Environmental Assessment

Black Canyon Dam and Recreational Facilities, Navajo County, Arizona

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Introduction

This Environmental Assessment (EA) is being prepared to analyze the effects of improving the Black Canyon Dam on the Black Mesa Ranger District, Apache-Sitgreaves National Forests (Figure 1). The site-specific analysis is tiered to the final environmental impact statement [1] and record of decision [2] for the Apache-Sitgreaves National Forests Land and Resource Management Plan (hereby referred to as forest plan) [3] and complies (currently meets or moves conditions towards desired conditions) with the forest plan. An interdisciplinary analysis on the proposed action is documented in a project record, which is located at the Black Mesa Ranger District. This analysis is consistent with the forest plan as amended and was developed in consideration of the best available science. Source documents from the project record are referenced throughout this EA by showing the document number in brackets [#].An index for the project record is located in Appendix A.

Black Canyon Dam is located at the east end of Black Canyon Lake, just north of the Mogollon Rim, 6 miles south of State Route (SR) 260 and approximately 12 miles southwest of Heber-Overgaard, in Navajo County, Arizona (Figure 1). The dam is located in Sections 13 and 24 of Township 11 North, Range 15 East, and the existing materials borrow pit is located in Section 21 of Township 11 North, Range 15 East on the Brookbank Point (1990), Arizona, U.S. Geological Survey 7.5-minute topographic series map.

The Black Canyon parking lot is located at the end of the lake access road (Forest Road [FR] 86B) in rolling terrain at the southwest end of Black Canyon Lake, 2.5 miles north of the Mogollon Rim, six miles south of SR 260, and approximately 12 miles southwest of Heber, Arizona). The boat ramp is located in the middle of the parking lot on the southwest side of the lake. The parking area and boat ramp are located in Township 11 North, Range 15 East, Section 24 on the Brookbank Point (1990), Arizona, U.S. Geological Survey 7.5-minute topographic series map.

This chapter describes the purpose and need for action, the proposed action, project locations, the decision to be made, public involvement, and issues identified.

Purpose and Need for Action

Existing Condition

Black Canyon Dam is located on the Apache-Sitgreaves National Forests (ASNFs) Black Mesa Ranger District. Dam construction and maintenance were authorized under a special use permit to the Arizona Game and Fish Department (AGFD). The permit has been in place since 1963, when the dam was originally constructed. Black Canyon Dam was built to provide flood storage capacity and public recreational opportunities. Black Canyon Dam is an intermediate-sized earthen structure with an elevated concrete spillway that extends from near the top of the dam to a concrete spilling basin near the bottom of the dam. The dam impounds drainage from several Mogollon Rim canyons that flows to form Black Canyon Lake in the upper portion of the West Fork of Black Canyon, southwest and upstream of the community of Heber-Overgaard in Navajo County, Arizona. Recreation facilities at Black Canyon Lake include a boat ramp, parking lot, and two Forest Service system trails that outline the perimeter of the lake and provide shoreline fishing access.

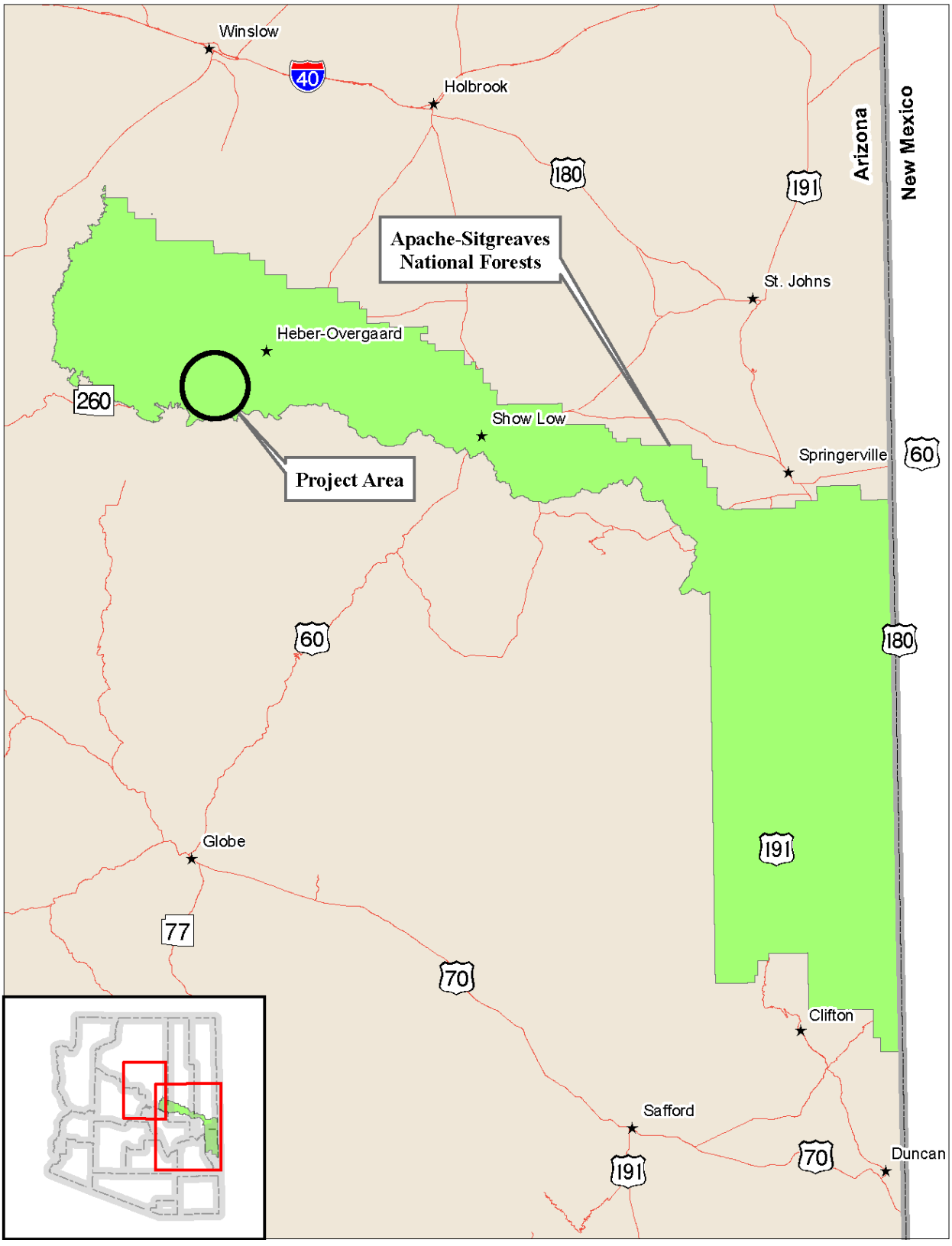

Figure 1. Project area

Watershed conditions have changed recently due to development within the floodplain downstream of the dam (i.e., in the Heber-Overgaard area) and accelerated runoff potential due to the Rodeo-Chediski Fire of 2002. Black Canyon Dam was originally designed to retain up to a 100-year, 24-hour storm event. Due to additional downstream development, the Arizona Department of Water Resources (ADWR) has assigned a hazard classification of "high" to Black Canyon Dam. Because of accelerated runoff conditions, the ADWR has determined that the existing crest height of the dam is insufficient to prevent overtopping during an Ideal Design Flood (IDF). Consequently, it has assigned a status rating of "unsafe" to the dam and is requiring the AGFD to modify the dam to contain the IDF. The IDF is approximately 50 percent of the Peak Maximum Flood (PMF). The PMF is the maximum amount of inflow that could potentially reach the reservoir based on maximum possible precipitation and watershed conditions. The PMF is estimated to have a recurrence of about once every 10,000 years. The proposed improvements would raise the dam crest height 6 feet, which will allow it to attenuate a larger volume of inflow into the reservoir without breaching the dam crest. The proposed improvement would also raise the height of the spillway walls to prevent flows over and behind the spillway walls during an IDF, which would compromise the integrity of the dam. Because the spillway elevation would remain the same, the ordinary water level on the lake would remain unchanged.

There is an existing parking area and boat launch ramp at the southwest end of Black Canyon Lake. Currently, the parking area is not large enough to provide for the substantial number of recreationists who wish to access the lake. Also, the boat launch ramp does not access the water during periods when lake levels are low. To accommodate recreationists the parking area would be expanded north and west of the existing lot and the boat launch ramp would be relocated north to where the water is more permanent.

Desired Condition

The desired condition is to improve the water storage capability of the dam, accommodate the IDF, and satisfy ADWR requirements for dam safety. The specific desired condition is for the crest of the dam and the spillway walls to be of sufficient height to prevent overtopping or breaching during an IDF event. The desired condition with regard to recreational improvements is to develop additional parking space and related facilities for the public and to establish a boat launch ramp that allows more consistent boat access to the lake.

Comparison of the existing condition of the project area and the desired conditions indicates a need to improve Black Canyon Dam and its associated structures to allow passage of the IDF over the spillway without overtopping the dam. This would result in improved flood safety in the watershed below Black Canyon Dam and would achieve standards set by the ADWR to be classified as a safe dam. There is a need for recreational improvements to provide additional parking opportunities and to enhance boat launch access to the lake.

Modified Proposed Action

Subsequent to completion of public scoping on the proposed dam improvements, the original proposed action was modified to include recreational improvements, specifically the expansion of the parking area north and west of the existing lot and relocation of the boat launch ramp north to where the water is more permanent. In response to the purpose and need for action, the Forest Service proposes to:

Improve the Black Canyon Dam, the associated spillway, and the stilling basin to enhance flood safety. Activities include increasing the crest height of the dam, reconstructing the spillway, and reinforcing the associated stilling basin. These improvements would allow larger flood events to be detained behind the dam and dissipated flows to pass through the spillway without overtopping the dam. The proposed improvements would not raise lake levels because the spillway elevation would remain unchanged. The

modified dam would meet the requirements of the ADWR to be classified as safe. Proposed modifications include:

- Raising the dam crest height
- Reconstructing the spillway
- Reinforcing/modifying the stilling basin
- Grading the dam access road

Material used to increase the height of the dam would be taken from an existing borrow pit on Forest Service land approximately 2 miles west of Black Canyon Lake. Additional materials may be obtained from off-Forest locations. Concrete removed from the existing spillway may be used as part of the fill material required for raising the dam crest. All construction activities would take place during daylight hours. Equipment and materials would be hauled to the construction site on SR 260, on the main access roads into Black Canyon Lake (FR 86 and FR 300), and on the access road to the dam. After construction, all disturbed terrain would be reseeded and allowed to revert to a semi-natural condition.

Construction activities for the parking lot expansion and boat ramp relocations (i.e., recreational facilities improvements) would include removing trees and brush with a bulldozer and backhoe north and west of the existing parking lot, grading and leveling, refilling the area with materials, hauling in crushed rock and gravel for the top four inches, and compacting all materials. The existing boat launch ramp would be removed and relocated north near the new parking area. A temporary dam would be constructed for dewatering the area where the ramp would be placed.

The access road into the parking area from FR 86 would be graded and graveled. The existing toilets would be moved and replaced as needed to accommodate the new parking area, requiring installation of new footings and slabs. Existing footings and slabs would be torn out with a backhoe. A ramada picnic area would be constructed in the center of the north side of the parking lot near the newly constructed boat ramp. A backhoe would trench the footings while the concrete trucks would bring in concrete to pour the slab. These improvements would allow recreationists greater accessibility to boating and fishing opportunities offered by the lake.

Construction would take place from September 1 to February 28, as weather conditions allow. All construction activities would take place during daylight hours. Equipment and materials would be hauled along the access road to the lake, along the main access road into Black Canyon Lake (FR 86), and along FR 300 to SR 260. Fill would be imported to the project area for the lake access road and the parking lot from private or commercial sources. See Chapter 2, pp. 2-3 for additional details.

Relationship to Forest Plan

The Forest Service has two types of decisions—programmatic (e.g., the forest plan) and project-level—that implement the forest plan. The Black Canyon Dam and Recreational Improvements EA is a project-level analysis; its scope is confined to addressing the key issues and possible environmental consequences of the project. It does not attempt to address decisions made at the programmatic level.

The forest plan embodies the provisions of the National Forest Management Act of 1976, its implementing regulations, and other guiding documents. The forest plan sets forth the direction for managing the land and the resources of the ASNFs.

The ASNF Plan identifies five Management Areas (MAs) with specific management standards and guidelines that must be met in addition to the applicable federal and state regulatory statutes. Two MAs overlap the project area: MA-1: Forested Lands and MA-11: Water.

Decision Framework

The Forest Supervisor is the Responsible Official for this assessment. Based on the analysis, the Forest Supervisor will decide whether and how to implement the proposed actions in accordance with forest plan goals, objectives, and desired future conditions. He will decide whether to implement an action alternative or the No Action alternative. If the action alternative is selected, the decision will include: (1) The location, design, and scheduling of the proposed action, (2) Compliance with laws, regulations, and Forest Service policies, and, (3) Mitigation measures and monitoring requirements.

A project initiation letter [4] was prepared by the acting District Ranger on the Black Mesa Ranger District outlining the required public scoping process and preliminary issues to be analyzed.

Public Involvement

This project has been listed on the ASNF Schedule of Proposed Actions since January 1, 2008. Public involvement for the project included sending scoping letters to interested and affected parties on a list provided by the Forest Service and property owners in the Black Canyon Creek floodplain [5,6], publication of public notices in newspapers that cover the project area [7], and the posting of fliers at businesses and public buildings (e.g., post offices) in the Heber-Overgaard, Forest Lakes, and Payson areas [8,9]. The letters and fliers defined the proposed action and the project purpose and need, and solicited responses from the recipients regarding any potential issues, comments, or concerns regarding the project. The scoping letters, newspaper public notices, and fliers were distributed, posted, and/or published from July 10 to July 17, 2008, with issue-identifying responses requested by August 11, 2008. No responses to the scoping letters, newspaper public notices, and fliers were received.

Issues

Scoping is an early and open process used to identify issues and concerns related to the proposed action. Many potential issues raised by the public are resolved by management plan direction, mitigation measures, design criteria, or laws and regulations. Others may fall outside the scope of the analysis. Significant issues are unresolved issues that are (1) within the scope of the analysis, (2) not decided by law, regulation, or previous decision, (3) related to the decision, (4) amenable to scientific analysis rather than conjecture, and (5) not limited in extent, duration, or intensity. Because no responses were received to the scoping letters, newspaper public notices, and fliers, no significant issues were raised during public scoping; therefore, a No Action and Modified Proposed Action alternative provides a reasonable range of alternatives for this analysis.

Chapter 2–Alternatives

Alternatives Considered But Eliminated From Detailed Analysis

Federal agencies are required by the National Environmental Policy Act (NEPA) to rigorously explore and objectively evaluate all reasonable alternatives and to briefly discuss the reasons for eliminating any alternatives that were not developed in detail (40 Code of Federal Regulations [CFR] 1502.14).

Original Proposed Action

The original proposed action was eliminated from detailed analysis and replaced with a modified proposed action. It did not adequately address the need to provide expanding parking for recreation use and did not address the need to have a boat launch that could be used during periods of low water levels.

Alternatives Considered in Detail

Alternative 1–Modified Proposed Action

The modified proposed action would raise the crest height of the dam, reconstruct the concrete spillway, and reinforce/modify the stilling basin. Raising the dam crest and reconstructing the spillway (i.e., increasing the height of the spillway walls), as proposed, would allow larger flood events to be detained behind the dam and dissipated flows to pass over the spillway without overtopping the spillway walls or the dam crest. These improvements would not raise lake levels because the spillway floor elevation would remain unchanged. The project would be funded by capital improvement funds from the AGFD. Proposed modifications and associated activities include:

- Raising the crest height of the dam
- Reconstructing the concrete spillway to increase the height of the spillway walls
- Reinforcing/modifying the stilling basin
- Improving the dam's access road to allow for construction equipment access

Specific activities associated with this alternative are described in Table 1, including construction methods and anticipated equipment to be used.

Material used for increasing the dam's crest height would be taken from an existing materials borrow pit on Forest Service land south of SR 260 (Figures 2 and 3), potential materials sources off-forest, and potentially from waste concrete obtained from removal of the existing spillway.

Construction would be scheduled to start in spring or early summer of 2010 and continue into fall 2010 or beyond. All construction activities would take place during daylight hours. Equipment and materials would be hauled along the access road to the dam, along the main access roads into Black Canyon Lake (FR 86 and FR 300) and to SR 260. After construction, all affected terrain would be reseeded and allowed to revert to a semi-natural condition.

Table 1. Proposed activities associated with rehabilitation/repair of Black Canyon Dam

Proposed Activity	Construction Methods	Equipment Anticipated to Be Used
Clear access road and grade to 14-foot minimum width, clear and grade staging/construction operations area.	Cut and remove trees; grade, compact, and resurface roadway.	Chainsaws, loader, haul truck, compactor, grader, excavator.
Remove concrete from existing spillway and incorporate as fill for elevated dam crest and slopes.	Jackhammer and/or rock drill to loosen concrete. Place material in haul trucks, and dump on dam crest and slopes.	Jackhammer, rock drill, excavator/backhoe, bulldozer, dump truck.
Remove overhanging rock near entrance to spillway.	Drill and place explosives, load debris onto haul truck for removal.	Rock drill, backhoe, bulldozer, and haul/dump truck.
Construct new spillway.	Construct falsework and pour concrete for spillway floor and walls.	Concrete trucks.
Reinforce spillway and stilling basin side slopes.	Place riprap and grout with shotcrete.	Haul trucks, bulldozer, excavator/trackhoe, concrete mixer, pneumatic pump.
Obtain fill materials from Brookbank Pit.	Excavate materials from within existing pit and haul materials to dam site.	Backhoe, bulldozer, and haul/dump trucks.
Raise top of dam approximately 6 feet from 7,169 to 7,175 feet elevation and place additional fill on downstream face of dam.	Place and compact fill material on top and backside of dam and reseed with native plant mix.	Haul trucks, excavator, grader, compactor, hydroseed truck.
Remove and replace riprap as necessary on upstream face of dam.	Dump and place riprap on upstream face of dam from water's edge to new top of dam, as necessary.	Haul/dump truck, backhoe, bulldozer.
Remove and replace log boom and anchors.	Remove existing boom and haul off, place new boom and anchor to dam.	Rock drill, backhoe, haul truck.
Replace flood warning equipment.	Remove existing ALERT station. Install new ALERT monitoring system, including standpipe, conduit, and pressure transducer at lake level and in drainage below dam.	Rock drill, concrete mixer, pickup truck.
Remove and replace fence west of the spillway.	Remove existing fence and fence posts, dig and set new fence posts, and attach wire.	Backhoe, posthole digger.

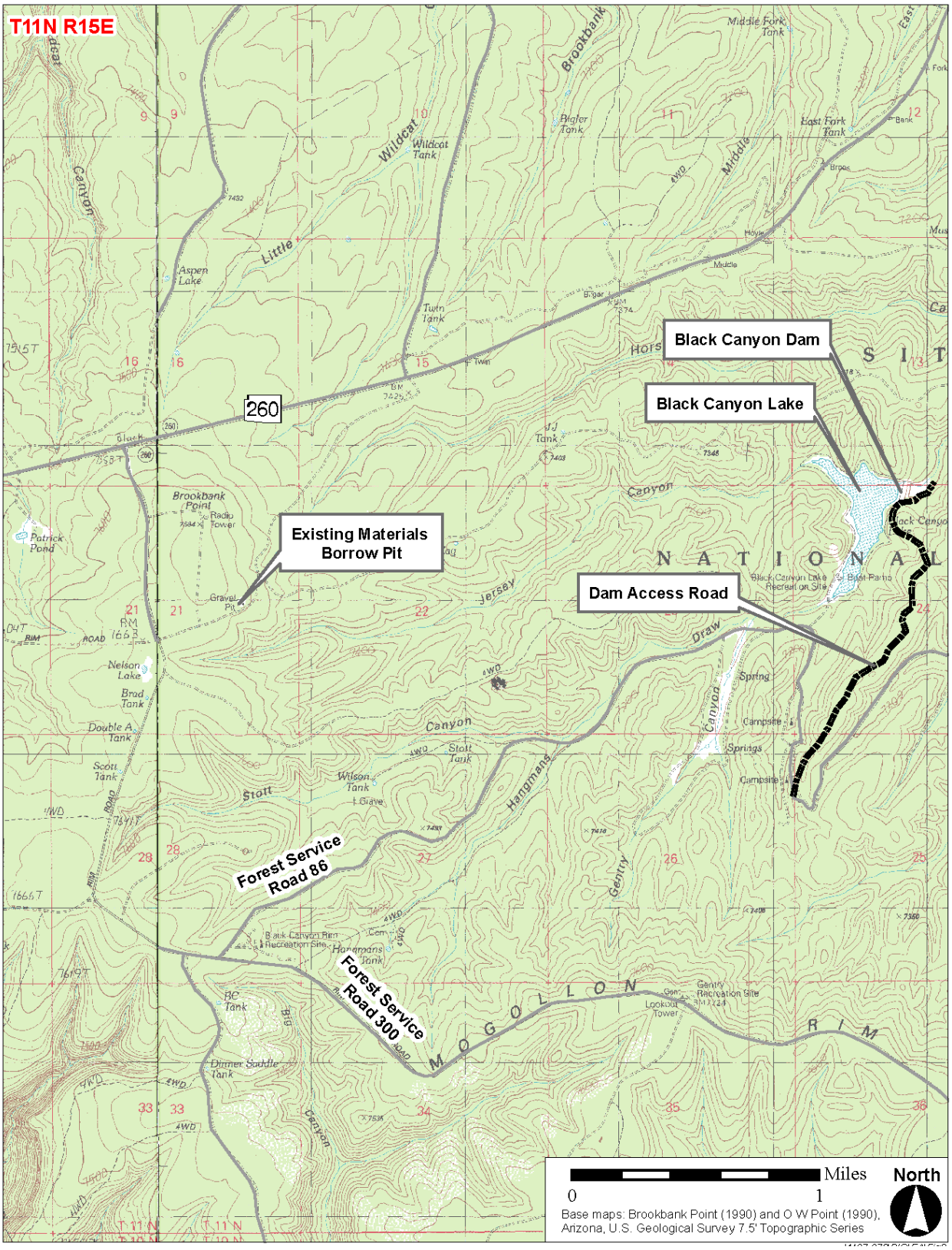

Figure 2. Project vicinity

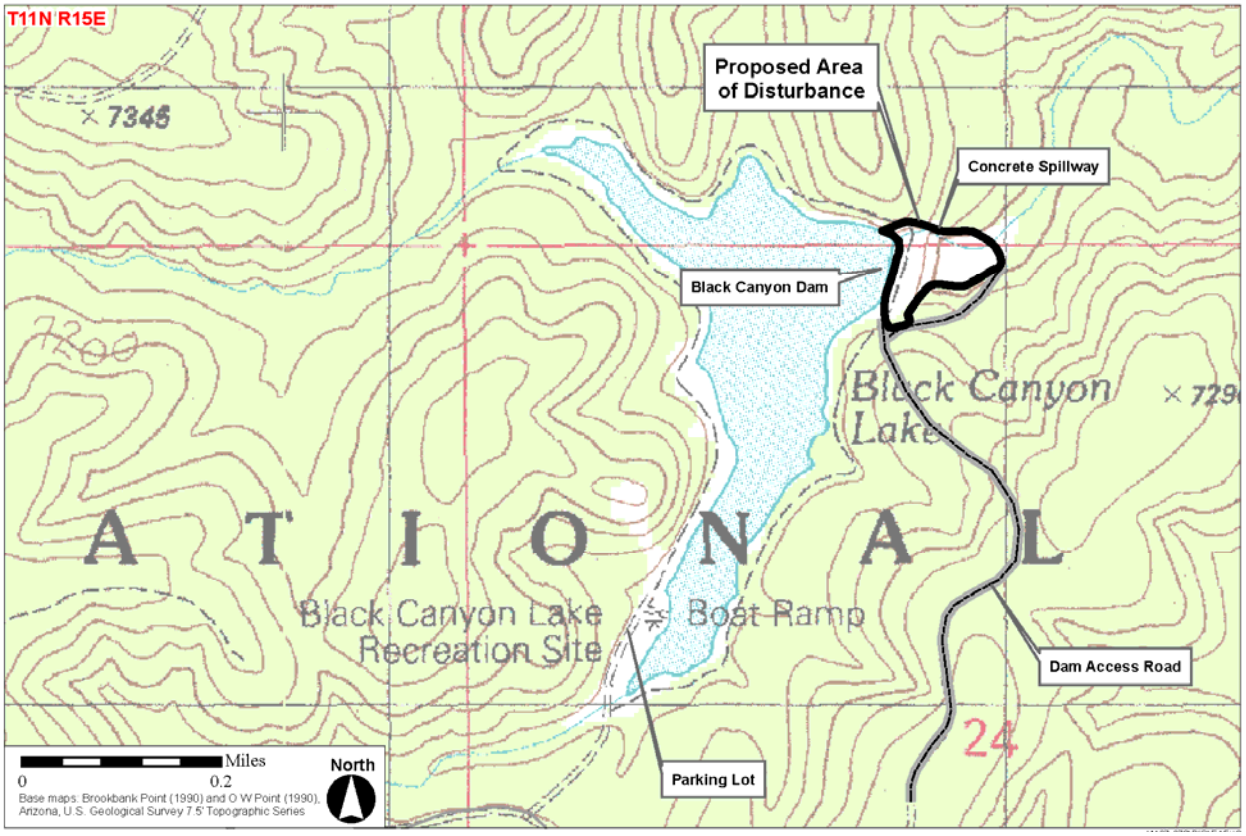

Figure 3. Project site

Construction activities for the parking lot expansion and boat ramp relocations (i.e., recreational facilities improvements) would include removing trees and brush with a bulldozer and backhoe north and west of the existing parking lot, grading and leveling, refilling the area with materials, hauling in crushed rock and gravel for the top four inches, and compacting all materials. The existing boat launch ramp would be removed and relocated north near the new parking area. A temporary dam would be constructed for dewatering the area where the ramp would be placed. The access road into the parking area from FR 86 would be graded and graveled. The existing toilets would be moved and replaced as needed to accommodate the new parking area, requiring installation of new footings and slabs. Existing footings and slabs would be torn out with a backhoe. A ramada picnic area would be constructed in the center of the north side of the parking lot near the newly constructed boat ramp. A backhoe would trench the footings while the concrete trucks would bring in concrete to pour the slab. These improvements would allow recreationists greater accessibility to boating and fishing opportunities offered by the lake.

Specific activities associated with the recreation facilities are listed and described in Table 2, including construction methods and anticipated equipment to be used. Construction would take place from September 1 to February 28, as weather conditions allow. All construction activities would take place during daylight hours. Equipment and materials would be hauled along the access road to the lake, along the main access road into Black Canyon Lake (FR 86), and along FR 300 to SR 260. Fill would be imported to the project area for the lake access road and the parking lot from private or commercial sources.

The main project limits for the parking lot expansion includes areas north and west of the existing parking lot. Construction activities near the lower slopes of hills adjacent to the existing Black Canyon Lake parking lot would involve the removal of some surviving ponderosa pine trees and post-fire succession

growth of young New Mexico locust and oaks from approximately two acres of terrain. No areas other than the expanded parking lot would be disturbed.

Table 2. Proposed activities associated with improvements to the recreation facilities in general chronological order

Proposed Activity	Construction Methods	Equipment Anticipated to Be Used
Tear out existing parking lot and vegetation islands	Rip up existing materials and vegetation to clear area for new parking lot materials.	Bulldozer, backhoe, blade.
Clear area where expansion of parking lot will occur	Push existing vegetation and rip up boulders.	Bulldozer, backhoe.
Grade and level proposed parking lot and lake access road	Grade, compact, and resurface parking lot and roadway. Haul in materials to fill in cut area. Haul in rock and crushed gravel for top four inches. Compact materials to 90 percent.	Bulldozer, motor grater, rock drill, compactor, haul/dump/water truck.
Relocate toilets	Tear out concrete footings/slabs and pour new concrete footings/slabs where toilets will be relocated. Use backhoe to dig vaults.	Backhoe, concrete trucks.
Remove and relocate boat launch ramp	Decide how far down ramp should go into the water. Place a temporary dam and pump to dewater area. Use existing ramp materials to create new earthen boat ramp structure.	Bulldozer, backhoe, concrete trucks.
Add ramada picnic area to parking lot	Trench footings and pour concrete for new slab. Construct ramada and install picnic table.	Haul and concrete trucks, backhoe.

Mitigation Measures and Best Management Practices (BMPs)

To minimize resource impacts, the mitigation measures and BMPs listed in Table 3 are included as part of the modified proposed action. The environmental effects described in Chapter 3 are estimated assuming these measures/practices will be implemented.

Table 3. Alternative 1 mitigation measures and BMPs

Mitigation Measure/BMP	Rationale
Soil and Water	
Erosion control measures such as hay bales, silt fencing, or comparable measures shall be installed and maintained at the downslope extent of disturbance areas. These measures will remain in place and will be maintained throughout the construction phase and until disturbed soils have been stabilized through revegetation or other means. An erosion control plan shall be developed and approved by the ASNFs prior to the start of construction.	To control sedimentation into downstream waters.
Soil-disturbing activities shall not be initiated during periods of heavy rain or excessively wet soils.	To minimize soil compaction, soil detachment and sediment transport. To maintain long-term soil productivity.
Topsoil replacement, seeding, and mulching (as necessary) shall be used to stabilized disturbed soils. Disturbed steep slopes shall be further stabilized using geotextiles (as necessary), water bars, and/or sediment wattles installed at appropriate intervals to discourage rill formation.	To minimize soil erosion through stabilization.
A specific area shall be designated and maintained to reduce the potential for and severity of hazardous materials spills. Fuel, oil, lubricants, and all other hazardous materials shall be stored in structures placed on impermeable surfaces with impermeable berms designed to fully contain the hazardous material plus accumulated precipitation for a period at least equal to that required to mitigate the spill. A hazardous materials spill prevention, containment, and remediation plan shall be developed and approved by the ASNFs prior to the start of construction.	To prevent contamination of surface and groundwater by hazardous materials.
Air Quality	
Disturbed areas shall be sufficiently watered during construction to prevent excessive dust.	To minimize dust emissions during construction.
Wildlife	
Construction activities, including blasting, excavation, and materials hauling, shall be limited to daylight hours.	To reduce impacts on Mexican spotted owl breeding activities.
Cultural Resources	
If any cultural resource sites are discovered during construction and clearing, all operations shall cease immediately and the ASNF District Ranger or assigned representative shall be contacted.	To protect and preserve cultural resources in the project area.

Table 3. Alternative 1 mitigation measures and BMPs

Mitigation Measure/BMP	Rationale
Human Environment/Public Safety	
Traffic caution signs regarding haul trucks shall be posted at critical locations along FR 86 and FR 300. The immediate vicinity of the dam site shall remain closed to public access throughout construction. The portion of the lake perimeter trail shall be closed in the vicinity of the dam site and caution signage posted regarding heavy equipment operation and blasting in the area. Appropriate measures shall be implemented to prevent public hazards related to excavation of borrow material from the Brookbank Pit. The ASNF District Ranger and project proponent shall determine what types of measures (e.g., fencing) may be needed to protect public safety after project completion.	To protect and caution the traveling public of haul truck traffic in the area and to protect recreationists from construction-related hazards in the project vicinity. To protect the public from potential hazards, such as steep headwalls, associated with the excavated Brookbank Pit.
Noxious Weeds	
Prior to construction and initial entrance onto the site, all earthmoving equipment and personnel vehicles shall be cleaned of visible mud, dirt, and plant debris. Prior to use, all borrow areas shall be inspected for the presence of state-listed and federally listed noxious weeds. Any required treatment of these areas shall be coordinated with, and approved by, the District Ranger. The ASNF or local guidelines shall be used to determine appropriate revegetation seed mixes and procedures. Seed mixes will consist of grasses and forbs native to the project area. Preference shall be given to local seed sources, as available and practicable. Seed shall be tested by the producer in a certified seed lab against the ASNF invasive weed list, the Arizona noxious weed list, and the federal noxious weed list.	To minimize the introduction of noxious weeds seeds into the project area from other construction sites via heavy equipment and vehicles, potentially contaminated soils from borrow areas, and the revegetation seed mix.

Monitoring

Under Alternative 2, the Black Mesa District Ranger or assigned representative would periodically monitor the project area during construction to ensure that the mitigation measures listed in Table 3 are implemented, including erosion, hazardous materials, and air quality control measures; construction timing restrictions to protect wildlife; public safety measures; and measures to control noxious weeds. After construction, the Black Mesa District Ranger or assigned representative would periodically monitor the project area to determine the long-term success of erosion control measures implemented and to determine whether additional measures are necessary with regard to erosion and noxious weed control. The AGFD would provide the means to address additional corrective measures.

Alternative 2–No Action

The No Action alternative provides a baseline for estimating the effects of other alternatives; therefore, include the effects of taking no-action in each environmental analysis.

With the No Action alternative, no improvements would be made to the existing Black Canyon Dam and its associated structures:

- The existing dam crest height, spillway, and stilling basin dimensions would remain unchanged.
- The dam access road would not be widened.
- The existing Brookbank Pit would not be further excavated, and no new materials borrow area would be developed.

This alternative would not improve long-term flood safety in the downstream watershed. Black Canyon Dam would remain classified as unsafe by ADWR. An IDF event could result in overtopping of the dam and potentially serious harm and injury to human life and property in the watershed below the dam. Under this alternative, no recreational improvements would be made with regard to the boat launch ramp and the parking area at the southwest end of the lake. The public would continue to use the existing boat launch and parking area.

Table 4 summarizes the environmental effects of the alternatives considered.

Table 4. Comparison of alternatives

Indicator	Alternative 1	Alternative 2
Purpose and Need	Would meet purpose and need to improve the water storage capability of the dam, accommodate the IDF, satisfy ADWR requirements for dam safety, to develop additional parking space and related facilities for the public, and to establish a boat launch ramp with more consistent boat access to the lake.	Would not meet project purpose and need. Water storage capacity would remain unchanged and existing dam structure would not accommodate the IDF or meet ADWR dam safety requirements. No additional parking space or related facilities would be developed for public use and existing boat launch ramp would remain unusable during low water conditions.
General Recreation Use	Would result in temporary access restrictions on recreational trails in the vicinity of the dam and dust from construction activities near Brookbank Pit for campers using the Brookbank throw-down area. Would facilitate use of the lake by boats up to 10-horse power gasoline motors, resulting in increased use and watercraft on lake and increase in ambient noise levels from operation of motors.	No temporary access restrictions in the vicinity of the dam for visitors to the lake. No construction-related increase in fugitive dust emissions at Brookbank throw-down area.

Table 4. Comparison of alternatives

Indicator	Alternative 1	Alternative 2
Recreation Opportunity Spectrum (ROS)	No change in the Semi-primitive Motorized and Roaded Natural ROS classification in the project area. Temporary access restrictions to trails near Dam and to parking area during construction. Would provide more parking opportunities for recreators and improved access to the lake for boaters and fishermen.	No change to existing ROS settings. Visitors' recreational experiences would not be affected.
Public Safety	Would prevent potentially catastrophic flooding (i.e., overtopping of the existing dam crest and potential dam failure) during events up to and including the Ideal Design Flood (IDF).	IDF event would result in overtopping existing dam crest, resulting in potential dam failure and a potentially serious downstream hazard to human health, safety, and property, primarily in the Heber-Overgaard area.
Aesthetic Resources	Visual Quality Objectives (VQOs) of Retention and Partial Retention at dam site and VQO of Partial Retention at parking/boat launch site would be met.	No change in current visual aesthetic character of dam construction site, Black Canyon Lake, the Brookbank Pit, or existing parking lot/boat launch area. VQOs of Retention and Partial Retention at dam site and VQO of Partial Retention at parking/boat launch site would be met.
Environmental Justice	Populations protected by Title VI would not be disproportionately affected.	
Socioeconomics	Would result in an estimated 25 construction-related jobs for a period of 5 to 6 months and associated increases in local revenue. Enhanced protection of downstream properties and enhanced long-term recreational opportunities and associated socioeconomic benefits generated by lake. Improved opportunities for motorized boating, increased recreational use of the lake by boaters, and increased revenues for businesses in nearby communities.	No construction-related jobs and no associated temporary business revenue increases in Heber-Overgaard. Potential dam overtopping during an IDF event could compromise dam integrity and negatively affect long-term recreation-related socioeconomic benefits associated lake. Potential downstream flooding could result in damage to an estimated 30 to 35 properties located in downstream floodplain zones in Heber-Overgaard area. Recreation-related revenues to businesses in surrounding communities would not change substantially.
Heritage and Cultural Resources	No effect on cultural resources because no sites are present in the area of potential effects.	

Table 4. Comparison of alternatives

Indicator	Alternative 1	Alternative 2
Plant Communities	Permanent removal of several ponderosa pines on downstream slope of dam, temporary disturbance of 5 to 6 acres of grasses and shrubs at dam construction area, and permanent removal of one narrowleaf cottonwood and one willow near stilling basin. Would result in some permanent removal of trees and other vegetation along dam access road. Permanent removal of some sapling ponderosa pines and shrubby and herbaceous growth at Brookbank Pit. Permanent elimination of about 2 acres of vegetation at parking lot/boat launch area.	No permanent removal of trees on or near dam and along dam access road, no temporary disturbance of vegetation at Brookbank Pit, and no removal of vegetation in parking lot/boat launch area.
Threatened and Endangered Species.	No adverse affect on habitat for threatened Mexican spotted owl (MSO). Construction noise at dam site likely to adversely affect nearby breeding MSO and parking lot expansion would eliminate about 2 acres of potential foraging habitat.	No effect on threatened or endangered species.
Sensitive Species	Would disturb and remove vegetation from up to 6 acres of potential habitat for Merriam's shrew, long-tailed vole, Arizona toad, Northern leopard frog, Arizona sneezeweed, Blumer's dock, and Bebb willow in drainage immediately below dam. Would affect up to 6 acres of potential foraging habitat for Allen's big-eared bat, potential foraging and perching habitat for zone-tailed hawk and Northern goshawk, and potential perching habitat for peregrine falcon and the bald eagle.	Potential overtopping dam during IDF would impact potential habitat for Forest Service sensitive species in area immediately below dam over the short term.
Management Indicator Species	Would disturb or remove up to 8 acres of foraging and/or nesting/breeding habitat for hairy woodpecker, Northern goshawk, turkey, pygmy nuthatch, spotted owl, elk, mule deer, Abert's squirrel, and cinnamon teal.	Habitat for Management Indicator Species would not be affected by dam and recreational improvements.

Table 4. Comparison of alternatives

Indicator	Alternative 1	Alternative 2
Migratory Birds	Permanent removal of about 2 acres of pine-oak habitat for expansion of parking lot. Construction of dam and recreational improvements would also result in short-term loss of Potential foraging habitat, short-term disturbance associated with vegetation removal, and loss of potential perch sites that could affect the olive-sided flycatcher, golden eagle, prairie falcon, cordilleran flycatcher, purple martin, flammulated owl, Grace's warbler, MacGillivray's warbler, and red-faced warbler.	Habitat for migratory birds would not be affected by dam and recreational improvements.
Wetland and Floodplain	No effects on wetlands or 100-year floodplain.	

Chapter 3–Environmental Consequences

Chapter 3 summarizes the physical, biological, social and economic environments of the affected analysis area (analysis area) and the potential changes to these environments if the alternatives were implemented. Chapter 3 also presents the scientific and analytical basis for the comparison of alternatives. Chapter 3 complies with the implementing regulations (40 CFR 1500-1508) of NEPA for analytic and concise environmental documents (40 CFR 1502.2). The project record contains copies of the full reports for most of the resources analyzed.

Environmental resources could be affected in various ways during implementation of alternatives. The effect or impact is defined as any change or alteration in the environment's existing condition produced by the alternatives, either directly or indirectly. NEPA regulations (40 CFR 1508.27 (a)) refer to effects in terms of short and long-term duration. Chapter 3 analyzes the environmental consequences of the proposed action and any alternatives to the proposed action. The analysis of effects for alternative 1 (modified proposed action) under each resource is described with the assumption that adaptive management may be addressed in a further analysis.

Past and Present (ongoing) Actions

2002 Rodeo-Chedeski Fire: The Rodeo-Chediski Fire of 2002 substantially accelerated runoff potential in the watershed feeding the reservoir because of the loss of vegetative cover and reduced soil stability. This has increased the potential for overtopping of the dam and potential dam failure during an IDF.

Recreation Use in the Vicinity of Black Canyon Lake: Management of Black Canyon Lake as a developed recreation site has been largely limited to establishing and maintaining a boat ramp and parking lot on the southwest shore of the lake. Prior to 2008, camping was restricted to a designated campground about 3 miles southwest of the lake. Since 2008, dispersed camping in the areas surrounding the lake has been allowed. Fishing and hunting are regulated by the AGFD in cooperation with the Forest Service. Since 2008, the ASNFs and the AGFD have authorized boats with up to 10-horsepower gasoline motors on the lake. The project area would continue to be used for recreational uses.

Grazing Allotments: The area around Black Canyon Lake falls within the Gentry Pasture of the Heber Grazing Allotment. The Black Canyon Allotment begins about 1.5 miles below Black Canyon Dam and extends to the town of Heber-Overgaard. Salvage activities took place after the Rodeo-Chediski Fire to remove salvageable timber from affected portions of the project area and vicinity. The project area would continue to be used for grazing uses.

Reasonably Foreseeable Future Actions

The ASNFs is currently conducting the Rodeo-Chediski Prescribed Fire Analysis, which evaluates potential future prescribed burning throughout the portion of the Forests affected by the Rodeo-Chediski Fire of 2002, including the project area and vicinity.

The ASNF Schedule of Proposed Actions from April to June 2010 was reviewed. No other planned projects or activities are identified that are in the vicinity of the project area or are relevant to the cumulative effects analysis for this project.

Resource Issues Analyzed

Recreation, Lands, Social, and Economics

General Recreation Use

The main developed facilities in the area are the parking lot and boat launch ramp located on the southwest side of the lake. Dispersed camping is currently permitted in the vicinity of the lake, and a developed/designated campsite exists approximately 3 miles southwest of the lake at the junction of FR 86 and FR 300 (Mogollon Rim Road). The lake provides fishing, boating (non-motorized, electric motor, and up to 10 horsepower motors only), and picnicking opportunities and is popular with nearby residents of Heber-Overgaard and the Forest Lakes community. Two Forest Service system trails, Rocky Bluff #612 and Three Oaks #613, outline the perimeter of the lake and provide shoreline fishing access to all areas of the lake. The Rocky Bluff Trail traverses the top of the existing dam. Other recreational activities include bird watching and wildlife viewing.

Recreation Opportunity Spectrum (ROS)

With regard to the ROS, the ASNF forest plan applies a Semi-Primitive Motorized setting to the dam access road and Roaded Natural ROS setting on the parking lot and boat launch ramp area. The Brookbank Pit occurs within a Roaded Natural setting.

The Semi-Primitive Motorized setting is characterized by a predominantly natural-appearing environment. Concentration of users is low, but there is often evidence of other users. There is a moderate probability of experiencing independence, isolation from the sights and sounds of humans, and self-reliance in an environment that offers risk and challenge.

In a Roaded Natural setting, such as the lake's parking lot and boat launch ramp area and the Brookbank Pit, resource modification and utilization are evident in a predominantly naturally appearing environment generally occurring within 0.5 mile (depending on terrain and vegetation, but no less than 0.25 mile) from better-than-primitive roads and other motorized travel routes. Interactions between users may be moderate to high, with evidence of other users prevalent. There is an opportunity to affiliate with other users in developed sites but with some chance for privacy. Self-reliance on outdoor skills is only of moderate importance, with little opportunity for challenge and risk. Motorized use is allowed.

Public Safety

Black Canyon Dam has been classified as an unsafe dam due to changes in upstream and downstream conditions of the watershed. The Rodeo-Chediski Fire of 2002 has substantially accelerated runoff potential in the watershed feeding the reservoir because of the loss of vegetative cover and reduced soil stability. This has increased the potential for overtopping of the dam and potential dam failure during an IDF. Furthermore, since the 1960s, when the dam was originally built, human development and occupation have increased substantially in the Black Canyon Wash floodplain in and near the community of Heber-Overgaard. As a result, the ADWR has assigned a hazard classification of "high" and a status rating of "unsafe" to Black Canyon Dam because the existing crest height of the dam is insufficient to prevent overtopping during the IDF.

Aesthetic Resources

Black Canyon Lake's visual aesthetic is best characterized as a woodland lake surrounded by a ponderosa pine–dominated conifer forest that extends over the steep hills and short canyons at the top of the

Mogollon Rim. The majority of the project area was severely burned during the Rodeo-Chediski Fire in 2002, and, as a result, the visual range has been extended farther due to the absence of live trees. In several places, communities of seral vegetation, such as young Gambel and Arizona white oak, have begun to revegetate the fire-damaged areas, often forming dense thickets. Foreground and middle-ground views from the lake area include the lake itself encompassed by abundant fallen burnt trees and the large rock and grass-covered earthen dam in the northeast corner. Prior construction of the boat ramp and parking lot in the southwest corner of the lake changed foreground views to include man-made improvements within a predominantly natural setting.

Black Canyon Dam and its associated spillway, stilling basin, and access road dominate foreground views in the immediate vicinity of the dam. Due to the dam's age, several ponderosa pines have established on the lower downstream side of the dam and survived the fire. Background views include fire-damaged forest areas over craggy sandstone hills and canyons.

The Brookbank Pit is in an area that was not affected by the fire and, as a result, has a foreground and middle-ground view that is dominated by live ponderosa pine. The area in the pit has been modified by prior materials excavation and is clear of vegetation. Background views are largely obscured by the thick forest that surrounds the pit area. No large mountains or other geological features dominate the extended background at either location.

The existing boat launch, parking area, FR 86, and toilet facilities dominate foreground views at the southwest end of the lake. Middle-ground views include surrounding forest, which consists of dense thickets shrub and oak and some relatively young ponderosa pines that survived the Rodeo-Chediski Fire. Background views from this location include Black Canyon Lake and the surrounding landscape.

The two MAs that cover the project area have designated Visual Quality Objectives (VQOs) of Retention and/or Partial Retention. The Forest Service defines these objectives as follows:

Retention—Management activities may not be visually evident. Contrasts in form, line, color, and texture must be reduced during or immediately after the management activity.

Partial Retention—Management activities must remain visually subordinate to the characteristic landscape. Associated visual impacts in form, line, color, and texture must be reduced as soon after project completion as possible but within the first year.

Environmental Justice

Title VI of the Civil Rights Act of 1964 and related statutes ensure that individuals are not excluded from participation in, denied the benefit of, or subjected to discrimination under any program or activity receiving federal financial assistance on the basis of race, color, national origin, age, sex, or disability. Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations (1994) directs that programs, policies, and activities identify and address, as appropriate, disproportionately high and adverse human health and environmental effects on minority and low-income populations.

For the purpose of environmental justice evaluations, a racial or ethnic minority population is an aggregate composed of the following categories: Black/African American, American Indian and Alaska Native, Asian, Native Hawaiian and Other Pacific Islander, Other Races, Two or More Races, and Hispanic. Table 5 provides a breakdown of the percentage of each minority population category. Table 6 lists the aggregate of these minority populations.

Poverty level status is defined as persons whose median household income is at or below the Department of Health and Human Services (DHHS) poverty guidelines. The most recent U.S. Census Bureau data are from the 2000 Census; therefore, the poverty guidelines from the DHHS are based on 1999 income. Poverty level in 1999 was established at an annual income below $8,240 for an individual and an added $2,820 per additional person in a family. In addition to minority populations and populations below poverty level, Title VI requires that age, gender, and disability status be examined during the screening process. For this study, age is analyzed for populations of persons 60 and older, gender is analyzed for populations of female heads of households with children under 18 years old and no husband present, and disability is analyzed for populations of persons with disabilities, including work disability status by mobility and self-care limitation. Census data for 2000 were compiled for communities adjacent to the project area as well as the floodplain below Black Canyon Dam. The data are based on a series of U.S. Census Block Groups (BGs) that cover the study area. This area includes one Census Tract (CT) that consists of two distinct BGs (Figure 4).

Demographic data were collected from Summary File 3 on the U.S. Census Bureau Web site on August 7, 2008 (www.census.gov). The data were collected to assess the demographic composition adjacent to the project area and the floodplain below Black Canyon Dam (Tables 5 and 6). Because the project area and the affected floodplain are solely within Navajo County, this county is used as a comparative population. According to the data, populations protected by Title VI do not occur in either of the two BGs.

Socioeconomics

The project area is located in the southwestern portion of Navajo County. In 2007, the county had a population of 113,796, a workforce of 38,347 individuals, and a 6.4 percent unemployment rate. Major industries in the county are mining and construction, educational and health services, and professional and business services (Arizona Department of Commerce 2008a).

Heber-Overgaard is the closest community to the project area, which in 2000 had a population of 2,722 and in 2007 a work force of 1,137 and an unemployment rate of 1.6 percent. Principal economic activities are retirement and tourism and associated service businesses. Proximity to the ASNFs enhances recreational and tourism opportunities. Other employment is provided by a saw mill, paper mill, government, schools, retail trade, and construction (Arizona Department of Commerce 2008b). An estimated 30 to 35 property owners were identified within the 100-year floodplain in Heber-Overgaard, downstream of Black Canyon Dam.

The project area lies along the Mogollon Rim, which supports a number of man-made lakes and provides recreational opportunities such as boating, fishing, sightseeing, hunting, camping, and picnicking (Arizona Department of Commerce 2008b). These activities have a significant economic impact on the state, counties, and communities. For 2001, the AGFD estimated that fishing and hunting contributed $958 million in expenditures, $314 million in salaries and wages, 17,190 full- and part-time jobs, and $58.2 million in state tax revenues. Fishing-related expenditures alone totaled $831.5 million in the state of Arizona and $28.9 million in Navajo County. For the latter, this included 15.5 million in trip-related expenditures (food, restaurants, lodging, transportation, etc.) and $13.4 million in equipment expenditures (AGFD 2002). Non-consumptive wildlife recreation had an estimated economic impact of $1.5 billion in Arizona in 2001. Approximately $87 million and 452 full- or part-time jobs were generated in Navajo County during this period (Southwick Associates 2003). The AGFD collects boating registration fees for all motorized watercraft, 15 percent of which goes to the state lake improvement fund for recreational facilities and design engineering jobs. Taxes levied on the sale of hunting and fishing equipment, license and permit fees collected, and motorboat fuel contribute to state funding to manage or improve fish and wildlife resources.

Table 5. 2000 racial and ethnic demographics

Area	Total Population	White		African American		Native American		Asian		Pacific Islander		Other Race		Two or More Races		Hispanic	
		#	%	#	%	#	%	#	%	#	%	#	%	#	%	#	%
CT 9607 BG 1	1,227	1,115	90.9	0	0	0	0	14	1.2	0	0	26	2.1	0	0	59	4.8
CT 9607 BG 2	3,402	3,188	93.7	5	0.1	40	1.2	0	0	0	0	35	1.0	28	0.8	156	4.5
Total BGs	4,629	4,303	93.0	5	0.1	40	0.9	0	0	0	0	61	1.3	28	0.6	215	4.6
Navajo County	97,470	89,622	91.9	908	0.9	46,723	47.9	156	0.2	82	>0.1	3,165	3.2	1,807	1.9	7,808	8.0

Source: U.S. Census Bureau 2008.

BG = Block Group, CT = Census Tract, # = Number, % = Percentage

Table 6. 2000 total minority, 60 and older, below poverty level, disabled, and female head of household populations

Area	Total Population	Total Minority[a]		60 and Older		Total Population for Whom Disabled Is Determined	Disabled		Total Population for Whom Poverty Is Determined	Below Poverty Level		House-holds	Female Head of Household	
		#	%	#	%		#	%		#	%		#	%
CT 9607 BG 1	1,227	112	9.1	252	20.5	1,169	224	19.2	1,227	295	24.0	368	15	4.0
CT 9607 BG 2	3,402	214	6.3	1,116	32.8	3,251	694	21.3	3,388	468	13.8	1,030	48	4.6
Total BGs	4,629	326	7.0	1,368	29.5	4,420	918	20.8	4,615	763	16.5	1,398	63	4.5
Navajo County	97,470	7,848	8.0	13,662	14.0	87,171	19,514	22.4	95,084	28,054	29.5	23,160	2,968	12.8

Source: U.S. Census Bureau 2008.

BG = Block Group, CT = Census Tract, # = Number, % = Percentage

[a] "Total Minority" is composed of all people who consider themselves Non-White racially plus those who consider themselves White Hispanic.

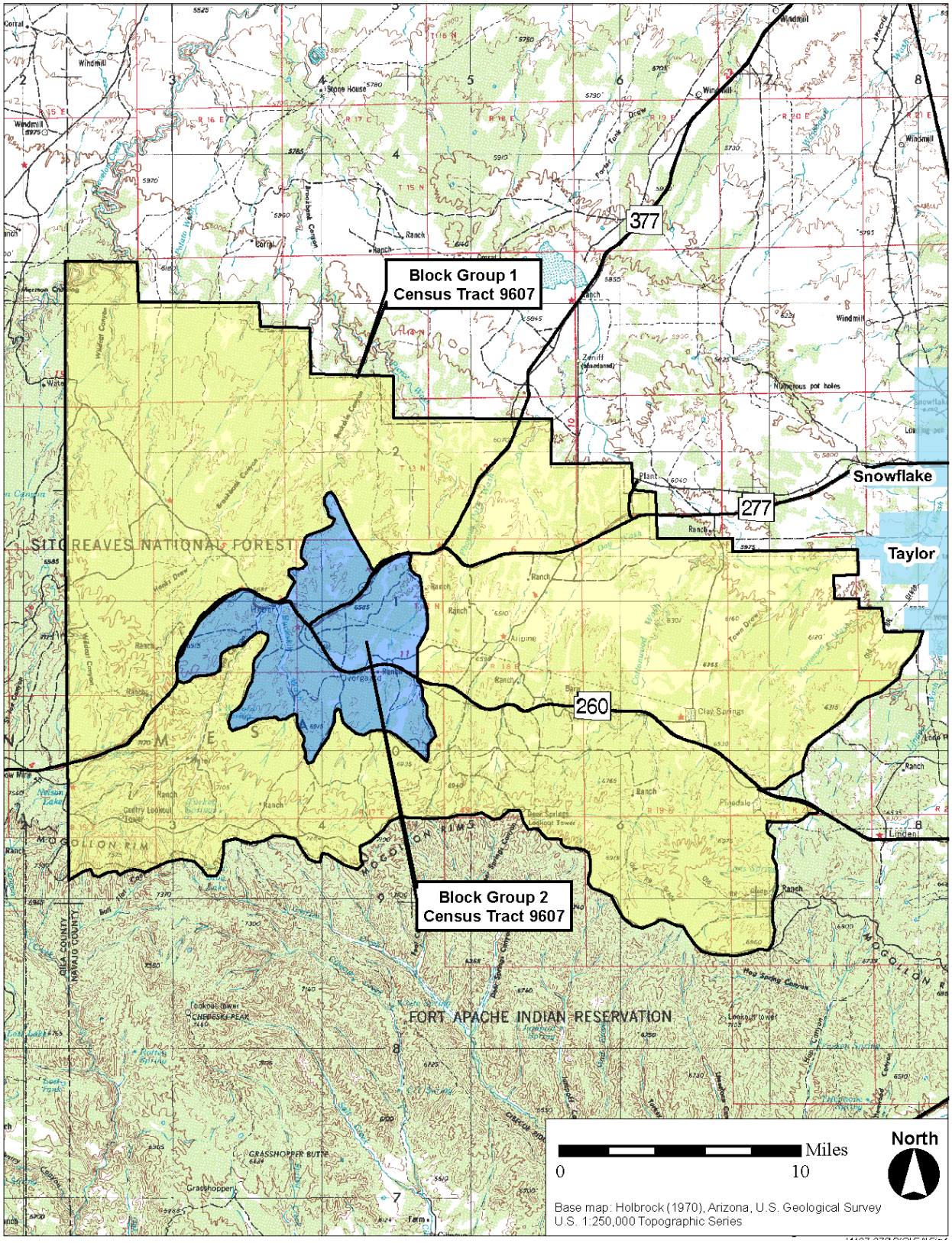

Figure 4. U.S. Census Block Groups in the study area

Environmental Consequences

Alternative 1–Modified Proposed Action

General Recreation Use

Alternative 1 would have temporary, short-term effects and some permanent effects to general recreation use at Black Canyon Lake. Trails #612 and #613 that circle the perimeter of the lake would have restricted access in the vicinity of the dam, including the section that traverses the top of the existing dam, during construction and post-construction reseeding. The areas of the lake in the vicinity of the dam would also have recreational use restrictions during this period. The grading of the dam access road would not affect general recreation use because the road is not accessible by the public. The Brookbank Pit is an existing materials borrow pit and is not generally used as a recreational area. However, dust from construction traffic from the Brookbank Pit may affect campers at the Brookbank throw-down area.

Expansion of the parking lot and improvement of the boat ramp would affect recreational use patterns by facilitating use of the lake by boats with up to 10-horsepower gasoline motors. This would likely result in increased use of the lake by these types of watercraft and an increase the average number of watercraft on the lake. It would also result in an increase in ambient noise levels from operation of motors, both for boaters and recreationists on shore. Currently, most of the recreational use involves fishing from the shoreline; boating/fishing on the lake on canoes, kayaks, and smaller watercraft that are non-motorized or have electric trolling motors; some motorized watercraft; and hiking and picnicking around the lake perimeter.

Recreation Opportunity Spectrum

The modified proposed action would not result in a change in the Semi-primitive Motorized and Roaded Natural settings that occur in the project area, and the standards and guidelines set by the Forest Service for managing these settings would be upheld. Visitors to Black Canyon Lake would have short-term pedestrian and boating access restrictions in the vicinity of the dam during construction activities. After construction, public motorized vehicles would continue to be restricted on the dam access road.

Recreational access to the parking lot and boat launch would be temporarily restricted or reduced during the construction period. After completion, these facilities would provide more parking opportunities for recreationists and improved access to the lake for boaters and fishermen. The new boat launch would allow improved access for motorized boats on the lake.

Public Safety

The modified proposed action would result in improvements to Black Canyon Dam that would allow it to retain larger inflow events. Specifically, it would prevent potentially catastrophic flooding (i.e., overtopping of the existing dam crest and potential dam failure) during events up to and including the IDF. The IDF is estimated to be approximately 50 percent of the PMF (~10,000-year return interval event). Implementation of the proposed action would lead to ADWR reclassification of the dam as safe. The proposed action would not prevent potential overtopping of the dam during events in excess of the IDF. Construction of the boat launch, expanded parking lot, and associated facilities would not affect public safety.

Aesthetic Resources

Within middle-ground and background views, increasing the crest height of the dam by 6 feet would not create a major obstruction to the visual range from the lake. This increased height would likely be imperceptible from most viewpoints, which are mainly concentrated around the developed boat ramp and parking areas at the opposite end of the lake. Foreground views in the direct vicinity of the dam would be modified by construction activities, but this effect would be mostly temporary in nature. Except for the removal of some ponderosa pines at the base of the downstream side of the dam, revegetation of disturbed areas would result in semi-natural visual characteristics similar to the existing conditions. Reconstruction of the concrete spillway and stilling basin would not substantially change the overall modified characteristics of these areas. Therefore, the modified proposed action would have short- to mid-term impacts to the visual aesthetic character of the dam construction site until revegetation is completed.

Additional fill material excavated for the dam at the Brookbank Pit would not constitute a significant change to the existing disturbed visual character of this site.

Proposed dam improvements and use of an existing borrow pit would result mostly in short- to mid-term impacts on visual quality. The VQOs of Retention and Partial Retention would be met because the proposed activities, considering the existing improvements in these areas, would not be visually evident or would remain subordinate to the current landscape characteristic, and contrasts in form, line, color, and texture would be reduced by revegetation of disturbed areas after construction.

Construction of the boat launch, expansion of the parking lot, relocation of toilets, and construction of the picnic ramada would not substantially change the visual character of this area, which currently includes the existing boat launch, parking area, and toilets. These activities would meet the VQI of Partial Retention.

Environmental Justice

Populations protected by Title VI would not be disproportionately affected by the modified proposed action.

Socioeconomics

Expansion of the parking lot and improvement of the boat ramp would facilitate boats with up to 10-horsepower gasoline motors to use the lake and would likely increase use of the lake by boaters. These improvements would result in an overall increase in recreational use of the area and associated benefits to the state, Navajo County, and local communities (Heber-Overgaard) in the form of increased recreation-related expenditures and tax revenues.

The proposed dam improvements would have limited socioeconomic impacts. Construction activities would take place primarily at the dam site and the existing borrow pit. Closure of portions of the trail system and the lake near the dam site would not substantially affect the amount of recreational use or the number of visitors to Black Canyon Lake, or overall revenue streams from recreational activities. Improvement of the dam would result in an estimated 25 construction-related jobs for a period of 5 to 6 months. The labor force for this work would likely come from outside of Navajo County, although service businesses in Heber-Overgaard would likely see an increase in business from construction personnel. Improvement of the dam would enhance protection of downstream properties in the Heber-Overgaard area from catastrophic dam failure and flooding and would enhance long-term recreational opportunities and associated socioeconomic benefits generated by the lake.

Completion of the boat launch and expansion of the parking area would provide improved opportunities for motorized boating on Black Canyon Lake and increased recreational use of the lake by boaters. The increase in overall recreational use of the area would provide some socioeconomic benefit for businesses in nearby communities.

Alternative 2–No Action

General Recreation Use

The No Action alternative would not affect general recreation use at Black Canyon Lake. Visitors to the lake would not experience temporary access restrictions in the vicinity of the dam. There would be no construction-related increase in fugitive dust emissions at the Brookbank throw-down area.

Under this alternative, visitors would continue to use the existing parking area and boat launch. The existing facilities would limit use of the lake by motorized boats by restricting parking space for boat trailers and providing inadequate boat launching opportunities when lake levels are low.

Recreation Opportunity Spectrum

No change would occur to the existing ROS settings as a result of the No Action alternative. Visitors' recreational experiences would not be affected.

Public Safety

Under this alternative, an IDF event would result in the overtopping of the existing dam crest, resulting in potential dam failure and a potentially serious downstream hazard to human health, safety, and property (primarily in the Heber-Overgaard area).

Aesthetic Resources

The No Action alternative would not change the current visual aesthetic character of the dam construction site, Black Canyon Lake, the Brookbank Pit, or the existing parking lot/boat launch area. This alternative would meet the Retention and/or Partial Retention VQOs of the affected areas.

Environmental Justice

Populations protected by Title VI would not be disproportionately affected by the No Action alternative.

Socioeconomics

Under this alternative, no construction-related jobs would be created, and there would be no associated temporary business revenue increases in Heber-Overgaard. Potential dam overtopping during an IDF event could compromise the integrity of the dam and negatively affect long-term recreation-related socioeconomic benefits associated with Black Canyon Lake. Potential downstream flooding during an IDF event could result in damage to an estimated 30 to 35 properties located in downstream floodplain zones in the Heber-Overgaard area.

Under this alternative, revenues to businesses in surrounding communities would not change substantially.

Cumulative Effects

General Recreation Use

Past fire salvage activities in the vicinity of the project have decreased the desirability of some areas for recreational users, though vehicular access is already largely restricted to existing FRs and designated campgrounds and recreation sites. Potential future prescribed burning may reduce pedestrian recreational uses such as hiking, picnicking, and wildlife watching in some areas, though these effects would be temporary and generally limited to one growing season.

Recreation Opportunity Spectrum

There would be no cumulative effects to ROS settings from past, present, or reasonably foreseeable future actions.

Public Safety

Past and continued livestock grazing in portions of the Gentry Pasture, completed fire salvage activities, and future prescribed burning may result in a cumulative increase in runoff potential in the watershed above Black Canyon Lake. Current watershed conditions, as affected by past actions, were considered in the proposed dam improvement design. Future management actions within the watershed, including prescribed burning, would be subject to additional analysis under NEPA.

Aesthetic Resources

Past actions such as livestock grazing and fire salvage activities have changed viewshed characteristics from a natural to a more disturbed or altered setting. Potential future prescribed burning in the project area would change visual characteristics at a site-specific scale, though these effects would be temporary and generally limited to one growing season.

Environmental Justice

Based on the relevant census data, there is no evidence that either alternative would result in disproportionate cumulative effects on any populations protected by Title VI.

Heritage and Cultural Resources

Cultural resources are properties that reflect the heritage of local communities, states, and nations. Properties judged to be significant and to retain sufficient integrity to convey that significance are termed “historic properties” and are afforded certain protections in accordance with state and federal legislation. The National Historic Preservation Act defines historic properties as sites, buildings, structures, districts, and objects included in, or eligible for inclusion in, the National Register of Historic Places, as well as the artifacts, records, and remains related to such properties. The area of potential effects was inventoried for cultural resources as reported by Larkin (2007) [10] and Luchetta (2008) [11]. No cultural resources were identified. Therefore, the ASNFs issued an Inventory Standards and Accounting Form dated 29 October 2008 [12] with a determination of No Historic Properties Affected–No Properties Present.

Environmental Consequences

Alternatives 1 and 2

Neither alternative would have a direct, indirect or cumulative effect on cultural resources because no sites are present in the area of potential effects.

Plant Communities

Plant communities in the project area are best described as ponderosa pine *(Pinus ponderosa)*–dominated Rocky Mountain (Petran) conifer forest, with some New Mexico locust *(Robinia neomexicana),* Gambel oak *(Quercus gambelii),* Arizona white oak *(Quercus arizonica),* scattered quaking aspen *(Populus tremuloides),* and Douglas-fir *(Pseudotsuga menziesii).* Portions of the project area have been affected by the Rodeo-Chediski Fire of 2002 [13].

At the existing Black Canyon Dam, grasses and shrubs have grown within the disturbed soils along the top and side slopes. Several ponderosa pine trees have grown on the downstream slope of the dam, some individuals reaching a height of 20 feet or more. A narrowleaf cottonwood *(Populus angustifolia)* and a willow *(Salix monticola)* are located adjacent to the stilling basin. As a result of the Rodeo-Chediski Fire, most trees on the forested slopes of the West Fork of Black Canyon at both ends of the dam were killed, though the trees on the downstream slope of the dam and adjacent to the stilling basin were not affected. Within the post-fire succession community, New Mexico locust and young Gambel and Arizona white oak grow abundantly, sometimes forming dense thickets of small trees or saplings. The West Fork of Black Canyon Creek immediately below the dam is ephemeral and supports no riparian vegetation, though some narrowleaf cottonwoods and box elder *(Acer negundo)* occur farther downstream outside the project area. The dam access road runs through ponderosa pine forest that has also been affected in part by the previous wildfire and associated salvage activities.

The Brookbank Pit is located within the ponderosa pine community unaffected by the Rodeo-Chediski Fire.

Vegetation near the Black Canyon Lake parking lot consists of dense thickets of post-fire successional communities such as New Mexico locust, Gambel oak, and Arizona white oak. As a result of the Rodeo-Chediski Fire, most of the ponderosa pine trees growing in this area were killed. Approximately 20 relatively young, even-aged ponderosa pine trees immediately west of the Black Canyon Lake parking lot survived the fire.

Environmental Consequences

Alternative 1–Modified Proposed Action

The modified proposed action would result in the removal of several ponderosa pines growing on the downstream slope of the dam and the removal of one narrowleaf cottonwood and one willow near the stilling basin. Removal of these trees would be permanent because trees would not be allowed to reestablish on or near the dam to maintain its structural integrity. Some permanent removal of trees and other vegetation would occur along the dam access road as a result of the proposed widening.

The modified proposed action would result in the temporary removal and/or disturbance of grasses and shrubs at the dam site construction area. This would affect an area of approximately 5 to 6 acres. Native grasses and forbs would reestablish over time and as a result of reseeding of disturbed areas.

Excavation at the Brookbank Pit would be limited to the previously disturbed area. This activity would result in the removal of some sapling ponderosa pines and shrubby and herbaceous growth that has occurred since the last time this site was used for borrow material.

Expansion of the parking lot and improvement of the boat ramp to facilitate use of motorized boats on Black Canyon Lake would result in the permanent elimination of approximately 2 acres of vegetation, a majority of which was burned in the Rodeo-Chediski Fire.

Alternative 2–No Action

Under this alternative, there would be no permanent removal of trees on or near the dam and along the dam access road, no temporary disturbance of vegetation at the Brookbank Pit, and no removal of vegetation in the parking lot/boat launch area.

Cumulative Effects

Past actions, such as the 2002 wildfire, livestock grazing, and fire salvage activities, have changed vegetation communities from more natural to more disturbed or altered conditions. Potential future prescribed burning in the project area would limit understory growth and promote growth of herbaceous groundcover.

Threatened and Endangered Species

The potential occurrence of federally listed or candidate species is limited to the threatened Mexican spotted owl *(Strix occidentalis lucida)* (MSO). The project area is located within designated critical habitat for this species and occurs in the vicinity of three Protected Activity Centers (PACs) designated by the ASNFs.

The MSO nests in steep, forested, and deep canyon terrain along the Mogollon Rim across the ASNFs. MSO nesting takes place from March to August. The vegetation community within typical MSO habitat consists of mixed conifer forest with a well-developed understory. Primary constituent elements for the MSO in these forested habitats are a high basal area of large-diameter trees, a moderate to high canopy closure, an uneven-aged stand structure, a multilayered canopy, a high snag basal area, a high volume of fallen trees and other woody debris, a high plant species richness, and a residual plant cover for prey species (U.S. Fish and Wildlife Service [USFWS] 2004). The Recovery Plan (USFWS 1995) identifies several categories of lands or habitats based on their importance in supporting nesting, roosting, and foraging habitat for MSOs. PACs are 600-acre areas of protected habitat established around sites currently or historically occupied by MSOs where management activities are limited and/or restricted (i.e., Protected Areas). Restricted Areas (mixed-conifer, pine-oak, and riparian forest types) are areas that are not currently or historically occupied by MSOs but with prescribed management guidelines may be able to support MSO activities in the future. Other Forest and Woodland Types (ponderosa pine and spruce-fir forest, aspen, and pinyon-juniper woodland) are generally not used for nesting or roosting but may be used for foraging, dispersal, and/or wintering habitat. These areas are not protected and do not have specific management guidelines.

The project area is located within designated critical habitat Unit UGM-7. Forest Service biologists and technicians and AGFD biologists have conducted surveys for this species on the Black Mesa Ranger District using the USFWS-developed protocol. The project area is located near but outside PACs designated by the ASNFs. Three PACs are located from 300 feet to 0.5 mile from the project site.

Environmental Consequences

Alternative 1–Modified Proposed Action

Table 7 summarizes the effects findings on MSO and other threatened and endangered species listed as potentially occurring on the Black Mesa Ranger District.

The modified proposed action would not adversely affect MSO habitat. The project area is characterized as relatively open, even-aged ponderosa pine forest that has been affected by the original construction of Black Canyon Dam, recreational improvements in the vicinity of the lake, and a recent severe wildfire. As a result, primary constituent elements are lacking and, therefore, the proposed construction activities would not result in adverse modification of critical habitat in Unit UGM-7. Furthermore, no construction activities would take place in Protected or Restricted areas.

Table 7. Summary of effects of the proposed action on threatened and endangered species

Species	Status	Effects Finding
Mexican spotted owl *Strix lucida occidentalis*	Threatened	Likely to adversely affect the Mexican spotted owl but not likely to adversely affect Mexican spotted owl critical habitat
Black-footed ferret *Mustela nigripes*	Endangered	No effect
Southwestern willow flycatcher *Empidonax traillii extimus*	Endangered	No effect
Chiricahua leopard frog *Lithobates (Rana) chiricahuensis*	Threatened	No effect
Little Colorado spinedace *Lepidomeda vittata*	Threatened	No effect

Construction activities are likely to adversely affect Mexican spotted owls. Construction activities with sudden loud noise pulses, such as blasting and jackhammering, may cause adult or young MSOs to flush from nests or roosts and could result in nest failure. This would most likely affect the closest PAC to the project area (approximately 300 feet away), where MSOs have recently been observed, but could also affect a second PAC in the project vicinity. All project activities, including hauling of materials and equipment along existing access roads, would take place outside PAC boundaries designated by the ASNFs, and there would be no removal of trees from protected or restricted areas. All activities would occur only during daylight hours, when MSOs are less active.

Expansion of the parking lot, construction of the new boat launch, and associated activities would take place between September 1 and February 28 (outside of the MSO breeding season) and would therefore not result in disturbance effects to nesting MSO. These improvements would result in permanent removal of approximately 2 acres that may represent occasional foraging habitat for MSO. Increased use of the lake by boats with up to 10-horsepower gasoline motors would increase ambient noise levels in the project area. This would be limited to daylight hours when MSOs are less active and would not be expected to adversely affect breeding, foraging, or dispersal activities.

A Biological Evaluation was prepared for the proposed action (Ecoplan 2009a) [14] and has been submitted to the USFWS for formal consultation under section 7 of the Endangered Species Act.

Alternative 2–No Action

The No Action alternative would have no effect on the MSO. Potential overtopping of Black Canyon Dam during an IDF would not result in inundation of nearby PACs.

Cumulative Effects

Past salvage activities and future prescribed burning may improve foraging habitat for MSOs by promoting herbaceous ground cover and increasing prey populations in the project area.

Forest Service Sensitive Species

Effects of the modified proposed action on Forest Service sensitive species are described in a Biological Evaluation (EcoPlan 2009b). [15]

The following Forest Service sensitive species have not been recorded in the project area but have the potential to occur: Merriam's shrew *(Sorex merriami leucogenys),* long-tailed vole *(Microtus longicaudus),* Allen's big-eared bat *(Idionycteris phyllotis),* peregrine falcon *(Falco peregrinus anatum),* zone-tailed hawk *(Buteo albonotatus),* Arizona toad *(Bufo microscaphus microscaphus),* Northern leopard frog *(Rana pipiens),* Arizona sneezeweed *(Helenium arizonicum),* Blumer's dock *(Rumex orthoneurus),* and Bebb willow *(Salix bebbiana).*

Two Northern goshawk *(Accipiter gentilis)* post-fledgling family areas are within 0.5 mile of the project area, and the Black Canyon Lake area is used by wintering bald eagles *(Haliaeetus leucocephalus).*

Environmental Consequences

Alternative 1–Modified Proposed Action

Table 8 summarizes the effects findings on Forest Service sensitive species under the proposed action.

The modified proposed action would disturb and remove vegetation from up to 6 acres of potential habitat for the Merriam's shrew, long-tailed vole, Arizona toad, Northern leopard frog, Arizona sneezeweed, Blumer's dock, and Bebb willow in the drainage immediately below Black Canyon Dam. The modified proposed action would also affect up to 6 acres of potential foraging habitat for the Allen's big-eared bat, potential foraging and perching habitat for the zone-tailed hawk and the Northern goshawk, and potential perching habitat for the peregrine falcon and the bald eagle.

Construction noise is not expected to adversely affect sensitive species. Post-fledgling areas for Northern goshawks are located more than 0.5 mile from the dam site, and blasting and jackhammering would not adversely affect breeding activities. Construction-related activities would likely discourage use of areas near the dam site by foraging goshawks and bald eagles. This would be a temporary effect and would not be expected to negatively affect overall energy budgets.

Expansion of the parking lot and improvement of the boat ramp to facilitate use of motorized boats on Black Canyon Lake would result in the permanent elimination of approximately 2 acres of potential habitat for Merriam's shrew and the long-tailed vole, Allen's big-eared bat (potential foraging habitat), and the Northern goshawk, the peregrine falcon, the bald eagle, and the zone-tailed hawk (perching and

foraging habitat). The importance of this area to these species is likely to be limited by its location adjacent to an area of relatively high human activity (existing parking lot and boat ramp).

Table 8. Summary of effects of the proposed action on Forest Service sensitive species

Species	Status	Effects Finding
Merriam's shrew *Sorex merriami leucogenys*	Forest Service sensitive	May impact individuals of this species but is not likely to result in a trend toward federal listing or loss of viability.
Long-tailed vole *Microtus longicaudus*	Forest Service sensitive	May impact individuals of this species but is not likely to result in a trend toward federal listing or loss of viability.
Allen's big-eared bat *Idionycteris phyllotis*	Forest Service sensitive	May impact individuals of this species but is not likely to result in a trend toward federal listing or loss of viability.
Northern goshawk *Accipiter gentilis*	Forest Service sensitive	May impact individuals of this species but is not likely to result in a trend toward federal listing or loss of viability.
American peregrine falcon *Falco peregrinus anatum*	Forest Service sensitive	May impact individuals of this species but is not likely to result in a trend toward federal listing or loss of viability.
Bald eagle *Haliaeetus leucocephalus*	Forest Service sensitive	May impact individuals of this species but is not likely to result in a trend toward federal listing or loss of viability.
Zone-tailed hawk *Buteo albonotatus*	Forest Service sensitive	May impact individuals of this species but is not likely to result in a trend toward federal listing or loss of viability.
Arizona toad *Bufo microscaphus microscaphus*	Forest Service sensitive	May impact individuals of this species but is not likely to result in a trend toward federal listing or loss of viability.
Northern leopard frog *Rana pipiens*	Forest Service sensitive	May impact individuals of this species but is not likely to result in a trend toward federal listing or loss of viability.
Arizona sneezeweed *Helenium arizonicum*	Forest Service sensitive	May impact individuals of this species but is not likely to result in a trend toward federal listing or loss of viability.
Blumer's dock *Rumex orthoneurus*	Forest Service sensitive	May impact individuals of this species but is not likely to result in a trend toward federal listing or loss of viability.
Bebb's willow *Salix bebbiana*	Forest Service sensitive	May impact individuals of this species but is not likely to result in a trend toward federal listing or loss of viability.

After construction activities, disturbed areas would be reseeded and potential habitat conditions allowed to reestablish for sensitive mammal, amphibian, and plant species. There would be some permanent or long-term loss of potential perch sites for the peregrine falcon, the bald eagle, the zone-tailed hawk, and the Northern goshawk in the project area, but there would not be a significant reduction in the overall availability of potential perch sites in the area. The modified proposed action could impact individuals of all of the aforementioned Forest Service sensitive species but would not be likely to result in a trend toward federal listing or loss of viability for any of them.

Alternative 2–No Action

Potential overtopping of Black Canyon Dam during an IDF would impact potential habitat for Forest Service sensitive species in the area immediately below the dam, at least over the short term.

Cumulative Effects

Past salvage activities and future prescribed burning may improve habitat conditions for Merriam's shrew and the long-tailed vole by promoting herbaceous ground cover.

Management Indicator Species (MIS)

The Forest Planning Regulations require that certain species whose population changes are believed to indicate the effects of management activities be selected and evaluated in forest planning alternatives (CFR 219.19). The Planning Regulations also require that the population trends of management indicator species be monitored and that relationships to habitat changes be determined (CFR 219.19). Specific management direction for MIS is also found in FSM 2600. Policy and direction that tiers from CFR 219.19 is provided for MIS for application at the Forest Plan and project levels relative to species selection, habitat analysis, monitoring and evaluation, and other habitat planning considerations, in FSM 2620. FSM 2630 provides guidance on improving MIS habitat and conducting habitat examinations and project-level evaluations for MIS in the project area. Effects of the proposed action on MIS are described in a Wildlife Specialist Report (EcoPlan 2009c). [16]

The following MAs in the ASNFs identify applicable MIS in the Black Canyon Dam Improvements project area: MA-1: Forest Lands and MA-11: Water. Brian Dykstra, the wildlife staff officer for the Black Mesa Ranger district, provided a list of the MIS relevant to these MAs and the project area. Information of indicator identification and habitat and population trends is summarized from the ANSF 2006 MIS analysis (ASNF 2006). Table 9 summarizes acres of habitat and current habitat availability trends for MIS in the project area.

Hairy woodpecker *(Picoides villosus)*

On the ASNFs, the hairy woodpecker is an MIS for snags in all forest habitat types. Currently, habitat quality for the hairy woodpecker on the ASNFs is considered fair, with an upward trend due to increases in snags, ongoing forest growth, and declining timber harvest. Populations are considered stable, though habitat conditions and population numbers are below their potential (ASNF 2006).

Red-naped (yellow-bellied) sapsucker *(Sphyrapicus nuchalis)*

On the ASNFs, the red-naped sapsucker is an MIS for aspen snags and is typically associated with deciduous and deciduous/coniferous forests, especially aspen and riparian woodlands. At this time, available habitat quality for the red-naped sapsucker on the ASNFs is fair, with a stable trend, though considered well below potential. Currently, red-naped sapsucker populations on the ASNFs are considered to be stable but likely lower than potential due to fire suppression (ASNF 2006).

Northern goshawk *(Accipiter gentilis)*

On the ASNFs, the Northern goshawk is an MIS for late succession. At this time, available habitat quality for the goshawk is fair, with a slight downward trend due to recent wildfires. Currently, goshawk populations on the ASNFs are considered to be stable but likely lower than potential (ASNF 2006).

Table 9. Summary of MIS habitat in the project area by MA

Management Area/ Vegetation Type/Species	Indicator or Key Habitat Condition	Indicator or KHC Trend (acres)			Total Acres
		Upward	Downward	Stable	
MA-1 (4-1, 5-1) Forested Land					
Hairy woodpecker	Snags	X			6
Red-naped sapsucker	Snags (aspen)			X	6
Northern goshawk	Late succession		X		6
Turkey	Late succession	X			6
Pygmy nuthatch	Late succession	X		X	6
Mexican spotted owl	Late succession			X	6
Elk	Early succession	X			6
Mule deer	Early succession	X			6
Abert's squirrel	Early succession			X	6
Red squirrel	Late succession	X			0
MA-11 (4-11, 5-11) Water					
Cinnamon teal	Wetlands			X	6

Turkey *(Meleagris gallopavo merriami)*

On the ASNFs, the turkey is an MIS for late-succession habitat and is typically found in ponderosa pine as well as riparian, deciduous, oak, and other vegetation types. Currently, there appears to be an upward trend in the amount of late-succession habitat due to protection of existing and potential old-growth areas, decreasing harvest levels, and high net annual growth rate. Turkey populations on the ASNFs are considered to be stable at this time and likely near potential (ASNF 2006).

Pygmy nuthatch *(Sitta pygmaea)*

On the ASNFs, the pygmy nuthatch is an MIS for late succession and is generally thought to be an indicator of snags in mature or "old growth" ponderosa pine. Available habitat quality for the pygmy nuthatch is considered fair, with an upward trend due to increases in snags, ongoing forest growth, and declining timber harvest. Currently, pygmy nuthatch populations on the ASNFs are considered to be stable but likely lower than potential (ASNF 2006).

Mexican spotted owl *(Strix occidentalis lucida)*

The MSO is an MIS for late succession on the ASNFs. Available habitat quality for the spotted owl is low, with a slight downward trend due to recent wildfires. Habitat on unburned portions of the ASNFs is likely improving due to protection of existing and potential old-growth areas, decreasing harvest levels, and high net annual growth rate, though actual improvements in the quality of late succession management areas will take many decades. Currently, spotted owl populations on the ASNFs are considered to be stable but likely lower than potential.

Elk *(Cervus elaphus)*

Elk is an MIS for early-succession habitat on the ASNFs. Based on the information currently available, there appears to be an upward trend in the amount of early-succession habitat due primarily to the effects of wildfire. The trend in the quality of early-succession habitat appears to be stable, but grasslands are

generally in poor condition and well below potential. Based on state population data and objectives for elk in these hunt units, elk populations on the ASNFs are considered to be stable but likely above carrying capacity (ASNF 2006).

Mule deer *(Odocoileus hemionus)*

On the ASNFs, mule deer is an MIS for early-succession habitat and was selected as an MIS for the spruce fir, mixed conifer, ponderosa pine, and pinyon juniper habitat components. Based on information currently available, there appears to be an upward trend in the amount of early-succession habitat due primarily to the effects of wildfire. The trend in the quality of early-succession habitat appears to be stable. Currently, mule deer populations on the ASNFs are considered to be in a downward trend and likely near potential (ASNF 2006).

Abert's squirrel *(Sciurus aberti)*

Abert's squirrel is listed as an MIS for early-succession ponderosa pine habitat, though it is currently thought to be a better indicator of more mature ponderosa pine forest. Based on information currently available, there appears to be an overall upward trend in late succession and mature ponderosa pine habitat due to reduced harvest levels and continuing strong forest growth. Currently, Abert's squirrel populations on the ASNFs are considered to be stable and likely somewhat below potential due to less than ideal forest structure in ponderosa pine habitats and drought conditions (ASNF 2006).

Red squirrel *(Tamiasciurus hudsonicus mogollonensis)*

On the ASNFs, the red squirrel is an MIS for late-succession habitat. Rarely found lower than about 7,500 feet elevation above mean sea level, these squirrels inhabit the cooler mixed conifer, aspen, spruce, and fir forest types on mountain summits, chilly ravines, and near cold or boggy areas within the deeper forest. Based on information currently available, the current habitat condition for this species is fair to good, with an overall upward trend in late succession habitat in mixed conifer, spruce, and aspen due to reduced harvest levels, continuing strong forest growth, and endemic insect infestations. Currently, red squirrel populations on the ASNFs are considered to be stable and likely near potential (ASNF 2006).

Cinnamon teal *(Anas cyanoptera)*

On the ASNFs, the cinnamon teal is an MIS for wetlands. Wetland habitat quality on the ASNFs ranges from good to poor condition, with an upward trend due to habitat protection projects. The amount of wetland habitat appears stable. Currently, cinnamon teal populations on the ASNFs are considered to be stable but likely below potential due to impacts of livestock grazing, recreation, and drought (ASNF 2006).

Environmental Consequences

Alternative 1–Modified Proposed Action

Effects to MIS under the proposed action are summarized in Table 10 and discussed in the following section.

Table 10. Anticipated effects to MIS under the modified proposed action

Project Name:	**Black Canyon Dam and Recreational Facilities Improvements**
Location: Black Canyon Lake	**Township 11 North, Range 15 East, Sections 13 and 24**
Vegetation type/elevation:	**Ponderosa pine forest/7,025 to 7,070 feet**
Will the Project Alter Vegetation or MIS Habitat?	**X Yes** **No** **If No, sign and date. If yes, explain in Notes/ Further analysis.**

Management Area/Vegetation Type/Species	**Indicator of:**	**Are Species Impacted?**		**Are Impacts Significant?**	
		Likely	**Not Likely**	**Yes**	**No**
MA-1 (4-1, 5-1) Forested Land					
Hairy woodpecker *(Picoides villosus)*	Snags	X			X
Red-naped sapsucker *(Sphyrapicus nachalis)*	Snags (aspen)		X		X
Northern goshawk *(Accipiter gentilis)*	Late succession	X			X
Turkey *(Meleagris galloparvo)*	Late succession	X			X
Pygmy nuthatch *(Sitta pygmaea)*	Late succession	X			X
Mexican spotted owl *(Strix occidentalis lucida)*	Late succession	X			X
Elk *(Cervus elaphus)*	Early succession	X			X
Mule deer *(Odocoileus hemionus)*	Early succession	X			X
Abert's squirrel *(Sciurus aberti)*	Early succession	X			X
Red squirrel *(Tamiasciurus hudsonicus)*	Late succession		X		X
MA-11 (4-11, 5-11) Water					
Cinnamon teal *(Anas cyanoptera)*	Wetlands	X			X

Hairy woodpecker *(Picoides villosus)*

Project construction at the dam site would disturb up to 6 acres of forest habitat. Project activity would remove up to 20 relatively young and even-aged ponderosa pine trees ranging from 10 to 30 feet in height and less than 24 inches in diameter-at-breast-height (DBH), including some snags and dead and down logs. This would reduce habitat and prey base for the hairy woodpecker at the dam site. Expansion of the parking lot and improvement of the boat ramp would result in the permanent removal of approximately 2 acres of potential habitat for hairy woodpeckers. Due to the small area affected, the modified proposed action should not result in changes in overall habitat or population trends for this species on the ASNFs.

Red-naped (yellow-bellied) sapsucker *(Sphyrapicus nuchalis)*

The modified proposed action would remove up to 20 relatively young and even-aged ponderosa pine trees over a 6-acre area, including some snags, but few, if any, aspen. Some recruitment of aspen into the dam site after construction may occur, though there are few, if any, aspen in the immediate vicinity. Any aspen becoming established on or in the immediate vicinity of the dam would be removed to maintain the integrity of the structure. No aspen occur in the area proposed for parking lot expansion and improvement of the boat ramp. Therefore, the modified proposed action would not affect overall habitat or population trends for the red-naped sapsucker on the ASNFs.

Northern goshawk *(Accipiter gentilis)*

The modified proposed action would disturb up to 6 acres of potential foraging habitat for the goshawk and would remove some trees that may be used as perch sites. Approximately 2 acres of potential foraging habitat for the Northern goshawk would be removed to expand the parking lot. Disturbance at the dam site and parking lot/boat launch would have a localized negative effect on potential prey for goshawks, but this would be a temporary effect and would not result in changes in overall habitat or population trends for this species on the ASNFs.

Turkey *(Meleagris gallopavo merriami)*

Project-related disturbance at and below the dam would affect up to 6 acres of habitat for turkey. This would be a localized and temporary effect. Expansion of the parking lot and improvement of the boat ramp would result in the permanent removal of approximately 2 acres of potential habitat turkey. The proposed action should not affect overall habitat or population trends for this species on the ASNFs.

Pygmy nuthatch *(Sitta pygmaea)*

Project construction would disturb up to 6 acres of ASNFs habitat. Project activity would remove up to 20 relatively young and even-aged ponderosa pine trees ranging from 10 to 30 feet in height and less than 24 inches in DBH, including some snags and dead and down logs. This would reduce habitat for the pygmy nuthatch at the dam site. Parking lot expansion and boat ramp improvement would result in the permanent removal of approximately 2 acres of potential habitat for pygmy nutchatches. Due to the small area affected, the proposed action should not result in changes in overall habitat or population trends for this species on the ASNFs.

Spotted owl *(Strix occidentalis lucida)*

The modified proposed action would disturb up to 8 acres of potential foraging habitat for the spotted owl and would remove some trees that may be used as perch sites. Disturbance at the dam site and parking lot/boat launch area would have a localized negative effect on potential prey for spotted owls, but this would be a temporary effect and would not result in changes in overall habitat or population trends for this species on the ASNFs.

Elk *(Cervus elaphus)*

Construction-related disturbance at the dam site would affect up to 6 acres of habitat for elk. This would be a localized and temporary effect. Expansion of the parking lot and improvement of the boat ramp would result in the permanent removal of approximately 2 acres of elk habitat. The modified proposed action should not affect overall habitat or population trends for this species on the ASNFs.

Mule deer *(Odocoileus hemionus)*

The modified proposed action would disturb up to 6 acres of habitat for deer. This would be a localized and temporary effect. Expansion of the parking lot and improvement of the boat ramp would result in the permanent removal of approximately 2 acres of habitat for mule deer. The modified proposed action should not affect overall habitat or population trends for this species on the ASNFs.

Abert's squirrel *(Sciurus aberti)*

Project construction at the dam site would disturb up to 6 acres of Abert's squirrel habitat on the ASNFs. Project activity would remove up to 20 relatively young and even-aged ponderosa pine trees ranging from 10 to 30 feet in height and less than 24 inches in DBH. This would reduce habitat for Abert's squirrel at

the dam site. Expansion of the parking lot would eliminate approximately 2 acres of habitat for Abert's squirrel. Due to the small area affected, the modified proposed action should not result in changes in overall habitat or population trends for this species on the ASNFs.

Red squirrel *(Tamiasciurus hudsonicus mogollonensis)*

No habitat for the red squirrel occurs in the project area; therefore, the modified proposed action would not affect this species.

Cinnamon teal *(Anas cyanoptera)*

The modified proposed action would disturb up to 6 acres of potential nesting habitat for cinnamon teal. This would be a localized and temporary effect and should not affect overall habitat or population trends for this species on the ASNFs. Expansion of the parking lot and construction of a new boat ramp would not affect nesting habitat for cinnamon teal due to existing improvements and the degree of human use that already occurs in this area.

Alternative 2–No Action

Hairy woodpecker *(Picoides villosus)*

Under the No Action alternative, snags and dead and down logs at the dam site (6 acres) would remain in place and would continue to provide potential nesting and foraging resources for hairy woodpeckers, at least over the short-term. Potential overtopping of Black Canyon Dam during an IDF event could result in removal of some snags and dead and down logs in the floodway. Under this alternative, approximately 2 acres of habitat for this species would remain undisturbed. This alternative would not result in changes in overall habitat or population trends for the hairy woodpecker on the ASNFs.

Red-naped (yellow-bellied) sapsucker *(Sphyrapicus nuchalis)*

Under this alternative, the dam site would remain undisturbed, other than the potential removal of some ponderosa pine snags and dead and down logs in the event of a dam overtopping/failure. Approximately 2 acres of pine-oak forest and scrub at the parking lots/boat launch area would remain undisturbed. Because few, if any, aspen occur in these areas, this alternative would not affect overall habitat or population trends for the red-naped sapsucker on the ASNFs.

Northern goshawk *(Accipiter gentilis)*

The dam site would remain undisturbed and would continue to provide potential foraging habitat and perch sites for Northern goshawks under this alternative. Approximately 2 acres of pine-oak forest and scrub at the parking lot/boat launch area would remain undisturbed and would continue to provide potential foraging habitat for goshawks.

Turkey *(Meleagris gallopavo merriami)*

Under the No Action alternative, the dam site would remain undisturbed and would continue to provide potential habitat for turkey. Potential overtopping of Black Canyon Dam during an IDF could result in temporary habitat disturbance in the floodway downstream of the dam but would not affect overall habitat or population trends for the turkey. Approximately 2 acres of pine-oak forest and scrub at the parking lot/boat launch area would remain undisturbed and would continue to provide potential habitat for turkey.

Pygmy nuthatch *(Sitta pygmaea)*

Under this alternative, snags and dead and down logs at the dam site (6 acres) would remain in place and would continue to provide habitat for pygmy nuthatches, at least over the short-term. Potential overtopping of Black Canyon Dam during an IDF could result in removal of some snags and dead and down logs in the floodway but would not result in changes in overall habitat or population trends for the pygmy nuthatch on the ASNFs. Approximately 2 acres of pine-oak forest and scrub at the parking lot/boat launch area would remain undisturbed and would continue to provide potential habitat for the pygmy nuthatch.

Spotted owl *(Strix occidentalis lucida)*

The dam site would remain undisturbed and would continue to provide potential foraging habitat and perch sites for spotted owls under this alternative. Approximately 2 acres of pine-oak forest and scrub at the parking lot/boat launch area would remain undisturbed and would continue to provide potential foraging habitat for spotted owls.

Elk *(Cervus elaphus)*

Under the No Action alternative, the dam site would remain undisturbed and would continue to provide potential habitat for elk. Potential overtopping of Black Canyon Dam during an IDF could result in temporary habitat disturbance in the floodway downstream of the dam but would not affect overall habitat or population trends for the elk. Approximately 2 acres of pine-oak forest and scrub at the parking lot/boat launch area would remain undisturbed and would continue to provide habitat for elk.

Mule deer *(Odocoileus hemionus)*

Under this alternative, the dam site would remain undisturbed and would continue to provide potential habitat for deer. Potential overtopping of Black Canyon Dam during an IDF could result in temporary habitat disturbance in the floodway downstream of the dam but would not affect overall habitat or population trends. Approximately 2 acres of pine-oak forest and scrub at the parking lot/boat launch area would remain undisturbed and would continue to provide habitat for mule deer.

Abert's squirrel *(Sciurus aberti)*

Under the No Action alternative, existing ponderosa pines at the dam site would not be removed and would continue to provide potential habitat for Abert's squirrels, at least over the short-term. Potential overtopping of Black Canyon Dam during an IDF could result in removal of some trees in the floodway but would not result in changes in overall habitat or population trends for the Abert's squirrel on the ASNFs. Approximately 2 acres of pine-oak forest and scrub at the parking lot/boat launch area would remain undisturbed and would continue to provide habitat for Abert's squirrel.

Red squirrel *(Tamiasciurus hudsonicus mogollonensis)*

No habitat for the red squirrel occurs in the project area; therefore, the No Action alternative would not affect this species.

Cinnamon teal *(Anas cyanoptera)*

Under the No Action alternative, the dam site would remain undisturbed and would continue to provide potential nesting habitat for cinnamon teal. Potential overtopping of Black Canyon Dam during an IDF could result in temporary habitat disturbance in the floodway downstream of the dam but would not affect overall habitat or population trends for this species.

Cumulative Effects

Salvage timber harvest and prescribed burning in response to the Rodeo-Chediski Fire of 2002 would benefit foraging habitat conditions for Northern goshawks, Mexican spotted owls, turkeys, elk, and deer; would negatively affect hairy woodpeckers and pygmy nuthatches; and would not affect habitat conditions for cinnamon teal. Prescribed fire would benefit Abert's squirrels. Livestock grazing in riparian areas would negatively affect turkeys, elk, and cinnamon teal through competition for forage or reduction of groundcover.

Migratory Birds

The Migratory Bird Treaty Act (MBTA) of 1918 strives to protect, restore, enhance, and manage populations and habitat of migratory birds and prevent further loss or degradation of remaining habitat. On January 10, 2001, President Clinton signed Executive Order 13186, placing emphasis on conservation of migratory birds. The AGFD recently included special status species responses for projects to cover compliance with the MBTA. These recommendations include minimizing project activities during the breeding season for birds, conducting avian surveys to determine species that may be using the project area, and developing a plan to avoid disturbance during the breeding season. No Forest Service Region 3 or ASNF policies have been developed to provide guidance on how to incorporate migratory birds into NEPA analysis. Advice from Forest Service Region 3 is to analyze effects in the following manner: (1) effects to Species of Concern listed by Partners in Flight, (2) effects to Important Bird Areas (IBAs), and (3) effects to important overwintering areas. Additionally, effects are analyzed to species on the USFWS "Birds of Conservation Concern–2002" list for Bird Conservation Region 16 (Southern Rockies/Colorado Plateau). Effects of the proposed action on migratory birds are documented in a Wildlife Specialist Report (EcoPlan 2009c) [15].

Arizona State Partners in Flight and the USFWS list priority species of concern by vegetation type. The following vegetation types are found in this project: ponderosa pine–dominated forest, which has been affected by the Rodeo-Chediski Fire in June and early July 2002, and early succession recovery areas with low growing patches of Gambel oak and New Mexico locust that often form dense thickets. Some riparian species of trees and shrubs are found in the project area, but not to the level of stand designation. Priority species of concern associated with these vegetation types are the Northern goshawk, the MSO, the peregrine falcon, the olive-sided flycatcher, the golden eagle, the prairie falcon, the cordilleran flycatcher, the purple martin, the flammulated owl, the Grace's warbler, the MacGillivray's warbler, and the red-faced warbler.

According to the Audubon Society Web site, IBAs are not located in or near the project area.

Black Canyon Lake and nearby streams and ponds are not important overwintering areas because they freeze over most winters, do not support a high concentration or diversity of birds, and are not known to support unique bird species.

Environmental Consequences

Alternative 1–Modified Proposed Action

Effects to the Northern goshawk, the MSO, and the peregrine falcon are discussed in the Threatened and Endangered Species or Sensitive Species sections of this EA. Long-term effects under the proposed action to other migratory bird priority species of concern are limited to the permanent removal of approximately 2 acres of pine-oak habitat for expansion of the parking lot. Construction of the dam and recreational improvements would also result in short-term loss of potential foraging habitat, short-term disturbance

associated with vegetation removal, and loss of potential perch sites that could affect the olive-sided flycatcher, the golden eagle, the prairie falcon, the cordilleran flycatcher, the purple martin, the flammulated owl, the Grace's warbler, the MacGillivray's warbler, and the red-faced warbler. The project would not affect range-wide population levels of any migratory bird species. In areas where vegetation is temporarily removed, impacts would be mitigated by reseeding the areas to a semi-natural condition.

No IBAs exist in or near the project area; therefore, none would be affected by the proposed action.

Because Black Canyon Lake is not considered an important overwintering area, the modified proposed action would not affect important overwintering areas.

Alternative 2–No Action

Overtopping of Black Canyon Dam during an IDF could result in some impacts to habitat for migratory birds, though these would likely be short-term and would affect a small proportion of available habitat.

Cumulative Effects

Salvage timber harvest and prescribed burning in response to the Rodeo-Chediski Fire of 2002 may negatively affect nesting habitat for cavity nesters such as the purple martin and the flammulated owl but may improve foraging habitat for the olive-sided flycatcher.

Wetland and Floodplains

No wetlands were identified in the project area. The drainage below Black Canyon Dam is ephemeral and generally lacks surface water. There is a small area immediately below the gate valve at the toe of the dam that periodically ponds a small amount of water, but this area lacks hydric soils and a predominance of hydrophytic vegetation and, therefore, does not represent a wetland.

According to Federal Emergency Management Agency (FEMA) floodplain map 04017C4375E (September 26, 2008), the project area is not within a floodplain. The 100-year floodplain for the ephemeral Black Canyon Creek that flows from Black Canyon Dam begins approximately 3 miles downstream from the dam. At this location, the floodplain is classified as Zone A (no base flood elevations determined). The floodplain extends northeast toward the town of Heber-Overgaard, where it is classified as Zone AE (base flood elevations determined) approximately 10 miles downstream from the dam. The 100-year floodplain for Black Canyon Creek is determined on FEMA floodplain maps 04014C4375E, 04017C4150E, 04017C4163E, 04017C4162E, and 04017C4161E that were published on September 26, 2008.

Environmental Consequences

Alternative 1–Modified Proposed Action

The modified proposed action would not affect wetlands. The modified proposed action would not affect the 100-year floodplain of Black Canyon Creek downstream of the project area because the elevation of the improved concrete spillway would remain the same as the existing spillway. The proposed increased dam crest height would allow the lake to temporarily attenuate a larger volume of inflow into the reservoir during a flood event without breaching the dam crest. The increased height of the improved spillway's sidewalls would decrease the likelihood of a flood event flowing over and behind the sidewalls. These improvements are designed to maintain the current downstream floodplain status while protecting the dam from being overtopped during an IDF (about 50 percent of the modeled PMF, which

has an estimated return interval of about 10,000 years). Because the elevation of the improved spillway would remain the same, the water levels in Black Canyon Lake would not be affected. Downstream areas in the creek's 100-year floodplain Zones A and AE would remain in these classified zones. Because there are no designated floodplains in the project area, there would be no floodplain impacts resulting from the proposed improvements and associated construction activities.

Alternative 2–No Action

The No Action alternative would not affect wetlands. The No Action alternative would not directly affect the 100-year floodplain of Black Canyon Creek downstream of the project area. However, based on current watershed conditions, the existing dam does not meet ADWR requirements to safely withstand an IDF. Under the No Action alternative, the potential exists that Black Canyon Dam would be overtopped during an IDF and cause serious harm and injury to people and property in or near the floodplain fringe in the Heber-Overgaard area downstream from the dam.

Cumulative Effects

There would be no cumulative effects to wetlands or floodplains as a result of the modified proposed action or the No Action alternative.

Chapter 4–Consultation and Coordination

The following federal, state, and local agencies and non–Forest Service persons were consulted during the development of this EA.

Federal, State, and Local Agencies

Arizona Game and Fish Department

Arizona State Land Department

Forest Lakes Fire Department

Navajo County Extension Service

Navajo County Sheriff's Department

U.S. Fish and Wildlife Service

Others

Arizona Wildlife Federation

Center for Biological Diversity

Environmental Economics Communities Organization

Heber-Overgaard Chamber of Commerce

Rim Country Regional Chamber of Commerce

White Mountain Audubon Society

White Mountain Conservation League

Wild Earth Guardians

The Wildlife Federation

The Wildlife Society Arizona Chapter

A complete list of scoping recipients, including property owners, local businesses, and homeowners associations, can be found in the project record.

Chapter 5–References

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Chapter 6–List of Preparers

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Appendix A–Project Record Index

Doc #	Date	Document	Author	Recipient
1	1987	Apache National Forests Land and Resource Management Plan Final Environmental Impact Statement	ASNFs	N/A
2	10-30-87	Apache National Forests Land and Resource Management Plan Environmental Impact Statement–Record of Decision	Sotero Muniz (ASNFs)	N/A
3	6-30-09	Apache Sitgreaves National Forests Plan	ASNFs	N/A
4	2-26-08	Project initiation letter	Fred Green (ASNFs)	Gordon Bleyl (AGFD)
5	7-10-08	Public scoping letter	Kate Klein (ASNFs)	Mailing list
6	6-08	Public scoping mailing list	Elizabeth Dykstra (ASNFs)	Jonathan Rigg (EcoPlan)
7	7-08	Newspaper and online public notices	Jonathan Rigg (EcoPlan)	Holbrook Tribune-News, Payson Roundup, White Mountain Independent, Mogollon Connection
8	7-08	Public notice flier	Jonathan Rigg (EcoPlan)	Various local businesses and public facilities
9	7-9-08	EcoPlan Associates, Inc. 2008. Memorandum from Stephen Hale to Jonathan Rigg describing locations where public notice fliers were posted	Stephen Hale (EcoPlan)	Jonathan Rigg (EcoPlan)

Doc #	Date	Document	Author	Recipient
10	10-3-07	Larkin, Robert A. 2007. A Cultural Resource Investigation of Proposed Modifications to Black Canyon Lake Dam and Spillway, Navajo County, Arizona. Stantec Consulting, Inc., Phoenix, Arizona.	Robert Larkin (Stantec Consulting)	Gordon Bleyl (AGFD)
11	10-08	Luchetta, Sarah 2008. A Class III Cultural Resources Assessment Survey of Approximately Five Acres Located at Black Canyon Lake Southwest of Heber in Navajo County, Arizona. Antigua Archaeology, LLC, Oracle, Arizona.	Sarah Luchetta (Antigua Archaeology)	Gordon Bleyl (AGFD)
12	10-22-09	Apache-Sitgreaves National Forests. 2008. Inventory Standards and Accounting Form for completed cultural resource surveys and reports.	Edward DeCleva (ASNFs)	Gordon Bleyl (AGFD)
13	Various	Project GIS files	Rachael Vaughn (ASNFs)	Ron van Ommeren (EcoPlan)
14	2-25-09	EcoPlan Associates, Inc. 2009a. Biological Evaluation for Threatened and Endangered Species–Black Canyon Dam Improvements, Navajo County, Arizona. EcoPlan Associates, Inc., Mesa, Arizona.	Stephen Hale, Tom Ashbeck (EcoPlan)	Rachael Vaughn (ASNFs)
15	4-4-09	EcoPlan Associates, Inc. 2009b. Biological Evaluation–Forest Service Sensitive Species: Black Canyon Dam Improvements, Navajo County, Arizona. EcoPlan Associates, Inc., Mesa, Arizona.	Stephen Hale, Tom Ashbeck, Ron van Ommeren (EcoPlan)	Rachael Vaughn (ASNFs)

Doc #	Date	Document	Author	Recipient
16	5-4-09	EcoPlan Associates, Inc. 2009c. Wildlife Specialist Report: Black Canyon Dam Improvements, Navajo County, Arizona. EcoPlan Associates, Inc., Mesa, Arizona.	Stephen Hale, Tom Ashbeck, Ron van Ommeren (EcoPlan)	Rachael Vaughn (ASNFs)