyoming Water Development Office (WWDO), a State of Wyoming agency, has a primary purpose of developing and preserving Wyoming's water and water-related land resources and encouraging development of facilities for irrigation, reduction of flood damage, and other purposes (Wyoming Statute 41-2-112(a)). The WWDO is proposing to develop a water storage reservoir on Alkali Creek to reduce late-season irrigation shortages. The proposed Alkali Creek Reservoir is approximately 3 miles northwest of Hyattville, Big Horn County, Wyoming. Alkali Creek is an intermittent creek that flows into Paint Rock Creek, which is a tributary of the Nowood River, all of which are in the Nowood River watershed.

The Bureau of Land Management (BLM) Worland Field Office (WFO) prepared an environmental impact statement (EIS) pursuant to the National Environmental Policy Act (NEPA) to analyze the potential direct, indirect, and cumulative effects of potentially granting a right-of-way (ROW) for the construction and operation of the proposed Alkali Creek Reservoir and the construction of associated roads and other structures. The formal public scoping process for the project began on October 11, 2017, with the publication of a notice of intent (NOI) in the *Federal Register* communicating BLM's intent to prepare an EIS. The notice of availability for the draft EIS was published in the *Federal Register* on August 31, 2018. The 45-day public review period extended through October 15, 2018. After reviewing and responding to public comments and making corresponding edits to the EIS, the BLM released the final EIS for a 30-day availability period on May 3, 2019. This record of decision (ROD) concludes the NEPA process.

PROJECT PURPOSE AND NEED

The WWDO has submitted a ROW application for the project (WYW-165353) to the BLM pursuant to Title V of the Federal Land Policy and Management Act of 1976, as amended (FLPMA), and implementing regulations 43 Code of Federal Regulations (CFR) 2800. This ROW application considers the need for late-season irrigation use and public recreational opportunities.

The purpose of the BLM's federal action is to respond to the WWDO's application for a ROW to construct, operate, and maintain access roads, a reservoir, and recreation site on public lands. The need for this action is to fulfill BLM's responsibility under FLPMA and BLM ROW regulations to manage the public lands for multiple use (43 CFR 2800).

AUTHORITIES

This ROD is prepared in accordance with the BLM's authority under Title V of FLPMA (Public Law [P.L.] 94-579, 43 United States Code [USC] 1701 et seq.), NEPA regulations (40 CFR 1500), 43 CFR 2800, and 18 CFR 380.14 for Section 106 of the National Historic Preservation Act (NHPA).

The project as proposed, the Proposed Action, conforms to the ROD and Approved Resource Management Plan (ARMP) for the Worland Field Office, dated September 2015, as amended. The decisions in the WFO ARMP provide general management direction and allocation of uses and resources on the public lands in the area.

This ROD has been reviewed to determine if the Proposed Action conforms to the ARMP as required by 43 CFR 1610.5. The ARMP provides that the planning area is open to consideration for rights-of-ways, including water impoundment facilities.

AGENCY DECISION

It is the BLM's decision to select the Proposed Action alternative considered in the final EIS and to authorize a ROW for the purpose of constructing and operating the Alkali Creek Reservoir (Figure 1). This authorization will be contingent upon approval of other state and federal agency authorization and implementation of mitigation measures.

This decision includes the authorization of a new earthen dam embankment and reservoir on Alkali Creek. The following would be included as part of the Proposed Action: staging, construction, and borrow material areas; the construction, operation, and maintenance of access roads; and a public recreation parking and boat ramp on public lands. The reservoir would primarily be filled with diversions from Paint Rock Creek and Medicine Lodge Creek during spring run-off. The supplemental irrigation water would be released starting in July, continuing through August, and extending into September.

This decision does not authorize construction to begin and does not apply to any state or private lands, which may be involved in the project, and does not create any right or easement, nor establish eminent domain, across such lands. The land descriptions of the public land applied for under application WYW-165353 are found in the following:

Sixth Principal Meridian, Wyoming T. 49 N., R. 90 W., sec. 3, lot 5; sec. 4, lot 15. T. 50 N., R. 90 W., sec. 26, NW¹/4SW¹/4; sec. 27, lots 5, 6, 7, 8, and NE¹/4SW¹/4; sec. 33, lot 1, and NE¹/4SE¹/4; sec. 34, lots 1, 3, 10 and 11, Parcel A, and NW¹/4NW¹/4; sec. 35, lots 9 and 10, Parcel A, and W¹/2SW¹/4NW¹/4; tracts 43A thru 43D.

Construction on public lands may not begin until a notice to proceed is issued by the BLM. Issuance of the notice to proceed will be contingent upon Wyoming Water Development Commission getting required authorizations, which may be necessary from other federal, state, or local agencies.

Mitigation

Other federal, state, and local permits and approvals may be required to implement the selected alternative. The BLM expects that the WWDO would implement mitigation measures and other specific stipulations and methods identified in the plan of development (POD) (Trihydro Corporation [Trihydro] 2017a) or other subsequent authorization over the entire length of the project, regardless of jurisdiction, while understanding the federal land management agencies do not have the authority to enforce mitigation measures on state and private land.



Figure 1. Location of Alkali Creek Reservoir.

- Cultural Resources
 - The fence line shall be moved to avoid an eligible prehistoric cultural resource (48BH4624).
 - Mitigation in a memorandum of agreement (MOA) with the Wyoming State Historic Preservation Office (SHPO), Advisory Council on Historic Preservation, tribes, landowners, the WWDO, and other consulting parties shall be implemented (Attachment 1).
 - The ROW grant holder shall be responsible for informing all persons in the area who are associated with the project that they will be subject to prosecution for knowingly disturbing historic or archaeological sites, or for collecting artifacts. If historic or archaeological materials are uncovered during construction, the holder shall immediately stop work that might further disturb such materials, and shall contact the Authorized Officer (AO). Within 5 working days, the AO shall inform the holder as to
 - a. whether the material appears eligible for the National Register of Historic Places;
 - b. the mitigation measures the holder will likely have to undertake before the site can be used (assuming in situ preservation is not necessary); and
 - c. a timeframe for the AO to complete an expedited review under 36 CFR 800.11 to confirm, through the SHPO, that the findings of the AO are correct and that mitigation is appropriate. The AO shall provide technical and procedural guidelines for the conduct of mitigation. Upon verification from the AO that the required mitigation has been completed, the holder will then be allowed to resume construction measures.
- Erosion Control
 - Holders are required to obtain a National Pollution Discharge Elimination System (NPDES) stormwater permit from the Wyoming Department of Environmental Quality (WDEQ) for any projects that disturb 1 acre or more. This general construction stormwater permit must be obtained from the WDEQ before any surface-disturbing activities and can be obtained by following direction on the WDEQ website at http://deq.state.wy.us. Further information can be obtained by contacting the WDEQ NPDES coordinator at (307) 775-7570.
 - The holder shall ensure all appropriate measures are taken to control erosion. Upon completion of construction, the operator shall initiate the approved stormwater discharge plans on the location.
 - The holder shall comply with the current requirements of the Federal Guidelines for Dam Safety for dam site investigation, design, construction, operation and maintenance, and emergency preparedness, including the following:
 - Federal Emergency Management Agency [FEMA] 64 Emergency Action Planning for Dams (FEMA 2013a)
 - FEMA 65 Earthquake Analyses and Design of Dams (FEMA 2005)
 - FEMA 93 Federal Guidelines for Dam Safety (FEMA 2004a)
 - FEMA P-94 Selecting and Accommodating Inflow Design Floods for Dams (FEMA 2013b)
 - FEMA148 Glossary of Terms (FEMA 2003)
 - FEMA 333 Hazard Potential Classification System for Dams (FEMA 2004b)
- Upon request from the BLM, the authorization holder shall provide all supporting documentation for reporting the adequacy and condition of the dam under these Federal Guidelines for Dam

Safety. If the terms of these requirements are not met, the holder shall, within 120 calendar days, provide a plan for the cure of the identified deficiencies to the BLM. Failure to report and act on curing dam safety deficiencies may result in suspension or termination of this authorization and the access to the BLM-administered public lands.

- The dam and reservoir shall be designed by an engineer licensed in the State of Wyoming with demonstrable experience in dam design.
- The holder shall submit, for the AO's review and approval, designs and plans approved by the Wyoming State Engineer (or other appropriate state authority) before construction or any other surface-disturbing activity. The AO shall issue a notice to proceed using BLM Form 2800-15 upon approval of the design and plans.
- Within 60 days after receipt of the AO's written notification of damage or defects found in the structure or related facilities, the holder shall restore the facility to the originally constructed condition, using materials of equal or superior quality to those used in the original construction.
- Within 30 days of completion, the holder shall submit to the AO as-built drawings and a certification of construction verifying that the facility has been constructed (and tested) in accordance with the design, plans, specifications, and applicable laws and regulations.
- Should the holder fail to perform the required maintenance or repair within 120 days of receipt of the AO's written notification to do so, the BLM may perform the required maintenance or repair, or at the discretion of the AO, remove the facility, at the holder's expense, including the administrative costs to the BLM to effect any such action.
- The holder shall prepare an emergency action plan in accordance with BLM standards for structures with a "High" or "Significant" hazard classification. The Wyoming State Engineer (or other appropriate state authority) shall determine the hazard classification following an inspection of the downstream potential for property damage and/or loss of life.
- The general construction and maintenance guidance in the BLM "Gold Book" *Surface Operating Standards and Guidelines for Oil and Gas Exploration and Development, Fourth Edition* (BLM 2007), and BLM Road Design Handbook (H-9113-1) shall be followed.
- The United States, its officers, and employees shall be held harmless from and indemnified against any damage, or judgments and expenses on account of bodily injury, death, or property damage, or claims for bodily injury, death, or property damage of any nature whatsoever, and by whomsoever made, arising out from the construction, operation, or maintenance of the dam and reservoir being authorized by this ROW grant; including any liability that the United States may have as owner of the land that is the subject of the ROW grant.
- Hazardous Materials
 - The holder and their contractors shall comply with all applicable federal and state laws and regulations hereafter enacted or promulgated as they relate to toxic substances and hazardous materials.
 - Hazardous materials are those chemicals listed in Title III List of Lists, EPA's Consolidated List of Chemicals Subject to Emergency Planning and the Community Right to Know Act (EPCRA); Section 112(r) of the Clean Air Act, as amended; or the 40 CFR 302.4 List of Hazardous Substances and Reportable Quantities, as amended. In the event any hazardous materials are used, they shall be handled in an appropriate manner to prevent environmental contamination. Any release of hazardous materials of reportable quantities shall be reported both to the National Response Center (NRC), as required in

the National Oil and Hazardous Materials Contingency Plan (40 CFR 300), and the BLM WFO, as per the Hazardous Materials Contingency Plan.

- The holder shall comply with the Toxic Substances Control Act of 1976, as amended (15 USC 2601 et seq.) with regard to any toxic substances that are used, generated by, or stored on the ROW or on facilities authorized under this ROW grant (see 40 CFR 702–799 and especially, provisions on polychlorinated biphenyls, 40 CFR 761.1–761.193). Additionally, any release of toxic substances (leaks, spills, etc.) in excess of the reportable quantity established by 40 CFR 117 shall be reported as required by the Comprehensive Environmental Response, Compensation and Liability Act of 1980, section 102b. A copy of any report required or requested by any federal agency of state government as a result of a reportable release or spill of any toxic substances shall be furnished to the AO concurrent with the filing of the reports to the involved federal agency or state government.
- The AO may add additional conditions of approval to protect the resources, if conditions require it. The holder shall comply with applicable laws and regulations.
- Bonding
 - The AO for the BLM reserves the right to require a bond from the grant holder in accordance with 43 CFR 2800 et seq. at any time during the life of the ROW grant. If required, the grant holder shall provide an acceptable bond for the construction, operation, maintenance, and termination of the grant. If the BLM determines that a bond is required, the bond shall be processed in accordance with BLM policy in place at the time of the determination.
- Noise
 - With regard to watercraft, reservoir use shall be limited to non-motorized boats.
- Public Health and Safety
 - The on-site project manual shall include the types and quantities of hazardous materials used, stored, transported, produced, or disposed of in conjunction with the project and contingency plans for releases, spills, fires, or explosions.
 - The holder shall maintain Safety Data Sheets on file at project operations headquarters.
 - The holder shall properly store hazardous materials.
 - The holder shall fuel and lubricate construction and transportation equipment only in a designated area with secondary containment if required by regulation (e.g., spill prevention, control, and countermeasure plan).
 - The holder shall adhere to proper management and handling procedures for hazardous materials and waste.
 - The holder shall follow manufacturers' suggested guidelines for use and disposal of hazardous materials.
 - The holder shall properly train and educate employees who will be using hazardous materials during project construction and implementation.
 - Frequent visual inspections of the dam shall be conducted by the dam operator and formal dam safety inspections shall be conducted by the Wyoming State Engineer's Office Safety of Dams Division.
 - The holder shall comply with the Wyoming Pollutant Discharge Elimination System permit.

- Soils
 - Topsoil salvaged and protected during reservoir construction plus accumulated sediments in the reservoir bottom shall be spread over disturbed areas.
 - Disturbed and re-contoured areas shall be fertilized (if appropriate based on soil tests), seeded with a BLM-approved seed mix, and mulched in accordance with the draft *Reclamation and Weed Management Plan* (Trihydro 2017b).
 - Temporary fencing of the reclaimed reservoir area may be required after seeding to exclude livestock and wildlife and to allow for revegetation success.
 - Additional reclamation details can be found in the draft *Reclamation and Weed Management Plan* (Trihydro 2017b), which sets out reclamation performance standards for both interim and final reclamation (e.g., final reclamation success must have 90% of the vegetation consisting of species included in the approved seed mix or desirable species). Reclamation areas shall be inspected regularly for general site status, soil erosion, vegetation density and diversity, and weed infestation.
- Transportation
 - The holder shall be required to develop a traffic management plan to limit effects.
 - A safety program shall be developed that includes driver safety reminders involving onsite and off-site travel, designated travel routes, and recommendations for drivers of large trucks making turns to and from Wyoming Highway 31 (WY 31). Most safety effects shall be addressed by roadway improvements and could be addressed with standard and customized construction driver awareness efforts and site-specific construction period intersection control measures, where appropriate. Intersection safety measures could include temporary signing, traffic control devices at key locations, and flaggers in some instances. Risks of collisions with wildlife and livestock shall be highlighted in the safety program along with speed limits on individual roadway segments.
- Vegetation Resources
 - The WWDO has committed to implementing noxious weed management and has provided a draft weed management plan (Trihydro 2017b).
 - The BLM requires provisions for invasive species management for all BLM-authorized actions. BLM Wyoming Reclamation Policy (Instructional Memorandum WY-2012-032) requires the following for all surface-disturbing activities: assessment of the area for invasive plants before initiating the activity, development of an invasive plant management plan, control of invasive plants using an integrated weed management approach, and monitoring of treatments (BLM 2012). BLM requirements for weed management shall not apply to private lands; here, weed management will need to comply with landowners' desires and Wyoming Weed and Pest Control Act requirements.
- Visual
 - All permanent above-ground structures, not subject to technical or safety requirements, shall be painted to blend in with the natural color of the landscape. The paint used shall be a color which simulates standard environmental colors pre-approved by the AO. Standard environmental color charts are available from the local BLM office.
- Water Resources
 - Mitigation for the proposed structures (ditch enlargements, Alkali Creek channel stabilization and culvert enlargements) shall be designed wherever feasible using natural channel design techniques in conjunction with specific biological recommendations from

the Wyoming Game and Fish Department. Natural channel design considers a stable dimension, pattern, and profile in regard to the dominant discharge and associated sediment transport and should generally follow techniques outlined for alluvial channels in Natural Resources Conservation Service's (NRCS's) *Stream Restoration Design* (NRCS 2017), and/or methods and treatments outlined in the *Stream Restoration: A Natural Channel Design Handbook* (North Carolina Stream Restoration Institute and North Carolina Sea Grant 2007). Where feasible, proposed channel stabilization structures shall be designed to provide functional lift and therefore be self-mitigating.

- An adaptive management plan (AMP) shall be implemented, as required by WDEQ Water Quality Division 401 certification permits (Attachment 2). The holder shall be responsible for implementation of monitoring and mitigation requirements of this plan, as updated and approved by the WDEQ.
- Flow changes in Alkali Creek shall be mitigated to include flow to be maintained throughout the year with a bypass flow of 0.4 cubic feet per second (cfs) or that equal to normal baseline flow pre-construction.
- Wetlands
 - Pursuant to 40 CFR 230.94 (Compensatory Mitigation for Losses of Aquatic Resources), a compensatory mitigation plan must be submitted and approved by the USACE before the District Engineer can issue an individual Clean Water Act (CWA) Section 404 permit. The plan shall need to address each of the 12 elements required for a mitigation plan. The amount of required compensatory mitigation and the detailed plan shall be developed after the determination of the least environmentally damaging practicable alternative by the USACE.
- Terrestrial and Aquatic Wildlife
 - Proposed fencing shall be wildlife friendly and constructed to best suit the needs of biggame species in the area.
 - Collision markers shall be added to the proposed fencing in areas with a high potential for greater sage-grouse collisions.
 - A mosquito abatement plan shall be developed in conformance with the WFO ARMP, as amended (BLM 2019b) and sage-grouse Executive Order 2019-3 to help reduce the risk of West Nile Virus outbreaks.
 - Construction within the greater sage-grouse priority habitat management area shall be suspended from March 15 to June 30.
 - No project activity shall occur between 6 p.m. and 8 a.m. from March 1 to May 15 in Sage-grouse Core/Priority Habitat Management Areas.
 - If vehicles and equipment are moved across multiple streams, equipment shall be cleaned with a spraying device that uses an uncontaminated water source (i.e., a water source with no aquatic invasive species being present).
 - If a culvert is required during construction, flow shall be maintained in a portion of the stream to allow unrestricted fish passage. Culverts should be designed using natural channel design techniques where feasible and effective.
 - Impacts from fuel spills shall be avoided or minimized by restricting refueling within 100 feet of wetlands and streams.
 - A conservation pool shall be maintained to minimize adverse effects on fish species in the Nowood River.

- Monitoring
 - In support of these measures, the BLM requires the holder to provide for BLM access for environmental compliance inspections during the construction, operation, and reclamation phases of the project. The primary role and responsibility of the inspections are to ensure the holder's compliance with all terms, conditions, and stipulations of the ROW grant; the final POD; and other permits, approvals and regulatory requirements.
 - The holder shall also be responsible for monitoring the activities authorized under this grant, and for compliance with their POD.

ALTERNATIVES

Of the 53 alternatives that were developed and evaluated, four alternatives were carried forward for detailed analysis in the EIS. Two of the four alternatives have been grouped together as the Modified Proposed Action alternative. The rationale for carrying these alternatives forward for detailed analysis is described in Appendix C of the final EIS.

Alternatives Analyzed in Detail

No Federal Action

The No Federal Action alternative consists of the continued operation of the Nowood Watershed Improvement District (NWID) under current management conditions without additional storage or lateseason water supplies. Currently, there is approximately 3,150 acres of unirrigated lands with associated water rights. Under this alternative, there is the potential for these idle lands to be left unirrigated, irrigated partially, or irrigated fully in the future. No BLM ROW, CWA Section 404, or highway encroachment permits would be issued under the No Federal Action. Late-season irrigation water shortages would continue.

The following activities are assumed to be ongoing under the No Federal Action:

- Use of Paint Rock Creek and the larger Nowood River watershed for irrigation
- Agriculture, ranching, and livestock grazing
- Use of Medicine Lodge, Paint Rock, and Alkali Creeks and downstream reaches for recreation (e.g., fishing)

The No Federal Action assumes that no ROWs or other substantial permits would be approved in the project area in the near future. However, selection of the No Federal Action would not preclude the approval of other ROWs or permits for other projects in the future.

Although the No Federal Action does not achieve the overall project purpose of addressing late-season irrigation shortages, NEPA requires that this alternative be analyzed in detail as a baseline for comparison.

Proposed Action

The Proposed Action would consist of the following primary elements:

• An earthen embankment dam across the Alkali Creek valley and two additional embankments, outlet works to control discharges, a principal spillway, and an auxiliary spillway.

- A reservoir with 1,878 acre-feet of flood storage capacity, 5,996 acre-feet of irrigation pool or operation pool, and 1,998 acre-feet of conservation pool. A 33,606-foot-long fence would be constructed around the reservoir to keep livestock from the water for the life of the project.
- A 6,218-foot-long bypass pipeline to allow Anita Ditch irrigation flows to be diverted during reservoir construction. The bypass pipeline would remain in place following construction to provide pressurized flow to irrigators for sprinkler operation.
- Two new temporary construction roads and two new permanent access roads. The primary permanent access road would provide public access to the reservoir; the secondary permanent access road would provide authorized personnel access to the dam for operations and maintenance. The temporary construction roads would provide temporary access to construction staging areas and the primary reservoir construction area, as well as temporary access for stabilizing Alkali Creek downstream of WY 31.
- The enlargement of Anita Ditch and Anita Supplemental Ditch to accommodate the flows required to fill the reservoir and meet the needs of existing ditch users. Anita Ditch (approximately 4.3 miles long) would convey flow from Medicine Lodge Creek to the Alkali Creek Reservoir, and the Anita Supplemental Ditch (approximately 0.5 mile long) would convey flow from Paint Rock Creek to Medicine Lodge Creek.
- Development of a recreation area at the reservoir, consisting of a parking lot, comfort station, and boat ramp.
- Stream stabilization on Alkali Creek to prevent exacerbation of current conditions (active incising and unstable stream banks). A stream stabilization plan would be developed and implemented, which would include the installation of rock grade control structures and bank revetments.
- An embankment borrow in the reservoir footprint and a drainage material borrow area south of WY 31.
- Wetland mitigation areas (constructed wetlands).

Modified Proposed Action

The Modified Proposed Action consists of the same elements and activities as the Proposed Action with two modifications: 1) reducing the length of the auxiliary spillway by approximately 3,375 feet (spillway modification #2), and 2) modifying the reservoir fill time from 30 to 50 days (modified filing time).

SPILLWAY MODIFICATION #2

This modification to the Proposed Action auxiliary spillway configuration would reduce the length of the auxiliary spillway by constructing an armored control section to direct probable maximum flood flows into an existing drainage flowing south across WY 31 and eventually back into Alkali Creek. The auxiliary spillway length would be reduced from 3,950 feet to approximately 575 feet.

This modification would reduce direct disturbance to row crops on the west side of the dam and would not introduce additional effects to irrigated fields east of Alkali Creek. It would avoid a large cut through the ridge along Alkali Creek's west bank and reduce the excavation by approximately 400,000 cubic yards. This modification would also avoid the auxiliary spillway cutting through the outlet from the reservoir to the downstream portion of the Anita Ditch.

MODIFIED FILLING TIME

This modification to the Proposed Action would extend the reservoir filling window from 30 to 50 days each spring and reduce the target volume from the normal high-water volume (7,994 acre-feet), which includes the conservation pool, to the irrigation or operation pool volume (5,996 acre-feet). After the initial fill, only the reservoir's operation pool should require annual filling.

This modification would involve enlarging the Anita Supplemental Ditch (to a lesser extent than the Proposed Action) to convey a total of 80 cfs (rather than 150 cfs) and enlarging the Anita Ditch to convey a total of 115 cfs (rather than 150 cfs). These flows would include the reservoir flow, conveyance losses, and the existing peak irrigation demands in May and June. By extending the filling window, the ditch flow area (during reservoir filling) would be reduced approximately 20%, decreasing the required ditch enlargements and resulting in a smaller disturbance footprint. Reducing the ditch enlargement size would lower project costs and lessen the complexities associated with replacing irrigation infrastructure. In addition, reducing the ditch enlargements and the volume of water carried in the ditches would reduce total seepage and evaporation losses.

As with the Proposed Action, rock grade control structures would still be installed in Medicine Lodge Creek and Paint Rock Creek to produce sufficient hydraulic head to divert flows through the enlarged ditches. Existing turnouts, weirs, and flumes would also be enlarged or replaced to allow for proper ditch operation and to maintain existing irrigation diversions. A section of the ditch would be lined to limit seepage losses along a cobble bench.

Alternatives Considered but Not Carried Forward for Detailed Analysis

The BLM screened an initial 40 storage alternatives that were evaluated by the WWDO and presented in Level II, Phase I and Phase II studies (Trihydro 2013, 2016). Using the information presented in the Level II studies, the BLM adopted a different screening approach to conduct an apples-to-apples comparison to confirm whether the proposed Alkali Creek Reservoir was the best candidate to be included in the draft EIS for detailed analysis. The screens were as follows:

- Purpose and need and reliability/yield
- Technological feasibility
- Environmental impacts
- Project cost
- Unique considerations

Detailed information for each screen is provided in Appendix C of the final EIS.

In addition to the initial 40 storage alternatives, 12 additional action alternatives were identified during an alternatives workshop held with cooperating agencies at the BLM office in Worland, Wyoming, on January 9, 2018. These comprised three groundwater alternatives, natural storage using beaver (*Castor canadensis*) management, conservation, water leasing, and six modifications that the WWDO proposed to its preferred alternative (Alkali Creek Reservoir). A No Federal Action alternative was also included as required by NEPA. The additional 13 alternatives were screened using the same practicability criteria as the initial 40 storage alternatives. In all, 53 alternatives were evaluated using this screening process.

The alternatives that were eliminated cannot provide the needed water supply (by location, yield, or storage) to meet the stated purpose and need, have technical or constructability issues (e.g., geology), or have greater environmental effects than the Proposed Action. The groundwater alternatives, conservation, beaver management, and water leasing were eliminated because the reliability of these alternatives to meet the project need was a major concern. Because the project needs to serve lands above the confluence of Paint Rock Creek with the Nowood River, there were no combinations of alternatives that passed the environmental or cost screens to justify more detailed evaluation in the EIS.

A summary of the screening of all alternatives can be found in Table C-1 in Appendix C of the final EIS.

Environmentally Preferred Alternative

The Proposed Action alternative with mitigation was chosen as being the most environmentally sound alternative that meets the purpose and need.

Management Considerations

Rationale for the Decision

Under the applicable land use plan, the lands to be occupied by the proposed reservoir and associated facilities are open to a ROW grant. The governing regulations (43 CFR 2800.0-2) establish that such grants to a qualified business or governmental agency are both an appropriate use of the public lands and an objective of the Secretary of Interior, provided that the ROW is managed so as to protect other resources and to avoid unnecessary or undue environmental damage. Upon review of the draft and final EISs, no alternative was identified that would cause substantially less impact while still meeting project purpose and need.

The draft and final EISs adequately disclose the impacts to the human environment of the Proposed Action and the alternative considered in detail and provide a sound basis for this decision. All practicable means to avoid or minimize environmental harm have been adopted, and construction, operation, and maintenance of the dam and reservoir would not cause unnecessary and undue degradation of the public lands, nor would they be contrary to the public interest. The applicant is qualified to hold a ROW and has demonstrated the technical and financial capacity to construct the project.

PUBLIC INVOLVEMENT

The BLM involved the public and coordinated with affected parties during the development of the EIS. These efforts included public scoping; identifying and designating cooperating agencies; consulting with applicable federal agencies and state, local, and tribal governments; and accepting comments on the EIS.

Letters to initiate tribal consultation were sent to the Blackfeet Nation, Northern Cheyenne Tribe, Crow Tribe of Indians, Shoshone-Bannock Tribes, Eastern Shoshone Tribe, and Northern Arapaho Tribe on October 10, 2017. The letters notified the tribes of the proposed project and requested government-to-government consultation between the BLM and the tribes. Other agencies that accepted the BLM's invitation to participate as cooperating agencies included the U.S. Fish and Wildlife Service, U.S. Environmental Protection Agency, WDEQ, WWDO, Wyoming State Engineer's Office, and Wyoming Game and Fish Department. A full list of cooperating agencies can be found in Table B-1 in Appendix B of the final EIS.

The formal public scoping process for the project began on October 11, 2017, with the publication of the NOI in the *Federal Register*. The NOI initiated the public scoping process and served to notify the public of the BLM's intent to prepare an EIS. The BLM also issued a media release and sent a mail and email announcement of the scoping period to the project mailing list. The mailing list was developed from the BLM's mailing list, tribal contacts, and other cooperating agencies. The 30-day public comment period concluded on November 13, 2017.

A meeting of cooperating agency representatives was held in Hyattville, Wyoming, on October 24, 2017. The public scoping meeting provided information on the proposed project and gave members of the public and agency personnel the opportunity to ask questions or make comments. Representatives from the BLM, the WWDO and their contractor, and the third-party NEPA contractor were also available during the meetings for questions. Members of the public and agencies could provide comments by email, in handwritten form on comment forms during the scoping meeting, or by mail on individual letters and comment forms.

The BLM WFO received a total of 11 submissions from members of the public and the cooperating agencies during the scoping period. In all, 73 unique comments were identified from all 11 submissions. Issue statements were developed from similar comments. All comments were given equal consideration, regardless of method of submittal.

The notice of availability for the draft EIS was published in the *Federal Register* on August 31, 2018. The 45-day public review period extended through October 15, 2018. A public meeting was held on September 20, 2018, in Hyattville. Methods established for providing comments were the same as for the initial public scoping meeting. The BLM ultimately received a total of 12 submissions from members of the public and cooperating agencies. Responses to the comments are located in Appendix F of the final EIS

An index of commenters providing comment submissions on the FEIS is included in the project's BLM administrative record and presented in Attachment 3.

FINAL AGENCY AUTHORIZATION

I hereby approve the decision to grant a ROW only for the construction and operation of the Alkali Creek Reservoir, as described in the Alkali Creek Reservoir draft and final EISs. This decision is subject to the accepted POD and associated mitigation measures adopted by this ROD.

This decision includes the authorization of a new earthen dam embankment, staging, construction and borrow material areas, a water supply pipeline and diversion structures fed by a diversion on Medicine Lodge and Paint Rock Creek, via the Anita Ditch and Supplemental Anita Ditch. Construction or upgrading of access roads associated with the activities as described in the EIS would be authorized under this decision. This decision includes recreation facilities and public access comprising a boat ramp, comfort station and trash facilities, parking area, and recreation pool.

This authorization will be contingent upon approval of other state and federal agency authorization and implementation of mitigation measures.

This decision does not authorize construction to begin and does not apply to any state or private lands, which may be involved in the project, and does not create any right or easement, nor establish eminent domain, across such lands.

Protest and Appeal Opportunities

The decision of the AO may be appealed to the Interior Board of Land Appeals, Office of the Secretary, in accordance with the regulations contained in 43 CFR 4 and Form 1842-1. If an appeal is taken, your notice of appeal must be filed in this office within 30 days from your receipt of this decision. The appellant has the burden of showing that the decision appealed from is in error.

If you wish to file a petition (pursuant to regulation 43 CFR 2801.10) for a stay of the effectiveness of this decision during the time that your appeal is being reviewed by the board, the petition for a stay must accompany your notice of appeal. A petition for a stay is required to show sufficient justification based on the standards listed below. A copy of the notice of appeal and petition for a stay must also be submitted to each party named in this decision and to the Interior Board of Land Appeals and to the appropriate Office of the Solicitor (see 43 CFR 4.413) at the same time the original documents are filed with this office. If you request a stay, you have the burden of proof to demonstrate that a stay should be granted.

Standards for Obtaining a Stay (43 CFR 4.21(b))

Except as otherwise provided by law or by other pertinent regulation, a petition for a stay of a decision pending appeal shall show sufficient justification based on the following standards:

- A. The relative harm to the parties if the stay is granted or denied
- B. The likelihood of the appellant's success on the merits
- C. The likelihood of immediate and irreparable harm if the stay is not granted
- D. Whether the public interest favors granting the stay

Signature

ebhauser) Kimber Liebhauser

10/17/2019

Date

Wind River/Bighorn Basin District Manager

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ATTACHMENT 1

Memorandum of Agreement

MEMORANDUM OF AGREEMENT AMONG BUREAU OF LAND MANAGEMENT, WYOMING STATE HISTORIC PRESERVATION OFFICE, AND WYOMING WATER DEVELOPMENT OFFICE, REGARDING MITIGATION OF ADVERSE EFFECTS RESULTING FROM THE ALKALI CREEK RESERVOIR IN BIG HORN COUNTY, WYOMING

WHEREAS, Wyoming Water Development Office (WWDO) has submitted an application for a rightof-way (ROW) grant on federal lands to the Bureau of Land Management (BLM) in order to construct the Alkali Creek Reservoir (Undertaking) on Alkali Creek, Big Horn County, Wyoming; and

WHEREAS, WWDO intends to construct, operate, and maintain the Undertaking according to general parameters contained in the approved Plan of Development (POD) for the Undertaking which shall be appended to and made a part of the Record of Decision (ROD) authorizing the ROW grant; and

WHEREAS, the BLM has determined that issuance of the ROW grant and related authorizations is an undertaking, as defined in 36 Code of Federal Regulations (CFR) Part 800.16(y) that triggers the requirements of Section 106 of the National Historic Preservation Act (NHPA) on affected federal and non-federal lands during the planning, construction, operation, and maintenance of the Undertaking; and

WHEREAS, the Programmatic Agreement among the BLM, the Advisory Council on Historic Preservation and the National Conference of State Historic Preservation Officers Regarding the Manner in Which BLM Will Meet Its Responsibilities Under the National Historic Preservation Act (hereinafter BLM's National PA), State Protocol between the BLM Wyoming State Director and Wyoming State Historic Preservation Office (WYSHPO) executed on April 25, 2014 (hereinafter State Protocol), is incorporated herein by reference; and

WHEREAS, the BLM has established the area of potential effect (APE), as defined in the State Protocol V.B.i, to include the physical footprint for the reservoir, embankments, and associated surface disturbance plus a one hundred (100) foot buffer, associated ditches plus a two hundred (200) foot buffer, associated roads plus a three hundred (300) foot buffer (direct), and the visual horizon up to three (3) miles from the surface disturbance for those historic properties eligible for the National Register of Historic Places (NRHP) under criteria A, B, and/or C (indirect); and

WHEREAS, the BLM has determined that the Undertaking will have an adverse effect on historic properties 48BH3887, 48BH4033, 48BH4034, 48BH4413, and 48BH4417 which are eligible for listing in the NRHP under criterion A; and

WHEREAS, the BLM has consulted with the Blackfeet Tribe, Crow Tribe, Eastern Shoshone Tribe of the Wind River Reservation, Northern Arapaho Tribe, Northern Cheyenne Tribe, and Shoshone-Bannock Tribes of the Fort Hall Reservation about the identification, eligibility, and possible effects of the Undertaking to properties of traditional religious and cultural importance to those tribes; and

WHEREAS, the BLM has consulted with the WYSHPO pursuant to the State Protocol; and

Memorandum of Agreement Among the Bureau of Land Management, Wyoming State Historic Preservation Office, and Wyoming Water Development Office, Regarding Mitigation of Adverse Effects Resulting from the Alkali Creek Reservoir in Big Horn County, Wyoming

WHEREAS, the State Protocol Part V.F.ii.a recognizes three (3) types of signatories to this agreement: Signatories, Invited Signatories, and Concurring Parties, which are referred to collectively as the Parties. Signatories and Invited Signatories may include any party who assumes responsibilities under this agreement. Concurring Parties have a demonstrated interest in the Undertaking or its effects on historic properties, but do not assume responsibilities under the agreement. Concurring Parties may participate in development of the document and may concur with this agreement. The refusal of any Invited Signatory or Concurring Party to sign does not invalidate the MOA. Concurring Parties cannot amend or terminate this agreement; and

WHEREAS, the BLM has determined that the Undertaking does not meet the thresholds for Advisory Council on Historic Preservation (ACHP) participation as found in Part 5.b. in the BLM's National PA; and

WHEREAS, the BLM has invited WWDO to participate in consultation and to be an Invited Signatory and WWDO has accepted; and

WHEREAS, the Blackfeet Tribe, Crow Tribe, Eastern Shoshone Tribe of the Wind River Reservation, Northern Arapaho Tribe, Northern Cheyenne Tribe, and Shoshone-Bannock Tribes of the Fort Hall Reservation have participated as consulting parties and have been invited to be Concurring Parties to this MOA; and

WHEREAS, Wyoming Association of Professional Archaeologists (WAPA), Alliance for Historic Wyoming (AHW), and Big Horn County have requested to be consulting parties in actions affecting historic properties and the BLM has invited WAPA, AHW, and Big Horn County to participate as Concurring Parties to this MOA and they have accepted; and

WHEREAS, Wyoming State Historic Society has requested to be a consulting party in actions affecting historic properties and the BLM has invited Wyoming State Historic Society to participate as a Concurring Party and they have not accepted;

WHEREAS, two (2) historic properties are located on private surface owned by Paint Rock Angus Ranch, Inc. and the BLM has invited Paint Rock Angus Ranch, Inc. to participate as a Concurring Party and it has accepted; and

WHEREAS, three (3) historic properties are located on private surface owned by American Colloid Company and the BLM has invited American Colloid Company to participate as a Concurring Party and it has not accepted; and

NOW, THEREFORE, the BLM, WYSHPO, WWDO, and other consulting parties agree that the Undertaking shall be implemented in accordance with the following stipulations in order to take into account the effects of the Undertaking on historic properties.

BLM will ensure that the following are implemented.

Memorandum of Agreement Among the Bureau of Land Management, Wyoming State Historic Preservation Office, and Wyoming Water Development Office, Regarding Mitigation of Adverse Effects Resulting from the Alkali Creek Reservoir in Big Horn County, Wyoming

I. STIPULATIONS

- A. WWDO will contract a qualified professional(s), who meets the Secretary of the Interior's Standards for Archeology or History (36CFR800.2(a)(1)), to research prehistoric and historic use of the Nowood River Watershed. Historic research will focus on water development within and near the Mercer homestead location, why the Mercer family chose the Alkali/Paint Rock Creek area, and how they adapted the land to meet their homesteading needs. The collected information will be used in an informational webpage (Stipulation I.B).
 - 1. The qualified professional(s) shall use, but is not limited to, locally available records and materials; relevant historic documentation; General Land Office plats and surveyor notes; general internet searches for reliable literary and academic sources; information submitted by the Parties; oral history interviews with the Mercer family; digital photography of the contributing buildings at each elevation and setting taken at the time of the interviews; and communications with interested tribal authorities concerning relevant history or ethnography.
 - 2. The qualified professional(s) shall provide two (2) digital copies of the data collected during research to BLM, who will provide a copy to WYSHPO. Digital copies shall meet the University of Wyoming Archaeological Repository Guidelines and Standards. Review and acceptance of the collected data will follow the procedures outlined in Stipulation I.C. Once the research is accepted, digital copies of oral histories and photographs shall be provided to the Mercer family.
- **B.** Using the data collected through professional research (Stipulation I.A), and with the help of the Stipulation I.A contractor, WWDO will contract a qualified professional(s) to develop an informational webpage to educate visitors about the prehistoric and historic use of the Nowood River Watershed.
 - 1. The webpage shall follow an Esri Story Map template and contain a combination of text, maps, and other visuals.
 - 2. Within thirty (30) days of completion and acceptance of the professional research (Stipulation I.A), the Signatories will discuss and come to a consensus on an appropriate Esri Story Map template.
 - **3.** BLM will host the completed Story Map and links shall be added to the BLM Story Maps webpage, WYSHPO's website, and the Wyoming Water Development Commission website for agencies, organizations, individuals, or other public entities to access.
 - 4. Review and acceptance of the informational webpage will follow the procedures outlined in Stipulation I.C.
 - 5. If changes to the webpage are requested by a Signatory after final review and acceptance, the other Signatories will have thirty (30) days to comment on the proposed change. If

Memorandum of Agreement Among the Bureau of Land Management, Wyoming State Historic Preservation Office, and Wyoming Water Development Office, Regarding Mitigation of Adverse Effects Resulting from the Alkali Creek Reservoir in Big Horn County, Wyoming

Signatories do not respond within thirty (30) days, concurrence will be assumed and the change can be made by the BLM.

- **C.** WWDO will provide copies of draft materials created under Stipulations I.A and I.B to BLM for distribution to WYSHPO and the concurring parties.
 - 1. BLM, in consultation with WYSHPO and concurring parties will review the draft materials and provide comments to WWDO. BLM will distribute the draft materials to WYSHPO and concurring parties as soon as practicable following receipt from WWDO. Concurring parties and WYSHPO will provide comments to BLM within thirty (30) days of receipt of the draft materials. BLM will consider comments received from WYSHPO and concurring parties and will provide comments to WWDO, with a copy to WYSHPO and concurring parties, within forty-five (45) days of receipt of the draft materials from WWDO.
 - 2. Following receipt of comments on the draft materials, WWDO's contractor will revise and resubmit to BLM within thirty (30) days of receipt of comments.
 - 3. BLM will distribute the revised materials to WYSHPO and concurring parties, who will have thirty (30) days to confirm that all comments provided to WWDO have been adequately addressed. Within forty-five (45) days of receipt of the materials from WWDO, BLM in consultation with WYSHPO, will either approve the revised materials or provide WWDO with additional direction as needed.
- **D.** WWDO will complete Stipulations I.A and I.B within two (2) years of the signing of the Undertaking's ROD.

II. CONFIDENTIALITY OF CULTURAL RESOURCE DATA

To the extent consistent with the National Historic Preservation Act, Section 304, and the Archaeological Resources Protection Act, Section 9(a), and other applicable laws and executive orders, cultural resources data from BLM lands will be treated as confidential by all Parties. The Signatories to this agreement will determine what information may be released to the other Parties. Duplication or distribution of cultural resource data from BLM lands by any Signatory requires written authorization from the BLM.

III. <u>DISPUTE RESOLUTION</u>

A. Should any Signatory to this MOA provide notice to the BLM of its objection to an action under this MOA, or implementation of the measures stipulated in this MOA, within thirty (30) days of becoming aware of an action, the BLM shall consult with the Parties to this MOA to resolve the objection, unless otherwise specified in this document. If the BLM determines that the objection cannot be resolved, the BLM shall forward all documentation relevant to the dispute to the ACHP. The objecting party must provide reasons for, and a justification of, its objection at the time it initially submits its objection to the BLM. Within thirty (30) days after receipt of all pertinent documentation, the ACHP shall either:

Memorandum of Agreement Among the Bureau of Land Management, Wyoming State Historic Preservation Office, and Wyoming Water Development Office, Regarding Mitigation of Adverse Effects Resulting from the Alkali Creek Reservoir in Big Horn County, Wyoming

- 1. Provide the BLM with recommendations, which the BLM shall take into account in reaching a final decision regarding the dispute; or
- 2. Notify the BLM that it will comment within an additional thirty (30) days. Any ACHP comment provided in response to such a request will be taken into account, and responded to by BLM with reference to the subject of the dispute.
- **B.** The BLM responsibility to carry out all actions under this MOA that are not the subject of the dispute will remain unchanged.

IV. <u>AMENDMENT</u>

Any Signatory to this agreement may request that the other Signatories consider amending the agreement if circumstances change over time and warrant revision of the stipulations of the agreement. Except in the case of amendments addressing resolution of disputes pursuant to Section III of this MOA, amendments shall be executed in writing and shall be signed by all Signatories in the same manner as the original MOA.

V. <u>TERMINATION</u>

Any Signatory to this MOA may initiate termination by providing written notice to the other Signatories of their intent. After notification by the initiating party, the remaining Signatories and Invited Signatories shall have ninety (90) business days to consult to seek agreement on amendments or any other actions that would address the issues and avoid termination. In the event of termination, the BLM shall refer to 36 CFR Part 800 to address any remaining adverse effects.

VI. <u>SUNSET TERMS</u>

This MOA shall remain in effect for ten (10) years after the date of execution hereof or until completion of stipulation requirements contained within Section I. The BLM and WYSHPO shall re-evaluate the MOA every five (5) years. The BLM shall ensure the MOA will be re-evaluated and amended, to accommodate any changes to the terms. All Signatories will be consulted during the amendment process (See Section IV).

VII. General Provisions

- A. Entirety of Agreement. This MOA, consisting of ten (10) pages and Appendix A, consisting of one (1) page, represents the entire and integrated agreement between the Parties and supersedes all prior negotiations, representations and agreements, whether written or oral, regarding compliance with Section 106 of the National Historic Preservation Act.
- **B. Prior Approval.** This MOA shall not be binding upon any party unless this MOA has been reduced to writing before performance begins as described under the terms of this MOA, and unless the MOA is approved as to form by the Wyoming Attorney General or his representative.

Memorandum of Agreement Among the Bureau of Land Management, Wyoming State Historic Preservation Office, and Wyoming Water Development Office, Regarding Mitigation of Adverse Effects Resulting from the Alkali Creek Reservoir in Big Horn County, Wyoming

- **C.** Severability. Should any portion of this MOA be judicially determined to be illegal or unenforceable, the remainder of the MOA shall continue in full force and effect, and any party may renegotiate the terms affected by the severance.
- **D.** Sovereign Immunity. The State of Wyoming, the WYSHPO, WWDO, and the Tribes do not waive their sovereign or governmental immunity by entering into this MOA and each fully retains all immunities and defenses provided by law with respect to any action based on or occurring as a result of the MOA.
- **E.** Indemnification. Each Signatory to this MOA shall assume the risk of any liability arising from its own conduct. Each Signatory agrees they are not obligated to insure, defend or indemnify the other Signatories to this MOA.

Execution of this MOA and implementation of its terms evidence that BLM has taken into account the effects of the Undertaking on historic properties.

Signatures. In witness whereof, the Parties to this MOA through their duly authorized representatives have executed this MOA on the dates set out below, and certify that they have read, understood, and agreed to the terms and conditions of this MOA as set forth herein.

The effective date of this MOA is the date of the last Signatory signature affixed to the pages that follow.

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Memorandum of Agreement Among the Bureau of Land Management, Wyoming State Historic Preservation Office, and Wyoming Water Development Office, Regarding Mitigation of Adverse Effects Resulting from the Alkali Creek Reservoir in Big Horn County, Wyoming

Signatories:

Bureau of Land Management, Worland Field Office

5/20/3 Michael J. Phillips, Worland Field Manager Date

Bureau of Land Man/agement, Wyoming State Office

25Feb 2019 Date

A Mike Abel, Acting Deputy State Director Resource Policy and Management

Wyoming State Historic Preservation Office

2/2e/19 Date Mary Hopkins

Invited Signatories:

Wyoming Water Development Office

Hay C. LaBunde Fr

2-21-19 Date

Harry C. LaBonde, Jr., Director

Concurring Parties:

Blackfeet Tribe

Harry Barnes, Chairman	Date		
Crow Tribe			
Alvin Not Afraid, Chairman	Date		
Eastern Shoshone Tribe of the Wind Riv	er Reservation		
Vernon Hill, Chairman	Date	3	
Northern Arapaho Tribe			
Lee Spoonhunter Chairman	Date		
	Duie		
Northern Cheyenne Tribe			
Lawrence Killsback, President	Date		
Shoshone-Bannock Tribes of the Fort Ha	Ill Reservation		
Blaine Edmo, Chairman	Date		

Memorandum of Agreement Among the Bureau of Land Management, Wyoming State Historic Preservation Office, and Wyoming Water Development Office, Regarding Mitigation of Adverse Effects Resulting from the Alkali Creek Reservoir in Big Horn County, Wyoming

Alliance for Historic Wyoming

Christy Smith, Executive Director

Date

ð

Paint Rock Angus Ranch, Inc.

Martin Mercer, Landowner

Big Horn County -6-14 Debra Craft, County Commissione Date

Wyoming Association of Professional Archaeologists

Becca Milsither Rebecca Mashak, President

Date

2-7-19

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Memorandum of Agreement Among the Bureau of Land Management, Wyoming State Historic Preservation Office, and Wyoming Water Development Office, Regarding Mitigation of Adverse Effects Resulting from the Alkali Creek Reservoir in Big Horn County, Wyoming Approval as to Form: Wyoming Attorney General's Office

2/26/19 Date 02 Alysia Goldman,

Assistant Attorney General Representing: Wyoming State Historic Preservation Office

Tyler M. Renner, Date

Assistant Attorney General Representing: Wyoming Water Development Office

List of Appendices:

Appendix A – Project Vicinity Map

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Memorandum of Agreement Among the Bureau of Land Management, Wyoming State Historic Preservation Office, and Wyoming Water Development Office, Regarding Mitigation of Adverse Effects Resulting from the Alkali Creek Reservoir in Big Horn County, Wyoming
ATTACHMENT 2

Wyoming Department of Environmental Quality Water Quality 401 Certification and Adaptive Management Plan



Department of Environmental Quality

To protect, conserve and enhance the quality of Wyoming's environment for the benefit of current and future generations.





Mark Gordon, Governor

September 20, 2019

Jason Mead Wyoming Water Development Office 6920 Yellowtail Road Cheyenne, Wyoming 82002

RE: Certification of Individual Standard Permit, File NWO-2016-01459 to construct Alkali Creek Reservoir northwest of Hyattville, Wyoming. The project area is located in Section 34, Township 50 North, Range 90 West, Big Horn County, Wyoming.

Dear Mr. Mead,

In accordance with the provisions of Section 401 of the Clean Water Act, the Wyoming Department of Environmental Quality (WDEQ) has reviewed your preconstruction notification and hereby grants certification of an Individual Standard Permit for this project, subject to conditions described below.

This certification is for the proposed Alkali Creek Reservoir Project. The proposed construction will create a 7,994 acre-feet reservoir on Alkali Creek, an intermittent tributary to Paint Rock Creek. The reservoir will also include an additional 1,878 acre-feet of flood storage capacity for a maximum storage capacity of 9,872 acre-feet. Water will be supplied to the proposed reservoir during early season runoff via the existing Anita Supplemental Ditch and the Anita Ditch, which currently divert flow from Paint Rock Creek and Medicine Lodge Creek. The proposed dam will be comprised of an east-west main embankment across the Alkali Creek valley and two secondary embankments (west and north embankments). The main embankment will be approximately 2,500-feet long and 98-feet high. The west embankment is between the main embankment and the auxiliary spillway and will be approximately 275-feet long and 15-feet high. The north embankment is located north of the west embankment and extends to the auxiliary spillway and will be 1,200-feet long and 8-feet high.

Approximately 8,700 feet of Alkali Creek will be inundated by the proposed reservoir pool and another 600-feet will be filled by the proposed dam. The embankment and proposed reservoir will permanently impact approximately 2.1 acres of wetlands. Additionally, stabilization of the bed and banks will occur within a 10,500-foot reach of Alkali Creek downstream of the proposed dam which may permanently impact an additional 4.1 acres of wetland. Loss of wetlands will be mitigated through establishment of up to 8.2 acres of new wetland within the project area. In May 2019, the United States Bureau of Land Management (USBLM) issued the final environmental impact statement (EIS) for the Alkali Creek Reservoir Project (hereafter referred to as the Project) which identified potential surface water quality issues from the Project. However, given the lack of water quality data and uncertainty in the potential impact of the Project to water quality, the EIS concluded that an adaptive management approach was warranted. Therefore, an adaptive management plan (AMP) for the Project was developed to ensure compliance with the Clean Water Act (CWA) provisions under Section 401, applicable Wyoming surface water quality standards as well as to ensure no exacerbation of the existing Escherichia coli impairment on downstream Paint Rock Creek. The Project AMP describes 1) the potential surface water quality issues identified in the EIS, 2) a sampling plan to monitor surface water quality in water bodies associated with or potentially affected by the Project; 3) thresholds and a methodology to detect and evaluate whether adverse impacts to surface water quality are occurring (once the Project has been implemented), 4) a step-wise process to determine whether identified adverse surface water quality impacts are caused by the Project; and 5) a process to identify appropriate corrective actions that will be implemented (subject to landowner approval and funding) to mitigate adverse surface water quality impacts attributed to the Project.

Special Conditions of Certification

- 1. In accordance with the May 2019 environmental impact statement (EIS) for the Project and to ensure compliance with Clean Water Act (CWA) provisions under Section 401, applicable Wyoming state surface water quality standards as well as ensure no exacerbation of the existing *Escherichia coli* impairment on Paint Rock Creek, the permittee and/or the designated responsible party shall implement and comply with all elements of the Project AMP as described in the September 10, 2019 Adaptive Management Plan, Alkali Creek Reservoir, Big Horn County, Wyoming (Project #: 06N-002-005) developed by Trihydro Corporation. Implementation and compliance with the Project AMP shall occur for a period of eight years from the date of this certification. However, the WDEQ reserves the right to amend the duration of the Project AMP based on findings from water quality monitoring and/or changes in environmental conditions within the Project area.
- 2. In accordance with the September 10, 2019 Adaptive Management Plan, Alkali Creek Reservoir, Big Horn County, Wyoming (Project #: 06N-002-005) developed by Trihydro Corporation, submission of an annual report to the WDEQ 401 certification coordinator at eric.hargett@wyo.gov and the USACE project lead at kevin.c.little@usace.army.mil is required before the end of each calendar year. This report shall include data summaries, copies of laboratory data reports and field data forms, a data evaluation that includes noting exceedances of thresholds or results that require special consideration, determination of whether threshold exceedances are associated with Project activities or operations, potential corrective action recommendations where appropriate, and an updated schedule of planned monitoring for the upcoming monitoring season. The report shall also document the condition of any previously implemented corrective actions.

Other Conditions of Certification

- 3. Vegetation must be protected except where its removal is absolutely necessary for completion of the work. Re-vegetate disturbed soil in a manner that optimizes plant establishment for that specific site. Revegetation may include topsoil replacement, planting, seeding, fertilization and weed-free mulching as necessary. Native material shall be used where appropriate and feasible. Re-vegetate cut and fill slopes with appropriate species to prevent erosion.
- 4. All excess stockpiled, dredged or excavated material shall be disposed of at an upland site, not in a wetland or watercourse. All measures and precautions shall be taken to prevent entry of said material into a watercourse or wetland during high water/flow events.
- 5. This certification requires all equipment to be inspected for oil, gas, diesel, anti-freeze, hydraulic fluid and other petroleum leaks. All such leaks will be properly repaired and equipment cleaned prior to being brought on-site. Leaks that occur after the equipment is on-site will be repaired within one day or removed from the project area. The equipment is not allowed to continue operating upon discovery of a leak. In addition, compliance with all State and Federal requirements for storage of petroleum products and solvents is required.
- 6. Any temporary crossings, bridge supports, cofferdams or other structures must be designed to handle high flows/water anticipated to occur while these structures are present. All temporary structures must be completely removed from the waterbody at the conclusion of the permitted activity and the area restored to a natural appearance.
- 7. Construction equipment should not be operated below the existing water surface except as follows:
 - i. Fording at one location is acceptable; however, vehicles should not push or pull material along the bed or banks below the existing water level. Impacts from fording should be minimized.
 - ii. Work below the waterline which is essential must be carried out in a manner which minimizes impacts to the aquatic system and water quality.
- 8. Where applicable, adequate stabilization and erosion control measures are required for all treatments to minimize erosion of these enhancements during high flows. Stabilization and erosion control measures shall include only native material where appropriate and feasible.
- 9. For activities that occur within ten stream miles of a downstream public water supply intake, the responsible parties for the public water supply intake shall be notified and all concerns addressed prior to the commencement of the activities. Documentation of this notification and how concerns were addressed shall be kept on file and be made available upon request.

- 10. All fill material should be placed and compacted and subsequently protected from erosion. Where applicable, areas proposed for fill should be cleared of all vegetation, debris and other materials that may destabilize the fill.
- 11. The tops of grade control structures, point bars, rock structures, boulder placements, log revetments, cross/rock/log vanes, benches or any other similar treatments shall not exceed the bankfull elevation.
- 12. Structures used for bank stabilization must meet the following criteria: 1) where applicable the hydraulic drop over the structure crest should not exceed 0.5 feet to maintain fish passage, 2) where applicable header rocks should be spaced at least 1/4 to 1/3 of the average head rock diameter, 3) the tops of all in-stream structures shall not exceed the bankfull elevation, 4) the tops of toe wood and vanes should intercept the bank at approximately 0.5 of the bankfull elevation, and 5) structure vane angle should not exceed 30 degrees as measured upstream from the vane arm to the tangent line where the vane intercepts the bank.
- 13. Culverted stream crossings must meet the following criteria where applicable: 1) culverts shall be placed in a relatively straight section of stream channel and outflows shall not be directed into a stream bank, 2) culvert dimensions shall not create water depths or velocities that prohibit upstream fish migration, 3) culvert slope shall be no steeper than the channel gradient immediately upstream and downstream of the culvert, and generally should match the overall channel gradient, 4) culvert outlet elevations or downstream bed scour shall not prohibit upstream fish migration, and 5) culverts shall be adequately sized to handle expected high flows.
- 14. No activities implemented as part of this project shall result in accelerated bed or bank erosion or excessive aggradation beyond pre-construction conditions within or downstream of the project area.
- 15. Activities associated with this certification shall not increase turbidity by more than 10 nephelometric turbidity units (NTUs) in all cold-water fisheries and/or drinking water supplies (Classes 1, 2AB, 2A and 2B) or by more than 15 NTUs in all warm water or nongame fisheries (Classes 1, 2ABww, 2Bww and 2C). However, in accordance with Section 23(c)(2) of Chapter 1 of the Wyoming Water Quality Rules and Regulations, the administrator of the Water Quality Division may authorize temporary increases in turbidity above the limits described above in response to an individual application for a waiver. The waiver must be approved before the authorized activity may elevate turbidity above these limits.
- 16. Adequate best management practices to prevent, control or reduce pollutant entry from the project area into waterways and wetlands is required. Approved best management practices include but are not limited to those provided at http://deq.wyoming.gov/wqd/non-point-source/resources/mgt-practices/.

- 17. Instream structures authorized by this certification shall not substantially disrupt movements of aquatic life indigenous to the waterbody, including those species that normally migrate through the area.
- 18. Placement of structures in the channel shall be done in a way that minimizes lateral convergence scour on streambanks and bar formation.
- 19. The timing and duration of construction must minimize conflicts with fish spawning in accordance with Nationwide Permits General Condition #27. This condition may be modified or waived based upon project-specific recommendations contained within written documentation provided by a local Wyoming Game and Fish Department fisheries biologist.

Other Water Quality Permitting Requirements

20.A WYPDES storm water permit for construction activities is required from the Wyoming Department of Environmental Quality (WDEQ) before any surface disturbance takes place for any project that will clear, grade or otherwise disturb **one or more acres**. A general permit has been established for this purpose and either the project sponsor or general contractor is responsible for complying with the provisions of the general permit if total disturbance exceeds one acre, and for filing a Notice of Intent (NOI) if total disturbance exceeds five acres. The NOI should be filed no later than 30 days prior to the start of construction activity. Please contact the WDEQ Stormwater Permitting Program at 307-777-7570 for additional information.

The major requirements of the storm water general permit pertain to the development and implementation of a pollution prevention plan along with regular inspection of pollution control activities. The permit is required for the surface disturbances associated with construction of the project, access roads, construction of wetland mitigation sites, borrow and stockpile areas, and equipment staging and maintenance areas.

- 21.A WYPDES discharge permit from the WDEQ may be required for point source discharges to surface waters not related to storm water runoff such as discharges from gravel crushing and washing operations, cofferdam or site dewatering, vehicle or machinery washing, or other material processing operations if they are conducted. Depending on the type of operation, the length of operation, and the type of discharge, either a general temporary discharge permit or an individual discharge permit may be required. Please be advised that if an individual permit is required, processing will require at least 90 days. Please contact the WDEQ WYPDES Program at 307-777-7090 for additional information.
- 22. If above ground storage of petroleum products exceeds 1,320 gallons in total or more than 660 gallons in a single tank, a Spill Prevention Control and Countermeasures plan may have to be developed as provided for in the Environmental Protection

Individual NWO-2016-01459 Page **6** of **6**

Agency's Oil Pollution Prevention regulations (40 CFR 112). The Region 8 EPA office in Denver should be contacted for guidance.

This letter constitutes state certification of this project as required by Section 401 of the Clean Water Act. **Please be advised that this letter is not an authorization to begin construction**. This letter does not exempt you or your contractor from any other federal, state or local laws or regulations, nor does it provide exemption from legal action by private citizens for damage to property that the activity may cause. The Department also reserves the right to amend this certification and any of its terms or conditions as may be appropriate or necessary to protect water quality and associated designated uses.

Sincerely,

Todd Parfitt Director Department of Environmental Quality

TP/KDF/EGH/CF

 Cc: Kevin Little, USACE, 2232 Dell Range Blvd, Suite 210, Cheyenne, WY 82009
 John Joyce, Nowood Watershed Improvement District, P.O. Box 164, 2838 Lane 49, Manderson, WY 82432
 Mark Donner, Trihydro Corporation, 1252 Commerce Drive, Laramie, WY 82070

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ADAPTIVE MANAGEMENT PLAN ALKALI CREEK RESERVOIR BIG HORN COUNTY, WYOMING

September 10, 2019

Project #: 06N-002-005

SUBMITTED BY: Trihydro Corporation

1252 Commerce Drive, Laramie, WY 82070

ENGINEERING SOLUTIONS. ADVANCING BUSINESS.

Table of Contents

1.0	INTRODUCTION			
	1.1	Project Background	1-1	
	1.2	Purpose and Implementation of an Adaptive Management Plan	1-2	
2.0	RES	RESPONSIBLE PARTY2-		
3.0	POT	ENTIAL WATER QUALITY ISSUES AND THRESHOLDS	3-1	
4.0	BEN	EFICIAL PROJECT FEATURES	4-1	
5.0	MONITORING AND EVALUATION		5-1	
	5.1	Monitoring Sites	5-1	
	5.2	Baseline Monitoring		
	5.3	Field Personnel		
	5.4	Sample Parameters, Methods, Frequency		
	5.5	Monitoring Schedule		
	5.6	Data Evaluation	5-5	
6.0	CRITERIA FOR CORRECTIVE ACTIONS		6-1	
	6.1	Corrective Actions	6-1	
	6.2	Proactive Measures	6-1	
7.0	ADAPTIVE RESPONSE PROCESS			
	7.1	Decision-making Process	7-1	
	7.2	Corrective Actions	7-2	
8.0	REP	REPORTING		
9.0	REFI	REFERENCES		



List of Tables

- 3-1. Potential Water Quality Issues, Indicators, and Thresholds
- 5-1. AMP Monitoring Location and Monitoring Frequency
- 5-2. Monitoring Parameters
- 5-3. Anticipated Baseline Monitoring Schedule
- 7-1. Livestock/Wildlife Best Management Practices
- 7-2. Stream Best Management Practices



List of Figures

- 1-1. Adaptive Management Plan Project Area
- 5-1. Adaptive Management Plan Monitoring Locations
- 5-2. Adaptive Management Plan Monitoring Locations
- 7-1. Adaptive Response Process



List of Appendices

A. FINAL ENVIRONMENTAL IMPACT STATEMENT, ALKALI CREEK RESERVOIR PROJECT, TABLE 3.15-14 WATER QUALITY ISSUES, DESIRED CONDITIONS, AND DEVELOPMENT OF AN ADAPTIVE MANAGEMENT PLAN



1.0 INTRODUCTION

The purpose of adaptive management is to identify uncertainty surrounding potential impacts that may result from a management action, recommend monitoring and data evaluation to reduce uncertainty and subsequently characterize potential impacts, and outline an iterative decision-making process that describes when and what kind of actions will be taken in the event that conditions of a resource change through time. This document describes an Adaptive Management Plan (AMP) for the proposed Alkali Creek Reservoir (ACR; also referred to herein as the Project), which is a 7,994 acre-feet reservoir along Alkali Creek in Big Horn County that is being proposed by the Wyoming Water Development Office (WWDO) on behalf of the Nowood Watershed Improvement District (NWID). The NWID will operate and maintain the reservoir following construction. As further described below, a primary objective of this AMP is to provide for Project (during construction and post-construction) compliance with Clean Water Act (CWA) provisions under Section 401, applicable state surface water quality standards and total maximum daily loads (TMDL) as required for the 401 certifications.

The proposed ACR is located on both Bureau of Land Management (BLM)-administered land and private land. The WWDO has submitted a Right-of-Way (ROW) application to the BLM for Project construction and operation. The Project has been reviewed under the National Environmental Policy Act (NEPA) of 1969 to inform the BLM's decision to grant the ROW. In addition to being reviewed under NEPA, the request for a federal license (ROW application) requires that the Project comply with other federal, state, and local regulations, which include obtaining a CWA Section 404 Permit and subsequently a Section 401 Water Quality Certification prior to Project commencement.

In May 2019, the BLM issued the final environmental impact statement (EIS) for the Project, which analyzed the potential impacts of and alternatives to the Project. The BLM concluded in the EIS that: "Given the lack of water quality data and uncertainty in water quality effects, an adaptive management approach is warranted. An AMP that addresses *E. coli* and other water quality issues will be developed before the ROD (Record of Decision) is published..." (BLM 2019). This AMP is being developed to satisfy the BLM's requirements stated in the EIS.

1.1 PROJECT BACKGROUND

The proposed Project (Figure 1-1) is located in the northern (downstream) end of the Nowood River watershed. The watershed covers approximately 2,012 square miles and falls primarily in Big Horn and Washakie Counties, Wyoming. The watershed encompasses the towns of Hyattville and Ten Sleep, as well as the western slope of the Big Horn Mountains. The proposed reservoir is sited on Alkali Creek, upstream of its confluence with Paint Rock Creek, a

7 Trihydro

primary tributary to the Nowood River. The Nowood River, in turn, is a tributary to the Big Horn River; joining the Big Horn River at Manderson.

The ACR will store approximately 7,994 acre-feet of water within a reservoir pool area of 294 acres at the normal high water line. The main embankment will be approximately 90-feet high and 2,500-feet long. The proposed ACR construction disturbance area encompasses BLM-administered and private lands. Water will be supplied to the proposed reservoir through the existing Anita Supplemental Ditch and Anita Ditch. These ditches will convey flow from Medicine Lodge Creek (Anita Ditch) and Paint Rock Creek (Anita Supplemental Ditch). Public access to the reservoir will be provided to allow for public benefits associated with the reservoir. The public recreation area will consist of a parking area and a boat ramp, which will be accessed by a proposed public road that will run north from Wyoming Highway 31 through both BLM administered lands and private lands.

1.2 PURPOSE AND IMPLEMENTATION OF AN ADAPTIVE MANAGEMENT PLAN

Per the final EIS, this AMP is being developed prior to publication of the ROD by BLM and the U.S. Army Corps of Engineers (USACE). The AMP will focus on potential water quality issues identified in Table 3.15-14 of the final EIS. A copy of this table is included in Appendix A.

The purpose of the ACR AMP is to present a plan to monitor water quality in water bodies associated with or potentially affected by the Project; evaluate whether impacts to water quality are potentially occurring (once the Project has been implemented), and if so, whether these impacts are caused by the Project; and identify potential adaptive measures or actions that will be implemented (subject to landowner approval and funding) to mitigate water quality impacts, if any, attributed to the Project. In the Sections that follow, the major components of the AMP will be presented:

- A monitoring plan to collect baseline and post-construction data
- Exceedance thresholds that will be used for screening post-construction monitoring data results and determining when additional analyses and/or adaptive management may be appropriate
- Potential (and voluntary) corrective actions or best management practices (BMPs) that may be used as adaptive management if water quality impacts attributable to the proposed Project occur
- Processes/approaches for determining threshold exceedances, whether the exceedances are attributable to the Project, and the type of adaptive management that may be warranted



The AMP will be implemented upon approval by the Wyoming Department of Environmental Quality (WDEQ); baseline data for AMP implementation will be collected beginning in July 2019.



2.0 RESPONSIBLE PARTY

The Nowood Watershed Improvement District (NWID) will operate Alkali Creek Reservoir and is responsible for and committed to implementing the ACR AMP.

ohn Joyce, Chairman, Nowood Watershed Improvement District

9/9/2019 Date

NWID Contact Information: Nowood Watershed Improvement District P.O. Box 164 2838 Lane 49 Manderson, WY 82432 Phone: (307) 568-3505



3.0 POTENTIAL WATER QUALITY ISSUES AND THRESHOLDS

Potential water quality issues that may arise following the construction of the ACR were identified and discussed in the final EIS and include the following (BLM 2019):

- Exacerbation of existing *E. coli* impairment in Paint Rock Creek
- Impacts to recreation in ACR and Alkali Creek downstream of the reservoir
- Impacts to aquatic life in ACR and Alkali Creek downstream of the reservoir
- Impacts to potential drinking water use in ACR
- Channel instability in Alkali Creek downstream of the reservoir

These potential water quality issues are described in detail within the final EIS in Section 3.15 and are also summarized in Table 3.15-14. Table 3.15-14 is included in Appendix A of this AMP for reference.

To evaluate if project-related impacts to water quality are occurring, indicators (or specific water quality parameters/metrics) for each issue have been identified and are included in AMP monitoring. Water quality monitoring parameters include the following:

- *E. coli* concentrations
- Presence or absence of Harmful Cyanobacteria Blooms (HCBs)
- Field parameters including water temperature, pH, turbidity, conductivity, and dissolved oxygen
- Nitrate
- Dissolved and total recoverable trace metals including arsenic, selenium, lead, copper, cadmium, zinc, and aluminum
- Alkali Creek stream morphology characteristics including channel aggradation and degradation

Post-construction monitoring data will be compared to thresholds that are outlined in this AMP. Threshold values (for each indicator and corresponding potential water quality issues) will be derived from baseline data (to identify deviations from baseline conditions) or, alternatively, are in accordance with Chapter 1 (Wyoming Surface Water Quality Standards) of the Wyoming Water Quality Rules and Regulations (to be protective or aquatic life and human health).

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A description of indicators and threshold levels specific to each potential water quality issue is provided in Table 3-1. An overview of individual indicator thresholds is also provided below.

E. coli:

<u>ACR</u>: For ACR, the exceedance threshold will be derived from baseline data that will be collected monthly during the operation season (May through September) during the first three years of reservoir operation. The threshold will be the upper 95^{th} percentile of the baseline data or 126 colony forming units per 100 milliliters (cfu/100 mL), whichever is greater. This approach allows for development of a site-specific value, which accounts for *E. coli* concentrations of water that flow into the reservoir. In the absence of a site-specific value during the initial years of operation, a seasonal geometric mean (derived from data collected throughout the operation season) of 126 cfu/100 mL will be used as the threshold. If the threshold is exceeded during two consecutive operation seasons and the exceedance is attributable to reservoir operations, adaptive management will be implemented.

Furthermore, if the *E. coli* concentration in any single sample exceeds the WDEQ Chapter 1 Water Quality Singlesample Maximum Concentration for lightly used full body contact of 410 cfu/mL, the Wyoming Department of Health (WDH) will be contacted to determine whether signage needs to be placed around the reservoir to inform recreationalists of elevated *E. coli* concentrations. If the NWID observes change in the use of the reservoir by recreationalists overtime, this threshold may be modified to represent a different full body contact criterion.

<u>Alkali Creek</u>: For Alkali Creek downstream of the reservoir, the exceedance threshold will be derived from baseline data that will be collected during the two recreation seasons prior to reservoir construction. Two locations for baseline data have been established and each will have its own threshold value. The threshold will be the upper 95th percentile of the baseline data at each specific monitoring location, or 126 cfu/100mL, whichever is greater. If the threshold is exceeded during two consecutive operation seasons, based on a seasonal geometric mean, and the exceedance is attributable to reservoir operations, adaptive management will be implemented.

<u>Paint Rock Creek</u>: For exacerbation of *E. coli* impairment in Paint Rock Creek, the exceedance threshold will be the 95th percentile of the simulated data for the flow ranges delineated in Figure 3-9 and Table 3-20 of the October 2013 *E. Coli Total Maximum Daily Loads for the Big Horn River Watershed* report by one or more samples collected at the WDEQ historical Paint Rock Creek TMDL location. If the threshold is exceeded in two consecutive operation seasons, then additional analyses to include the data from the five other *E. coli* sample locations will be completed to characterize *E. coli* concentrations and loads within upstream waters and the reservoir. These may also include a trends analysis to determine whether *E. coli* has been increasing over time and to characterize the potential rate of change associated with the historic TMDL data in that location. If the exceedance is attributable to reservoir operations and



above the *E. coli* reduction amount associated with proactive management projects/measures (described in Section 4 and Section 6), then adaptive management will be implemented.

HCBs: Monitoring for HCBs is limited to ACR. The exceedance threshold for HCBs is more than one HCB observed during the operation season of May through September. If the threshold is exceeded for two operation seasons, adaptive management will be implemented. Additionally, the NWID will contact the WDH and the WDEQ if an HCB is observed to determine whether signage should to be placed around the reservoir, or other responses should be taken to inform recreationalist of the HCB.

Field parameters:

<u>ACR</u>: Field parameters within ACR will be measured, with trends evaluated and reported, but there will be no thresholds for these indicators. Significant directional changes in a parameter will receive additional evaluation.

<u>Alkali Creek</u>: As part of baseline data collection, field parameters will also be measured downstream of the proposed ACR during the two recreation seasons before reservoir construction. These data will be used to derive a site-specific threshold, which will be the 95th percentile (upper or lower as appropriate) of the baseline data. If the threshold value is exceeded during two operation seasons and attributable to reservoir operations, adaptive management will be implemented.

Total and dissolved metals and Nitrate:

<u>ACR</u>: Within ACR, the exceedance threshold for total and dissolved metals (as appropriate to the particular metal) will be WDEQ Chapter 1 Water Quality criteria for Human Health (relative to impacts to potential drinking water use) and Aquatic Life (relative to impacts to aquatic life). The exceedance threshold for total nitrate will be WDEQ Chapter 1 Water Quality criteria for Human Health. If a threshold is exceeded during two consecutive operation seasons and attributable to reservoir operations, then adaptive management will be implemented. If the Human Health (drinking water) threshold is exceeded, the NWID will also coordinate with the WDH and downstream potentially affected public water supply intakes, if any, to determine whether additional measures, such as signage, are needed to communicate elevated concentrations of particular metals to recreationalists.

<u>Alkali Creek</u>: Within Alkali Creek downstream of the reservoir, the exceedance threshold for total and dissolved metals will be WDEQ Chapter 1 Water Quality criteria for aquatic life. If this threshold is exceeded during two consecutive operation seasons and the exceedance is attributable to reservoir operations, then adaptive management will be implemented.

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4.0 BENEFICIAL PROJECT FEATURES

As currently proposed, the ACR design includes features and/or operational considerations that are expected to benefit water quality in both the short- and longer- term. These include:

- Serving as an irrigation reservoir that will store approximately 7,994 acre-feet of water within a reservoir pool area of 294 acres at the normal high-water line; approximately 6,000 acre-feet of which is included in the operation (irrigation) pool. In serving as a storage basin for water, ACR also serves as a site for the degradation of chemicals that come into the reservoir from Alkali Creek, and from Paint Rock and Medicine Lodge Creeks via the Anita Ditch. This degradation will benefit downstream water quality.
- Fencing the reservoir. Portions of the proposed reservoir pool (specifically the southern end) currently serve as seasonal pasture and rangeland for cattle along Alkali Creek. Construction of the reservoir will preclude this use along this reach of Alkali Creek, subsequently reducing erosion and *E. coli* loading that may have occurred in the past because of livestock use and waste production. The reservoir pool area will also be fenced to exclude livestock from the reservoir area. This fencing will also reduce forage on vegetation between the fence and the reservoir normal highwater line. This natural vegetative buffer should assist in further reducing sediment, nutrient, and *E. coli* loading to an approximate 10,000-feet length of Alkali Creek that will be inundated by the proposed reservoir. The buffering provided by fencing the reservoir will reduce loading to downstream surface waters.
- Establishing wetlands at the Anita Ditch discharge into the reservoir. A Wetland Mitigation Plan is being developed as part of the CWA Section 404 Permit for the Project. As part of this plan, approximately 1 to 2 acres of wetlands may be created in the area where the Anita Ditch discharges into ACR. Wetlands effectively enhance the quality of water entering adjacent water bodies by reducing nutrients, *E. coli*, and sediment loading. This Project component will improve water quality entering the ACR and subsequently, downstream surface waters.
- Installing grade control structures in Alkali Creek downstream of the proposed reservoir. Grade control
 structures will be installed in Alkali Creek downstream of the reservoir. The purpose of these structures is to
 prevent downcutting of the streambed due to the introduction of relatively sediment-free water from the reservoir.
 These structures will also reduce existing (pre-construction) downcutting observed in the downstream portions of
 the incised Alkali Creek.
- Installing a multi-level outlet structure. The reservoir will include a multi-level outlet structure, which will allow water to be released from different levels in the reservoir. Using this structure, the NWID will be able to regulate the temperature of water released from the reservoir to benefit Alkali Creek downstream of the reservoir. The multi-level outlet may also be used to release water from different levels of the reservoir to avoid constituents that may be concentrated within reservoirs zones (epilimnion, metalimnion, hypolimnion).

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• Stream and wetland mitigation downstream of Highway 31 bridge. A Stream Mitigation Plan is being developed as part of the CWA Section 404 Permit for the Project. Compensatory stream mitigation is planned for the reach of Alkali Creek immediately downstream of the Highway 31 bridge. This area of Alkali Creek is heavily impacted by livestock use. The mitigation plan for this area may include re-establishment of native wetland vegetation, minor regrading of the bank and/or floodplain in the immediate area, and exclusion/minimization of use by livestock in the future. This mitigation will effectively enhance the quality of water flowing downstream by reducing nutrients, *E. coli*, and sediment loading.



5.0 MONITORING AND EVALUATION

An integral component of this AMP is establishing permanent monitoring locations throughout the Project area where data will be collected to characterize baseline and post-construction (reservoir operation) water quality or stream conditions. Data will be collected to document water quality metrics/parameters that can be used to determine whether the potential impacts to water quality or stream conditions identified in the EIS (and provided in Appendix A for reference) occur after the reservoir is constructed and operating and consequently whether or not any potential future impact can be attributed to reservoir operations.

For the purposes of this AMP, data that are collected prior to commencing reservoir construction are considered baseline data. Baseline data will be used to quantitatively characterize specific water quality parameters during the period prior to Project construction. In the case of the reservoir itself, baseline data will be collected after the reservoir has filled. In the case of the historic TMDL sample location on Paint Rock Creek (PRC-3; Paint_Rock_Creek_2 in the 2013 TMDL Report), previous *E.coli* data collected intermittently between 2000 and 2010 will be evaluated in conjunction with baseline data collected as part of this AMP. Baseline data will be used in some cases (as discussed in Section 3 and presented in Table 3-1) to establish thresholds. There are some upfront limitations to recognize in using a relatively short period to determine the range in background conditions (or pre-construction) conditions for a site. These include interannual variability in hydrology (due to variability in annual weather patterns and/or management) within and outside of the Project area. These potential limitations will be considered when post-construction data are reviewed and compared to thresholds.

Data collected during reservoir operation will be evaluated and compared with water quality standards or baseline data to determine if thresholds are being met. When review of reservoir operation monitoring data indicates that water quality thresholds have been exceeded, the data will be evaluated to determine if the threshold exceedances are attributable to the reservoir or to other factors. Conditions in the watershed may change based on a variety of factors, such as, but not limited to, reservoir operation, natural/climatic fluctuations, changes in non-reservoir management practices, and other non-reservoir anthropogenic activities.

Monitoring plan details are described in the following sections.

5.1 MONITORING SITES

Eight monitoring sites have been identified to assess water quality in water bodies associated with or potentially affected by the Project. These eight locations were selected to provide data that can be used to address the potential

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water quality issues identified in the EIS. The locations are described below and are shown on Figure 5-1 and Figure 5-2. Both primary monitoring sites (sample size, or n=4) and supporting data monitoring sites (n=4) are included in the monitoring program. Primary monitoring sites are designated in bold font in Table 3-1, other monitoring sites listed in Table 3-1 are supporting sites. The purpose of structuring the monitoring program in this way is to focus data evaluation on a limited number of locations that were selected to identify whether a significant change in an indicator has occurred and the value has exceeded an established threshold. If a threshold exceedance occurs, a broader level of data evaluation will be completed to better characterize changing conditions throughout the Project area and identify whether the change at a primary monitoring location is likely due to reservoir operations or (alternatively) to interannual variability, non-reservoir management changes, or other factors that are unrelated to reservoir operations. This tiered approach to data collection was designed to streamline data analysis and to broaden the scope of data evaluation and analysis as needed.

Additionally, specific locations along Alkali Creek downstream of the proposed reservoir will be monitored to evaluate potential physical impacts to the stream channel that may be caused by reservoir construction and operations.

A description of each monitoring location is provided below.

- AC-US is a supporting data monitoring site located on Alkali Creek approximately 4 miles upstream of the
 proposed reservoir. This site will be monitored following reservoir construction. This monitoring site is located
 on BLM-administered land, thereby allowing for continued monitoring access throughout the monitoring period.
 AC-US was selected to be representative of Alkali Creek water upstream of the reservoir, and the data collected
 from this location can be used to quantify and characterize changes in influent water quality over time.
- ACR-OUT is a primary monitoring site located on Alkali Creek approximately 350 feet downstream of the
 proposed reservoir embankment toe. After the reservoir is constructed and operating, the location of this
 monitoring site will be adjusted so that water samples are collected from the reservoir outlet and; therefore, will be
 representative of water being released from the reservoir. Water samples will be collected from ACR-OUT during
 pre-construction baseline monitoring and will be used to derive threshold values that can be used for comparisons
 against post-reservoir water quality conditions. This site is located on private property.
- AD-IN is a supporting data monitoring site located in the Anita Ditch approximately 4,400 feet upstream of the ditch's discharge into the proposed reservoir. The monitoring location may be adjusted following reservoir construction to a location closer to the Anita Ditch discharge into the reservoir. This site will serve as a monitoring location during baseline and post-reservoir monitoring to assess water quality conditions in water entering the reservoir. This monitoring site may be used to provide supporting information in determining whether observed

threshold exceedances in primary monitoring locations may be attributed to the reservoir and/or other sources within the watershed. This site is located in an easily accessible section of the ditch on private property.

- AC-DS is a primary monitoring site located in Alkali Creek, south of Highway 31 and approximately 0.7 miles downstream of the proposed reservoir. AC-DS will be monitored during baseline sampling to assess water quality thresholds downstream of the reservoir and post-reservoir to identify potential threshold exceedances and/or changes in water quality indicators from the outlet of the reservoir. This site is located on private property.
- ACR-1 is a primary monitoring site located at the constructed reservoir. This site will be sampled following construction to collect water quality data within the reservoir. The sample location is anticipated to be near the public parking area.
- PRC-1 is a supporting data monitoring site located on Paint Rock Creek approximately 1.8 miles upstream of the confluence with Alkali Creek. This sampling site will be monitored during baseline monitoring and post-reservoir construction and serves as an indicator of water quality upstream of reservoir influences (other than flow diversion). The site is located on private property.
- PRC-2 is a supporting data monitoring site located on Paint Rock Creek just downstream of the confluence with Alkali Creek. Paint Rock Creek has a designated TMDL impairment for Fecal Coliform (*E. coli*) from its confluence with the Nowood River to 5.2 miles upstream. This monitoring site is upstream of the 5.2-mile impaired section of Paint Rock Creek and will be sampled during baseline and post-reservoir construction. Data from this site may be used to provide supporting information in determining whether observed threshold exceedances (related to *E. coli* loading) in primary monitoring locations may be attributed to the reservoir and/or other sources within the watershed. The site is located on private property.
- PRC-3 is a primary monitoring site located on Paint Rock Creek within the impaired zone at the current TMDL monitoring location. This site will be monitored during baseline sampling and post-reservoir construction sampling to monitor the potential effects of the reservoir on the current *E. coli* TMDL. This site is located along Lower Nowood Road within the Big Horn County ROW (County Road 43^{1/2}).
- Alkali Creek downstream of ACR will be monitored to evaluate stream channel changes that may result due to
 reservoir construction and operations. This monitoring will include field observations at approximately four
 representative sites, located near proposed grade control structures or bank stabilization locations. These sites will
 be monitored once prior to commencing reservoir construction and annually following reservoir construction. The
 sites will be located on private property.

Landowner permission will be obtained before accessing and monitoring on private property.

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5.2 BASELINE MONITORING

Baseline data will be collected at six of the eight monitoring locations. These include ACR-OUT, AD-IN, AC-DS, PRC-1, PRC-2 and PRC-3. The frequency and type of data that will be collected in each of these locations are described in Table 5-1. Baseline data will be collected during the 2019 and 2020 recreation seasons, at a minimum, and used to derive thresholds against which post-reservoir data can be compared in order to identify impacts from reservoir operations.

5.3 FIELD PERSONNEL

Field parameters and water samples for AMP monitoring will be collected by NWID staff or South Big Horn Conservation District (SBHCD) staff. SBHCD staff will collect baseline data. Field staff will be trained in sample collection methods and will be provided WDEQ Standard Operating Procedures (SOP) outlining sample collection procedures.

Contacts

South Big Horn Conservation District Ashely Henderson, District Manager (307) 765-2483 ext. 103, <u>sbhcd1@gmail.com</u> 408 Greybull Avenue Greybull, WY 82426

Nowood Watershed Improvement District

John Joyce, Chairman (307) 568-2514, jnjoyce56@gmail.com P.O. Box 164 2838 Lane 49 Manderson, WY 82432

Wyoming DEQ, Water Quality Division

Eric Hargett, 401 Certification Coordinator (307) 777-6701, <u>eric.hargett@wyo.gov</u> 200 W. 17th Street Cheyenne, WY 82002



5.4 SAMPLE PARAMETERS, METHODS, FREQUENCY

Sampling locations and frequency of sampling are detailed in Table 5-1. Field parameters and chemical constituents that will be sampled during baseline and post-construction monitoring are detailed in Table 5-2. Table 5-2 also includes a description of the analytes, holding times, and laboratory methods and references a corresponding SOP for data collection. Sampling will follow the SOP from the WDEQ Water Quality Division Watershed Protection Program SOP Manual (WDEQ 2018).

5.5 MONITORING SCHEDULE

Baseline monitoring will occur from July 2019 through September 2019, and May 2020 through September 2020. Additional baseline data may be collected depending on observed trends/data evaluation and reservoir construction timing. The anticipated schedule for baseline monitoring is shown in Table 5-3. Post-construction reservoir monitoring will begin following reservoir construction, which is anticipated to occur in 2022. Monitoring frequency following reservoir construction is described in Table 5-1. Monitoring duration for metals is anticipated to be 3 years following the reservoir's first fill; monitoring for *E. coli* and field parameters is anticipated to be for 5 years following the first fill. However, monitoring durations may change based on data analysis and discussions with WDEQ. If any parameter has 3 consecutive years of monitoring results below threshold values, monitoring may be discontinued, or the frequency may be reduced, following discussion with WDEQ.

5.6 DATA EVALUATION

The NWID may contract a qualified engineering or environmental consultant to provide data review, evaluation, and assistance with implementing adaptive management, as needed. Alternatively, the NWID may elect to perform data review and evaluation internally. Trihydro Corporation (Trihydro) will provide these services for the baseline monitoring; the NWID will select a consultant to provide these services for post-construction reservoir operational monitoring at a later date.

Field and laboratory data will be reviewed by the NWID or forwarded to their engineering consultant for review. The consultant (or the NWID) will review the field data and laboratory analytical data upon receipt to verify that the data are reliable, unbiased, accurate, and complete, and that both field and laboratory documentation (Tier 1 data validation) are complete. This review will also include checking for individual sampling event exceedances of specific thresholds. The NWID will notify the WDEQ and WDH of *E. coli* concentrations that exceed the single-sample maximum concentration or metals concentrations that exceed the WDEQ Chapter 1 Water Quality Criteria for Human Health for Consumption of Fish and Drinking Water in the reservoir water samples within 30 days of receipt of the analytical data.

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The NWID will also notify the WDEQ, via the Report a Spill hotline (WyoSpills.org or 307-777-7501), if an HCB is identified in the reservoir.

The NWID or their engineering consultant will evaluate the data collected during each operation season at the end of that field season (field seasons will generally end in September). The evaluation will consist of compiling and organizing the data; assessing potential trends and seasonal variability; and documenting findings. Figures may be developed to illustrate trends and/or identify data points that appear to be unusually/uncharacteristically high or low. Water quality data will be compared with applicable water quality standards and thresholds identified in this AMP and exceedance of thresholds will be highlighted (as needed). Statistical tests may be used in combination with the figures as necessary, especially in cases where an exceedance has occurred and supporting data must be evaluated to determine the primary source.

The evaluation will be used, along with the criteria for corrective actions (Section 6), to determine whether adaptive responses or corrective actions may be warranted. This process is described in Section 7. The data evaluation, as well as recommendations for corrective measures, if any, will be reported to the WDEQ annually as outlined in Section 8.



6.0 CRITERIA FOR CORRECTIVE ACTIONS

6.1 CORRECTIVE ACTIONS

Adaptive responses will be initiated when the threshold frequency for a particular parameter has been exceeded. As described in previous sections, monitoring data from primary monitoring sites will be compared to thresholds as a first step in identifying whether an exceedance has occurred. When data suggest an exceedance has occurred, the second step will be to evaluate the data from supporting monitoring locations to determine whether the exceedance can be attributed to reservoir operations. The frequency of exceedance for each indicator/parameter is defined in Table 3-1. In all cases, exceedances in two consecutive operating seasons (attributable to reservoir operations) is the criterion for implementing corrective actions. However, corrective measures may be implemented after an exceedance in one operating season, if monitoring data indicates reservoir operations are the cause and there is an egregious exceedance of a threshold identified in Section 3.0 and Table 3-1.

6.2 PROACTIVE MEASURES

The NWID is currently working with the SBHCD and WDEQ to identify proactive measures that may be implemented prior to and/or during reservoir construction. Recognizing the current impairment of the Nowood River watershed for *E. coli* loading, the primary goal in implementing proactive measures is to reduce *E. coli* loading from one or more non-point sources within the watershed to effectively reduce total *E. coli*, nutrient, and sediment loading within an impaired stream. In doing so, the NWID is making a voluntary and good faith effort to actively work with stakeholders to improve overall water quality within the Nowood River watershed so that any potential increases in *E coli* loading associated with the Project would not further exacerbate the existing *E. coli* impairment in the watershed. Furthermore, these efforts may serve to proactively reduce loading within this area of the watershed.

These proactive measures would specifically be targeted at reducing *E. coli* loading to water bodies in the Project area. Measures may include BMPs to reduce *E. coli* loading from non-point sources, such as fencing to limit animal access, vegetative filter strips to moderate and/or attenuate *E. coli* in surface water inputs to ditches and streams, providing alternative or upland water sources for animals that currently use ditches or streams in the watershed, manure management, and/or water diversion structures to capture overland flow. These potential measures are voluntary measures that could be taken by private landowners in recognition of the existing impaired status of the Nowood River Watershed and WDEQ's Wyoming Nonpoint Source Management Plan (WDEQ 2013) principles and objectives for improving water quality within Wyoming.

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Most of the Project area, especially those areas that might benefit from BMPs to reduce *E. coli* and nutrient loading, are located on private lands. Therefore, the timing and extent of voluntarily proactive measures will depend on identifying landowners who are interested/willing to have measures implemented on their lands. The timing for implementing proactive measures will also depend on securing funding. The NWID is currently working to identify potential grant funding sources as well as possible landowners with whom to partner on projects.

Proactive measures, which could be voluntarily implemented prior to reservoir construction or in advance of any potential exceedance of the thresholds identified in Table 3-1, will be documented in future annual reports that are submitted to WDEQ (described in Section 8). Reports will include a description of the type and extent of a BMP or other measure implemented, anticipated monitoring or maintenance requirements, and a qualitative estimate of the expected outcome/benefit (including potential reduction in *E. coli* and/or other potential water quality benefit). Benefits to water quality realized through these voluntary proactive measures are expected to be incorporated as buffers to thresholds when analyzing data and evaluating whether an observed exceedance may be attributable to the reservoir itself, reservoir operations, or other factors.



7.0 ADAPTIVE RESPONSE PROCESS

The adaptive response process is an important component of the AMP. The following section describes the adaptive response process for the ACR AMP, including the steps that will be taken if the exceedance frequency threshold has been passed for a particular indicator. The steps in the AMP process in which monitoring results will be used to generate actions or initiate responses are illustrated on Figure 7-1. These specific actions or responses may include notifying project stakeholders including the BLM, WDEQ Water Quality Division (WQD), and SBHCD; notifying the WDH or downstream water supply operators; suggesting changes in monitoring frequency/intensity, a more intense review of laboratory and field data, initiating further investigation if needed, and/or implementing voluntary corrective actions.

7.1 DECISION-MAKING PROCESS

The general decision-making process and adaptive management feedback loop are shown on Figure 7-1. There are two primary decisions/responses that are part of the AMP process:

- 1. A change to the monitoring program approach is needed.
- 2. A plan to address a 2-year exceedance threshold is needed (which may, in turn, result in a change to the monitoring program).

The first decision/response point in the adaptive management process relates to changes in the monitoring program that are described in this document. Most (if not all) of the potential water quality issues identified in the EIS, if they were to occur, would be expected to occur within the initial years of reservoir operation. If negative impacts to a particular water quality indicator do not occur (i.e. no exceedances), monitoring intensity may be downscaled or terminated after 3 years or another time frame that is determined to be appropriate for a particular indicator. The NWID or its designated consultant (for data review/reporting) may request changes to the monitoring program that are supported by the monitoring data. This recommendation would be made in the annual report. Similarly, if BMPs are implemented (proactively and voluntarily), the monitoring plan would be updated to reflect changes in monitoring locations, frequencies, and/or indicator thresholds. As described in item 2 above, changes to the monitoring program may also be made if BMPs or corrective actions are implemented in response to an exceedance that has occurred.

The second decision/response point applies when data for a particular water quality indicator have exceeded the threshold level for two consecutive seasons. Under this scenario, the data will be evaluated to determine whether some portion or all of the exceedance is attributable to reservoir operations. Depending on the outcome of this evaluation, additional investigation may be warranted. When the exceedance is determined to be attributable to reservoir

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operations, the NWID will identify applicable corrective actions and develop a plan for implementing the voluntary corrective actions. The monitoring program will also be evaluated to determine if changes to the program are necessary to monitor the specific water quality indicator for which a threshold has been exceeded, better quantitatively characterize reservoir or other source contributions, and/or to monitor the effectiveness of voluntary corrective actions.

7.2 CORRECTIVE ACTIONS

In the event that monitoring indicates water quality thresholds are not being met and/or adverse impacts to the Alkali Creek stream channel are occurring, plans to implement BMPs or other corrective actions will be initiated, including possible reservoir operational adjustments. Implementing these corrective actions will depend on, among other considerations, willingness of private landowners to implement BMPs on their property. Standard BMPs that are applicable to the Project area and may be used are included in Table 7-1 (livestock and wildlife BMPs) and Table 7-2 (stream specific BMPs). Other BMPs may be evaluated and/or employed depending on the specific condition being addressed. The NWID will discuss proposed corrective actions, including BMPs, with the SBHCD and WDEQ prior to attempting to implement.

BMPs in Table 7-1 specifically target water quality issues such as elevated nutrients (nitrogen or phosphorus), high erosion/sedimentation, and *E. coli* contributions from livestock, wildlife, human, and pets in streams and adjacent riparian areas and wetlands by focusing on improving riparian and wetland conditions and reducing direct access to streams or ditches. Several factors would be considered in selecting a BMP, including impact source (if discernable), willingness of a private landowner, potential to significantly reduce elevated concentrations of *E. coli* and/or other associated constituents, physical characteristics of potential implementation sites, and the relative cost to implement.

BMPs in Table 7-2 specifically target physical stream impairments such as unstable or eroding bed and banks (stream instability). While the BMPs in Table 7-2 target physical stability, implementing these BMPs may also benefit stream habitat and improve water quality parameters such as temperature, dissolved oxygen, turbidity, and pH. Factors that would be considered in implementing stream BMPs include the degree and type of stream instability, impacts to structures, expected flow ranges, livestock and wildlife use, willingness of a private landowners, adjacent upstream and downstream characteristics, and the relative cost to implement.

In addition to the BMPs listed in Tables 7-1 and 7-2 or other BMPs that may be evaluated, the NWID may propose corrective actions that fit within reservoir operations. Examples of possible reservoir operation adjustments that could be considered as corrective actions include, but are not limited to, modifying the timing or duration of releases, adjusting reservoir diversions flows, modifying the Anita Ditch by-pass pipeline operation, adjusting Alkali Creek



by-pass flows, limiting recreation or posting recreational advisories, and/or releasing flows from different levels of the ACR. Operational adjustments, if any, would be undertaken within the constraints of applicable ACR permits, governing regulations, and in consideration of the ACR's primary purpose to reduce late-season irrigation shortages.

For the potential issue of HCBs, the Harmful Algal Bloom Action Plan for Publicly Accessible Lakes and Reservoirs of Wyoming (WDEQ 2018a) may be used as guidance. HCBs are typically related to imbalances in nitrogen and phosphorus and common in warmer, stagnant water. Corrective actions may include reservoir aeration, monitoring phosphorous and nitrogen in incoming water sources, adjusting reservoir diversion flows, and adjusting reservoir water level / changes in reservoir releases.

Potential water quality issues related to elevated metals (e.g. selenium) and/or water chemistry (e.g. pH) may require additional data collection and analysis, along with discussions with WDEQ before specific corrective actions or BMPs can be identified and potentially implemented. A primary goal of additional analysis would be to identify the source and discern whether the elevated levels are natural or human-caused. If the analysis indicates the elevated levels are human-caused, then efforts would focus on identifying the source and if possible, isolating the source. Depending on the source, the NWID may request WDEQ evaluate developing site-specific criteria. In some cases, modifications to reservoir operations may be adequate to bring indicators within acceptable ranges and below exceedance thresholds.



8.0 **REPORTING**

The NWID will report *E. coli* concentrations that exceed the single-sample maximum concentration for *E. coli*, metals concentrations that exceed the WDEQ Chapter 1 Water Quality Criteria for Human Health for Consumption of Fish and Drinking Water, or observations of HCBs in the reservoir to the WDEQ and, as appropriate, the WDH. Because these exceedances are linked to established criteria that are protective of human heath, these notifications would occur, and possible actions would be implemented regardless of whether or not the associated threshold exceedance frequency listed in Table 3-1 has been met.

The NWID will also submit an annual evaluation memo or letter-style report to the WDEQ WQD 401 Certification Coordinator (current contact is Eric Hargett) before the end of each calendar year. A copy of the report will also be provided to the USACE (current contact is Kevin Little) for informational purposes. The evaluation memo will include data summaries, laboratory data reports and field data forms, a data evaluation, including noting exceedances or results that require special consideration, potential corrective action recommendations, if appropriate, and an updated schedule of planned monitoring for the upcoming monitoring season. The report will also document the condition of previously implemented corrective actions, if any. Conversations with WDEQ regarding exceedances, corrective actions, or other related matters will be documented in the subsequent annual report.



9.0 REFERENCES

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- Wyoming Department of Environmental Quality Water Quality Division. 2018b. Manual of Standard Operating Procedures for Sample Collections and Analysis. Watershed Protection Program. March 2018.



TABLES


TABLE 3-1. POTENTIAL WATER QUALITY ISSUES, INDICATORS, AND THRESHOLDS ALKALI CREEK RESERVOIR AMP BIG HORN COUNTY, WYOMING

Potential Water Quality Issue	Desired Condition	Indicator E. coli	Baseline Monitoring Frequency and Locations ¹ Monthly during approximately the first 3 years of reservoir operation ² ACR-1, AD-IN	Threshold Level Prior to establishing baseline condition: Exceedance of <i>E. coli</i> concentration of 126 cfu/100 mL during the operation season ³ based on seasonal geometric mean of the collected operation data.	Threshold Exceedance Frequency Two consecutive operation seasons in which the threshold has been exceeded and the exceedance is attributed to reservoir operations ⁴	Sample Method and Waterbody Grab samples in monitoring locations Alkali Creek Reservoir Alkali Creek Anita Ditch	Monitoring Frequency Monthly	Monitoring Sites ⁸ ACR-1 AC-US AD-IN
Impacts to recreation on Alkali Creek Reservoir.	elevated <i>E. coli</i> and harmful cyanobacteria blooms that may pose risks to recreational activities.	Hermful Cyanabasteria		After establishing baseline conditions: Exceedance of the upper 95th percentile of the baseline data or 126 cfu/100mL, whichever is greater, during the operation season based on a seasonal geometric mean of the operation data.		Dhoto documentation	Monthly	
		Blooms (HCBs)	NA	recreation season May through September	seasons ⁵	Alkali Creek Reservoir	Monuny	ACR-1
Impacts to recreation on Alkali Creek downstream of the reservoir.	Alkali Creek downstream of the reservoir is free from elevated <i>E</i> . <i>coli</i> that may pose risks to recreational activities.	E. coli	Every 2 weeks during recreation season ACR-OUT and AC-DS	Exceedance of the upper 95th percentile of the baseline data or 126 cfu/100mL, whichever is greater, at a specific monitoring location based on a seasonal geometric mean of the collected operation data.	Two consecutive operation seasons in which the threshold has been exceeded and the exceedance is attributed to reservoir operations	Grab samples in monitoring location Alkali Creek	Monthly	ACR-OUT AC-DS
Exacerbation of existing <i>E. coli</i> impairment in Paint Rock Creek.	No net increase in <i>E. coli</i> to the impaired Paint Rock Creek segment.	E. coli	Every 2 weeks, during recreation season ACR-OUT, AC-DS, PRC- 1, PRC-2, PRC-3	Exceedance of the upper 95th percentile of the simulated data for a given flow range by one or more samples collected at the TMDL location (PRC-3).	Two consecutive operation seasons in which the threshold has been exceeded and the exceedance is attributed to reservoir operation	Grab samples in monitoring locations Alkali Creek Paint Rock Creek	Monthly	AC-US ACR-OUT AC-DS PRC-1 PRC-2 PRC-3
Impacts to aquatic life	Chemical and physical parameters in Alkali Creek Reservoir are	Field parameters Dissolved Oxygen pH Temperature Conductivity	NA	NA - field parameters will be monitored, evaluated for adverse trends, and reported.	NA	Field probe measurements Epilimnion of Alkali Creek Reservoir	Monthly	ACR-1
in Alkali Creek Reservoir.	stable and within suitable ranges to sustain indigenous aquatic life.	Total and dissolved metals Se, As, Pb, Cd, Cu, Zn, Al TSS Hardness	NA	Exceedance of WDEQ Chapter 1 Water Quality criteria for aquatic life.	Two consecutive operation seasons ⁶	Grab samples in monitoring locations Epilimnion of Alkali Creek Reservoir	Annually at the end of the operation season, and prior to ceasing reservoir releases.	ACR-1
Impacts to aquatic life in Alkali Creek downstream of the reservoir.	Chemical and physical parameters in Alkali Creek downstream of the reservoir are stable and within	Field parameters Dissolved Oxygen pH Temperature Conductivity	Every 2 weeks during recreation season ACR-OUT and AC-DS	Exceedance of the 95th percentile (upper or lower, as appropriate) of the baseline data during the operation season based on a seasonal geometric mean of the collected operation data.	Two consecutive operation seasons in which the threshold has been exceeded and the exceedance is attributed to reservoir operations	Field probe measurements Deepest portion of Alkali Creek channel	Monthly	ACR-OUT
	reservoir are stable and within suitable ranges to sustain indigenous aquatic life.	Total and dissolved metals Se, As, Pb, Cd, Cu, Zn, Al TSS Hardness	~5 pre-construction samples ACR-OUT AD-IN	Exceedance of WDEQ Chapter 1 Water Quality criteria for aquatic life.	Two consecutive operation seasons in which the threshold has been exceeded and the exceedance is attributed to reservoir operations ⁶	Grab samples in monitoring locations Alkali Creek	Annually at the end of the operation season, and prior to ceasing reservoir releases.	ACR-OUT AC-DS

TABLE 3-1. POTENTIAL WATER QUALITY ISSUES, INDICATORS, AND THRESHOLDS ALKALI CREEK RESERVOIR AMP BIG HORN COUNTY, WYOMING

Potential Water Quality Issue	Desired Condition	Indicator	Baseline Monitoring Frequency and Locations ¹	Threshold Level	Threshold Exceedance Frequency	Sample Method and Waterbody	Monitoring Frequency	Monitoring Sites ⁸
Impacts to potential drinking water use in Alkali Creek reservoir	Alkali Creek Reservoir does not contain concentrations of metals or other compounds in concentrations know to limit the ability to use water for human consumption without reasonable treatment.	Total and dissolved metals Se, As, Pb, Cd, Cu, Zn, Al Nitrate=Nitrite-N TSS Hardness	NA	Exceedance of WDEQ Chapter 1 Water Quality criteria for Human Health.	Two consecutive operation seasons ^{6, 7}	Grab samples in monitoring locations Epilimnion of Alkali Creek Reservoir	Annually at the end of the operation season, and prior to ceasing reservoir releases.	ACR-1
Channel instability in Alkali Creek downstream of the reservoir	The Alkali Creek channel form is stable and supports the range of flows associated with reservoir operation	Channel stability (aggradation and degradation)	Collect one time pre- construction. Between ACR-OUT and Hwy 31, between Hwy 31 and AC-DS, near AC-DS, and at bank adjacent to Tharp residence.	Indicators of channel instability: excessive degradation (accelerated bank erosion, headcut formation) or excess sediment deposition in or adjacent to constructed channel structures or other treatments (e.g., bank revetment)	Multiple indicators of channel instability tied to activities/operations at Alkali Creek Reservoir over two consecutive operation seasons.	Field observations and photo documentation Alkali Creek	Annually following end of reservoir irrigation operation	At representative, installed grade control structures or bank stabilization. Between ACR-OUT and Hwy 31, between Hwy 31 and AC-DS, near AC-DS, and at bank adjacent to Tharp residence.

Notes:

1) Baseline sampling commenced in July 2019.

2) Baseline reservoir *E. coli* data will be collected for a minimum of 3 years following the reservoir's initial fill. After 3 years, the data may be collected.

3) The recreation and operation season is May through September.

4) The NWID will coordinate with the Wyoming Department of Health in cases where the *E. coli* concentration in a reservoir sample exceeds 410 cfu/100 mL (WDEQ Chapter 1 Water Quality criteria for single-sample maximum concentration associated with lightly used full body recreation contact) to identify and implement, as appropriate, protective actions such as posting public advisories. Follow-up sampling will be completed to confirm the *E. coli* levels and to determine when advisories may be cancelled. The threshold for contacting the Wyoming Department of Health may be modified in the future if the NWID observes changes in reservoir use.

5) The NWID will notify the WDEQ, via the Report a Spill hotline at WyoSpills.org or (307) 777-7501, when an HCB is observed, regardless of whether or not the threshold frequency has been observed.

6) If the data evaluation indicates exceedances are human-caused, appropriate BMP's and/or other corrective actions will be deployed. If the data evaluation indicates exceedances are due to natural/environmental conditions then the NWID will request the WDEQ evaluate site-specific criteria.

7) The NWID will coordinate with the Wyoming Department of Health in cases where metals concentrations exceed WDEQ Chapter 1 Water Quality criteria for Human Health, Drinking Water or Fish Consumption to identify and implement, as appropriate, protective measures such as notifying potentially affected downstream public water supply intake operators.

8) Monitoring sites shown in bold represent the primary monitoring sites at which the threshold values are applied. Monitoring sites shown in italic font are supporting monitoring sites that will be used to identify reservoir vs non-reservoir impacts.

TABLE 5-1. AMP MONITORING LOCATION AND MONITORING FREQUENCY ALKALI CREEK RESERVOIR AMP BIG HORN COUNTY, WYOMING

				Baseline Monitoring Frequency				Post-Construction Monitoring Frequency						
Location ID	⁵Latitude	Longitude	Station Description	¹ Metals & Nitrogen	E. Coli	² Field Parameters	Staff Gauge (WL ft)	Channel Instability	Nitrogen	¹ Metals	E. Coli	² Field Parameters	³ Harmful Cyanobacteria (HCBs)	Channel Instability
AC-DS	44.24891	-107.64515	Alkali Creek downstream of the proposed reservoir		Every 2-weeks: July 2019 - Sept. 2019, May 2020 - Sept. 2020	Every Sampling Event	Use ACR-OUT measurement			Annually at the end of the operation season, and prior to ceasing reservoir releases.	Monthly (May- Sept.)			
⁴ ACR-1	1		Alkali Creek Reservoir		Monthly (May-Sept.) for the first 3 years of reservoir operation				Annually at the end of the operation season, and prior to ceasing reservoir releases.	Annually at the end of the operation season, and prior to ceasing reservoir releases.	Monthly (May- Sept.)	Monthly (May Sept.)	Monthly (May-Sept.)	
ACR-OUT	44.25681	-107.6466	At the outlet of the proposed Alkali Creek Reservoir	Aug. 2019, Late-Sept. 2019, May 2020, July 2020, Late Sept. 2020	Every 2-weeks: July 2019 - Sept. 2019, May 2020 - Sept. 2020	Every Sampling Event	Every Sampling Event			Annually at the end of the operation season, and prior to ceasing reservoir releases.	Monthly (May- Sept.)	Monthly (May Sept.)		
⁴ AC-US	44.33087	-107.6164	Alkali Creek upstream of the reservoir								Monthly (May- Sept.)			
AD-IN	44.25419	-107.6263	Anita Ditch inlet to the proposed reservoir	Aug. 2019, Late-Sept. 2019, May 2020, July 2020, Late Sept. 2020	Every 2-weeks: July 2019 - Sept. 2019, May 2020 - Sept. 2020	Every Sampling Event	Every Sampling Event				Monthly (May- Sept.)			
PRC-1	44.23848	-107.6225	Paint Rock Creek upstream of the confluence with Alkali Creek		Every 2-weeks: July 2019 - Sept. 2019, May 2020 - Sept. 2020	Every Sampling Event	Every Sampling Event				Monthly (May- Sept.)			
PRC-2	44.2392	-107.6509	Paint Rock Creek just downstream of the confluence with Alkali Creek		Every 2-weeks: July 2019 - Sept. 2019, May 2020 - Sept. 2020	Every Sampling Event	Every Sampling Event				Monthly (May- Sept.)			
PRC-3	44.20551	-107.7155	Paint Rock Creek downstream of the reservoir at the outlet of the existing TMDL reach		Every 2-weeks: July 2019 - Sept. 2019, May 2020 - Sept. 2020	Every Sampling Event	Every Sampling Event				Monthly (May- Sept.)			
Alkali Creek	TBD	TBD	Alkali Creek stream channel downstream of the reservoir				Use ACR-OUT measurement	Once prior to construction						Annually at the end of each operation season

¹ Metals laboratory analysis includes Total Recoverable and Dissolved for Al, As, Cd, Ca, Cu, Pb, Mg, Se, Zn, TSS, and Hardness (CaCO3) ² Field parameters include Temperature, pH, Dissolved Oxygen, Conductivity, and Turbidity.

³HCBs sampling may be triggered based on observed algae blooms ⁴Location not sampled during baseline monitoring

⁵GCS North American 1983

TABLE 5-2. MONITORING PARAMETERS ALKALI CREEK RESERVOIR AMP BIG HORN COUNTY, WYOMING

Parameters	Reporting Limit	Preservative	Holding Time	Analytical Method	¹ WDEQ-WQD Watershed Protection SOP
Field					Chemical Field Measurement Procedure - Lotic pg. 193
Temperature (deg. Celsius)					Temperature, Water pg. 218
pH, s.u.					рН рд. 214
Dissolved Oxygen (DO), mg/L & %sat					Dissolved Oxygen (DO) pg. 204
Conductivity (SC), umhos/cm					Conductance, Specific (Conductivity) pg. 200
Turbidity, NTU					Turbidity pg. 220
Water Level (ft)					
Laboratory Analysis					
Hardness (Calculated, As CaCO3)	1	Nitric Acid to pH < 2.0	6 Months	SM 2340B	
Calcium (Ca), mg/L	1	Nitric Acid to pH < 2.0	6 Months	EPA 200.7	
Magnesium (Mg), mg/L	1	Nitric Acid to pH < 2.0	6 Months	EPA 200.7	
Nitrogen, Nitrate-Nitrite as N, mg/L	0.05	to <= 6 deg. C	28 days	EPA 353.2	Chemical Grab Sampling Procedure - Lotic pg. 196
² Cyanobacteria, cells/mL		Glutaraldehyde			Harmful Algal Blooms: Cyanobacteria Collection (Lentic) pg. 80
² Cyanotoxin					Harmful Algal Blooms: Cyanotoxin Collection (Lentic) pg. 83
E. Coli, cfu			8 hours		Fecal Coliform Bacteria pg. 71
Trace Metals (Total Recoverable and	Dissolved Fractio	ons)			Chemical Grab Sampling Procedure - Lotic pg. 196
Aluminum (Al), mg/L	0.05	Nitric Acid to pH < 2.0	6 Months	EPA 200.7	Metals, Total and Dissolved pg. 211, Dissolved Metals Filtration Procedure pg. 202
Arsenic (As), mg/L	0.001	Nitric Acid to pH < 2.0	6 Months	EPA 200.8	Metals, Total and Dissolved pg. 211, Dissolved Metals Filtration Procedure pg. 202
Cadmium (Cd), mg/L	0.0001	Nitric Acid to pH < 2.0	6 Months	EPA 200.8	Metals, Total and Dissolved pg. 211, Dissolved Metals Filtration Procedure pg. 202
Copper (Cu), mg/L	0.005	Nitric Acid to pH < 2.0	6 Months	EPA 200.8	Metals, Total and Dissolved pg. 211, Dissolved Metals Filtration Procedure pg. 202
Lead (Pb), mg/L	0.001	Nitric Acid to pH < 2.0	6 Months	EPA 200.8	Metals, Total and Dissolved pg. 211, Dissolved Metals Filtration Procedure pg. 202
Selenium (Se), mg/L	0.001	Nitric Acid to pH < 2.0	6 Months	EPA 200.8	Metals, Total and Dissolved pg. 211, Dissolved Metals Filtration Procedure pg. 202
Zinc µg/L	0.01	Nitric Acid to pH < 2.0	6 Months	EPA 200.7	Metals, Total and Dissolved pg. 211, Dissolved Metals Filtration Procedure pg. 202

¹Manual of Standard Operating Procedures for Sample Collection and Analysis, Wyoming Department of Environmental Quality, Water Quality Division, Watershed Protection Program, 2018.

² May only be analyzed post-construction when harmful algae bloom is observed

TABLE 5-3. ANTICIPATED BASELINE MONITORING SCHEDULE ALKALI CREEK RESERVOIR AMP BIG HORN COUNTY, WYOMING

YEAR 2019	AC-DS	ACR-OUT	AD-IN	PRC-1	PRC-2	PRC-3
	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli
Week of July 8	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters
,		Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
	E Coli	E Coli	E Coli	E Coli	E Coli	E Coli
Week of July 22	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters
		Stroom Elow	Stroom Elow	Stroom Flow	Stroom Elow	Stroom Elow
	E Cali					
Week of Aug. 5	E. COII Field Decemeters	E. COII Field Decemeters	E. COII Field Decemptors	E. COII Field Deremeters	E. COII Field Decemptors	E. COII
Week of Aug. 5	FIEID Farameters					
	"	Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
	E. Coli	E. Coli	E. Coll	E. Coli	E. Coli	E. Coll
*Week of Aug. 19	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters
, i i i i i i i i i i i i i i i i i i i		Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
		Metals & Nitrogen	Metals & Nitrogen			
	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli
Week of Sept. 2	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters
		Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli
Week of Sept. 16	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters
		Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli
	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters
*Week of Sept. 30		Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
		Metals & Nitrogen	Metals & Nitrogen			
YEAR 2020		Motalo a Marogon	Motalo a Marogon			
	E Coli	E Coli	E Coli	E Coli	E Coli	E Coli
Week of May 4	Eield Parameters	Eield Parameters	Eield Parameters	Eield Parameters	Eield Parameters	Eield Parameters
week of May 4		Chrosens Flow	Character Flow	Chrosens Flaur		
	F C = <i>l</i> i	Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
	E. COll Field Denementers	E. COII	E. COII	E. COII	E. COII	E. COII
*Week of May 18	Field Parameters					
		Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
		Metals & Nitrogen	Metals & Nitrogen			
	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli
Week of June 1	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters
		Stream Flow	Stream Flow	Stream Flow	Water Level	Water Level
	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli
Week of June 15	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters
		Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli
Week of June 29	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters
		Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli
*Week of buby 12	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters
Week of July 13		Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
		Metals & Nitrogen	Metals & Nitrogen			
	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli
Week of July 27	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters
		Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
	E Coli	E Coli	E Coli	E Coli	E Coli	E Coli
Week of Aug. 10	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters
		Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
	E Coli				E Coli	
Week of Aug. 24	Eield Parameters	Eield Parameters	Eield Parameters	Eield Parameters	Eield Parameters	Eield Parameters
WEEK OF Aug. 24						
	5 0 <i>"</i>	Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
Week of Oract 7	E. COII	E. COII	E. COII	E. COII	E. COII	E. COll
vvеек от Sept. /	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters
		Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli	E. Coli
*Week of Sept. 21	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters	Field Parameters
		Stream Flow	Stream Flow	Stream Flow	Stream Flow	Stream Flow
		Metals & Nitrogen	Metals & Nitrogen			

* Metals laboratory analysis includes Total Recoverable and Dissolved for Al, As, Cd, Ca, Cu, Pb, Mg, Se, Zn and Hardness (CaCO3)

TABLE 7-1. LIVESTOCK/WILDLIFE BEST MANAGEMENT PRACTICES ALKALI CREEK RESERVOIR AMP BIG HORN COUNTY, WYOMING

BMP	NRCS Code	Description	Application	Water Quality Benefits
General Livestock Grazing Management	528	The Management of livestock grazing to sustainably achieve desired production and conservation objectives	Improving stream and reservoir water quality	Reduce <i>E. coli</i> , HCBs, and soil erosion/turbidity Protect riparian areas, stabilize streambanks, increase infiltration
Alternative Water Sources and Shade	r Sources and 614 / 642 Help producers and land managers limit the amount of time livestock and wildlife spend in or near surface waters to protect water quality and riportian areas		Reduce <i>E. coli</i> , HCBs, soil erosion/turbidity, and degradation of stream banks and riparian areas	
Stream Crossings	578 Establishing stable stream access points and crossings to prevent excess damage from trampling and to protect water quality and riparian areas. Improving stream and reservoir water quality		Reduce <i>E. coli</i> , HCBs, soil erosion/turbidity, and degradation of stream banks and riparian areas	
Manure Management	317 / 313 / 633	Handling, utilizing, composting, and storing animal waste in a way such that nutrients and pathogens are not introduced into water resources.	Improving stream and reservoir water quality	Reduce <i>E. coli</i> and HCBs
Fencing	382	Controlling and limiting access to an area of land with constructed structures, such as fences, that act as barriers to animals.	Improving stream and reservoir water quality	Reduce <i>E. coli</i> , HCBs, soil erosion/turbidity, and degradation of stream banks and riparian areas Protect riparian areas
Vegetated Filter Strips	393	Strips of planted vegetation adjacent to surface waters that reduce the amount of pollutants reaching surface waters by filtering and treating polluted runoff.	Improving stream and reservoir water quality	Reduce <i>E. coli</i> , HCBs, and soil erosion/turbidity Increase infiltration and nutrient uptake
Grassed Swales	412	Vegetated channels used to treat and convey runoff at a slow, controlled rate in order to allow time for nutrient absorption and sediment capture.	Improving stream and reservoir water quality	Reduce <i>E. coli, HCBs, and soil</i> erosion/turbidity
Riparian Buffer	391 / 390	Established areas of dense vegetation adjacent to natural water bodies, which maintain the integrity of waterways and reduce pollution by preventing stream bank erosion and treating polluted runoff.	Improving stream water quality	Reduce E. coli, HCBs, and soil erosion/turbidity and temperature Increase infiltration, filtering, and uptake of nutrients
Diversion Structures	ctures 362 Channels constructed to intercept and divert slope runoff to a desired location to prevent erosion.		Improving stream and reservoir water quality	Reduce erosion/turbidity, <i>E. coli</i> , and HCBs

Note: Information contained in this table is pulled from the Wyoming Department of Environmental Quality Livestock/Wildlife Best Management Practice Manual (2013 Update, Document #13-0038).

TABLE 7-2. STREAM BEST MANAGEMENT PRACTICES ALKALI CREEK RESERVOIR AMP BIG HORN COUNTY, WYOMING

BMP	NRCS Code	Description	Application	Water Quality Benefits
Coconut Eiber Roll	NA	Reduces erosion by stabilizing the toe of the slope	Stabilizing stream banks and improving stream	Reduce soil erosion/turbidity, temperature, and pH
	110	and by trapping sediment from the streambank	water quality and aquatic habitat	Increase dissolved oxygen and bank stability
Live Station	NA	Dormant woody cuttings are inserted directly into	Stabilizing stream banks and improving stream	Reduce soil erosion/turbidity, temperature, and pH
Live Stakes	NA	habitat for aquatic plants and animals	water quality and aquatic habitat	Increase dissolved oxygen and bank stability
Durus kilaurania a	NA	Minimizes bank erosion while enhancing	Stabilizing stream banks and improving stream	Reduce soil erosion/turbidity, temperature, and pH
Brushiayering	NA	aesthetics through the establishment of vegetation	water quality and aquatic habitat	Increase dissolved oxygen and bank stability
Francisco O control Disculato		Temporarily stabilizes and protects disturbed soil	Stabilizing stream banks and improving stream	Reduce soil erosion/turbidity, temperature, and pH
Erosion Control Blankets	NA	from surface erosion and conserves soil moisture	water quality and aquatic habitat	Increase dissolved oxygen and bank stability
Notice Material Development	NA	Minimizes bank erosion and improves habitat for	Stabilizing stream banks and improving stream	Reduce soil erosion/turbidity, temperature, and pH
Native Material Revetment		aquatic plants and animals	water quality and aquatic habitat	Increase dissolved oxygen and bank stability
Dank Chaning and Vegetation	NA	The use of bank shaping and vegetation is often a	Stabilizing stream banks and improving stream	Reduce soil erosion/turbidity, temperature, and pH
Bank Shaping and Vegetation	NA	techniques	water quality and aquatic habitat	Increase dissolved oxygen and bank stability
Stan a Tao Daviationanta	NA	Reduces erosion by stabilizing the toe of the bank,	Stabilizing stream banks and improving stream	Reduce soil erosion/turbidity, temperature, and pH
Stone Toe Revelments		preventing undermining of the upper banks	water quality and aquatic habitat	Increase dissolved oxygen and bank stability
Les Deek and Lileek Vanas	NA	Protect the streambank from erosion and enhance	Stabilizing stream banks and improving stream	Reduce soil erosion/turbidity
Log, Rock, and J-Hook vanes	NA	pool and riffle habitat	water quality and aquatic habitat	Increase dissolved oxygen and bank stability
		Reduce streambank erosion, enhance fish habitat,	Stabilizing stream bed and banks and improving	Reduce soil erosion/turbidity
Grade Control Structures	NA	and provide for irrigation diversion structures	stream water quality and aquatic habitat	Increase dissolved oxygen and bank stability
Culvert Modification and		Protects infrastructure from damage while	Stabilizing stream bed and improving stream water	Reduce soil erosion/turbidity, temperature, and pH
Replacement	NA	improves habitat and reduces siltation	quality and aquatic habitat	Increase dissolved oxygen and bank stability

Note: Information contained in this table is pulled from the Wyoming Department of Environmental Quality Stream and Lakeshore Restoration Best Management Practice Manual (2014 Update, Document #14-0532.

FIGURES









FIGURE 7-1. ADAPTIVE RESPONSE PROCESS ALKALI CREEK RESERVOIR AMP BIG HORN COUNTY, WY



*If no exceedances are identified after 3 years of monitoring (or other reasonable timeframe) then monitoring frequency or number of locations for indicator data collection may be reduced. **Voluntary proactive BMPS may be implemented at any time. **APPENDIX A**

FINAL ENVIRONMENTAL IMPACT STATEMENT, ALKALI CREEK RESERVOIR PROJECT, TABLE 3.15-14 WATER QUALITY ISSUES, DESIRED CONDITIONS, AND DEVELOPMENT OF AN ADAPTIVE MANAGEMENT PLAN



APPENDIX A TABLE 3.15-14. WATER QUALITY ISSUES DESIRED CONDITIONS AND DEVELOPMENT OF AN ADAPTIVE MANAGEMENT PLAN

Potential Water Quality Issue	Desired Condition (Indicators and Thresholds)	Evaluation and Potential Corrective Actions
Exacerbation of existing <i>E. coli</i> impairment in Paint Rock Creek	There is no net increase in <i>E. coli</i> loading to the impaired segment of Paint Rock Creek.	The project proponent will develop an AMP that includes monitoring to evaluate <i>E. coli</i> loading to the impaired reach of Paint Rock Creek and a suite of possible corrective actions that could be implemented upon a determination that a departure from the desired condition is associated with reservoir construction and/or operation.
Impacts to recreation in Alkali Creek Reservoir and Alkali Creek downstream of the reservoir	Alkali Creek Reservoir and Alkali Creek downstream of the reservoir are free from elevated <i>E. coli</i> and harmful cyanobacteria blooms that may pose risks to recreational activities.	The project proponent will develop an AMP that includes monitoring to evaluate E. coli and harmful cyanobacteria blooms in both waterbodies and a suite of possible corrective actions that could be implemented upon a determination that a departure from the desired condition is associated with reservoir construction and/or operation
Impacts to aquatic life in Alkali Creek Reservoir and Alkali Creek downstream of the reservoir	Chemical and physical parameters in Alkali Creek Reservoir and Alkali Creek downstream of the reservoir are stable and within suitable ranges to sustain indigenous aquatic life.	The project proponent will develop an AMP that includes monitoring to evaluate chemical and physical parameters in both waterbodies and a suite of possible corrective actions that could be implemented upon a determination that a departure from the desired condition is associated with reservoir construction and/or operation.
Impacts to drinking water in Alkali Creek Reservoir	Alkali Creek Reservoir does not contain concentrations of metals or other compounds in concentrations known to limit use of water for human consumption.	The project proponent will develop an AMP that includes monitoring for chemical parameters known to occur in the underlying geologic material that may pose a risk for human consumption of the water at elevated concentrations.
Channel instability in Alkali Creek downstream of the reservoir	The Alkali Creek channel form is stable and supports the range of flows associated with reservoir operation.	The project proponent will develop an AMP that includes monitoring for channel stability and a suite of possible corrective actions that could be implemented upon a determination that a departure from the desired condition is associated with reservoir construction and/or operation.

ATTACHMENT 3

Comments on the Final Environmental Impact Statement and Agency Responses

THE BUREAU OF LAND MANAGEMENT'S (BLM'S) RESPONSES TO THE U.S. ENVIRONMENTAL PROTECTION AGENCY'S (EPA'S) DETAILED COMMENTS ON THE FINAL ENVIRONMENTAL IMPACT STATEMENT (EIS) FOR THE ALKALI CREEK RESERVOIR PROJECT

EPA Comment/Recommendation #1:

"To provide reasonable assurance that the project will avoid causing or contributing to violations of WQS, EPA recommends that the Record of Decision (ROD) include committed measures to ensure that the project's contributions to WQS violations are prevented before construction begins." (pgs. 3-4)

BLM Response:

An adaptive management plan (AMP) targeting water quality issues was developed for the project in coordination with the Wyoming Department of Environmental Quality and reviewed by the BLM and U.S. Army Corps of Engineers (USACE). The AMP identifies a number of beneficial project features designed to mitigate potential water quality standard violations (e.g., fencing of the reservoir to exclude livestock, constructed wetlands at Anita Ditch discharge to reservoir). The AMP also includes additional lists of best management practices for wildlife, livestock, and stream stabilization to be employed if ongoing monitoring indicates water quality thresholds are not being met. The AMP has been included as in Attachment 2 of the ROD.

EPA Comment/Recommendation #2:

"EPA compared the E.coli data summary in Tables 3.15-2, 3.15-3 and 3.15-10 to the corresponding data provided to us by WDEQ and BLM and identified apparent discrepancies between the two. One particular example concerns the data for the impaired section of Paint Rock Creek near its confluence with the Nowood River. The data we reviewed show E. coli concentrations significantly higher than what is presented in Table 3.15-2 during May, a time when unimpaired water upstream from this site would be diverted away from the stream and into the proposed reservoir. According to these data, E. coli concentrations in the stream in May exceed the WOS during wet and dry years, while Table 3.15-2 of the Final EIS indicates that concentrations exceed the WOS in May only during dry years. Additionally, it does not seem likely that during May, when diversion of unimpaired water to the proposed reservoir would occur, the E. coli concentration at this downstream site as well as the impaired site on the Nowood River would stay the same or decrease, as predicted for wet and normal years in Table 3.15-10. Rather, the decrease in dilution flow would be expected to increase concentrations of E. coli. Therefore, it appears that the E. coli-based impairments may be more severe and more frequent than what is presented in the Final EIS, and the effects from the ACRP would likely be greater than what is disclosed. We recommend that BLM revisit these data and ensure the most accurate information is considered when developing the ROD." (pgs. 4-5)

BLM Response:

This is because of the differences in monitored flow vs. modeled flow. The main factor driving the model is the modeled streamflow. Because of the nature of a lumped model, further source segregation (overland flow vs. stream flow) cannot be accomplished for the two in-between areas. This will cause bias in the prediction to overlook the impact of these sources. The monitored *E. coli* concentration was used to predict "lumped" *E.coli* concentrations from the two in-between areas. This model is set up as a loading balance. Limitation exists when the modeled flow at the confluence is less than the flow at the most upstream point. The *E.coli* model then does not count any runoff contribution from the in-between area. Therefore, the *E.coli* concentration is similar to the upstream location. To better calibrate the model, the AMP specified the collection of additional baseline data. This data collection started in 2019 and will continue through 2020. Regarding final EIS Table 3.15-10 and the minimal *E. coli* concentration changes in May in wet and normal years: note that a relatively large amount of water stored in the reservoir comes from Alkali Creek in April. Correspondingly, April *E. coli* concentrations in the Paint Rock Creek TMDL reach are predicted to increase.

EPA Comment/Recommendation #3:

"Our review noted two apparent inconsistencies in the Final EIS with respect to impacts to designated beneficial uses. First, the Final EIS states, in the comparison of alternatives in Appendix C, that the ACRP would have no adverse effects on fisheries in Alkali Creek. Similarly, it states that the bypass flow of 0.4 cfs through the proposed reservoir would maintain current conditions (p. 13). These statements are not consistent with the analysis provided in the EIS. The Environmental Consequences chapter in the EIS concludes that substantial adverse effects to aquatic species, including loss of aquatic habitat, would occur in all three waterways as a result of the streamflow reductions under the preferred alternative (pp. 157-159). Second, the Final EIS (p. 156) states that attainment of beneficial uses related to aquatic life would not be changed by implementing the preferred alternative and refers to Section 3.15.4.2.3 (Effects to Water *Ouality) for a relevant discussion. However, Section 3.15.4.2.3 does not discuss how the* designated beneficial aquatic life uses would be maintained despite the reduction of flows and resulting adverse effects to aquatic habitat and species, including sensitive species of concern. Wyoming's WOS recognize that dams, diversions and hydro logic modifications can preclude the attainment of beneficial uses. We recommend that the ROD consider how the disclosed adverse effects to aquatic life and habitat that would occur by implementing the selected alternative would affect maintenance of related beneficial uses. We also recommend that the ROD explain how and to what extent those effects would be managed or avoided through the AMP." (pgs. 5-6)

BLM Response:

BLM notes that there does appear to be an inconsistency between Appendix C and Section 3.18.4.2.2 of the Final EIS. Table C-1 in Appendix C of the final EIS is a summary of the initial evaluation that was completed prior to detailed analyses of alternatives presented in the EIS. However, Table C-3 in Appendix C presents additional information on the Alkali Creek, Cottonwood Creek, and Little Cottonwood Creek alternatives and incorrectly indicates that the Alkali Creek alternative would have no effects to fisheries in Alkali Creek.

It appears that the theme of the remainder of EPA's comment is that reductions of water quantity (not quality) associated with Alternative B can impact aquatic life designated use. The reference to Section 3.15.4.2.3 (Environmental Effects – Alternative B: Proposed Action – Water Quality) in Section

3.18.4.2.2 on page 156 is under the heading of *Habitat Disturbance/Alteration and Water Quality*. This section states:

The attainment of beneficial uses in Medicine Lodge and Paint Rock Creeks and the Nowood River related to 1) non-game and game fish species and other aquatic life such as macroinvertebrates and 2) fish consumption would not be changed as a result of the Proposed Action, as discussed in Section 3.15.4.2.3.

This section is referring to water quality parameters (not water quantity). The BLM does not believe this is an inconsistency. Changes in water quantity can have an impact on water quality and designated use; however, effects to water quality are expected to be monitored and corrected through implementation of the AMP.

The AMP has been included in Attachment 2 of the ROD. As noted above in the BLM's response to EPA Comment/Recommendation #1, the AMP addresses potential water quality standards concerns and subsequent impacts to beneficial use designations through project design features, consistent monitoring of identified water quality indicators, and application of best management practices.

EPA Comment/Recommendation #4:

"Mitigation for the loss of 9,300 linear feet of Alkali Creek in the dam and inundation areas of the ACRP is not included in the Final EIS.

"EPA continues to recommend using the Corps' WSQT debit tool to calculate the amount of stream compensation required due to the damming and inundation of this portion of Alkali Creek. Medicine Lodge Creek, Paint Rock Creek and the Nowood River are State of Wyoming-designated red ribbon streams that are recognized under the Corps' WSMP as "Special Resources." Special Resources are weighted relatively high when the Corps mitigates adverse effects under its permitting authority. EPA recommends evaluating the secondary effects to these two streams and the Nowood River downstream of the proposed diversions as well as Alkali Creek below the proposed reservoir. Compensatory mitigation should be provided for any unavoidable impacts to aquatic resources and the WSQT should be applied at any mitigation sites to ensure adequate mitigation has been proposed." (pg. 6)

BLM Response:

Mitigation for the stream loss on Alkali Creek is being addressed as part of Clean Water Act (CWA) Section 404 permitting through the USACE. This permit process requires evaluating wetland and stream losses and developing compensatory mitigation plans, as appropriate to mitigate these losses. The stream compensatory mitigation plan is targeted at stream resource losses along Alkali Creek due to construction of the proposed embankment and inundation by the proposed reservoir pool. As part of this permitting process, the USACE's Wyoming Stream Quantification Tool (WYSQT) is being used to calculate stream functional loss as well as to calculate anticipated stream lift in proposed mitigation reaches. The USACE will not issue the 404 Permit until the USACE has received and approved the wetland and stream compensatory mitigation plans.

Potential secondary effects to Alkali Creek, downstream of the proposed reservoir, are being addressed as part of the proposed stream mitigation plan. These potential secondary effects are also addressed in the AMP included as Attachment 2 of the ROD.

Other stream reaches, including Medicine Lodge Creek, Paint Rock Creek, and the Nowood River are being evaluated as part of a separate AMP process coordinated with the Wyoming Game and Fish Department.