3.3 Cultural Resources

3.3.1 Affected Environment

Initial observations suggested that the Fossil Creek valley was continuously occupied by the Southern Sinagua from about A.D. 800 to 1300 and was later intensively occupied by the Apache or Yavapai, or both (see Appendix G for information on the cultural history of the Verde Valley). The valley encompassing the wilderness site is the largest relatively flat, potentially inhabitable area in the lower 7.3-mile segment of Fossil Creek from Sally May Wash to its confluence with the Verde River. This segment is a rugged, steep-sided canyon that is too steep for occupation except for a few small, discontinuous terraces or benches and the broad terrace at the Verde confluence. Consequently, these relatively flat surfaces of the valley landscape potentially contain archaeological features and artifacts.

The latest Forest Service listing for the National Register of Historic Places was consulted; no sites listed or formally determined eligible for inclusion on the Register are known within the project area, although several sites are eligible for inclusion. Preliminary observations suggest that the portion of the valley near the wilderness site location is a potential National Register District.

No areas of traditional cultural importance or areas of specific tribal concern are known within the project area, based on previous consultations between the Forest Service and Native American Indian groups and Forest research into tribal uses of the National Forest.

Reclamation and Forest Service archaeologists conducted a preliminary archaeological survey of the area of potential effect for this project, which included the fish barrier sites, contractor staging areas, and a terrace above the wilderness site. Archaeological Consulting Services Limited, under contract to Reclamation, conducted an intensive (Class III) survey of approximately 34.4 acres encompassing the wilderness barrier site and associated wilderness contractor use areas (Boston et al. 2003). Much of the information presented in this section is taken from that report. A geological assessment of the project area conducted as a part of this survey identified four terraces above the active floodplain. The lowest of these is a degrading landform, and the potential for intact, buried cultural deposits is low. In contrast, thick alluvial and colluvial sediments have accumulated on the three upper terraces, and buried cultural deposits are likely.

The survey area was systematically examined using pedestrian transects at 15 meter intervals. Three newly discovered sites were recorded, and two previously identified sites were rerecorded within the project area. All of these sites are considered eligible for inclusion on the National Register of Historic Places, and all are likely to include buried cultural deposits, given their geologic settings.

3.3.2 Environmental Consequences

No Action Alternative

No environmental consequences to cultural resources would occur under the No Action alternative.

Proposed Wilderness Alternative

Preliminary and intensive archaeological surveys of the area of potential effect for the proposed action have been completed, including the Wilderness barrier site, Stehr Lake contractor staging area, and a bench or terrace above the channel where project-related activities (possibly including daily foot travel, camping for up to 1 month, limited staging, and storage of valuable equipment) would occur in the Wilderness.

No cultural resources were identified at the proposed barrier site itself or the Stehr Lake contractor use area. An archaeological site near the contractor use area at Stehr Lake would be avoided. The boundaries of the contractor use area would be fenced and a construction monitor would ensure that activities stay within the authorized use area.

Five archaeological sites considered eligible for inclusion on the National Register of Historic Places have been recorded on the terrace above the floodplain in the vicinity of the proposed barrier site; the largest of these is located in the area closest to the proposed barrier site and thus is most likely to be adversely affected by construction-related activity.

Access to the stream channel from Stehr Lake has the potential to adversely affect these sites without appropriate avoidance or mitigation. Ground disturbance and impacts to archaeological sites between Stehr Lake and the wilderness barrier site would be reduced by bringing in materials and equipment by helicopter and lowering them by sling line directly onto the fish barrier construction site.

To reach the barrier site, construction crews will be required to hike a 1 to 2 mile route that descends over steep and rugged terrain to the job site. This access route would be surveyed and flagged to minimize effects on cultural resources. The trampling impact of recurrent pedestrian traffic would likely result in the formation of a trail from the Stehr Lake staging area to and through areas that are archaeologically sensitive. Trail development also has the potential to facilitate public access, which would have a long-term negative effect on the archaeological qualities of this relatively pristine valley. Project-created trails would be obliterated following construction, with particular attention paid to removing evidence of the trailhead to minimize possible future use.

In order to expedite completion of the project and minimize trail development, construction crews of no more than 10 people would be allowed to camp on a terrace near the stream for the estimated month-long construction period. This area also would be used for emergency helicopter landing, and possibly some unloading and staging of

construction supplies, and camping. There is a potential impact to archeological sites in the area from construction crews and other project personnel. This includes trampling and moving artifacts. However, this would be avoided by restricting activities to designated areas. No foot traffic or storing of materials or supplies would be allowed outside authorized areas, and monitoring by qualified personnel would be required to minimize the likelihood of impacts. Following construction, access to Fossil Creek for native fish salvage and restoration and long-term monitoring activities would be managed to avoid impacts to cultural resources.

If all mitigations are followed and sites are avoided, a "no effect" would be the appropriate determination for Section 106 compliance with the National Historic Preservation Act.

Nonwilderness Alternative

The staging area for the alternative barrier incorporates both the north and south sides of FR 502 west of the confluence of Sally May Wash and Fossil Creek. This area was once occupied by a circa 1910 to 1950 structure (called the Sally May House) associated with APS employees who worked at the Irving Power Plant. The structure was razed in the 1950s leaving scattered pieces of metal, glass, and crockery on the north side of the road. This area has been graded and is used today for parking and camping. No cultural resources were recorded in a survey of the alternative barrier location or in the short distance between the staging area and barrier site (Forest Service 2000).

Use of part of the house site for construction staging would not result in new impacts to cultural resources. The boundaries of this previously impacted area would be flagged to delineate the contractor use area and confine staging activities. Project activities would be monitored periodically by Reclamation or Forest Service staff to ensure that sites outside the authorized area are not disturbed. Access to Fossil Creek for native fish salvage and stream restoration and long-term monitoring activities would be managed to avoid impacts to cultural resources.

Cumulative Effects

No environmental consequences or cumulative effects to cultural resources are anticipated under either action alternative.

3.4 Recreation and Visual Aesthetics

3.4.1 Affected Environment

Scenic Condition. The project area includes a diverse range of natural landscapes that are visually interrupted by APS power generating and transmission facilities and Forest roads (FR 708 and FR 502). Distinctive natural features with high scenic quality dominate these landscapes. Views include rugged canyon slopes, a meandering stream valley, and high surrounding desert. Over the past several years, adverse visual impacts

along road-accessible streamside areas have resulted from increasing evidence of human activity such as fire rings, soil destabilization, and damage to vegetation. These intruding visual elements locally detract from the overall natural character of the valley landscape. Restoration of full flows and removal of APS facilities under the proposed FERC decommissioning process would permanently change the baseline for scenic conditions. The term "scenic integrity" is used by the Forest Service as a measure of the degree to which a landscape is altered from a purely natural condition. Scenic integrity is also indirectly expressed in Forest Plans as the Visual Quality Objective (VQO).[13] VQOs are intended to indicate the potential expectations of the visitor by considering the frequency a management area is viewed and the degree to which an area has been modified by human activity. The VQO defined in the Coconino and Tonto Forest Plans for the nonwilderness portion of the project area (Coconino National Forest Management Area 11 and Tonto National Forest Management Area 4F) is Retention[14] of the characteristic landscape, although the VQO is actually closer to Partial Retention[15] along road accessible areas due to the extent to which human activity has fundamentally altered the landscape. In contrast, the VQO within the Mazatzal Wilderness (Coconino National Forest Management Area 1 and Tonto National Forest Management Area 4A) prescribes Preservation[16] of the natural landscape.

Recreation. Exceptional scenery and perennial stream flow have created a demand for recreation in upper and middle portions of Fossil Creek. Forest Plan emphasis for management of visitor use in these areas calls for dispersed recreation. Within the project area, the most popular recreational activities include sightseeing, hiking, primitive camping, wildlife viewing, hunting, and angling. Sightseeing, camping, and angling are most intensively practiced in road accessible areas along a 2.9-mile segment of Fossil Creek south of Irving. Recreational use within wilderness segments of the project area is low due to general remoteness, rugged terrain, and lack of recreation trails.

Flow restoration would enhance the attractiveness of roadside segments of the stream between Irving and Sally May Wash for dispersed day use and camping. Preliminary studies of the Coconino National Forest Fossil Creek Planning Team predict public use in the Fossil Creek area will increase if decommissioning of the APS hydroelectric facilities occurs. Increases in public use would result in higher visitor densities and greater demands on resources along roadside segments of Fossil Creek. Proximity to the rapidly growing greater Phoenix metropolitan area will likely sustain high recreation pressure into the foreseeable future. The Coconino and Tonto National Forests are preparing an environmental analysis document to address future management changes designed to protect streamside resources within the Fossil Creek area.

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13 VQOs are desired levels of visual quality based on the physical and sociological characteristics of an area. They refer to the degree of acceptable alteration of the characteristic landscape.
14 Retention is a degree of alteration in which management activities area generally not evident to the casual visitor.
15 Partial retention is a degree of alteration in which management activities generally may be evident but must remain subordinate to the characteristic landscape.
16 Preservation refers to a natural state that provides for ecological change only.

Fishing recreation as measured by angler days is very light. Total angler days per year is estimated at less than 300 (AGFD 2001), with most use occurring in the roadside segment of stream. Poor access, low angler interest in available fish species (primarily smallmouth bass, green sunfish, and yellow bullhead), and small average size of sport fishes contribute to the light fishing pressure. Fossil Creek also lacks a long angling history of significance. In 1995, flooding destroyed a natural barrier that previously kept smallmouth bass and yellow bullhead restricted to the segment of stream below the project area.

3.4.2 Environmental Consequences

No Action Alternative

There would be no effect to scenic condition under this alternative.

There would be no effect to most recreational uses in the area, however, in the absence of Federal action to recover native fishes in Fossil Creek, the nonnative sport fishery could improve as more smallmouth bass and catfish move into upstream reaches. Return of full flows might enhance this nonnative fishery by allowing larger catfish and smallmouth bass to move farther upstream. However, a proportionate increase in fishing pressure would not be expected because of the low interest in this type of fishery throughout the Verde River watershed. Creel survey data collected by AGFD indicate that little demand exists among anglers for warm water fishes in the tributaries of the Verde River watershed (AGFD 1999). Upstream dominance of nonnative species would diminish or eliminate the native chub fishery.

Proposed Wilderness Alternative

Scenic Condition. High rock abutments and steeply sloping canyon walls would conceal the barrier, embankment plugs, and rock gabion structure from distant viewpoints, minimizing impacts within the context of the overall viewshed. Visual access to the site is limited by rugged terrain and an absence of recreation trails. Concrete used in the barrier and embankment plugs would be colored and textured to blend these structures into the surrounding environment. The gabion structure would be visually isolated from the barrier by intervening boulders, and concealed somewhat from nearby viewpoints by a colored mortar fascia. These attempts to visually conform the barrier, embankment plugs, and gabion structure to the surrounding terrain would render them largely unobtrusive to the casual observer. However, the presence of "non-conforming" structures in Wilderness creates subtle changes in the natural landscape that would lower the scenic integrity rating of the project site equivalent to a Retention VQO.

Recreation. Stream renovation would eliminate the present assemblage of nonnative, warm water sport fishes from the 9.5-mile segment of Fossil Creek between the proposed barrier and the Fossil Springs diversion dam. Fishes in the 4.5-mile reach below the barrier would not be affected. The existing populations of roundtail chub and headwater

chub would replace the nonnative sport fishery, providing a continuing and unique angling opportunity available in few other streams. Loss of nonnative sport fishes would displace a few anglers to other nearby drainages, such as the Verde River, West Clear Creek, Wet Beaver Creek, Dry Beaver Creek, and Oak Creek. The impact on fishing recreation is low due to the weak demand for the nonnative fishery in Fossil Creek and the proximity of other warm water fishing opportunities in the Verde River watershed.

Construction support activities outside of wilderness would result in temporary noise and visual impacts from helicopter operations and equipment use at the Stehr Lake staging area. Ambient noise levels along forest roads would temporarily increase as a result of increased vehicle traffic associated with construction and may detract from visitor enjoyment; however, construction traffic and equipment operation would be infrequent and limited to daytime hours and weekdays. Once construction is complete, noise levels would return to pre-project conditions.

Nonwilderness Alternative

Scenic Condition. Implementation of the alternative action would result in minor modification of the scenic integrity of the area, shifting the Retention VQO to Partial Retention at the barrier. The barrier would be concealed from vehicular traffic on FR 502 by a high bluff that forms the west bank of Fossil Creek. Visual impacts would be greatest within the channel prism immediately downstream of the barrier. To minimize these effects, all structural concrete would be colored and textured to blend with surrounding rock.

Recreation. Effects of the alternative action are very similar to the proposed action but confined to areas outside Wilderness. With possible return of full flows and increasing demand for water-based recreation, visitor use along roadside segments of stream will increase. The waterfall effect created by the barrier may attract concentrated use at the structure and result in localized impacts to soil and vegetation. If full instream flows are restored, the drop structure could pose a hazard for certain water-based activities like tubing.

Cumulative Effects

A Qwest fiber optic line installed along FR 708 will be buried, and there are no other past, present, or reasonable foreseeable projects that could affect scenic quality within the project area.

There are no past, present, or reasonable foreseeable projects that would be additive to the project's minor effects on sportfishing opportunities and ambient noise levels that could impact recreationists.

3.5 Wild and Scenic River Status

3.5.1 Affected Environment

In 1993, the Forest Service conducted a preliminary analysis of rivers on six national forests in Arizona to determine their potential eligibility for inclusion in the National Wild and Scenic River (WSR) System (National System). This process was conducted at the request of the Arizona Congressional delegation, and completed by an interdisciplinary team, who determined that of the rivers analyzed, 57 appeared to meet eligibility requirements of the Wild and Scenic Rivers Act (WSRA). Fossil Creek was one of the 57 rivers determined free-flowing, and possessing one or more "outstandingly remarkable" values (ORVs). The segment of Fossil Creek between the Fossil Springs diversion dam and the Mazatzal Wilderness Boundary (6.9 miles) received a preliminary classification of "recreational," and the segment from the Mazatzal Wilderness boundary to the Verde Wild and Scenic River boundary (6.6 miles) was classified as "wild." Outstandingly remarkable values were listed as: Geologic, Fish, Wildlife, Historic, and Riparian/Ecological. Free-flowing is defined in the WSRA, in part, as ". . . existing or flowing in natural condition without impoundment, diversion, straightening, rip-rapping, or other modification of the waterway."

In a recent court case on the status of the 57 rivers, the 9th Circuit Court of Appeals determined the findings of the 1993 report constituted eligibility (July 7, 2003).

Only rivers in the National System or authorized by Congress for study under Section 5(a) of the WSRA are afforded statutory protection. In the case of Fossil Creek, a river identified by a Federal land managing agency for study under Section 5(d)(1) of the WSRA, protection of the river's free-flow and other values is provided through agency policy. The Forest Service Handbook (FSH 1909.12, 8.12) directs protection in the following ways:

1. "To the extent the Forest Service is authorized under law to control stream impoundments and diversions, the free flowing characteristics of the identified river cannot be modified.
2. Outstandingly remarkable values of the identified river area must be protected and, to the extent practicable, enhanced.
3. Management and development of the identified river and its corridor cannot be modified to the degree that eligibility or classification would be affected (i.e., classification cannot be changed from wild to scenic or scenic to recreational)."

Forest Service policy (FSM 2354.76) identifies a 10-step process to use when evaluating proposed water resources projects on a river included in the National Wild and Scenic Rivers System or authorized by Congress under Section 5(a) of the WSRA. In the absence of a required or alternative process for eligible rivers such as Fossil Creek, the

10 steps identified in FSM 2354.76 have been addressed in detail and summarized in a separate report prepared by the Forest Service as a means to analyze potential effects to the creek's eligibility (free flow and ORVs) and classification.

The closest designated Wild and Scenic River is the Verde River, which is located approximately 4.5 miles south of the project area. A 40.5-mile segment of the Verde River was added to the National System by Congress in 1984 with enactment of the Arizona Wilderness Act. The project would not affect the free-flowing character, or scenery, recreational, or wildlife values of the Verde WSR that were present on the date of designation.

3.5.2 Environmental Consequences

No Action

Eligibility. Fossil Creek's eligibility as a wild and scenic river would not be affected.

Free Flow. With no fish barrier construction in Fossil Creek, free-flow would not be affected.

Outstandingly Remarkable Values. This alternative would have no effect on geologic, historic, and riparian/ecological ORVs.

Fish and wildlife ORVs are being adversely affected in Fossil Creek by nonnative fish. Without action to remove nonnative fish from the creek, native fish and wildlife populations would continue to decline. Reintroduction of extirpated native species would not be successful with the increasing dominance of nonnative fish, and some native species would trend towards the need for federal listing under the Endangered Species Act.

Classification. Classification for either the wild or recreational segments of Fossil Creek would not be affected.

Proposed Wilderness Alternative

Eligibility. The proposed project would not affect Fossil Creek's eligibility as a wild and scenic river (see discussion below).

Free Flow. Given the definition of "free-flow" in the WSRA, the proposed fish barrier would have a minor effect on free-flow at the barrier site because it would result in a slight modification of the waterway. However, the selected location and the design of the barrier minimize the impacts to the free-flowing characteristics of the stream to the extent practicable. The magnitude of effect would be negligible with regards to the overall stream function and the free-flowing character of Fossil Creek. The fish barrier would use the existing channel features to plug three notches carved in bedrock to blend with channel geomorphology, and would function within the natural step-pool stream

dynamic. The barrier would increase the height of an existing step in this reach of the creek and would mimic bedrock falls that currently exist throughout the system, and natural travertine formations that historically created and enhanced the step pool system in the upper reach of the stream. The 5-foot barrier would be within the size range of these natural features, which vary in size from a few inches to 22 feet in height. Additionally, the barrier would restore the protective function that a natural barrier provided until the mid-1990's near the proposed wilderness site. This natural rock structure was removed by massive flood flows in 1995 (Roberson et. al 1996; personal communication, C. Benedict, AGFD).

Outstandingly Remarkable Values. This alternative, which is designed to protect and enhance the fish ORV by improving 9.5 miles of stream, would also benefit the wildlife ORV, and would not adversely affect any other ORV.

Impacts to riparian habitat would be negligible, as the barrier site is bedrock dominated and no riparian trees are expected to be disturbed.

For the geologic ORV, travertine was the main feature of interest identified in the Resource Information Report (Forest Service 1993b). Before diversion of flows out of the creek, travertine precipitated out and formed natural falls in the upper 1/3 to ½ of Fossil Creek, as evidenced by many large travertine buttresses along the creek. Because about 5 cfs is being discharged into Fossil Creek from the Irving power plant, travertine is currently forming immediately downstream. Travertine will reform in the upper reach above Irving with return of additional flows to the creek, but is not expected to form significantly at the barrier site, although some marling or coating could occur. The Wilderness fish barrier would function similarly to travertine falls in the upper reach of the creek, like bedrock and boulder drops that occur throughout the system, and like the natural barrier that occurred near the site until the mid-1990s. These features all function by raising the water surface profile and creating a falls.

The historic ORV is primarily related to the Childs-Irving hydroelectric facilities and prehistoric southern Sinagua sites (Forest Service 1993b). The power plant facilities are listed on the National Register of Historic Places and are designated as a National Mechanical Engineering Landmark. Southern Sinagua site densities are high, with almost every site type known located within the corridor. The final cultural resources clearance concludes that implementation of the project at the wilderness site will not adversely affect cultural resources, and if all recommendations are followed, the appropriate finding would be "no effect."

As compared to the nonwilderness site, the wilderness barrier site provides greater protection and enhancement of native fish and wildlife ORVs. More habitat is restored (20 percent more of Fossil Creek), and long-term likelihood of success is greater, since the risk of nonnative fish being intentionally moved from below the barrier to above the structure is much lower due to difficult access to the wilderness site.

Classification. The preliminary classification given to the reach of Fossil Creek where the wilderness barrier would be constructed is "wild." Wild river areas are defined in the WSRA as being free of impoundments and generally inaccessible, with watersheds or shorelines essentially primitive and waters unpolluted. Impoundment is defined in the Wild and Scenic Rivers Guidelines as "a body of water formed by any manmade structure." Although the three plugs would create a small body of water for a short period of time, the site would quickly aggrade following storm events, the small pond would disappear, and the site would become naturalized so that the barrier itself will not be noticeable to the casual observer as the water flows over the plugs in a 5-foot high waterfall. The plugs would functionally replace the natural rock barrier that flooded out in the mid 1990's, and would augment the existing step at the site. The natural function and naturally-appearing nature of the creek would be maintained.

Classification will be evaluated at the time a suitability study is completed, probably at Forest Plan revision, expected to begin in a few years. When evaluating rivers for possible inclusion to the National System of wild and scenic rivers, policy direction allows for designations as wild, even with a few minor existing structures if they fit with the primitive and natural values of the viewshed (FSH 1909.12, Chapter 8). If the fish barrier were to impound water in the long-term, the wild classification would be affected, reducing it to recreational, since both wild and scenic classifications are to be free of impoundments. However, since it is anticipated that no body of water would be present above the fish barrier in a short period of time after construction, and the area would remain inaccessible and primitive otherwise, the wild classification may be appropriate when it is evaluated in the future.

Nonwilderness Alternative

Eligibility. The proposed project would not affect Fossil Creek's eligibility as a wild and scenic river (see discussion below).

Free Flow. Given the definition of "free-flow" in the WSRA, the proposed fish barrier would have a minor effect on free-flow at the barrier site, because it would result in a slight modification of the waterway. The structure would uniformly span the width of the channel and would have slightly more impact to free-flow than the Wilderness site because it modifies the waterway to a slightly greater extent. It may also be more difficult to create a naturally-appearing structure that harmonizes with the surrounding environment at this site. Despite the greater difficulty of harmonizing this structure with site conditions, the barrier would conform to the overall step/pool morphology of the stream, and would mimic bedrock falls that currently exist throughout the system, and travertine formations that historically created and enhanced the step-pool system in the upper reach of the stream. The 5-foot barrier would be within the size range of these natural features, which vary in size from a few inches to 22 feet in height. In contrast to the Wilderness site, no natural fish barrier is known to have existed at or near the nonwilderness barrier site; therefore, the structure will not restore any protective function to this part of the creek, but it would augment an existing step at the site.

Outstandingly Remarkable Values. This alternative, which is designed to protect and enhance the fish ORV by improving 6.7 miles of stream, would also benefit the wildlife ORV, and would not adversely affect any other ORV.

Impacts to riparian habitat would be negligible, as the barrier site is bedrock dominated, and no riparian trees are expected to be disturbed.

For the geologic ORV, travertine was the main feature of interest identified in the Resource Information Report (US Forest Service 1993b). Before diversion of flows out of the creek, travertine precipitated out and formed natural falls in the upper 1/3 to ½ of Fossil Creek, as evidenced by many large travertine buttresses along the creek. Because about 5 cfs is being discharged into Fossil Creek from the Irving power plant, travertine is currently forming immediately downstream. Travertine will reform in the upper reach above Irving with return of additional flows to the creek, but is not expected to form significantly at either barrier site, although some marling or coating could occur. The nonwilderness fish barrier would function similarly to travertine falls in the upper reach of the creek, and like bedrock and boulder drops that occur throughout the system. These features function by raising the water surface profile and creating a falls.

The historic ORV is primarily related to the Childs-Irving hydroelectric facilities and prehistoric southern Sinagua sites (USDA Forest Service 1993b). The power plant facilities are listed on the National Register of Historic Places and are designated as a National Mechanical Engineering Landmark. Southern Sinagua site densities are high, with almost every site type known located within the corridor. Use will occur on already impacted sites, so the project would have no new impacts.

As compared to the wilderness site, the nonwilderness barrier site provides less protection and enhancement of native fish and wildlife ORVs. Approximately 20 percent less habitat would be restored. Additionally, the long-term likelihood of success is lower, since the risk of nonnative fish being intentionally moved from below the barrier to above the structure is much greater, due to ease of accessibility from the road and nearby dispersed camping sites.

Classification. The preliminary classification given to the reach of Fossil Creek where the nonwilderness barrier would be constructed is "recreational." Recreational river areas are defined in the WSRA as rivers or sections of rivers that are readily accessible by road or railroad, may have some development along shorelines, and may have undergone some impoundment or diversion in the past. Classification would not be affected by the nonwilderness fish barrier.

Cumulative Effects

There are no past, present, or reasonably foreseeable projects that would be additive to the project's impacts on free-flow. Features such as the Fossil Springs dam, Irving dam, and the road crossing at Irving were in place prior to Fossil Creek being eligible for inclusion to the National System, and therefore define the existing condition. Cumulative impacts to fish and wildlife ORVs are disclosed in the fish and aquatic wildlife and other sensitive species sections.

3.6 Mazatzal Wilderness

3.6.1 Affected Environment

The southern 2.8-mile portion of the project area forms part of the northern boundary area of the Mazatzal Wilderness. Established as a primitive area by the Chief of the Forest Service in 1938, Congress designated the Mazatzal Wilderness with passage of the Wilderness Act on September 3, 1964. The Arizona Wilderness Act of August 28, 1984 increased the total size of the Wilderness Area to 250,517 acres. The Mazatzal Wilderness lies within the jurisdiction of Coconino and Tonto National Forests. Management responsibilities are shared by the two National Forests, with the Tonto having lead responsibilities.

The name of the Wilderness is from an old Indian culture in Mexico, and is correctly pronounced "Mah-zaht-zahl," meaning "land of the deer." The eastern side of the Wilderness predominantly consists of brush or pine-covered mountains, sometimes broken by narrow, vertical-walled canyons. On its west side below the steep brush-covered foothills, the Verde River flows through the Sonoran Desert. Elevations range from 2,060 feet along the Verde River to 7,903 feet on Mazatzal Peak. Fossil Creek forms part of the northwestern boundary of the Wilderness and is within the portion that was added in 1984. The rugged topography and remoteness of the area, combined with terrestrial and riparian habitats, provide a full range of wilderness qualities and opportunities.

The Mazatzal Wilderness is part of the 106 million acre National Wilderness Preservation System and represents 5.5 percent of the total Wilderness acreage in Arizona. Legislated Wildernesses are recognized as areas where the earth and its community of life are untrammeled or unchanged by man, where man himself is a visitor who does not remain. Wilderness is an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvements of human habitation, which is protected to preserve its natural conditions and which generally appears to have been affected primarily by the forces of nature with the imprint of man's work substantially unnoticeable (1964 Wilderness Act).

Wilderness Law, Regulation, and Policy. The Mazatzal Wilderness Implementation Plan (Implementation Plan) (National Forest 1994) was developed to further specify and act on prescriptions contained within the Tonto Forest Land and Resource Management

Plan (LRMP) and expands on policies and guidelines within Forest Service Manuals and Handbooks. The Implementation Plan identifies desired future conditions and specific management policies and actions for the Wilderness.

Sec. 2 (c) of the Wilderness Act states that "A wilderness . . . is hereby recognized as an area where the earth and its community of life are untrammeled by man . . . an area of undeveloped Federal land retaining its primeval character and influence, without permanent improvement or human habitation, which is protected and managed so as to preserve its natural conditions, and which generally appears to have been affected primarily by the forces of nature, with the imprint of man's work substantially unnoticeable. . . ."

Sec. 4. (c) goes on to say that ". . . except as necessary to meet minimum requirements for the administration of the area for the purpose of this Act (including measures required in emergencies involving the health and safety of persons within the area), there shall be no temporary road, no use of motor vehicles, motorized equipment or motorboats, no landing of aircraft, no other form of mechanical transport, and no structure or installation within any such area."

Federal regulations at 36 CFR 293.6 (c) specify that the Chief, Forest Service, may authorize . . . motorized equipment, mechanical transport, aircraft, . . ., or structures . . . to meet the minimum requirements for authorized activities to protect and administer the Wilderness and its resources. . . . Forest Service Manual direction at FSM 2326 identifies the Regional Forester as the line officer with delegated authority to approve transport and supply by aircraft and the use of portable motorized equipment to meet minimum needs for protection and administration of the area as wilderness, only as follows:

a. A delivery or application problem necessary to meet wilderness objectives cannot be resolved within reason through the use of nonmotorized methods.

b. An essential activity is impossible to accomplish by nonmotorized means because of such factors as time or season limitations, safety, or other material restrictions. Forest Service Manual direction at 2323 delegates the authority to approve fish control projects and pesticides to the Regional Forester. To allow the Regional Forester to approve these nonconforming uses requires that these actions be necessary to meet minimum requirements for administration of the area as Wilderness.

The key question relative to the necessity of building the proposed structure in wilderness is, "is it the minimum required for administration of the Mazatzal Wilderness in terms of restoring native fishes in Fossil Creek"? Another way to ask this question is, "is this particular structure absolutely necessary" (to be built in wilderness)? To address these questions, direction is available in FSM 2320.2, FSM 2323.3, the 1986 MOU for Policies and Guidelines for Fish and Wildlife Management in National Forest and Bureau of Land Management Wilderness, and the relevant sections of the Mazatzal Wilderness Plan. All of these documents are available in the project record.

The 1986 MOU for Policies and Guidelines for Fish and Wildlife Management in National Forest and Bureau of Land Management Wilderness (Appendix H) sums up the relevant direction as follows: All management activities within wilderness are to be done without motorized equipment or landing of aircraft, unless truly necessary to administer the area. Wilderness managers must determine that such use is the minimum necessary to accomplish the task. In rare instances, facility development and habitat alteration may be necessary to alleviate adverse impacts caused by human activities on fish and wildlife. Actions necessary to protect or recover threatened or endangered species must be necessary for the perpetuation or recovery of the species and it must be demonstrated that the actions cannot be done more effectively outside wilderness. Areas outside of wilderness that offer equal or better opportunities for species protection are preferable to areas within wilderness.

To answer the question of whether the location within the wilderness is superior to the location outside of wilderness, an analysis of the relative benefits to fisheries of the wilderness versus the nonwilderness sites was done. The summary of this document states: "the wilderness site provides protection for significantly more habitat for all the native species existing and proposed for Fossil Creek in the 2.8 miles below the nonwilderness site. The wilderness site would protect approximately .2 mile of critical habitat designated under the Endangered Species Act for spikedace and loach minnow. Although not designated as critical habitat, Fossil Creek upstream to around Irving may provide additional suitable habitat for the loach minnow. It better meets scientific, education, and species conservation values that contribute to an enduring wilderness resource." The "Fisheries Benefits Determination for Fossil Creek" can be found in the project record.

Finally, if it is determined that a project meets the minimum requirements for administration of the area as Wilderness, a minimum tools analysis is done. The purpose of this analysis is to identify the minimum tools needed to accomplish the work. A minimum tools analysis was completed for this project by a team comprised of wilderness managers, an archeologist, and a wildlife biologist. Three alternatives were analyzed: a substantially motorized alternative, a totally nonmotorized alternative, and a recommended alternative which drew on elements of the first two alternatives. The recommended alternative was developed to identify the minimum tools necessary to complete the work that resulted in the least impact to the physical resource and wilderness values. The recommended alternative was incorporated into the proposed action. The Minimum Tools Analysis is available in Appendix I. The alternatives discarded through the minimum tools analysis are further described in section 2.1 of this EA, Alternatives Considered but Eliminated.

For more information on relevant Wilderness Law, regulation, and policy, see the Review of Law, Regulations, and Policy Affecting Decision for Proposed Native Fish Restoration Activities and Structures on Fossil Creek within the Mazatzal Wilderness 9/16/03 in Appendix J.

3.6.2 Environmental Consequences

No Action Alternative

Social. Social wilderness values would remain largely unchanged since barrier construction and piscicide application would not occur.

Biophysical. Upstream incursion of nonnative fishes would continue to disrupt the native fish community in the project area's portion of the Mazatzal Wilderness, threatening continued loss of part or all of the native fishery and wilderness values associated with it. Natural processes in the Wilderness that are linked to native aquatic biota would be adversely affected by the increased dominance of nonnative fishes.

Wilderness values associated with native fish and other aquatic biota would not be restored or enhanced within 2.8 miles of Fossil Creek within the Mazatzal Wilderness and critical habitat for loach minnow and spikedace would not be improved.

Proposed Wilderness Alternative

Social. The fish barrier would be a non-natural permanent human made structure within the Wilderness. This is a nonconforming Wilderness use requiring Regional Forester approval. With full flows returned to Fossil Creek, it would not be visible to the casual observer.

Materials, equipment, camping gear, and sanitation facilities would be flown by helicopter and long-lined to the wilderness job site. The work would involve 7 to 9 days of helicopter flights including landings (contact with the ground through long-line delivery is considered a landing), and approximately 5 days of motorized equipment use. Actual landing of the helicopter aircraft itself would only occur in an emergency situation. Use of a helicopter is a nonconforming Wilderness use requiring Regional Forester approval.

Barrier construction would involve the use of limited mechanized equipment in addition to helicopter transport (e.g., generator, compressor, rock drill, and concrete vibrator). The generator, compressor, and drill would be used for drilling anchor bar holes in rock substrates. No other power tools would be allowed. Use of motorized equipment is a nonconforming Wilderness use requiring Regional Forester approval.

Concrete would be flown in by helicopter and long-lined to the job site. The concrete would be poured in two phases – the first phase to fill two slots, and the second phase to fill the remaining slot. Use of the helicopter and mechanized equipment would be restricted to weekdays to minimize conflicts with visitor enjoyment of the area.

A helicopter would also be used to transport 55-gallon drums containing captured native fish from Fossil Creek to holding facilities at Irving. The helicopter would again be used to ferry the native fish from Irving back into the creek following chemical treatment. Total helicopter use for fish transport is estimated at 2 days.

There would be a short-term and highly localized effect on the wilderness experience for visitors who encounter project implementation activities. Construction noise, helicopter operations, and increased presence of humans would result in sporadic auditory and visual intrusions for approximately 1 month. Weekday use of mechanical equipment would minimize some of that impact. The number of people impacted by the noise would be low since use in this part of the Wilderness is low. People recreating at Stehr Lake would likely hear the noise at the job site, leading some of them to investigate the noise at the project site, resulting in increased use, which is not desirable.

Use of piscicides in the Wilderness is a nonconforming Wilderness use requiring Regional Forester approval.

Biophysical. Crews would hike in to the site. No trail would be constructed, but the route would be flagged. Presence of a temporary trail could lead to increased visitation from the public at the job site. Creation of a trail is a concern because of increased Wilderness visitation and potential impacts to cultural resources. Use of the trail during the month-long construction phase could result in increased soil erosion. The trail would be rehabilitated after completion of construction activities.

There would be a short term trampling impact to soils and vegetation from on-the-ground activities at the camping area and job site. Some disturbance would occur to terrestrial wildlife that normally moves through the area from the occupancy of the camping area and job site.

Brush would need to be cleared to create a backup helispot near the Wilderness barrier.

Wilderness values associated with native fish and other aquatic biota would be restored or enhanced within 2.8 miles of Fossil Creek within the Mazatzal Wilderness. By removing introduced nonnative fish, 2.8 miles of habitat would be improved for the roundtail chub, which was recently petitioned to be federally listed. This alternative would correct human caused conditions (introduction of nonnative fish) in this portion of the species' range that could lead to the need for federal listing (FSM 2323.3(2)). Approximately 0.2 mile of loach minnow and spikedace critical habitat would be improved, and additional potential habitat would be created upstream from the critical habitat boundary. Creating conditions favorable for reintroducing loach minnow and spikedace and other listed species would contribute positively towards recovery of those species (FSM 2323.31(3)).

Project implementation would protect wilderness values associated with natural processes and functions that otherwise would decline with continued upstream incursion and dominance of nonnative aquatic fauna. Based on prior precedent, projects involving barriers and piscicide use are accepted activities to protect native fish communities within areas designated under the Wilderness Act.

Nonwilderness Alternative

Social. The alternative site is located outside the Wilderness boundary. Social wilderness values would not be affected by this alternative.

Biophysical. Upstream incursion of nonnative fishes would continue to disrupt the native fish community in the project area's portion of the Mazatzal Wilderness, threatening continued loss of part or all of the native fishery and wilderness values associated with it. Natural processes in the Wilderness that are linked to native aquatic biota would be adversely affected by the increased dominance of nonnative fishes.

Wilderness values associated with native fish and other aquatic biota would not be restored or enhanced within 2.8 miles of Fossil Creek within the Mazatzal Wilderness and critical habitat for loach minnow and spikedace would not be improved.

Construction activities at the nonwilderness site would not affect the Mazatzal Wilderness. No nonconforming structure would be built in the Wilderness.

Cumulative Effects

Project implementation effects on Wilderness soils and vegetation would be additive to disturbances caused by ongoing livestock grazing. These effects would be confined to temporary contractor use areas and access routes between Stehr Lake and the wilderness job site. There are no other past, present, or reasonably foreseeable projects that would result in nonconforming uses in the Wilderness, and no other projects that would have additive noise or Wilderness recreation effects.

3.7 Soils

3.7.1 Affected Environment

Soils within the project area consist of the following two classifications: Mesic Semiarid soils of the Graham-House Mountain Rock Outcrop association and the Cabezon-Thunderbird-Springville association, and Thermic Semiarid soils of the Lithic Torriorthents-Lithic Haplustolls Rock Outcrop association (Hendricks 1985). Many of these upland soils have a shallow depth to bedrock and are characteristically stony, cobbly, and gravelly loams with large rock fragments. The soils found in the river floodplain, terraces, and fans are well-drained and consist of coarse to fine textured grains with slopes that are nearly level to steep. Soils along streamside portions of the project area are primarily alluvial in nature. Stream channel substrates at the barrier sites

consist mostly of bedrock and boulders of Tertiary Period volcanic origin, with small percentages of cobble, gravel, and fine sediment. Bedrock is chiefly dark-gray basalt and tuff.

Soil conditions vary throughout the project area as a result of long-term grazing pressure and recreation. Livestock grazing on upland slopes has reduced ground cover, destabilized soils, and accelerated runoff and erosion during storm events. Dispersed recreation and grazing activities along 2.5 miles within the middle reach of Fossil Creek have damaged stream banks and sedimentation. The Forest Service has recently restricted or eliminated much of the livestock use adjacent to the stream in the middle reach.

In the future, partial or total removal of the Fossil Springs diversion dam could result from decommissioning of APS facilities. Removal of the dam would temporally increase sediment transport as impounded sediment is eroded by high seasonal flows and floods. Depending on the removal option selected for the dam (partial or full), part or all of the estimated 25,000 cubic yards of impounded sediment would be discharged downstream. FERC is currently analyzing the effects of sediment transport associated with partial or full removal of the dam.

3.7.2 Environmental Consequences

No Action Alternative

No environmental consequences to soils would occur under the No Action alternative.

Proposed Wilderness Alternative

Fish barrier construction would directly affect 0.4 acre of channel substrates consisting of bedrock, boulders, and alluvium. At the barrier, approximately 17 cubic yards of alluvium would be excavated and redeposited as backfill on the upstream side of the structure. The footprint of the completed barrier would occupy an area of approximately 0.01 acre. After construction, a temporary pool would inundate 0.1 acre of bedrock and boulders within the channel immediately upstream of the barrier. Sediment captured by the barrier would quickly displace the pooled water and form a new layer of bedload deposits over existing channel substrates. Deposition of material upstream of the barrier would be accelerated by sediment-laden storm flows and floods.

The Stehr Lake and Wilderness staging areas would affect 0.9 acre of upland soil. Soils at Stehr Lake already are heavily impacted by recreation and vehicle use. Livestock grazing has historically impacted the wilderness terrace site identified for project staging adjacent to stream channel. Total project impact on soils including sedimentation at the barrier is estimated to be 1.4 acres.

Overall, soil impacts from barrier construction and stream renovation would be minor. The trailing and trampling effects from work associated with barrier construction and stream renovation would be limited by the high rock fragment content of soils and solid rock substrates within the stream channel. The small volume of sediment impounded by the barrier would not affect long-term sediment transport and stream balance.

Nonwilderness Alternative

Construction at the alternative site would affect less than 0.1 acre of channel substrates. The footprint of the completed barrier would occupy an area of approximately 0.01 acre. After construction, a temporary pool would inundate approximately 0.1 acre of bedrock, boulders, and cobbles within the channel immediately upstream of the barrier. Alluvium captured by the barrier would eventually displace the pooled water. The contractor staging areas along FR 502 would affect 0.3 acre, most of which consists of bare and compacted soils. The total acreage impacted from barrier construction and operation is estimated to be slightly more than 0.4 acre.

The environmental consequences to soils resulting from barrier operation and stream renovation are similar to those described under the proposed action.

Cumulative Effects

Project impacts on soils and the effects of sedimentation would be minor and occur on very small acreages. These would be additive to ongoing livestock grazing impacts to riparian and upland vegetation and soils, as well as soil disturbance from installation of the Qwest fiber optic line installation, on-going road and trail maintenance activities, and reconstruction of the Mail Trail above Fossil Springs. The Forest Service is proposing management changes within the Fossil Creek area resulting from a future Forest Plan amendment (DEIS available in early spring 2004). This proposed amendment would place more emphasis on managing soils, riparian vegetation, and fish and wildlife habitat (FR 68 (115)) and implementation of specific actions associated with the proposed action may affect the same resources.

3.8 Air Quality

3.8.1 Affected Environment

Air quality is determined by the ambient concentrations of pollutants that are known to have detrimental effects. The U.S. Environmental Protection Agency (EPA) has promulgated National Ambient Air Quality Standards for six criteria pollutants: carbon monoxide, nitrogen dioxide, particulate matter (PM_{10}), ozone, sulfur dioxide, and lead. Gila and Yavapai counties are in attainment for all criteria pollutants. Ambient air quality in the project area is considered good.

The EPA has also established classes of air quality. Class I status under Section 162(a) of the Clean Air Act is designated for specified geographic areas where the cleanest and most stringent protection from air quality degradation is considered important. Class I areas include national parks over 6,000 acres and national wilderness areas over 5,000 acres. The Mazatzal Wilderness Area has been designated a Class I airshed. Air quality in the Wilderness is protected under provisions of the State Implementation Plan, which is administered by ADEQ.

The project area is representative of climates associated with high desert in Arizona. Traffic on unpaved forest roads contribute temporary and highly localized increased levels of fugitive dust that can affect portions of the project area and northern wilderness boundary. On a regional scale, periodic high winds can contribute to temporary increases in the levels of atmospheric dust. Pollutants carried from Verde valley communities and the Greater Phoenix Metropolitan Area may also influence air quality.

3.8.2 Environmental Consequences

No Action Alternative

No environmental consequences to air quality would occur under the No Action alternative.

Proposed Wilderness Alternative

During construction, sources of air pollution include fugitive dust from soils destabilized by construction activities, and tailpipe emissions from vehicles. Tailpipe emissions would exist only during active construction.

Dust picked up and dispersed by construction traffic on unpaved roads would increase the concentration of total suspended particulates. These effects would be temporary and confined mostly to areas outside the Class I airshed.

Construction activities within wilderness would result in temporary localized increases in fugitive dust and engine (helicopter) emissions. The effect on Class I air quality would be minor.

Nonwilderness Alternative

The air quality effects would be similar to those described under the proposed action for areas outside the Class I airshed.

Cumulative Effects

Minor and short-term project impacts to air quality would occur, but there are no past, present, or reasonable foreseeable projects anticipated to occur within the same area or during the same time that would result in additive impacts to air quality.