



United states Department of Agriculture

Restoration of Gila Trout (*Oncorhynchus gilae*) and other Native Fishes to Whitewater Creek, New Mexico

Environmental Assessment July 2017



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Glenwood Ranger District

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Acronyms and Abbreviations

µg/L	microgram per liter
APE	Area of Potential Effect
AZGFD	Arizona Game and Fish Department
BISON-M	Biota Information System of New Mexico
CDFW	California Department of Fish and Wildlife
cfs	cubic feet per second
DEGEE	diethylene glycol monoethyl ether
EA	Environmental Assessment
eDNA	Environmental DNA
EMU	Ecological Management Unit
ESA	Endangered Species Act
GNF	Gila National Forest
kg	kilogram
lb	pound
MIS	Management Indicator Species
ml	milliliter
MP	1-methyl-2-pyrrolidone
NMAC	New Mexico Administrative Code
NMDGF	New Mexico Department of Game and Fish
NMED	New Mexico Environment Department
NMPIF	New Mexico Partners in Flight
NMRPTC	New Mexico Rare Plant Technical Council
PAC	Protected Activity Center
PCE	Primary Constituent Element
ppm	parts per million
SOP	standard operating procedure
SWQB	Surface Water Quality Bureau
USDA	United States Department of Agriculture
USEPA	United States Environmental Protection Agency
USFS	United States Forest Service
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
WWBC	Whitewater-Baldy Complex

Introduction

The United States Forest Service (USFS), Gila National Forest (GNF) Glenwood Ranger District, in cooperation with the New Mexico Department of Game and Fish (NMDGF) and the United States Fish and Wildlife Service (USFWS), propose to restore native Gila trout (*Oncorhynchus gilae*), as well as the native speckled dace (*Rhinichthys osculus*), desert sucker (*Catostomus clarki*), and Sonora sucker (*Catostomus insignis*) to Whitewater Creek and its tributaries. The project includes removal of all non-native salmonids (other trout) prior to restocking the creek with Gila trout and the three other specified fishes that are endemic to Arizona and New Mexico. The Regional Forester is responsible for approving the NMDGF proposed use of the piscicide Rotenone, through a pesticide use proposal, in the wilderness area where the project is located. This environmental analysis and subsequent decision will inform the Regional Forester in the review of the pesticide use proposal from NMDGF. The purpose of the project is to re-establish a viable and self-sustaining population of Gila trout in Whitewater Creek to provide for species recovery and recreational fishing opportunities. As part of the Proposed Action, approximately 12 miles of Whitewater Trail (#207) from Hummingbird Saddle to the Gold Dust Trail (#41) would be re-established. The Proposed Action would be implemented on the Glenwood Ranger District of the Gila National Forest (GNF).

This environmental assessment (EA) is being prepared to determine whether implementation of the actions necessary to restore the Gila trout and the other specified native fishes to Whitewater Creek and complete trail reconstruction may significantly affect the quality of the human environment and thereby require the preparation of an environmental impact statement. By preparing this EA, the USFS is fulfilling its policy and direction to comply with the National Environmental Policy Act.

Background

The Gila trout is readily identified by its iridescent gold sides with fine, profuse black spotting on its body and dorsal and adipose fins. Adults are golden to greenish-yellow in color. Dorsal, pelvic, and anal fins have a white to yellowish tip that may extend along the leading edge of the pelvic fins (USFWS 2003).

The Gila trout is endemic to mountain streams in the Gila, San Francisco, Agua Fria, and Verde river drainages in New Mexico and Arizona. It historically occurred in mountain stream habitats in Sierra, Grant, and Catron counties in New Mexico and Greenlee, Apache, Graham, Gila, and Yavapai counties in Arizona (USFWS 2003) (Figure 1).

Suitable habitat for the Gila trout is found in moderate- to high-gradient perennial mountain streams above 5,400 feet in elevation with water temperature below 77 degrees Fahrenheit (F). Gila trout are typically found in streams that flow through narrow, steep-sided canyons and valleys, and have clean gravel substrates for spawning with continuous streamflow of sufficient quantity to maintain adequate water depth and temperature. Pool habitat provides refuge during low-flow conditions and periods of thermal extremes. Abundant invertebrate prey, cover, and water free from contaminants also are required. Cover typically consists of undercut banks, large woody debris, deep pools, exposed root masses of trees at water's edge, and overhanging vegetation (USFWS 2003).

Gila Trout Recovery

The Gila trout was originally recognized as endangered under the federal Endangered Species Preservation Act of 1966 (32 Federal Register [FR] 4001; March 11, 1967); federal designation of the species as endangered continued under the Endangered Species Act of 1973 (ESA). When the Gila trout was listed as endangered, the most important reason for the species' decline was hybridization and competition with and/or predation by non-native salmonids (52 FR 37424; October 6, 1987). Uncontrolled angling also depleted some populations of Gila trout, which in turn encouraged stocking of hatchery-raised, non-native species (USFWS 2003). Range reductions also have occurred when populations are extirpated due to stream sedimentation and ash flows after high-intensity forest fires destroy soil-holding vegetation or when non-native trout hybridize with or predate the native Gila trout. By 1975, known distribution of the species consisted of only five relict populations restricted to headwater stream habitats in the upper Gila River drainage in New Mexico: Main Diamond, South Diamond, McKenna, Spruce, and Iron creeks (USFWS 2003). Subsequent analysis determined that the fish in Iron and McKenna creeks were not pure Gila trout and were hybridized with rainbow trout (*Oncorhynchus mykiss*) (USFWS 2003). A relict Gila trout population in Whiskey Creek (headwater tributary to the upper West Fork Gila River) was discovered in the mid-1990s (USFWS 2003).

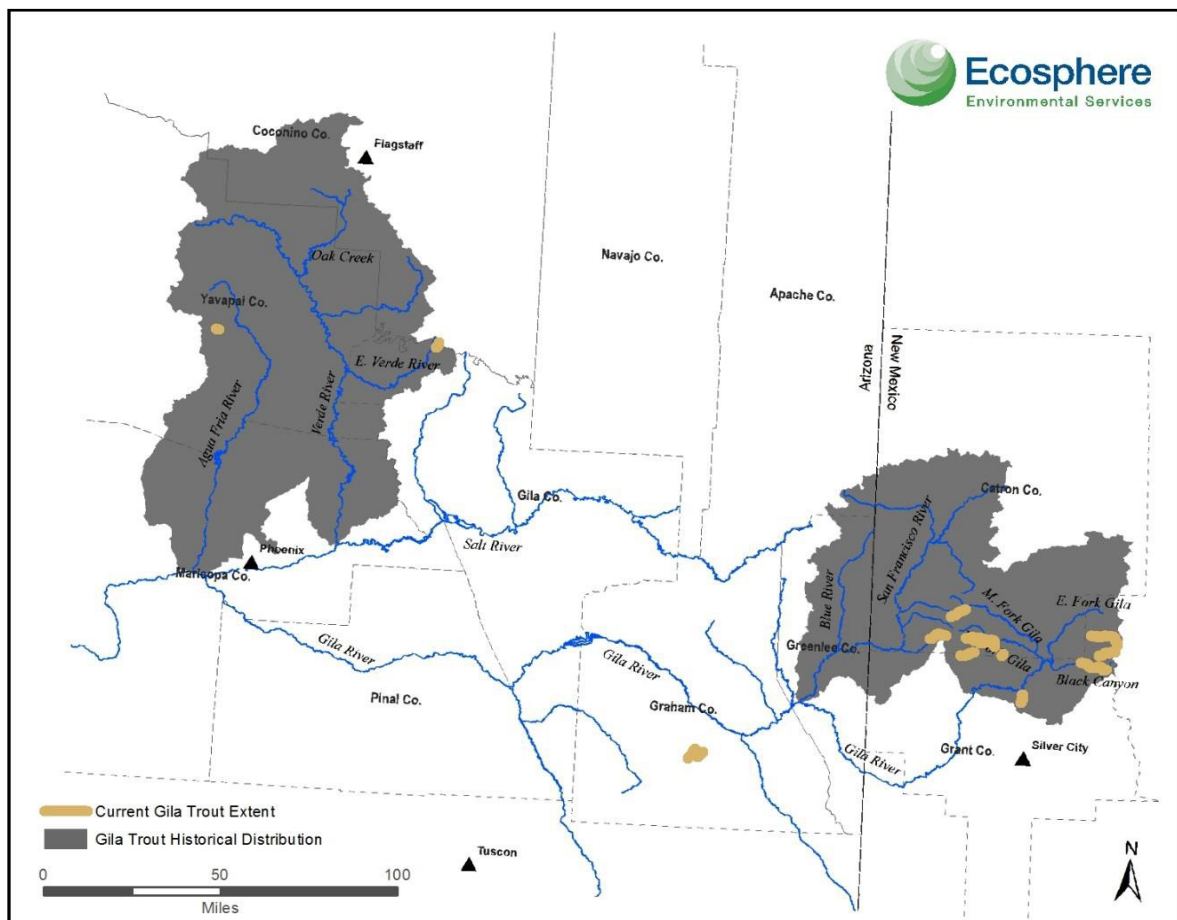


Figure 1. Historical (gray) and currently occupied range (gold) of Gila trout in the Southwestern United States.

The USFWS, USFS, NMDGF, and Arizona Game and Fish Department (AZGFD) are participants in implementing recovery actions for Gila trout (USFWS 2003). Both federal and state agencies are guided in the restoration and management of Gila trout by the Gila Trout Recovery Plan, first issued in 1979. The main objective of the 1979 Recovery Plan was to “improve the status of Gila trout to the point that its survival is secured and viable populations of all morphotypes are maintained in the wild” (USFWS 1979). A third revision of the recovery plan was issued in 2003. The objectives of the 2003 Recovery Plan are to down-list and then delist the Gila trout. The criteria for down-listing in the 2003 Recovery Plan include:

- Protection and replication of the four known non-hybridized indigenous lineages (Main Diamond, South Diamond, Spruce, and Whiskey creeks) of Gila trout in at least 53 miles of streams in the wild,
- Replication of each of these lineages in a stream geographically separate from its remnant population, and
- Development and implementation of an Emergency Evacuation Plan to address wildfire impacts and discovery of non-native salmonid invasion in Gila trout streams (USFWS 2003).

In 2006, after evaluating threats affecting the species, the status of the wild population, and available conservation measures, the USFWS determined that the Gila trout was no longer in danger of extinction throughout all or a significant portion of its range and the species was down-listed to threatened (71 FR 40657; July 18, 2006). Concurrent with down-listing, management of Gila trout by the states as a recreational species with regulated fishing became allowable under Section 4(d) of the ESA, in coordination with the USFWS. Primary threats to Gila trout continue to include competition, predation, and hybridization with non-native salmonids; habitat degradation as a result of altered land use practices; and stochastic events such as wildfire and post-fire flooding (71 FR 40657; July 18, 2006).

Speckled dace, desert sucker, and Sonora sucker are native fishes that live in the cool water reaches of Whitewater Creek and were present in the Catwalk reach of the project area before the 2012 Whitewater Baldy Fire. The speckled dace, a member of the minnow (Cyprinidae) family, is a USFS Region 3 sensitive species and is not a protected species in New Mexico (Biota Information System of New Mexico [BISON-M] 2016). The desert sucker, a medium-sized fish from the sucker (Catostomidae) family, is a USFS Region 3 sensitive species and a state of New Mexico Species of Greatest Conservation Need (BISON-M 2016). The Sonora sucker, a medium- to large-sized fish from the sucker family, is a USFW Region 3 sensitive species and is not a protected species in New Mexico (BISON-M 2016). Management concerns for these three species include introduction of non-native aquatic species, alteration of historical streamflow regimes, construction of reservoirs, and degradation of habitat quality due to a variety of land uses (USFS 2013c).

Proposed Project Location

The project area is within the Glenwood Ranger District of the GNF and the majority of the project area is within the Gila Wilderness. The proposed treatment area is Whitewater Creek in Catron County, New Mexico, from the headwaters to the USFS boundary below the Catwalk National Recreation Area parking area (including all perennial tributaries) (Figures 2 and 3).

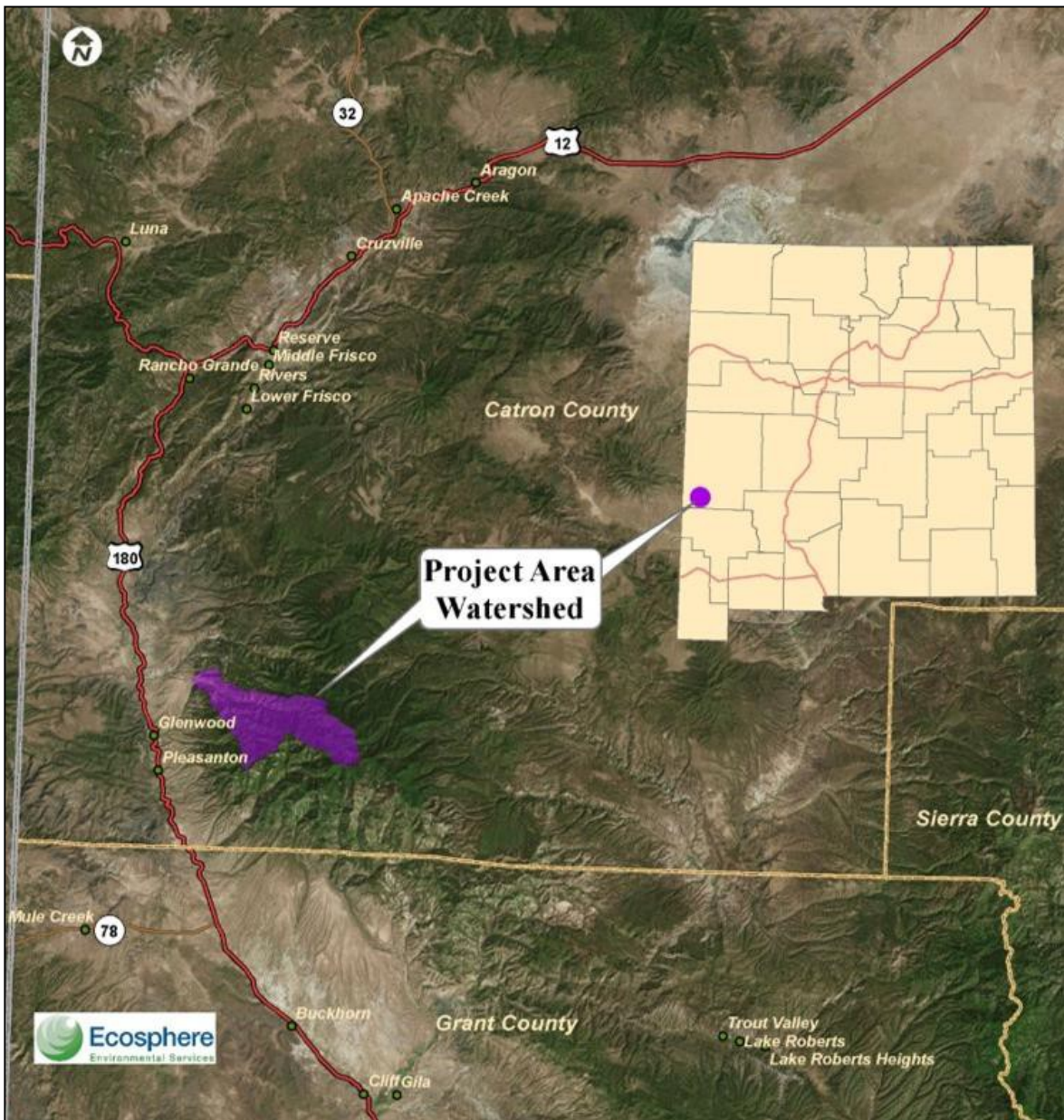


Figure 2. Location of the Whitewater Creek project area watershed in southwestern Catron County

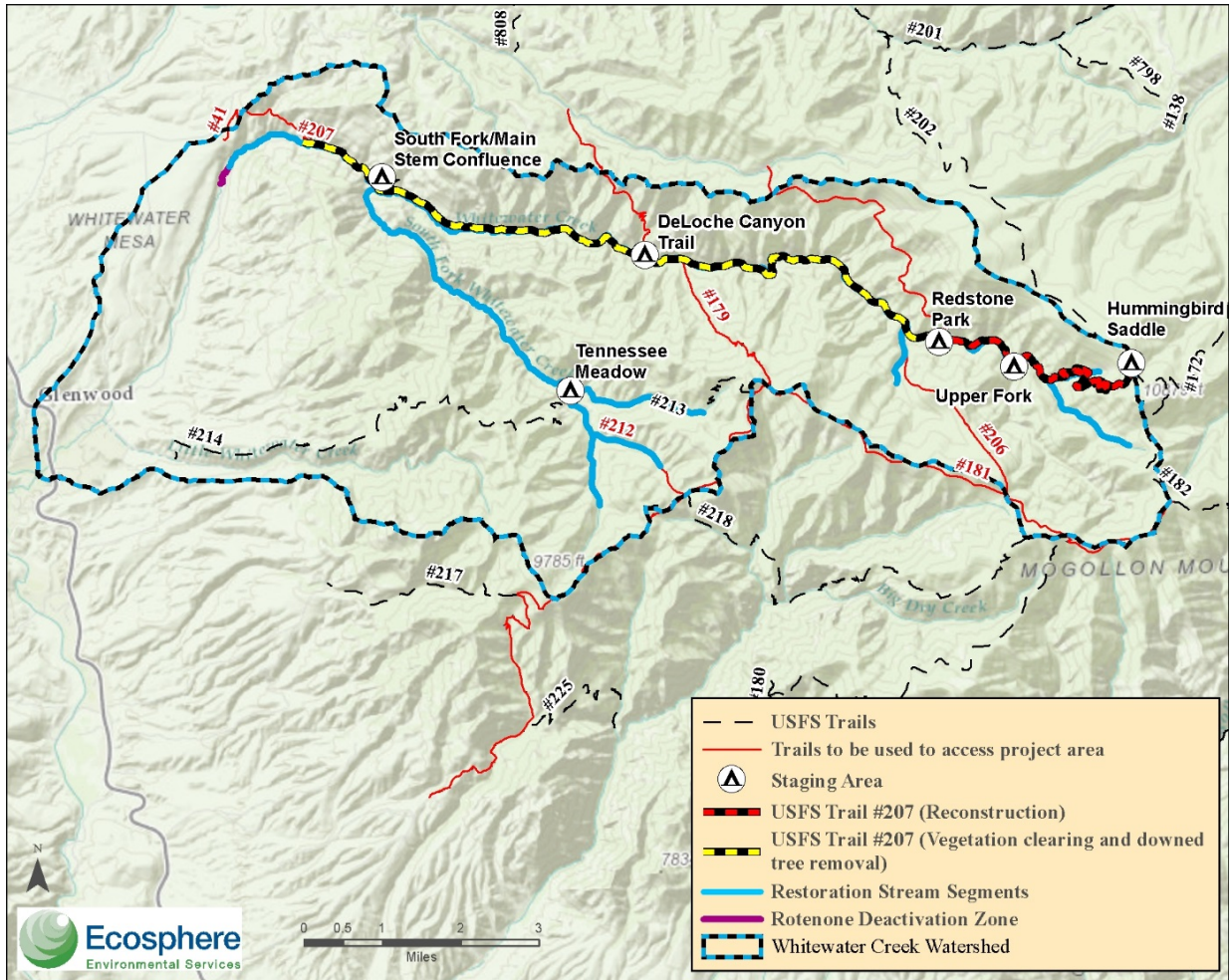


Figure 3. Restoration stream segments in the Whitewater Creek project area watershed

Purpose and Need for the Proposal

The Proposed Action would restore Gila trout, as well as the speckled dace, desert sucker, and Sonora sucker, to approximately 23 miles of perennial stream thereby contributing to recovery goals and criteria. This would establish a viable, self-sustaining recovery population of Gila trout that also would be managed for recreational fishing in Whitewater Creek and its tributaries. As part of the Proposed Action, approximately 12 miles of access to Whitewater Creek would be restored by reconstruction and maintenance of the Whitewater Trail (#207) from Hummingbird Saddle to the Gold Dust Trail (#41). All non-native salmonids (other trout) would be removed before restocking the creek with Gila trout and the three other specified native fishes. The **purpose** of the Proposed Action is to further the conservation of Gila trout and progress towards recovery of Gila trout under the ESA. This action is **needed** to contribute to the delisting criteria of restoring genetically pure populations of Gila trout to watersheds within its historic range as specified in the 2003 Recovery Plan. Establishment of a viable population of Gila trout in Whitewater Creek is needed to meet delisting criteria for the species.

Public Involvement and Tribal Consultation

Prior to initiating the scoping for this EA, two public meetings were held in Glenwood, New Mexico. At these meetings, representatives from the NMDGF provided a Gila trout management update and presented information on the proposals under consideration to restore the Gila trout to Whitewater Creek, as well as other Gila trout conservation activities in New Mexico. The November 10, 2015 meeting was attended by approximately 40 people. The February 16, 2016 meeting was attended by 11 people. Specific topics of discussion included the need for easier/better access to angling locations, support for expanding angling opportunities for trout fishing and quality trout waters, identification of other streams the public felt were suitable for Gila trout restoration, the economic value to the community of having Gila trout in the area, and the timelines for the proposed projects. In addition, NMDGF representatives attended a meeting of the Southwestern County Commissioners Alliance in August 2015 to present plans for Gila trout conservation—including the Whitewater Creek project. As a result of the presentation, Catron and Hidalgo counties provided letters of support for the Whitewater Creek Gila trout restoration project. NMDGF provides current information about the Gila trout and restoration and recovery projects on the Gila Trout Recovery and Angling website (NMDGF 2016a).

The project was first listed in the April 2016 schedule of proposed actions and updated throughout the process.

A news release announcing the proposal to restore native Gila trout and other native fishes to Whitewater Creek and its tributaries and seeking public input on the proposal was issued by the GNF on March 1, 2016. A scoping letter was mailed to more than 60 interested parties on March 3, 2016. The letter provided details on the project background, purpose, location, and draft proposal, and gave the recipient the opportunity to comment. Persons receiving the mailing included local elected officials in Catron County and the Village of Reserve, tribal officials, state and federal agencies, non-governmental organizations, and individuals. In addition, the letter was posted on community bulletin boards in Glenwood, New Mexico at the U.S. Post Office, Glenwood Trading Post, and Alma Grill and Store. The GNF also made hard copies of the letter available at the USFS Supervisor's Office in Silver City, New Mexico and at the Glenwood Ranger District Office in Glenwood, New Mexico. This letter and information on the opportunity to comment on the proposal also was posted on the USFS GNF website (USFS 2016a) and the NMDGF Gila Trout Recovery and Angling website (NMDGF 2016a). The project appeared on the GNF Schedule of Proposed Actions on April 1, 2016.

During the scoping period, 60 comments were received from the public, agencies, tribes, and interest groups. Many comments expressed either support for or opposition to the Proposed Action. The respondents indicating support for the Proposed Action generally were in favor of restoring a native fish and establishing a recreational fishery for Gila trout with improved access to Whitewater Creek. The majority of respondents opposed to the Proposed Action disapproved of removing non-native fish from the stream; disagreed with, or had concerns about, the safe use of a piscicide; or felt that it would be wasteful to kill one type of fish in favor of another.

Substantive comments included the following:

- Several scoping comments suggested that electrofishing be utilized as an alternative to rotenone to remove non-native fish.
- Several scoping comments suggested that genetic swamping (stocking large numbers of Gila trout and leaving non-native fish in the stream) could be utilized as an alternative to rotenone to establish a Gila trout population.

These comments were considered while developing alternatives for the Proposed Action and focusing the analysis of project effects on issues of concern.

The preliminary Environmental Assessment was mailed to 48 individuals, organizations, tribal contacts, and elected officials, and the legal notice was published in the Silver City Daily Press on February 14, 2017 for the 30 day comment period. Comments were received from 38 individuals, organizations, and agencies. The following federal, state, tribal, local government and agency representatives were consulted during development of this EA:

- Catron County: Anita A. Hand, Glyn Griffin, Van J. (Bucky) Allred (Commissioners)
- Hidalgo County: Darr Shannon, Marianne Stewart, Richard Chaires (Commissioners)
- United States Fish and Wildlife Service: Wally Murphy
- New Mexico Department of Game and Fish: Alexandra Sandoval (Director)
- New Mexico Environment Department, Surface Water Quality Bureau: John Money
- New Mexico State Forestry Division: Doug Boykin
- Alamo Navajo Chapter: Stanley Herrera (President)
- Fort Sill Apache Tribe: Michael Darrow
- Mescalero Apache Tribe: Holly B. E. Houghten
- Pueblo of Acoma: Damian Garcia
- Pueblo of Zuni: Kurt Dongoske
- Ramah Navajo Chapter: Harry B. Yazzie, Sr.
- The Hopi Tribe: Leigh J. Kuwanwisiwma
- The Navajo Nation: Timothy Begay
- San Carlos Apache Tribe: Vernelda J. Grant
- White Mountain Apache Tribe: Mark T. Altaha
- Ysleta Del Sur Pueblo: Javier Loera

Proposed Action and Alternatives

Alternatives Considered but Eliminated from Detailed Analysis:

Two alternatives based on comments were considered, but were eliminated from further analysis because they did not meet the purpose and need of the proposed project.

- An alternative method to remove non-native trout by electrofishing was considered. However, this alternative was eliminated from further consideration because it was considered ineffective and impractical for this stream. Use of electrofishing to eradicate non-native trout from large stream segments or complex drainage networks, such as the project area, is likely impossible (Finlayson et al. 2010). In some cases, electrofishing has been used to remove populations of non-native trout in relatively small reaches of stream with simple habitat structure, but such efforts are labor intensive, take many years to complete, and are costly. Other studies have shown reduction in, but not complete removal of, non-native trout abundance by electrofishing (Larson et al. 1986; Meyer et al. 2006; and Thompson and Rahel 1996). Because of the 23-mile length of Whitewater Creek and its tributaries, the rough and steep terrain along much of its length, its remote location in a designated wilderness area, and the difficulty to access the stream, eradication of non-native trout by electrofishing was considered to be neither economically nor technically practical nor feasible and was eliminated from further consideration.

- Repeatedly stocking large numbers of native, genetically intact Gila trout into Whitewater Creek and its tributaries was considered, but eliminated from further consideration as an alternative to removing the remaining non-native salmonids from the stream with a piscicide. The intent of this alternative would be to reduce hybridization by non-native trout to an undetectable level through “genetic swamping.” This technique has been employed in restoration of westslope cutthroat trout (*O. clarki lewisi*) in Montana (Leary et al. 1989), but there are no peer-reviewed analyses evaluating effects of the program. The concept is that over a long period of time, such a program may reduce the occurrence of non-native salmonid genetic material in Whitewater Creek. However, elimination of non-native salmonid hybridization would not be possible, and a native/non-native trout hybrid swarm would continue to persist in the creek and its tributaries. Additionally, competition with and predation by brook trout (*Salvelinus fontinalis*), which do not interbreed with Gila trout, would continue to impede re-establishment of a viable and self-sustaining Gila trout population in Whitewater Creek. Consequently, genetic swamping would not achieve the purpose of the proposal to further conservation of the Gila trout nor the need to restore non-hybridized indigenous lineages of the species to a portion of its historic range and thereby contribute to the achievement of the delisting criteria for the species as specified in the 2003 Recovery Plan.

Only Alternative One (Proposed Action) and the No Action Alternative are brought forward for further analysis in this EA.

Alternative One (Proposed Action)

Alternative One would restore Gila trout and the other specified native fishes to Whitewater Creek and its tributaries after successful removal of non-native salmonids. Alternative One consists of three major components:

- **Removal of Non-native Salmonids:** To remove non-native salmonids from the stream, the piscicide rotenone (CFT Legumine®, 5 percent rotenone, and Prentox® Prenfish™ Fish Toxicant Powder) would be applied. Rotenone treatments would be conducted one to two times per year over a 2- to 3-year period until all non-native salmonids are removed. Application of rotenone would follow the standard operating procedures for fisheries management and the product labels. Rotenone would be chemically deactivated at the downstream end of the project area by applying potassium permanganate (Finlayson et al. 2010).
- **Stocking:** Gila trout, speckled dace, desert sucker, and Sonora sucker would be stocked in the creek once removal of non-native salmonids has been confirmed. Stocking would be conducted multiple times to ensure a viable and self-sustaining population is established in a reasonable period of time.
- **Re-establishment of Public Access by Trail Reconstruction and Maintenance:** Public access to Whitewater Creek would be restored by reconstruction and maintenance of the Whitewater Trail (#207).

Each of these major components is described in detail below.

Removal of Non-native Salmonids

The NMDGF would lead the piscicide treatment in collaboration with the USFS-GNF. Non-native

salmonids would be removed from streams in the project area through application of rotenone (Prentox CFT Legumine®, 5 percent rotenone, and Prentox® Prenfish™ Fish Toxicant Powder). Prentox CFT Legumine® contains 5 percent rotenone, 5 percent “other associated resins,” and 90 percent “other ingredients” (refer to Appendix A for the product label and Material Safety Data Sheet). The “other ingredients” portion of the formulation is 60 percent diethylene glycol monoethyl ether (also known as DEGEE), 10 percent 1-methyl-2-pyrrolidone (also known as MP), 17 percent Fennodefo 99™, and 3 percent other compounds (California Department of Fish and Wildlife [CDFW] 2010). The “other ingredients” in rotenone formulations do not affect the toxicity of the end product, as evidenced by the fact that formulations are no more toxic than pure, technical grade rotenone (United States Environmental Protection Agency [USEPA] 2006). Diethylene glycol monoethyl ether and MP are water-soluble solvents for rotenone, and together compose approximately 93 percent of CFT Legumine by weight. Neither of these solvents is volatile and both would be removed from water by aerobic biodegradation (ToxNet 2016a and 2016b). Fennodefo 99™, which composes approximately 17 percent of CFT Legumine by weight, aids in the emulsification and dispersion of rotenone in water. Fennodefo 99™ contains polyethylene glycol, hexanol, and a mixture of fatty acid esters. The mixture of fatty acid esters is likely derived from “tall oil” or “pine oil,” which consists of naturally occurring fatty acids and resins that are a distilled byproduct of wood pulp manufacture. Tall oil is a common ingredient in soap formulations (CDFW 2010).

Powdered rotenone (Prentox® Prenfish™ Fish Toxicant Powder) would be used in a sandmix formulation to treat springs, seeps, and wetlands adjacent to restoration stream segments. Sandmix is composed of 1 pound of powdered rotenone, 1 pound of dry sand, 2 ounces of unflavored gelatin, and sufficient water to create a dough-like consistency (Finlayson et al. 2010). Prentox® Prenfish™ Fish Toxicant Powder consists of 7.4 percent rotenone, 11.1 percent other associated plant resins, and 81.5 percent other ingredients such as clay or talc (as dry diluents) and wetting or dispersing agents (refer to Appendix A for the product label and Material Safety Data Sheet).

Rotenone treatments would be conducted one to two times per year for up to 3 years to ensure complete removal of all non-native salmonids. Application of rotenone would comply with all federal and state laws and all label requirements and would follow the standard operating procedures (SOPs) (Appendix B) for fisheries management (Finlayson et al. 2010). The SOPs provide guidance on how to use rotenone in a safe and effective manner. The SOPs that would be incorporated into project implementation as appropriate, include the following:

- SOP 1 Public Notification and Treatment Area Restrictions
- SOP 2 Supervisory Training and Qualifications and Regulatory Compliance
- SOP 3 Safety Training and Hazard Communication
- SOP 4 Rotenone Storage, Transportation, and Spill Containment
- SOP 5 Determining Treatment Rates and Strategies
- SOP 6 Determining Treatment Areas and Project Areas
- SOP 7 Determining Need and Methods for Chemically Induced Deactivation
- SOP 10 Transferring (Mixing/Loading) Liquid Rotenone Concentrate
- SOP 11 Operation of Drip Stations, Peristaltic Pumps, and Propwash Venturi for Application of Liquid Rotenone
- SOP 12 Operation of Sprayers for Applying Diluted Liquid Rotenone
- SOP 13 Use of Rotenone Powder/Gelatin/Sand Mixture
- SOP 14 Use of *In-Situ* Bioassays to Monitor Efficacy
- SOP 15 Collection and Disposal of Dead Fish

SOPs 5 through 10 address treatment areas, treatment rates, application methods, and treatment procedures. All rotenone treatments would be applied at concentrations well below the maximum allowable concentration of 0.2 parts per million (ppm) active ingredient. Actual concentrations would be determined based on flow rate and field bioassay to calculate the minimum effective dose, which would be doubled to determine actual treatment rate (Finlayson et al. 2010).

The typical concentration used to eradicate non-native salmonids is 0.05-ppm rotenone (active ingredient). In some circumstances, concentrations higher than 0.05-ppm active ingredient may be necessary. The maximum concentration used would not likely exceed 0.1-ppm active ingredient. Rotenone would be applied using drip stations placed at intervals appropriate to maintain treatment rate. Isolated areas such as seeps, springs, and backwater habitats would be treated using backpack sprayers and hand application of rotenone sand mix (a mixture of powdered rotenone, sand, and gelatin) (Spateholts and Lentsch 2001). Typically, complete eradication of fishes with rotenone is obtained after two treatments and fish eradication is expected to be completed in 2 to 3 years. One to two treatments would occur per year in each stream segment. Public notification and treatment area restrictions are described in SOP 1. The project area would be closed to public entry immediately prior to application and public access would be prohibited during actual chemical application. Complete treatment of the project area could take up to 4 weeks including project setup, weather delays, and demobilization. Potassium permanganate would be used to deactivate rotenone at the downstream end of the project area to achieve a concentration of 2-4 ppm depending on the organic need of the water and the rotenone concentration.

Restoration stream segments would be treated until no additional fish are killed during a treatment, thus confirming complete removal of non-native salmonids. In addition, analysis of environmental DNA would be used to determine persistence of non-native salmonids. Treatments would cease when it is confirmed that non-native salmonids have been eradicated. If species targeted for removal are found, the stream would be re-treated. Individual rotenone treatments are expected to occur over a 7-day period. Rotenone treatments would be conducted by a crew of 15 to 20 workers under the supervision of a certified pesticide applicator(s). Rotenone treatments in stream segments located in the Gila Wilderness would comply with all relevant regulations including limiting the treatment group size to less than 25 individuals and 35 head of pack and saddle stock, and any use motorized equipment would require Regional Forester approval.

A helicopter would be used to transport gear and equipment to areas inaccessible to pack stock. The helicopter staging and loading area would be located outside the designated Gila Wilderness at the Glenwood Ranger District office with flights to locations within designated wilderness. Helicopter use would consist of 8 to 16 flights (depending on trail conditions) for the purpose of transporting and backhauling camp gear and treatment supplies, to support up to four camps per treatment period. One to two treatments would be accomplished per year. All helicopter use would follow the minimum tool concept, require Regional Forester approval, and will decrease as trail work is accomplished and access for pack stock is improved. Similarly, in the event that currently accessible trails become impassible due to fire, flooding, or other damage, additional helicopter flights may need to be added to successfully complete each treatment. To reduce the potential impact to recreational activities, helicopter use would not occur on weekends. Recreational use of the area is currently very light due to limited trail access to the project area. Personnel would camp for periods of up to 7 days during treatments. Leave no trace practices will be implemented and no refuse or equipment associated with the Proposed Action would remain after the project is completed. Rotenone treatments would be supported from camps set up at the following locations:

- Hummingbird Saddle or near the junction of the Whitewater Trail (#207) and Whitewater Creek
- Redstone Park – foot access to this camp would be via the Redstone Park Trail (#206), but, dependent upon trail conditions, gear and equipment may have to be brought in via helicopter
- Upper Fork – foot access to this camp would be from the Redstone Park Camp on Whitewater Trail (#207), but, dependent upon trail conditions, gear and other equipment may have to be brought in via helicopter.
- DeLoche Canyon Trail – foot access would be via the DeLoche Canyon Trail (#179) and Whitewater Trail (#207), but gear and equipment would have to be brought in via helicopter
- South Fork/Mainstem Confluence – access to this camp can be made by pack stock via the Gold Dust Trail (#41) and Whitewater Trail (#207)
- Tennessee Meadow – access to this camp can be made by pack stock via the Holt-Apache Trail (#181) and South Fork Whitewater Trail (#212)

Rotenone would be chemically deactivated at the downstream end of the project area by applying potassium permanganate to Whitewater Creek at the Catwalk National Recreation Area parking lot area using a metering device with a reservoir for holding the chemical. Potassium permanganate would be applied to achieve a 1-ppm residual level potassium permanganate at the downstream end of a 30-minute contact zone to ensure complete deactivation of residual rotenone at the downstream end of the project area (Finlayson et al. 2010). Actual in-stream concentration of potassium permanganate would be approximately 2 to 4 ppm, but would depend upon local field conditions. The maximum extent of the rotenone deactivation zone would not extend past the National Forest lands downstream from the Catwalk National Recreation Area (Figure 3). Rotenone deactivation effectiveness would be assessed by *in situ* bioassay to ensure no fish are affected by rotenone, rotenone residue, or potassium permanganate downstream of the rotenone deactivation zone. Individuals working at the deactivation station either would camp on site or stay in Glenwood to actively monitor deactivation. All vehicle travel would be restricted to existing roads. If Whitewater Creek is dry on USFS lands near the Catwalk parking area, potassium permanganate would not be required.

Stocking

Gila trout, speckled dace, desert sucker, and Sonora sucker would be stocked into Whitewater Creek and its tributaries once removal of non-native salmonids has been confirmed and monitoring shows the aquatic macroinvertebrate community has recovered and can support a fish community. The aquatic macroinvertebrate community would be sampled prior to the initial rotenone treatment to characterize the stream baseline. Following completion of rotenone treatments, the aquatic macroinvertebrate community would be sampled and monitored to assess recovery of the food base; presence/absence of non-native salmonids would be confirmed via environmental DNA analysis from each stream reach.

Gila trout would be stocked multiple times to ensure a viable and self-sustaining population (as evidenced by recruitment) is established. Protocol established by the Gila Trout Recovery Team requires a minimum of 3 consecutive years of stocking followed by surveys to document recruitment. The population is expected to be established within 3 years; however, fish stocking would continue until a self-sustaining population is confirmed. Source stock for Gila trout would include hatchery-raised fish from Mora National Fish Hatchery and wild fish collected from Big Dry Creek and/or

Spruce Creek (tributaries to the San Francisco River in Catron County, New Mexico). Fish would be transferred directly from Big Dry Creek, Spruce Creek, or other wild sources of Gila trout to Whitewater Creek or transferred to Mora National Fish Hatchery to supplement broodstock and ensure the hatchery can meet the stocking needs for Whitewater Creek. Speckled dace, desert sucker, and Sonora sucker would be sourced from populations in adjacent streams (i.e., San Francisco River, Mineral Creek) and transferred to cool-water reaches of Whitewater Creek.

Due to the project area's remote location, pack stock and helicopters would be needed to transport fish. In areas where trails allow access to the stream and transport times are less than 5 hours, primitive means (pack stock outfitted with specialized fish-hauling panniers) would be used to transport fish to and from streams. In areas where trails are not passable or safe, or where travel times are greater than 5 hours, a helicopter with a specialized fish-transport container would be used to transport fish to and from streams. Fish would be stocked at multiple locations in the mainstem of Whitewater Creek and South Fork Whitewater Creek to ensure establishment throughout the drainage. Up to five helicopter trips per year for up to 5 years would be used to transport and stock fish. The helicopter may be used for transfers of fish to and from streams or a hatchery truck throughout the project area. Helicopter use for stocking purposes may decrease as trail access is improved for pack stock. The use of a helicopter for stocking operations requires Regional Forester approval and would be timed to avoid high recreational use periods.

Trail Reconstruction and Maintenance

Post-fire erosion has damaged all of the trails that provide access to Whitewater Creek. Reconstruction and maintenance on the Whitewater Trail (#207) to restore public access to Whitewater Creek. Figure 4 shows the location of trails and reconstruction activities in a portion of the project area.

Severe erosion is occurring within the drainage. If drainage structures are not rebuilt, large portions of several trails, including the Whitewater Trail (#207), would be lost, requiring significant reconstruction work. Due to the location within the Gila Wilderness, this work would require livestock pack support. Potential deviations from the original trail corridor would be surveyed and analyzed for potential impacts to cultural, historic, and biological resources. Trail work to re-establish approximately 12 miles of Trail #207 from Hummingbird Saddle to the Gold Dust trail would include the following:

1. Reconstruction of four switchbacks with widened landings and stacked rock retaining walls.
2. Rerouting short sections of approximately 4 miles of trail at various locations along Whitewater Creek.
3. Construction of 12 small, stacked rock check dams to protect the trail.
4. Construction of approximately 1,000 square feet of stacked rock retaining wall.
5. Removal (cutting and grubbing) of regenerated aspen growing in the trail tread from Hummingbird Saddle to the trail's intersection with Whitewater Creek.
6. Logging out and brushing of the entire trail.
7. Removal of 5 to 10 large log and debris jams blocking the bottom of the canyon. Blasting is the preferred removal method unless a more efficient and less costly method can be utilized.
8. Construction of erosion control structures along the trail.

All trail work would be completed using primitive tools, and any materials (i.e., rock, logs) would be obtained on site. Blasting would occur prior, concurrently, and post-treatment as needs and conditions allow.

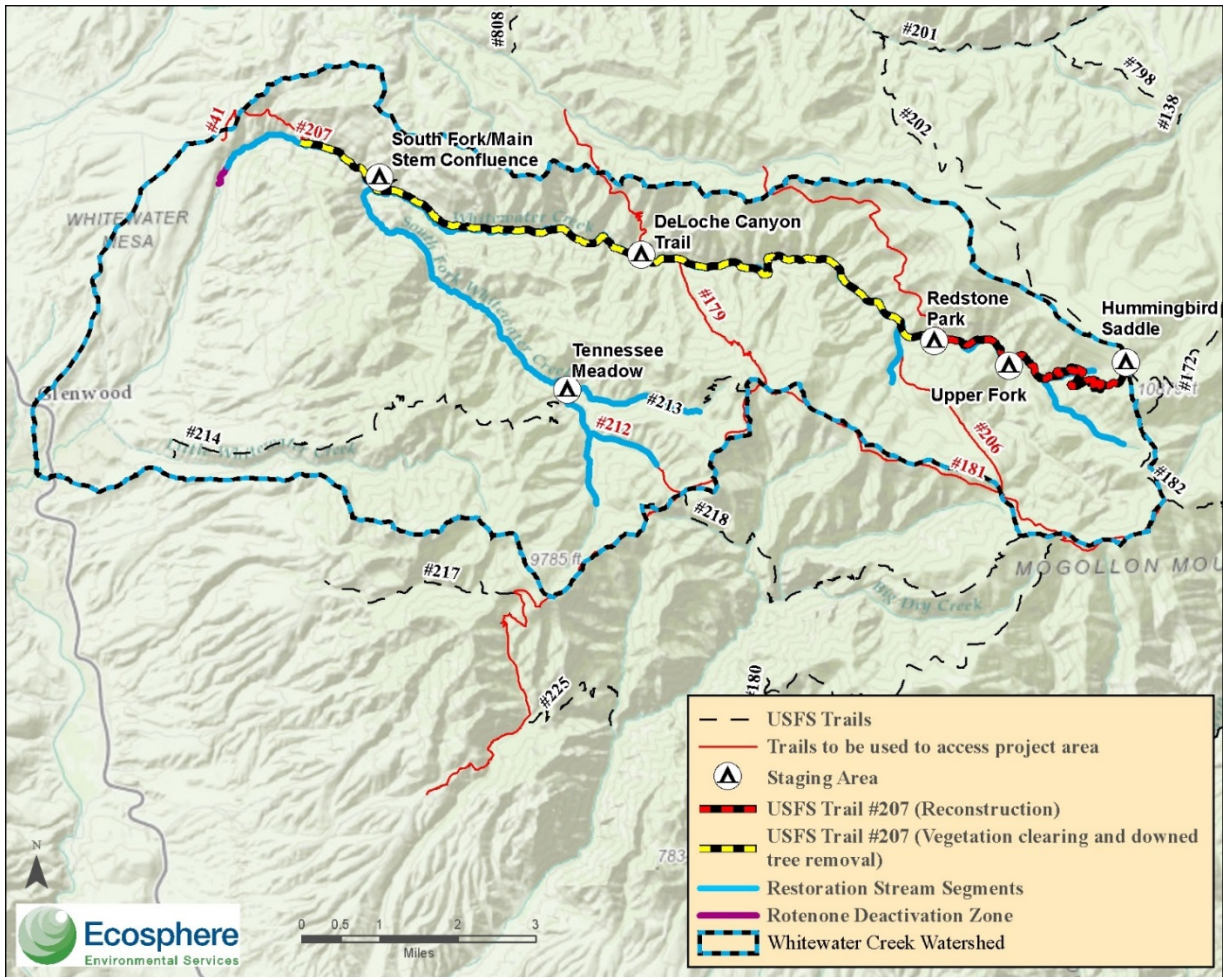


Figure 4. Proposed trail work sites on a section of the Whitewater Trail (#207) from Redstone Park to Hummingbird Saddle within the project area.

Design Features

A number of design features would be used to implement the Proposed Action to ensure consideration and protection of other forest resources. Design features serve to minimize, reduce or eliminate impacts from the proposed action. These features are listed below by resource category:

Geology and Soils

- Standard trail construction techniques will be utilized and drainage will be built into trails to prevent erosion

Water Resources

- The New Mexico Environment Department (NMED) and Glenwood Ranger District have an agreement that states the USFS will endeavor to minimize and mitigate all potential non-point source pollution activities. The agreed upon method to mitigate impacts is to implement and monitor BMPs. The USFS Southwest Region has developed site specific Soil and Water Conservation Practices (Forest Service Handbook 2209.18) to accomplish this goal.
- Mechanized equipment used in or adjacent to perennial streams would be minimized due to wet soil conditions and low soil strength, and to provide a filter for sediment entering the drainages from treated areas. Unauthorized mechanized equipment would not be used in designated wilderness areas.

Biological Resources (Aquatic Biota, Terrestrial Wildlife, Sensitive Species)

- Where possible, camps and equipment maintenance areas would be located away from sensitive habitats (e.g., wetlands) to minimize impacts on these habitats.
- To reduce adverse effects to aquatic macroinvertebrates, the headwaters of tributaries where fish are absent and are protected by a waterfall or other barrier to upstream fish movement would not be treated. These fishless stream segments and other, untreated aquatic habitats near the project area will provide a recolonization source for aquatic macroinvertebrates.
- To prevent introduction or spread of noxious and/or invasive plant species in areas where ground disturbing activities will take place the following design features will be implemented. Equipment used during ground disturbing activities will be inspected and cleaned of any soil or plant material prior to use. During ground disturbing activities crews will notify the appropriate personnel if any noxious and/or invasive species are identified or suspected in the area of the ground disturbing activity.

Recreation and Wilderness

- The minimum tool concept would be applied.
- Unauthorized motorized/mechanized equipment would not be used within designated wilderness areas.
- The public would be notified of temporary closures in the project area through news releases, and public postings at least 1 week prior to each closure.
- “Leave No Trace” methods would be utilized.

Public Health and Safety

- The project area would be closed to the public prior to piscicide application. Public access to the area would be prohibited during actual chemical application.
- Appropriate signage would be implemented per SOP 1.
- The public would be notified of temporary closures in the project area through news releases,

and public postings at least 1 week prior to each closure.

Cultural Resources

- Complete archaeological survey of the area of potential effect and consultation with State Historic Preservation Office shall occur prior to any construction activities; archaeological survey may be conducted in conjunction with trail design activities.
- If any cultural resources are found during trail reconstruction and maintenance, activities would cease in that location.

No Action Alternative

The No Action Alternative serves as a baseline, or representative “status quo.” The purpose of including a No Action Alternative in an environmental impact analysis is to ensure agencies compare the potential impacts of the proposed federal action to the known impacts of maintaining current conditions.

Under the No Action Alternative, there would be no change to the current condition of Whitewater Creek. The native Gila trout, speckled dace, desert sucker, and Sonora sucker would not be restored to Whitewater Creek and non-native salmonids would not be removed. A viable, self-sustaining population of Gila trout in Whitewater Creek and its tributaries would not be established. The No Action Alternative would not contribute to the recovery goals and criteria for Gila trout. Public access to the creek would not be restored or improved by reconstruction of the Whitewater Creek Trail (#207) in a timely manner.

Comparison of Alternatives

Table 1 provides a comparative summary of the assessment of environmental consequences for each resource area by alternative.

Table 1. Summary and comparison of the environmental consequences by alternative

Resource Area	Alternative One (Proposed Action)	No Action Alternative
Landscape Setting and Climate	No effect	No effect
Water Quality and Aquatic Biota	<ul style="list-style-type: none"> • Approximately 12 miles of Trail #207 from Hummingbird Saddle to the Gold Dust Trail would be restored using best management practices (BMPs) to reduce erosion and sedimentation within the watershed. There would be short-term increases in turbidity during activities near the stream corridor. • There would be short-term impacts on water quality from rotenone application. • Existing fish populations in the restoration steam segments would be eliminated. Removal of non-native fish species would have long-term beneficial impacts to Gila trout and other native fish species and make significant progress towards recovery criteria. • Rotenone treatments would cause short-term reductions in aquatic macroinvertebrate abundance. Aquatic macroinvertebrate abundance and species richness would likely return to pre-project levels within 1 year following treatments. These impacts would not occur below the rotenone deactivation zone. • The designation of Whitewater Creek and South Fork Whitewater Creek as Outstanding Natural Resource Waters would not be altered. There would be no long-term degradation of water quality. 	<ul style="list-style-type: none"> • Status of Gila trout would not be improved through restoration of the species to the Whitewater Creek watershed. Approximately 12 miles of Trail #207 from Hummingbird Saddle to the Gold Dust Trail would not be restored. There would be no short-term increases in turbidity during activities near the stream corridor. • There would be no effects on water quality. • Non-native trout would still occupy outstanding natural resource waters.

Resource Area	Alternative One (Proposed Action)	No Action Alternative
Terrestrial Wildlife	<ul style="list-style-type: none"> • Consumption of rotenone-treated water or rotenone-killed fish would not affect terrestrial wildlife. Short-term reduction of aquatic macroinvertebrates would occur but would not measurably affect terrestrial wildlife that prey on insects. • Noise and activity may cause wildlife to be temporarily displaced; however, they would be expected to return to the area after activity associated with the Proposed Action ceases. 	No effect
Special Status Species, Management Indicator Species, and Migratory Birds	<ul style="list-style-type: none"> • The native fish community would be restored to approximately 23 miles of streams in the Whitewater Creek watershed. The status of Gila trout would be improved through restoration of the species making significant progress towards recovery criteria. • Since the narrow-headed gartersnake has likely been extirpated from the project area, the Proposed Action would not jeopardize the continued existence of the species. Given the short-term effects of rotenone and potassium permanganate and the restocking of native fish, the proposed project will not destroy or adversely modify proposed critical habitat for the narrow-headed gartersnake. • For insectivorous species, there may be a short-term reduction in prey base following rotenone treatment; this would not be expected to adversely impact migratory birds. The proposed project would disturb approximately 3.6 acres of potential nesting habitat for migratory birds. Noise associated with trail reconstruction, blasting, 	<ul style="list-style-type: none"> • No effect. The native fish community would not be restored to approximately 23 miles of streams in the Whitewater Creek watershed. • No effect on other species

Resource Area	Alternative One (Proposed Action)	No Action Alternative
	<p>and helicopter flights may cause individuals to avoid the project and action areas.</p> <ul style="list-style-type: none"> • Noise and air movement from helicopter transport of equipment and fish or blasting during trail reconstruction may affect, but is not likely to adversely affect, the Mexican spotted owl. 	
<p>Recreation and Wilderness</p>	<ul style="list-style-type: none"> • Temporary displacement of recreationists due to project area closures during rotenone treatments. Non-native trout, which provide a recreational fishery, would be removed from the Whitewater Creek watershed over the short-term. The action would establish a fishable population of Gila trout in Whitewater Creek and its perennial tributaries providing a unique opportunity to fish for a rare native trout. • Access to the Wilderness would be restored via enhanced trail access. • There would be no effect to the natural and other features of value wilderness characteristic. • The untrammelled, undeveloped, and solitude or primitive and unconfined recreation characteristic would be negatively affected. 	<ul style="list-style-type: none"> • Access to the Whitewater Creek and a major portion of western area of the Gila wilderness would continue to be limited and trails would continue to deteriorate. • There would be no effect on the untrammelled, undeveloped, or other features of value characteristics of wilderness. • The natural characteristic of wilderness would be negatively affected. • The opportunity for solitude or primitive and unconfined recreation characteristic of wilderness would be negatively affected.

<p>Socioeconomic Factors</p>	<ul style="list-style-type: none"> • No public exposure to rotenone or rotenone residue due to area closures, standard operating procedures, and deactivation measures. The project complies with Executive Order 12898 (Environmental Justice). • Implementation of the Proposed Action would result in minor economic benefits to local communities. 	<p>No effect</p>
<p>Heritage Resources</p>	<p>No effect</p> <p>These historic values in Whitewater Creek include remnants of early 19th century mining activity and structures constructed in the canyon by Civilian Conservation Corps. The proposed action would have no impact to these values.</p>	<p>No effect</p>

Environmental Impacts of the Proposed Action and Alternatives

This section describes the affected environment and the potential impacts expected to result from implementing the alternatives. The affected environment described in this section focuses on the relevant major resources or issues that have the potential to be affected by the Proposed Action and alternatives. Under the No Action Alternative, the Proposed Action would not be implemented. Impacts from the No Action Alternative and Proposed Action are summarized in the following resource sections.

Where applicable, alternatives meet the Gila National Forest Management Plan standards and guidelines, policies, and statutes regarding protection of wilderness, sensitive species, wildlife habitat, water, soil, vegetation, heritage resources, and provision for recreation.

Direct impacts are those caused by the action and occur at the same time and place. Indirect impacts are those caused by the action and occur later in time or farther removed in distance, but are still reasonably foreseeable. Cumulative impacts describe how the Proposed Action affects resources when considered with other past, ongoing, and anticipated activities in the area. Impacts can be either long term (permanent, residual) or short term (incidental, temporary). Short-term impacts affect the environment for only a limited time and the environment usually reverts rapidly to the pre-construction condition.

Cumulative effects are the impacts from other land uses that are not part of the Proposed Action but that may have an additive effect when combined with the impacts expected from the Proposed Action. The cumulative effects analysis considers land management actions outside of the treatment areas if they could have an additive effect on the resources affected by the Proposed Action. No commercial logging or mining operations occur within the treatment areas. Actions within the treatment areas that could potentially contribute to cumulative effects include wildfire and suppression efforts, trail maintenance, wildlife management, and recreation.

Landscape Setting and Climate

Existing Conditions

The Whitewater Creek watershed is a sub-basin of the San Francisco River Basin. The project area comprises the portion of Whitewater Creek that extends from a point 2 miles downstream of the Catwalk National Recreation Area parking area up to the creek's headwaters including its perennial tributaries (Figure 3).

The majority of the project area is located within the Gila Wilderness and is undeveloped. Mechanized equipment is prohibited in the Wilderness. There are few trails and no developed campgrounds or other recreational sites in the Wilderness.

Elevation ranges from 4,950 feet in the rotenone deactivation zone to 10,500 feet near Hummingbird Saddle. Slopes are typically steep (30 to 60 percent) and increase from the bare above-treeline area near the headwaters toward the slot canyons of the Catwalk. The tributary creeks generally flow in an - west-northwesterly direction and converge approximately 1.75 miles above the Catwalk into Whitewater Creek before flowing southwest toward the confluence with the San Francisco River.

Typical vegetation in the project area watershed varies concomitantly with elevation, with limited piñon juniper/shrub oak woodland in lower elevations, ponderosa pine and mixed conifer at mid-elevations, and spruce/fir at higher elevations. The creeks support riparian vegetation in elevation zones according to their tolerances for disturbance, inundation, and desiccation. Fast-growing trees and shrubs that can tolerate moderate disturbance and grow best in moist soils dominate the low riparian zone. These woody plants also grow in the middle riparian zone intermixed with bunchgrasses and perennial shrubs. The high riparian zone experiences the least flood disturbance but the most desiccation stress; it is inhabited by a mix of drought-tolerant riparian plants (Kennedy and Ralston 2011).

In 2012, the Whitewater-Baldy Complex (WWBC) fire burned several thousand acres in the project area and had devastating effects on many riparian and aquatic ecosystems (USFS 2015). Of the 22,800-acre project area watershed, approximately 74 percent was burned with varying degrees of severity (low, moderate, or high). Less than 6,000 acres of the project area watershed remain relatively unscathed, categorized as unburned, burned with very low severity, or outside the WWBC fire perimeter (NMED SWQB 2016b). Figure 4 shows the extent and intensity of the 2012 WWBC fire in the project area.

The nearest weather station to the project area (number 293577) is located in Glenwood, New Mexico approximately 2.5 miles downstream from the rotenone deactivation zone. The period of record for the station is September 1, 1939 to May 31, 2016. Precipitation is divided between summer thunderstorms associated with the southwest monsoon and winter snowfall as Pacific weather systems drop south into New Mexico. The average maximum temperature at Glenwood is 74.9 degrees Fahrenheit while the average minimum temperature is 40.3 degrees Fahrenheit (WRCC 2016). Table 2 below lists the average snowfall and precipitation recorded at the Glenwood weather station.

Climate changes pose challenges for the desert southwest which is expected to get hotter and, in its southern half, significantly drier. Snowpack and streamflow amounts are projected to decline in parts of the southwest decreasing surface water supply reliability for cities, agriculture, and ecosystems. Warming temperatures, drought, insect outbreaks, and increased wildfires are all linked to climate change (Enquist and Gori 2008). Reduced snowpack, earlier spring runoff, reduced summer flows, increased floods, and drought will pose additional stressors for freshwater fish populations (Williams et al. 2009).

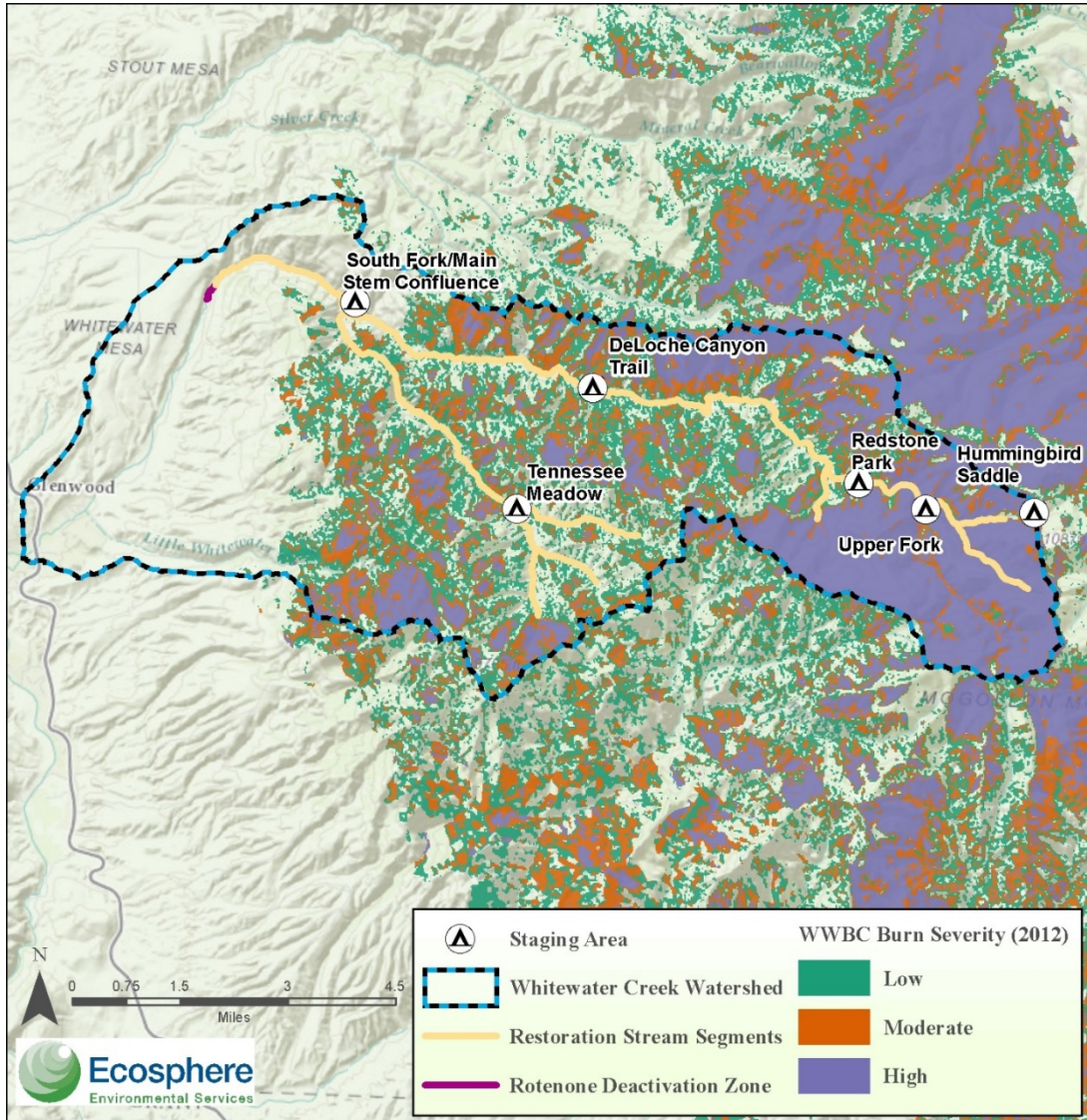


Figure 5. Extent of the 2012 Whitewater Baldy Complex (WWBC) fire near the proposed project area

Table 2. Average total snowfall and precipitation in inches recorded at Glenwood, New Mexico; period of record September 1, 1939 to May 31, 2016

	Jan	Feb	Mar	Apr	May	June	July	Aug	Sept	Oct	Nov	Dec	Annual
Average Total Snow Fall (inches)	6.9	1.8	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	3.2	12.2
Average Total Precipitation (inches)	0.82	1.05	1.17	0.57	0.44	0.93	2.17	2.48	2.77	1.01	1.00	1.64	16.04

Source: WRCC 2016.

Effects on Landscape Setting and Climate

No Action

The No Action would have no effects on landscape setting or climatic conditions in the project area.

Proposed Action

The Proposed Action would not affect landscape setting or climatic conditions in the project area.

Water Quality and Aquatic Biota

Existing Conditions

Water Quality

Whitewater Creek has been designated a high-quality cold-water stream, currently with no officially recognized water quality impairments; however, potential impairments have not been assessed (NMED Surface Water Quality Bureau [SWQB] 2016a). The designated uses for the proposed restoration segments are domestic water supply, fish culture, high-quality cold-water aquatic life, irrigation, livestock watering, wildlife habitat, and primary contact (20.6.4.603 NMAC). Additionally, in the San Francisco River basin, Whitewater Creek and South Fork Whitewater Creek are designated as Outstanding National Resource Waters, a designation whose criteria include having exceptional recreational or ecological significance (20.6.4.9 NMAC).

Impacts from the WWBC fire to water quality in the project area include increased erosion and sedimentation in Whitewater Creek and its tributaries. In particular, erosion, ash flows, and turbidity increases have been observed following large precipitation events (USFS 2015).

Perennial streams in the project area watershed are not monitored; however, a gauging station operated through cooperation of the State of New Mexico's Department of Homeland Security and Emergency Management, the Gila National Forest Service, and the United States Geological Survey (USGS) was installed in Whitewater Creek at the Catwalk National Recreation Trail near Glenwood, New Mexico. The gauge was installed after the WWBC fire to alert nearby residents of oncoming potential flood events (USGS 2016). Since its installation in April 2013, provisional data indicate that average discharge through the gauge hovers around 34 cubic feet per second (cfs). During a 1-week period in

September 2013, over 10 inches of rain fell in the watershed, sending an estimated 20-foot wall of water and debris down the canyon (Photograph 1); discharges exceeded 7,000 cfs (USGS 2016). Table 3 lists the average discharge and precipitation at the gauging station since its installation.

Table 3. Site data for U.S. Geological Survey gauging station #09443800, Whitewater Creek at Catwalk National Recreation Trail

Year	Average Discharge ^a (cfs)	Total Precipitation ^a (in)
April-Dec 2013	104	26.39
2014	34	18.66
2015	34	20.90
Jan-April 2016	35	1.25

Source: USGS 2016.

^a Discharge data are provisional and may be inaccurate during and immediately following a large flow event due to the inability to quickly verify physical changes in the channel. Any changes in the channel during high-flow events have a direct impact on the discharge accuracy. Note: cfs = cubic feet per second; in = inches

As part of an effort to repair the damage caused by the historic discharges and debris to the Catwalk in 2013, the NMED SWQB, in coordination with the GNF and the U.S. Army Corps of Engineers, has been working to mitigate any potential water quality degradation that may occur during reconstruction of the Catwalk. Water quality monitoring was requested as a special condition to the Clean Water Act 404/401 permit, and the GNF has been measuring turbidity and temperature during construction in the stream. During monitoring, there have been short spikes of turbidity as debris is cleared from the canyon, but other water quality parameters have remained stable and within acceptable limits (NMED SWQB 2016b).

Aquatic Biota

Aquatic biota above the Catwalk were decimated by post-fire impacts to Whitewater Creek such as increased erosion and sedimentation in waterways during and immediately after the fire, and by increased turbidity in previously occupied streams following large precipitation and erosion events (USFS 2015). Narrow-headed gartersnake were present prior to the Whitewater-Baldy Fire but have since been likely extirpated from the project area. Speckled dace, desert sucker, and Sonora sucker are native to Whitewater Creek and its tributaries and were present in the cool-water reaches of the stream prior to the 2012 Whitewater Baldy Fire. They provide an important food source for trout and other animals. Nonnative brook trout (*Salvelinus fontinalis*) and rainbow trout were abundant in Whitewater Creek prior to the fire. Gila trout had been extirpated from the Whitewater Creek prior to the WWBC fire (NMDGF 2016b), however, they are native to the San Francisco River Watershed.

In 2014 and 2015, NMDGF, USFWS, the USFS - GNF, and Trout Unlimited assessed the potential for Gila Trout restoration in Whitewater Creek. The survey of Whitewater Creek found a small population of hybridized rainbow trout in the upper mainstem and a few brook trout in the south and east forks of the creek (NMDGF 2016b). Field observations indicated that the stream in both locations had been heavily impacted by post-wildfire flood events and associated scouring and debris flow off adjacent slopes. However, numerous pools and spawning substrate were observed that would provide suitable habitat for Gila trout and other native species (NMDGF 2016b).

Effects on Water Quality and Aquatic Biota

No Action

Under the No Action Alternative, Gila trout and other native fishes would continue to be absent from the upper reaches of Whitewater Creek and its tributaries. The Whitewater Creek watershed would not contribute to conservation of Gila trout or de-listing under ESA. Water quality in the approximately 25 miles of project-area streams, including the proposed 2-mile rotenone deactivation zone, would remain unchanged. Existing non-native fish, aquatic invertebrates, larval life stages of amphibians, and other aquatic biota would not be affected by proposed repatriation activities. The Whitewater Trail would continue to be subject to erosion with limited recreational access to the watershed. The existing non-native fishery in Whitewater Creek would begin to recover and expand over time. The duration of the recovery time necessary for the existing non-native fishery to provide sufficient recreational angling opportunities has not been determined.

Proposed Action

Gila trout, speckled dace, desert sucker, and Sonora sucker would be stocked into Whitewater Creek and its tributaries, thus restoring the native fish community. The Proposed Action would add 23 miles of occupied stream habitat for the Gila trout. This represents approximately 14 percent of the 168 total stream miles of habitat occupied by non-hybridized, indigenous lineages of Gila trout considered to be the minimum necessary to delist the species under the ESA. The effects of the Proposed Action on aquatic biota in the project area would be a short-term reduction in abundance, but improved population status in the long term through removal of non-native fish species. The essential characteristics of Whitewater Creek and the South Fork Whitewater Creek that qualified the streams as Outstanding Natural Resource Waters would be enhanced by the establishment of native fisheries, which increase the biological integrity of Whitewater Creek. Further, the chemical and physical integrity of the streams would be temporarily affected which is permissible under U.S. Environmental Protection Agency guidance for Outstanding Natural Resource Waters (USEPA 1994).

The proposed concentration used for eradication of nonnative salmonids would 0.05-ppm rotenone active ingredient. However, concentrations higher than 0.05-ppm active ingredient may be necessary and the maximum concentration used would not likely exceed 0.1-ppm active ingredient.

Rotenone has a half-life of 5.5 days at 48 degrees F; it is rapidly degraded through hydrolysis and photolysis (USEPA 2007). Degradation is dependent upon several factors such as temperature, pH, water hardness, and sunlight. Toxicity of rotenone declines concurrent with chemical decay, which indicates that the breakdown products of rotenone degradation are comparatively non-toxic to aquatic life (Marking and Bills 1975). In flowing water, rotenone dissipates in less than 24 hours due to dilution, increased rates of hydrolysis, and photolysis. Rotenone or rotenolone residues in stream sediments may persist in concentrations above the detection level of 0.03 ppm for up to 7 days (Finlayson et al. 2001). At the maximum treatment concentration of 0.1 ppm rotenone (active ingredient), concentrations of DEGEE and MP in solution would be 1.2 ppm and 0.2 ppm, respectively. Neither of these substances pose any toxicological risk to fish or wildlife in concentrations associated with the proposed rotenone applications (CDFW 2010). The maximum concentration of Fennodefo 99™ in solution would be 0.34 ppm, which poses no toxicological risk to fish or wildlife (CDFW 2010).

Given the rapid degradation of rotenone in flowing-water habitats from the combined effects of dilution, hydrolysis, and photolysis, it is expected that aquatic organisms -could be subject to the maximum treatment concentration for approximately 4 hours for each treatment. Approximately 24 hours after the cessation of a treatment, the concentrations of rotenone would decline below the

detection limit of 0.002 ppm (USEPA 2007).

At the maximum treatment concentration of 0.1 ppm, rotenone is toxic to many aquatic organisms, especially fish. For example, for a 96-hour exposure the LC50 for rainbow trout is 0.00194 ppm (USEPA 2006). The highest concentration at which there was no observed adverse effect of rotenone on early life stage rainbow trout was 0.001 ppm (USEPA 2006). The LC50 is the concentration of a chemical that results in death of 50 percent of the test organisms over a specified time. Table 4 lists the lethal concentrations of rotenone at the 24-hour LC50 for three coldwater fish species.

Table 4. Lethal concentrations of rotenone for selected fish species

Fish Species	Lethal Concentration of Rotenone LC50 24-hour (ppm) ^a
Brook trout (<i>Salvelinus fontinalis</i>)	0.0024
Chinook salmon (<i>Oncorhynchus tshawytscha</i>)	0.0056
Rainbow trout (<i>Oncorhynchus mykiss</i>)	0.0034

Source: Ling 2003.

^a ppm = parts per million

Note: The 24-hour LC50 is the median concentration of rotenone that kills 50 percent of the test organisms in a 24-hour period at 12 degrees Celsius.

Amphibians are susceptible to rotenone poisoning, but generally are more tolerant than fish. Gilled larvae such as tadpoles or salamander neonates are the most sensitive to rotenone poisoning (CDFW 2010). Chiricahua leopard frog (*Lithobates chiricahuensis*) has been shown to exhibit greater sensitivity than northern leopard frog (*L. pipiens*) across all developmental stages and both species exhibited decreasing sensitivity to rotenone concentrations through tadpole development. Caldwell and others (2014) observed acute toxicity effects as low as 0.021-ppm rotenone in early life stages (throughout limb bud formation) of Chiricahua leopard frog (Caldwell et al. 2014). Adult amphibians appear to be tolerant of the proposed treatment-level rotenone concentration of 0.1 ppm. Table 5 lists lethal concentrations of rotenone for selected amphibian species (CDFW 2010).

Table 5. Lethal concentrations of rotenone for selected amphibian species

Amphibian Species	Lethal Concentration of Rotenone LC50 24-hour (ppm) ^a
Northern leopard frog (<i>Rana pipiens</i>), adult	0.24-1.58
Tiger salamander (<i>Ambystoma tigrinum</i>), larvae	0.05

Source: California Department of Fish and Wildlife 2010.

^a ppm = parts per million

Aquatic invertebrates are much more tolerant of rotenone than are fish (Chandler and Marking 1982). Zooplankton appear to be the group of aquatic invertebrates most sensitive to rotenone. Table 6 lists

the lethal concentrations of rotenone for selected aquatic invertebrate species (Ling 2003).

Table 6. Lethal concentrations of rotenone for selected aquatic invertebrate species

Aquatic Invertebrate Species	Lethal Concentration of Rotenone LC50 24-hour (ppm) ^a
Flatworm (<i>Catenula</i> spp.)	5.10
Cladocera (<i>Daphnia pulex</i> spp.)	0.027
Ostracod (<i>Cypridopsis</i> spp.)	0.49
Dragonfly (<i>Macromia</i> spp.), larvae	4.70
Stonefly (<i>Pteronarcys californica</i>), larvae	2.90
Backswimmer (<i>Notonecta</i> spp.)	3.40
Caddisfly (<i>Hydropsyche</i> spp.), larvae	0.61 ^b
Whirligig beetle (<i>Gyrinus</i> spp.)	3.56
Snail (<i>Oxytrema catenaria</i> spp.)	1.75 ^b
Bivalve mollusc (<i>Elliptio complanata</i> spp.)	2.00 ^b

Source: Ling 2003.

^a ppm = parts per million.

^b Values for the 96-hour LC50.

Note: The 24-hr LC50 is the median concentration of rotenone that kills 50 percent of the test organisms in a 24-hour period at 12 degrees Celsius.

The effects of piscicidal rotenone treatments on aquatic macroinvertebrates primarily depends on the concentration and duration of rotenone treatments, morphology and life history of individual taxa, occurrence of refuge areas, and distance from colonization sources (Vinson et al. 2010). Individual aquatic invertebrate taxa vary in their tolerance to rotenone, as do different developmental stages of the same taxon shown in Table 6.

Skorupski (2011) studied the effects on aquatic invertebrates of rotenone treatments at concentrations of 0.05-ppm active ingredient. The treatments were conducted in Costilla and Comanche creeks in northern New Mexico. Invertebrate responses included reductions in abundance and species richness immediately after initial treatments (Skorupski 2011). Immediate post-treatment reductions in aquatic macroinvertebrate abundance were approximately 42 percent at Comanche Creek after the first application and 28 percent after the second application, while the post-rotenone treatment reduction in aquatic invertebrates at Costilla Creek was approximately 10 percent. Aquatic invertebrate abundance recovered to pre-treatments levels (approximately) within 1 year following individual treatments (Skorupski 2011). Studies have shown that rotenone also can cause increases in invertebrate drift downstream (Ling 2003)

Potassium permanganate is proposed to deactivate rotenone at the downstream end of the project area to achieve a concentration that is two to four times the concentration of rotenone. Potassium permanganate was selected, because it is a strong oxidizer that breaks down into potassium, manganese, and water. All are common in nature and have no deleterious environmental effects at the concentrations that would be used for the activities authorized by the Forest under the Proposed Action (Finlayson et al. 2010).

The reported 96-hour LC50 for rainbow trout is 1.22 to 1.80 ppm of potassium permanganate (Marking and Bills 1975). Potassium permanganate would neutralize rotenone in 15 to 30 minutes, depending on

water temperature. Manganese oxide, formed during the oxidation of the rotenone, is a biologically inactive compound. In flowing water treatments, this balance usually limits aquatic exposure to permanganate and rotenone to 0.25 to 0.5 mile downstream of the neutralization site (Hobbs et al. 2006). The proposed maximum potassium permanganate application (1 ppm) would not result in toxic conditions for aquatic biota that occur in the project area.

Native fish would be stocked into Whitewater Creek and its tributaries once removal of non- native fish has been confirmed and monitoring shows that the aquatic macroinvertebrate community has recovered to the point that it can support a fish community. Potential direct impacts on macroinvertebrates and amphibians from stocking include predation on eggs, young, and adults, and competition for food and space. Restocking native fishes into the proposed project watershed would result in potential indirect effects through initial mortality, dispersal of stocked fish out of stocking sites, and movement of other species into stocking sites. Additionally, introduction of native fish would contribute to the re-establishment of aquatic-terrestrial food web linkages between stream habitats and adjacent riparian zones. Such effects would be identical to natural dispersal from areas where fish remained after the Whitewater-Baldy fire.

Standard trail construction techniques, utilizing BMPs, would be utilized and drainage would be built into trails to prevent erosion. Trail restoration and installation of proper drainage would result in positive impacts to water quality from reduced sedimentation.

Cumulative Effects

Future post-fire recovery efforts including reconstructive rehabilitation of other trails in the watershed would have positive effects to water quality through a reduction in erosion from stabilization. The effects of past and ongoing actions on water quality and aquatic biota is represented by the existing conditions of these resources. The principal actions that occurred in the past that have affected water quality and aquatic biota in the project area were stocking of non-native fish, fire suppression and post-fire recovery and restoration efforts. The introduction of non-native trout has had negative impacts on Gila trout and other native fish species in the Whitewater Creek watershed by contributing to population declines from predation, hybridization, and competition (USFWS 2003). Restoration of the Whitewater Trail (#207) would allow anglers, hunters, and other recreationists to access the Whitewater Creek watershed. This would also reduce the reliance on helicopter-use within the wilderness to augment the population in the future. The Proposed Action would overlap spatially and temporally with the effects of past actions, but would not result in negative adverse effects.

Terrestrial Wildlife

Existing Conditions

Habitat for terrestrial wildlife in the project area consists of the riparian corridor along proposed restoration stream segments and adjacent forests and woodlands. The low riparian zone is dominated by fast-growing trees and shrubs that can tolerate moderate disturbance and grow best in moist soils. These woody plants also grow in the middle riparian zone intermixed with bunchgrasses and perennial shrubs. The high riparian zone experiences the least flood disturbance but the most desiccation stress; it is inhabited by a mix of drought tolerant riparian plants (Kennedy and Ralston 2011).

Mammal species that may occur in the riparian corridor in the project area and that may consume rotenone-treated water or rotenone-killed fish are shown in Table 7. Also included in Table 7 are mammal species that may forage on larval or, more likely, adult forms of aquatic insects (e.g., bats).

The project area is situated in Game Management Unit 22 (NMDGF 2016c). The northern portion of Unit 22 is considered core occupied elk range (NMDGF 2015). The 2015 NMDGF elk harvest report combines results for Unit 16B and Unit 22. According to the 2015 harvest report 184 bulls and 2 cows were harvested from Unit 16b and Unit 22 (NMDGF 2016d). The 2015 mule deer harvest report estimated 53 bucks and 1 doe were harvested from Unit 22 (NMDGF 2016d).

Table 7. Mammals associated with riparian or aquatic habitat in the project area and that may consume treated water, dead fish, or aquatic macroinvertebrates (larval or adult forms)

Common Name	Scientific Name	Common Name	Scientific Name
Vagrant shrew	<i>Sorex vagrans</i>	Mexican vole	<i>Microtus mexicanus</i>
Yuma myotis	<i>Myotis yumanensis</i>	Long-tailed vole	<i>Microtus longicaudus</i>
Little brown myotis	<i>Myotis lucifugus</i>	Coyote	<i>Canis latrans</i>
Southwestern myotis	<i>Myotis auricolus</i>	Gray fox	<i>Urocyon cinereoargenteus</i>
Long-eared myotis	<i>Myotis evotis</i>	Black bear	<i>Ursus americanus</i>
Fringed myotis	<i>Myotis thysanodes</i>	Raccoon	<i>Procyon lotor</i>
Long-legged myotis	<i>Myotis volans</i>	Western spotted skunk	<i>Spilogale gracilis</i>
California myotis	<i>Myotis californicus</i>	Striped skunk	<i>Mephitis mephitis</i>
Western pipistrelle	<i>Pipistrellus hesperus</i>	Common hog-nosed skunk	<i>Conepatus mesoleucus</i>
Big brown bat	<i>Eptesicus fuscus</i>	Mountain lion	<i>Felis concolor</i>
Western harvest mouse	<i>Reithrodontomys megalotis</i>	Bobcat	<i>Lynx rufus</i>
Deer mouse	<i>Peromyscus maniculatus</i>	Elk	<i>Cervus elaphus</i>
White-throated woodrat	<i>Neotoma albigula</i>	Mule deer	<i>Odocoileus hemionus</i>
Mexican woodrat	<i>Neotoma mexicana</i>	White-tailed deer	<i>Odocoileus virginianus</i>

Source: Findley et al. 1975.

Bird species observed along Whitewater Creek are listed in Table 8. While this list does not represent a comprehensive survey of all bird species likely to occur in riparian habitats in the project area, it does provide a representative range of species that may be found in the project area.

Table 8. Bird species observed along Whitewater Creek, 1984 to 2009

Common Name	Scientific Name	Common Name	Scientific Name
American dipper	<i>Cinclus mexicanus</i>	House finch	<i>Carpodacus mexicanus</i>
Back-chinned sparrow	<i>Spizella atrogularis</i>	Ladder-backed woodpecker	<i>Picoides scalaris</i>
Blue-gray gnatcatcher	<i>Polioptila caerulea</i>	Lesser goldfinch	<i>Carduelis psaltria</i>
Bridled titmouse	<i>Baeolophus wollweberi</i>	Lucy's warbler	<i>Vermivora luciae</i>
Broad-tailed hummingbird	<i>Selasphorus platycercus</i>	Mexican jay	<i>Aphelocoma ultramarina</i>
Canyon towhee	<i>Pipilo fuscus</i>	Northern harrier	<i>Circus cyaneus</i>
Canyon wren	<i>Catherpes mexicanus</i>	Northern oriole	<i>Icterus galbula</i>
Cassin's kingbird	<i>Tyrannus vociferans</i>	Painted redstart	<i>Myioborus pictus</i>
Chipping sparrow	<i>Spizella passerina</i>	Spotted towhee	<i>Pipilo maculatus</i>
Common black hawk	<i>Buteogallus anthracinus</i>	Townsend's warbler	<i>Dendroica townsendi</i>
Common poorwill	<i>Phalaenoptilus nuttallii</i>	Violet-green swallow	<i>Tachycineta thalassina</i>
Elf owl	<i>Micrathene whitneyi</i>	Western kingbird	<i>Tyrannus verticalis</i>
Flammulated owl	<i>Otus flammeolus</i>	Western tanager	<i>Piranga ludoviciana</i>
Greater pewee	<i>Contopus pertinax</i>	Western wood-pewee	<i>Contopus sordidulus</i>
Hepatic tanager	<i>Piranga flava</i>	White-throated swift	<i>Aeronautes saxatalis</i>
Hooded oriole	<i>Icterus cucullatus</i>	Yellow-rumped warbler	<i>Dendroica coronata</i>

Source: New Mexico Ornithological Society 1998.

Effects on Terrestrial Wildlife

No Action

Terrestrial wildlife in the project area would not be exposed to rotenone in water or rotenone residues in treatment-killed fish. There would be no disturbance from crews, pack animals, or helicopter flights. Wildlife species composition, abundance, behavior, and population status in the project area would not be altered from the existing condition.

Proposed Action

Rotenone in a liquid or sand mix formulation would be applied directly to water. Consequently, there would be no exposure of terrestrial wildlife to rotenone via airborne, terrestrial soil, or terrestrial vegetation pathways. Terrestrial wildlife may be exposed to rotenone by ingestion of treated water or consumption of aquatic organisms or wetland vegetation in treated stream segments.

The maximum concentration of rotenone in water would be 0.1 ppm. Concentration of rotenone would decline following application in restoration stream segments. The rate of degradation of rotenone would depend upon local conditions (i.e., flow rate and turbulence, water temperature, light intensity, organic material, etc.). A conservative estimate is that terrestrial wildlife may be exposed

to rotenone in water during each treatment for up to approximately 4 hours at concentrations not exceeding 0.1 ppm. After treatment has ceased, rotenone concentrations would decrease to below detection levels within approximately 24 hours.

Rotenone may bioconcentrate in aquatic organisms that are killed by treatments, to a maximum level of approximately 28 times the ambient concentration of rotenone in treated water (USEPA 2006). Thus, at a maximum treatment concentration of 0.1 ppm, maximum rotenone concentration in killed fish would be approximately 2.8 ppm.

Mammalian acute oral toxicity LD50 values for rotenone range from 39.5 ppm for female rats to 1,500 ppm for rabbits. For birds, the acute oral toxicity LD50 values range from 130 ppm for nestling English song sparrow to 2,200 ppm for adult mallard duck (CDFW 2010). Lethal dose (LD50) is the amount of an ingested substance that kills 50 percent of the test sample.

Ingestion of water with a maximum concentration of 0.1 ppm would not pose a toxicological risk to mammals or birds. For example, a 1.5-pound (lb.) (0.7 kilogram [kg]) rabbit would have to ingest 2,100 milligram of rotenone to meet the LD50 threshold of 1,500 ppm, which corresponds to ingestion of over 2,640 gallons (10,000 liters) of water with a rotenone concentration of 0.1 ppm within a 24-hr period. Table 9 lists estimated daily water and food ingestion rates for selected wildlife species.

Table 9. Estimated daily water and food ingestion rates for selected wildlife species

Species	Adult Body Weight (g)	Daily Food Intake (g)	Daily Water Intake (ml)
Quail	190	19.5	19
Marsh wren	11.25	8	3
Hairy woodpecker	60	9.2	9
Bald eagle	3,750	450	139
Mouse	21	2.8	7
Red fox	4,530	237	428
Mule deer	75,470	2,400	4,800
Black bear	128,870	3,900	7,800

Source: California Department of Fish and Wildlife 2010.

Note: g = grams, ml = milliliters.

Terrestrial wildlife also may be exposed to rotenone via consumption of rotenone-killed fish. Using the most sensitive oral toxicity LD50 value listed above (39.5 ppm) and assuming a rotenone residue concentration of 2.8 ppm in killed fish, a 2.2-lb (1-kg) mammal would have to consume approximately 32 lbs. (14 kg) of rotenone-killed fish in a 24-hour period to reach the conservative acute oral toxicity threshold. Under the same scenario, a 1.1-lb (0.5-kg) carrion-feeding bird would have to consume approximately 102 lbs. (46 kg) of rotenone-killed fish in a 24-hour period to reach the most sensitive avian oral toxicity threshold of 130 milligrams per kilogram body weight.

For terrestrial wildlife, hypothetical ingestion of vast quantities of water alone would prove lethal long before manifestation of any toxicological effects from rotenone. Consequently, ingestion of rotenone-treated water poses no toxicological risk to mammals or birds. Similarly, the quantities of rotenone-killed fish that would have to be consumed by birds or mammals in a 24-hour period to result in lethal poisoning are well beyond what is physically possible.

A short-term 10 to 40 percent reduction in aquatic invertebrate abundance may occur following individual rotenone treatments, with recovery to pre-treatment levels likely within 6 to 12 months. Emergent aquatic insects may subsidize the diet of terrestrial insectivores, but are unlikely to constitute the sole source of food for any vertebrate or invertebrate insectivore species. Terrestrial insectivores, such as bats and birds, are highly mobile and adapt to variation in prey availability by altering foraging areas and shifting to other prey (e.g., short-term shift to consumption of more terrestrial invertebrates). These adaptations would occur under baseline conditions in response to fluctuations in prey caused by climatic variation, drought, floods, forest fire, insect population dynamics (e.g., irruptions), and other factors. Any indirect impacts from the application of rotenone would be relatively short term (less than 1 year after the final treatment) and would be limited to the relatively narrow riparian corridor in the project area.

Direct impacts to terrestrial wildlife would consist of limited disturbance from the presence of crews and pack animals. Access over the ground by pack animals is expected to occur only on the Crest Trail (#182), Gold Dust Trail (#41), Redstone Trail (#206), Whitewater Trail (#207), Holt- Apache Trail (#181), and South Fork Whitewater Trail (#212); other trails would be impacted by foot traffic only. Access would occur over 7 days, several times over a 3-year period for the application of rotenone, and again multiple times for fish stocking.

Direct impacts from reconstruction of the Whitewater Trail (#207) from the Gold Dust Trail (#41) to Hummingbird Saddle would include soil disturbance and removal of aspens and other plants, as well as impacts to small animals that may have recruited or established on collapsed benches or down trees along the proposed trail footprint. Blasting of large logs and debris jams at 5 to 10 locations along Whitewater Trail would result in noise and ground vibrations that would decrease as distance from the blast increases. These impacts may cause wildlife to be temporarily displaced, however, they would be expected to return to the area when disturbance ceases. Blasting also would result in debris scattered off trail. The permanent footprint of the proposed trails would be approximately 3.6 acres, assuming an average trail width of 1.5 feet.

There would be noise and air movement impacts from helicopter transport of supplies and fish between the helicopter staging and loading area outside the Gila Wilderness and locations in the drainage. Noise and air movement impacts may cause wildlife to be temporarily displaced; however, they would be expected to return to the area following completion of supplies and fish transport. Impacts to wildlife from helicopter disturbance would be temporary and limited to the brief periods of prior to or following each rotenone application, and each fish restocking activity.

Cumulative Effects

Because the Proposed Action is not likely to have any measurable effect on terrestrial wildlife, there would be no cumulative effects associated with the Proposed Action alternative.

Special-Status Species, Management Indicator Species, and Migratory Birds

Existing Conditions

Special Status Species

There are 94 special-status species that may occur in the GNF and Catron County, New Mexico. Special-status species include:

- Species that are listed, proposed for listing, or candidates for listing and have designated or proposed critical habitat under the ESA.
- Animal species listed as endangered or threatened by the state of New Mexico.
- Plant species listed as threatened or endangered by the New Mexico Endangered Plant Species Act.
- Plant and animal species listed as sensitive in Region 3 of the USFS.
- There are also nine Management Indicator Species (MIS) identified by the Gila National Forest Management Plan, as amended.

Thirty-one species were identified as potentially occurring within the project area watershed and could be affected by the proposed action (Table 10). The special-status species discussed in this analysis include three species listed as threatened under the ESA (critical habitat is either designated or proposed for two of these), five species listed as threatened or endangered by the state of New Mexico, 28 USFS Region 3 sensitive species, and 1 GNF MIS. Some of these species have multiple designations (i.e., all of the State-listed species are also listed as Forest Service sensitive).

A project specific biological assessment/evaluation was prepared to evaluate the potential impacts to special status species. This section summarizes the findings in the biological assessment/evaluation.

Table 10. Special status species potentially affected by the Proposed Action

Species	Conservation Status
Gila trout (<i>Oncorhynchus gilae</i>)	Federal Threatened, State Threatened, MIS
Narrow-headed gartersnake (<i>Thamnophis rufipunctatus</i>)	Federal Threatened, Proposed Critical Habitat; State Threatened; USFS R3 Sensitive
Mexican spotted owl (<i>Strix occidentalis lucida</i>)	Federal Threatened, Critical Habitat Designated; MIS
Southwestern willow flycatcher (<i>Empidonax traillii extimus</i>)	Federal Endangered, Critical Habitat Designated; State Endangered
Dashed ringtail (<i>Erpetogomphus heterodon</i>)	USFS R3 Sensitive
Dry Creek woodlandsnail (<i>Ashmunella tetrodon inermis</i>)	USFS R3 Sensitive
Dry Creek woodlandsnail (<i>Ashmunella tetrodon mutator</i>)	USFS R3 Sensitive
Dry Creek woodlandsnail (<i>Ashmunella tetrodon tetrodon</i>)	USFS R3 Sensitive
Bearded mountainsnail (<i>Oreohelix barbata</i>)	USFS R3 Sensitive
Whitewater Creek woodlandsnail (<i>Ashmunella danielsi</i>)	USFS R3 Sensitive
Desert sucker (<i>Catostomus clarkii</i>)	USFS R3 Sensitive
Sonora sucker (<i>Catostomus insignis</i>)	USFS R3 Sensitive
Common black hawk (<i>Buteogallus anthracinus</i>)	State Threatened; USFS R3 Sensitive; MIS
Gray vireo (<i>Vireo vicinior</i>)	State Threatened; USFS R3 Sensitive
Northern goshawk (<i>Accipiter gentilis</i>)	USFS R3 Sensitive, MIS
Allen's lappet-browed bat (<i>Idionycteris phyllotis</i>)	USFS R3 Sensitive

Species	Conservation Status
Arizona gray squirrel (<i>Sciurus arizonensis arizonensis</i>)	USFS R3 Sensitive
Hooded skunk (<i>Mephitis macroura milleri</i>)	USFS R3 Sensitive
Pale Townsend's big-eared bat (<i>Corynorhinus townsendii pallescens</i>)	USFS R3 Sensitive
Spotted bat (<i>Euderma maculatum</i>)	State Threatened, USFS R3 Sensitive
Western red bat (<i>Lasiurus blossevillii</i>)	USFS R3 Sensitive
Blumer's dock (<i>Rumex orthoneurus</i>)	USFS R3 Sensitive
Davidson's cliff carrot (<i>Pteryxia davidsonii</i>)	USFS R3 Sensitive
Gila thistle (<i>Cirsium gilense</i>)	USFS R3 Sensitive
Gooding's onion (<i>Allium goodingii</i>)	State Endangered, USFS R3 Sensitive
Heartleaf groundsel (<i>Packera cardamine</i>)	USFS R3 Sensitive
Hess' fleabane (<i>Erigeron hessii</i>)	State Endangered, USFS R3 Sensitive
Mogollon death camas (<i>Anticlea mogollonensis</i>)	USFS R3 Sensitive
Mogollon hawkweed (<i>Hieracium brevipilum</i>)	USFS R3 Sensitive
Rusby's hawkweed (<i>Hieracium abscissum</i>)	USFS R3 Sensitive
Wooton's hawthorn (<i>Crataegus wootoniana</i>)	USFS R3 Sensitive
Yellow lady's slipper (<i>Cypripedium parviflorum</i> var. <i>pubescens</i>)	USFS R3 Sensitive

Source: BISON-M 2016, USFS 2013a, 2013b, 2013c.

BISON-M = Biota Information System of New Mexico, MIS = Management Indicator Species, USFS R3 = U.S. Forest Service Region 3.

Gila Trout

Gila trout is listed as threatened by the USFWS and state of New Mexico. This species also is considered an MIS by the GNF (USFS 1986, 2006). Recovery of this species is guided by the USFWS Gila Trout Recovery Plan, most recently amended in 2003. Since recovery actions began in the early 1970s, Gila trout have been established in over 80 miles of stream in New Mexico and Arizona (USFWS 2006). As a result, this species was down-listed from federally endangered to threatened with a special rule under section 4(d) of the ESA in 2006 (USFWS 2006). Threats include predation, competition, and hybridization with non-native trout; land management practices, such as livestock grazing, timber harvesting, and road construction; and natural events such as catastrophic wildfire and drought (Propst 1999, USFWS 2003). Ongoing restoration efforts include continued re-establishment of self-sustaining populations in protected stream reaches in the Gila and San Francisco river drainages in New Mexico and Arizona (USFWS 2003).

The Gila trout is a moderately-sized salmonid distinguished from other trout species by its golden-colored body, salmon-colored lateral band, and fine irregularly shaped spots occurring from the lateral line to the dorsal fin (USFWS 2003). The historical range of this species included the Upper Gila and San Francisco river basins, as well as tributaries of the Gila and Verde rivers in Arizona (USFWS 2003). Currently, Gila trout occupy approximately 12 miles of historical habitat in Arizona and 69 miles of historical habitat in New Mexico. There are 16 populations of Gila trout throughout

its historical range:

- Sierra County, New Mexico – Main Diamond Creek and South Diamond Creek
- Grant County, New Mexico – Black Canyon and Sheep Corral Canyon
- Catron County, New Mexico – Big Dry Creek, White Creek, Langstroth Creek, Little Creek, McKenna Creek, Willow Creek, Mineral Creek, and Mogollon Creek
- Yavapai County, Arizona – Grapevine Creek
- Graham County, Arizona – Frye Creek and Ash Creek
- Gila County, Arizona – Dude Creek

Gila trout are found in perennial mountain streams with cool, clear water, generally above 5,400 feet. This species requires an abundant invertebrate prey base and stream reaches with cover provided from undercut banks, root masses, riparian vegetation, and large woody debris. Deep pools are important to this species and provide refuge during high-flow events and droughts. Occupied streams generally are found within mixed woodland, montane coniferous forest, and subalpine coniferous forest. This species spawns over gravel substrate (USFWS 2003). Gila trout in the GNF were severely impacted by the 2012 WWBC fire. Multiple populations were eliminated from streams immediately post-fire (USFS 2015). Gila trout had been extirpated from the Whitewater Creek drainage prior to the WWBC fire.

Narrow-headed Gartersnake

The narrow-headed gartersnake is a federally threatened species with proposed critical habitat (Figure 5). This species also is listed as threatened by the state of New Mexico and is a USFS Region 3 sensitive species. Primary threats include loss of habitat, overutilization and over-collection, disease, and predation by non-native species (USFWS 2014).

The narrow-headed gartersnake is a small to medium-sized gartersnake, distinguished from other gartersnake species by its lack of dorsal and side striping. This species has an unusually elongated head. Narrow-headed gartersnakes are generally gray-brown or tan with conspicuous brown, black, or reddish spots (USFWS 2014). This species preys almost exclusively on fish (BISON-M 2016). Predators of this species include raptors, other snakes, waterfowl, large fish, and generalist mammalian predators such as raccoons (USFWS 2014). Narrow-headed gartersnakes are viviparous, with females giving birth to 4 to 7 offspring in late July to early August. This species breeds annually (USFWS 2014). The narrow-headed gartersnake is surface-active between March and November (USFWS 2014). This species can be found basking along shorelines of aquatic habitats, but when disturbed, will hide at the bottom of adjacent waterbodies (BISON-M 2016).

This species occurs in central Arizona, east to southwestern New Mexico, and south into Mexico. In New Mexico, this species occurs in the Gila and San Francisco river drainages in Catron, Grant, and Hidalgo counties (BISON-M 2016).

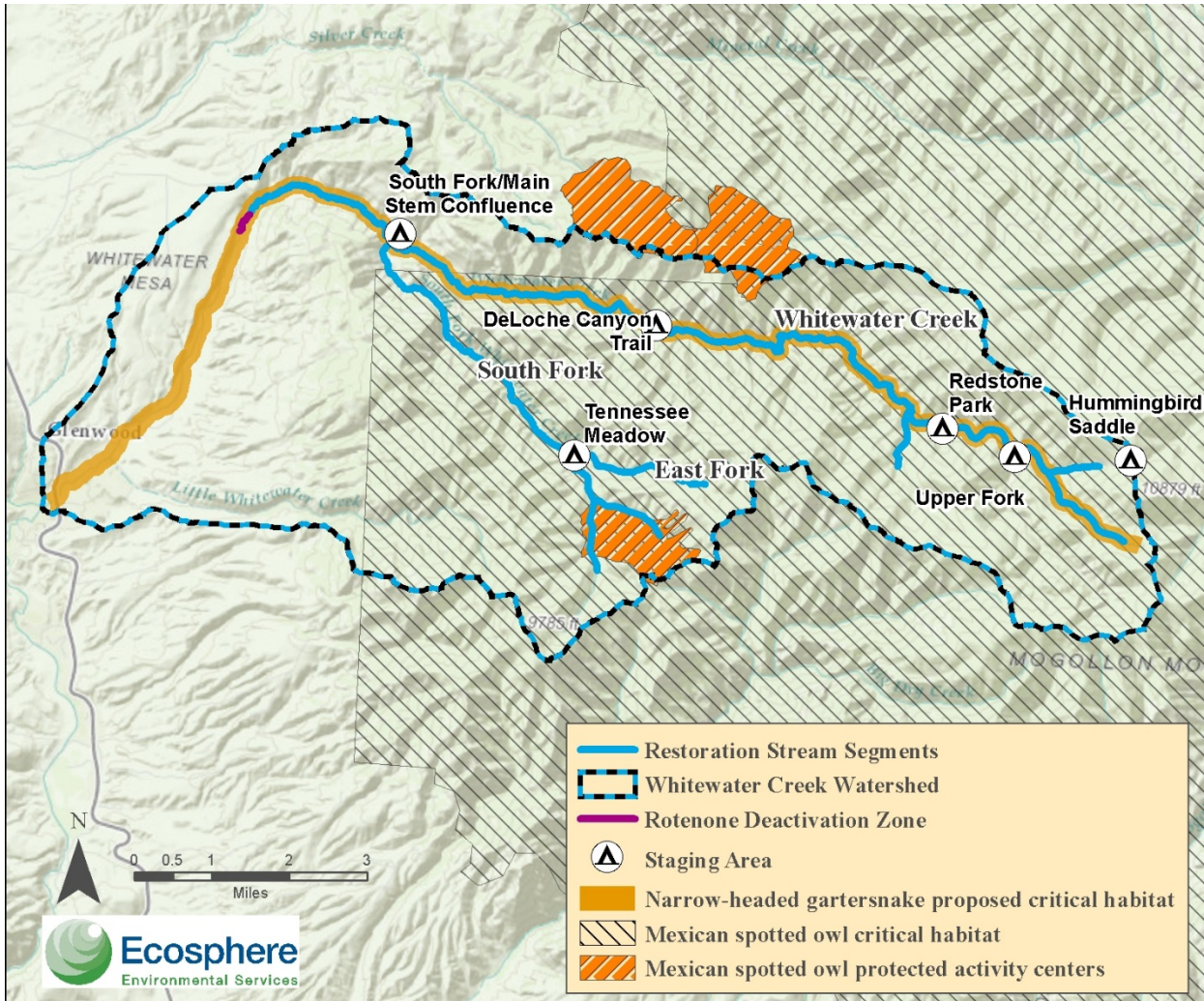


Figure 6. Proposed Critical habitat within the action area

Source: U.S. Fish and Wildlife Service 2016

The narrow-headed gartersnake is a highly aquatic species occurring between elevations of 4,200 and 8,000 feet. This species rarely is found more than 600 feet from a water source. The USFWS has identified the below-listed Primary Constituent Elements (PCEs) for this species (USFWS 2013).

- Stream habitat that includes:
 - a. Perennial or spatially intermittent streams with sand, cobble, and boulder substrate and low to moderate amounts of fine sediment and substrate embeddedness, and that possess appropriate amounts of pool, riffle, and run habitat to sustain native fish populations
 - b. A natural, unregulated flow regime that allows for periodic flooding or, if flows are modified or regulated, a flow regime that allows for adequate river functions, such as flows capable of processing sediment loads.
 - c. Shoreline habitat with adequate organic and inorganic complexity (e.g., boulders, cobble bars, vegetation, and organic debris such as downed trees or logs, debris jams) with appropriate amounts of shrub- or sapling-sized plants to allow for thermoregulation, gestation, shelter, protection from predators, and foraging

opportunities.

- d. Aquatic habitat with no pollutants or, if pollutants are present, levels that do not affect survival of any age class of this species or maintenance of prey populations.
- e. Adequate terrestrial space (600 feet lateral extent to either side of bankfull stage) adjacent to designated stream systems to support life history functions such as gestation, immigration, emigration, and brumation.
- f. A prey-base consisting of viable populations of native fish species or soft-rayed, non-native fish species.
- g. An absence of non-native fish species of the families Centrarchidae and Ictaluridae, bullfrogs (*Lithobates catesbeianus*), and/or crayfish (*Orconectes virilis*, *Procambarus clarkii*), or occurrence of these species at low enough levels such that recruitment of narrow-headed gartersnakes and maintenance of a viable prey base is still occurring.

Surveys prior to the 2012 WWBC fire indicated a robust population of narrow-headed gartersnakes in Whitewater Creek from the Catwalk downstream to private land (Jennings and Christman 2015). In May 2012 when the WWBC fire started burning, state and federal personnel captured and translocated as many narrow-headed gartersnakes as possible to mitigate the loss of individuals from expected post-fire ash flow events that would likely eliminate all fish, their sole food source, from the creek. During the 2012 survey, 18 narrow-headed gartersnakes were collected and translocated into Saliz Creek (several drainages to the north). The 2013 survey yielded three narrow-headed gartersnakes, two of which were exhibiting signs of starvation. These individuals also were collected and translocated into Saliz Creek. In 2014, no snakes or fish were observed in Whitewater Creek and they are considered extirpated from lower Whitewater Creek (Jennings and Christman 2015). Additional surveys may be conducted prior to implementation of the project if required by USFWS.

Mexican Spotted Owl

The Mexican spotted owl is a federally threatened species with designated critical habitat (Figure 5). It also is a state of New Mexico sensitive taxon (informal designation) and a Gila National Forest MIS (USFS 1986, 2006). Threats include loss of habitat through timber extraction and catastrophic wildfire, recreation disturbance, overutilization, disease, and predation (USFWS 2012).

The Mexican spotted owl is a medium-sized owl characterized by dark eyes, a lack of ear tufts, and mottled brown and white features on the abdomen, back, and head. Male and female owls have similar plumage. Mexican spotted owls consume a variety of prey throughout their range. They commonly eat small and medium-sized rodents such as woodrats, deer mice, pocket gophers, and voles, but they also consume bats, birds, reptiles, and arthropods (USFWS 2012). The diet of Mexican spotted owls varies by geographic location. Woodrat consumption by Mexican spotted owls is far greater where owls occur in rocky canyons; Mexican spotted owls occupying mountain ranges with forest-meadow interfaces take more voles than in other areas (USFWS 2012). Mexican spotted owls nest in caves, stick nests built by other species, debris platforms, and tree cavities (USFWS 2012). Generally, this species begins courtship in March and lays eggs in late March and early April. Eggs hatch approximately 30 days after laying. Brooding typically lasts until early to mid-June, when owlets fledge to nearby branches or cliff ledges surrounding the nest. During this time, fledglings are dependent upon parents for food and may continue begging until early fall, when dispersal occurs (USFWS 2012).

This species occurs in isolated mountain ranges and canyons in New Mexico, Arizona, Colorado, Utah, and western Texas. As part of this species' recovery, the USFWS divided the owl's range into 10 Ecological Management Units (EMUs); five occur in the U.S.: (1) Colorado Plateau, (2) Southern

Rocky Mountains, (3) Upper Gila Mountains, (4) Basin and Range – West, and (5) Basin and Range – East (USFWS 2012). These EMUs serve as geographical subdivisions of this species' distribution and allow for focused recovery efforts throughout its range (USFWS 2012).

Critical habitat was designated for this species in 2004 (USFWS 2004). In addition to critical habitat, areas surrounding established owl territories are designated as Protected Activity Centers (PACs) by the USFWS. These PACs are intended to protect and maintain occupied owl habitat (USFWS 2012). The minimum size for a PAC is 600 acres and is based on the estimated area required for foraging. Each PAC comprises a core nesting and roosting area surrounded by foraging habitat. There is no maximum size for a PAC (USFWS 2012).

Mexican spotted owls occur in at least two distinct habitat types throughout their range in the western U.S., rocky canyon lands and forests in isolated mountain ranges (USFWS 2012).

Preferred forested habitat occurs in steep, sometimes rocky canyons that contain mature or old growth stands of mixed conifer woodlands with complex structure, uneven age, and high canopy cover (USFWS 1995). In the Upper Gila Mountains EMU, Mexican spotted owls occur in forested habitat types. Suitability of Mexican spotted owl habitat in forests is primarily limited by three factors: (1) availability of nesting and roosting sites, (2) availability of foraging habitat/prey items, and (3) competition for habitat among other raptors (USFWS 2012). The USFWS developed PCEs associated with forest structure for Mexican spotted owl habitat in forested areas are as follows (USFWS 2004):

- A range of tree species, including mixed conifer, pine-oak, and riparian forest types, composed of different tree sizes reflecting a mixed-age stand, 30 to 45 percent of which are large trees with a diameter of 12 inches or more;
- A shade canopy covering 40 percent or more of the ground; and
- Large dead snags with a trunk measuring 12 inches or greater.

Primary Constituent Elements related to maintenance of prey species include:

- High amount of fallen trees and woody debris to provide cover for prey species;
- Diverse tree and plant species, including hardwoods for maintenance of prey species habitat; and
- Adequate levels of residual plant cover to maintain fruits, seeds, and allow for plant regeneration.

The proposed project is located in the Upper Gila Mountains EMU, characterized by steep mountains and deep river drainages (USFWS 2012). Approximately 20,000 acres, or 83 percent of the proposed project area watershed, contains designated critical habitat for this species. The watershed also is adjacent to the DeLoche Canyon PAC (030604038), contains a small portion (106 acres) of the Silver Creek PAC (030604037), and fully contains the Camp Creek Saddle PAC (030604037). These PACs experienced low to moderate burn severity during the 2012 WWBC fire. However, survey data indicate that the DeLoche Canyon and Silver Creek PACs were occupied as recently as June 2015. The Camp Creek Saddle PAC has not been surveyed for some time, but is considered occupied (USFS 2016c). Areas outside of the PAC were similarly affected by the fires; however, there may be some residual pockets of potential habitat in the action area. Owls have been known to occur outside of the PACs and may fly through or forage in the action area.

There are no Mexican spotted owl PACs within 0.25 mile (0.4 km) of Whitewater Creek. The Silver Creek PAC is approximately 0.48 mile (0.77 km) and the Deloche Canyon PAC is approximately 0.66 mile (1 km) from the canyon bottom. The proposed DeLoche Canyon Trail staging area is

located more than 1-mile south of the Silver Creek and DeLoche Canyon PACs. The headwaters of the South Fork Whitewater Creek occur in the Camp Creek Saddle PAC. The Tennessee Meadow staging area is approximately 0.6 mile northwest of the Camp Creek Saddle PAC.

Southwestern Willow Flycatcher

The southwestern willow flycatcher (*Empidonax traillii extimus*) is a federally listed endangered species with designated critical habitat. Threats to the southwestern willow flycatcher include destruction and modification of riparian habitat (USFWS 2002).

Southwestern willow flycatchers are found in thickets of trees and shrubs, primarily 13 to 23 feet (4 to 7 meters) in height, and among dense and homogenous foliage (USFWS 2002). Habitat occurs at elevations below 8,500 feet (2,591 meters) (USFWS 2002).

The southwestern willow flycatcher historically occupied much of the southwestern U.S., including southern California, southern Nevada, southern Utah, Arizona, New Mexico, western Texas, and southwestern Colorado. The current range is similar in breadth; however, the quantity of suitable habitat within that range has been significantly reduced (USFWS 2002). The project area is located within the Rio Grande Unit as defined in the Southwestern Willow Flycatcher Recovery Plan (USFWS 2002). In 2002, there were 128 known southwestern willow flycatcher territories within this unit, a majority of which occur along the Rio Grande River. The number of known territories within the Rio Grande Unit has increased to 319 territories in 2009 (NMDGF 2014).

A survey performed in 2007 found one pair of southwestern willow flycatchers near the Glenwood Hatchery site, which is approximately 3 miles (4.8 km) downstream of the proposed rotenone deactivation zone (USFS 2016c). These observations occurred adjacent to southwestern willow flycatcher designated critical habitat located along the San Francisco River in Glenwood, New Mexico. There are no known occurrence records within the project or action area. The majority of the project area is located above elevations of 8,500 feet (2,590 meters) and above the elevation preferred by this species. The lower elevation riparian corridor in the project and action areas is not considered suitable habitat given its lack of structure, density, and vegetative composition.

American Dipper

The American dipper (*Cinclus mexicanus*) is protected as a migratory bird and considered vulnerable in New Mexico (Natureserve 2015).

The resident range of American dipper includes western and northeastern Alaska, north-central Yukon, northern British Columbia, southwestern Alberta, south in mountains to southwestern South Dakota, south to southern California and highlands of Mexico to western Panama (Wilson and Kingery 2011). In the U.S., American dippers are typically found along swift-flowing montane streams or occasionally along the shorelines of mountain ponds and lakes. Nests are normally on raised sites such as cliffs, waterfalls, and bridges overlooking water or sometimes on rocks in streams (Wilson and Kingery 2011). Historically, the species has historically has been recorded nesting in Catron County and considered a fairly common permanent resident in the Gila National Forest (Bison-M 2017). The American dipper is an invertivore feeding mainly on insects and their larvae, but they will also eat fingerling fish (Bison-M 2017).

Dashed Ringtail

The dashed ringtail is a USFS Region 3 sensitive species. Primary threats to this dragonfly include timber harvesting, improper livestock grazing, and wildfires that destabilize streamflow (USFS 2013c).

The dashed ringtail is a member of the family Odonata. This species is distinguished from closely related species by dark stripes on the thorax and black tibiae. The face, thorax, and abdomen are pale green (Abbot 1999). This species is an insectivore (NatureServe 2015). Females oviposit while hovering over water and tapping the abdomen to the water's surface. Males perch on rocks near streambanks (Abbot 1999). Seasonal distribution for the dashed ringtail begins in late June and extends into late August. This species occurs in streams in Catron and Grant counties in New Mexico (USFS 2013c). Preferred habitat is along higher-altitude rivers and streams with swift currents and rock or cobble substrate, generally over 3,000 feet in elevation (Abbot 1999, BISON-M 2016). The type locality for this species is the Tularosa River in Catron County, New Mexico (Abbot 1999).

There are no known records of this species in the project or action area; its potential to occur is based on habitat associations and distribution information. Substrates within Whitewater Creek and its perennial tributaries are rock and cobble in some places. Rocks along the shore of Whitewater Creek may provide perching habitat for males of this species.

Dry Creek Woodlandsnail (*Ashmunella tetrodon inermis*)

Ashmunella tetrodon inermis is a USFS Region 3 sensitive species. Primary threats to this terrestrial snail are deforestation and fire (USFS 2013c).

Ashmunella tetrodon inermis is a small, air-breathing land snail in the family Polygyridae. It is herbivorous and hermaphroditic; it primarily inhabits accumulations of talus or piles of rock that accumulate near creek sides within deep canyons that have abundant leaf litter and logs (Metcalf and Smartt 1997). It has a brown, low, wide shell with four teeth. The four teeth of the subspecies *inermis* are very reduced; it is a narrow endemic and is known only from Dry Creek Canyon, 6 miles above the crossing of Dry Creek and U.S. 180 in a 2-mile-long box canyon (Pilsbry and Ferriss 1915).

There are no known records of this subspecies in the action area; its potential to occur is based on habitat associations and proximity to known populations. Dry Creek Canyon is just south of the project area watershed on the other side of Holt Mountain.

Dry Creek Woodlandsnail (*Ashmunella tetrodon mutator*)

Ashmunella tetrodon mutator is a USFS Region 3 sensitive species. Primary threats to this terrestrial snail are deforestation and fire (USFS 2013c).

Ashmunella tetrodon mutator is a small, air-breathing land snail in the family Polygyridae. This snail is herbivorous and hermaphroditic; it primarily inhabits accumulations of talus or piles of rock that accumulate near creek sides within deep canyons that have abundant leaf litter and logs (Metcalf and Smartt 1997). The snail has a brown, low, wide shell with four teeth. The four teeth of the subspecies *mutator* are prominent; it is a narrow endemic and is known only from Dry Creek Canyon, 6 miles above the crossing of Dry Creek and U.S. 180 in a 2-mile-long box canyon (Pilsbry and Ferriss 1915).

There are no known records of this subspecies in the action area; its potential to occur is based on habitat associations and proximity to known populations. Dry Creek Canyon is just south of the project area watershed on the other side of Holt Mountain.

Dry Creek Woodlandsnail (*Ashmunella tetrodon tetrodon*)

Ashmunella tetrodon tetrodon is a USFS Region 3 sensitive species. Primary threats to this terrestrial snail are deforestation and fire (USFS 2013c).

This snail is known from Dry Creek Canyon in the southwestern Mogollon Mountains, in and above the "Box" from 6,000 to 7,000 feet (1,800 to 2,100 meters) in Catron County, New Mexico. In this mountain range, this subspecies appears to be limited to creek sides with abundant leaf litter, logs, and rocks within deep canyons.

There are no known records of this subspecies in the action area; its potential to occur is based on habitat associations and proximity to known populations. Dry Creek Canyon is just south of the project area watershed on the other side of Holt Mountain.

Bearded Mountainsnail

The bearded mountainsnail is a USFS Region 3 sensitive species. Primary threats to this terrestrial snail are riparian disturbance, improper cattle grazing, and road building (USFS 2013c).

The bearded mountainsnail is a small air-breathing land snail in the family Oreohelicidae. This herbivorous and hermaphroditic snail primarily inhabits accumulations of talus or piles of rock that accumulate near creek sides within deep canyons that have abundant leaf litter and logs (Metcalf and Smartt 1997). This snail is less than 0.28 inch in height and has several spiral fringes of cuticular hairs on its shell. In New Mexico, the bearded mountainsnail occurs in southwestern canyons of the Mogollon Mountains, from Little Dry Creek Canyon to Whitewater Creek Canyon, and northeastward to Willow Creek. This species has been found in Whitewater Creek Canyon in rock rubble along the creek in the leaf litter from deciduous trees.

Whitewater Creek Woodlandsnail

The Whitewater Creek woodlandsnail (*Ashmunella danielsi*) is a USFS Region 3 sensitive species. Primary threats to this snail are fire, climate change, disturbance to talus, and deforestation (USFS 2013c).

This snail is found on wooded, north-facing slopes in moss-covered igneous rock talus with damp leaf litter between stones.

This snail is known from Little Whitewater Canyon at approximately 7,000 feet in elevation in the western Mogollon Mountains in Catron County, New Mexico. The species has not been recorded in the project or action area.

Desert Sucker

The desert sucker is a USFS Region 3 sensitive species. Primary threats include alteration of streamflow and temperature, competition with and predation by non-native species, and dewatering of occupied streams (USFS 2013c).

This species is native to the Gila and San Francisco drainages, including tributary streams (BISON-M 2016). Desert suckers occur in cool-water streams with rapids or flowing pools, over gravel-rubble substrate with sandy silt interstices. Juveniles are found in quiet pools near banks, but move to swift water upon maturity. Spawning occurs in riffles in late winter or early spring (BISON-M 2016).

Monitoring conducted from 2012 through 2014 at permanent designated sites on the San Francisco, Tularosa, and Gila rivers, and Negrito, Willow, and Gilita creeks indicate populations of this species were severely impacted by the Whitewater-Baldy and Silver fires. Recruitment may be occurring in larger-order rivers such as the Gila, San Francisco, and Tularosa; however, small tributary populations do not show significant signs of recruitment (USFS 2015). No desert suckers were observed in Whitewater Creek or its perennial tributaries during a 2014 survey (Jennings and Christman 2015). During surveys conducted by the USFS in July 2016, 15 desert suckers were collected in the lower Whitewater Creek. No fish were collected above the fiberglass bridge, where a waterfall appears to impede upstream movement (USFS 2016b).

Sonora Sucker

The Sonora sucker is a USFS Region 3 sensitive species. Primary threats to this species include water diversion, altered hydrology, and competition or predation from non-native fishes (USFS 2013c).

The Sonora sucker is native to the Gila and San Francisco river drainages, except in extreme headwaters (BISON-M 2016). This species occurs in a variety of environments, from warm-water desert streams to cold, clear mountain streams. Typical substrate in occupied habitat is comprised of small pebbles or gravel (BISON-M 2016). This species spawns in late winter through mid-summer. Eggs are deposited in riffles and fall into gravel substrate (BISON-M 2016).

Monitoring conducted from 2012 through 2014 at permanent designated sites on the San Francisco, Tularosa, and Gila rivers, and Negrito, Willow, and Gilita creeks indicate populations of Sonora sucker were severely impacted by the Whitewater-Baldy and Silver fires. Recruitment may be occurring in larger-order rivers such as the Gila, San Francisco, and Tularosa; however, small tributary populations do not show significant signs of recruitment (USFS 2015). No Sonora suckers were observed during 2015 or 2016 fish surveys in the lower Whitewater Creek (USFS 2016b).

Common Black Hawk

The common black hawk is a USFS Region 3 sensitive species and a state of New Mexico-listed threatened species. Threats to this species include loss of riparian habitat, disturbance at nesting sites, and illegal shooting (NMDGF 2014).

The common black hawk is a large black raptor with a prominent white tail band. Immature birds are brown or buff with a strong facial pattern and distinguished tail bands (Schnell 1994). This species is

distinguished from turkey vultures (*Cathartes aura*) because it does not exhibit a dihedral wing pattern. Common black hawk wings are proportionately broader than other large buteos (Schnell 1994).

This species occurs throughout Central America and the southwestern U.S. In New Mexico, the common black hawk is found in the San Francisco, Gila, and Mimbres watersheds. In 2011, during HawkWatch International surveys contracted by the NMDGF, 27 active territories were located in the Gila watershed (primarily the Gila and San Francisco rivers) (NMDGF 2014). This species is migratory in the U.S., and arrives in the southwest in late February or early March (Schnell 1994). Breeding typically is initiated in March and April. Breeding habitat for this species includes mature riparian forests located near perennial streams with perching substrate such as exposed boulders and low, bare branches (Schnell 1994). This species typically nests at elevations lower than 7,500 feet (Schnell 1994). Prior to breeding and nest-site selection, this species may be found at higher elevations along riparian corridors, especially those linking breeding areas (Neal, pers. comm., March 14, 2016).

Black hawk individuals and a nest were observed in the lower portions of Whitewater Creek, near its confluence with the San Francisco River in Glenwood during the 2011 NMDGF survey effort (NMDGF 2014). Additionally, upper Whitewater Canyon has been identified as an area where this species may occur incidentally during March as well as a possible breeding territory, although no nests have been identified in the project area (Neal, pers. comm., March 14, 2016).

Gray Vireo

The gray vireo (*Vireo vicinior*) is a small passerine bird. It breeds from the southwestern United States and northern Baja California to western Texas. It is a migrant, wintering in northwestern Mexico, and in Baja California Sur. It is usually found at altitudes between 1,300 and 8,200 ft. This vireo frequents dry brush, especially juniper, on the slopes of the southwestern mountains.

Northern Goshawk

The northern goshawk is a USFS Region 3 sensitive species. This species also is considered an MIS by the Gila National Forest, selected to represent species using ponderosa pine habitat (USFS 1986, 2006). The northern goshawk is a state of New Mexico sensitive taxon (informal designation). Threats to this raptor include loss of habitat through timber extraction, development and human encroachment, stand-replacing fires, and pesticides (Squires and Reynolds 1997).

This species is the largest North American accipiter and is primarily associated with montane forest habitats. Northern goshawks prey on smaller forest birds such as the northern flicker (*Colaptes auratus*) or mourning dove (*Zenaida macroura*), as well as small mammals. In New Mexico, this species occurs in mountain ranges from the north-central part of the state, extending to the southwest (Squires and Reynolds 1997). Northern goshawks generally prefer forest stands with high (60 to 90 percent) canopy closure located on north-facing slopes or along canyon bottoms for nesting. This species may forage in a wide range of habitats, but generally prefers closed-canopy mature forests and tends to avoid open habitats (Squires and Reynolds 1997). In New Mexico, this raptor is typically found in mixed conifer or ponderosa pine forest with preferred canopy and habitat structure (BISON-M 2016). A total of 55 northern goshawk sites have been identified on the Gila; some of these nesting areas were first documented in the 1970s, and monitoring on the Forest started in the 1980s (USFS 2011).

This species has not been detected in the Mexican spotted owl PAC survey areas since the Whitewater-Baldy Fire in 2012 (Neal, pers. comm., February 4, 2016). Forest surrounding the proposed project area has been moderately to severely impacted by the Whitewater-Baldy Fire; thus, ponderosa pine forest surrounding the project area may no longer support adequate canopy closure for this species.

Allen's Lappet-Browed Bat

Allen's lappet-browed bat is a USFS Region 3 sensitive species. This bat is a common summer resident to the GNF (BISON-M 2016). Threats include habitat loss via vandalism or closure of abandoned mines and removal of snags during timber extraction (USFS 2013c).

Allen's lappet-browed bat is distinguished from all other New Mexico bat species by two lappets located at the base of the ears (BISON-M 2016). Females form nursery or maternity colonies in mine tunnels and caves. Young are likely born from mid- to late June, and are volant by late July (BISON-M 2016). Allen's lappet-browed bat is most commonly found in ponderosa pine forest and, to a lesser extent, piñon-juniper/oak forests and riparian forest (BISON-M 2016). This species typically roosts in boulder piles, sandstone crevices, caves, or mines, or under bark flakes in large ponderosa trees (living or snag) and often near perennial water sources. Non-reproductive bats are less selective of roosts and maternity colonies often re-use roosts annually (Mering and Chambers 2012). Most recorded locations for this species occur at elevations between 3,600 and 8,200 feet (Siders and Jolley 2009). The location nearest the project area watershed from which specimens have been collected is located approximately 5 miles downstream from the project area watershed (BISON-M 2016).

There are no records of this bat occurring within the project area; its potential to occur is based on habitat preferences and distribution information. Ponderosa pine trees, snags, and cliffs within the action area may provide roosting habitat for this species.

Arizona Gray Squirrel

The Arizona gray squirrel is a USFS Region 3 sensitive species. Threats include its restricted distribution, riparian habitat loss, and degradation (USFS 2013c).

The Arizona gray squirrel is about 16 to 20 inches long and has gray fur and a white to cream belly, long ears with no tufts, and a fluffy tail edged in white. Compared with other tree squirrels, Arizona gray squirrels differ more seasonally in color, being grayer with a pronounced dorsal stripe in the winter (Best and Reidel 1995). It is confined to deep canyons with water, where black walnuts and acorns are abundant, and where groves of cottonwoods and sycamores offer cover and protection (Best and Reidel 1995). In New Mexico, this species occupies watersheds of the San Francisco and Gila rivers in Catron County and the Piños Altos Mountains in Grant County.

There are no records of this species occurring within the proposed project area; its potential to occur is based on habitat associations and distribution information. Individuals were observed near the Glenwood state fish hatchery southwest of the project area and in Willow Creek, northeast of the proposed project (Findley et al. 1975).

Hooded Skunk

The hooded skunk is a USFS Region 3 sensitive species. Threats include habitat loss and degradation, timber extraction, and historical trapping (USFS 2013c).

The hooded skunk resembles the striped skunk but has a longer tail and rarely has a dorsal white stripe that is divided into a "V." However, the back may be entirely white, or it may be black with two lateral white stripes. Hooded skunks prefer rocky slopes, cliff bases, and rocky or brushy sides of arroyos for cover in stream valleys and canyons. Major habitat types for this species include coniferous forests, deciduous forests, and riparian areas, as well as desert lowland or Chihuahuan-mesquite grasslands in other regions (BISON-M 2016). The hooded skunk is documented in the GNF, specifically from the Negrito watershed on the Reserve Ranger District (BISON-M 2016).

There are no records of this species occurring in the project area; its potential to occur is based on habitat associations and distribution information. The hooded skunk is well documented in Negrito Creek, approximately 5 miles northeast of the proposed project. Whitewater Creek supports coniferous forests, deciduous forests, and riparian areas within the project area watershed, and downed logs and rocky outcrops may provide cover for this species.

Pale Townsend's Big-Eared Bat

The pale Townsend's big-eared bat is a USFS Region 3 sensitive species. Threats include destruction of roost sites and human disturbance (USFS 2013c).

The pale Townsend's big-eared bat has very large ears that join across the forehead, and ranges in color from slate gray to pale brown (NatureServe 2015). This species is relatively sedentary and generally does not travel far from roosts or water sources (NatureServe 2015). The pale Townsend's big-eared bat is widely distributed throughout New Mexico and is a common resident of the GNF (BISON-M 2016). This species occurs in semi-desert shrublands, piñon-juniper woodlands, and open montane forests throughout the state. This bat roosts mostly in caves, mines, or abandoned buildings, but will also use rock crevices and hollow trees as roost sites (BISON-M 2016).

There are no records of this bat occurring in the project area; its potential to occur is based on habitat associations and distribution information. Cliffs in the action area may provide roosting habitat for this species, and Whitewater Creek and its perennial tributaries provide foraging opportunities. There are no abandoned buildings or mines (this species preferred roosting habitat) in the project or action area; however, this bat may use cliffs, rock crevices, or hollow trees in the project or action area.

Spotted Bat

The spotted bat is a USFS Region 3 sensitive species and a state of New Mexico threatened species.

Threats include pesticides, disturbance of foraging habitats, and disturbance to roosting sites (NMDGF 2014).

This species is a black bat with very large pink ears and prominent white spots on each shoulder and on the rump (NatureServe 2015). The spotted bat differs from other species in the unique spotted patterns of its fur and very large ears (NatureServe 2015). This bat is widely distributed throughout the state of New Mexico and is a rare summer resident in the GNF (BISON-M 2016). This species forages in forest openings, piñon-juniper woodlands, riparian habitats, meadows, and agricultural fields. It is a broad-ranging bat in New Mexico; however, its distribution is highly associated with prominent rock features. Rocky cliffs with suitable roosting substrate (e.g., crevices, cracks) are critical to this species. Perennial water sources also are important for this species (BISON-M 2016).

Records of occurrence include the “Mogollon Mountains, 9 miles east of Mogollon” (BISON-M 2016), but there are no records of spotted bats occurring in the project area; its potential to occur is based on habitat associations and distribution information. Cliffs within the action area may provide roosting habitat for this species, and the perennial Whitewater Creek provides foraging opportunities.

Western Red Bat

The western red bat is USFS Region 3 sensitive species. Threats to this species include habitat loss and degradation, pesticides, and prescribed fires (USFS 2013c).

The western red bat is medium-sized bat with red fur and short, rounded ears. In New Mexico, it breeds from April to May and may migrate southward into Mexico for winter

(NatureServe 2015). It exhibits a widespread distribution, including southern British Columbia, most of the western U.S., through Mexico, Central America, and South America (NatureServe 2015). Known localities in New Mexico are scattered throughout the lower Rio Grande, Pecos, and Gila river valleys (BISON-M 2016). Western red bats are associated with riparian habitats dominated by cottonwoods, oaks, sycamores, and walnuts, but are rarely found in desert habitats or caves (Texas Parks and Wildlife Department 2013).

Western red bats have been collected at the Glenwood State Fish Hatchery, located approximately 5 miles downstream from the project area watershed (BISON-M 2016). Its potential to occur in the project and action areas is based on the proximity of these collections as well as habitat associations, including the presence of a deciduous riparian woodland.

Blumer's Dock

Blumer's dock is a USFS Region 3 sensitive species. Threats to this species include habitat loss and disturbance from grazing, motorized travel, and camping.

Blumer's dock is a long-lived herbaceous perennial plant that can reach heights of up to 6.6 feet. The semi-succulent, bright green basal leaves are up to 18 inches long and 7 inches wide.

Blumer's dock occurs in Apache, Cochise, Coconino, and Gila counties in Arizona, and Catron, Mora, Otero, San Miguel, and Taos counties in New Mexico. This rhizomatous plant grows in wetlands with moist, organic soil adjacent to perennial springs or streams in canyons or meadows at elevations ranging from 4,480 to 9,660 feet (AZGFD 2002, USFS 2013e). Flowers appear from late July to mid-August once plants are 1 or 2 feet tall. Recent taxonomic study has changed the concept of this species (USFS 2013d). Many plants formerly identified as *R. occidentalis* are now considered to be *R. orthoneurus*, greatly expanding its range.

No Blumer's dock has been recorded in the project area, but individuals were observed north of the project area watershed along Bursum Road (Kleinman 2008). Wetlands are not known to occur in the project area watershed; however, Whitewater Creek may provide high-elevation meadow habitat for this species.

Davidson's Cliff Carrot

Davidson's cliff carrot is a USFS Region 3 sensitive species. Threats to this species include extreme rarity, grazing, riparian degradation, and fire (USFS 2013d).

Davidson's cliff carrot is a small, perennial herb, 6 to 16 inches tall. Yellow or purple flowers are borne in an umbrella-shaped cluster; this species flowers in August. This species grows in moist rocky places and sheer, north-facing cliffs at 6,500 to 8,000 feet. In New Mexico, it has been observed in the Mogollon and Piños Altos mountains in Catron and Grant counties, respectively.

No Davidson's cliff carrot has been recorded within the Whitewater Creek project area watershed. However, individuals have been observed southeast of the proposed project area. Additionally, this species' habitat description indicates that it has the potential to occur in the lower reaches of Whitewater Creek.

Gila Thistle

The Gila thistle is a USFS Region 3 sensitive species. Threats to this species include exotic biological control agents used to combat noxious thistle species (USFS 2013d).

The Gila thistle is a biennial plant, growing up to 6.5 feet tall. This species flowers from July to September. Flowers are yellow to greenish yellow and are solitary at the end of branches (New Mexico Rare Plant Technical Council [NMRPTC] 1999). Gila thistles are found in moist areas or mountain meadows in montane coniferous forest at elevations between 7,000 and 8,000 feet.

Generally, this species is not threatened by surface disturbance (NMRPTC 1999). Gila thistle is found in Catron County, New Mexico, and in the White Mountains of Arizona. In the GNF, this species has been known to occur in the upper San Francisco and Gila river drainages (USFS 2013d).

No Gila thistle has been recorded within the Whitewater Creek project area watershed. However, individuals have been observed in Willow Creek, approximately 2 miles to the northeast on the other side of Willow Mountain. Additionally, this species' habitat description indicates that it has the potential to occur in the lower reaches of Whitewater Creek.

Goodding's Onion

Goodding's onion is a USFS Region 3 sensitive species and a state of New Mexico threatened species. Threats to this species include habitat disturbance from motorized vehicles and dispersed camping (USFS 2013d).

Goodding's onion is an herbaceous perennial with clustered bulbs and iris-like rhizomes connecting individual bulbs (AZGFD 1999). This plant is distinguishable from other onion species in that leaves are much wider and flower stalks are upright rather than noticeably drooping (AZGFD 1999). Flowers are purplish red to pink on scapes measuring up to 18 inches tall. This species is known from Grant, Catron, and Otero counties in New Mexico and Apache and Pima counties in Arizona. Goodding's onion is found in mixed conifer and spruce fir forests, generally in north-trending drainages at elevations between 7,500 and 11,250 feet (USFS 2013d). This species grows along streams in moist soils with high organic content (USFS 2013d).

Goodding's onion has been documented northeast of the project area throughout the Willow and Indian creek watersheds (USFS 2016d). Much of the project area along Whitewater Creek and its

tributaries may provide additional habitat for this species.

Heartleaf Groundsel

Heartleaf groundsel is a USFS Region 3 sensitive species. Threats to this species include its narrow range, fire, and logging (USFS 2013d).

Heartleaf groundsel is an herbaceous perennial with distinctive broadly rounded basal leaves and an inflorescence of one to three flower heads with long, narrow yellow ray florets that bloom from late April to August (NMRPTC 1999). It occupies steep slopes and forest understory in upper montane coniferous forest between 8,000 and 10,000 feet. This species is endemic to climax spruce-fir forest in the high mountains of southwestern New Mexico and adjacent Arizona; in New Mexico, it is found in the Mogollon Mountains in Catron County, New Mexico. Populations are small and sporadic, but not infrequent in suitable habitat (USFS 2013d).

Heartleaf groundsel has not been recorded within the Whitewater Creek project area watershed. However, individuals have been observed south of the proposed project area. Additionally, this species' habitat description indicates that it has the potential to occur in the uppermost elevations of Whitewater Creek.

Hess's Fleabane

Hess's fleabane is a USFS Region 3 sensitive species and a state of New Mexico threatened species. Threats to this species include extreme rarity and fire (USFS 2013d).

Hess's fleabane is an herbaceous perennial characterized by densely tufted short branches and prominent, solitary flower heads with white ray florets that bloom from August to early September (NMRPTC 1999). This species is found on andesitic dikes in otherwise rhyolitic rock growing from bedrock cracks in open areas in upper montane to subalpine conifer forest; 9,500 to 10,200 feet. A very narrow endemic of the Mogollon Mountains in southwestern New Mexico, it is presently known from only two locations near Whitewater Baldy in the Gila Wilderness. Each population consists of only a few hundred plants. Plants grow on rock outcrops, so there are few potential impacts, but they could be vulnerable to catastrophic wildfire.

Hess's fleabane has not been recorded within the Whitewater Creek project area watershed. However, individuals have been observed near Whitewater Baldy, at the easternmost extent of the proposed project area. Additionally, this species' habitat description indicates that it has the potential to occur in the uppermost elevations of Whitewater Creek.

Mogollon Death Camas

Mogollon death camas is a USFS Region 3 sensitive species. Threats to this species include extreme rarity and fire (USFS 2013d).

Mogollon death camas is an herbaceous perennial, up to 3 feet tall with linear basal leaves and a nodding bell-shaped flower, reddish-purple along the margins and blending to yellowish-green at the middle (NMRPTC 1999). It flowers from late July to early September and occurs in organic soils in understory of upper montane and subalpine coniferous forest, often with aspen at elevations of 8,700

to 10,500 feet. A very narrow endemic, this species is known only from the Mogollon Mountains in the area of Whitewater Baldy and adjacent peaks. Most of its range is within the northwest corner of the Gila Wilderness where it is a common and often abundant forest understory species (NMRPTC 1999).

Mogollon death camas has not been recorded within the Whitewater Creek project area watershed. However, individuals have been observed near Whitewater Baldy, at the easternmost extent of the proposed project area and adjacent peaks. Additionally, this species' habitat description indicates that it has the potential to occur in the uppermost elevations of Whitewater Creek.

Mogollon Hawkweed

Mogollon hawkweed is a USFS Region 3 sensitive species. Threats to this species include extreme rarity and fire (USFS 2013d).

Mogollon hawkweed is an herbaceous perennial, up to 12 inches tall with hirsute stems, leaves, and flower heads (NMRPTC 1999). This species has broad basal leaves, usually no stem leaves, and oblong flower heads with yellow florets that bloom during August and September (NMRPTC 1999). It occurs in grassy openings in ponderosa pine forest and in mountain meadows at 8,200 to 10,500 feet in the Mogollon Mountains of Catron County (NMRPTC 1999).

This species has been collected and photographed in the Mogollon Mountains in a meadow near Center Baldy, approximately 2 miles south of Whitewater Baldy at the southeastern extent of the project area.

Rusby's Hawkweed

Rusby's hawkweed is listed as USFS Region 3 sensitive species. Threats to this species include rarity and fire (USFS 2013d).

Rusby's hawkweed is an herbaceous perennial, up to 30 inches tall with basal, hirsute leaves and yellow ray florets but no disc florets (NMRPTC 1999). It flowers from July to August and is found within mixed conifer forests at high elevations above 8,000 feet, in southeastern Arizona, the Mogollon range in New Mexico, and from Guadalupe y Calvo in Chihuahua, Mexico (NMRPTC 1999).

This species has been collected in the Mogollon Mountains, which include the proposed project area. However, its current status in New Mexico is unknown (USFS 2013d).

Wooton's Hawthorn

Wooton's Hawthorn is a perennial tree/shrub native to the United States. The species has long spines on the branches and white flowers. On the Gila National Forest the species is known only from the Pinos Altos range at mid to high elevations.

Yellow Lady's Slipper

Yellow lady’s slipper is listed as USFS Region 3 sensitive species. Threats to this species include collection pressure, herbivory by ungulates, and habitat loss and modification (USFS 2013d).

Yellow lady’s slipper is a long-lived perennial orchid that grows as a single plant or in a colony. The plant is roughly 1-foot-tall with three to six broad oval-lanceolate leaves (Mergen 2006).

Stems and leaves sprout from rhizomes and are glandular-hairy throughout. One or rarely two insect-pollinated flowers that vary from yellowish-green to purplish-brown are borne at the top of each stem. Each flower bears long, twisting lateral sepals and a conspicuous pouch-shaped lip petal, 1 to 2 inches (3 to 5 centimeters) long, which gives the species its name (Mergen 2006). Yellow lady’s slipper is found in forest habitats in moist, muddy areas with dripping water or in moderate shade along streambanks, mountain meadows, and mesic places, often rooted beneath a rich layer of humus and decaying leaf litter (Coleman 2002).

The yellow lady’s slipper is not known to occur in the project area. Locations within the action area with shade and moist soils may provide habitat for this species.

Management Indicator Species

Management Indicator Species have been identified by the Land and Management Plan for the GNF (USFS 1986, USFS 2006) and are discussed in this evaluation to address the National Forest Management Act. The MIS identified in the GNF management plan were selected to be representative of several wildlife categories such as commonly hunted or fished species, non- game species, and threatened or endangered species. The objective was to select species that would indicate ecological change related to current forest-management activities in each major vegetation type found in the Forest, and serve as an indicator for detecting major habitat changes (USFS 1986). The MIS also are used as a tool by the USFS for assessing changes in specialized habitats, formulating habitat objectives, and establishing standards and guidelines to provide for a diversity of wildlife, fish, and plant habitats in the Forest. Gila National Forest MIS and their respective habitat types are listed in Table 11.

Suitable MIS habitat in the project and action areas includes habitat for mule deer, plain titmouse, northern goshawk, Mexican spotted owl, hairy woodpecker, native trout, and American beaver.

The northern goshawk, common black hawk, Mexican spotted owl, and Gila trout are discussed under Special Status Species since some of the proposed activities could affect individuals of these species primarily through disturbance from human activity. The proposed action would not affect habitat elements for mule deer, plain titmouse, hairy woodpecker, or American beaver; therefore, these species are not discussed further in this EA.

Table 11. Gila National Forest Management Indicator Species and the habitat type and/or habitat component they are indicators for

Management Indicator Species	Habitat Type or Feature Species is Indicator For
Mule deer	Desert Shrub and Pinyon/Juniper, Shrub Oak Woodland
Mearn’s quail	Plains and Mountain Grassland

Plain titmouse	Pinyon/Juniper, Shrub Oak Woodland
Northern goshawk	Ponderosa Pine Forest
Mexican spotted owl	Mixed Conifer Forest
Hairy woodpecker	Ponderosa Pine, Mixed Conifer and their Snag Component
Common black hawk	Low and Mid Elevation Riparian
American beaver	Low, Mid, and High Elevation Riparian
Long-tailed vole	Wet Meadow and Wetland
Native trout	High Elevation Riparian

Native Trout

Native trout, including Gila trout and Rio Grande cutthroat trout (*O. c. virginalis*) are considered MIS for high riparian habitats. Of the two species, only Gila trout historically occurred within the Whitewater Creek watershed. Rio Grande cutthroat trout do not occur on the GNF (BISON-M 2016).

Overall, the USFS indicates an upward trend in riparian condition, although localized impacts from fires and unauthorized grazing may result in poor conditions (USFS 2015). The current population trend for Gila trout was down due to the effects of recent large wildfires. As of January 2017, 16 streams were occupied by Gila trout in Arizona and New Mexico (NMDGF unpublished data).

Migratory Birds

The Migratory Bird Treaty Act protects a variety of bird species. Data collected through breeding bird surveys coordinated by the USFWS as well as other private sector efforts have provided the basis for the Partners in Flight organization to develop bird *Watch Lists* and the USFWS' *Birds of Conservation Concern*. The project area contains low, middle, and high riparian habitat dominated by woody vegetation and bunch grasses, and is surrounded by ponderosa and mixed conifer woodlands that have been recently burned. The project and action areas are located in three potential habitat types as designated within the New Mexico Partners in Flight (NMPIF) Conservation: ponderosa pine forest, mixed conifer-spruce-fir (subalpine) forest, and montane riparian (New Mexico Partners in Flight [NMPIF] 2007).

According to NMPIF 2007, birds listed as a conservation priority by the NMPIF that may occur in the project or action area include:

- Blue (dusky) grouse (*Dendragapus obscurus*)
- Boreal owl (*Aegolius funereus*)
- Band-tailed pigeon (*Patagioenas fasciata*)
- Northern pygmy owl (*Glaucidium gnoma*)
- Virginia's warbler (*Oreothlypis virginiae*)
- Plumbeous vireo (*Vireo plumbeus*)
- Warbling vireo (*Vireo gilvus*)
- Western bluebird (*Sialia mexicana*)
- Mountain bluebird (*Sialia currucoides*)
- Olive-sided flycatcher (*Contopus cooperi*)

Effects on Special Status Species

No Action

Under the No Action, Gila trout would continue to be absent from the fish community in the Whitewater Creek project area. Non-native rainbow and brook trout would persist. The Whitewater Creek project area would not contribute to conservation and delisting of Gila trout. The approximately 23 miles of project-area streams, including the proposed 2-mile rotenone deactivation zone, would not be impacted by rotenone treatments. Helicopter flights to carry supplies and equipment into the project area would not occur. No trail reconstruction would occur. The No Action Alternative would have no adverse effects to any other special status species.

Proposed Action

A project-specific biological assessment/evaluation was prepared to evaluate the potential impacts to special status species. The following summary of impacts to special status species is based on findings in the biological assessment/evaluation. The Proposed Action would have no effect on the following special status species because they do not occur in the project area, they would not be affected by the Proposed Action, or because the Proposed Action would have no impact on elements of their habitat:

- Southwestern willow flycatcher (Federal Endangered, State Endangered)
- Gray vireo (State Threatened, USFS R3 Sensitive)
- Wooton's hawthorn (USFS R3 Sensitive)

Gila Trout

Application of rotenone and potassium permanganate and trail reconstruction would have no direct effects to Gila trout. Potential direct impacts from stocking include transport to stocking sites, evacuation, and collection of Gila trout. The Proposed Action would benefit the species by restoring Gila trout to approximately 23 miles of high-quality habitat in the Whitewater Creek watershed within the GNF.

Narrow-Headed Gartersnake

Narrow-headed gartersnake is considered extirpated from Whitewater Creek. The U.S. Fish and Wildlife Service determined that the proposed action would not jeopardize the continued existence of the narrow-headed gartersnake and would not destroy or adversely modify proposed critical habitat for the species (USFWS 2017).

The application of rotenone and potassium permanganate would not appreciably diminish the value of proposed critical habitat for the conservation of the species in the project or action area. The toxicities of rotenone and potassium permanganate are short-lived and are unlikely to persist or bioaccumulate in fish, the narrow-headed gartersnake's sole prey. The proposed restocking of native fishes would provide a prey base for any future narrow-headed gartersnake introductions in the area. The shoreline habitat, river function, and periodic flooding necessary for this species would not be permanently altered by trail reconstruction.

Mexican Spotted Owl

The piscicide application would be implemented in the South Fork Whitewater Creek in the Camp Creek Saddle PAC. However, the proposed application of rotenone and potassium permanganate

would not result in any modification of forest stand structure, woody vegetation, or any of the PCEs associated with the PACs or critical habitat. Project activities would occur during daytime hours when owls are not foraging; therefore, no disruption of feeding activities would be expected. Mexican spotted owls and their primary prey do not depend on aquatic food sources or the aquatic ecosystem. Consequently, removal of fish or short-term reduction of aquatic macroinvertebrate abundance would not affect the species. Consumption of rotenone-treated water or rotenone-killed fish would not have any toxicological effect on terrestrial wildlife species, such as the Mexican spotted owl.

Trail reconstruction would increase the amount of human disturbance and noise in the project and action area. Reconstruction would include 5 to 10 blasting occurrences within the Whitewater Creek canyon bottom, which is located more than 0.25 mile from occupied PACs in the project and action area. Increased noise levels from blasting would be temporary and would dissipate with increasing distance from the source. The topography and vegetative nature of the project area would serve to minimize the distance that increased noise levels would travel. Delaney et al. (1999) found that Mexican spotted owls did not flush from nests when the stimulus was greater than 492 feet, regardless of stimulus type. Based on the limited number of blasting occurrences and the distance to occupied PACs, no adverse effects to Mexican spotted owls are expected to occur.

Helicopter flights would avoid and would not fly directly over occupied PACs. Short duration, single pass, single aircraft overflights were found to have little effect on spotted owls. No substantive evidence was found that helicopter overflights during the nesting season detrimentally affected spotted owl success or productivity. Female spotted owls were found to flush only after their chicks had left the nest (Delaney et al. 1999). Helicopter use would consist of up to 16 flights, for the purpose of transporting and backhauling camp gear and treatment supplies, to support up to four camps per treatment period. One to two treatments would be accomplished per year.

Helicopter use could decrease as trail work is accomplished and access for pack stock is improved. Helicopter use for fish transport and stocking would require up to five helicopter trips per year for up to 5 years. Depending on the distance to nesting owls and flight patterns, it is possible a helicopter overflight may occur within the distance threshold to illicit a flush or alert response from Mexican spotted owls. However, given the limited number of flights proposed to occur on an annual basis, the distance to and avoidance of PACs, and the expected behavioral response of Mexican spotted owls, no adverse effects to reproduction or nesting success would be expected to occur.

Dashed Ringtail

The rotenone application concentration is far below the lethal concentration for dragonfly larvae and other invertebrate prey items (Ling 2003); thus, survival of dashed ringtail or eggs should not be affected. Direct impacts to adult dashed ringtails could include short-term avoidance by individuals that may incidentally occur in the action area during rotenone application, fish restocking, and trail reconstruction. These impacts are unlikely since the dashed ringtail is not known to occur in the project area. There is the potential for eggs to be dislodged or destroyed during trail reconstruction as soils and rocks may be moved to create the trail surface, the rock check dams, and retaining walls. Five to 10 large debris and log jams in the canyon bottom would be removed by blasting, which could also result in the destruction of egg masses. There also could be short-term increases in stream turbidity resulting from blasting in or near the channel that could temporarily impact larvae. Following completion of the trail reconstruction, the proposed project would have no long-term impacts on the dashed ringtail.

Dry Creek Woodlandsnail (Ashmunella tetrodon inermis)

This subspecies is not aquatic, so the proposed application of rotenone and the activities associated

with restocking of native fishes to the project area is not expected result in adverse effects. For most of its length, the Whitewater Creek Trail runs along the bottom of Whitewater Canyon through suitable habitat and within the elevation range described for the species. During trail reconstruction, debris, soils, and rocks may be dislodged and removed to create the trail surface, the rock check dams, and retaining walls. Five to 10 large debris and log jams in the canyon bottom would be removed by blasting. Although it is not known to occur in the project area, these trail reconstruction activities could result in the mortality of individual adults or eggs. Following completion of the trail reconstruction, the proposed project would have no adverse long-term impacts to this subspecies.

Dry Creek Woodlandsnail (Ashmunella tetrodon mutator)

This subspecies is not aquatic, so the proposed application of rotenone and the activities associated with restocking of native fishes to the project area is not expected result in adverse effects. For most of its length, the Whitewater Creek Trail runs along the bottom of Whitewater Canyon through suitable habitat and within the elevation range described for the species. During trail reconstruction, debris, soils, and rocks may be dislodged and removed to create the trail surface, the rock check dams, and retaining walls. Five to 10 large debris and log jams in the canyon bottom would be removed by blasting. Although it is not known to occur in the project area, these trail reconstruction activities could result in the mortality of individual adults or eggs. Following completion of the trail reconstruction, the proposed project would have no adverse long-term impacts to this subspecies.

Dry Creek Woodlandsnail (Ashmunella tetrodon tetrodon)

This subspecies is not aquatic, so the proposed application of rotenone and the activities associated with restocking of native fishes to the project area is not expected result in adverse effects. For most of its length, the Whitewater Creek Trail runs along the bottom of Whitewater Canyon through suitable habitat and within the elevation range described for the species. During trail reconstruction, debris, soils, and rocks may be dislodged and removed to create the trail surface, the rock check dams, and retaining walls. Five to 10 large debris and log jams in the canyon bottom would be removed by blasting. Although it is not known to occur in the project area, these trail reconstruction activities could result in the mortality of individual adults or eggs. Following completion of the trail reconstruction, the proposed project would have no adverse long-term impacts to this subspecies.

Bearded Mountainsnail

The bearded mountainsnail is not aquatic, so the proposed application of rotenone and the restocking of native fishes to the project area is not expected to result in adverse effects. For most of its length, the Whitewater Creek Trail runs along the bottom of Whitewater Canyon through suitable habitat and within the range described for the species. During trail reconstruction, debris, soils, and rocks may be dislodged and removed to create the trail surface, the rock check dams, and retaining walls. Five to 10 large debris and log jams in the canyon bottom would be removed by blasting. Although it is not known to occur in the project area, these trail reconstruction activities could result in the mortality of individual adults or eggs of the species. Following completion of the trail reconstruction, the proposed project would have no adverse long-term impacts to this bearded mountainsnail.

Whitewater Creek woodlandsnail (Ashmunella danielsi)

The Whitewater Creek woodlandsnail is not aquatic, so the proposed application of rotenone and activities associated with restocking native fishes to the project area is not expected to result in adverse effects. For most of its length, the Whitewater Creek Trail runs along the bottom of

Whitewater Canyon through suitable habitat and within the range described for the species.

During trail reconstruction, debris, soils, and rocks may be dislodged and removed to create the trail surface, rock check dams, and retaining walls. Five to 10 large debris and log jams in the canyon bottom would be removed by blasting. Although this snail is not known to occur in the project area, these trail reconstruction activities could result in the mortality of individual adults or eggs of the species. Following completion of the trail reconstruction, the proposed project would have no adverse long-term impacts to this species.

Desert Sucker

The desert sucker occurs in lower Whitewater Creek. The rotenone treatment would result in mortality of any desert sucker within the treatment area. Potential mortality may occur during transport to stocking sites, evacuation, and collection of desert sucker. Potential direct impacts from stocking include predation on eggs, young, and adults, and competition for food and space; however, these interactions are part of the natural ecology of the ecosystem. Stocking Whitewater Creek and its perennial tributaries with desert sucker would have positive long-term effects to the species. The Proposed Action would restore desert sucker to approximately 23 miles of streams within the Whitewater Creek watershed.

Sonora Sucker

The Sonora sucker does not currently occur in Whitewater Creek. The rotenone treatment and the activities associated with the trail reconstruction would have no effect to the species. Potential mortality may occur during transport to stocking sites, evacuation, and collection of Sonora sucker. Potential direct impacts from stocking include predation on eggs, young, and adults, and competition for food and space; however, these interactions are part of the natural ecology of the ecosystem. Stocking Whitewater Creek and its perennial tributaries with Sonora sucker would have positive long-term effects to the species. The Proposed Action would restore Sonora sucker to approximately 23 miles of streams within the Whitewater Creek watershed.

Common Black Hawk

Implementation of the proposed project would not result in the loss or modification of breeding or foraging habitat for common black hawk. Consumption of rotenone-treated water or rotenone-killed fish would not have any toxicological effects on the black hawk. Trail reconstruction would increase the amount of human disturbance and noise in the project and action area, which may cause black hawks to temporarily avoid the area for the duration of the activity. Impacts to nesting common black hawks would be minimized if trail reconstruction activities commence in late May or later. Nest failures have been most commonly associated with significant and/or protracted proximate human intrusions during the critical incubation and egg hatching periods (late April to mid-May) (NMDGF 2014). The species is not known to nest in the area.

Helicopter flights and blasting during trail reconstruction would result in periodic short-term increases in noise levels. Trail reconstruction would include 5 to 10 blasting occurrences in the Whitewater Creek canyon bottom. Increased noise levels from blasting would be temporary and would dissipate with increasing distance from the source. The topography and vegetative nature of the project area would serve to minimize the distance that blast noise levels would travel.

Helicopter use would consist of up to 16 flights for the purpose of transporting and backhauling camp gear and treatment supplies to support up to four camps per treatment period. One to three treatments would be accomplished per year. Helicopter use could decrease as trail work is accomplished and access for pack stock is improved. Helicopter use for fish transport and stocking would require up to five helicopter trips per year for 5 years. Given the limited number of flights

proposed to occur on an annual basis and the likelihood of the species occurring in the area, no adverse impacts to black hawks are expected to occur from blasting or helicopter use. Following completion of the Proposed Action, no long-term adverse effects to the black hawk would be expected. Stocking of Gila trout and other native fishes would have a positive impact by restoring the black hawk's principal prey (fish) and re-establishing the food web to support other prey items such as amphibians and reptiles.

Northern Goshawk

No impacts to nesting northern goshawks would be expected to occur. It is possible this species may fly through the action area while foraging or moving between forest patches. Noise and human activity from implementation of the proposed project may cause this species to avoid the project area; however, avoidance would be limited to the brief periods of rotenone application and fish restocking. Trail reconstruction would be more protracted but would still be of short- duration and low intensity.

Helicopter flights and blasting during trail reconstruction would result in periodic short-term increases in noise levels. Increased noise levels from blasting would be temporary and would dissipate with increasing distance from the source. The topography and vegetative nature of the project area would serve to minimize the distance that noise levels would travel. Helicopter use could decrease as trail work is accomplished and access for pack stock is improved. Given the limited number of flights proposed to occur on an annual basis and the likelihood of the species occurring in the area, no adverse impacts to northern goshawk are expected to occur from blasting or helicopter use.

American Dipper

American dipper may potentially occur in the project and action area based on the presence of suitable habitat. Trail reconstruction would increase the amount of human disturbance and noise in the project and action areas which may temporarily disturb birds and other wildlife. The proposed application of rotenone and potassium permanganate would not result in any modification of potential American dipper nesting habitat. Consumption of rotenone-treated water or macroinvertebrates would not have any toxicological effect on American dipper. A short-term reduction in aquatic invertebrate abundance may occur ranging from about 10 to 40 percent following individual rotenone treatments, with recovery to pre-treatment levels likely within 6 to 12 months. This would result in a short-term decrease in American dipper prey base in the project area. American dippers are highly mobile and would likely adapt to the change in prey availability by altering foraging areas. Following completion of the proposed action, no long-term adverse effects to American dipper would be expected.

Allen's Lappet-Browed Bat

No ponderosa pine trees, snags, or cliff habitat would be removed during rotenone application or fish stocking. Noise and human activities associated with these activities may cause individuals to avoid the project area; however, these activities would occur during daylight hours and would not affect foraging bats. Five to 10 ponderosa snags may be removed by reconstruction of the trail.

However, there are abundant roosting sites within the project and action area and this habitat removal is not expected to result in measurable adverse impacts. The application of rotenone may result in the mortality of some aquatic invertebrates reducing bat prey in the short term. Previous literature has reported a range of different impacts to macroinvertebrate assemblages. Most report

immediate reductions of assemblages in some capacity; however, recovery was rapid (Vinson et al. 2010). A short-term reduction in prey base is not expected to cause mortality or reduced fitness in Allen's lappet-browed bat, since it is highly mobile and can alter foraging areas and shift to other prey sources.

Arizona Gray Squirrel

Rotenone application, fish stocking, and trail restoration would not modify potential habitat for the Arizona gray squirrel. Consumption of rotenone-treated water would not have any toxicological effects on the Arizona gray squirrel. Noise and human activities associated with piscicide treatments, fish stocking, and trail reconstruction may cause individuals to avoid the area where these activities are occurring. Avoidance would be short term, and they would be expected to return to the area once the activity has ceased. No long-term effects to Arizona gray squirrel would occur.

Hooded Skunk

Rotenone application and fish stocking would not modify potential habitat for the hooded skunk. Consumption of rotenone-treated water or rotenone-killed fish would not have any toxicological effects on this species. Noise and human activities associated with trail reconstruction may cause individuals to avoid the project area during construction; however, these activities would occur during daylight hours and since this species is nocturnal, these activities would not likely affect hooded skunks.

Pale Townsend's Big-Eared Bat

No cliff habitat would be removed during rotenone application, fish stocking, or trail reconstruction. Noise and human activities associated with these activities may cause individuals to avoid the project area; however, they would occur during daylight hours and would not affect foraging bats. The application of rotenone may result in the mortality of some aquatic invertebrates reducing bat prey in the short term. A short-term reduction in prey base is not expected to cause mortality or reduced fitness in the pale Townsend's big-eared bat, since it is highly mobile and can alter foraging areas and shift to other prey sources.

Spotted Bat

No cliff habitat would be affected during rotenone application, fish stocking, or reconstruction of trails in the Proposed Action area. Noise and human activities associated with these activities may cause individuals to avoid the project area; however, they would occur during daylight hours and would not affect foraging spotted bats. The application of rotenone may result in the mortality of some aquatic invertebrates reducing bat prey in the short term. A short-term reduction in prey base is not expected to cause mortality or reduced fitness in this spotted bat, since it is highly mobile and can alter foraging areas and shift to other prey sources.

Western Red Bat

No deciduous riparian woodland would be affected during rotenone application, fish stocking, or reconstruction of trails in the Proposed Action area. Noise and human activities associated with these activities may cause individuals to avoid the project area; however, they would occur during daylight hours and would not affect foraging bats. The application of rotenone may result in the mortality of some aquatic invertebrates reducing bat prey in the short term. A short-term reduction in prey base is not expected to cause mortality or reduced fitness in western red bat, since it is highly mobile and can alter foraging areas and shift to other prey sources.

Plant Species

- Blumer's dock
- Davidson's cliff carrot
- Gila thistle
- Goodding's onion
- Heartleaf groundsel
- Hess's fleabane
- Mogollon death camas
- Mogollon hawkweed
- Rusby's hawkweed
- Yellow lady's slipper

No direct impacts to special status flora species would occur from the application of rotenone or restocking of native fishes. Although none of these species have been recorded in the project area, trampling by foot traffic and pack stock could occur during the transport of equipment and fish and during trail reconstruction. The permanent footprint of the proposed trail would be approximately 3.6 acres, assuming an average trail width of 1.5 feet. Reconstruction and rerouting of the trail may result in the modification of potential habitat for these species. The amount of potential habitat would likely be less than 3.6 acres since not all of the trail would be suitable habitat for these species. A pre-disturbance survey in suitable habitat could identify individuals to avoid during trail reconstruction and would contribute to the limited knowledge of the distribution, abundance, and habitat requirements for these species.

Cumulative Effects

Status of the Gila trout would be substantially improved by restoring it to approximately 23 miles of stream habitat in the Whitewater Creek watershed. The speckled dace, Sonora sucker, and desert sucker also would be beneficially affected by the Proposed Action. No adverse cumulative effects to any special status species would occur from implementing the Proposed Action.

Effects on Management Indicator Species

No Action

Selection of the No Action Alternative would not change the current status or trend of any MIS on the GNF. Native trout habitat would not be increased within the GNF.

Proposed Action

This project specific analysis is tiered to the Forest level MIS analysis. As part of this analysis all MIS except native trout were eliminated from further analysis for various reasons, including:

- the indicator habitat or feature is not present in the action area (long-tailed vole)
- the Proposed Action would not alter habitat quality or quantity (Northern Goshawk, Mexican Spotted Owl, Common Blackhawk, American beaver, Hairy Woodpecker, Mearn's Quail, Plain Titmouse, mule deer), and/or
- the MIS species is not present in the action area.

Native trout, specifically the Gila trout, may experience mortality during transport to stocking sites. However, the Proposed Action would benefit Gila trout by restoring these fish to high- quality

habitat in the Whitewater Creek watershed within the GNF. The number of individuals and populations of Gila trout on the Forest would increase as a result of the proposed action. There would be no impacts to any other GNF MIS habitats from implementing the Proposed Action.

Cumulative Effects

The Proposed Action would restore Gila trout to approximately 23 miles of streams within the Whitewater Creek watershed resulting in positive cumulative impacts to the species.

Effects on Migratory Birds

No Action

Selection of the No Action Alternative would not change the existing population status and trend or habitat conditions for migratory birds in the project area.

Proposed Action

Consumption of rotenone-treated water or rotenone-killed fish would not have any toxicological effects on the migratory birds. For insectivorous species, there may be a short-term reduction in prey base following rotenone treatment, but this would not be expected to adversely impact migratory birds. The proposed project would result in disturbance of approximately 3.6 acres of potential nesting habitat for migratory birds. Noise associated with trail reconstruction, blasting, and helicopter flights may cause individuals to avoid the project and action areas. Individuals nesting in the project or action area may abandon their nests due to increased noise and activity where trail reconstruction is occurring since it would be more sustained disturbance; however, suitable habitat is abundant in adjacent areas. Blasting and helicopter flights might cause migratory birds to temporarily avoid areas where increased noise levels are occurring, but they would be expected to return to the area when the noise has ceased. Following completion of the proposed project, there would be no long-term impacts to migratory birds.

Cumulative Effects

Because the Proposed Action is not likely to have any measurable effect on migratory birds, there would be no cumulative effects associated with the action alternative.

Recreation and Wilderness

Existing Conditions

Approximately 22 miles of the streams proposed for treatment are located in the Gila Wilderness. Access to the project area is only achievable through use of the USFS trail system or cross-country travel. There is a public access road at the lower end of the project area at the Catwalk Recreation Area.

Recreational activities in the area include hiking, sightseeing, picnicking, and fishing. The Whitewater-Baldy fire impacted and continues to impact all of these activities. The Catwalk Recreation Area is closed occasionally due to flooding and road damage. The catwalk portion of the trail was recently reconstructed after it was destroyed by flooding. The New Mexico Department of Game and fish angler surveys indicate that there has been an approximate 81% decrease in the number of anglers fishing in the stream after the fire (Kirk Patten, NMDGF pers. com.). During the period 1997-2004 and 2007-2008 the average, annual number of anglers reporting that they fished Whitewater Creek was 327, during 2015-2016 the number of anglers reporting that they fished the stream dropped to 64. This reduction in angler use is likely due to the lack of trail access to the

stream and the deteriorated condition of the fishery due to post fire effects.

Trails within the Whitewater Creek drainage were burned over by the WWBC fire and impacted by post-fire effects. Severe erosion is now taking place within the drainage, and large portions of several trails, including Whitewater Trail (#207), have been or will be lost if drainage structures are not rebuilt. The Whitewater Trail provides the main access from the Catwalk to the upper portions of the Whitewater Creek. Recreational use of the area is currently very light and limited due to poor trail conditions in the project area.

The Forest Plan lists a segment of Whitewater Creek as eligible for wild and scenic river designation. Outstandingly, remarkable values identified for Whitewater Creek include:

- Free flowing characteristic
- Recreational values accessed by the Catwalk National Recreation Trail
- Historic values including mining-related materials and Civilian Conservation Corps activities that together form a unique historic district.

The Forest Plan provides guidance for the management of eligible streams which include:

- Protect existing characteristics through the study period and until designated or released from consideration
- Maintain outstanding values
- Maintain free flowing characteristics
- Protect and to extent practicable enhance outstandingly remarkable values
- Management cannot be modified to the degree that eligibility or classification would be affected

These requirements will continue until a decision is made as to the future of the river.

Effects on Recreation and Wilderness

No Action

Under the No Action Alternative, the Whitewater Trail would not be restored and drainage structures would not be rebuilt. The character of the Gila Wilderness is natural and untrammled. Whitewater Creek and the Gila Wilderness would remain generally inaccessible to outfitters, hikers, anglers, hunters, and other recreationists. This alternative would have no effect to the wilderness characteristics of untrammled, undeveloped, and other features of value. This alternative would preclude repatriation of the native Gila trout, desert sucker, Sonora sucker, and speckled dace in Whitewater Creek. The results of not taking action would have negative impacts to the natural quality of wilderness character and the conservation and scenic public purposes of wilderness. This alternative would have negative impacts to both the opportunities quality and the recreation public purpose characteristics because access to the drainage and larger portions of the wilderness would not be restored in a timely manner, as well as the lack of recreational opportunities to enjoy native Gila trout in Whitewater Creek within the wilderness.

Proposed Action

The Proposed Action would restore Gila trout, as well as the speckled dace, desert sucker, and Sonora sucker, to approximately 23 miles of perennial stream. This would establish a viable, self-sustaining population of Gila trout that would be managed for recreational fishing in Whitewater Creek and its tributaries.

The Proposed Action would result in short-term periodic displacement of all recreationists since the project area would be closed to public entry prior to and during rotenone application. Considering current state of the trail system, such displacement would be negligible. Helicopter use would occur within wilderness, for the purpose of transporting and backhauling camp gear and treatment supplies, to support up to four camps per treatment period. Since the area would be closed, these helicopter flights would have no impact to recreationists. The public would be notified through news releases, and public postings at trailheads or other areas at least 1 week prior to each closure. For each treatment (from one to two per year for up to 3 years), the project area would be closed to public access for approximately 2 weeks, requiring recreationists to alter the date or location of their plans to recreate in the area. Closures would not occur during high use times (i.e., holiday weekends) and efforts would be made to limit the length of closures.

The project area would not be closed during fish stocking or trail restoration actions. Blasting and helicopter flights into the project area and the Wilderness would result in short-term periodic impacts to recreationists seeking solitude and quiet. Blasting for trail restoration would be limited to 5 to 10 locations on the Whitewater Trail (#207). Helicopter use could decrease as trail work is accomplished and access for pack stock is improved. However, in the event that currently accessible trails become impassible due to fire, flooding, or other damage, up to eight helicopter flights may need to be added to successfully complete each treatment. Due to the project area's remote location, pack stock and helicopters would be needed to transport fish. In areas where trails are not passable or safe, or where travel times are greater than 5 hours, a helicopter with a specialized fish transport container would be used to transport fish to or from streams. Up to five helicopter trips per year for up to 5 years would be used to transport and stock fish. To minimize impacts to recreational activities, helicopters would not be used on weekends. All helicopter use would require approval by the Regional Forester.

The project has been designed to comply with the management regulations of the Gila Wilderness. To retain Wilderness character, the minimum tool concept and BMPs would be applied during restoration of the Whitewater Trail. Treatment group size would be limited to no more than 25 individuals and 35 saddle and pack stock. It is unlikely that recreationists would encounter this size of group, as these numbers would only be needed during rotenone treatments when the project area is closed to the public. During fish-stocking activities, recreationists could encounter teams of three to four workers, which may affect the visitor's Wilderness experience.

The Proposed Action could have long-term impacts to anglers. Removal of non-native trout may be unpopular with recreationists who prefer to fish for those species. In addition, fishing opportunities would be limited while the Gila trout population expands into a self-sustaining population. The proposed action would provide an opportunity for anglers to fish for a rare and unique native trout species.

The Proposed Action would result in long-term positive effects to recreationists including anglers, hunters, outfitters, and hikers by restoring the Whitewater Trail (#207), thereby increasing access to the Gila Wilderness and improving trail safety.

The proposed action may have no effect, positive effects, or negative effects to wilderness characteristics. Neither the transportation (by helicopter or pack string) nor the specific treatment method impacts the untrammelled quality. However, the untrammelled quality is impacted when there is manipulation or control of the natural processes in wilderness. Even though the salmonids present in the stream are nonnative, actions to restore native Gila trout (chemical removal) affects untrammelled qualities by intervening in or manipulating natural processes. The stocking/repatriating of Gila trout into the wilderness is also a trammeling even if the actions ultimately help

preserve/restore natural conditions. The use of a chemical piscicide in the wilderness is a negative impact to the natural conditions and this quality. It would have short-term impacts on non-target organisms (gill-breathing invertebrates) but recent studies have shown that these latter impacts are very short-lived, and are ameliorated within a year.

The effect of the treatment which will allow for repopulation of native indigenous Gila trout is a positive impact to natural conditions and this quality. The long term benefits of protecting the natural conditions represented by the restoration of native Gila trout in the wilderness outweighs the short term negative impacts from the use of piscicide.

Use of pack/saddle stock and helicopter for transport of people and gear does not affect the Natural quality of wilderness. The removal of nonnative salmonids from Whitewater Creek and the subsequent stocking/repatriation and establishment of Gila trout would restore the wilderness values of these wild areas, and would benefit the natural quality of the Wilderness. The necessary area closures during piscicide applications will temporarily degrade opportunities for unconfined recreation and may impact the opportunity for visitors to experience primitive recreation in those areas.

The use of helicopter for transportation of gear and materials may temporarily degrade opportunities for solitude during helicopter operations. Encounters with saddle/pack stock on their way to camp sites may affect/degrade outstanding opportunities for solitude, however, the frequency and duration of such encounters will be greatly reduced compared to the 2nd and 3rd alternatives.

Benefits of restoring Gila trout to Unconfined and Primitive Recreation character are only slight when compared to the benefit to the Natural character of wilderness. The effect of the treatment which will allow for restoration of the native Gila trout is a positive impact to the Natural quality and any resulting impact on the wilderness visitors experience is because of the changed natural conditions.

The proposed action would have no impact to either the free flowing characteristic of Whitewater Creek or the outstandingly remarkable historic features along the stream. The Proposed Action would enhance the outstandingly remarkable recreation features by reestablishing the trail along Whitewater Creek from the confluence of South Fork Whitewater Creek to Hummingbird Saddle.

Cumulative Effects

When combined with reasonably foreseeable activities such as wildfire and suppression efforts, trail maintenance, wildlife management, and recreation, the Proposed Action may result in cumulative effects. However, these impacts would not change the Gila Wilderness character. Restoration of the Whitewater Trail would be expected to increase visitor use of the project area. Once viable Gila trout populations are established, angler use in Whitewater Creek and its tributaries may also increase. While the Proposed Action would contribute to cumulative impacts, these impacts are not expected to be significant. Overall the cumulative effects on wilderness character would be negligible.

Heritage Resources

Existing Conditions

Archaeological inventory has not been conducted for the entirety of the proposed project area. Inventory which has been conducted has primarily been along Whitewater Creek and the Gold Dust Trail. The Catwalk and associated historic resources have been recorded within the project area and just west of the project area. Portions of the trail system itself are known to be historic in nature, having been constructed by the Civilian Conservation Corps in the 1930s. Erosion and flooding within the Whitewater drainage has damaged some historic sites (e.g., the Catwalk) just downstream from the project area; however, the upper portion of this site (within the project area) have not been assessed for historic integrity since 2013 flooding. The condition of sites within the project area has not been assessed since flooding and is unknown; it is possible some have disappeared or deteriorated and that other resources may have been exposed. Eight previous inventories have recorded six archaeological sites within the project area, including one prehistoric resource. Additional archaeological fieldwork is required in order to adequately describe existing conditions and assess effects. This fieldwork would be conducted in conjunction with trail design work prior to any ground disturbing activities; current ground conditions within the project area are not conducive to archaeological fieldwork.

Effects on Heritage Resources

No Action

The No Action Alternative would not directly affect historic resources within the project area. However, resources within the project area may have been affected by flooding within the drainage; without stabilization, there may be an increased chance of further degradation.

Proposed Action

Water based activities associated with the Proposed Action include removing non-native salmonids (using piscicide) and restocking the creek with native fishes; these activities do not have the potential to affect heritage resources.

Ground-disturbing activities that would occur as part of the Proposed Action, including restoration work on the Whitewater Trail (#207); this activity would have the potential to effect historic properties. Portions of the Whitewater Trail are historic in nature, rendering those portions of the trail an historic resource. Adequate survey and assessment data are not available at this time to evaluate the effects to resources that could occur. Based on previous work in the general area, it is anticipated that historic resources were damaged during 2013 flooding; it is possible that trail work would serve to stabilize some resources and could actually be beneficial to resources. Per conversations with New Mexico State Historic Preservation Office archaeologist Michelle Ensey, on 12/1/2016, complete archaeological survey of the area of potential effect and consultation with State Historic Preservation Office shall occur prior to any construction activities; archaeological survey may be conducted in conjunction with trail design activities.

Socioeconomic Factors

Existing Conditions

The Proposed Action is located in Catron County on the GNF with the majority of the area located within the Gila Wilderness. Glenwood, New Mexico, the nearest community, is located approximately 2.5 miles downstream from the proposed rotenone deactivation zone. Covering nearly

7,000 square miles of mostly rugged mountainous terrain, Catron County is the largest county in the state, but it has the third smallest population of any New Mexico county (approximately 3,500 people). Reserve is the county seat; with a population of about 400, and it is the largest town in the county (Catron County 2016).

There is one grazing allotment, where permitted livestock graze, with portions of pastures within the project area and two grazing allotments adjacent to but not within the project area. There are no livestock watering or handling improvements other than fences within the project area.

Before the WWBC fire, local outfitters, hikers, hunters, and anglers depended on the trails staying open and in a safe condition for access to Whitewater Creek for recreation, hunting, and fishing. Whitewater Trail has been prioritized for reconstruction by the Glenwood Ranger District because of its importance to the community that relies on the economic benefit provided by visitors to the Gila Wilderness.

Outdoor recreational activities contribute to the Catron County economy. According to a recent study, 5,500 resident (New Mexico) anglers and 1,828 non-resident anglers— totaling 41,926 fishing days fished in Catron County during 2013. It was estimated that each angler spent an average of \$1,670 on recreation fishing activities (Southwick Associates 2014). The indirect economic impact of angler spending was estimated to add another \$1.8 million in Catron County (Southwick Associates, 2014). Catron County is one of the top three counties in the state where hunters go to hunt. In 2013, 9,648 resident and 2,758 non-resident hunters visited the county— totaling 60,588 hunter days. The largest numbers of these persons were involved in elk hunting (Southwick Associates 2014). On average, hunters in New Mexico spend \$3,963 per year on recreational hunting activities. The indirect economic impact of hunter spending was estimated to add another \$15 million to Catron County (Southwick Associates 2014).

Effects on Socioeconomic Factors

No Action

Under the No Action Alternative native fish populations would not be reintroduced to Whitewater Creek. Current angling opportunities would continue with non-native fish populations. Whitewater Creek and the Gila Wilderness would remain generally inaccessible to outfitters, hunters, hikers, anglers, and other recreationists. The No Action Alternative would result in net negative impacts on socioeconomic conditions from a decline in recreational use in the project area; however, these effects may not be measurable.

Proposed Action

Rotenone has no known carcinogenic, mutagenic, or teratogenic properties (see Section 11 of the Material Safety Data Sheets in Appendix A). Potential human exposure would be limited to applicators involved in project implementation. Due to the rapid degradation of rotenone and ephemeral flow conditions below the project area, no rotenone or rotenone residue would be transported downstream below the deactivation zone. Rotenone does not persist in the environment. None of the inert components of the rotenone application (DEGEE, MP, or Fennodefo 99™) pose any toxicological risk to human health in concentrations proposed under the action (Finlayson et al.

2012).

At excessively high doses and inapplicable exposure routes (i.e., intravenous injection), rotenone has been shown to cause neurological damage in mammals (Finlayson et al. 2012). However, such dosages and exposure pathways would never occur in fisheries management applications, including the Proposed Action. Laboratory studies that have associated rotenone with symptoms of Parkinson's Disease in test animals have involved extraordinary routes of exposure such as direct injection of rotenone into brain tissue and intravenous administration of rotenone into the bloodstream, and prolonged, continuous exposure periods (weeks to months) to highly concentrated rotenone (Finlayson et al. 2012). Such conditions would not occur during application of rotenone to remove non-native fish from restoration stream segments in the Whitewater Creek watershed, nor would such exposure conditions and rotenone concentrations be even remotely approached by the Proposed Action.

Rotenone exposure includes oral, dermal, and inhalation routes. Oral ingestion would be prevented by exercising care in handling of the material and there would be no inhalation exposure because liquid rotenone is not volatile (Finlayson et al. 2012). The CFT Legumine® formulation of rotenone that would be used in the Proposed Action is poorly absorbed through human skin (0.37 percent absorption; Finlayson et al. 2012). As required by the label, applicators would wear chemically resistant gloves, eye protection, and protective clothing to prevent dermal contact with CFT Legumine® (a 5 percent rotenone solution) or Prentox® Prenfish™ Fish Toxicant Powder.

Potassium permanganate has no known carcinogenic, mutagenic, or teratogenic properties (see Appendix A). Due to the short-term use of potassium permanganate, low concentrations involved (i.e., maximum application concentration of 4 ppm), and its rapid degradation, it would not persist in the environment and would not be transported downstream beyond the deactivation zone. There would be no potential for chronic exposure of humans to potassium permanganate.

Public exposure to treated water would be prevented by excluding non-project personnel from the project area until rotenone residues subside and by detoxifying stream water at the downstream terminus of the project area by applying potassium permanganate. Rotenone transport to and contamination of groundwater would not occur with the proposed stream treatments (Finlayson et al. 2001, USEPA 2006). There would be no exposure to permitted livestock within the project area.

The Proposed Action would have no effect on flow volume in Whitewater Creek or its tributaries as no new diversions, dams, impoundments, or any other flow modifications are part of the Proposed Action. The Proposed Action would have no effect on water rights, land use, or land ownership.

No measurable direct economic effects to the local economy are anticipated from the Proposed Action. Direct expenditures for project implementation (e.g., regional or local purchases of food, gas, stock feed, supplies) would be considered a minor economic benefit. Future economic benefits may be received through increased recreational fishing activities and accessibility to the Gila Wilderness following successful completion of the project. While this would be expected to have net positive effects to socioeconomic conditions, the magnitude of these potential effects is uncertain.

As there would be no permanent adverse effects to Forest visitors or local area residents, there would be no disproportionate adverse effects to Forest visitors or to residents near the project area. Therefore, the project is in compliance with Executive Order 12898 Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations.

Cumulative Effects

Because the Proposed Action would have no measurable effects on socioeconomic factors, including human health and safety, there would be no cumulative effects on socioeconomic factors arising

from selection and implementation of the Proposed Action.

Finding of No Significant Impact

As the responsible official, I am responsible for evaluating the effects of the project relative to the definition of significance established by the Council on Environmental Quality (CEQ) Regulations (40 CFR 1508.13). I have reviewed and considered the EA and documentation included in the project record, and I have determined that proposed restoration of Gila trout and other native fishes to Whitewater Creek will not have a significant effect on the quality of the human environment. As a result, no environmental impact statement will be prepared. My rationale for this finding is as follows, organized by sub-section of the CEQ definition of significance cited above.

Context

For the Proposed Action and alternatives, the context of the environmental effects is based on the environmental analysis in this EA. The Proposed Action is limited in context. The effects from this project will be localized to the proposed project area within the Whitewater Creek drainage.

Intensity

Intensity is a measure of the severity, extent, or quantity of effects, and is based on information from the effects analysis of this EA and the references in the project record. The effects of this project have been appropriately and thoroughly considered with an analysis that is responsive to concerns and issues raised by the public. The agency has taken a hard look at the environmental effects using relevant scientific information and knowledge of site-specific conditions gained from field visits. My finding of no significant impact is based on the context of the project and intensity of effects using the 10 factors identified in 40 CFR 1508.27(b).

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

Both beneficial and adverse effects and their significance have been discussed for the alternatives considered in detail. Effects were minimized or eliminated through design features. None of the adverse effects were determined to be significant, singularly, or cumulatively. A summary of the anticipated environmental effects for each alternative is provided on pages 16-19. The beneficial effects were not used to minimize the severity of any adverse impacts. Furthermore, the beneficial effects of the Proposed Action do not bias my finding of no significant environmental effects. The proposed uses of National Forest System lands will not result in any known significant irreversible resource commitments or a significant irreversible loss of soil productivity, water quality, wildlife habitats, heritage resources, or recreational opportunities. This project is likely to have impacts which are perceived as negative, as well as positive.

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

The implementation of the alternatives will not cause a threat to human health or safety. Application of rotenone would comply with all federal and state laws and all label

requirements and would follow the SOPs for fisheries management which provide guidance on how to use rotenone in a safe and effective manner (pages 9-10).

Neither rotenone nor potassium permanganate have any known carcinogenic, mutagenic, or teratogenic properties. None of the inert components of the rotenone application pose any toxicological risk to human health in concentrations proposed under the action (page 63). No rotenone, rotenone residue, or potassium permanganate would persist in the environment or be transported downstream below the deactivation zone. There would be no potential for chronic exposure of humans to rotenone, rotenone residues, or potassium permanganate (page 64).

Potential human exposure would be limited to applicators involved in project implementation. As required by the label, applicators would wear chemically resistant personal protective equipment to prevent dermal contact with CFT Legumine® (a 5 percent rotenone solution) or Prentox® Prenfish™ Fish Toxicant Powder. Public exposure to treated water would be prevented by excluding non-project personnel from the project area until rotenone residues subside and by detoxifying stream water at the downstream terminus of the project area by applying potassium permanganate (page 64). Rotenone transport to and contamination of groundwater would not occur with the proposed stream treatments (page 64).

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

There are no unique characteristics of the geographical area that will be significantly affected by this project. There are no effects to prime farmland, Wilderness study areas, inventoried roadless areas, or ecologically critical areas as these characteristics do not occur in the project area. There would be no negative effects to floodplains (pages 22-29).

Adequate survey and assessment data are not available at this time to evaluate the effects to historical and cultural resources that could occur. Significant effects would be avoided through complete archaeological inventory of the area prior to any trail construction activities and consultation with the State Historic Preservation Office. Historic resources in the area were likely damaged during 2013 flooding; it is possible that trail work would serve to stabilize some resources and could have positive effects to historic and cultural resources (page 62).

The project has been designed to comply with the management regulations of the Gila Wilderness. To retain Wilderness character, the minimum tool concept and BMPs would be applied during restoration of the Whitewater Trail. The natural quality of Wilderness character and resources would be enhanced by reintroduction of native Gila trout, speckled dace, Sonora sucker, and desert sucker.

This project will not affect Whitewater Creek's designation as an Outstanding National Resource Water (page 22) or its eligibility as a wild and scenic river (page 61). The proposed action would have no impact to either the free flowing characteristic of Whitewater Creek or the outstandingly remarkable historic features along the stream. The action would enhance the outstandingly remarkable recreation features by reestablishing the trail along Whitewater Creek from the confluence of South Fork Whitewater Creek to Hummingbird Saddle (pages 60-62)

4. The degree to which the effects on the quality of the human environment are likely to be highly controversial.

The activities associated with this project will not significantly affect the quality of the human environment, and the effects are unlikely to be highly controversial. The use of rotenone for fish control does not present a risk of unreasonable adverse effects to humans and the environment (pages 9-10 and 60-62). The best available science was considered and the project record demonstrates a thorough review of relevant scientific information.

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

This project has no known effects on the human environment that are highly uncertain or involve unique or unknown risks. The Proposed Action will implement SOPs and BMPs to minimize or avoid effects (pages 9-10 and 14-15)

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

This project does not represent a precedent for future actions with significant effects or a decision in principle about a future consideration. The EA is site-specific and its actions incorporate the practices envisioned in, as well as the goals and objectives, of the GNF Forest Plan.

7. Whether the action is related to other actions with individually insignificant but cumulatively significant impacts. Significance exists if it is reasonable to anticipate a cumulatively significant impact on the environment. Significance cannot be avoided by terming an action temporary or by breaking it down into small component parts.

The project will not have a significant effect on the quality of the human environment, either as an individual action or as part of the cumulative effects of other past, present, and planned actions with the project area. The EA describes the anticipated cumulative effects for each of the affected resources (pages 28-65). None of the cumulative effects analyses for this project are significant.

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

The Catwalk and associated historic resources have been recorded within the project area. Eight previous inventories have recorded six archaeological sites within the project area, including one prehistoric resource. Historic resources in the area were likely damaged during 2013 flooding; it is possible that trail work would serve to stabilize some resources and could have positive effects to historic and cultural resources (page 62).

Additional archaeological fieldwork is required in order to adequately describe existing conditions and assess effects. This fieldwork would be conducted in conjunction with trail design work prior to any ground disturbing activities; current ground conditions within the project area are not conducive to archaeological fieldwork. Significant

effects would be avoided through complete archaeological inventory of the area prior to any trail construction activities and consultation with the State Historic Preservation Office.

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

The USFWS provided a list of threatened and endangered species that occur in Catron County for consideration in the analysis (Consultation code # 02ENNM00-2016-SLI-0296). The biological assessment (documented in the project record) determined the proposed action may affect, but is not likely to adversely affect, the Gila trout and Mexican spotted owl. The proposed action would result in beneficial effects to Gila trout. The proposed action would not jeopardize the continued existence of the narrow headed gartersnake and would not destroy or adversely modify proposed critical habitat. There would be no effect to the Southwestern Willow Flycatcher. The proposed action would have no effect on Mexican spotted owl designated critical habitat. There would be no effect to any other listed species from the Proposed Action (page 52-53).

10. Whether the action threatens a violation of Federal, State, or local law or requirements imposed for the protection of the environment.

The Proposed Action would not violate Federal, State, or local laws or requirements imposed for the protection of the environment, including but not limited to:

- Gila National Forest Plan, as amended (1986)
- National Environmental Policy Act (NEPA) of 1969, as amended, (42 United States Code [USC] § 4321 et seq.)
- Regulations for Implementing the Procedural Provisions of NEPA (40 Code of Federal Regulations [CFR] 1500-1509)
- National Forest Management Act of 1976, as amended (16 USC Part 1600)
- Antiquities Act of 1906, as amended (16 USC 431-433)
- American Indian Religious Freedom Act of 1978 (42 USC 1996)
- Archaeological Resources Protection Act of 1979, as amended (16 USC § 470aa et seq.)
- Clean Air Act, as amended (42 USC § 7401 et seq.)
- Clean Water Act, as amended (33 USC § 1251, et seq.)
- Endangered Species Act of 1973 (16 USC § 1531 et seq.)
- Executive Order 11988 Floodplain Management
- Executive Order 11990 Protection of Wetlands
- Executive Order 12898 Environmental Justice
- Executive Order 13007 Indian Sacred Sites
- Executive Order 13112 Invasive Species
- Executive Order 13186 Responsibilities of Federal Agencies to Protect Migratory Birds

- Fish and Wildlife Coordination Act of 1958 (16 U.S.C. 661 et seq., as amended)
- Migratory Bird Treaty Act of 1918, as amended (16 USC §§ 703-712; 50 CFR Part 21)
- Native American Graves Protection and Repatriation Act of 1990 (25 USC 3001; 43 CFR Part 10)
- Section 106 of the National Historic Preservation Act of 1966 (16 USC 470 et seq.), as amended (implemented under regulations of the Advisory Council on Historic Preservation, 36 CFR Part 800)

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