



United States Department of Agriculture
Forest Service

Dry Wash Reservoir Expansion and Pipeline Environmental Assessment

**Moab-Monticello Ranger District
Manti – La Sal National Forest
San Juan County, Utah**

May 2014



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Chapter 1 - Purpose & Need

Introduction

This environmental assessment (EA) has been prepared to determine whether expanding the existing Dry Wash Reservoir by raising the dam crest elevation by approximately 18 feet, and constructing a 12-inch pipeline running from Dry Wash Reservoir to the existing Blue Mountain Irrigation pipeline located about 1 mile southeast of the reservoir, may significantly affect the quality of the human environment and thereby require the preparation of an environmental impact statement. If there are no significant effects determined through this analysis, we will summarize our results in a Finding of No Significant Impact (located in Chapter 5 – Finding of No Significant Impact (FONSI)) and release a draft Decision Notice for public review and objection. By preparing this EA, we are fulfilling agency policy and direction to comply with the National Environmental Policy Act (NEPA). For more details of the proposed action, see the Proposed Action and Alternatives section (located in Chapter 2 - Proposed Action and Alternatives) of this document.

Background

Dry Wash Reservoir is currently operated and maintained by Blanding Irrigation Company (Irrigation Company) under the authority of a special use permit. The main use of the water in the reservoir is for irrigation purposes. However, through an existing agreement, Blanding City (City) may use the water for culinary purposes during periods of drought or other agreed upon times. Both entities agree that as much as 50 percent or more water is lost transferring water from the reservoir to the diversion downstream. In many of the previous years, the Irrigation Company used most, if not all, of the water in the reservoir for irrigation. Because the reservoir area is highly valued for recreation and very susceptible to wildfire, San Juan Water Conservancy District recognized the need to increase the storage capacity of the reservoir to keep a reserve pool for these purposes. The three entities signed an agreement to expand the reservoir with San Juan Water Conservancy District as the responsible party.

San Juan Water Conservancy District has since submitted an application proposing the project, which consists of two main components. The first is an expansion of the existing Dry Wash Reservoir by raising the dam crest elevation by approximately 18 feet, and the second is installation of a 12-inch pipeline running from Dry Wash Reservoir to the existing Blue Mountain Pipeline located about 1 mile southeast of the reservoir. Water is currently transported from the reservoir through the natural drainage channel below Dry Wash Reservoir.

Dry Wash Reservoir falls under Water Right number 09-125 obtained in 1947. The reservoir was constructed in 1961 and a special use permit was issued on June 18, 1963. A subsequent permit was issued on September 24, 1990 and expired in 2009. Utah Division of Water Rights – Dam Safety approved a Simplified Emergency Action Plan for the reservoir (Dam Identification Number: UT00094) on May 1, 2010. The Emergency Action Plan (EAP) defines responsibilities and provides procedures designed to:

- Identify unusual and unlikely conditions that may endanger the dam.
- Initiate remedial actions to prevent or minimize the downstream impacts of a dam failure.
- Initiate emergency actions to warn downstream residents of impending or actual failure of the dam.

This plan did not identify any existing problems, but identified the procedures to follow and contacts if something happened to affect the structure of the dam. Also, there have been no operational or maintenance issues.

The reservoir's maximum storage capacity is currently 185 acre-feet and the crest elevation of the dam is currently 7,712 feet. The San Juan Water Conservancy District would like to increase the amount of storage in the reservoir by raising the dam crest an additional 18 feet to an elevation of 7,730 feet. The reservoir expansion would provide additional irrigation storage capacity for the Blanding Irrigation Company, increased public recreation opportunities, enhanced aquatic habitat, provide additional water storage for wildfire suppression to protect nearby resources from frequent wildfires, a conservation pool to enhance the fishery, and provide a readily available water supply for any emergency needs. The final proposed dam would be 61 feet tall. The maximum storage capacity of the enhanced reservoir would be 500 acre-feet.

The Utah National Parks Council (Boy Scouts of America) is permitted by the Forest Service to stage its Blue Mountain Scout Camp 2 weeks each year west of the reservoir.

Proposed Project Location

Dry Wash Reservoir is located on the Manti-La Sal National Forest, Moab-Monticello Ranger District, about 12 miles north of Blanding, Utah on the southern slopes of the Abajo Mountains (T 34 S, R 22 E, Section 31). Access is along National Forest System Road 0095, which is part of the Abajo Loop Scenic Backway. San Juan County holds a Forest Service easement for this road (See Appendix A – Project Maps).

Need for the Proposal

The Forest Service has an obligation to act on special use applications when they are consistent with the Manti-La Sal National Forest Land and Resource Management Plan (Forest Plan) and according to a set priority identified within the Plan (Forest Plan p. III-37). In acting upon proposals and applications, the Forest needs to evaluate whether or not to authorize occupancy of National Forest System land through an environmental analysis and public participation process known as the NEPA process. If the decision is made to implement the proposed action, a special use permit is the tool to authorize the activities. The Forest Service need is to determine whether to grant a special use permit to San Juan Water Conservancy District to expand Dry Wash Reservoir by raising the dam, and installing a pipeline for water transportation.

San Juan Water Conservancy District's purpose and need for the reservoir expansion is to provide additional irrigation storage. The purpose and need for the irrigation pipeline is to provide a more efficient means to convey water from Dry Wash Reservoir to the Blue Mountain Pipeline, thus minimizing evaporation and infiltration losses. Currently these losses are calculated to be approximately 50 percent.

Other Opportunities for the Proposal

The reservoir expansion would provide increased public recreation opportunities, enhanced aquatic habitat, additional water storage for wildfire suppression to protect nearby resources from frequent wildfires, a conservation pool to enhance the fishery, and a readily available water supply for any emergency needs.

Proposed Action

The Manti-La Sal National Forest proposes to approve an application from the San Juan Water Conservancy District to increase the storage capacity in the Dry Wash Reservoir by reconstructing the dam and constructing a pipeline to transport water to the existing Blue Mountain Irrigation pipeline located about 1 mile southeast of the reservoir. The National Forest System Road 0095 would need to be rerouted slightly to accommodate the increased reservoir area. The project would disturb approximately 28.2 acres. These actions are proposed to be implemented on the Monticello Ranger District of the Manti-La Sal National Forest (See Appendix A – Project Maps).

Decision to Be Made

The Acting Forest Supervisor is the Responsible Official for the project. After considering the environmental analysis disclosed in this document, the decision to be made by the Acting Forest Supervisor is:

- Whether or not to authorize the proponent to occupy National Forest System land by issuing a special use permit to construct, operate, and maintain the proposed facilities.
- Under what terms and conditions of use the proposed facilities would be authorized.

Conformance with National Forest Land Use Plan

The National Forest Management Act of 1976, as amended, and the *Forest and Rangeland Renewable Resources Planning Act of 1974*, govern the development of forest plans guiding all resource management activities on national forests based on the principles of multiple-use and sustained-yield.

The Forest Plan sets forth direction for managing the land and resources of the Manti-La Sal National Forest. It describes management goals and objectives, desired resource conditions, and resource protection methods (standards and guidelines). The Forest Plan is the result of a programmatic analysis documented in the Land and Resource Management Plans FEIS (USDA Forest Service 1986).

This environmental assessment of the Dry Wash Reservoir Expansion and Pipeline is a project-level analysis. Its scope is confined to addressing the issues and potential environmental consequences of authorizing (or not authorizing) reconstruction of the dam and other activities outlined in the proposed action. This analysis tiers to the Manti-La Sal National Forest Land and Resource Management Plan FEIS, as directed by NEPA and CEQ implementing regulations (at 40 CFR 1502.20).

The alternatives described below (proposed action and no action) are in conformance with the goals and desired future condition of the Forest Plan.

Forest Management Goals

Lands: Consider special-use applications and permits on the basis of relative benefit to the public and individual need (Forest Plan p. III-5).

Desired Future Condition of the Forest

Lands: Utilities and other special uses would be considered in suitable areas and/or corridors based on need and overall benefit. The need and number of special-use permits issued is expected to increase proportional to population growth, expansion of industry, and the demand for natural resources, especially energy minerals (Forest Plan p. III-13).

Dry Wash Reservoir and the proposed project activities are located in the management area TBR, which has an emphasis on wood fiber production and harvest. The primary uses or activities in this management area are timber management, livestock grazing, and dispersed recreation (Forest Plan p. III-67). In

addition, the Forest Plan specifies standards and guidelines that further define land uses and resource management activities, and the manner in which they are to be conducted. However, there are no standards and guidelines prescribed for special uses management within the TBR management area, so the general direction applies, which is:

“Encourage burying utility and lines, except when:

- A. Visual quality objectives of the area can be met using an over-head line.
- B. Burial is not feasible due to soil erosion or geologic hazard or unfavorable geologic conditions.
- C. Greater long-term site disturbance would result.
- D. It is not technically feasible, or economically reasonable” (Forest Plan p. III-37).

The existing Dry Wash Reservoir is currently in conformance with this management direction. The proposed action, as described, would also be in conformance with this management direction. Many other Forest Plan standards and guidelines (both Forest-wide and at the management area level) are relevant to this project. A list of these standards and guidelines, along with a project consistency checklist completed for the proposed action, can be found in the project record. The Forest Plan consistency analysis shows that the proposed action is in compliance with all relevant Forest Plan standards and guidelines.

Public Involvement

The Forest Service began the public involvement process by listing the proposal in the Manti-La Sal National Forest Schedule of Proposed Actions (SOPA) starting April 1, 2013. A scoping letter was sent out during the business week starting Monday, July 21, 2013 to 173 people and organizations.

An internal scoping meeting was held with an interdisciplinary team (IDT) of Forest Service resource specialists. The Forest also published a legal notice of proposed action in the Sun Advocate (newspaper of record) on July 23, 2013, and in the San Juan Record on July 24, 2013, providing a formal 30-day comment period. Four comment letters were received in response to these notices. The comments and responses to those comments are summarized in Appendix C.

Tribal Consultation and Coordination

Tribal governments have a special and unique legal and political relationship with the United States government as reflected in the United States Constitution, treaties, statutes, court decisions, executive orders, and memoranda. This relationship imparts a duty on all federal agencies to consult, coordinate, and communicate with American Indian Tribes on a government-to-government basis. Because Indian Tribes can be affected by the policies and actions of the Forest Service in managing the lands and resources under its jurisdiction, the Forest Service has a duty to consult with them on matters affecting their interests. Because of this government-to-government relationship, efforts were made to involve local tribal governments and to solicit their input regarding the proposed action.

The Hopi Tribe responded to the scoping notice and requested a copy of the cultural report to review prior to their submitting any comments on the project. No other tribes have expressed an interest in the project, but they have been contacted about this project as part of the tribal consultation process. No construction would be allowed to start until the tribal and state historic preservation office (SHPO) consultation processes have been completed.

Issue Identification

Issues serve to identify the environmental effects or consequences that may occur from a proposed action and alternatives. Identification of issues provide opportunities during the analysis to reduce adverse effects and compare trade-offs for the decision-maker and public to understand.

The proposed action and public comments were reviewed by the interdisciplinary team to identify potential issues or concerns that should be considered in this environmental assessment. This review is documented on the Issues Checklist (See Appendix B - Issues Checklist). A determination of Not Present (NP), No Impact (NI), or Potential Impact (PI) is identified for each resource on the list. Those resources which are identified in the checklist as “Not Impacted” by the proposed action or “Not Present” at the project area are not discussed further in the text of this document. Those resource concerns identified with a “Potential Impact” were evaluated against the following criteria:

- Was the concern beyond the scope of the project or not relevant to the proposed action (would a cause-and-effect relationship exist or not exist as a direct result of the proposed action?)
- Was the concern addressed and resolved through application of Forest Plan standards and guidelines, or applicable and appropriate mitigation and best management practices (BMPs)?
- Can the concern be addressed and resolved through implementation of project-specific design features associated with the proposed action?
- Was the concern addressed during processes or analyses routinely conducted by the interdisciplinary team?

Based on internal review and comments received, the interdisciplinary team identified preliminary issues for consideration in this environmental assessment. Issues are of two types:

- **Key Issues** were used to develop alternatives, mitigation measures, or design features to address the effects of the proposed action.
- **Non-Key Issues** were analyzed in terms of potential environmental effects, but did not lead to a new alternative.

Key Issues

No key issues or other unresolved conflicts with the proposed action were identified.

Non-Key Issues

The following non-key issues were identified and are considered further in the environmental assessment, and briefly summarized as follows:

Soils

Construction activities could affect soil productivity and the potential for erosion.

Recreation/Visual

Recreational use such as camping, fishing, and hunting would be disturbed during construction activities and altered if construction is completed. The increased surface area of the dam could affect visual resources in the area.

Vegetation, Including Federally Listed Species

Construction activities could affect various vegetation types within the project area. There are no Federally listed plant species in the project area.

Water Resources/Quality (drinking/surface/ground) including Riparian Zones

Whenever there is surface disturbance, there is potential to modify or disturb drainages or drainage patterns, thus potentially affecting surface waters. Dewatering of the existing reservoir could lead to erosion of the streambank soil and impact vegetation.

Wildlife

Wildlife species would be temporarily displaced during construction activities, but would return post-construction. There are no federally listed wildlife species or designated critical habitat within the project area.

Cultural and Paleontological

Two resources, cultural and paleontological, are present in the project area but would not be affected. Bighorn Archaeological Consultants, LLC completed Class I and III inventories for the project area. No new cultural sites were found during their survey. Three existing sites documented in prior surveys were located and re-evaluated. Based on their work, Bighorn recommended a determination of “no adverse effect” for this project. Construction would not be allowed to start until this recommendation is confirmed by the SHPO and the appropriate tribal consultation has been completed. If the SHPO does not concur, the Forest Service would coordinate with them on the appropriate mitigation needed. Bone fragments are known to exist in the project area. Prior to construction, a paleontological survey would be completed to ensure that no paleontological resources are damaged.

Travel Analysis

A detailed roads analysis is not needed for this project. National Forest System Road 0095 would need to be rerouted to accommodate the expanded reservoir. It would be impractical to build a bridge or elevate the road to meet this need. The reroute is designed to minimize soil and water issues and other recreational and maintenance conflicts. The road will be maintained to maximize recreation access to the reservoir while minimizing further disturbance and costs associated with building new access roads.

Legal and safety requirements make it necessary to remove the road that crosses the dam. Dispersed sites would be access through other existing routes.

This approach is consistent with the Forest Plan recreational goals and the Travel Planning Handbook (FSM 7709.55).

Chapter 2 - Proposed Action and Alternatives

This chapter describes the no-action and proposed action alternatives and summarizes their likely and/or potential environmental effects. Associated design features are also described and analyzed. Two alternatives are considered in this environmental assessment: the proposed action and the no action alternative.

Proposed Action

The Forest collaborated extensively with the applicant in revising the initial proposal to address anticipated concerns, and together, formulated the following proposed action: First is an expansion of the existing Dry Wash Reservoir by raising the dam crest elevation by approximately 18 feet, and the second is a 12-inch pipeline running from Dry Wash Reservoir to the existing Blue Mountain Irrigation pipeline located about 1 mile southeast of the reservoir. Water is currently transported from the reservoir through the natural drainage channel below Dry Wash Reservoir. There is an estimated 50 percent loss of water from the channel from evaporation and infiltration (See Appendix A – Project Maps).

The proposed reservoir expansion construction process would include:

1. Removing the existing outlet piping and replace it with an upgraded design. Some pipe and concrete would be required to construct the outlet work .
2. Raising the dam by 18 feet, utilizing 160,000 cubic yards of material to enlarge the dam. The dam would be a homogenous earthfill dam. All the borrow material for the dam construction would be taken from wherever suitable material is available within the high water mark of the proposed reservoir. The majority of the material would be gathered in the western portion of the reservoir basin near the existing roads.
3. Importing up to 6,000 cubic yards of riprap from off National Forest System lands to protect the upstream face of the dam and outlet channels from erosion. The construction contractor would be responsible to provide the additional riprap from an approved source. The riprap would likely be imported on National Forest System Road 0095 in rock trucks capable of hauling up to 15 cubic yards of rock on each trip.
4. The downstream face of the dam would be reclaimed and seeded to match the adjacent vegetation type. Mulch and/or other soil amendments may be required depending on topsoil quality/quantity.
5. Realigning two-thirds of a mile of the existing National Forest System Road 0095. This section of the road would be constructed to match the design and standards of the existing road. This section of the road would be constructed to meet Forest Service design standards outlined in Forest Service Handbook 7709.56 – Road Preconstruction Handbook. This construction would take approximately 2 weeks. A cross section diagram of this proposed road section is located in Appendix D - Road Cross Section. The portions of this road used to import construction materials would also be regularly maintained by the construction contractor. The county easement will be amended to include the new section of road and remove the old section.
6. Reconstructing the spillway channel in a location away from the critical infrastructure on the main portion of the dam. The spillway channel would be excavated around the east side of the reservoir and tied back into the existing spillway channel. The new channel would be lined with riprap where the channel has significant erosion potential.
7. Prior to construction, the reservoir would be drained and allowed to dry out. The reservoir gate would be opened to allow whatever water that is stored to drain. The bed of most of the reservoir should already be dry because of the low water level from the fall of 2013. No water would be

diverted into the reservoir during construction. Most of the construction activities would take place outside the muddy areas, so construction can begin immediately after the reservoir is drained.

8. Reservoir construction is expected to take approximately 180 days to complete. Construction is anticipated to occur during the summer and fall of 2014, and will likely be completed in summer of 2015.

Dry wash reservoir currently has a surface area of 12.5 acres. The proposed reservoir would have a surface area of 26.4 acres. The reservoir expansion was designed to store a total of 500 acre-feet of water. A 100-acre-foot conservation pool would always be maintained in the reservoir. The conservation pool would primarily be used to maintain fish populations during times of low water, and to also provide water storage in times of emergencies such as drought or wildfire. The remaining 400-acre-feet of water was determined to be sufficient storage to meet current and future demands on the portion of the Blanding Irrigation system connected to the reservoir. Dry Wash Reservoir would continue to be a year round water storage reservoir after the expansion.

Construction of the pipeline would disturb approximately 1.8 acres. Installation would require an approximately 15-foot-wide construction corridor and would include approximately 5,000 linear feet of 12-inch HDPE pipeline. The pipeline would be buried at a depth of 3 feet below the existing ground surface. Construction would take approximately 30 days. The alignment of the pipeline was selected using the following criteria:

1. Follow existing roads and trails where possible to minimize new disturbance to resources.
2. Be hydraulically capable of conveying water from the reservoir to the existing pipeline.
3. Minimize the length of the pipeline to reduce construction costs and impacts to resources.

The new pipeline would primarily be used during irrigation season. This would typically be from about April through October.

It is anticipated that the construction of the dam would take approximately 180 total days to complete. The pipeline could be installed in approximately 30 days. Disturbed areas near the reservoir would be utilized for staging. A staging area would be needed at both ends of the pipeline to enable construction. (See Appendix A – Project Maps). The projects would likely be completed under separate construction contracts and may not occur simultaneously. Construction of the proposed reservoir expansion and pipeline is anticipated to begin in the summer of 2014, pending approvals .

Forest Service project design features (mitigation measures) which would be applied to this project are included in Appendix E - Forest Service Design Features. They were taken into consideration during the impact analysis contained in this assessment.

No Action Alternative

Under the no action alternative, the Dry Wash Reservoir would be maintained at its current size and the water would be carried in the existing drainage to the Blue Mountain Pipeline. The new pipeline would not be constructed and National Forest System Road 0095 would not be relocated.

Alternatives Considered but not Analyzed in Detail

Construction of a new reservoir was considered, but would be too expensive and the impacts would be much greater. A concrete-lined channel from Dry Wash Reservoir to Blue Mountain Pipeline was considered. The cost of this channel would be significantly more than a pipeline and would require a much larger disturbance footprint.

Chapter 3 - Affected Environment

Introduction

This chapter presents the affected environment (i.e., the physical, biological, social, and economic values and resources) for those resources within the project area which could possibly be affected, as identified in Appendix B - Issues Checklist. They are presented as non-key issues in chapter 1 of this assessment. This chapter provides the baseline for comparison of impacts and consequences described in Chapter 4 - Environmental Impacts.

General Setting

Dry Wash Reservoir is located about 12 miles north of Blanding Utah on the southern slopes of the Abajo Mountains. Access is along National Forest System Road 0095, which is part of the Abajo Loop Scenic Backway. (See Appendix A – Project Maps). The vegetation in the area is predominantly ponderosa pine (*Pinus ponderosa*), pinyon pine (*P. edulis*), and Gambel oak (*Quercus gambelii*), with scattered open areas of sagebrush grasslands.

Resources/Issues Brought Forward for Analysis

Soils

The soils in the project area is mapped as Larkson family unit (soil map unit 47) on 3-25% slopes, and has a taxonomic classification of Fine, Montmorillonitic Typic Eutroboralfs and is derived from shale parent material.

General descriptions of the embankment material to be used in construction were made by completing two boreholes within a proposed borrow area located to the northwest of the subject site. Both borehole sites are within the high water mark of the proposed reservoir. Soils encountered in the boreholes consisted of Sandy Fat CLAY (CH), Sandy Lean CLAY (CL), and Lean CLAY (CL) with sand. The soils extended approximately 9-12 feet below the existing site grade before grading into highly to moderately weathered claystone bedrock. The fines content for the materials in the borrow area ranged from a low of 47.1 percent to a high of 78.1 percent. The fine-grained soils typically classified as a Fat CLAY (CH). Soils observed within the roadcut consisted of Fat CLAY (CH) with sand. A sample of the soils exposed in the roadcut had a fines content of 75.8 percent. Due to the fine-grained nature of the embankment soils as well as the presence of fat clay, the existing embankment soils are anticipated to have a relatively low shear strength and low permeability (Jones and DeMille Engineering 2012).

Impact analysis considers the area to be disturbed.

Recreation/Visuals

The project area is used mainly for dispersed camping and fishing in the reservoir. There are numerous primitive campsites on both sides of the reservoir. Forest Service's Nizhoni campground is located approximately one-half mile north of the reservoir. Campers there use the reservoir area as part of their recreational experience. Impact analysis considers the potential disruption of the project to the recreational activities in and near the project area.

This project area falls within the "partial retention" visual quality objective (VQO). Within "partial retention," management activities should remain visually subordinate to the characteristic natural landscape. Activities should repeat form, line, color, or texture common to the characteristic landscape as much as possible, and any changes to the aforementioned with regards to their qualities of size, amount,

intensity, direction, or pattern, must remain visually subordinate. Activities may introduce form, line, color, or textures which are found infrequently or not at all within the characteristic landscape, but they should remain subordinate to the visual strength of the characteristic landscape.

The Utah National Parks Council (Boy Scouts of America) is permitted by the Forest Service to stage its Blue Mountain Scout Camp for 1 week each year, west of the reservoir. The next camp will held be on June 16-21, 2014. The camp registration is full, with 537 participants as scouts, leaders, and camp staff. Impact analysis considers the potential disruption of the project to the scout camp activities.

Currently, there is a road accessing the dispersed campsites across the dam. This access would be eliminated with the construction of the new dam.

Vegetation

There are no federally listed plant species or Forest Service sensitive species that could potentially be affected in the project area (Two R Ranch Wildlife Consulting 2014). The major vegetation types in the project area are ponderosa pine with an understory of shrubs and perennial and annual grasses and forbs, and a mixed oak brush/juniper woodland. Within both vegetation types, there are open areas of sagebrush grassland. Impact analysis considers the potential loss of acres of vegetation types.

Water Resources/Quality (drinking/surface/ground) and Riparian Zones

Dry Wash Reservoir currently has a surface area of 12.5 acres, with a maximum storage capacity of 185 acre-feet of water. The source of water for Dry Wash Reservoir is a manmade earthen ditch that diverts spring and runoff water from the upper reaches of the Dry Wash watershed to the reservoir. This watershed is located generally north of the reservoir and includes approximately 88 acres. Inflows into the reservoir vary significantly throughout the year and are typically around 1 cfs. The Irrigation Company's water right, obtained in 1947 (09-125), allows for up to 10 cfs to be diverted into the reservoir from Dry Wash.

Water is currently transported from the reservoir through the natural drainage channel below the reservoir to the existing Blue Mountain Irrigation pipeline located about 1 mile southeast of the reservoir. This pipeline transports the water to Blanding for irrigation and potentially some culinary use. There are also 12 taps along the Blue Mountain pipeline to provide for livestock water. There is an estimated 50 percent loss of water from the channel due to evaporation and infiltration before it gets to the pipeline.

There is a small wetland area in the channel just below the dam which covers approximately 0.17 acres (See Appendix A – Project Maps). The evaluation of this area is documented in the Wetland Report (Nebeker 2013).

Wildlife

Management Indicator Species

The management indicator species (MIS) potentially affected by the project are Abert's squirrel (*Sciurus aberti*), northern goshawk (*Accipiter gentilis*), mule deer (*Odocoileus hemionus*), elk (*Cervus canadensis*), and golden eagle (*Aquila chrysaetos*). Detailed information on Abert's squirrel and northern goshawk can be found in the Raptor Nest Survey Report (Jones 2013) and the Biological Evaluation (Two R Ranch Wildlife Consulting 2014).

Abert's Squirrel

Four potential squirrel nests were located within a quarter-mile buffer zone of the lake and the stream (Jones 2013). As designed, no nest trees would be disturbed by implementation of the project.

Northern Goshawk

The Forest Service conducts surveys for goshawk breeding territories and has data on most locations. No territories have been identified in the project area, and mature and old growth trees are not being affected by the project; therefore there would be no direct impacts to nesting habitat. Foraging habitat is present, but marginal in quality. The northern goshawk is also a Forest Service sensitive species.

Golden Eagle

There are no known nests within the half-mile spatial buffer of the disturbance area. The area could be used by golden eagles for foraging.

Mule Deer

The project area is within UDWR summer crucial habitat for mule deer.

Elk

The project area is within UDWR spring/fall crucial habitat and winter crucial habitat for elk. Elk use in the area may be limited due to the project being on a major Forest Service road that receives moderately high levels of traffic to and from a major recreation campground.

Threatened, Endangered, and Sensitive Species

There are no federally listed animal species that would be affected in the project area (Two R Ranch Wildlife Consultants 2014). There are three Forest Service sensitive species that may potentially be found in the project area. These are the northern goshawk, flammulated owl (*Otus flammeolus*), and three-toed woodpecker (*Picoides dorsalis*) (Two R Ranch Wildlife Consultants 2014). Impacts to northern goshawk are addressed above.

Flammulated Owl

Potentially suitable habitat of mature pine is limited within the project area.

Three-toed Woodpecker

Potential habitat in the project area is only marginally suitable for breeding and foraging.

Migratory Birds

Several migratory bird species are likely to occur on lands affected by the proposed project. Migratory bird species are protected under the Migratory Bird Treaty Act (MBTA) (16 USC 703-711). Executive Order 13186 (66 Federal Register 3853) sets forth the responsibilities of Federal agencies to implement further provisions of the Act by integrating bird conservation principles and practices into agency activities and by ensuring that Federal actions evaluate the effects and agency plans and actions on migratory birds. Migratory bird species identified in this document have been listed as priority species by Utah Partners in Flight (Parrish et al. 2002) and Birds of Conservation Concern by the USFWS (U.S. Fish and Wildlife Service 2008).

Migratory bird species commonly found in the project area include: pinyon jay (*Gymnorhinus cyanocephalus*), gray vireo (*Vireo vicinior*), black-throated gray warbler (*Dendroica nigrescens*), juniper titmouse (*Baeolophus ridgwayi*), Brewer's sparrow (*Spizella breweri*), sage sparrow (*Amphispiza belli*), sage thrasher (*Oreoscoptes montanus*), Virginia's warbler (*Vermivora virginiae*), flammulated owl, Lewis's woodpecker (*Melanerpes lewis*), band-tailed pigeon (*Patagioenas fasciata*), Grace's warbler (*Dendroica graciae*), and Cassin's finch (*Carpodacus cassinii*) (Parrish et al. 2002).

Chapter 4 - Environmental Impacts

Introduction

This section discloses the impact analysis for those resources identified by the Forest Service interdisciplinary team as being potentially impacted by the proposed action. This review is documented on the Appendix B - Issues Checklist. The potential impacts or issues related to each of these resources are discussed in the following sections.

Direct and Indirect Impacts

Direct effects are caused by the action and occur at the same time and place. Indirect effects are caused by the action and are later in time or farther removed in distance, but are still reasonably foreseeable. Direct and indirect impacts for this project are either quantifiable, presence or absence, or perceived. Quantifiable impacts are measured in acres. Presence or absence impacts are determined by completing surveys for various wildlife species. An individual's recreational experience is an example of a perceived impact.

Proposed Action

Soils

Dry wash reservoir currently covers a surface area of 12.5 acres and the proposed expansion of the reservoir would add approximately 13.9 acres, making the total reservoir area approximately 26.4 acres. Construction materials for the dam and staging areas would be located with the proposed area of the reservoir. Additional rock needed for riprap on the face of the dam would be trucked in from a permitted source off National Forest System lands.

Construction of the pipeline within the 15-foot-wide corridor would temporarily disturb approximately 1.8 acres. A small staging area would be required on either end of the proposed pipeline. These staging areas would not be cleared; they would be used to store pipe and other materials and to park vehicles (See Appendix A – Project Maps). Topsoil would be stockpiled separately during trenching and used for reclamation. Soils and vegetation from the wetland area would be stockpiled and replaced to facilitate the reclamation of the wetland area. Reclamation of any surface disturbance could take place in the same growing season. The design features in Appendix E provide additional measures to avoid adverse impacts to soil resources.

Recreation/Visuals

The project would cause minimal impacts to recreational activity in the area. Developed campgrounds do not occur within the project area. Dispersed camping areas are used within the project area. One or two of these sites would likely be eliminated with the expansion of the reservoir. However, campers could use other similar areas within the project area. No campsites would be affected by construction of the dam or the pipeline. Fishing at the reservoir could be enhanced with the establishment of the 100-acre-foot conservation pool within the reservoir.

Campsites to the west of the reservoir, where the Boy Scout camp is located, would not be affected. Boy Scout activities affected by construction work on the project would be those associated with the reservoir. During construction, the scouts would be bused to one of the reservoirs closer to Blanding. This has occurred in previous years when the reservoir was empty or did not have enough water to support Boy Scout activities. If the reservoir expansion is approved, the conservation pool would provide additional recreation opportunities.

The existing road across the dam would be eliminated with the construction of the new dam. Access to the dispersed campsites on the west side of the reservoir would be accessed via the existing Forest System Roads 5238 and 5239.

The dam is a massed feature which would inherently disrupt the visual qualities of the natural landscape, which are low to the ground in this area and punctuated by vertical forms created by trees. In order to reduce these visual impacts, efforts to blend the dam as much as possible would be undertaken. The design of the dam minimizes its dominance by reducing reflection off the dam by the establishment of native vegetation on the downslope side to cast shadows and create natural light diffusion. The hard linear edge of a typical concrete dam would not be present as the proposed dam is earthen, and as such would have softer edges, creating a more natural appearance. Other design features in Appendix E would further reduce the visual impact of the project.

Vegetation

New disturbance of the project would be approximately 15.7 acres. This would include approximately 13.9 acres for the expanded area of reservoir and 1.8 acres for the pipeline. The new disturbance for the dam and the reservoir would be in both ponderosa pine and sagebrush/grassland vegetation types. Approximately 13 acres of rangeland could be lost due the expansion of the reservoir and the rerouting of the road section. The amount of this loss would be variable each year because of the highly variable nature of the water level. This level is dictated by both the amount of water available from the watershed any given year and the amount of water taken out for irrigation use. The project would result in loss of approximately 7 acres of suitable pine forest from the Forest Plan base acreage. This loss in productivity is considered to be irretrievable due to the anticipated long-term nature of the project, though at some future point in time, the site may be reclaimed and returned to productivity.

The pipeline disturbance would be temporary. No mature ponderosa pines would be removed due to construction of the pipeline. Reclamation of any surface disturbance could take place in the same growing season.

Water Resources/Quality (drinking/surface/ground) and Riparian Zones

The proposed reservoir would have a total surface area of 26.4 acres with a storage capacity of 500 acre-feet of water. The 100-acre-foot conservation pool would always be maintained in the reservoir.

Even though the proposed reservoir capacity is 500 acre-feet of water, that amount may not accumulate in the reservoir every year. The amount would depend on the yearly amount of snow and rainfall. The shortfall in the reservoir can normally be made-up from other reservoirs and water sources that Blanding City owns an interest in.

The only impact to ground water resulting from the project would be a more stable water source from the reservoir. If there was a need, Blanding City could divert some of the water from the pipeline into their culinary water system.

There is a small wetland area in the channel below the dam. It covers approximately 0.17 acres. Approximately 0.03 acres (1,309 square feet) would be under the proposed enlarged dam. Approximately 0.14 acres would be temporarily disturbed during pipeline construction (See Appendix A – Project Maps). Livestock grazing in the project area is affecting the stability of the existing wetland. The wetlands would be maintained by seepage under and through the dam. Seepage may increase with a deeper reservoir and with a toe drain collection system that would collect and discharge the seepage water in the channel, thus maintaining or potentially increasing the size of the wetland area.

Wetland Mitigation

The topsoil and associated vegetation from the wetland area disturbed during pipeline or dam construction would be stockpiled and replaced after construction. This topsoil would be removed with a trackhoe or

similar type off equipment and placed on the opposite side of the trench from the trenching and pipeline equipment. It would be replaced after the trench is covered.

The wetland area would be fenced after the construction of the pipeline and dam is completed. This would keep livestock out, which would enable the wetland area to be re-established after construction of the project and to be a viable vegetation type in the future.

If the anticipated seepage is lower than expected, a small pipe would be attached to the outlet pipe or directly from the reservoir to ensure a continual supply of water to the wetland. Blanding City would be required to install the Forest Service-approved outlet. It would be designed in such a way as to not require regular maintenance or adjustment.

Wildlife

Management Indicator species

Abert's Squirrel

As designed, the reservoir expansion, the pipeline, and road realignment would not damage any nesting trees. Disturbance from project activities is unlikely as squirrels in the area are likely habituated to the existing recreation use of the area. Implementation of the project would not affect population trends of Abert's squirrel on the Manti-La Sal National Forest.

Northern Goshawk

No territories have been identified in the project area, and mature and old growth trees are not being affected by the project; therefore there would be no direct impacts to nesting habitat. Foraging habitat is present, but marginal in quality. Disturbance to the foraging goshawks could occur, but is unlikely as the birds may avoid areas where project activities are occurring, and there is abundant suitable foraging habitat outside of the project area. Implementation of the project would not affect population trends of northern goshawk on the Manti-La Sal National Forest, nor result in a loss of viability or contribute to a trend toward federal listing of the species.

Golden Eagle

Disturbance to the foraging eagles could occur, but is unlikely as the birds may avoid areas where project activities are occurring, and there is abundant suitable foraging habitat outside of the project area.

Mule Deer

Disturbance from project activities is unlikely as deer in the area are likely habituated to the existing road and recreation use of the area. Reclamation of the pipeline would provide available forage for mule deer. Implementation of the project would not affect population trends of mule deer on the Manti-La Sal National Forest.

Elk

Disturbance from project activities is unlikely as elk in the area are likely habituated to the existing road and recreation use of the area. With a permanent source of water available elk may utilize the reservoir after dark in dry times of the year when other water sources have dried up. Implementation of the project would not affect population trends of elk on the Manti-La Sal National Forest.

Threatened, Endangered, and Sensitive Species

Flammulated Owl

The proposed project would not remove any trees capable of providing nesting habitat. Disturbance to foraging owls may occur, but is unlikely as the proposed activities would occur during the day, when these nocturnal owls are roosting. If owls were to pass through the area at night, they would likely not be disturbed by project activities.

Three-toed Woodpecker

Potentially suitable habitat in the project area is only marginally suitable for breeding. Foraging habitat is present, but marginal in quality. Disturbance to the foraging woodpeckers could occur, but is unlikely as the birds may avoid areas where project activities are occurring, and there is abundant suitable foraging habitat outside of the project area. Implementation of the project would not result in a loss of viability or contribute to a trend toward federal listing of the three-toed woodpecker.

Migratory Birds

Impacts to migratory birds would be limited to short-term construction disturbance with no loss of nesting habitat. Disturbance from project activities is unlikely as migratory birds in the area are likely habituated to the existing road and recreation use of the area.

Findings Required by other Applicable Laws and Regulations

Federal and State Permit Requirements

In addition to the Forest Service special use permits for the dam, pipeline, and road re-alignment, the State of Utah requires a Dam Safety Construction Permit prior to construction. This permit has been submitted. Following construction, the State requires a Standard Operating Procedures Plan be submitted. A draft of this plan is located in Appendix F - Standard Operating Procedures. The final review and approval of this plan by the State would not take place until construction of the dam is complete. The Standard Operating Procedures for Dry Wash Reservoir would provide detailed instructions for the observation, operation, and maintenance of Dry Wash Reservoir. This information would provide operating personnel the information needed to perform the required duties (inspections and maintenance) associated with the dam and reservoir.

Federal Water Pollution Control Act

The objective of the Federal Water Pollution Control Act, commonly referred to as the Clean Water Act, is to restore and maintain the chemical, physical, and biological integrity of the Nation's waters by preventing point and nonpoint pollution sources. The watershed condition indicators were evaluated for the watershed and fisheries analysis, which can be used as surrogates for the chemical, physical, and biologic integrity of the water bodies that could be impacted by implementing the project. Construction of the dam, the pipeline, or the road re-alignment would not affect the watershed in the project area. The 100 acre-foot conservation pool of water would sustain a fishery in the reservoir during low water periods.

Executive Order 11988, Floodplain Management and Executive Order 11990, Protection of Wetlands

There are no floodplains present in the project area and the proposed action would not increase the risk of flooding or the risk of damage to human life and property and would not be contrary to Executive Order 11988 – Floodplain Management.

There is a small wetland area in the channel just below the dam which covers approximately 0.17 acres. Approximately 0.03 acres of the wetland would be eliminated due to dam construction. Mitigation measures identified in this chapter of the EA would more than compensate for the loss of the 0.03 acres of wetland area.

Endangered Species Act

The Endangered Species Act (ESA; 16 USC 35 §1531 et seq. 1988) provides for the protection and conservation of threatened and endangered plants and animal species. All alternatives were assessed to determine their effects on threatened and endangered plant and animal species. The U.S. Fish and

Wildlife Service provide the Forest Service with a list of threatened, endangered, proposed, and candidate species to consider in project planning. This list is generally updated as needed. There are no federally listed threatened or endangered species or designated critical habitat in the project area.

Migratory Bird Treaty Act

The Migratory Bird Treaty Act (MBTA) decreed that all migratory birds and their parts (including eggs, nests, and feathers) were fully protected. Under the MBTA, taking, killing, or possessing migratory birds is unlawful. The original intent was to put an end to the commercial trade in birds and their feathers that had wreaked havoc on the populations of many native bird species. On January 17, 2001, President William Clinton signed an Executive Order (E.O. 13186) directing executive departments and agencies to take certain actions to further implement the Migratory Bird Treaty Act (MBTA) (FR Vol. 66, No.11, January 17, 2001).

The Forest Service and U.S. Fish and Wildlife Service have entered into a memorandum of understanding (MOU) to promote the conservation of migratory birds as a direct response to E.O. 13186 (USDA Forest Service and USDI FWS 2008). One of the steps outlined for the Forest Service is applicable to this analysis: “*Within the NEPA process, evaluate the effects of agency actions on migratory birds, focusing first on species of management concern along with their priority habitats and key risk factors. (p.6)*” The Forest Service additionally agreed, to the extent practicable, to evaluate and balance benefits against adverse effects, to pursue opportunities to restore or enhance migratory bird habitat, and to consider approaches for minimizing take that is incidental to otherwise lawful activities. Impacts to migratory birds should be limited to short-term construction disturbance with no loss of nesting habitat. See chapters 3 and 4 for of this EA more details.

Facilitation of Hunting Heritage and Wildlife Conservation (Executive Order 13443)

On August 16, 2007, President George Bush signed an EO directing appropriate federal agencies to facilitate the expansion and enhancement of hunting opportunities and the management of game species and their habitat (FR Vol. 72, No. 160, August 20, 2007). Construction would not take place during hunting seasons of any game animals. See chapters 3 and 4 of this EA for more detail.

Prime Farmland, Rangeland, and Forest Land (USDA Regulation 9500-3)

There are no prime or unique farmlands within the project area.

National Historic Preservation Act

The National Historic Preservation Act (NHPA) of 1966 is the principle, guiding statute for the management of cultural resources on National Forest System lands. Section 106 of NHPA requires federal agencies to consider the effects of their activities and programs on historic properties. Historic properties are significant cultural resources that are included in or eligible for inclusion in the National Register of Historic Places. The criteria for National Register eligibility and procedures for implementing Section 106 of NHPA are outlined in the U.S. Code of Federal Regulations (36 CFR Parts 60 and 800, respectively).

Bighorn Archaeological Consultants, LLC completed Class I and III inventories for the project area. No new cultural sites were found during their survey. Three existing sites documented in prior surveys were located and re-evaluated. Based on their work, Bighorn recommended a determination of no adverse effect for this project.

Environmental Justice—Executive Order 12898

In accordance with E.O. 12898 (59 FR 32, 1994), all action alternatives were assessed to determine whether they would have disproportionately high and adverse human health effects (including social and

economic) on minority or low-income human populations. No populations that meet the criteria for minority or low income are present (EPA Environmental Justice View web site, 3-9-2011).

No Action Alternative

Selection of the no action alternative would result in no change to the existing situation in the project area. At times, the reservoir may not have enough water to maintain a viable fish population. The potential lack of water in the reservoir would also limit the recreational experience to visitors. Lack of water would force the Boy Scout camp staff to periodically bus the scouts to another reservoir for their water activities. Approximately half of the permitted water that is released into the channel below the dam would continue to be lost due to evaporation and infiltration. This would result in less water available to residents for irrigation and to a lesser extent culinary uses.

Cumulative Impacts Analysis

Federal regulations at 40 CFR 1508.7 define cumulative impacts as: "...the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency (federal or non-federal) or person undertakes such other actions. Cumulative impacts can result from individually minor but collectively significant actions taking place over a period of time."

In past years, projects have been implemented in the Johnson Creek, Recapture Creek, and Dry Wash drainages of the San Juan River, and small portions of the Cottonwood Wash and Montezuma Creek watersheds. These, along with projects planned for the future, are documented and explained in the Nizhoni Restoration Project Report (Forest Service 2011). The following is a general list of these projects:

- Previous timber sales and vegetation treatments in the Johnson Creek area (1960s)
- Nizhoni fire (2002), salvage (2003), and reforestation (2007)
- Blue Mountain Ranch- pre-commercial thin (2004), commercial thin (2011-2012)
- Devil Canyon-Bulldog area (2015-2022)
- Brushy Basin project (2010-2011)
- Blanding City water system/pipeline
- Recreational activities, including dispersed and permitted recreation
- Permitted livestock grazing
- Johnson Creek Hazard Fuels Project (2013)

Any residual impacts remaining from the implementation of these projects would not affect the implementation of this project. Implementation of the proposed projects would not affect the Dry Wash Reservoir project because of their broad scale and the small project area of the Dry Wash Reservoir project. It is assumed that the continued use of the area by the Boy Scouts and general public use in the project area and at the Nizhoni Campground would continue at approximately the same level. Construction could cause a short disturbance to campers, but the enlargement of the reservoir may enhance long term recreational potential of the area. It would also enhance aquatic habitat, provide additional storage for wildfire suppression and introduce a 100 acre-foot conservation pool to enhance the fishery and provide year round supply water for any emergency needs.

Chapter 5 – Finding of No Significant Impact (FONSI)

As the responsible official, I am responsible for evaluating the effects of the project relative to the definition of significance established by the CEQ Regulations (40 CFR 1508.13). I have reviewed and considered the EA and documentation included in the project record, and I have determined that implementation of the Dry Wash Reservoir project would not have a significant effect on the quality of the human environment. As a result, no environmental impact statement will be prepared. My rationale for this finding is as follows, organized by sub-section of the CEQ definition of significance cited above.

Context

For the proposed action and the no action alternatives, the context of the environmental effects is based on the environmental analysis in this EA.

Intensity

Intensity is a measure of the severity, extent, or quantity of effects, and is based on information from the effects analysis of this EA and the references in the project record. The effects of this project have been appropriately and thoroughly considered with an analysis that is responsive to concerns and issues raised by the public. The agency has taken a hard look at the environmental effects using relevant scientific information and knowledge of site-specific conditions gained from field visits. My finding of no significant impact is based on the context of the project and intensity of effects using the ten factors identified in 40 CFR 1508.27(b).

1. Impacts that may be both beneficial and adverse. A significant effect may exist even if the Federal agency believes that on balance the effect will be beneficial.

Context. The beneficial effects are accompanied by short-term adverse effects, as described in chapter 4 of the EA.

Intensity. Short-term impacts to resources (e.g., soils, recreation, and wildlife) will occur, but are not significant, as disclosed in chapter 4 of the EA. Construction impacts would be short-term and reclamation of disturbed areas could start in the same growing season. Completion of the project would help maintain the way of life of the Blanding area residents and the tourists by adding more stability to the water source for irrigation and culinary use.

Finding. I have determined that there will be neither significant beneficial nor significant adverse impacts from the action. I have based this determination on the effects analysis as documented in the EA.

2. The degree to which the action affects public health or safety.

Context. Short-duration safety hazards associated with construction operations are addressed with project design features designed to ensure public safety during project activities (See Appendix E - Forest Service Design Features).

Intensity. Project activities may pose some safety risk to visitors along the road as well as construction areas. The public notification, timing measures, and onsite signing and warning methods outlined in the project design features provide for public safety during project activities. The existing dam is stable and poses no risk of failure. Project activities and raising the dam height would not affect stability. Construction in this area avoids any potential conflicts with campers using the area.

The 100 acre-foot conservation pool maintained in the reservoir would provide water in times of emergency situations such as drought and fire.

Finding. The proposed action and associated design features address health and safety concerns. I have determined the project activities incorporate safety and health design to insure effective protections. The action does not pose a significant effect upon public health or safety.

3. Unique characteristics of the geographic area such as proximity to historic or cultural resources, park lands, prime farmlands, wetlands, wild and scenic rivers, or ecologically critical areas.

Context. No historic or cultural resources would be adversely affected by the project.

The Project Area does not include park lands or prime farmlands.

There is a small wetland area in the channel below the dam. It covers approximately 0.17 acres. Approximately 0.03 acres is under the proposed enlarged dam. Approximately 0.14 acres would be temporarily disturbed during pipeline construction.

The Project Area does not include wild and scenic rivers.

The Project Area does not include identified ecologically critical areas.

Intensity. Known cultural sites within the project area will not be adversely affected.

The wetland would be maintained by seepage under and through the dam. Seepage may increase with a deeper reservoir and with a toe drain collection system that would collect and discharge the seepage water in the channel, thus maintaining or potentially increasing the size and life of the wetland area.

Finding. There are no historic or cultural resources, park lands, prime farmlands, or ecologically critical areas in the project area. I have determined that the project design will provide adequate protection for the identified localized wetland.

4. The effects on the human environment are not likely to be highly controversial.

Context. The area affected by the project activities will be primarily limited to the vicinity of the project area. The Public Involvement Plan, approved on August 5, 2013, identifies the scoping process to be followed for this project. This process included mailing a scoping notice for the project to 173 interested parties, and publishing paid notices in the Sun Advocate on July 23, 2013, and the San Juan Record on July 24, 2013. Four comment letters were received. The letters from San Juan County and Ferd Johnson were in support of the project. The Hopi Tribe asked for the opportunity to review the Cultural Resources Survey report prior to officially commenting. Utah Environmental Congress (UEC) posed questions or concerns relating to wetlands, potential wilderness areas, threatened or endangered species, and the purpose and need of the project.

Intensity. UEC's questions or concerns and the responses are documented in Appendix C - Comment Analysis/Response to Comments. None of the comments raised issues that were not already addressed in the EA. No other significant issues were identified during scoping or the 30-day public comment period.

Finding. After reviewing the project record and EA, I have determined that concerns have been appropriately addressed in the proposed action and resource analyses. There does not exist an unusual or high degree of controversy related to the action.

5. The degree to which the possible effects on the human environment are highly uncertain or involve unique or unknown risks.

Context. Possible effects to the human environment and natural resources are addressed in Chapter 4 of the EA. None were identified as highly uncertain or involving unique or unknown risks.

Intensity. The environmental analysis determined that the effects of proposed project activities are measurable and disclosed in Chapter 4 of the EA.

Finding. The project actions are similar to those taken into consideration in the Forest Plan and other projects within the Manti-La Sal National Forest. The effects on the human environment are not considered highly uncertain or involve unique or unknown risks.

6. The degree to which the action may establish a precedent for future actions with significant effects or represents a decision in principle about a future consideration.

Context. The project design was created to be consistent with Forest Plan direction, to incorporate common practices derived from the best available science, and to be applied specifically to the project area for the Dry Wash Reservoir project.

Intensity. The determinations for this project are applied to the site-specific area and conditions. The project, as described, would not establish any precedent for future actions. The engineering and construction methodologies used for the project are normal industry practices.

Finding. The action does not represent a precedent for future actions with significant effects or represent a decision in principle about a future consideration.

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts.

Context. Other ongoing or reasonably foreseeable future actions were included in Chapter 4 of the EA. Cumulative impacts were analyzed for direct and indirect impacts to resources.

Intensity. Forest Service staff specialist or county personnel identified additional projects which were known or anticipated within the project area, but none would add significantly to the impacts of implementing the proposed action. Camping and other recreational activities would continue in the area. It is assumed that this activity would continue at approximately the same level. None of the cumulative effects were determined to be significant.

Finding. Upon review of the analysis, there are no significant cumulative effects of the proposed action.

8. The degree to which the action may adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, or may cause loss or destruction of significant scientific, cultural, or historical resources.

Context. No Historic Properties were found within the project boundaries. No significant scientific, cultural, or historical resources were identified in the area. Fossil bone fragments are known to exist in some areas of the project area.

Intensity. Bighorn Archaeological Consultants, LLC completed Class I and III inventories for the project area. No new sites were found during their survey. Three existing sites documented in prior surveys were located and re-evaluated. Based on their work Bighorn recommended a determination of “no adverse effect” for this project (Bighorn Report Number 13-26, State Project No. U13-HO-0661f).

Prior to construction, a paleontological survey would be completed. If any fossils are located that could be affected by the construction of the project the contractor would coordinated with the Forest Service to develop appropriate mitigation measures.

Finding. I have determined that the effects of the action have been sufficiently analyzed and disclosed in the EA. The action will not adversely affect districts, sites, highways, structures, or objects listed in or eligible for listing in the National Register of Historic Places, or cause loss or destruction of significant scientific, cultural, or historical resources.

9. The degree to which the action may adversely affect an endangered or threatened species or its habitat that has been determined to be critical under the Endangered Species Act of 1973.

Context. There are no federally listed plant or animal species or designated critical habitat in the project area.

Intensity. No effect.

Finding. I have determined that the project is compliant with the Endangered Species Act.

10. The action will not violate Federal, State, or local law or requirements imposed for the protection of the environment.

Context. Forest Service must comply with various environmental protection laws, including the Clean Water Act, Executive Order 11990, Executive Order 13186, and the Endangered Species Act.

Intensity. The proposed action and the no action alternatives are in conformance with the Land and Resource Management Plan for the Manti-La Sal National Forest, as amended. Implementation of the proposed action does not violate any Federal, State, or local law or requirements imposed for the protection of the environment. This statement is supported by the impacts described in the EA.

Finding. I have determined that implementation of the action will not violate any Federal, State, or local law or requirements imposed for the protection of the environment.

Chapter 6 - Consultation and Coordination

Introduction

The issue identification section of Chapter 1 identifies those issues analyzed in detail in Chapter 4. Appendix B - Issues Checklist provides the rationale for issues that were considered but not analyzed further. The issues were identified through the public and agency involvement process described below.

Persons, Groups and Agencies Consulted

The Forest Service Public Involvement Plan, approved on August 5, 2013, identified the scoping process to be followed for this project. The process was also explained in the scoping notice that was mailed to interested parties. The authority for this process and the process description is located in 36 CFR Part 218 Predecisional Administrative Review Process. This process included mailing a scoping notice of the project to 173 interested parties and publishing paid notices in the Sun Advocate on July 23, 2013, and the San Juan Record on July 24, 2013. Four comment letters were received. The commenters, their comments, and our responses are summarized in Appendix C - Comment Analysis/Response to Comments. All resource questions or concerns needing analysis are addressed in the body of the EA, leaving no outstanding issues relating to their comments.

List of Preparers

Non-Forest Service

Jones & DeMille Engineering, Inc.

Ryan Jolley, PE: Project Lead

Adam Perschon, GIS Specialist: GIS mapping

Glen Nebeker, Environmental/NEPA Manager: Environmental document preparation

Jenna Jorgensen, Environmental/NEPA Manager: Environmental document preparation

Bighorn Archaeological Consultants, Inc.

Jon Baxter, Archaeologist: Cultural surveys

Two R Ranch Outfitters

Derris Jones, Biologist: Sensitive and T&E plant and animal surveys

Forest Service

Joel Nowak, Program Manager: Project Management

Nathan Lewis: EA review and NEPA coordination

Michael Diem, District Ranger: Management review and project approval

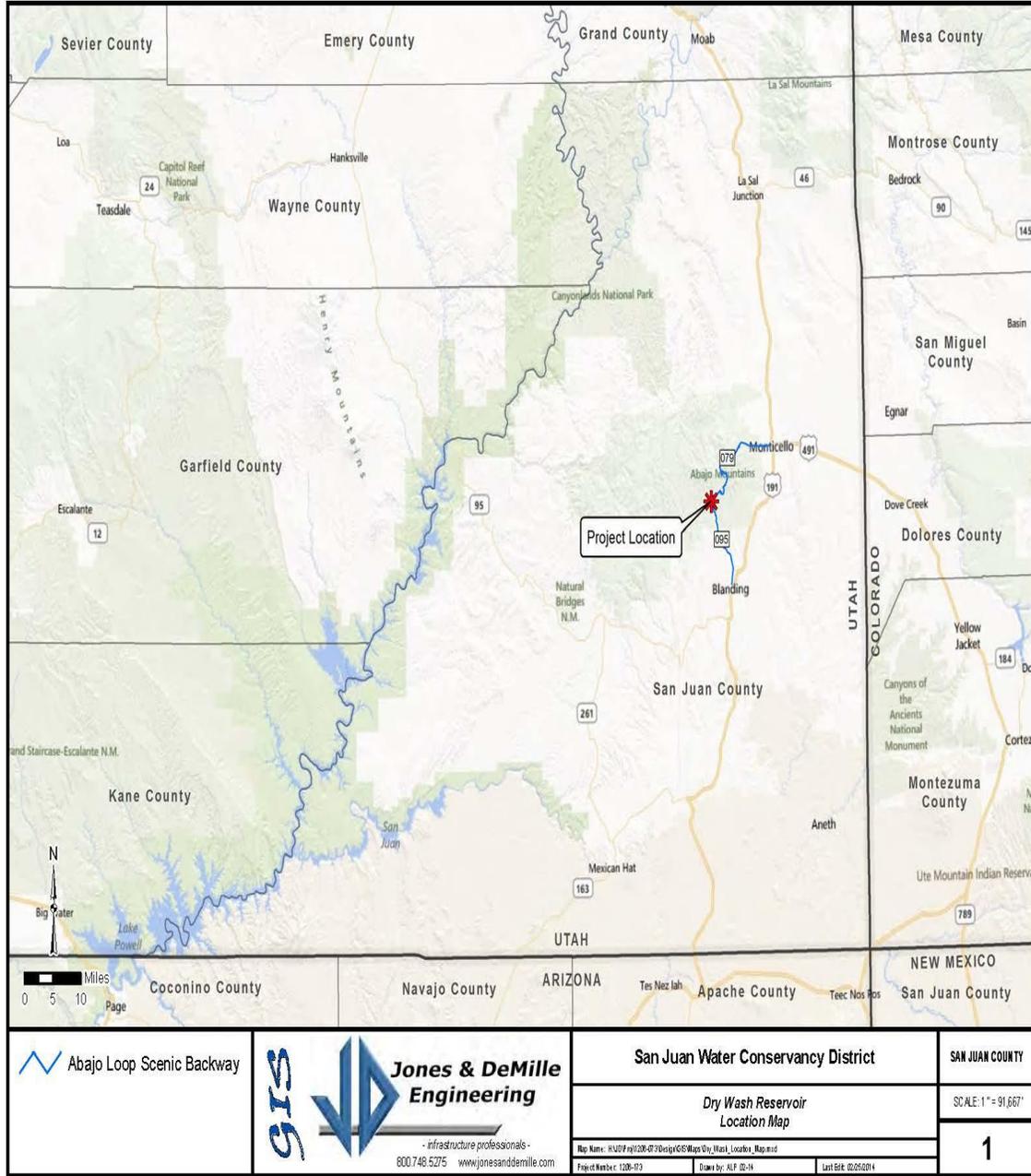
Additional Forest Service staff members involved with the project are identified on the issues checklist found in Appendix B - Issues Checklist.

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Appendix A – Project Maps

Project Location Map



Recreation Map



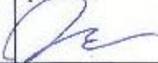
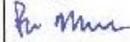
Appendix B - Issues Checklist

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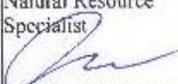
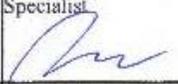
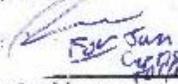
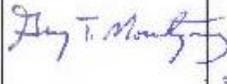
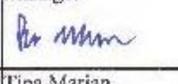
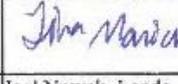
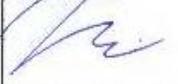
NP = not present in the area impacted by the proposed or alternative actions

NI = present, but not affected to a degree that detailed analysis is required

PI = present with potential for relevant impact that need to be analyzed in detail in the EA

Determination*	Resource	Rationale for Determination	Name, Title and Signature	Date
NI	Air Quality	Small amounts of dust and exhaust emissions from equipment could impact air quality during construction and reclamation of the project. These amounts are seen as transitory and not adversely affecting established air quality standards for the project area such that detailed analysis is warranted.	Joel Nowak Natural Resource Specialist 	3/6/14
NI	Climate Change	Due to the short duration of construction and relatively minor change in vegetation, this project will have a negligible impact on climate change.	Joel Nowak Natural Resource Specialist 	3/6/14
NI	Cultural Resources	Class I and III inventories have been completed for the project area. No eligible sites were found during the Class III survey; therefore, a finding of No Adverse Effect was determined. Details of these finds are discussed in the Cultural Resource Inventory Report (UII-HO-0939f, p), which is not available to the public nor included in the project record because of sensitive information. As proposed, should any cultural resources be unearthed, surface-disturbing activities would be re-routed to avoid or halted until the cultural sites/artifacts can be evaluated for significance, and a mitigation/salvage plan be formulated. These actions would successfully mitigate possible impacts to cultural resources such that detailed analysis is not required.	Don Irwin, District Archaeologist 	3/8/2014
NP	Draft Unroaded Undeveloped Areas	The project is not within any Draft Unroaded Undeveloped Areas	Brian Murdock, Recreation Program Manager 	3/5/14
NI	Geologic, Mineral and Paleontologic Resources	Formations in the general project area may contain fossils. however there should be no impact to palcontological resources because all construction disturbances would take place in the existing bed of the reservoir, on the dam or in a shallow trench following existing roads and trails where possible to minimize new disturbance to resources. In addition, a palcontological survey will be completed prior to construction and any significant resources will be avoided, or excavated by a professional paleontologist.	Joel Nowak, District Mineral Specialist 	3/6/14
NI	Engineering/ Transportation Access	A section of National Forest System Road 0095 would be realigned around the proposed expanded reservoir. The road is currently under a road right-of-way easement issued to San Juan County. The proponent will need to submit design and alignment drawings to the county and Forest for approval before any construction begins. No road closures will be in effect during holiday weekends or during the first weekends of the big game hunting seasons.	Seth Wallace, Forest Engineer 	3/5/14

Dry Wash Reservoir Expansion and Pipe Line

Determination*	Resource	Rationale for Determination	Name, Title and Signature	Date
NP	Environmental Justice	No populations that meet the criteria for minority or low income are present. (EPA Environmental Justice View web site, 3-9-2011)	Joel Nowak Natural Resource Specialist 	3/6/14
NP	Farmlands (Prime or Unique)	There are no prime or unique farmlands within the project area.	Joel Nowak Natural Resource Specialist 	3/6/14
NI	Fire/Fuels	The project would increase the available water for fighting wildfires in the area. Firefighter safety increases as available water resources increase, <i>pending use agreement.</i>	Brian Mattox, District Fuels Specialist 	3/6/14
NP	Floodplains	There are no floodplains present in the project area and the proposed action would not increase the risk of flooding or the risk of damage to human life and property and will not be contrary to Executive Order 11988 – Floodplain Management.	Jan Curtis-Tollestrup, Hydrologist  <i>For Jan Curtis-Tollestrup</i>	4/4/14
NI	Forest and Woodland Vegetation	There will be incidental removal or damage to vegetation within and surrounding the project area. Design features will help minimize impact to large Ponderosa trees. The project will result in loss of approximately 7 acres of suitable pine forest and 13 acres of rangeland from the Forest Plan base acreage. Most of these losses in productivity are considered to be irretrievable due to the anticipated long term nature of the project. Though at some future point in time, the site may be reclaimed and returned to productivity. See Forested Vegetation Effects report for additional information and design features.	Kreg Montgomery, Forester Silviculturist 	3/4/2014
NI	Inventoried Roadless Areas	The project is not within any IRA's. The Blue Mountain Roadless Area is located approximately 1 mile north the project area. See Appendix A, Wilderness Map	Brian Murdock, Recreation Program Manager 	3/5/14
NI	Invasive Species/Noxious Weeds	All equipment would be power washed to reduce the potential of introducing new weed species into the area. This would mitigate the possible introduction and/or increase of invasive, non-native species. The Forest actively minimizes the spread of invasive species by monitoring, spraying and mechanical methods.	Tina Marian, Rangeland Management Specialist 	3/18/14
PI	Lands Special Uses	The proposed project would be subject to valid prior existing rights and any associated activities would be coordinated with permit holders. The project would not affect access to Federal lands. Construction activities could affect activities at the Blue Mountain Boy Scout Camp.	Joel Nowak, Lands Special Use Administrator 	3/6/14
NI	Law Enforcement	The project will have no impact on public safety or hinder the abilities of the law enforcement personnel as long as the road closures are minimal or the road is opened relatively quickly if law enforcement need access through the area.	Scott Watson, LEO 	3/18/2014

Dry Wash Reservoir Expansion and Pipe Line

Determination*	Resource	Rationale for Determination	Name, Title and Signature	Date
NI	Livestock Grazing	There is some livestock grazing in the project. Construction and placement of the dam would eliminate approximately 13.9 acres. A slight benefit to grazing may be seen as the result of the seeding along the pipeline and a permanent water source.	Tina Marian, Rangeland Management Specialist <i>Tina Marian</i>	3/19/2014
NI	Native American Religious Concerns	There are no known Native American concerns within the project area.	Don Irwin, District Archaeologist <i>Don Irwin</i>	3/18/2014
PI	Recreation	Recreational use such as camping, fishing and hunting could be disturbed during construction activities. Several popular dispersed campsites will no longer be available as the increased size of the dam will cover the sites. Other suitable sites for camping are located in the vicinity and dispersed camping will still be available in the area. The permitted Blue Mountain Scout Camp may be impacted during the construction of the project. Work should be scheduled to not occur during the month of June when the Scout Camp is operating. The enlarged reservoir and the conservation pool may enhance the recreational opportunities.	Brian Murdock, Recreation Program Manager <i>Brian Murdock</i>	3/5/14
NI	Socio-Economics	The enlarged reservoir and pipeline would provide additional water needed in the Blanding area and provide enhanced recreation.	Joel Nowak, Natural Resource Specialist <i>Joel Nowak</i>	3/6/14
PI	Soils	Soils would be disturbed by construction activity. Any soils planned for disturbance, need to have topsoil salvaged, stored, and protected for future reclamation. "Live haul" of salvaged topsoil may be used for any current reclamation of proposed disturbance, such as cut and fill slopes. Excess salvaged soils should be stored to maximize soil health vitality by maximizing surface area and minimizing soil storage depth, and by planting and establishing protective vegetation. All stored topsoil areas need to be protected and signed for long term storage. Depth of topsoil salvage needs to be verified by a natural resource specialist. Any compacted soils in staging areas and temporary roads need to be treated to alleviate compaction, and then re-vegetated using Manti-La Sal NF approved seed mix.	Robert Davidson, Soil Scientist <i>Robert Davidson</i>	4/3/14
PI	Rangeland Vegetation, USFWS Listed Plant Species and Sensitive Species	Construction activities could affect various vegetation types within the project area. There are no USFWS Listed Threatened or Endangered Species in the project area.	Tina Marian, Rangeland Management Specialist <i>Tina Marian</i>	3/17/14
NI	Visual Resources	The Manti-La Sal Forest Plan shows the location of the project is within the Visual Quality Objective of Partial Retention. The current dam and project dam are not visible from any highly sensitive locations and with the Forest requirement of design features minimizing the visual impact, the project will move towards this Visual Quality Objective. See Visual Design Features for additional recommendations.	Aulumn Ela, Visual Resources Specialist <i>Aulumn Ela</i>	3/5/14

Dry Wash Reservoir Expansion and Pipe Line

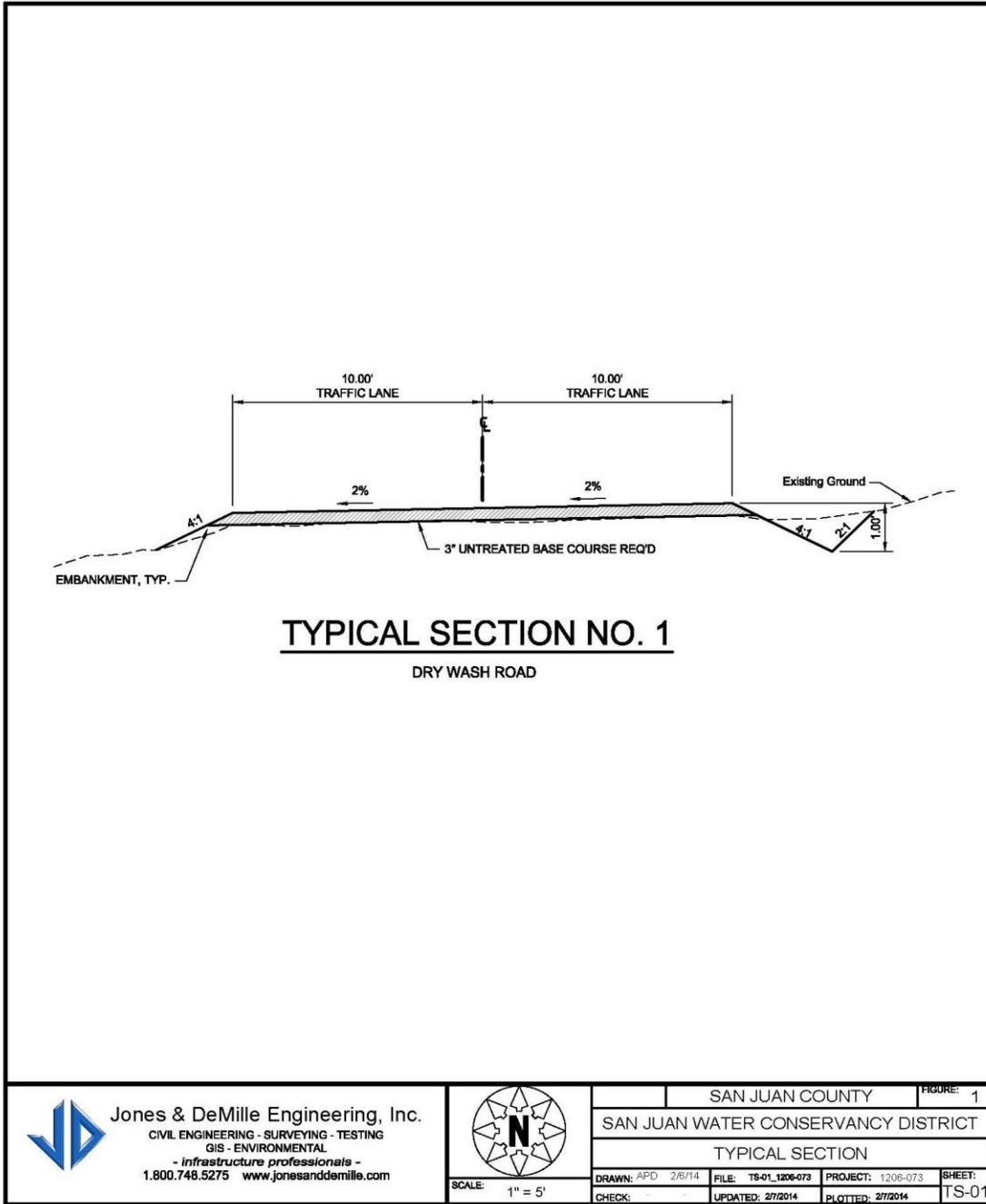
Determination*	Resource	Rationale for Determination	Name, Title and Signature	Date
PI	Water Resources, Floodplains, Wetlands, Municipal Watersheds, (drinking/surface/ground) and Riparian Zones	There are no riparian areas within the project area and one small wetland area. With the increase in water storage and additional design features, the wetland structure would be enhanced and its size may increase. Some of the water stored in the reservoir would be for Blanding City Culinary use.	Jan Curtis-Tollestrup, Hydrologist <i>Jan M. Curtis</i>	<i>Tollestrup</i> 4/3/14
NP	Wild and Scenic Rivers and Research Natural Areas	There are no designated wild and scenic rivers present, and there are no river segments found to be either eligible or suitable for potential wild and scenic river designation by Congress. The Cliff Dwellers Pasture Research Natural Area is approximately 3 miles west of the project area.	Brian Murdock, Recreation Program Manager <i>Brian Murdock</i>	3/5/14
NI	Wilderness/ National Recreation Areas	The Project will not occur within any wilderness or NRA. The Dark Canyon Wilderness Area is approximately 12 miles west of the project area. See the attached map.	Brian Murdock, Recreation Program Manager <i>Brian Murdock</i>	3/5/14
PI	Wildlife, Fish, USFWS Listed Species, Sensitive Species, and Migratory Birds	Wildlife species, including USFS sensitive species and migratory birds, would be temporarily displaced during construction activities, but are expected to return post-construction. There are no USFWS listed threatened or endangered species or designated critical habitat in the project area.	Barb Smith, Wildlife Biologist <i>Barb Smith</i>	3/4/14

Appendix C - Comment Analysis/Response to Comments

Comment	From	Date	Response
The Hopi Cultural Preservation Office considers the prehistoric archaeological sites of our ancestors to be Traditional Cultural Properties. To assist us in determining if this proposal may adversely affect cultural resources significant to the Hopi Tribe, please provide us with a copy of the cultural resources survey report of the area of potential effect for review and comment. If prehistoric sites are identified that may be adversely affected by project activities, we request continuing consultation, including to be provided with a copy of any proposed treatment plans for review and comment.	Hopi Tribe	July 29, 2013	Tribal Consultation and cultural resources are discussed on page 4 and 6 of the EA and in the ID Checklist in Appendix B. The Cultural Resource Inventory Report was sent to the State Historic Preservation Office; they concurred with the findings. The Forest is currently consulting with the Hopi and other tribes.
The Proposed Action is consistent with these policies in San Juan County's Master Plan and San Juan County fully supports this action.	San Juan County	Aug 5, 213	This is a general comment, position statement, or opinion.
This project is being processed under a brand new set of national rules and regulations promulgated in response to a rider on a Christmas eve omnibus appropriations bill. To the best of our knowledge, this is the first proposed action for which you are the responsible official that is to be processed under the new federal rule, which is said to be found at 36 CFR 218, 36 CFR 220 and corresponding FSM 1909.15, and the new 36 CFR 219 and FSM/FSH 1909.12 rules. To the best of our understanding the public is to be involved in the environmental analysis of proposed land management plans and actions.	UEC ¹	Aug 23, 2013	The public involvement process for this project is summarized on pages 4 and 22 of the EA.
If the proposed new facilities are within the footprint of existing roads, power lines, or other existing utility corridors, then UEC may not have concerns adverse to the project. If the proposed new facilities are not within the footprint of an existing road, power line or other existing utility then we cannot and must not support the proposed action.	UEC ¹	Aug 23, 2013	The proposed action is described in Chapter 2 of the EA, starting on page 7. Potential impacts from implementation of the proposed action are disclosed in Chapter 4, starting on page 12 of the EA.
If the installation of the proposed action's new development results in any degree of medium or long term potential effects (that are negative) to lake, wetland, potential Wilderness or TES species/habitats, then UEC cannot support the proposed action. If that turns out to be the event, then we would respectfully ask you please consider turning down the company's request.	UEC ¹	Aug 23, 2013	Resources potentially impacted are identified in Appendix B - Issues Checklist. Potential impacts from implementation of the proposed action are disclosed in Chapter 4, starting on page 12 of the EA.
We also have a concern that the purpose and need for the action is not outlined or developed, to date. Is the proposed action an action connected to new housing development on Forest Service land. Is the proposed action connected to housing or industrial development on downstream private land south of the USFS boundary? If the answer to either of these inquiries should trend toward yes, then UEC must object to the proposed action as presently described.	UEC ¹	Aug 23, 2013	The purpose and need for the project is addressed on page 2 of the EA.
I'm writing in behalf of the Dry Wash Reservoir, and pipe line. I am very much in favor of this project, as it will benefit the people of San Juan County, in water for farming, fishing, recreation, and help in fire control. Also the pipe line will help conserve the loss of water, in place of an open ditch.	Ferd Johnson	Aug 12, 2013	This is a general comment, position statement, or opinion.

¹ Utah Environmental Congress (UEC)

Appendix D - Road Cross Section



Appendix E - Forest Service Design Features

General:

- Stamped Engineered drawings of the dam and pipeline must be submitted and approved by the Forest before construction begins.
- The State must approve the design of the dam and construction plans before activities begin.
- The Standard Operating Procedures/Operation and Maintenance Plan will need to be reviewed and approved by the FS.
- The Forest must be notified 2 business days in advance of beginning ground disturbing operations.
- The Applicant will notify San Juan County before construction begins to determine if any road permits or bonding will be required.
- Changes and additions to the plans must be submitted to the authorized officer for approval before work may begin.
- Equipment is required to be maintained clean, operationally safe, and in good repair. All equipment will be thoroughly washed to remove accumulations of oil and grease, mud, soil, vegetative material and noxious weed seed prior to entering the forest. The permittee shall make equipment available for inspection by the responsible Forest officer prior to entering the Forest.
- Unstable areas identified by the Forest Service Project Administrator will need site-specific designs developed by San Juan Water Conservancy District and approved by the Forest before construction begins in these areas.
- San Juan Water Conservancy District or the contractor will need to coordinate with the County for construction on the county road. Any road closures will need to be coordinated with the FS well ahead of construction. Signs will be placed on each end of the road warning the public of construction activities ahead.
- Road work will be scheduled in such a way as to allow emergency personnel the ability to pass through as quickly as possible. Ideally, the old road will be left open while the new road is being constructed, so as to avoid delays.
- Schedule work to avoid opening day/weekends of the rifle/gun big game hunts. No construction activities will be conducted from noon on Friday until 6:00 a.m. on Monday during the hunts. Refer to Utah Division of Wildlife Resources for current hunting season dates.
- No construction activities will be during the Pecos conference held August 7-10.
- A paleontological survey will be conducted and all sites will be avoided or collected by a professional paleontologist before work begins in the area.

Wildlife:

- Project activities will be conducted in compliance with applicable requirements of the Endangered Species Act of 1973, as amended.
- There will be no construction activity during the seasonal restrictions (November 1 – May 14) set by the Forest in connection with wildlife and outside the normal operating season unless specifically authorized by the Forest Service.

Vegetation/Timber:

- A Noxious Weed/Exotic Plant Prevention and Control Plan will be attached to the special use permit and adhered to by the Permittee.
- Larger shrubs, trees, and other obstacles will be avoided where possible; no cutting or removal of large trees (greater than 8 inches in diameter) is allowed without prior approval by the authorized officer.

Erosion Control and Water Quality:

All applicable Soil and Water Conservation Practices (SWCP's) and Best Management Practices (BMP's) will be incorporated into the special use permit by reference. Some of these are:

- A Spill Prevention, Control and Containment (SPCC) plan will be prepared by the proponent and approved by the Forest Service before construction starts.
- The contractor shall conduct all activities to prevent soil erosion and sedimentation. Temporary erosion control measures may be required to prevent, control, and mitigate erosion and sedimentation. Temporary and permanent erosion control work must be kept current with ongoing operations, especially when construction occurs outside of the normal operating season.
- To reduce erosion and subsequent sedimentation from construction and staging areas, include proper drainage and dispersion of water including preventing any runoff from reaching the staging area and draining the area properly with necessary erosion control measures as required by the FS project administrator.
- Care will be taken to minimize disturbance to the wetland area. Any soil removed will be stockpiled carefully to minimize destruction of soil structure. The stockpile will be placed so as to not be disturbed until reclamation. Wetland activities will be conducted in conjunction with FS permit administrator.
- The reclaimed wetland area would be fenced to exclude livestock. The area to be fenced would be determined by the Forest Service after evaluating the size wetland area that was reclaimed. The fence will be of sufficient durability to minimize maintenance and be of materials that blend in with the Forest.
- Erosion control measures are applied prior to expected hydrologic events (spring runoff, high-intensity storms, etc.). Contractor must complete and maintain erosion control work as specified by the project administrator or in the special use permit.
- San Juan Water Conservancy District must provide maintenance of soil erosion control structures constructed by the contractor until they become stabilized for up to, but not for more than one year after their construction.
- Cease operations promptly during wet conditions that lead to four inch ruts on the pipeline corridor or outside the high water mark of the reservoir.
- Sections of steep slopes (greater than 40 percent slope) may exist along the pipeline corridor. An additional soil erosion plan needs to be developed by the proponent if these exist. The plan should include measures for capturing sediment so that it is not delivered into the drainage network during construction as well as methods for reclamation. The Forest Service would be responsible for approving this plan.

Recreation:

- The northern segment of the old county road will be left in place and a small turn-around/parking area at the south end will be constructed for public access. The turn-around/parking area will be designed by the permittee and approved by the Forest Service prior to construction.
- If determined appropriate for safety and to prevent off-road driving beyond constructed areas, barriers will be erected around the perimeter of the parking area and or on other roads surrounding the reservoir.
- Remove and reclaim the northern segment of the current county road both above and below high water mark to junction of the old county road.
- FSR 55225 will remain from the new county road to the junction of the old county road.
- FSR 55245 will remain from the old county road to the dam.
- The unnamed spur road from the old county road to the current water's edge will remain.
- The Forest Atlas and Motor Vehicle Use Map will be updated with all modifications approved with this project.

Cultural/Paleontological:

- The eligible sites identified during the archaeological survey will be avoided via installation of a construction fence or other FS approved method. No activities will be allowed beyond the fence. The contractor must contact the Forest Service Project Administrator to identify the site location before construction activities begin. If cultural or paleontological resources are found during implementation of the project, operations will immediately cease at that location and the District Ranger will be notified. Unauthorized excavation, removal, or damage of archaeological resources is subject to fines and other penalties under authority of the Archaeological Resources Protection Act (ARPA) of 1979 (as amended).
- A paleontological survey will be conducted and all sites will be avoided or collected by a professional paleontologist before work begins in the area.

Soils:

- The contractor will designate the location, size, and use of service refueling areas for the approval of the agency project administrator. Refueling areas will be a minimum of 200 feet from perennial and intermittent stream channels, seeps and springs, wetlands, lakes, and reservoirs, stock water developments, and other water features. All heavy equipment and service vehicles will have a supply of absorbent and other cleanup materials on hand for initial containment of spills.
- The contractor will adhere to the Hazardous Substance Spill Plan in case of accidents.
- The normal operating season on National Forest land in this area is from May 15th to October 30th. Construction and other activities outside the normal operating season require approval from the District Ranger.
- Surface soils will be salvaged to a minimum depth of 6 inches. If topsoil depths are greater than 6 inches, the entire depth will be salvaged, stockpiled, and protected from erosion or other damages during operations.
- All disturbed areas will be seeded with seed mixtures or suitable replacement developed for the project. The seed will be certified weed and noxious weed free. The proponent will have an independent test of seed purity, germination, and weed content prior to seed application. Seed all

- disturbed soils within 6 working days of final grading, weather and soil conditions permitting. If the soil surface is crusted, take appropriate measure to break up the crusted areas prior to seeding.
- Mulch will be applied on areas with highly erodible or droughty soils, slopes greater than 40 percent, visually sensitive areas, 100' on both sides of water bodies, and other areas as specified by the agency project administrator.
 - Material should be windrowed on contour. Little to no soil should be incorporated in the piles. Stockpiled material will be randomly scattered over areas of soil disturbance with preference given to those areas where topsoil was replaced.
 - All herbicide and pesticide use/plans will be submitted to the FS and approved before use.

Visuals:

- The top 1/3 upslope face of the dam will incorporate a dark, non-reflective rip rap color to minimize visual impact.
- As much vegetation as possible will be kept around the dam/reservoir to shield man-made facilities and break up lines.
- Groin lines and other straight lines will be feathered or varied where possible.
- Any concrete associated with the dam or spillway will be stained or colored to match the surrounding landscape where practicable.

Fire Protection:

- The Permit Holder is responsible to follow Forest and State mandated fire restrictions. The Forest Service reserves the right to suspend operations during periods of high fire potential.

Reclamation:

- Reclamation will occur within 90 days of project completion if weather and soil moisture conditions are suitable.
- Salvaged topsoil will be spread over areas from which the topsoil was stripped. The surface should be left rough/pitted (with surface variations of 6-12 inches) to limit rilling and to provide for water retention to enhance seed germination. Topsoil will not be spread when the ground or topsoil is frozen, wet, or powdery. Mulching or other soil amendments may be required for application on steep slopes, south facing slopes or other areas identified by the agency project administrator.
- Reclamation of temporary roads used to access the pipeline or reservoir would depend on the amount of use the road received during construction and reclamation. If the vegetation currently present on the road bed appears to retain the ability to recover, ripping and/or seeding would not be necessary. If the vegetation is beyond recovery and compaction of the road bed has occurred, then the following would be necessary:
 - Re-grading any cuts and fills to re-establish the original ground contours and drainages.
 - Ripping the roads to a depth of 12 to 18 inches.
 - Placing 6 inches of loose topsoil in locations where topsoil was removed (if applicable).
 - Seeding the soil with a Forest Service approved seed mix.
- Staging areas and pipeline right-of-way will be de-compacted and re-vegetated. This includes taking appropriate measures to establish an adequate cover of grass or other vegetation acceptable

to the Forest Service if the soil has been severely disturbed by the Proponents operations and establishment of vegetation is needed to minimize erosion. Fencing out livestock may be necessary to ensure successful re-vegetation.

- The proponent will seed the entire disturbed area with a Forest approved seed mix (See below). The seed mixture must meet or exceed the pure live seed standards containing a maximum allowable weed content of less than 2 percent with no noxious weed species. Independent seed analysis is required on seeds to determine other undesirable weed species. The Permittee is responsible for eradication of presently known noxious weeds or exotic plants and eradication of presently unknown noxious weeds and exotic plants that enter any disturbed areas.
- All drainages (including intermittent and ephemeral in flow) crossed by the pipeline need to be returned to pre-project morphology (channel width/depth/sinuosity) and plant compositions at the end of the project.
- Toe slopes of steep hillslopes along the corridor need to be stabilized according to specifications given by the agency project administrator.
- Post reclamation success would be gaged by seventy percent (70%) vegetation and crown cover over the entire disturbed area and 60% ground cover (vegetation, rock, litter). The site will be monitored for 3 years and will be reseeded as necessary.

Forest Service Approved Seed Mix¹

		<u>lbs PLS/acre</u>
Indian ricegrass- Rimrock	<i>(Achnatherum hymenoides)</i>	3
Western wheatgrass	<i>(Pascopyrum smithii)</i>	5
Thickspike wheatgrass	<i>(Elymus lanceolatus)</i>	5
Muttongrass	<i>(Poa fendleriana)</i>	3
Mountain brome	<i>(Bromus carinatus)</i>	3
Lewis flax	<i>(Linum perenne lewisii)</i>	1

¹Species may be substituted with other available species with prior approval from the Forest Service project Administrator.

Appendix F - Standard Operating Procedures

Dry Wash Dam
UT00094
Standard Operating Procedures



Operated By: Blanding Irrigation Company

Issued: March 4, 2014

Revised: _____

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Project Data

Dam Name: Dry Wash Dam
Owner Name: Blanding Irrigation Company
Creek / River: Dry Wash / Johnson Creek
Dam Type: Earthen Dam

Location Approximately 10 miles north of Blanding Utah.

Section: 31 Township: 4 South Range: 22 East

Directions to the Dam

The dam is located approximately 10 miles north of the town of Blanding in San Juan County Utah. Head north on 100 East Street in Blanding Utah. After the 800 North Street intersection the road becomes North Blue Mountain Road. Continue to follow North Blue Mountain Road north for approximately 7.4 miles where it will change from a paved road to a dirt road and become Johnson Creek Road. Follow Johnson Creek road for approximately 3.6 miles and you will arrive at Dry Wash Reservoir.

Primary Dam

Height: 52' Crest Length: 1685' Crest Width: 15'

Downstream Hazard Classification: Moderate Hazard

Number of Homes in Primary Dam break floodplain: 0

Flows from the dam caused by flooding will flow into Johnson's Creek and into Recapture Reservoir.

Individual Responsibilities

Operation:

Name: Title: Telephone:

Maintenance:

Name: Title: Telephone:

Inspections:

Name: Title: Telephone:

Monitoring of Instrumentation:

Name: Title: Telephone:

There are no telephones or other communication devices located at the dam. Use the Emergency Action Plan (EAP) developed for Dry Wash Reservoir during emergency situations.

Project Purpose

The Standard Operating Procedures for Dry Wash Reservoir were prepared in order to provide detailed instructions for the observation, operation, and maintenance of Dry Wash Reservoir. The information contained herein will assist operating personal to perform the required duties associated with the dam and reservoir. An Emergency Action Plan has also been developed for Dry Wash Reservoir and is to be used in concurrence with this document to outline the protocol during standard operation as well as during emergency situations.

The Blanding Irrigation Company owns and operates Dry Wash Reservoir. Dry Wash Reservoir falls under Water Right number 09-125 obtained in 1947. The San Juan Water Conservancy District (WCD) filed an application to increase the water in the reservoir and raise the dam crest elevation to allow for more irrigation storage capacity for the Blanding Irrigation Company.

The Reservoir expansion will also increase public recreation opportunities, enhance aquatic habitat, provide additional water storage for wildfire suppression to protect nearby resources from frequent wildfires, and provide a conservation pool to enhance the fishery and provide a readily available water supply for emergency needs. Irrigation patterns will not be altered once the expansion of the reservoir is completed.

A 12" diameter pipeline will be placed downstream of the reservoir. It will run from the dam outlet to the existing Blue Mountain Irrigation pipeline located approximately 1 mile southeast of the reservoir.

DRAFT

DRAFT

Initial Filling

Filling Rate

The source of inflow into Dry Wash Reservoir is a manmade earthen ditch that diverts spring and runoff water from the upper reaches of the Dry Wash watershed to the reservoir. Inflows into the reservoir vary significantly throughout the year and are typically around 1 cfs.

Once the reservoir has exceeded half the hydraulic height (elev. = 7712.5'), the maximum allowable fill rate is not to exceed 1' per day. The inflow into reservoir when the reservoir has reached an elevation of 7712.5' cannot exceed 4 cfs during the initial filling. Although the Irrigation Company's water right (09-125) allows for up to 10 cfs to be diverted into the reservoir from Dry Wash, the initial filling inflow must not exceed 4 cfs. If the inflow of the reservoir is higher than this value, Dam Safety is to be notified immediately.

The graph below shows the anticipated 1 cfs inflow into the reservoir as well as the maximum allowable inflow of 4 cfs.

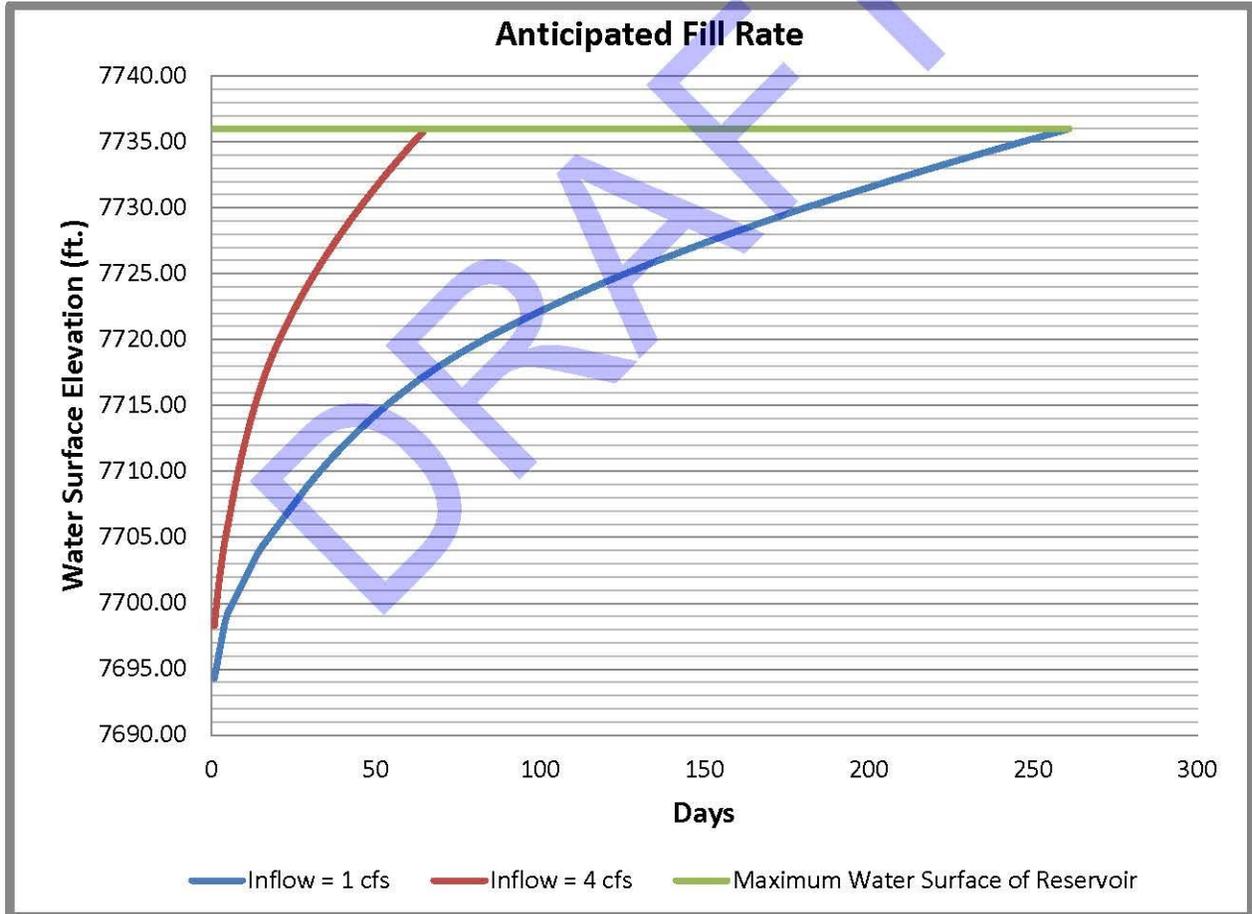


Figure 1 - Anticipated Fill Rate Curve

Inspection and Observation

Refer to the Operation & Maintenance section of this plan for specific details on inspection and maintenance requirements. Record Keeping will be handled by: _____.

Any unexpected or inconsistent readings are to be reported to the Owner and Engineer in a timely manner to determine if any corrective measures are to be taken. Refer to the Dry Wash Reservoir Emergency Action Plan when determining the next course of action.

All project structures are to be inspected and observed during the Initial Filling in order to assure proper function. Forms to be used during inspections and maintenance are located at the back of this plan. Owner and Engineer are to be contacted in the event a project feature or structure fails to perform as designed. Mitigation efforts or work are to be evaluated and provided if necessary.

Daily Inspection & Observation

- | | |
|-------------------------------------|--|
| 1. Check Piezometers | 4. Check spillway outflow channel for debris |
| 2. Record water surface elevation | 5. Record pertinent information in Operating Log |
| 3. Check and record toe drain flows | 6. Make required changes in gates and valves |

Weekly Inspection

- | | |
|--|---|
| 1. Check condition of:
a. Crest of dam
b. Upstream and downstream faces
c. Visible portions of foundation
d. Abutment contacts
e. Galleries
f. Spillway stilling basin
g. Outlet works stilling basin
h. Critical landslide areas
i. Reservoir area | 4. Check for debris in inlet channel
5. Check operation of gates |
|--|---|

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Operation & Maintenance

Hydraulic Elements Controlling Inflow/Outflow for Reservoir

Dam

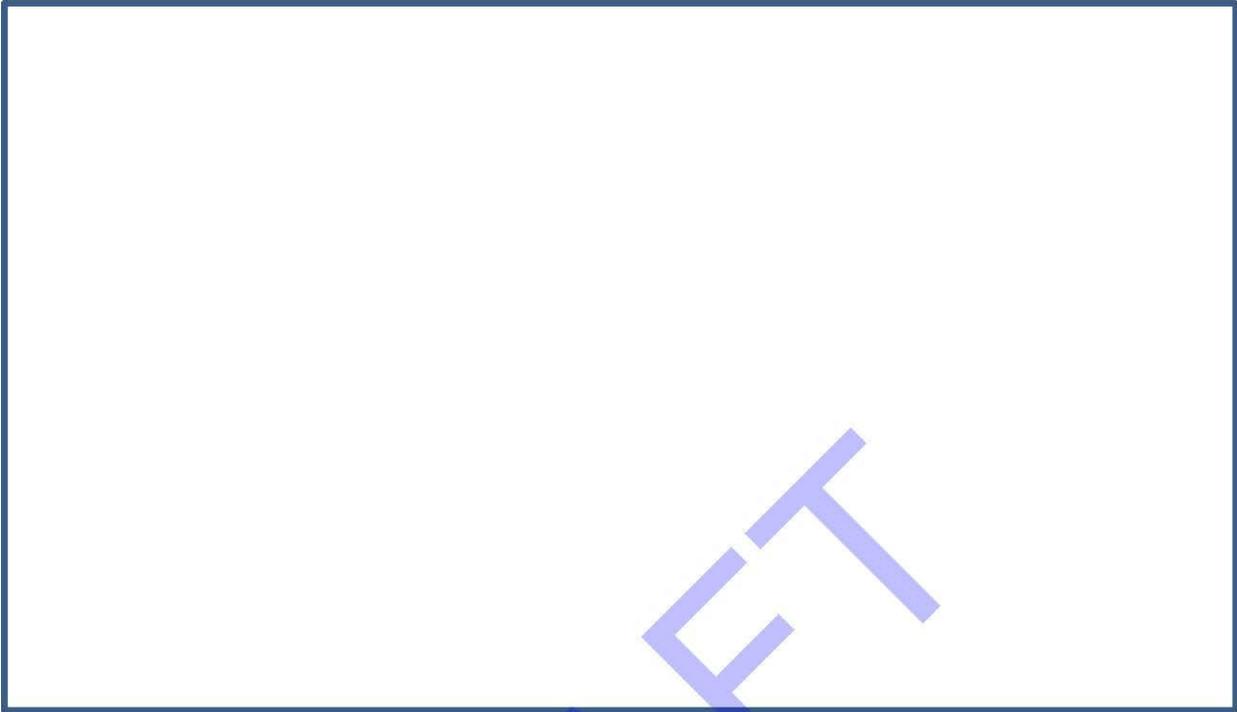
Outlet Head Gate Control Structures – Located on top of Primary Dam Crest



The outlet works are located at the south end of the reservoir at approximately station 18+75. There are two intake structures associated with the dam. Both structures flow into the same outlet conduit for the dam. The intakes are located on the upstream face of the dam. Intake Structure #1 is located at the base of the dam at an elevation of 7689'. Intake Structure #2 is located higher on the upstream face of the dam at an elevation of 7715'. Intake Structure #1 will be used to drain the reservoir if needed for an emergency or maintenance and repairs. Intake Structure #2 will be used by the Irrigation Company in order to always maintain the 100 acre-foot conservation pool required in the reservoir at all times. Water will flow through this structure and run parallel to the dam face until it connects to the outlet conduit next to Intake Structure #1. The flow will then be directed through the dam to the discharge outlet.

The head gate control structures for the Intake Structures are located on the dam crest within two concrete blocks. Fresno 4200 gate valves are located at the intake structures to regulate flow through the outlet conduit. Rotating the hand cranks for the valves counter clockwise will open the gates and clockwise will close the gates. The outlet conduit is 24" Class 350 D.I. Pipe. The outlet conduit has a T-connection with a 24" connection and 12" connection. The 24" connection has a butterfly valve on it and regulates the flow into a riprap plunge pool and then into Dry Wash which will then flow to the confluence with Johnson Creek approximately 1 mile southeast of the reservoir. The 12" connection also has a butterfly valve on it and will direct flow into a 12" diameter pipeline which will then connect with the existing Blue Mountain Irrigation pipeline located approximately 1 mile southeast of the reservoir.

Emergency Overflow Spillway



The emergency overflow spillway for Dry Wash reservoir is located on the northeast side of the reservoir just north of the proposed dam. It is a rectangular channel that is 8' wide and 5' deep with a 2' deep concrete cutoff wall located at the bottom of the channel which extends to 7' deep on the sides of the channel. It is protected by both the cutoff wall and riprap bank armor placed on both sides of the cutoff wall. The spillway elevation is 7736'. Water flowing through the emergency spillway will flow to the east through a channel 8' wide with 2:1 side slopes for approximately 180'. The channel will then release the water to the native hillside which slopes to the south around the reservoir and will merge back with Dry Wash southeast of the reservoir outlet. The water will then flow to the confluence with Johnson's Creek.

Reservoir Operation

The source of inflow into Dry Wash Reservoir is a manmade earthen ditch that diverts spring and runoff water from the upper reaches of the Dry Wash watershed to the reservoir. Typically inflows through this channel into the reservoir are around 1 cfs throughout the year.

Irrigation patterns will not be altered once the reservoir is constructed, except that the additional water storage can allow for additional acres to be cultivated. Non-irrigation months will be used to recharge the reservoir from drawdown that occurs during irrigation season.

The reservoir will be operated to maintain the maximum amount of storage in the reservoir of 518 acre-feet at all times, to the extent possible given available water, and only consistent with safe operation. During times of drawdown, the conservation pool of 100 acre-feet will be maintained within the reservoir. The maximum water surface elevation is 7736'.

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Items Requiring Periodic Maintenance or Inspection

Annual inspections of the dam to be performed by Owner. Any deficiencies found during inspection are to be repaired or replaced.

Record Keeping will be handled by: _____.

Weekly

1. Check Piezometers and drain flows (See Special Instructions on Page 13.)	4. Make required changes in gates and valves
2. Record water surface elevation	5. Check spillway outlet channel for debris
3. Check and record toe drain flows	6. Record pertinent information in Operating Log

Monthly

1. Check condition of: <ul style="list-style-type: none"> a. Crest of dam b. Upstream and downstream faces c. Visible portions of foundation d. Abutment contacts e. Galleries f. Spillway and stilling basin g. Outlet works stilling basin h. Critical landslide areas i. Reservoir area 	3. Check Piezometers and drain flows
2. Grease outlet head gate	4. Check signs that warn public of hazards: <ul style="list-style-type: none"> a. Near trash rack of intake structure b. Outlet works stilling basin c. At outlet head gate control structure
	5. Check for debris in inlet channel
	6. Check operation of gates
	7. Check fence condition.
	8. Exercise gates and valves
	9. Seepage
	10. Outlet and 12" Pipeline

Annually

1. Check condition of outlet conduit	4. Review the SOP / EAP
2. Vegetation Control	5. Examine intake structure, upstream face and stilling basin which normally are under water
3. Repair Erosion on Crest and dam faces	6. Review inundation areas shown in the EAP and identify any residences or structures. Update notification lists as applicable
4. Check condition of riprap along upstream face of dam, spillway, and outlet conduit	

Monuments have been installed on the dam at 200' intervals. These monuments are to be surveyed 1 year following construction and then every 5 years to monitor settlement. Please see Construction Drawings for locations of Monuments and Control Points to be used when surveying.

Special Instructions

The inspection forms at the end of this document are to be complete during each inspection and given to the personnel in charge of Record Keeping as specified on the previous page. Inspections are to be submitted to the State Engineer's Office, dam Safety Section for review.

Drains & Piezometers

Drains should be maintained open, this may require occasional cleaning. *Piezometers* should be equipped with a surface casing and locking lid to protect them from vandalism. They are to be checked monthly when the reservoir exceeds 50% of the hydraulic height and then weekly when the reservoir exceeds 90% of the hydraulic height. Readings are to be reported to the State Engineer's Office, Dam Safety Section.

Seepage Monitoring

Seepage monitoring can be performed at a 4' diameter manhole located at the toe of the dam near the discharge of the outlet conduit. The drainage system for the dam consists of a chimney drain from the dam crest intersects with 8" slotted PVC pipe that flows to the low point near the toe of the dam. The drainage pipes connect with the 4' diameter manhole. The flows through the drainage system should be monitored for increases in flow and sediment flow. Seepage flow rates should be reported to the State Engineer's Office, Dam Safety Section.

Inspections

During the inspections of the dam and reservoir, any deficiencies found are to be replaced or repaired immediately. Examples of deficiencies are: cracks, slides, sinkholes, sand boils, slope erosion, subsidence, springs or boggy areas in the embankment. They also include repairing any animal burrows, removal of debris from spillway, stilling basin, or outlet channel. Riprap or concrete in the spillway, outlet works, or upstream slope need to be repaired, they are to be repaired immediately. Areas where the outlet pipeline is located should be checked to verify that the pipeline is functioning properly.

Areas used as access to the dam are to be inspected to verify the dam is free of damage or vandalism caused by public access. The locks for the gate hoists are to be checked during inspections to ensure they are functioning as planned.

Any unusual conditions found during inspections are to be reported to the State Engineer's Office, Dam Safety Section.

Vegetation Control

All types of woody, deep-rooted vegetation and brush growing on dam embankments or in the spillway are considered a problem and should be controlled. Some of the problems associated with excessive vegetation growth on the dam are:

- Heavy vegetation obstructs the view of the dam inspector and obscures any cracking, seepage and other surficial indications of a problem with the dam.

- After trees and brush die, the root systems can decay, leaving behind a tunnel through which water can pass (piping).
- Large trees blown over during windstorms can have their root systems uprooted, leaving behind a large hole in the embankment that could lead to breaching.
- Vegetation on the embankment provides habitat for burrowing animals, whose presence further endangers the dam.

Taking early action to remove vegetation before it becomes established is a critical part of dam maintenance.

Common types of vegetation detrimental to dams are willows, salt cedar (tamarisk), Russian olives, cottonwoods, sagebrush, aspens, poplars, pine, spruce, fir, and juniper.

Evergreen species are the easiest to eradicate since most of them die when cut and do not regenerate from roots. Deciduous trees are generally more difficult to control because many are capable of reproducing from roots and do not die from cutting. Some form of poisoning is an integral part of a program to control this type of vegetation.

As a general statement for all trees whether evergreen or deciduous, killing trees over about 6 feet tall on the dam must also be accompanied by excavating the roots and recompacting clean fill material into the excavation. This should be done in a radius extending from the trunk equal to the height of the tree or until the laterally extending roots are less than about a half inch in diameter.

POLICY - Only grasses which do not obscure observation of the embankment should be allowed to grow on the dam itself (contact your county agricultural agent for information on appropriate grasses for your area). All brush and trees should be prevented from growing: 1) on the dam itself and within 50 feet of the dam for deciduous trees and 25 feet for evergreens, 2) in the spillway and within 50 feet of the spillway for deciduous trees and 25 feet for evergreens, 3) near the spillway or outlet channels such that flow through those structures is reduced or water backs up on the embankment.

Herbicide Application

Several formulations of herbicides suitable for tree and brush control are available. They can be foliar applied or soil applied and consists of liquid spray solutions, granules;

Foliar Applications – consist of spraying the chemical directly onto the target plant, especially the leaves. It is necessary to thoroughly cover all above ground vegetation on the plant to the point of runoff. Foliar applications need to be made in the late spring or early summer when plants are actively growing and new growth is young and succulent. In many plants, the heat of summer causes the tree to develop a waxy layer on the leaves which inhibits absorption of foliar applied herbicides into the plant. Also, the tree may become coated with dust as the

summer progresses. Both of these factors reduce the effectiveness of foliar applied herbicides. Many foliar herbicides are neutralized in the soil.

Soil treatment - consists of applying the herbicide directly to the soil around the target plant. These treatments are intended to be moved into the soil by precipitation and can remain active for several years. If significant quantities of low lying vegetation exist around the target plant, it may be necessary to remove that vegetation and perhaps scarify the soil to obtain acceptable results. Time of year of these applications is not as critical as with foliar sprays since the herbicide is taken into the plant through the roots. However, do not apply soil treatments to frozen ground. These chemicals are often restricted from use where they may come into contact with irrigation waters, and all precautions and instructions on the labels of herbicides should be followed. They should not be used around the upstream side of the dam nor areas where surface water could move the chemical into conveyance structures.

Frill Method – consists of making cuts at a convenient height in a circle completely around a tree with downward axe strokes. These cuts should extend well into the sapwood and the sapwood be continuously exposed around the tree. The frilled area is then saturated with herbicide.

Notch or cup method – consists of forming one or more notches or cups on the tree with two downward axe cuts, one above the other, and prying out the chips. Notches should be at the base of the tree as near the ground as possible and on the main roots if any show. Two notches are recommended for trees up to 6 inches in diameter, and notches spaced every 10 to 16 inches around larger trees are recommended. Again, the herbicide is applied into the notched areas.

Cut stump method – consists of cutting the tree and spraying or painting herbicide onto the remaining stump. Best results are obtained by treating the stump immediately following cutting. Care should be taken to ensure thorough coverage of the area just inside of the bark of the tree.

Herbicide Selection

Translocated herbicides (herbicides which are moved from the place of application to other parts of the plant e.g., moved from the leaves to the roots.) are the main type which are useful for control of vegetation detrimental to dams. These herbicides should be applied when the vegetation is growing and is not dormant. One commonly used herbicide which is not translocated is glyphosate (trade name Roundup). It is not recommended for the uses described herein; particularly, it is not effective in trunk or stump treatments. Translocated foliar sprays which are applied to the leaves (foliage) of plants destroy the plant by being translocated or moved by the plant into its roots. Only plants which are contacted by the chemical are affected. Foliar sprays are normally neutralized in the soil. Soil treatments are applied to the ground rather than directly to the vegetation. They remain active in the soil where they kill plant roots. A single treatment of soil sterilant can remain effective for several years. Choice of a specific herbicide will normally be dictated by where it is to be applied and the proximity of the area to irrigation water rather than the type of vegetation targeted. Extra care needs to be taken in selecting a herbicide for application to vegetation on the upstream side of the dam since some herbicides may contaminate the irrigation supply and result in damage to crops. A complete and thorough discussion of herbicides and laws controlling their use is beyond the scope of this publication and the reader is referred to the following publications:

UTAH WEED CONTROL HANDBOOK 1989
Compiled by Steven A. Dewey
Utah State University
Available through any county extension office

Herbicide Manual
By Gary W. Hansen, Floyd E. Oliver, N.E. Otto
U.S. Department of the Interior
Bureau of Reclamation

Applying Pesticides Correctly
A Guide for Private and Commercial Applicators
U.S. Department of Agriculture
U.S. Department of Environmental Protection
Distributed by the Utah Department of Agriculture

Willows do not have a large taproot although sinker roots on large trees can be 6 to 8 feet deep. These trees are commonly found around water and reproduce from roots, seeds or from cuttings. Application of a foliar herbicide, such as 2-4-D, will kill young willows if properly applied. Repeat applications are normally required because 2-4-D does not affect the seeds. A soil sterilant, such as tebuthiuron (available from Elanco as SPIKE), is probably the easiest way to control willows, especially large ones. However, it may only be used on areas of the dam where the chemical will not be washed into irrigation waters. Always carefully read and follow the instructions on the labels of these chemicals. Small, brushy willows have shallow, spreading

roots which should not require excavation to repair their damage. Large willows will require extensive excavation to successfully remove spreading roots. For this reason it is imperative that willows be controlled while they are small.

Saltcedar (tamarisk) trees are becoming more of a problem on Utah dams. One of the best and easiest to control saltcedar is the cut stump application. The tree is first cut and the stump is then sprayed or painted with the herbicide picloram plus 2-4-D (available from Dow Chemical as Tordon RTU). It is essential that the entire cut stump surface be coated with the herbicide, especially the area next to the bark. Application of the herbicide should be done immediately following cutting of the tree. A good kill should be obtained using this procedure. Young, new growth of saltcedar can be handled by applying a foliar spray such as imazapyr (available from American Cyanamid as Arsenal). Foliar applications of 2-4-D are not effective on saltcedar.

Russian olive trees have a shallow root system spreading laterally some 3 to 4 feet or more beyond their limb width. Applications of 2-4-D as a foliar spray is not effective. However, the cut stump treatment recommended for saltcedar above or a notch method using a translocated herbicide should be effective. Soil sterilant treatments should also work well to control Russian olives. If controlled when they are young, roots of Russian olives do not need to be excavated. If they are allowed to reach a height of 6 feet or more, roots need to be excavated and soil recompacted in the excavation.

Cottonwoods do not have a taproot but do have sinker roots which grow downward from a lateral root and may be 3 or 4 feet in depth. Lateral roots can extend 150 feet or more from the tree. These trees are very sensitive to water drawdown and can be a significant deadfall problem at reservoirs which have them growing around the edge of the water. Because of their extreme lateral root growth, clearance zones around dams should be increased for cottonwoods. Cutting small cottonwoods will probably cause sprouting of new growth from roots, and herbicide treatments need to be incorporated into small cottonwood removal. Cutting of large cottonwoods should also be accompanied with painting the stump as recommended under saltcedar.

Aspen trees also do not have a taproot, and reproduce by root suckers or seeds. Any of the methods described above should effectively kill aspens. Simply cutting the offending trees will result in additional new growth from root suckers, making herbicidal treatment a necessity. Roots from all but the smallest aspens should be removed from the embankment.

Pine and Spruce trees have extremely shallow root systems. The width of the lateral radial spread of the roots can be equal to the height of the tree and more. Pines do have taproots which may reach 10 feet deep for large trees. Usually, with the exception of firs, simply cutting these evergreens is all that is required for control. Firs may re-sprout after cutting and their stumps should be poisoned. For assistance in selecting and implementing a vegetation control program, we recommend that the local Utah State University County Extension Agent be contacted. Each county (except Daggett) has a local extension agent and a county weed supervisor who can assist or advise you in herbicide application programs.

Burrowing Animal Control

The information on rodents used in this guidebook has been taken from *Field Rodent Damage Control Booklet* by Ray H. Piggot and Donald W. Hawthorne, developed by the U.S. Fish and Wildlife Service cooperating with the Utah State Department of Agriculture. Some of the typical burrowing animals which damage dams in Utah are squirrels, prairie dogs, rock chucks, badgers, beavers, and muskrats. Proper maintenance of embankment dams require that these animals be prevented from burrowing on the dam and that they be eradicated if they are present on a dam. Repair of rodent damages will be discussed in this section.

Control of Ground Squirrels can be accomplished by using strychnine-treated oats at 0.50% concentration. This bait should be scattered thinly in teaspoonful quantities near the burrow openings or in areas where feeding is evident. Do not place the bait inside the burrows. Thorough, systematic coverage will produce the best results. A pre-bait appetizer of clean oats may help gain bait acceptance. Treatment should be done just after the animals become active after coming out of hibernation.

Small burrowers can attract badgers which dig for them and create very large holes in dams. Under R608-11-3 General Rules, Section (J) Depredation, Utah Proclamation of the Wildlife Board for Taking, Possessing, Selling, Purchasing, and Disposing of Furbearers, 1989-90, it is stated, "Badgers...may be taken without a license when creating a nuisance or causing damage and these animals or parts of them are not being commercialized." Badgers can be shot under this depredation exemption. Employment of a professional trapper may be the best way to rid a site of badgers. It is recommended that dam owners having problems with badgers contact the Utah State Division of Wildlife Resources office or conservation officer nearest them.

Beaver may also pose problems on dams and water conveyance structures. As discussed above for badgers, the Proclamation for Furbearers regulates taking beaver. Also in Section (J) Depredation, it states, "Beaver doing damage may be taken or removed by an individual during closed seasons. A "Beaver Nuisance Permit" to remove damaging beaver must first be obtained from Division offices or conservation officers." If beaver are a problem, the Division of Wildlife Resources should be contacted for a permit and assistance.

Rock chucks (marmots) can also damage dams. No toxic chemicals are registered for use on rock chucks. Shooting can provide some control. If the den can be located, gas cartridges can be used. This is done by lighting the cartridge, placing it inside the den opening, and sealing the opening. The acrid gas released by the cartridge then displaces the air inside the burrow. A professional trapper may also be the best solution to deal with rock chucks.

Muskrat can also be a particularly troublesome problem for dam owners since the only viable means of removing them is to trap them. Muskrats can be seen swimming in the reservoir but are seldom seen on land. Employing a professional trapper is also recommended to rid a reservoir of muskrat.

The Utah Division of Wildlife Resources, Proclamation of the Wildlife Board for Nongame Mammals sets forth rules governing certain nongame mammals. Among these is the Utah Prairie Dog which is a protected species in Beaver, Garfield, Iron, Kane, Piute, Sevier, and

Wayne Counties. On sites in these counties where the prairie dog is present, assistance from the Division of Wildlife Resources should be requested to remove the offending animals. A certificate of registration from DWR must first be obtained before taking action against the prairie dog.

Repair of Damage

Repair of rodent burrows on dams should be made by digging out the holes and recompacting clean fill into the excavation. This work can usually be done by hand.

Pesticide Licensing

The Utah State Department of Agriculture licenses and regulates pesticide applications. Individuals desiring to use pesticides on their own private property can do so by obtaining a private applicator's license from the Department of Agriculture. Irrigation companies should have an individual in the company obtain a noncommercial applicator's license for using rodenticides on irrigation company facilities. Both of these licenses can be obtained from the Department of Agriculture at various local offices around the state.

Other Embankment Maintenance

Deterioration of the surfaces of an earth dam may occur for several reasons. For example, wave action may cut into the upstream slope, vehicles may cause ruts in the crest or slopes, or runoff waters may leave erosion gullies on the downstream slope. Damage of this nature must be repaired on a continuing basis. The maintenance procedures described below are effective in repairing minor earthwork problems.

The material selected for repairing embankments depends upon the purpose of the earthwork. Generally, earth should be free from vegetation, organic materials, trash, or large rock. Most of the earth should be fine-grained soils or earth clods which easily break down when worked with compaction equipment. The intent is to use material which, when compacted, forms a firm, solid mass, free from excessive voids.

If flow-resistant portions of an embankment are being repaired, materials which are high in clay or silt content should be used. If the area is to be free draining or highly permeable (i.e., riprap bedding, etc.) the material should have a higher percentage of sand and gravel. As a general rule, it is usually satisfactory to replace or repair damaged areas with soils similar to those originally in place.

Crest of Dam

A dam's crest usually provides the primary access for inspection and maintenance. Because surface water will pond on a crest unless that surface is well maintained, this part of a dam usually requires periodic regarding. However, problems found on the crest should not be simply graded over or covered up. When a questionable condition is found, the state's dam safety engineers should be notified immediately.

Surface runoff – should be directed toward the upstream face of the dam by having the crest graded toward the reservoir. Any ruts caused by vehicular traffic on the crest of the dam should be repaired as soon as possible.

Settlement – of the embankment or foundation can result in a low area in the dam crest and loss of freeboard necessary to pass flood flows safely through the spillway. The dam crest should be surveyed when low spots are noticed and then assessed by an engineer. Action should be taken to correct the problem and re-establish a uniform crest.

Slopes of the Dam

Livestock Access – to the dam embankment should be controlled by proper fencing. Overgrazing of protective grass on the slopes of the dam can cause damage by increasing erosion.

Slope Protection – must prevent soil from being removed from the embankment. The slopes of the dam must be inspected and routine maintenance provided to assure soils are not transported away from the site. Riprap must be replaced anytime finer bedding material is exposed.

Outlet Maintenance

A dam's inlet and outlet works are essential to the operation of the dam. The low level outlet must always be operable so that the pool level can be drawn down in case of an emergency or for repairs. Outlet controls must be accessible during periods when the reservoir is spilling. All valves and gates should be operated at least once per year. Exercising the gate involves slowly opening the valve, checking for noise and vibration. Noises which sound like gravel being rapidly transported through the system could indicate cavitation.

All valves should be fully opened and then closed at least once per year. This limits corrosion buildup on the control stems and gate guides, and also provides an opportunity to check for smooth operation of the system.

Inspecting the outlet system should be done by entering all accessible portions of the structure including the conduit if it is large enough. While inside the conduit it should be tapped with a hammer to help locate possible voids behind the pipe. All joints, connections and vents should be checked for leakage, offsets or damage. Any material obstructing the conduit should be removed. If the conduit is too small to be entered by the person performing the inspection, video inspection by a remote video camera should be performed. If possible, the entire length of the conduit should be inspected for any obvious holes, cavitation damage, or alignment problems.

Spillway Maintenance

The spillway should be inspected for defects which may cause failure by erosion or underlying soils. This means that the spillway should be clear of obstructions and have the ability to resist erosion.

Obstructions

Obstructions of a spillway may result from excessive grass growth, weeds, brush trees, or debris and landslide deposits. Any of these obstructions can reduce the capacity of the spillway and lead to overtopping of the dam. Only low lying grasses should be permitted to grow in the spillway and all of other obstructions should be removed. The riprap in the spillway should be

checked for erosion problems which may cause the underlying material to become exposed. Replacement riprap may need to be placed within the spillway. For this spillway the minimum D_{50} size is 9”.

Reservoir Basin

Floating debris have the potential to obstruct or damage spillways and outlets and should be removed from the reservoir basin and dam embankment as part of the routine maintenance.

Landslides entering the reservoir basin greatly contribute to the sediment load and may drastically shorten the useful life of a reservoir. Sediment buildup in the reservoir is usually due to destabilization of upstream drainages. Dredging of the reservoir would forestall the loss of capacity but removing the sediment source would be much more effective. During periods of low capacity, the reservoir should be checked for sediment build up.

Sinkholes in the reservoir basin, especially adjacent to the embankment, should be cause for concern. Sinkholes adjacent to the embankment may be a result of internal erosion of the embankment material. Sinkholes located away from the upstream toe of the dam may be a result of seepage through the foundation material. This can cause a failure of the dam. Any sinkholes found should be brought to the attention of the Dam Safety Office and monitored for any significant changes.

Signs of Embankment Distress

Structural problems with the embankment may be exhibited in the embankment itself, the foundation of the dam, or the abutments. Many of these types of problems become evident early in the life of the dam, often during the first reservoir filling. Symptoms of structural problems are seepage, cracking, movement, settlement, sinkholes, and erosion.

Seepage may be noticed by wet areas or water emerging in a concentrated location. It can occur through joints in the bed rock zones or low permeability in the foundation or abutments.

Cracking may occur in multiple places on the dam. Cracks which run perpendicular to the crest of the dam can indicate that stresses in the dam are being created by unequal settlement of the fill or foundation material. Cracks which run parallel to the dam crest can occur anywhere on the dam. Foundation problems or embankment weakness can be manifested by cracks. Emptying the reservoir quickly can also cause cracks on the upstream side of the dam. Randomly oriented, shallow cracks are usually attributable to drying of surface soils on the dam. Cracks of any sort should be reported to the State Engineer’s Office, Dam Safety Section.

Movement can occur and usually initiated by a period of unusually high moisture in the ground and are aggravated by seepage flows. Cracks at the top and bulging at the bottom, or toe, of the moving material frequently accompanies a slope failure. Any movement of the embankment should be reported to the State Engineer’s Office, Dam Safety Section.

Erosion of the embankment can result from inadequate protection of the dam from wave action or from rain collecting and running down the face of the dam. Waves create steps along the upstream face of dams not properly protected by riprap. Erosion of the upstream face of

the dam should be corrected by placing an adequate layer of properly graded riprap. The riprap D_{50} for Dry Wash reservoir has been determined to be 9”.

Review SOP

The SOP is to be reviewed along with the EAP each year to determine if any modifications or adjustments are necessary. Inundation areas identified in the EAP should be checked for any residences or other structures that may be threatened by a flood or breach of the dam. Contact lists should be updated to ensure correct notification procedures are available during emergency situations.

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Maintenance & Inspection Form

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Date:

Dry Wash Inspection & Maintenance Form

Inspector Name:

Signature:

Checklist Item	Deficiencies Found		Comments, Location, and Remedial Action Taken
	Yes	No	
Piezometers and Drain Flows - Piezometer 1a (el.) - Piezometer 1b (el.) - Piezometer 2 (el.)			
Check Outlet Drain			
Record Water Surface Elevation			
Record Canal Releases			
Make Changes in Gates and Valves			
Check Condition of: (check for cracks, slides, seepage, settlement, erosion, movement, riprap needed, etc.) - Crest of Dam - Upstream and Downstream Faces - Visible Portions of Foundation - Abutment Contacts - Galleries - Spillway and Stilling Basin - Outlet Works, Stilling Basin, & Pipeline - Critical Landslide Areas - Reservoir Area			
Grease Outlet Head Gate			
Check Public Warning Signs - Near Trash rack of intake structure - Outlet works stilling Basin - Head Gate Control Structure			
Check for debris in inlet channel			
Check Operation of Gates			
Check Fence Condition			
Check for Seepage			
Check Vegetation			

* Any Deficiencies found must be reported to the State Engineer's Office, Dam Safety Section, Owner, and Engineer. Include detailed notes for location, dimensions, etc.

As Built Drawings

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