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Environmental Assessment for

Bridge Replacement and Rehabilitation on National Forest System Road (NFSR) 150

Gila National Forest
Grant and Catron Counties

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SUMMARY

The Gila National Forest (GNF) proposes to replace or rehabilitate eight (8) bridges on National Forest System Road (NFSR) 150, also known as North Star Mesa road. The project is within the administrative boundaries of the Wilderness and Black Range Ranger Districts, Gila National Forest, New Mexico (NM). This action is needed because bridge inspections determined the bridges are in need of replacement or rehabilitation to ensure they continue to be safe for vehicular travel.

The modified proposed action may have temporary effects on threatened Gila trout populations in Black Canyon and may cause delays in traffic during construction. The bridges were built during the Civilian Conservation Corps (CCC) –era and are part of a linear cultural resource site that is Eligible to the National Register of Historic Places. With exception of two (2) bridges in Terry Canyon, these structures would be replaced or rehabilitated. The GNF and the State Historic Preservation Officer (SHPO) have agreed that this will cause an adverse effect to this linear cultural resource site. In order to preserve a sample of historic bridge construction, NFSR 150 would be re-routed around bridges at Terry Canyon #2 and Terry Canyon #5 and a new pipe arch structure would be installed in each of the two (2) re-routed sections. The original structures would be retained at Terry Canyon #2 and Terry Canyon #5 for historical interpretation.

Pursuant to 36 CFR 800.6, the GNF and the SHPO have developed several mitigations, including the preservation of Terry Canyon #2 and Terry Canyon #5, which will be written into a Memorandum of Agreement. These mitigations will be followed as specified in that document.

In addition to the proposed action, the Forest Service also evaluated the following alternative:

- **No action** – No bridges on NFSR 150 would be replaced or reconstructed.

Based upon effects of alternatives, the responsible official will decide:

1. Whether the proposed action would proceed as proposed, as modified by an alternative, or not at all.
2. If it proceeds, what mitigation measures and monitoring requirements will the Forest Service apply to the proposed bridge replacement or rehabilitation; and
3. Whether the project requires a Gila National Forest Land and Resource Management Plan, as amended (Forest Plan) amendment.

INTRODUCTION

Document Structure

The Forest Service has prepared this environmental assessment (EA) in compliance with the National Environmental Policy Act (NEPA) and other relevant federal and state laws and regulations. This EA discloses direct, indirect, and cumulative environmental impacts that could result from the proposed action and alternatives. The document is organized into four parts:

- *Introduction:* The section includes information on the history of the project proposal, the purpose of and need for the project, and the agency's proposal for achieving that purpose and need. This section also details how the Forest Service informed the public of the proposal and how the public responded.

Comparison of Alternatives, including the Proposed Action: This section provides a more detailed description of the agency's proposed action as well as alternative methods for achieving the stated purpose. These alternatives were developed based on significant issues raised by the public and other agencies. This discussion also includes possible mitigation measures. Finally, this section provides a summary table of the environmental consequences associated with each alternative.

- *Environmental Consequences:* This section describes the environmental effects of implementing the proposed action and other alternatives. This analysis is organized by resource area. Within each section, the affected environment is described first, followed by the effects of the No Action Alternative that provides a baseline for evaluation, and comparison of the other alternatives that follow.
- *Agencies and Persons Consulted:* This section provides a list of preparers and agencies consulted during the development of the environmental assessment.
- *Appendices:* The appendices provide more detailed information to support the analyses presented in the environmental assessment.

Additional documentation, including more detailed analyses of project-area resources, may be found in the project planning record located at the GNF Supervisor's Office in Silver City, New Mexico.

Background

Seven (7) structures (bridges) are within the Wilderness Ranger District and one (1) is within the Black Range Ranger District. NFSR 150 is located in the corridor between the Gila and Aldo Leopold Wilderness Areas within Catron and Grant Counties. The project lies within the Forest Plan management areas (MA) 2B, 5A, 5B, and 5C.

NFSR 150 was originally constructed in the late 1800s to early 1900s, and traverses about 45 miles of the GNF from NM Highway 35 to Beaverhead, NM near NM Highway 59. It is a maintenance level (ML) 3 road. A ML 3 road is defined as open and maintained for travel by prudent drivers in standard passenger cars. In 2010, NFSR 150 underwent significant maintenance to correct drainage, erosion, and surface problems. No maintenance, replacement, or reconstruction of bridges along NFSR 150 was done at the time. Recent bridge inspections, however, indicate that replacement or rehabilitation is needed on eight (8) structures. Replacement and rehabilitation work would ensure these bridges continue to be safe for motor vehicle travel.

Concurrently, the GNF is undergoing travel management planning, where it is required to designate roads and trails open to motorized use per 36 Code of Federal Regulations (CFR) 212 Subpart B. NFSR 150 is proposed to remain open in all action alternatives of the Travel Management Draft Environmental Impact Statement (DEIS). Maintenance and repairs of roads and their related structures throughout the GNF, however, is not precluded by the travel management process.

Purpose and Need for Action

The purpose of this project is to implement the GNF Plan goals and objectives. The project would do this by replacing three (3) bridges on NFSR 150 with pipe arch structures in Terry Canyon, rerouting and constructing two (2) pipe arch structures in the vicinity of the Terry Canyon #2 and Terry Canyon #5 bridges (leaving existing bridges intact, as a basis for historical interpretation, but no longer in service), replace two (2) bridges on NFSR 150 with new bridges in East Indian Creek and a tributary to Black Canyon, and rehabilitate one (1) bridge in Black Canyon. The action is needed to ensure these structures

are safe for public travel. In addition, a site specific Forest Plan amendment is needed to allow for replacement of historical bridges within requirements of Section 106 of the National Historic Preservation Act (NHPA), as amended.

The following information was used to determine the need for action:

Terry Canyon #1-5, Black Canyon Tributary, Black Canyon, and East Indian Creek Bridges**:** If the project is not implemented these bridges would remain in place and continue to deteriorate. The bridges current condition would require posting of signage to restrict weight crossing five structures (see table 2). The current condition reflects a delamination of concrete on top of the slab. Delamination is internal to the slab and not visible on the surface. Concrete delamination is caused by corrosion of reinforcing steel, which expands and separates the concrete matrix. As water infiltrates the slab, deterioration progresses, impacting the structural depth of the concrete's compression block that resists applied loads. The grades on the slab bridges are flat. The curbs retain water on the deck and the deck drains at mid-span do little to nothing to drain the decks of water that infiltrates the concrete. All bridges, except for Black Canyon, appear to be built in accordance with a Forest Service Region 3 standard design. The standard design has 3/8" diameter reinforcing steel connecting the curbs to the slab. The reinforcement has 1" concrete cover to protect the steel, which is less than the standard 2 ½" cover for bridge slabs currently. Based on the structures type, the structures would require biannual bridge inspections to monitor their condition. The frequency of inspections would increase as bridges continue to deteriorate. The structures would also require periodic structural analysis to determine decreasing load carrying capacity as each bridge continues to deteriorate. In accordance with Forest Service policies, these bridges are at the end of their structural life expectancy. The remaining structure life would require a more detailed investigation into the depth of delamination to determine the amount of concrete and steel rebar deterioration. The remaining life would be dependent on the amount of sound material (concrete and steel rebar) remaining, number of truck overload cycles/trips, climate conditions, and maintenance. The bridges are also on a maintenance level 3 road (i.e., bridge and approach rails are required as the road is subject to the Highway Safety Act). Only the Black Canyon Bridge has bridge rails. All bridges have barrier curbs. No bridges have approach rails. The road is a primary arterial route that links the southern portion of the GNF to the northern portion. As these bridges continue to deteriorate, their load carrying capacity would continue to drop, forcing eventual closure and a lengthy detour. In accordance with Forest Service policy, any bridge with a load carrying capacity of less than 3 tons is required to be closed to traffic.

Black Canyon Tributary Bridge: In addition to the superstructure deterioration described above, the abutment walls are not aligned with the stream channel. The misalignment has resulted in stream channel scour at the abutment. During high flows, the misaligned abutment walls create a greater obstruction to the flow resulting in turbulence that transports material downstream, exposing the upstream foundation. The channel has scoured out near the upstream wing walls. Scoured material has been deposited near the downstream edge of the bridge. Additional scour may affect the structure's life. The limited space under the bridge would inhibit or prohibit any countermeasure construction, since equipment must be used to key in rock used for scour protection and current clearance between the slab and channel is between 3.5 to 5 feet.

Black Canyon Bridge: In addition to superstructure deterioration previously described, two of the bridge's wing walls have separated from abutment 2. The wing walls retain roadway embankment fill at bridge approaches. If wing walls were to fail, the roadway approach embankment would be lost, making the route impassible. The bridge railing is substandard and does not meet any of the traffic

loading requirements. Forest Service policies state that bridges with bridge rails shall have approach rails, since the end of the bridge rail creates a traffic hazard. The existing bridge does not have approach railings. Based on delamination of the concrete deck, the bridge should be analyzed for its safe load carrying capacity. Both destructive and non-destructive inspection/testing should be performed to determine location and size of rebar, sound concrete thickness, and concrete compressive strength. The more detailed inspections/testing are required due to lack of as-built drawings and that this bridge is a two span continuous bridge compared to the other single span bridges which have a regional standard design. Costs associated with detailed inspections/testing would be greater than $3,000 which is two to three times routine inspection costs.

East Indian Creek Bridge: In addition to superstructure deterioration previously described, abutment walls are not aligned with the stream channel. The misalignment can result in scour at the abutment, which can be covered up once flows subside. During high flows, the misaligned abutment walls create a greater obstruction to the flow resulting in turbulence that transports material downstream exposing the upstream foundation. As flows subside, velocities decrease and transported material may settle, filling in scour holes. The channel bed is sandy material which is very susceptible to scour. Scour can adversely affect the life of a bridge.

Modified Proposed Action

This proposal has been modified from the original proposed action that was presented to the public for scoping in late 2011. It was modified to include mitigations for cultural resources. .

- The Forest Service proposes to replace three (3) bridges on NFSR 150 with pipe arch structures in Terry Canyon;
- Re-route and construct pipe arch structures at Terry Canyon #2 and Terry Canyon #5;
- Retain original structures at Terry Canyon #2 and Terry Canyon #5 for preservation and interpretation of this type of historical feature;
- Replace two (2) bridges on NFSR 150 with new bridges in East Indian Creek and a tributary to Black Canyon;
- Rehabilitate one (1) bridge in Black Canyon
- Amend the Forest Plan for one time site specific work described in this proposal.

Decision Framework

Given the purpose and need, the deciding official reviews the proposed action and other alternatives in order to make the following decisions:

1. Whether the proposed action would proceed as proposed, as modified by an alternative, or not at all.
2. If it proceeds, what mitigation measures and monitoring requirements would the Forest Service apply to the bridge replacement or rehabilitation; and
3. Whether the project requires a GNF Plan amendment.

Public Involvement

The proposal was first listed in the Schedule of Proposed Actions on October 1, 2011. It is available online at: http://www.fs.usda.gov/projects/gila/landmanagement/projects. The proposal was provided to the public and other agencies for comment during public scoping October 3 through November 1, 2011

It was mailed to 39 individuals and organizations, 10 tribes, and 11 federal, state, and local representatives and was available to review at the Black Range and Wilderness Ranger District Offices and at the GNF Supervisor's Office.

Using the comments from the public, tribes, organizations, and federal, state and local governments (see *Issues* section), the interdisciplinary team developed a list of issues to address.

Issues

The Forest Service separated issues into two groups: key and non-key issues. Key issues were defined as those directly or indirectly caused by implementing the proposed action. Non-significant issues were identified as those: 1) outside the scope of the proposed action; 2) already decided by law, regulation, Forest Plan, or other higher level decision; 3) irrelevant to the decision to be made; or 4) conjectural and not supported by scientific or factual evidence. The Council on Environmental Quality (CEQ) NEPA regulations require this delineation in Sec. 1501.7, "…identify and eliminate from detailed study the issues which are not significant or which have been covered by prior environmental review (Sec. 1506.3)…" A list of non-significant issues and reasons regarding their categorization as non-significant may be found in the content analysis for scoping located in the project record.

The GNF identified one (1) key issue raised during scoping. This issue was:

> *Re-routing NFSR 150 during construction on the Black Canyon, tributary to Black Canyon and Indian Creek bridges could result in resource degradation due to inadequate rehabilitation and could lead to the development of illegal Off Highway Vehicle (OHV) routes through them.*

ALTERNATIVES, INCLUDING THE MODIFIED PROPOSED ACTION

This chapter describes and compares alternatives considered to meet the need for the project. It includes a description and map of each alternative considered. This section also presents alternatives in comparative form, sharply defining differences between each alternative and providing a clear basis for choice among options by the decision maker. Some information used to compare alternatives is based upon design of the alternative (i.e., helicopter logging versus the use of skid trails) and some of the information is based upon environmental, social, and economic effects of implementing each alternative (i.e., the amount of erosion or cost of helicopter logging versus skidding).

Alternatives

Alternative 1

No Action

Current Forest Plan Management Area (MA) direction guide management of the project area. No bridges would be replaced or rehabilitated.

Alternative 2

The Modified Proposed Action

This project proposes to:

- Replace three (3) of five (5) bridges on NFSR 150 with pipe culvert arch structures in Terry Canyon;
- Reroute and construct two (2) pipe arch bridges at the vicinity of the current Terry Canyon #2 bridge and Terry Canyon #5 bridge, leaving the existing bridges (referred to as Terry #2 and Terry #5) intact.
- Replace two (2) bridges on NFSR 150 with new bridges in East Indian Creek and a tributary to Black Canyon;
- Rehabilitate one (1) bridge in Black Canyon. A site specific amendment to the Forest Plan is needed per GNF Plan direction on page 23 for Cultural Resources A02, #5. This site specific amendment would apply only to this project and would not amend the Forest Plan for any other project. The current Forest Plan direction reads:

  > *"5. Where resource management conflicts occur, the desirability of in-place preservation of cultural resources will be weighed against the values of the proposed land use. Preservation of cultural resources in place will become increasingly important under the following conditions.*
  >
  > *Where present methods of investigation and data recovery cannot realize the current research potential of the sites.*

Where the sites are likely to have greater importance for addressing future research questions than current ones.

Where the cultural values derive primarily from qualities other than research potential, and where those values are fully realized only when the cultural remains exist undisturbed in their original context[s] (e.g., association with significant historical persons or events, special ethnic or religious values, or unique interpretive values).

Where cultural resources are important primarily for the quality of their architecture and the integrity of their setting.

Where preservation in place is necessary to accomplish the objectives of the State Historic Preservation Plan.

Where site density would make data recovery economically infeasible, or require attainable operating conditions.

Where preservation in place is important under these conditions, the Forest will give serious consideration to such options as project redesign, relocation, or cancelation. The procedures specified in 36 CFR 800 will be followed in reaching a management decision and the minimum management standard will be to achieve a "No Adverse Effect" finding.

The site specific Forest Plan amendment would remove the language "*and the minimum management standard will be to achieve a "No Adverse Effect" finding"* from the last paragraph of Cultural Resources A02, #5, page 23 of the GNF Plan as shown in the shaded area above.

The GNF Plan will read:

"5. Where resource management conflicts occur, the desirability of in-place preservation of cultural resources will be weighed against the values of the proposed land use. Preservation of cultural resources in place will become increasingly important under the following conditions.

Where present methods of investigation and data recovery cannot realize the current research potential of the sites.

Where the sites are likely to have greater importance for addressing future research questions than current ones.

Where the cultural values derive primarily from qualities other than research potential, and where those values are fully realized only when the cultural remains exist undisturbed in their original context[s] (e.g., association with significant historical persons or events, special ethnic or religious values, or unique interpretive values).

Where cultural resources are important primarily for the quality of their architecture and the integrity of their setting.

Where preservation in place is necessary to accomplish the objectives of the State Historic Preservation Plan.

Where site density would make data recovery economically infeasible, or require attainable operating conditions.

Where preservation in place is important under these conditions, the Forest will give serious consideration to such options as project redesign, relocation, or cancelation. The procedures specified in 36 CFR 800 will be followed in reaching a management decision."

A map of locations for each structure is shown in Figure 1. Photos of the bridges are located in appendix A.

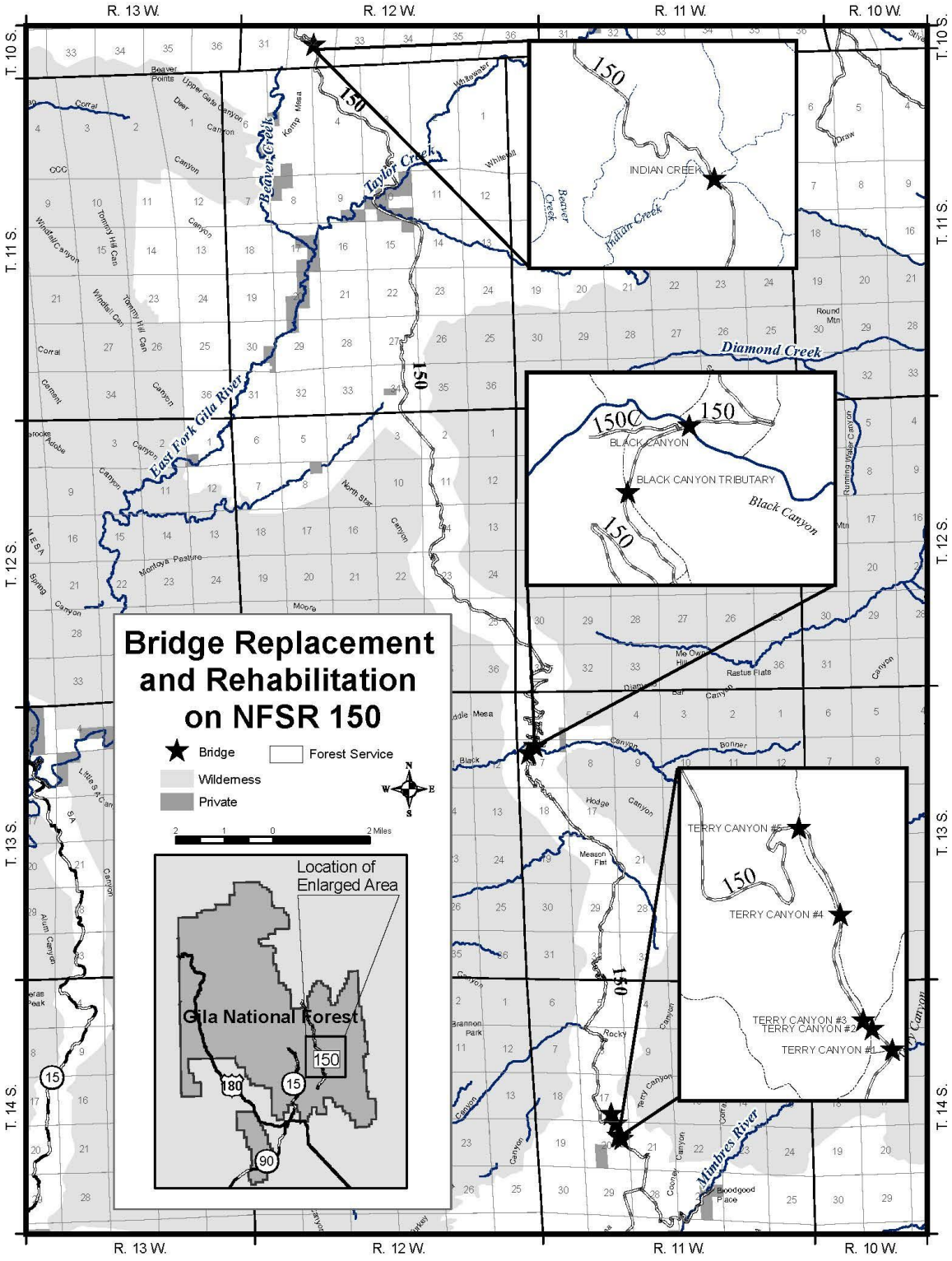
Proposed designs and/or alignment of bridges can be found in the project record. Bridge designs are considered part of the design criteria below. A copy on Compact Disc (CD) may be requested from the Forest Service.

Design Criteria:

- NFSR 150 would be rerouted during construction/reconstruction to allow for traffic flow at Black Canyon, tributary to Black Canyon, and Indian Creek construction/reconstruction sites. Segments of NFSR 150 would be closed to traffic during construction of the five (5) pipe arches in Terry Canyon. Closures are not anticipated to be more than a few days.
- All bypass routes for the Black Canyon, Black Canyon Tributary and Indian Creek bridges construction and rehabilitation sites would be rehabilitated similar to the original contours and seeded.
- Best Management Practices (BMPs) would be used to minimize impacts from construction/reconstruction due to erosion and sedimentation. This includes minimizing removal of trees and other vegetation, rehabilitating sites after construction or rehabilitation, and following BMPs to reduce or eliminate impacts from construction itself.
- Waste materials from the Black Canyon bridge and the tributary to Black Canyon bridge would be hauled away to a site outside of the GNF, north on NFSR 150.
- Chiricahua leopard frogs (CLF) are known to occupy habitat in Beaver Creek, approximately two miles downstream from the Indian Creek bridge site. If water is running while Indian Creek Bridge is under construction, surveys would be conducted to determine if CLF have dispersed into the area prior to any further construction. If CLF are found, one or both of the following would be implemented:
  - Hauling would not be permitted while the creek is flowing; or
  - Install temporary culverts with wing fencing to funnel migrating CLF through the culverts.
- CLF have also been known to occupy Black Canyon in the past. Surveys would be needed to determine if CLF are occupying the site prior to construction. If found, reinitiation of consultation with United States Fish and Wildlife Service (USFWS) would occur prior to construction activities.

- Gila Trout are known to occupy Black Canyon. Prior to any construction on Black Canyon bridge site, block nets would be put in place outside of construction zone upstream of work site. Gila trout would be removed with electroshocking equipment from the section below block nets and released upstream of block nets.
- Riparian or wetland habitat that is disturbed during reconstruction or rehabilitation would be restored to pre-construction conditions. This may include seeding and planting.
- NM Environment Department Clean Water Act (CWA) 401/404 permits are in place and all requirements would be followed.
    - Note: CWA 401/404 permits stipulate measures to be taken to ensure that appropriate erosion control measures are taken, materials and chemicals are handled appropriately, and provide other provisions to ensure both water quality and habitat for aquatic species is protected.
- Section 106 of the NHPA, as amended, would be completed prior to any construction or reconstruction work.
- A memorandum of agreement (MOA) between the Forest Service and the SHPO would be in place prior to a decision.
- The following stipulations would be complied with to mitigate adverse effects to historical bridges in accordance with Section 106 of the NHPA and in agreement with the SHPO. Effects would be described in chapter 3 of this document:
    - Terry Bridge #2 (#5887-150-91) and Terry Canyon Bridge #5 (#5884 -150-97) would be left in place and interpreted. Interpretation will include the history of NFSR 150.
    - One (1) bridge, to be determined, would be dismantled and recorded to see if there is any evidence of military or CCC activities, buried road alignment, or construction techniques. Information gathered through this process would be used in the interpretation of NFSR 150.
    - Several ‘similar’ CCC bridges within the GNF have been reviewed and visited. These are listed within Report 2012-06-010A/New Mexico Cultural Resource Information System (NMCRIS) 125138.
    - Information on the history of the NFSR 150 bridges would be displayed at the Wilderness Ranger District.
    - The CCC bridges along NFSR 150 would be documented through video and photography with interpretive information. This information would be available to the public via the GNF website.
    - The GNF would provide a list of CCC/Work Project Administration (WPA) sites on the GNF.
    - The GNF will contact CCC/WPA groups that might aid in interpretation, grants, and funding preservation activities.
- Terry Bridge #2 (#5887-150-91) and Terry Canyon Bridge #5 (#5884- 150-97) would be included within a maintenance schedule to ensure rock work in the wall abutments would not erode or collapse.

Figure 1. Project location map.



Comparison of Alternatives

This section provides a summary of effects of implementing each alternative. Information in the table is focused on activities and effects where different levels of effects or outputs can be distinguished quantitatively or qualitatively among alternatives.

Table 1. Comparison of Alternatives.

Resource	Alternative 1 – No Action	Alternative 2 – Modified Proposed Action
Transportation	Does not address safety issues. Continued deterioration of bridges over time with costs of maintaining over 50 years anticipated to be $3.1 million. Should the road need to be closed due to safety concerns, there would be a loss of motorized access to private lands, administrative site, and for recreational purposes.	Addresses safety concerns. Maintains motorized access to private lands, administrative site, and for recreational purposes. Costs of building bridges estimated to be $1.34 million with maintenance costs estimated at $103,000 over 50 years.
Cultural Resources	No change - there would be no effect on any cultural resource.	Adverse effects due to loss of historic bridges. Stipulations developed with SHPO require retention of two (2) CCC era constructed bridges (Terry Canyon #2 and #5), detailed recording during dismantling of other bridges, interpretation of retained bridges, and other stipulations to mitigate loss of several CCC era bridges. Forest Plan amendment to allow for this site specific project to proceed with agreed upon stipulations is not significant.
Water Quality	No direct, indirect, or cumulative effects to water quality.	Potential to temporarily affect water quality due to soil erosion, sediment discharge, oil and fuel discharge. Indirectly, there is potential to affect water quality in intermittant and ephemeral stream downstream of the project area(s). BMPs and erosion control plans are designed to minimize these effects. Long term effects are not anticipated.

Resource	Alternative 1 – No Action	Alternative 2 – Modified Proposed Action
Soils	No direct, indirect, or cumulative effects to soils.	Total of 2.03 acres would be affected. Direct effects include ground distrubance at each site. Indirect effects would be increased erosion due to surface runoff. BMPs and erosion control plans would mitigate these effects, with no long term effects anticipated. No cumulative effects are anticipated.
Air Quality	No direct, indirect, or cumulative effects to air quality.	Temporary increase in dust emissions and pollutant emissions from vehicle and equipment exhaust. Impact would be highly localized, and short-term. No long term effects to ambient air quality. No cumulative effects.
Watershed	No direct, indirect, or cumulative effects to the watershed(s).	Short term direct and indirect effects due to working directly in stream channels from erosion and increased runoff. BMPs and erosion control plans are to be implemented to avoid or minimize effects. Long term effects are not anticipated. The overall cumulative effects are expected to maintain the current watershed condition.
Riparian	No direct, indirect, or cumulative effects to riparian resources.	Direct effects to riparian vegetation due to ground disturbance at construction sites. Bridge designs include BMPs and rehabilitation plans to ensure riparian vegetation is not affected long term. No indirect or cumulative effects anticipated.

Resource	Alternative 1 – No Action	Alternative 2 – Modified Proposed Action
Biological Resources	No change –there would be no direct, indirect, or cumulative effects to biological resources.	**Threatened and Endangered Species:** • *Mexican spotted owl* – May Affect, Not Likely to Adversely Affect (MANLA). • *Southwestern willow flycatcher* – MANLA • *Gila trout* – May Affect, Not Likely to Adversely Affect (MANLA). • *Chiracahua leopard frog* – MANLA • *Mexican gray wolf* – Not likely to jeopardize species. **Management Indicator Species (MIS):** • *Beaver* – No effect on population trends. • *Long tail vole* – No effect on population trends. • *Mexican spotted owl* – No effect on population trends. • *Northern goshawk* – No effect on population trends. **Migratory Birds:** Temporary disturbance to areas immediately adjacent to construction sites, no effect on habitats or long term trends.
Recreation Resources	There would be no change in recreation resources or access to them unless bridges become unusable. At that time, motorized access to trailheads and other recreation facilities and opportunities could be limited if NFSR 150 should be closed to motorized traffic.	No change – motorized access to trailheads and other recreation activities and facilities would remain the same.
Socio-economics	No change unless the bridges should become unusable. At that time, access to recreation activities and to private property could become limited if NFSR 150 should be closed to motorized traffic. Costs of maintenance could be as much as $3.1 million over 50 years.	No change to social uses of NFSR 150. Costs of rehabilitation and construction are projected to be $1.34 million, with maintenance costs of $103,000 over a 50 year period.

ENVIRONMENTAL CONSEQUENCES

This section summarizes physical, biological, social, and economic environments of the affected project area and potential changes to those environments due to implementation of the alternatives. It also presents scientific and analytical basis for comparison of alternatives presented in table 1.

Transportation

Affected Environment

The affected environment for transportation is NFSR 150. NFSR 150 is the only GNF road that connects the southern portion of the GNF to the northern end. NFSR 150 begins at NM Highway 35 and ends at the GNF administrative boundary north of Beaverhead Work Center at the junction of NM Highway 59. Approximately 40 miles of this road are within the Wilderness Ranger District and 10 miles are within the Black Range Ranger District. The road receives low to moderate traffic by a wide variety of users including general recreationists, hunters, cyclists, private land owners, industry, and Forest Service administration including fire suppression personnel and equipment. NFSR 150 provides the only access to Meown administrative site, Rocky Canyon Campground, Upper and Lower Black Canyon Camp Ground, and several wilderness trailheads.

NFSR 150 is a maintenance level 3 road; open and maintained for travel by prudent drivers in standard passenger cars. User comfort and convenience on level 3 roads is not considered a priority. Level 3 roads are typically low speed with single lane turnouts and spot surfacing. Some level 3 roads may be fully surfaced with either native or processed material. Most level 3 roads have low to moderate traffic volume and typically connect to arterial and collector roads. A combination of dips and culverts provide drainage. *(Guidelines for Road Maintenance Levels, Forest Service Manual* (FSM) 7700 Transportation Management, 0577 1205-SDTDC, December 2005).

In 2009, the GNF received funding for rehabilitation and maintenance of NFSR 150 as part of the American Recovery and Reinvestment Act (ARRA). Objectives of this project were to improve road conditions and watershed function along the reaches of NFSR 150. The work primarily consisted of culvert installation and replacement along with application of roadway surfacing. The project funds weren't sufficient to complete all work associated with the road and its adjoining bridges. Thus, bridge work was not included in the final decision. The GNF completed road work and utilized a portion of ARRA funds to develop designs for three bridges on NFSR 150: Indian Creek, Black Canyon, and Black Canyon tributary bridges. Five other designs were also completed through other funding sources to replace smaller bridges at Terry Canyon. The objective of the designs was to address deficiencies identified during previous inspections. The bridges on NFSR 150 have been in use since the 1930s and have deteriorated over the years due to their age and inadequate funding for maintenance. Long-term structures typically have a service life of 50 years (FSM 7709.56b.7 Structural Design Handbook pg 13). The project would improve public safety related to the eight (8) structures by rectifying deficiencies identified during inspections from past years. Two (2) structures in Terry Canyon (Terry Canyon #4 and Terry Canyon #5) and the bridge at East Indian Creek are structurally deficient (i.e., the structure's decks are in poor or serious condition). The other five (5) structures have condition ratings that are less than satisfactory. The five (5) bridges that currently require posting to restrict truck loads crossing each structure are shown in table 2.

Table 2: Bridge Weight Restrictions

Bridge	Type 3 Truck Posted Load (Tons)	Type 3S2 Posted Load (Tons)	Type 3-3 Posted Load (Tons)
Terry Canyon #1	22	35	43
Terry Canyon #3	20	32	39
Terry Canyon #4	17	28	34
Terry Canyon #5	23	36	45
East Indian Creek	22	33	43

Note: American Association of State Highway Transportation Officials (AASHTO) Legal Loads are Type 3 – 25 Tons, Type 3S2 – 36 Tons, and Type 3-3 – 40 Tons. A Type 3 truck is a short truck with one single axle and one set of tandem axles. A Type 3S2 truck is a semi-truck with one single axle and two sets of tandem axles on each end of a trailer. A Type 3-3 truck is a two trailer truck.

Once built, the new structures would accommodate today's greater truck load capacity. Maintaining access routes through the GNF that meet today's structural standards and functional demands while utilizing up-to-date technology and construction is a necessary part of public safety.

Six (6) of the eight (8) designs utilize existing road alignment with only minor changes to improve horizontal and vertical alignments. The second and fifth bridge in Terry Canyon, Terry Canyon #2 and Terry Canyon #5, would be bypassed with a short realignment (approximately 400 feet and 500 feet, respectively) of NFSR 150 and new pipe arch structures would be installed downstream of the existing bridges. The two bridges, Terry Canyon #2 and Terry Canyon #5, would remain intact for historical interpretation. Other 'like" bridges built by the CCCs were reviewed and visited by forest archeologists to insure that the GNF would retain other examples of these unique CCC-era engineered projects.

ENGINEERING BRIDGE DESIGN:

The design for replacement of six (6) bridges on NFSR 150 was determined based on the following:

- Black Canyon Tributary Bridge would be replaced based on field observations and past inspection results as described throughout this analysis. The upstream end of the bridge has been impacted by stream channel scour. The bridge superstructure has delaminated concrete, which impacted its condition. The alignment of the bridge to the channel needs to be adjusted.

- East Indian Creek Bridge would be replaced based on field observations and past inspection results as described throughout this analysis. The existing bridge abutments are not aligned with the stream channel and are subject to scour during higher flows. The bridge superstructure has delaminated concrete, which has impacted its condition.
- Pre-stressed concrete slabs were selected to minimize impacts from debris flows. Removing curbs and sloping the deck transversely would improve deck drainage, enhancing the bridge life. The transverse post tensioning would improve load transfer between slabs and prevent longitudinal cracks on the keyway between slabs. The pre-stressed concrete slabs are constructed of higher strength concrete to improve durability of the structure. Epoxy coated rebar and air entrainment concrete admixtures would also be used to enhance structure life.
- Riprap was designed in accordance with U. S. Corps of Engineer standards to prevent stream channel scour and protect bridge foundations long term.
- Riprap was designed based on a flow velocity for 100 year flood flow with 50 percent debris blockage. Debris flows are a primary concern for Forest Service bridges.
- Slab lengths were designed based on hydraulic span needs and access road geometry.
- Pipe arches were selected as replacement structures in Terry Canyon due to minimal hydraulic needs and low installation, operation, and maintenance costs.

Rehabilitation of Black Canyon bridge was selected based on past inspection results and experience relative to the bridge rails.

- The bridge deck would be repaired with a new concrete topping. The curbs would be removed and the deck crowned to improve deck drainage. Ponding water on the deck is one cause for delamination. Top of deck mounted rails are stronger than side mounted rails. Riprap was designed in accordance with U.S. Corps of Engineer standards to prevent stream channel scour and protect bridge foundations long term.
- The wing walls near abutment 2 are failing; separated from the abutment walls.

Other items:

- Penetrating water repellent was specified to make concrete more resistant to water which is a cause of delamination.
- The bridge types at East Indian Creek and Black Canyon tributary are not unique. This slab bridge type is common throughout the Southwestern Region of the Forest Service. Similar bridges were replaced on the Cibola National Forest through a Forest Highway Project with Central Federal Lands Highway Division (CFLHD).
- Construction detours were designed to maintain traffic during construction/rehabilitation of the three larger structures at East Indian Creek, Black Canyon, and Black Canyon tributary. Low water fords were selected to keep construction costs as low as possible. East Indian Creek Bridge and Black Canyon tributary bridge incorporated a geotextile fabric to mitigate impacts of fill over wetland vegetation. Black Canyon bridge detour culverts were designed to pass the seasonal high-water or 2 year flood flow. The five (5) designs for replacement pipe arches at Terry Canyon do not include construction detours. The installation of the five (5) pipe arches should go much quicker than construction on the three (3) bridges mentioned above. NFSR 150 would be closed to traffic during installation of the five (5) pipe arches.
- Approach rails were added based on current agency requirements that bridge rails require approach rails for safety.

- Paved approaches were added to help alleviate the accumulation of gravel and debris onto the bridge decks. By doing so, maintenance costs are reduced and the life of the concrete deck is extended.

Construction documents addressed resource issues at each site per specialist input.

EFFECTS

Table 3: Effects by Issue

Issue	Alternative 1 - No Action	Alternative 2 -Modified Proposed Action
Re-routing NFSR 150 during construction on Black Canyon, Tributary to Black Canyon and Indian Creek bridges could result in resource degradation due to inadequate rehabilitation and could lead to the development of illegal OHV routes through them.	No diversions would occur as no construction would be taking place and therefore there would be no effect.	Bypasses would occur in order to accommodate traffic for local users including private land owners. There would be an anticipated adverse effect to private land owners as well as GNF visitors if the bypasses at Black Canyon, Black Canyon tributary and Indian Creek sites were not implemented.

DIRECT AND INDIRECT EFFECTS

Alternative 1 – No Action: This alternative would not address current maintenance and safety issues. The eight (8) structures would continue to deteriorate, which would be reflected in future inspection reports and load restrictions. Deferred maintenance of all the structures would increase with time. The continued deterioration of the bridges will result in more restrictive traffic load restrictions and ultimately a road closure due to a bridge's inability to provide service. Loss of access would impact the Meown administrative site, Rocky Canyon Campground, Upper and Lower Black Canyon Campgrounds, private land owners and several wilderness trailheads. A more in-depth inspection process would be required to assess their current amount of deterioration and predict any remaining structure life. Continued in-depth inspections would be required over several inspection cycles to extrapolate the remaining bridge life. Factors that would affect the remaining structural lives of the bridges are climatic conditions, further material deterioration, and future truck traffic loading relative to the restricted capacities of each bridge.

Alternative 2 – Modified Proposed Action: This alternative would address current maintenance and safety needs. Designs have incorporated temporary bypasses near each of the three larger construction sites to maintain traffic through construction. All bypasses are designed for passenger vehicle use and signed per the Manual on Uniform Traffic Control Devices (MUTCD) standards. The Black Canyon bridge traffic control bypass would maintain stream flows with a vented ford. A vented ford is a crossing where the road grade is a few feet above

the stream channel bottom and all of the water passes through the structure during period of low flow. During floods most of the flow overtops the structure. The openings through the structure may be corrugated metal pipe, concrete pipe, or concrete box culverts. All wetland areas would be protected with a layer of geotextile to separate the vegetation from the detour road fill. (Bridge Designs – Project Record) All temporary bypass areas would be reclaimed similar to their original condition. Construction specifications and drawings associated with Alternative 2 – Modified Proposed Action has incorporated provisions to mitigate wildlife and aquatic species impacts. All imported seed and mulch would be certified weed free to prevent spread of noxious weeds. All equipment would be cleaned and inspected to prevent importing noxious weeds and spills or leaks of equipment fluids in water influence areas. Black Canyon Bridge and East Indian Creek Bridge replacements would be similar in appearance to existing slab bridges with wall abutments. All structures have been evaluated hydraulically to pass a 100 year design flood and resist stream channel scour even if their openings are partially blocked. The cast-in-place concrete would be air entrained and coated with a penetrating water repellent to resist freeze thaw damage. Epoxy coated rebar is used to the greatest extent possible to resist corrosion of the reinforcing bars which was a cause for the delamination of the existing structures. Pre-stressed and post tensioned concrete would be used for the superstructures at Black Canyon tributary and East Indian Creek to resist cracking and other deterioration. Black Canyon bridge rehabilitation would maintain the current two continuous span slab bridge appearance. Rehabilitation would address stream channel scour issues with designed countermeasures. Rehabilitation would replace failing wing walls, delaminated slab concrete, and substandard rails. All structures with railings would have approach railings with appropriate end treatment and bridge rail transitions. Terry Canyon bridges would be replaced with pipe arches since bridges are not warranted due to minimal hydraulic needs at these locations. Pipe arches would not require biannual bridge inspections per Federal Highway Administration and agency policies which would save the GNF road maintenance funding for other needs. The pipe arch sites would accommodate sufficient cover over culverts, maintaining structural capacity for highway loadings. Pipe arches would not require railings or signage, due to their size, improving opportunity to successfully compete for construction funds and reducing impacts to the GNF limited road maintenance budget. The GNF road maintenance budget has decreased approximately 40 percent in the last 15 years. The road maintenance budget is used to maintain approximately 4,600 miles of open GNF system roads including all bridges, culverts, signs, and cattle guards.

Table 4: Alternative Comparison

Comparison Criteria Description	Alternative 1 – No Action	Alternative 2 – Modified Proposed action
Improving motorists safety	Does not meet GNF Plan goal to improve safety	Meets GNF Plan goal to improve safety
Construction Costs	NA	$1,344,230
Possible total maintenance costs over a 50 year structural life	$3,100,000	$103,000

Alternative two addresses all hydraulic, structural, safety and continuous access requirements.

CUMULATIVE EFFECTS

Alternative 1 – No Action

There would be increased deferred maintenance overall for the GNF. There would also be increased maintenance costs to the GNF. When combined with the closure of many routes in the GNF Travel Management Plan, there would be less access to the Forest as a whole, and this area specifically, should the bridges become impassible.

Alternative 2 – Modified Proposed Action

The proposed design addresses all hydraulic, structural, safety, and continuous access requirements. When combined with the maintenance work completed on NFSR 150 in 2010, vehicular travel on NFSR would be safer and costs of maintaining the route would be reduced.

The new/rehabilitated structures would address approximately $600,000 of current deferred maintenance work. The five pipe arches at Terry Canyon would be reclassified as culverts and be exempt from biannual inspections creating a savings of $6,000 every 2 years. New railing systems would be installed where required, improving public safety. Travel would be unrestricted for highway legal loadings.

Cultural Resources

Affected Environment

The GNF proposes to replace, construct, or rehabilitate eight (8) historic Civilian Conservation Corps (CCC) era existing bridges along NFSR 150. The purpose of this project is to improve safety by replacing three (3) bridges on NFSR 150 with pipe arch structures in Terry Canyon, reroute and construct two (2) pipe arch structures in the vicinity of the Terry Canyon #2 (#5887-150-91) and Terry Canyon #5 (#5884-150-97) bridges (leaving the existing bridges intact, as a

basis for historical interpretation, but no longer in service), replace two (2) bridges on NFSR 150 with new bridges in East Indian Creek and a tributary to Black Canyon, and rehabilitate one (1) bridge in Black Canyon. The work is needed to ensure the road structures are safe for public travel. The GNF and the SHPO have agreed that the NFSR 150 Bridges Project will cause an 'Adverse Effect' to several historic Civilian Conservation Corps (CCC) bridges, which are part of a linear site AR-03-06-05-618/LA 103484. This project is approximately six (6) acres in size and it is located in Catron and Grant Counties.

The objective of the bridge designs is to address deficiencies identified during previous inspections. The bridges on NFSR 150 have been in use since the 1930's and the wooden decks have been replaced with concrete decks in 1953 and have deteriorated over the years due to their age and lack of funding for maintenance. Long-term structures typically have a service life of 50 years (USDA Forest Service, Structural Design Handbook). The project is needed to improve public safety related to these eight structures by rectifying deficiencies identified during inspections from past years. Two (2) of the structures in Terry Canyon (Terry #4 and Terry #5) and the bridge at East Indian are structurally deficient, i.e., the structures decks are in poor or serious condition. The other five structures have condition ratings that are less than satisfactory. Once built, the new structures would accommodate today's greater truck load capacity. Maintaining access routes through the GNF that meet today's structural standards and functional demands while utilizing up-to-date technology and construction is a necessary part of public safety.

A review of the GNF Cultural Resources site atlas, GIS, project files and the on-line Archaeological Records Management Section (ARMS) database revealed twelve sites and six cultural resource surveys along NFSR 150. However, only three sites occur within the area of potential effect (APE).

Historic site AR-03-06-05-618 is a linear site that includes several historic CCC-era bridges, CCC-era culverts and NFSR 150, which was a military road known as the North Star Road. The NFSR 150 Bridges Project will have an adverse effect to this site. The other two cultural resource sites have not been revisited. However, both cultural resources sites will be revisited and updated during the survey for the proposed re-route, temporary route bypasses and staging areas.

For the GNF, a cultural resource site is defined as "a locus of purposeful human activity which has resulted in a deposit of cultural material beyond one or a few accidentally lost artifacts." Cultural resources that qualify as sites should exhibit at least one of the following:

1) One or more features;
2) One formal tool if associated with other cultural materials, or more than one formal tool; OR
3) An occurrence of cultural material that contains one of the following:

a. Three or more types of artifacts;
b. Two types of artifacts or materials in a density of at least 10 items per 100 m^2
c. A single type of artifact or material in a density of at least 25 items per 100 m^2

For historic remains, site designations are generally reserved for those at least 50 years old. Boundaries of a cultural resource site include all features, tools, identifiable activity areas and all areas of cultural material exhibiting a density of ten or more cultural items per 100 square meters. These criteria may be

modified, where appropriate, based on a professional archaeologist's judgment. Isolated occurrences (IOs) are loci of human activity that do not meet site criteria and are considered not eligible to the National Register of Historic Places.

Project History

Starting in 1875, C.P. Crawford came up with the concept for a new route known as the North Star Road. The first labor on the "new" road came from citizens in Mimbres and Silver City in early 1875 (Pope and Jaquez 2011:230). Official work on the North Star Road began in 1875 by Capt. Wells, 8th Cavalry and 35 men. In 1876, Captain Wells was replaced by Captain Charles D. Beyer as road supervisor, Company C, 9th Cavalry and 45 enlisted men to complete the road work. The North Star Road/NFSR 150 was completed by 1877; it extended as far as Wall Lake today. The soldiers stayed at Camp Vincent during the construction of North Star Road, located near the junction of Diamond Creek (Pope and Jaquez 2011:230-231). The U.S. Military was trying to establish a better military route for travel instead of relying on the Cooke's Canyon or Jornada del Muerto routes. By the mid-1930s the CCCs was enhancing the trail/route to make a suitable road for civilian use. They followed the military road since it was already established and started building a better infrastructure of bridges and culvert drainages along the road for both wagon and vehicular traffic. By 1936, the Bureau of Public Roads noted the existence of the road and the GNF has used and maintained NFSR 150 to present.

Starting in the 1970s through 1986 the bridges along NFSR 150 were periodically inspected for safety by the GNF Engineers. In 1987, all the bridges and culverts were avoided for routine road maintenance, but the initial report was never submitted and/or processed until 1993 (Report #1987-06-99). The seven CCC-era bridges and eight culverts were assigned the same site number AR-03-06-05-618/LA 103484 because they are an interconnected CCC-era engineered project (FS Reports 1987-06-099, 1996-06-033 & 1996-06-033A) and were determined eligible under criteria "a" and "d". The culverts were the only features documented to scale, and the bridges were given identification numbers and photo'd, but were never fully documented. The seven bridges identified in this report are 150-90 (Terry Canyon Bridge 1- #5888); 150-91 (Terry Canyon Bridge 2 - #5887); 150-92 (Terry Canyon Bridge 3 - #5886); 150-94 (Terry Canyon Bridge 4 - #5885); 150-97 (Terry Canyon Bridge 5 - #5884); 150-216 (Black Canyon Tributary Bridge) and 150-218 (Black Canyon Bridge -#5882). Older site forms mention that wooden decks on the bridges were replaced in the 1950s. Regional bridge plans from approximately 1958 seem to confirm this and promote the idea that the decks are built into the wing walls. Also, in Identifying and Preserving Historic Bridges, it is stated that the Terry Canyon Bridges were replaced in 1953 (Eriksson, McLeod and Gard 2000:41). Presently NFSR 150 is maintained as a Maintenance Level 3 Road by the Forest Service. It is a seasonal road for high clearance vehicles and serves as a public and administrative corridor between the Aldo Leopold and the Gila Wilderness.

GNF History

The GNF has a rich archaeological and cultural history. The Gila NF includes lands that have been used and occupied by humans throughout the prehistoric era, beginning with the Paleoindian Period (<9,500 B.C. -5,500 B.C) (ARMS 2009). Paleoindian peoples were highly

mobile hunters and gatherers who hunted megafauna (now-extinct large mammals such as mammoths) (Cordell 1997). The Archaic Period (5,500 B.C. -A.D. 200) follows the Paleoindian Period (ARMS 2009). Archaic peoples were also mobile and relied on hunting and gathering. However, this is the period in which people began to rely more on plants, and horticulture began (Cordell 1997). The Mogollon Culture (A.D. 200-A.D. 1400) spanned about 1,200 years during which people relied more on horticulture, followed by predominance of agriculture. Pottery and more permanent dwellings (pithouses, A.D. 200-A.D. 1000, and then pueblos, A.D 1000-A.D.1400) were hallmarks of the period (ARMS 2009; Cordell 1997; Diehl and LeBlanc 2001; Martin 1979). Phases of the Mogollon Culture are primarily defined by pottery and dwelling types (see Anyon and LeBlanc 1984; LeBlanc 1980a; LeBlanc 1980b; Lekson 1992; Berman 1989; Martin and Rinaldo 1950). The Mogollon people are the most widely studied on the Gila NF. Most prehistoric sites found on the Gila NF are Mogollon, including habitation remains in the form of pithouses or masonry dwellings; roasting pits; lithic (stone) and pottery artifact scatters; some agricultural features like check dams; cultural landscapes; etc.

The historic period began in New Mexico with Spanish contact in 1539. On the Gila NF and elsewhere in New Mexico, the historic period is divided by the rise and fall of political control by the Spanish (A.D. 1539-1821), Mexican (A.D. 1821-1848), and American (A.D. 1848-present) periods (Opler 1983). From the Spanish Period through the first several decades of the American Period, the goal of each political entity was to secure safe passage through this area and/or provide access to its resources for mining, ranching and grazing. During the American Period, overlapping interests of Apache peoples and settlers of the area led to conflict between the two groups. Eventually, the U.S. Government turned to the removal of Apache peoples to reservations. Most resisted as long as possible, but eventually most Apache Tribal people were removed to several reservations within and outside New Mexico (Opler 1983).

Contemporary and historic land uses include mining, ranching, grazing, logging, frontier settlement, frontier military activities, and government land management. Evidence of these activities persists in the archaeological record today in the form of the remains of forts, cabins, corrals, windmills, abandoned mines, military reservations, water wells, irrigation ditches, check dams, bridges, sawmills, homesteads, historic roads and trails, and Forest Service administrative sites. Other site types include rancherias, camps, battle sites (Indian Wars in particular), and trash dumps. Since the establishment of the Gila NF in 1905, ranger stations, administrative sites, lookouts, and recreational areas have been built as well. Finally, Civilian Conservation Corps (CCC) associated camps and infrastructure like roads, bridges and campgrounds are found on the Gila NF.

Today, land use in the Gila NF continues to follow the multiple use Mission of the Forest Service (FS), including grazing, mining, ranching, and vegetation and fuels management. Native American tribes also continue to intermittently use the Gila NF for traditional activities including plant gathering and visits to special places.

Effects Analysis

Direct, Indirect, and Cumulative Effects:

Alternative 1-No Action

The bridges would remain in place and continue to degrade naturally.

Alternative 2- Modified Proposed Action

The project calls for the removal, construction and rehabilitation of bridges, the use of staging areas, and both temporary bypasses associated with bridge work and two permanent bypasses around Terry Canyon Bridge #2 and Terry Canyon Bridge #5. This work will be done with heavy equipment.

The removal, construction, and rehabilitation of the bridges will cause direct effects to several of the historic bridges along NFSR 150. Other sites could be damaged by direct contact with heavy equipment in the construction of the bridges, bypasses or in staging areas. Sites located near the bypasses could be affected by erosion and/or direct contact with vehicles. In addition, surface collecting and/or looting could occur at the cultural resource sites.

Under Alternative 2, the following bridges are proposed to be removed due to unsafe conditions Terry Canyon Bridge #1; Terry Canyon Bridge #3, and Terry Canyon Bridge #4 and would be replaced with pipe arch structures; Black Canyon Tributary Bridge and Indian Creek Bridge would be replaced with bridges; Black Canyon Bridge would be rehabilitated with a new concrete surface and two new retaining wing walls. In addition to these bridges, a fourth and fifth pipe arch structure would be constructed in Terry Canyon to replace Terry Canyon Bridge #2 and Terry Canyon Bridge #5, which will remain in place. These bridges are historic CCC bridges that constitute a linear site. This site includes historic CCC culverts along NFSR 150 and Forest Road 150 itself, which was a military road known as North Star Road. This site is Eligible to the National Register of Historic Places.

The bridge replacements and rehabilitation are not replacements ‘in kind’ under current Secretary of the Interior’s Standards and Guidelines for Archeology and Historic Preservation. Replacements ‘in kind’ refer to the replacement of like for like structural or esthetic elements. Under 36CFR800.5, an adverse effect “is found when an undertaking may alter, directly or indirectly, any of the characteristics of a historic property that qualify the property for inclusion in the National Register in a manner that would diminish the integrity of the property’s location, design, setting, materials, workmanship, feeling, or association.” An example of such adverse effects on historic properties is listed under 36CFR800.5 (2ii) “…alteration of a property including, restoration, rehabilitation, repair, maintenance, stabilization, hazardous material remediation, and provision of handicapped access, that is not consistent with the Secretary’s standards for the treatment of historic properties (36 CFR 68) and applicable guidelines.”

Therefore, the project will have an ‘Adverse Effect’ on the historic bridges along NFSR 150.

Pursuant to 36 CFR 800.6, the GNF met with the SHPO on November 8, 2012, to discuss mitigations and to create a draft Memorandum of Agreement (MOA). At this meeting several mitigation points were discussed:

- Terry Canyon Bridge #2 (#5887-150-91) and Terry Canyon Bridge #5 (#5884-150-97); will be left in place and interpreted. Interpretation will include the history of NFSR 150.
- One bridge, to be determined, will be dismantled and recorded to see if there is any evidence of military or CCC activities, buried road alignment, or construction techniques. Information gathered through this process will be used in the interpretation of NFSR 150.
- A list of 'like' CCC bridges that are within the GNF has been reviewed and visited. These are listed within Report 2012-06-010A/NMCRIS 125138.
- Information on the history of the NFSR 150 bridges will be displayed and/or brochures provided at the Wilderness Ranger District.
- The CCC bridges along NFSR 150 will be documented through video and photography with interpretive information. This information will be available to the public via the GNF website.
- The GNF will provide a list of CCC/WPA sites on the forest.
- The GNF will contact CCC/WPA groups that might aid in interpretation, grants, and funding preservation activities.
- Terry Canyon Bridge #2 (#5887-150-91) and Terry Canyon Bridge #5 (5884-150-97) will be included within a maintenance schedule to ensure the rock work in the wall abutments will not erode or collapse.

These mitigations will be introduced within this MOA and additional Section 106 reporting will continue as the project moves forward. Fieldwork and consultation for the proposed NFSR 150 re-route around Terry Canyon Bridge #2, Terry Bridge #5 and any proposed temporary route bypass or staging will occur in the future before the project begins. It is anticipated that all cultural resources discovered or revisited during that process will be avoided.

This alternative would also amend the Forest Plan to allow for an 'adverse effect' in this instance. The amendment would apply only to this project. Considering this, and the mitigations and stipulations proposed for this project, the amendment is not significant.

Documentation of the Native American Consultation Process

Native Americans were informed about GNF Wilderness Ranger District activities through the quarterly mailings for our Schedule of Proposed Actions (SOPA) calendar, and follow-up letters to each tribe describing the proposed action and existing conditions. In addition, each tribe was contacted by phone in November of 2012. The tribes included in the mailings and phone calls are: Fort Sill Apache Tribe, Pueblo of Zuni, Hopi Tribe, Pueblo of Acoma, Pueblo of Laguna, Mescalero Apache Tribe, San Carlos Apache Tribe, White Mountain Apache Tribe, Ysleta Del Sur Pueblo, the Navajo Nation, Ramah Navajo, and the Alamo Navajo. There were no replies from the tribes except for phone calls and emails from the Hopi Tribe, White Mountain Apache Tribe, Fort Sill Apache Tribe and the Alamo Navajo that either wanted letters sent to additional tribal members, deferring to the SHPO or thanking the Forest Service for including them in the process. To date, no tribe has expressed concern about the NFSR 150 Project.

Advisory Council on Historic Preservation Consultation Process

In accordance with 36 CFR 800.6 (a) (1) and Section VII.B of the Region 3 First Amended Programmatic Agreement, the GNF notified the Advisory Council on Historic Preservation of the NFSR 150 Bridges Project's 'Adverse Effect' on site AR-03-06-05-618/LA 103484 and afforded them the opportunity to participate in the resolution of the adverse effect. To date, we have had no reply by phone or mail by the ACHP.

Watershed Resources

Water Quality

Permitting Requirements

Construction plans that propose any direct alteration or indirect impact to wetlands or watercourses within the project area would require permits from the appropriate regulatory agencies. The following section describes permits that may be required or have been obtained should Alternative 2 be implemented.

A National Pollutant Discharge Elimination System (NPDES) permit for storm water discharges during construction would not be required for three (3) Terry Canyon Bridge Sites #1, #3, and #4 since the amount of disturbance shown in the construction design is collectively less than 1 acre. If the rerouting and construction of two (2) bridges in the vicinity of Terry Canyon Bridge #2 and #5 results in disturbing more than 1 acre of land during construction, a Storm Water Pollution Prevention Plan (SWPPP) would be required in accordance with Environmental Protection Agency (EPA) NPDES guidelines.

The Black Canyon Tributary Bridge replacement would be covered under Nationwide Permit #14 for Linear Transportation Crossings which has already been authorized and permitted by the US Army Corps of Engineers (USACE) under Action No. SPA-2009-00607-ELP (Project Record). The USACE Albuquerque Office has determined that an additional Section 404 permit would not be required. A Nationwide Permit #14 Pre-Construction Notification (PCN) was submitted for the USACE project file and to satisfy the New Mexico Environment Department's (NMED) requirements for individual water quality certification.

The Black Canyon Bridge rehabilitation project was been authorized and permitted by the U.S. Army Corps of Engineers (USACE) under Action No. SPA-2009-00607-ELP on June 11, 2010, and subsequently reauthorized on August 2, 2011. The USACE Albuquerque Office has determined that an additional 404 permit would not be required. A Nationwide Permit #3 PCN was submitted for the USACE project file and to satisfy the NMED requirement for individual water quality certification. Construction would require that temporary and permanent erosion and sedimentation control measures be implemented in accordance with EPA regulations for SWPPP. An NPDES permit for storm water discharges from a construction site in excess of one (1) acre would not be required due to the overall size of the disturbance being approximately 0.31 acres.

The East Indian Creek Bridge replacement project was been authorized and permitted by the USACE under Action No. SPA-2009-00607-ELP on June 11, 2010 and reauthorized on August 2, 2011. The USACE Albuquerque Office has determined that an additional 404 permit would not be required. A Nationwide Permit #14 Pre-Construction Notice for Linear Transportation Projects was submitted for the USACE project file and to satisfy the New Mexico Environment Department's requirements for individual water quality certification.

Wetlands in the project area are regulated at the federal level by the USACE and the EPA. Additionally, this project is subject to Nationwide General Permits issued under Section 404(e) of the Clean Water Act (CWA) by the USACE that authorize activities that have minimal individual and cumulative adverse environmental effects. The USACE approved this project on June 11, 2010 and subsequently reviewed Gila National Forest's request for re-verification of the authorization and in a letter dated August 2, 2011, determined that the project remains authorized. These approval letters are located in the Project Record.

A wetlands delineation report was prepared in 2011 using methods in accordance with the 1987 USACE *Wetlands Delineation Manual*. The East Indian Creek Bridge PCN details erosion control mitigations (Project Record).

Section 303(d) of the CWA stipulates that water bodies where water quality standards are not met are to be identified and prioritized. For waters listed under Section 303(d), states and tribes establish Total Maximum Daily Load (TMDL) for each pollutant of concern in order to achieve water quality standards. More information on TMDL is available from the NMED Surface Water Quality Bureau (2010).

Affected Environment

The Black Canyon tributary is an ephemeral stream and has no wetland associated with it. When water is present within this channel, it appears to be contained within the banks. This stream appears to only flow during high precipitation events. The drainage area for the Black Canyon Tributary is approximately 0.71 m^2 (~ 1.84 km^2).

The temporary gravel detour for the bridge would be 14 feet (~ 4.27 m) wide with geotextile fabric laid beneath gravel located on downstream western side of bridge. Temporary impacted area for Black Canyon Tributary Bridge would include 807 ft^2 (~ 0.02 acres) for placement and grading of temporary bypass (282 ft^2) and demolition of existing abutment (525ft^2). Temporary impacts would be limited to the period of time during construction/rehabilitation. Permanent impacted areas would include a total of 865 ft^2 (~0.02 acres) for placement of rip rap (710 ft^2) and new abutment (155 ft^2).

Black Canyon is a perennial stream with an associated wetland adjacent to the channel. The affected area for impact analysis at Black Canyon would include 591 ft^2 (0.01 acres) for placement and grading of the temporary bypass (315 ft^2), placement of additional pipe for the bypass (118 ft^2), and temporary rip rap that would be placed at end of the pipe to protect against a wash out (247 ft^2). Temporary impacts would be limited to the period of time during construction/rehabilitation. The bridge crossing Black Canyon would remain in place and the deck would be rehabbed. The area affected would be where rip rap would be placed at bridge abutments and bridge railings would be upgraded. The rip rap

pad thickness would be 4.0 feet (~ 1.2 m) in all areas except for the edges, where the depth would be increased to 6.0 feet (~ 1.83 m).

A wetland report was prepared in 2011 for Clean Water Act 404 determination.

East Indian Creek is an intermittent stream with an associated floodplain wetland. The affected area for analysis is the bridge crossing at East Indian Creek that would be replaced with a new single span concrete bridge with vertical abutments and would pass the 100-year event with 4.34 feet (~ 1.32 m) of freeboard and the 500-year event with 2.79 feet (~ 0.85 m) of freeboard. Additionally, the affected area for impact analysis at East Indian Creek would include 2,137ft^2 (~ 0.05 acres) for placement and grading of the temporary bypass (1533 ft^2), demolition of abutments (34 ft^2), placement of rip rap at the base of the new abutment (499 ft^2), and placement of new abutment (71ft^2) .

A hydrology report was prepared in 2010 for NFSR 150 by the Forest Service and included a watershed report, discussed regulations that pertain to watershed management, and provided a list of impaired streams on NFSR 150 listed under Section 303(d) of the CWA. The impairment is turbidity related in the project area.

Under CWA, states and tribes are required to restore and maintain the chemical, physical, and biological integrity of the Nation's water. Improving water quality by reducing contaminants in surface waters is a central focus of the CWA. The State of NM through the New Mexico Water Quality Control Commission (NMWQCC) and NMED establishes and enforces water quality standards needed to protect designated uses. Designated uses refer to what water is used for (usually defined for a specific water location), such as livestock watering. Most of the drainages are ephemeral, but East Indian Creek is intermittent and Black Canyon perennial. The designation for ephemeral, intermittent, and perennial streams include livestock watering, wildlife habitat, limited aquatic life, and secondary contact (NMWQCC 2011).

Stream reaches that are listed as not meeting standards are listed by the NMWQCC (2011). Impaired reaches are listed in tables 6 and 7. Probable causes and sources of impairment are listed in table 7 (NMED, 2011).

The impaired stream reach in the project area is Black Canyon Creek (East Fork Gila River to headwaters). This stream has the following category: 4A - impaired for one or more designated uses and the TMDL has been completed. The beneficial use not supported is high quality cold water aquatic life. The probable cause is water temperature, and probable sources are habitat, riparian habitat loss, off-road vehicles, rangeland grazing, silviculture, and fire suppression.

Table 6. Summary of Impaired Stream Reaches within Watersheds at Bridge Locations

Bridge Location	6th Level Watershed Number	Identification for Listed Reach	Listed Reach Name	Category	Length (mile)
East Indian Creek	Taylor Creek – Beaver Creek / 150400010403	None	--	--	--
Black Canyon and Tributary (2 Bridges)	Outlet Black Canyon / 150400010704	NM-2503_21	Black Canyon Creek (East Fork Gila River to headwaters)	4/4A	25.21 miles
Terry Canyon (5 Bridges)	Rocky Canyon – Sapillo Creek / 150400010802	None	--	--	--

Source: NMWQCC (2010) – Appendix A

Table 7 Summary of Rationales for Listing of Impaired Streams within the Project

Bridge Location	6th Level Watershed Number	Identification for Listed Reach	Listed Reach Name	Beneficial Use Not Supported	Probable Cause	Probable Sources
East Indian Creek	Taylor Creek – Beaver Creek / 150400010403	None	--	--	--	--
Black Canyon and Tributary (2 Bridges)	Outlet Black Canyon / 150400010704	NM-2503_21	Black Canyon Creek (East Fork Gila River to headwaters)	High quality cold water aquatic life	Water Temperature	Habitat Modification (Other than Hydro-modification), Riparian Habitat Loss, Off-road Vehicles, Rangeland Grazing, Silviculture, Fire Supression
Terry Canyon (5 Bridges)	Rocky Canyon – Sapillo Creek / 150400010802	None	--	--	--	--

Source: NMWQCC (2010) – Appendix A

Natural sediment delivery rates range from 0.01 to 0.004 tons/hectare/year See table 8 in Soils section below.

Effects Analysis

Alternative 1 – No Action.

In Alternative 1 eight (8) bridges would not be replaced, rebuilt, or rehabilitated on NFSR 150. No direct, indirect, or cumulative soil erosion due to construction would cause impacts to wetlands in the

project area or watercourses of the United States. Alternative 1 would not cause direct, indirect, or cumulative changes to water quality.

Alternative 2 – Modified Proposed Action. Direct and Indirect Effects

This project has potential to impact wetlands directly and indirectly in the Black Canyon and East Indian Creek by disturbing the soil and vegetation in the construction and bypass area. Design criteria, including BMPs and other measures described in the bridge designs (Project Record) would restore any wetlands disturbed, resulting in no long term effects to wetlands.

The five (5) culverts proposed in Terry Canyon would be installed with minimal impact to the ephemeral waterways and any disturbance is anticipated to be less than one (1) acre collectively for replacing bridges #1, #3, and #4. There are no impacts to water quality anticipated.

To mitigate damage to water quality in the project areas, temporary and permanent erosion and sedimentation control measures would be implemented in accordance with EPA regulations pertaining to the NPDES.

During construction, Alternative 2 has potential to cause temporary soil erosion and sediment discharge to waters of the United States. Additionally, construction equipment, if not properly maintained, may cause oil and fuel discharge. Alternative 2 has potential to indirectly affect water quality. Temporary and permanent erosion and sedimentation control measures would be implemented in accordance with Environmental Protection Agency (EPA) regulations pertaining to the NPDES to mitigate effects to water quality in the project area.

Potential indirect effects include increased erosion due to surface runoff, increased sediment transportation to primarily intermittent and ephemeral streams, and a potential increase in turbidity levels. Increased ground disturbance associated with installation of eight (8) structures on perennial waterways, intermittent, and ephemeral tributaries, including the Black Canyon and East Indian Creek Bridge, could result cumulatively in an increased potential for exceedances of turbidity and sediment discharge. However, magnitude and extent of this potential would be mitigated by the implementation of Best Management Practices (BMPs). Any increases in turbidity would be expected to be very minimal, and well below thresholds, as BMPs would be implemented and disturbance would occur only for a very short period of time.

Alternative 2 – Modified Proposed Action – Cumulative Effects

Because the effects to water quality are expected to be temporary and limited to the period of construction, no cumulative effects are anticipated.

Municipal Watersheds

No municipal waters are located within the project areas.

Soils

Affected Environment

Terrestrial ecosystems are recognized by the obligatory relationship of soil, climate, and vegetation. Soil and vegetation are each influenced by climate, and soil and vegetation influence each other. In addition to these three main components; time, geology, elevation, and topography also have influence on terrestrial ecosystem development. Gradient analysis is used for initial segmentation of similar soil moisture and temperature regimes from a continuum. The correlation of indicator plants to soil moisture and temperature regimes further refines segmentation. Timing and amount of precipitation information is also collected and used in the segmentation process. The integration of soil categories based on the *11th Edition of Soil Taxonomy* results in individual terrestrial ecosystems (Soil Survey Staff 2010). Soil is mapped to family phase. The result is an alignment of terrestrial ecosystems with a continuum of climax classes. Departures from climax class, or disclimaxes, result in prolonged departures of vegetation from climax condition due to recurrent of sustained disturbances (USFS 1986). The resulting terrestrial ecological units are then used in inventory and monitoring and also for making predictions and interpretations for land-use management (Winthers et. al. 2005).

The terrestrial ecological unit inventory (TEUI), formerly referred to as the terrestrial ecosystem survey (TES) is mapped at a scale of 1:24,000. The objectives, policies, and responsibilities for TEUI are contained in "*Forest Service Manual (FSM) 1940"* (Winthers et. al. 2005). The TEUI is still ongoing and in draft form and is subject to revision without notice. Some of the project areas were within a TES survey done for the Sapillo/Upper Mimbres Ecosystem Project area. Other portions were mapped at a later date or have yet to be mapped and are still in draft form. All of the map unit descriptions and interpretations found in this document came from the "*Terrestrial Ecosystem Survey: Sapillo/Upper Mimbres Ecosystem Areas"* report (USFS 1999). Interpretations were made using guidance found in the "*Terrestrial Ecosystem Survey Handbook*" (USFS 1986) and the "*National Soil Survey Handbook*" (Natural Resources Conservation Service 2012a). Vegetation classes are listed as codes defined in "*The PLANTS Database*" (Natural Resources Conservation Service 2012b).

Detailed descriptions of the lithology and surface materials can be found in the project record.

Effects Analysis

This effects analysis considers the effects to soils in the same watersheds as the Watershed analysis below.

Direct and Indirect Effects

<u>Alternative 1- No Action</u>

No change from present condition beyond that of natural sediment delivery (see table 8). For those bridges where channel morphology is not lining up with existing bridges, flowing water would continue to cut into stream channel bank soils resulting in minor erosion and sediment transport.

<u>Alternative 2 - Modified Proposed Action</u>

The replacement and rehabilitation of existing bridges as well as construction of bypass locations on NFSR 150 are expected to disturb soil in approximately 0.21 acres at six (6) of the (8) eight sites (estimated 150 foot by 60 foot disturbance footprint per site), 0.17 acre at Terry Canyon #2 re-route site, and approximately 0.6 acre at Terry Canyon #5 re-route site, resulting in a total of 2.03 acre total of soil disturbance. All bridges except Black Canyon Bridge would impact Map Unit 84 (see table 8). The Black Canyon Bridge is on Map Unit 50. A total of 2.03 acres would be affected. The erosion hazard is slight on most soils except the second component of Map Unit 84, which has a moderate soil erosion hazard. All soils are stable. Natural sediment delivery rates range from 0.01 to 0.004 tons/hectare/year. Potential sediment delivery rates range from 0.09 to 1.37 tons/hectare/year. Other soil mapping units are located outside of the project areas and would not be affected by the proposed action.

Table 8 Soil Impacts By Bridge

Map Unit / Bridge	Acres of soil Disturbance	Erosion Hazard	Soil Stability	Sediment Delivery Natural	Sediment Delivery Potential
	acres			**tons/hectare/ year**	**tons/hectare/ year**
Map Unit 84, First Component					
Terry Creek Canyon Bridges #1-5 Black Canyon Tributary Bridge East Indian Creek Bridge	1.82	Slight	Stable	0.01	0.9
Map Unit 84, Second Component					
Terry Creek Canyon Bridges #1-5 Black Canyon Tributary Bridge East Indian Creek Bridge	1.82	Moderate	Stable	0.01	1.37
Map Unit 50, First Component					
Black Canyon Bridge	0.21	Slight	Stable	0.004	0.36
Map Unit 50, Second Component					
Black Canyon Bridge	0.21	Slight	Stable	0.004	0.09

Sources: see tables 1, 2, 7, and 8 in the Soils Report in the Project Record.

Direct effects would be ground disturbance associated with bridge replacement and rehabilitation. Grading and placement of rip-rap would occur at bridge sites. Temporary stream crossings for bypasses would consist of a gravel road with underlying geotextile fabric. Construction equipment including backhoes, dozers, dump trucks, front-end loaders, graders, and cranes would be used. BMPs would be would be implemented to minimize water quality effects. The duration would be limited to the period of construction/rehabilitation m due to implementation of BMPs. .

Potential indirect effects include increased erosion due to surface runoff. As discussed previously in "Design Features", BMPs would be incorporated to avoid or minimize potential for increased erosion, runoff, and sediment transport to streams, and potential for turbidity increases. Increases in indirect effects would be expected, but duration of increase would be expected to be limited to the period of construction/rehabilitation with implementation of BMPs.

Direct and indirect effects would be expected due to work in ephemeral (6 streams), intermittent (1 stream), and a perennial stream during the period of construction/rehabilitation. GNF personnel would be on-site during work on these sites to approve wood removal and large boulder selection. However, long-term indirect effects would not be expected due to the short duration of soil disturbance and application of BMPs.

Cumulative Effects

Other projects within the cumulative effects boundary for this project that are considered as present and future projects include the future implementation of the GNF Travel Management planning effort, maintenance activities on the Black Canyon Creek fish barrier, and the NFSR 150 ARRA Restoration Project. The Travel Management project encompasses all portions of the 6^{th} level watersheds within the Forest's administrative boundary. Although a decision has not yet been made, the current proposed alternative includes closing 962 miles of road to motor vehicle use and closing the Forest to motorized cross county travel. While not all of these miles are within the analysis area of this project, the elimination of cross country travel, and reduced road miles would reduce sediment delivery. In addition, The NFSR 150 ARRA Restoration Project improved riparian health through construction of small sediment catchments that reduced quantity of road-related sediment. During the past five (5) years a few CWA Section 319 water quality improvement projects were completed in Black Canyon, and there have been a few forest fires. The overall cumulative effect of the proposed action and other actions is expected to maintain the current soil conditions.

Compliance with Relevant Laws, Regulations, Policies

The no action and modified proposed actions are consistent with management direction, including standard and guidelines in the Forest Plan and its provisions that were developed in accordance with the National Forest Management Act of 1976 (16 USC 1604(i) and 36 CFR 219.10([e]).

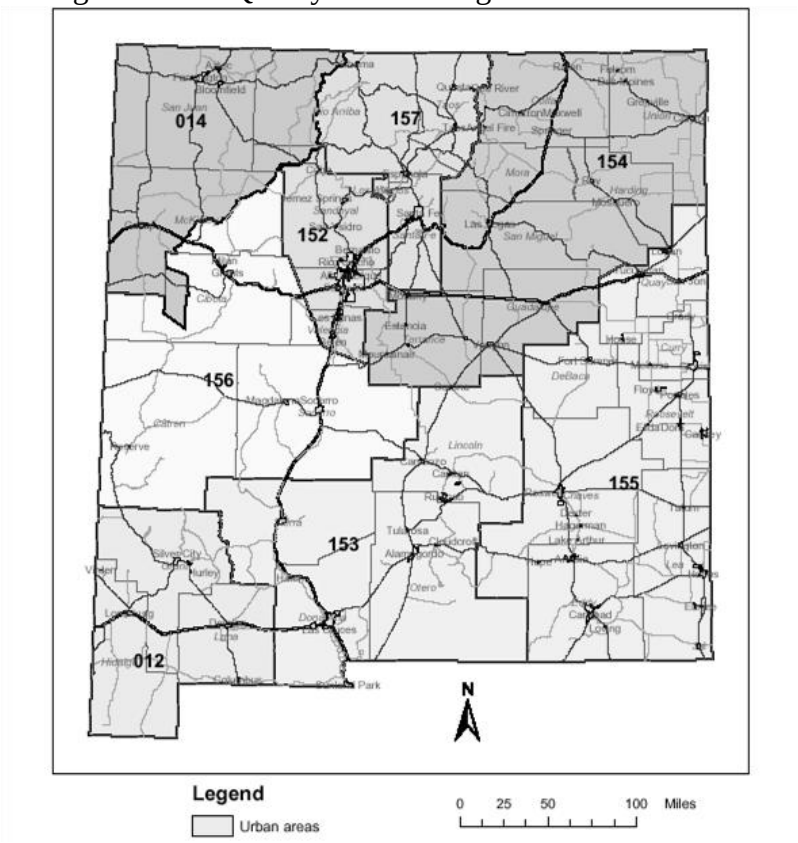
Air Quality

The Clean Air Act (CAA) of 1970, which was last modified in 1990 (Clean Air Act as amended (CAAA)), established the framework for setting nation-wide air quality standards for pollutants. Initially, the EPA developed the National Ambient Air Quality Standards (NAAQS) for six criteria pollutants: Sulfur Dioxide (SO_2), Particulate Matter equal to and less than 10 micrometers in aerodynamic diameter (PM10), Nitrogen Dioxide (NO_2), Carbon Monoxide (CO), Ozone (O_3), and Lead (Pb). These standards established acceptable levels of pollutant concentration in ambient air. In 2006, the EPA promulgated a NAAQS for particulate matter equal to or less than 2.5 micrometer in aerodynamic diameter (PM2.5).

Affected Environment

This project is located in Grant and Catron counties and includes EPA Air Quality Control Regions (AQCR) 012 and 156. The Arizona-New Mexico Southern Border Interstate Air Quality Control Region 012 is located in the southwestern part of NM and covers an area of 10,374 square miles. The counties within the region include Grant, Hidalgo, and Luna. The Southwestern Mountains-Augustine Plains Intrastate Air Quality Control Region 156 covers 20,256 square miles in western NM and includes Catron County, Socorro County, those portions of McKinley County lying east of the Continental Divide, and those portions of Valencia County, excluding Zuni and Ramah Navajo Reservations, lying west of a line described as follows: starting at the point at which the south boundary of Bernalillo County intersects with the section line between sections 1 and 2, Township 7 north, Range west; then southerly on section lines to the Socorro-Valencia County line at sections 11, 12, 13, and 14, Township 5 north, Range 2 west.

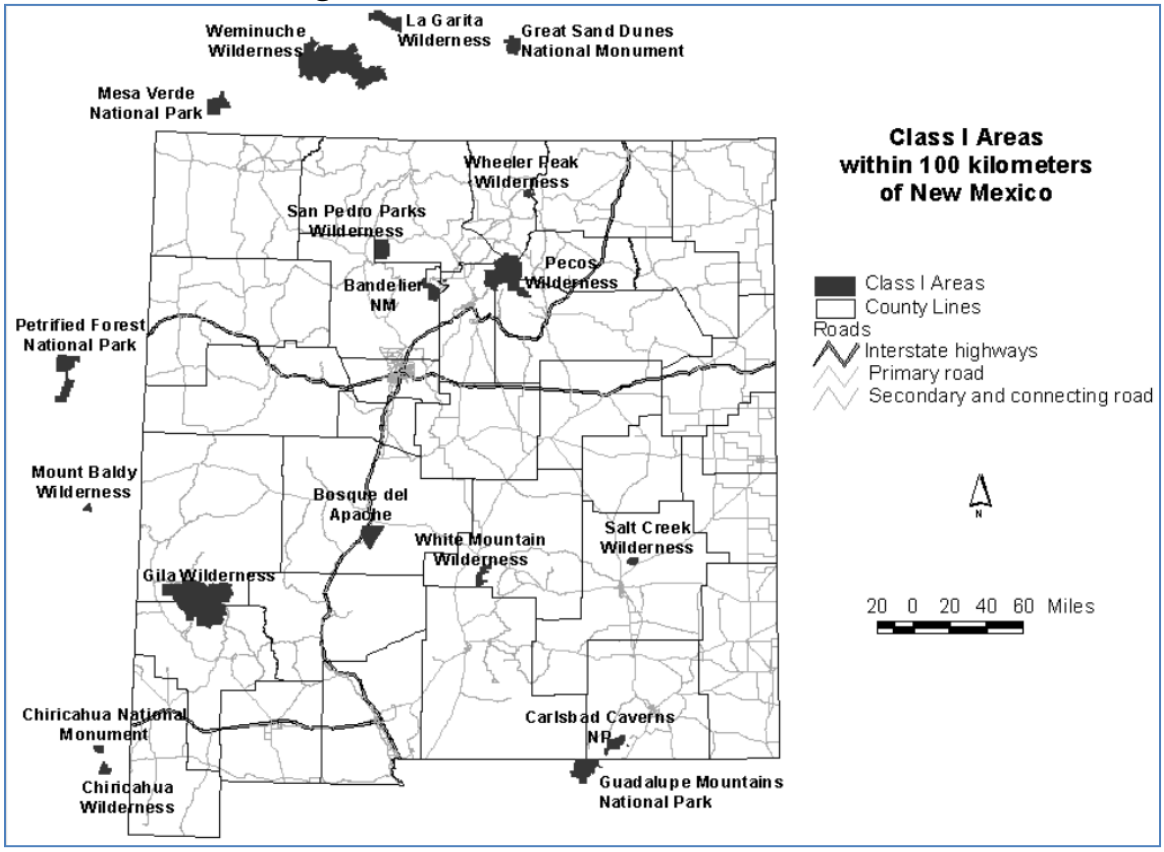
Figure 2 - Air Quality Control Regions in New Mexico



The project area is designated by EPA to be in attainment and in compliance with national and NM air quality standards. EPA designation is based on air quality being monitored in nearby Silver City, NM for pollutants Ozone and PM2.5 and these data were used to demonstrate compliance with the area's air quality standards. The NMED operates two ambient air quality monitoring sites in the area, one in Silver City and another at the former Chino mines smelter in Hurley, NM. Additionally, the Forest Service maintains the Class I Interagency Monitoring of Protected Visual Environments (IMPROVE) air quality monitors located near the Gila

Wilderness (See figure 3). The Gila Wilderness is designated as a Class I air shed and thus subject to more stringent air quality standards. The purpose of the Gila Wilderness monitoring site is to monitor visibility related air pollutants that are associated with regional haze.

Figure 3 - Class I Areas in New Mexico

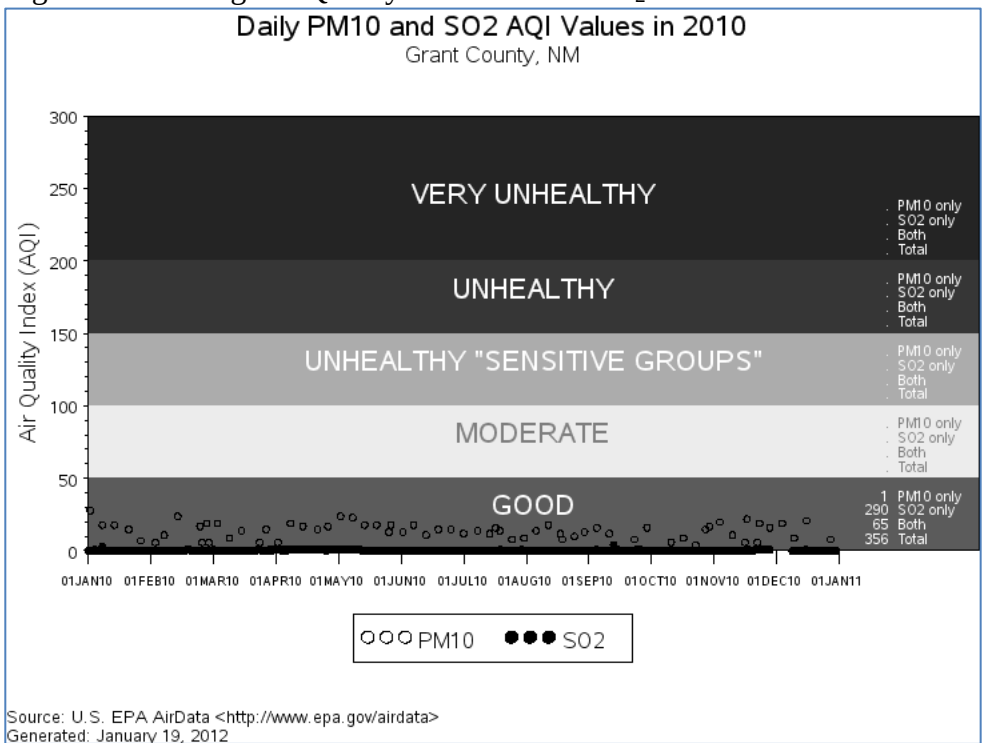


The three (3) ambient air quality monitors listed in table 9 are located within 100 miles from the NM NFSR 150 Bridge Replacement Project.

Table 9 – List of Air Quality Monitors Near Project Area

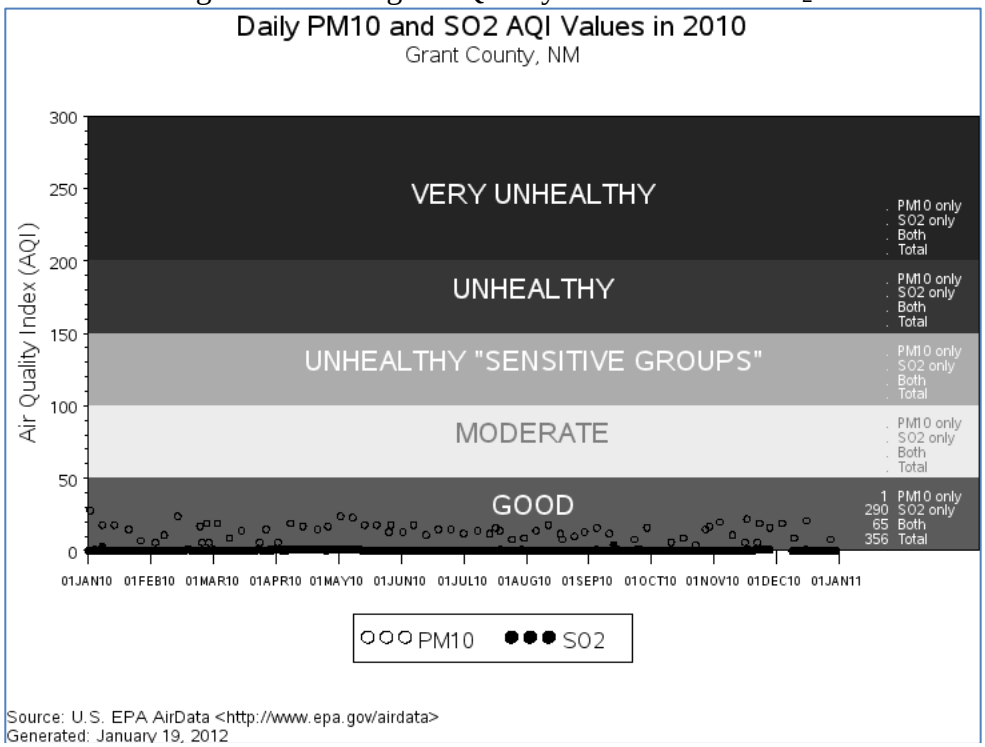
Air Quality Monitor ID	Location	Latitude	Longitude
35-017-1002	On Roof of Western NM University Adult Basic Education Bldg	32.784444	-108.271667
35-017-1003	Alongside Softball Field and Near Chino Copper Smelter	32.691944	-108.124444
35-003-9000	Gila National Forest Improve Site; Gila Wilderness	33.220502	-108.235719

Figure 4 - Existing Air Quality for PM10 and SO_2



Summary data obtained from the EPA for 2010 show results of Grant County ambient air quality monitoring in figures 4 and 5. An air quality index (AQI) value of 100 generally corresponds to national air quality standard for the pollutant; the level EPA has set to protect public health. AQI values below 100 are generally thought of as being satisfactory. When AQI values are above 100, air quality is considered to be unhealthy- first, for certain sensitive groups of people, then, as AQI values rise, for the rest of the population. The AQI information shows that the project areas have good air quality and is in compliance with air quality standards with very good days in 2010.

Figure 5- Existing Air Quality for Ozone and NO_2



Effects Analysis

Air quality effects are discussed because the project area is within a Class I airshed The area of analysis is the Class I airshed.

Direct Effects to Air Quality

Alternative 1 - NoAction

The eight (8) bridges along NFSR 150 would not be replaced, rebuilt, rerouted, or rehabilitated and construction related short-term dust emissions would not exist. Additionally, construction equipment would not operate and therefore, pollutants such as CO, SO_2, NO_2, and Volatile Organic Compounds (VOC) formed by fuel combustion by equipment during construction would not be generated. Alternative 1 alternative would have no change to air quality.

Alternative 2 - Modified Proposed Action

This project would cause short-term temporary dust emissions and pollutant emissions from vehicle and equipment exhaust during construction. The project air quality impact would be minor, highly localized, and short-term. As soon as construction is completed, impacts would no longer exist. Increase in road traffic would also create road dust. Dust emissions would be mitigated by reducing vehicle speed limit during construction; graveling and watering dirt roads; and using BMPs in accordance with EPA recommended control measures for reducing dust. (Bridge design – Project Record) These impacts

would also be minimized by Forest Service Standard Specifications for Construction, Section 00290.30(b) and(c).

The project would cause short-term, localized, temporary minimal increase in dust and fuel exhaust emissions during a six month period when the project is being conducted. The project may cause minimal localized impact to short term ambient air quality.

Cumulative and Indirect Effects to Air Quality

Alternative 2 - Modified Proposed Action

Indirectly, this project would minimize dust emissions with bridge rerouting and replacements accompanied by stabilization of slopes and road graveling. Contractors and operators who supply aggregate material for this project are required to have appropriate permits from the NMED. This project would not cause long term negative effects to ambient air quality.

There are no other permitted air pollutant sources within 10 miles of the project area and the vehicle speed is low (15 mile/hour) and traffic on the road appears to be minimal. This project would not negatively affect long term cumulative regional air quality within AQCR 012 and AQCR 156 in Grant and Catron counties.

Climate

The project area is located in a cool mountain climate. Based on data from the Mimbres Ranger Station (Fryxell 2010), temperatures range from an average maximum temperature of 86.6 degree Fahrenheit (°F) in July to an average minimum temperature of 19.6 °F in January. Warmest temperatures typically occur from June through July and coldest temperatures from January through March. Average annual precipitation is 17.09 inches, but it is highly variable from year-to-year. July and August typically receive more than three inches of monthly precipitation. Annual snowfall averages 11.1 inches.

NM experiences a monsoon season from mid-June through September. Storms are created from moist air from the Gulf of Mexico or Pacific Ocean. This can produce short duration, high intensity storms. Prior to monsoon season, there typically is a dry period from April through mid-June. This is time of the year is when the highest risk of wildland fires is present. Snowfall occurs during winter months. It is typically generated from frontal storms moving across the region from west to east. Extreme winter cold can occur when cold air masses move into NM from the north.

Evidence of global climate change continues to be documented and is a result of cumulative and indirect impacts of many human activities. Increases of greenhouse gases (GHG) in the atmosphere are resulting in a gradual increase in average temperatures throughout the world. Human activity is believed to be causing the increase, with fossil fuel combustion for electricity generation and for transportation considered as leading causes. Observed indicators of climate change include rising atmospheric concentrations of GHGs such as carbon dioxide and methane, melting of glaciers and the arctic ice cap, and a gradual sea level rise. In the American

Southwest, global climate change may result in more droughts (International Panel on Climate Change 2007; Pew Center on Global Climate Change 2011; USEPA 2010; U.S. Global Climate Change Research Program 2011).
No measureable effects are anticipated that would contribute to climate change in either alternative.

Watershed

Watersheds affected by the Bridge Replacement and Rehabilitation of NFSR 150 project are listed in table 10. Each bridge project affects a specific drainage location within the watershed. The project area is located within the Gila River basin.

Table 10 Summary of Watersheds, Watershed Condition Class, and Drainages Associated with Project

Bridge Location	5th Level Watershed Name / Number	5th Level Watershed Condition Class	6th Level Watershed Name / Number	6th Level Watershed Score and Condition Class	Number of Drainages Affected per 6th Level Watershed
East Indian Creek	Headwaters East Fork Gila River / 1504000104	Satisfactory	Taylor Creek – Beaver Creek / 150400010403	1.4 Functioning Properly	1
Black Canyon and Tributary (2 Bridges)	Outlet East Fork Gila River / 1504000107	Satisfactory	Outlet Black Canyon / 150400010704	1.6 Functioning Properly	2
Terry Canyon (5 Bridges)	Sapillo Creek / 1504000108	Satisfactory	Rocky Canyon – Sapillo Creek / 150400010802	1.6 Functioning Properly	5

Source: Gila National Forest geographic information system

Riparian

Seven (7) of the eight (8) drainages have little riparian vegetation. Black Canyon, because of perennial water, has riparian vegetation such as cottonwoods, willows, and herbaceous plants associated with riparian areas. The other seven (7) drainages are ephemeral and are dry much of the year and support little riparian vegetation. Bare ground and grass cover is present. Non-riparian woody vegetation, such as ponderosa pine and Gambel oak, grows near these drainages.

Applicable Laws and Regulations

Direction for protecting and managing water, riparian, and soil resources in contained in the Forest Plan. A complete list of goals, standards, and guidelines and direction found in MAs is within the project record. Other legal requirement are also listed in the watershed report (Project Record).

Effects Analysis

Methodologies

In October 2011 a reconnaissance level field survey was conducted. The survey included representatives from the GNF and consultant team. Information was obtained from published literature, government agency internet sources, and GIS data. Professional knowledge of watershed management was also used.

For effects analysis, two levels of spatial context were defined for the Bridge Replacement and Rehabilitation of NFSR 150 project. The boundary for analyzing direct and indirect effects, as well as cumulative effects, is defined as the three 6th level watersheds where the project bridges are located. Sixth level watersheds typically range in area from 17,000 to 36,000 acres. This level of analysis was selected as it provides a good scale for determining potential effects. If a larger scale was used, the amount of area tends to be overwhelming, and when smaller scales are used, the amount of area is too limited in scope.

Two levels of temporal context were used in the effects analysis. The time-frame for short-term effects is defined as less than 10 years and long-term is defined as greater than 30 years.

A watershed cumulative impact is defined as total impact, positive or negative, on runoff, erosion, water yield, floods, and/or water quality that results from incremental impacts of a proposed action, when added to other past, present, or reasonably foreseeable future actions occurring within the same natural drainage basin or watershed (Council on Environmental Quality 1997).

Direct and Indirect Effects

Alternative 1 - No Action

Because there would be no construction, reconstruction, or rehabilitation of any bridges on NFSR 150 there would be no change from present condition. For those bridges where the stream channel morphology is not lining up with existing bridges, flowing water would cut into stream channel banks resulting in continued minor erosion and sediment transport.

Alternative 2 – Modified Proposed Action

Direct effects would be ground disturbance associated with bridge replacement and rehabilitation. Grading and placement of rip-rap would occur at bridge sites. Temporary stream crossings for bypasses would consist of a gravel road with underlying geotextile fabric. Construction equipment including backhoe, dozer, dump truck, front-end loader, grader, and crane would be used. Increases in direct effects would be expected due to increased ground disturbance. BMPs would be implemented to minimize water quality effects. The duration would be limited to the period of construction due to implementation of BMPs.

Potential indirect effects include increased erosion due to surface runoff; increased sediment transportation to ephemeral, intermittent, and perennial streams; and a potential to increase

turbidity levels. As discussed previously in "Design Features", BMPs would be incorporated to avoid or minimize potential for increased erosion, runoff, and sediment transport to streams, and potential for turbidity increases. Increases in indirect effects would be expected, but duration of increase would be expected to be limited to the period of construction with implementation of BMPs.

Table 11. Summary of Structural Features in Proposed Design for NFSR 150 Bridges Projects

Proposed Item	Proposed Location	Stream Type	Number of Proposed Items
Corrugated Steel Pipe-Arch	Five Terry Canyon sites	Ephemeral	5
Single Span Bridge	Black Canyon Tributary and East Indian Creek	Ephemeral Intermittent	2
Existing Bridge Rehabilitation	Black Canyon	Perennial	1

Direct and indirect effects are expected during the time of construction/rehabilitation due to work in ephemeral (6 streams), intermittent (1 stream), and one (1) perennial stream. GNF personnel would be on-site during work on these sites to approve wood removal and large boulder selection. However, long-term direct effects are not expected due to short duration of in-stream work and application of BMPs. Long-term indirect effects are not expected as these streams are characterized by high sediment/substrate transport volumes along with carrying large amounts of wood debris. Work at these sites are not expected to exacerbate NMED CWA 303(d) listings as BMPs would be applied including *Road-7 Stream Crossings* BMP practices and NMED CWA Section 404/401 permit BMPs.

Stream channel morphology and function within the 6th level watersheds would be expected to continue to function adequately at bridges that align with stream channel morphology with implementation of Alternative 2 - Modified Proposed Action. Although both direct and indirect effects would be expected due to proposed ground disturbance, overall watershed condition is expected to remain within acceptable thresholds with the implementation of the BMPs.

Short-term direct and indirect effects may occur within riparian areas associated with intermittent and perennial drainages as maintenance work is conducted and ground disturbance and vegetative cover disturbance occurs. However, extent of these effects would be expected to be negligible as disturbance would be localized, occurring only where maintenance activity is conducted.

Increased ground disturbance associated with installation of proposed bridge, rehabilitation, and reconstruction on ephemeral and perennial streams to the listed reach would have potential to increase turbidity. However, magnitude and extent of this potential would be mitigated by implementation of BMPs. Any increases in turbidity would be expected to be negligible as BMPs would be implemented and disturbance would occur only during the construction period. This applies to Black Canyon Tributary and Black Canyon Bridge sites that are located near water quality limited stream segment NM-2503_21. In the long-term and indirectly, implementation of Alternative 2 – Modified Proposed Action would maintain current watershed conditions.

No municipal watersheds are present, and thus, would not be impacted by implementation of Alternative 2 – Modified Proposed Action. Temporary bypass roads would have potential for short-term impacts to the floodplains by causing ground and vegetation disturbance. BMPs would be implemented to minimize the level of floodplain impact and return the floodplain to a natural state. Effects would also occur to wetlands at the Black Canyon Bridge during the time of construction due to the construction of the temporary bypass road. Alternative 2 – Modified Proposed Action would be designed to minimize the area of temporary wetland loss and mitigate loss with restoration of wetlands impacted by construction activities.

Cumulative Effects

No Action

Continued erosion where the channel and bridge are not aligned can be expected to continue. No cumulative effects are expected from the continued use of the other bridges.

Modified Proposed Action

Cumulative effects were considered within the 6th code HUCs where these bridges are proposed for reconstruction/rehabilitation. Other projects within the cumulative effects boundary for this project that are considered as present and future projects include implementation of the GNF Travel Management planning, maintenance activities on the Black Canyon Creek fish barrier, and the NFSR 150 ARRA Restoration Project. The Travel Management project encompasses all portions of the 6th level watersheds within the GNF administrative boundary. Although a decision has not yet been made, the current proposed alternative includes closing 962 miles of road to motor vehicle use Forest wide and closing the GNF to motorized cross country travel. Implementation of Alternative 2 - Modified Proposed Action and maintenance on the gabion fish barrier would result in short-term direct and indirect cumulative watershed impacts. Sediment transport would be reduced in the immediate vicinity of the bridge sites, specifically in Black Canyon Creek where the fish barrier project is located. The NFSR 150 ARRA Restoration Project would improve riparian health through construction of small sediment catchments that would reduce quantity of road-related sediment into drainages within the 6th level watersheds noted in table 10. During the past five (5) years, a few Section 319 water quality improvement projects were completed in Black Canyon, and there have been a few wildland fires. The cumulative effects of Alternative 2 - Modified Proposed Action and other actions in the watersheds would maintain the current condition of the watersheds.

Compliance with Relevant Laws, Regulations, Policies and Plans

Alternative 1 – No Action is consistent with management direction, including standard and guidelines in the Forest Plan and its provisions that were developed in accordance with the National Forest Management Act of 1976 (16 USC 1604(i) and 36 CFR 219.10([e]).

Alternative 1 – No Action would meet the intent of the CWA and the executive orders for wetlands and floodplains.

Alternative 2 – Modified Proposed Action is consistent with management direction, including standard and guidelines in the Forest Plan and its provisions that were developed in accordance with the National Forest Management Act of 1976 (16 USC 1604(i) and 36 CFR 219.10([e]).

Alternative 2 – Modified Proposed Action would meet the intent of the CWA and the executive orders for wetlands and floodplains.

Biological Resources

Threatened and Endangered and Sensitive Species

During preliminary project planning, the GNF determined that potential suitable habitat for five (5) USFWS threatened or endangered species may be present within or directly adjacent to the proposed bridge reconstruction/rehabilitation sites (Mexican spotted owl, southwestern willow flycatcher, Chiricahua leopard frog, Gila trout, and Mexican gray wolf). Potential effects to those species are evaluated. Avoidance and mitigation measures have been incorporated into the proposed action by GNF personnel.

Based on studies completed for recent projects along the NFSR 150 route, the GNF determined that potential suitable habitat for other threatened or endangered species is not present within or directly adjacent to the bridge sites. The GNF determined effects to those species do not require formal evaluation and they are not addressed in this analysis.

Species Effects Evaluations

Species Name – Mexican spotted owl (*Strix occidentalis lucida*)

Summary Species Description/ Ecology/Threats

The Mexican spotted owl (MSO) is protected as a federally threatened species with designated critical habitat within the GNF in Grant, Sierra, and Catron Counties. The range of MSO extends north from Aguas Calientes, Mexico, through the mountains of Arizona, New Mexico, and western Texas, to the canyons of southern Utah, southwestern Colorado, and the Front Range of central Colorado. The MSO occupies a fragmented distribution corresponding to availability of forested mountains and canyons (USFWS 2004).

MSO nest, roost, forage, and disperse in many biotic communities. Nesting habitat is typically located in complex forests or canyons with mature or old-growth stands that are uneven-aged, multi-storied, and have high canopy closure (USFWS 1995). In the northern portion of the range (southern Utah and Colorado), nests are located in caves or on cliffs in steep-walled canyons. Elsewhere, nests are located in Douglas fir (Arsenault *et* al. 1997, Fletcher and Hollis 1994, Ganey *et al.*1998). A variety of trees are used for roosting, though Douglas fir is the most common (Fletcher and Hollis 1994). MSO generally use a wider variety of forest conditions (mixed conifer, pine-oak, ponderosa pine, montane riparian, pinyon-juniper) for foraging than for nesting or roosting.

Data Sources (Including Surveys Conducted)

Information was obtained from USFWS, and NM Department of Game and Fish (NMDGF) databases, Forest Service personnel, and relevant literature. A site visit was conducted at each proposed bridge location during October 2011.

Affected Habitat Description

The eight (8) proposed project locations occur on NFSR 150 which is located just outside of the western boundary of designated critical habitat for MSO (USFWS Critical habitat Unit UGM 5b – see attached unit map). The slopes and canyon ridges adjacent to bridge locations generally support coniferous forest, a few elements of mixed conifer, and scant pinyon juniper vegetation communities. According to the GNF, these areas have been surveyed and it has been determined that no roost or nest sites are present. The areas may be utilized by MSO for foraging.

Indian Canyon: No suitable nesting habitat for MSO is present at or immediately adjacent to this bridge site, which, in general, supports an open ponderosa pine/mixed conifer vegetation community.

Black Canyon: MSO are known to occur within the general area, which is surrounded by designated critical habitat immediately to the east and several miles to the west. According to the GNF, MSO Protected Activity Centers (PACs) occur approximately four (4) miles upstream of the Black Canyon Bridge location. The location provides perennial water and supports riverine emergent and riverine forested wetlands. MSO would be unlikely to nest at or immediately adjacent to this bridge site, but riparian habitat at Black Canyon provide habitat and resources for prey species, and MSO may forage within the vicinity.

Black Canyon Tributary: MSO are known to occur within the general area, which is surrounded by designated critical habitat immediately to the east and several miles to the west. According to the GNF, MSO PACs occur approximately four (4) miles upstream of the Black Canyon Bridge location. No suitable nesting habitat for MSO is present within or adjacent to this bridge site, and no perennial waters, wetlands, or other limited resources for prey species are present.

Terry Canyon: All five (5) Terry Canyon sites support open ponderosa pine and minimal elements mixed conifer vegetation along shallow ephemeral drainages. No suitable nesting habitat for MSO is present within or adjacent to these bridge sites, and no perennial waters, wetlands, or other limited resources necessary to maintain prey species are present.

Effects Analysis

No MSO were observed during site visits, but critical habitat occurs immediately to the east and several miles to the west of the NFSR 150 route. Potentially suitable foraging habitat occurs immediately adjacent to the Black Canyon site. Areas immediately surrounding bridge sites are unlikely to provide suitable nesting locations because woody canopy cover is generally less than 40 percent, no or few snags or large dead trees are present, and no canyon crevices

are present.

The Black Canyon Bridge location supports perennial waters which provide resources and habitat for prey species.

Determination of Effect/ Mitigation

Potential suitable habitat for MSO occurs just east of the NFSR 150 roadway at all bridge locations, as critical habitat Unit UGM 5b is bounded by the roadway. Some removal of ponderosa pine trees is expected under current design specifications, which include construction of detours adjacent to bridge sites.

The USFWS Federal Register critical habitat designation for MSO identifies the following Primary Constituent Elements (PCEs) of critical habitat:

1) A range of tree species (mixed conifer, pine-oak, and riparian forest) composed of different tree sizes (30 percent to 45 percent large trees with a trunk diameter of 12–plus inches measured at 4.5 feet from the ground);
2) A shade canopy created by the tree branches covering 40 percent or more of the ground; and
3) Large dead trees (snags) with a trunk diameter of at least 12 inches (0.3 meters) when measured at 4.5 feet from the ground.

PCE related to maintenance of prey species (B) and canyon habitat (C) are identified as the following:

B –

(*1*) High volumes of fallen trees and other woody debris;
(*2*) A wide range of tree and plant species, including hardwoods; and
(*3*) Adequate levels of residual plant cover to maintain fruits and seeds and allow plant regeneration.

C –

(*1*) Presence of water (often providing cooler and often higher humidity than the surrounding areas);
(*2*) Clumps or stringers of mixed conifer, pine-oak, pinyon-juniper, and/ or riparian vegetation;
(*3*) Canyon walls containing crevices, ledges, or caves; and
(*4*) High percent of ground litter and woody debris.

Alternative 1 – No Action

The no action alternative would result in no effect to this species. There would be no effect to critical habitat as the proposed bridge locations and associated bypass routes are not located within designated critical habitat boundaries.

Alternative 2 – Modified Proposed Action

The eight (8) NFSR 150 bridge sites occur on and immediately adjacent to the roadway that does not support these elements (See photos A-H). Proposed bypass routes located adjacent to these bridges would involve some tree removal (Project Record – Bridge designs). The Black Canyon site supports wetlands and perennial waters that provide resources to MSO prey species, and construction

during nesting season could affect foraging behavior or success.

The replacement and re-routing of existing bridges as well as construction of bypass locations are expected to result in approximately 0.21 acres of soil disturbance at six (6) of (8) eight sites (estimated 150 foot x 60 foot disturbance footprint per site), 0.17 acre at the Terry Canyon #2 re-route site, and approximately 0.6 acre at the Terry Canyon #5 re-route site, resulting in a total of approximately 2.03 acre total of soil disturbance, and removal of trees. No soil disturbance or removal of trees would occur within designated critical habitat.

Indirect effects to this species are possible as a result of construction activities adjacent to critical habitat and removal of trees within potential foraging areas, but would be reduced by minimizing loss of large trees during construction. The GNF has determined that the action areas are not occupied by this species. Occupied sites occur several miles from proposed work areas. Alternative 2 - Modified Proposed Action would not affect critical habitat or any PCE of critical habitat.

Alternative 2 - Modified Proposed Action may affect, but is not likely to adversely affect this species.

There would be no effect to critical habitat as the proposed bridge locations and associated detour routes are not located within designated critical habitat boundaries.

Southwestern willow flycatcher (*Empidonax traillii extimus)*

Summary Species Description/ Ecology/Threats

The southwestern willow flycatcher is protected as an endangered species by the USFWS and the State of New Mexico. In 2005, the USFWS published a final rule designating critical habitat. During 2011 a proposed rule revising critical habitat was published (USFWS 2011a Appendix A). Critical habitat in the Upper Gila Unit occurs from the confluence of Turkey Creek to upstream of the Gila Box. No critical habitat occurs within or adjacent to the proposed NFSR 150 bridge locations.

The southwestern willow flycatcher is a small pale subspecies of willow flycatcher historically present throughout southwester riparian forests (USFWS 2002). It has declined in recent years due to loss of breeding habitat within riparian zones. Loss of migration habitat also threatens flycatcher populations. Large scale losses of southwestern wetlands have occurred in the last 125 years, particularly the cottonwood-willow riparian flycatcher habitats (USFWS 2002).

This flycatcher begins arriving in NM in late April and May to nest, and young fledge in early summer. They occur statewide during migration. In NM, flycatchers breed along Chama, Rio Grande, Zuni, Gila, Hondo, and San Juan rivers. It is found in close association with dense groves of coyote willow and other willows, alder, arrow weed, buttonbush, tamarisk, and Russian olive. They nest in thickets of trees and shrubs approximately 6.5 - 23 feet in height or taller, with a densely vegetated understory from ground or water surface level to 13 feet or more in height. Surface water or saturated soil is usually present beneath or next to occupied thickets

(USFWS 2002, NMDGF 2011).

Data Sources (including surveys conducted)

Information was gathered from NMDGF and USFWS databases and relevant reports/literature. Site visits of each bridge location were conducted during October 2011.

Affected Habitat Description

Suitable migration habitat for the southwestern willow flycatcher occurs at willow thickets associated with the Black Canyon riparian vegetation zone both up and downstream of the bridge location. Thickets present near the Black Canyon site are isolated and do not cover large areas. They do not appear to provide suitable nest sites for this species.

Surveys for flycatcher conducted previously within the area failed to detect any flycatchers. No suitable habitat for migration or nesting is present at other bridge sites.

Black Canyon – Willows and herbaceous wetland species occur along portions of the Black Canyon stream within the proposed bypass area. Some of this wetland vegetation and trees would be removed and would result in a temporary loss of marginal migration habitat. The higher quality habitat consisting of willow thickets up and downstream of the bridge would not be impacted by bridge rehabilitation activities. This habitat loss is expected to be limited to the construction period and the time it takes to regrow the vegetation, and it would re-grow once vegetation is restored.

The Black Canyon Tributary, Terry Canyon, and Indian Canyon sites do not support suitable habitat for this species.

Effects Analysis

Alternative 1 – No Action

Alternative 1 – No Action would not affect this species.

Alternative 2 – Modified Proposed Action

Black Canyon - Under current design, project activities could result in temporary loss of a small area of marginal suitable southwestern willow flycatcher migration habitat since a bypass would be constructed over the Black Canyon stream channel. Additionally, construction noise and activity could affect migration use of the area, which provides perennial water and insect habitat. No removal of nest sites or direct effects to nesting pairs is expected.

The Black Canyon Tributary, Terry Canyon, and Indian Canyon sites do not support suitable habitat for this species and construction at these sites is not expected to result in effects to southwestern willow flycatcher.

Determination of Effect/Recommended Mitigation

Proposed bypass construction activities at the Black Canyon site would result in a temporary loss of some suitable migration habitat for southwestern willow flycatcher.

Construction at the Black Canyon Tributary, Terry Canyon, and Indian Canyon sites would not affect this species.

Alternative 2 - Modified Proposed Action may affect, but is not likely to adversely affect this species and would have no effect on critical habitat.

Species Name – Gila Trout (*Oncorhynchus gilae)*

Summary Species Description/Ecology/Threats

Gila trout is a federal and State of New Mexico threatened species. It is a moderate-sized, deep bodied salmonid native to Arizona and NM. Adults are golden to greenish-yellow in color. Dorsal, anal, and pelvic fins are edged in white. The golden coloration of the body, parr marks, and fine, profuse spots above the lateral line (USFWS 1993). The diet includes aquatic insects and other arthropods, as well as smaller fishes (Rinne 1980). Spawning begins in early spring at lower elevations and continues through the summer at higher elevations.

The species historically occurred throughout the Gila and San Francisco drainages of NM and Arizona, were extirpated from many of these areas by the mid-1900s, and have been re-introduced to several previously occupied streams, but persisted in a few (USFS 2009, NMDGF 2011, Propst 1999) .

Threats to this species include habitat degradation, erosion and sedimentation, predation, hybridization with nonnative fishes, illegal fishing, and natural events such as fire, drought, or flooding (USFWS 1993).

Data Sources (Including Surveys Conducted)

Information was gathered from NMDGF and USFWS databases and relevant reports/literature. Site visits of each bridge location were conducted during October 2011.

Affected Habitat Description

Black Canyon - This is a perennial waterway that supports a montane riparian community and wetlands along its banks. According the USFS, Gila trout are known to occur within the Black Canyon Drainage in the vicinity of the bridge site (USFS 2009, USFS 2010, USFS 2011). A fish barrier was re-constructed just downstream of the proposed bridge replacement location to improve Gila Trout habitat, reduce invasive species, and prevent genetic introgression and hybridization with non-native trout populations (USFS 2009).

No suitable perennial aquatic habitat for this species is present at the Indian Canyon, Black Canyon Tributary, or Terry Canyon bridge locations. No indirect downstream effects to this species due to construction at these locations are expected.

Effects Analysis

Alternative 1 – No Action

The no action alternative would not affect this species.

Alternative 2 – Modified Proposed Action

Black Canyon - : Potential direct and indirect effects to Gila trout are possible at the Black Canyon site. The bridge at this site would be rehabilitated and a temporary bypass would be constructed under current design. The bypass would extend from approximately 35 to 55 feet northwest from edge of existing bridge through Black Canyon Creek. The bridge site occurs less than .1 mile upstream of a fish barrier and is likely occupied by Gila trout, which are known to occur within Black Canyon Creek above this barrier (USFS 2009, USFS 2010).

Construction at this location would occur during base (low) flow season (May-June). Prior to construction, the USFS would install a block net upstream of the proposed work site and collect Gila trout and other native fish species present between block net and the fish barrier (located just downstream of the bridge site). Collected individuals would be relocated upstream of the construction site. After completion of construction, the block net would be removed.

Construction at the Black Canyon Tributary, Terry Canyon, and Indian Canyon sites would not affect this species.

Determination of Effect/ Recommended Mitigation

Proposed bypass construction and bridge rehabilitation activities at Black Canyon site would impact bank vegetation and creek substrata. Relocation of fishes present within the work site could result in some immediate or eventual mortality or injury to individuals. The GNF fisheries biologist is permitted to conduct these activities as well as "take" individuals. "Take" is defined in Section 7 of the Endangered Species Act as "harming (includes killing) or harassing a listed species".

Activities divert or remove water from Black Canyon Creek above the fish barrier, or result in deposition of hazardous materials or sediments to the Black Canyon Creek could affect Gila trout locally, and impact other species present at Black Canyon bridge site or downstream areas. The following measures have been incorporated into Alternative 2 - Modified Proposed Action to reduce direct and indirect impacts to Gila trout and other aquatic animals residing within Black Canyon:

- Prior to any construction on the Black Canyon bridge site, block nets would be put in place outside of construction zone upstream of work site. Gila trout would be removed with electroshocking equipment from section below block nets and released upstream of block nets;
- Riparian or wetland habitat that is disturbed during reconstruction or rehabilitation would be restored to pre-construction conditions to the greatest extent possible. This may include seeding and planting;
- Construction would be completed during the dry and low (base) flow seasons to reduce surface water quality impacts within work site and downstream locations.

Alternative 2 - Modified Proposed Action may affect, but is not likely to adversely affect this species.

Species Name – Chiricahua leopard frog (*Rana chiricahuensis)*

Species Description/Ecology/Threats

CLF is a federal threatened species and is a State of New Mexico species of greatest conservation need. During March 2011 the USFWS published a proposed rule to designate critical habitat for the species within Arizona and NM recovery unit areas (USFWS 2011b, USFWS 2007, appendix A). It is a green, spotted frog with an unspotted head, and a unique thigh pattern composed of white-tipped tubercles on a dark background (USFWS 2011b, NMDGF 2011). It is assumed that this species feeds upon a variety of insects and other small arthropods like other leopard frogs (Degenhardt et al. 1996). According to NMDGF, Fritts *et al.* (1984) reported that they generally breed in June, July, and August above 5,400 feet in elevation and in spring to late summer below that. According the NMDGF, Jennings (1990) observed that populations in thermally stable habitats such as hot springs may reproduce throughout the year.

CLF occurs in and near perennial mountain streams, springs, streams, ponds, lakes, marshes, and stock ponds, rivers, and stock tanks within southwestern NM between approximately 4,500 and 8,900 feet in elevation (USFWS 2011b, NMDGF 2011, USFS 2010) and is most abundant in the Gila and San Francisco river drainages. Within the Rio Grande Drainage, they are present within Alamosa Creek in Socorro County and Cuchillo Negro Creek in Sierra County. Other occupied areas include the Mimbres River drainage and intermittent creeks in southwestern Hidalgo County.

Threats to this species include stream modification, wetland loss, habitat alteration, and predation by introduced organisms, commercial exploitation, disease, introduction of environmental contaminants, and drought (USFWS 201b1, NMDGF 2011).

Data Sources (Including Surveys Conducted)

Information was obtained from USFWS, and NMDGF databases, GNF personnel, and relevant literature. A site visit was conducted at each proposed bridge location during October 2011.

Affected Habitat Description

Black Canyon: This is a perennial waterway that supports a montane riparian vegetation community and emergent, forested, and scrub/shrub wetlands along its banks. According to the USFS, CLF once occurred downstream near the confluence with the East Fork (USFS 2011b). During the most recent surveys, no CLF were detected in Black Canyon. Black Canyon is not included under the proposed critical habitat designation, though nearby downstream areas are (Beaver Creek upstream from Taylor Creek/East fork confluence and Diamond Creek downstream of North Start Canyon confluence [USFWS 2011b]).

It is not known if CLF are currently present within the vicinity of the Black Canyon bridge site.

However recent surveys have not detected the species in the action area. Wetlands and perennial waters present within and up/downstream of this site provide suitable habitat for this species. Elevation at the site is approximately 6,800 feet, which is within elevation range of occurrence for this species.

No suitable perennial aquatic habitat for this species is present at the Indian Canyon, Black Canyon Tributary, or Terry Canyon bridge locations. However, waterways downstream of Black Canyon tributary and Indian Canyon provide potential suitable habitat for this species.

Effects Analysis

Alternative 1 – No Action

Alternative 1 - No Action alternative would not affect this species.

Alternative 2 – Modified Proposed Action

Black Canyon: If CLF is present within Black Canyon site or immediately downstream, direct effects to this species may result from proposed project activities. The proposed bypass route would result in disturbance of wetland and aquatic habitat at Black Canyon Creek. If this area is occupied by CLF, disturbance of habitat and loss of individuals would likely result from project activities.

All sites: Indirect construction effects such as erosion, sedimentation, and reduced surface water quality or introduction or toxins are possible in all areas where suitable wetland or aquatic habitat occurs downstream of bridge work sites**.** These effects could occur in association with all work sites, though the Black Canyon and Indian Canyon sites have the most direct connection to known occupied and potentially occupied areas.

Determination of Effect/ Recommended Mitigation

Proposed bypass construction activities at the Black Canyon site would directly impact aquatic and wetland habitat suitable for CLF. If CLF is present within or immediately downstream of the Black Canyon work site, direct effects could result from proposed construction activities. These include habitat disturbance, mortality and injury of individuals, interruption of reproductive activity, and loss of egg masses or tadpoles. Indirect effects could include siltation and erosion at and downstream of work site, introduction of contaminants, and accidental introduction of non-native species from construction equipment.

CLF are known to occupy habitat in Beaver Creek, approximately two (2) miles downstream from the Indian Creek Bridge site. If water is running while Indian Creek Bridge is under construction, protocol surveys would be conducted to determine if CLF have dispersed into the area prior to any further construction. If CLF are present, one or more of the following would be implemented:

- Hauling would not be permitted while the creek is flowing; and/or
- Temporary culverts with wing fencing to funnel migrating frogs would be installed

CLF are known to have occupied Black Canyon in the past. Surveys would be needed to determine

if CLF are occupying the site prior to construction. If the species is present, consultation with USFWS would occur prior to the onset of construction.

Alternative 2 - Modified Proposed Action may affect, but is not likely to adversely affect this species.

Species Name: Mexican gray wolf (*Canis lupis baileyi*)

Species Ecology/Threats

The Mexican Gray wolf, a subspecies of gray wolf, is a federal experimental animal and State of New
Mexico endangered species. Historically, it occurred throughout Arizona, NM, Texas, and Mexico, but by the 1970s was nearly eliminated from the United States and Mexico. It is the smallest, southern-most occurring, rarest, and most genetically distinct subspecies of gray wolf in North America. They have a distinctive gray, rust, and black coat. Like other wolves, they live in extended family groups which consist of up to eight (8) animals, with a territory of up to several hundred square miles. They typically breed in late winter to early spring (February) and give birth in the late spring (April- May) to up to six (6) pups (USFWS 2009).

Mexican wolves are found in a variety of southwestern mountain woodland habitats. They hunt cooperatively to bring down elk, mule deer, white-tailed deer, and other small mammals. Mexican wolves can and do occasionally kill livestock, particularly young animals. In areas where wolves and livestock coexist, such as Minnesota, Montana, and Alberta, Canada wolves take an average of less than one-tenth of one percent (0.1%) of available livestock (USFWS 2009).

In 1976 the Mexican wolf was listed as endangered under the Endangered Species Act of 1973. In 1978 the USFWS listed the entire gray wolf species as endangered, except in Minnesota where it was listed as threatened. An Environmental Impact Statement (EIS) was finalized in 1996, in which the Apache and Gila National Forests in eastern Arizona and western NM were identified as appropriate areas for reintroduction. On March 29, 1998 captive-reared Mexican wolves were released within this area and designated a non-essential experimental population (USFWS 2009).

A Memorandum of Understanding (MOU) established a Mexican Wolf Adaptive Management Oversight Committee. Under this MOU, Arizona and New Mexico State Game and Fish Departments and the White Mountain Apache Tribe have lead responsibility for implementing the Blue Range Wolf Recovery Area Reintroduction Project in their respective jurisdictions.

Data Sources (including surveys conducted)

Information regarding natural history, status, and current locations of collared individuals was obtained from the USFWS, Arizona Game and Fish Department, and NMDGF. No wolves were observed during field visits to bridge sites. The GNF has indicated that no wolves are known to use the bridge areas (USFS 2010).

Affected Habitat Description

NFSR 150 passes through potentially suitable wolf habitat. Aerial location records provided by the

Arizona Game and Fish Department (AGFD) for the Blue Range Wolf Recovery Area for radio-collared wolves from July 1 2012- September 30 2012 indicate that the Middle Fork pack were utilizing areas approximately 20 miles northwest of the Indian Canyon site (appendix A). This pack may hunt near the bridge locations if they are in the area, but would be expected to avoid human contact and construction noise.

Effects Analysis

Alternative 1 – No Action

Alternative 1 - No Action alternative would not impact this species.

Alternative 2 – Modified Proposed Action

Because Mexican gray wolves are known to occur within the vicinity of the project areas, the project may result in temporary impacts to this species such as avoidance of the project area during, and for a time, after project implementation, if they are present. However, it is expected that wolves would resume use of the project areas shortly after traffic and noise associated with human occupation of the sites has ceased. Alternative 2 – Modified Proposed Action is not expected to create increased speed or capacity on the roadway, which could be associated with collision mortalities.

Determination of Impact/Recommended Mitigation

Alternative 2 – Modified Proposed Action is not likely to result in direct impacts to Mexican gray wolves, as individuals or prey animals which may occur within the general area would not enter into the vicinity during construction due to associated noise and human activity. Alternative 2 – Modified Proposed Action is limited in scale and would result in primarily temporary avoidance impacts.

Alternative 2 - Modified Proposed Action may impact individuals, but is not likely to jeopardize the species.

Species Not Fully Evaluated

The GNF determined that the following species, which do not occur within or directly adjacent to the proposed NFSR 150 bridge work sites, would be not be affected by proposed project activities because construction BMPs and compliance with project permit conditions would prevent indirect impacts, and no direct impacts would occur as a result of the project.

Listed species not discussed below are discussed in separate documents, would only occur as transients at bridge locations, or occur in areas that would not be directly or indirectly impacted by proposed project.

Loach minnow (*Tiaroga cobitis*) and spikedace (*Meda fulgida*): These fishes are federally endangered, and state endangered. Critical habitat was designated within the East, West, and Middle forks of the Gila River during 2007 (USFWS), then voluntarily remanded by the USFWS, and a revised proposed rule was published during October 2011 (USFWS 2011) which included previously designated critical habitat along with additional areas. Neither the species nor designated critical

habitat occurs within the action area.

Gila chub (*Gila intermedia:* This species is federally endangered with designated critical habitat located at Turkey Creek within Grant County, and NM state endangered. No critical habitat occurs within or directly adjacent to the NSFR 150 bridge sites.

Gila springsnail (*Pyrgulopsis gilae*) and New Mexico springsnail (*Pyrgulopsis thermalis*): These USFS sensitive and NM state threatened spring snails are known to occur downstream of Indian Canyon in Beaver Creek (USFS 2011). The USFS has determined that suitable habitat for these species is present above the bankfull stage of Beaver Creek and no indirect impacts are likely to result from project activities.

Three (3) species of USFS sensitive fishes are known to occur within the waters of Black Canyon at or near to the project area (USFS 2011). These are: longfin dace (*Agosia chrysogaster*), desert sucker (*Catostomus clarki*), and Sonora sucker (*Catostomus insignis*). Mitigation and avoidance measures for Gila trout apply to these species. The proposed project may impact individuals of these species but is not expected to result in the need to list any of them.

Management Indicator Species

This section is a discussion and display of the direct, indirect, and cumulative environmental impacts/effects to management indicator species (MIS) that could result from implementation of the NFSR 150 Bridge replacement and reconstruction project. The bridge work and bypass sites are located on and adjacent to the existing NFSR 150 alignment, which forms the eastern boundary of the Gila Wilderness Area and the western boundary of the Aldo Leopold Wilderness Area. The sites occur on the *North Star Mesa, Hay Mesa, Spring Canyonand Middle Mesa*, New Mexico US Geological Survey 7.5 minute quadrangle maps.

The Secretary of Agriculture's Policy on Fish and Wildlife (9500-4) directs the Forest Service to "manage habitats for all native and desired nonnative plants, fish, and wildlife species to maintain viable populations of each species."

This MIS analysis is based upon literature reviews (including the Forest Plan), GNF data, and bridge site visits. The techniques and methodologies used in this analysis consider appropriate science. The analysis includes a summary of credible scientific evidence that is relevant to evaluating reasonably foreseeable impacts. The analysis also identifies methods used and references scientific sources relied on. The conclusions are based on a scientific analysis that shows a thorough review of relevant scientific information.

Species Considered

Species analyzed in this report include those that are GNF MIS as listed in the Forest Plan amendment #11.

Appropriate Science

This evaluation was developed in consideration of the appropriate science. For example, it included older/classic literature and more current literature, and evaluation of applicability of literature from other geographic areas to the Southwest and NM.

Management Indicator Species

Management Indicator Species (MIS) (1982 Planning Rule) (36 CFR 219): MIS are identified in the Forest Plan. MIS are addressed in order to implement the National Forest Management Act regulations. They are selected because their population changes are believed to indicate effects of management activities (36 CFR 219.19(a) (l)). The MIS approach is designed to function as a means to provide insight into effects of national forest management on plant and animal communities. Species are selected to represent several categories, such as commonly hunted or fished species, non-game, and threatened and endangered species (TES). They may be used as a tool 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.

Forest Plan amendment #11 for MIS amended the MIS list for the GNF to represent major vegetation types potentially affected by management actions. The GNF MIS analysis is incorporated by reference into this analysis where all 11 MIS and their 11 associated habitats are considered. Table 12 identifies MIS species considered for this evaluation.

Management Indicator Species Associated Habitats: According to GIS information provided by the GNF, the NFSR 150 bridge sites overall consist of a mix of pinyon-alligator juniper; evergreen-oak mix; and ponderosa pine forest habitat types. Site visits were conducted and habitat types present at each bridge location were identified. Most bridge sites were dominated by open ponderosa pine forest intermixed with scattered oaks. The Black Canyon Bridge location also had a well-developed montane riparian community. Pinyon-juniper communities were present on south-facing slopes over 100 feet from the bridge site. MIS were selected or indicated for consideration based on the habitat types present at each location.

Table 12: Management Indicator Species considered and selected or eliminated from further consideration and the rationale therein.

Management Indicator Species	Management Indicator For:	Selected for Analysis		Rationale for Elimination or Inclusion as MIS
		YES	NO	
Mule Deer (*Odocoileus hemionus*)	Desert shrub, pinyon-juniper, shrub oak woodland communities		x	Habitat does occur but the project is not going to affect suitability of habitat and therefore will have no impact on population trends of mule deer.
Beaver (*Castor canadensis*)	Low, mid, and high riparian areas	x		Habitat for this species exists at Black Canyon bridge site. Beaver are known to occupy the waters of Black Canyon both below and above the bridge site.
Long-tail Vole (*Microtus longicaudus*)	Wet meadows and wetlands	x		Habitat for this species exists at Black Canyon bridge site.
Mearn's [Montezuma] Quail (*Cyrtonyx montezumae mearsni*)	Plains and Mountain grassland communities		x	Effects to Mearn's [Montezuma] quail were not analyzed because habitat for this species does not occur at the bridge sites.
Mexican Spotted Owl (*Strix occidentalis lucida*)	Mixed conifer community	x		Effects to Mexican spotted owl were analyzed because bridge sites are adjacent to designated critical habitat for this species, and riparian corridor provides foraging habitat.
Northern Goshawk (*Accipiter gentilis*)	Ponderosa pine community	x		Habitat for this species exists throughout bridge sites.
Gila Trout (*Oncorhynchus gilae*)	Riparian habitat at high elevation	x		Habitat for this species exists at Black Canyon bridge site.

Beaver (*Castor Canadensis*)

Beaver were selected to represent species using low, mid, and high riparian areas. This species depends upon existence of permanent bodies of water for survival. The shelters beavers create out of sticks and mud have profound ecological effects on surrounding habitat. Beaver primarily eat cambial tissue of shrubs and trees and buds and roots.

Effects Analysis

Direct and Indirect Effects

Alternative 1 -No Action

Because there would be no change to habitat under the Alternative 1 – No Action, there would be no effect to this species.

Alternative 2 – Modified Proposed Action

All drainages in the project areas with exception of Black Canyon drainage are too dry to sustain beaver use (photo A). Black Canyon is suitable habitat for beaver, and beaver activity was noted approximately 100 yds. downstream of the bridge and upstream of the bridge. The proposed bridge reconstruction at Black Canyon would affect potential habitat for beaver and could disrupt beaver activity during the period of construction, but should have no direct or indirect effects upon beaver population and habitat trends in the GNF.

Long- tail Vole *(Microtus longicaudus)*:

Long-tail Vole were selected to represent species using wet meadow and wetland habitat. Long-tail vole is primarily a montane forest species, usually associated with meadows and forest edges, and sometimes living in forest itself. It is most common in mixed coniferous and spruce-fir forest, but it can occur in riparian areas within ponderosa pine forest.

Alternative 1 - No Action

Because there would be no change to habitat under Alternative 1 – No Action, there would be no effect to this species.

Alternative 2 - Modified Proposed Action

Only Black Canyon had sufficient riparian development to provide potential habitat for long-tail vole, and based on elevation of bridge site, this habitat is probably marginal. Although there may be potential long-tail vole habitat in the general area along the creek, the actual bridge replacement site is poor habitat. Alternative 2 - Modified Proposed Action may temporarily impact marginal potential habitat for long-tail vole during construction/rehabilitation, but should not have a measurable affect to population and habitat trends in the GNF.

Mexican Spotted Owl *(Strix occidentalis lucida)*

MSO were selected to represent species that inhabit mixed conifer communities. MSO nest, roost, forage, and disperse in many biotic communities. Nesting habitat is typically located in complex forests or canyons with mature or old-growth stands that are uneven-aged, multi-storied, and have high canopy closure (USFWS 1995). The NFSR 150 bridge sites are adjacent to designated critical habitat for this species.

Alternative 1 - No Action

Because there would be no change to habitat under Alternative 1 – No Action, there would be no effect to this species.

Alternative 2 - Modified Proposed Action

Though none of the NFSR 150 bridge sites provide mixed conifer communities, proximity of bridge sites to designated critical habitat could result in indirect effects to nesting behavior and

success due to noise and activity in the area of an unknown nest site. The Black Canyon site supports wetlands and perennial waters that provide resources to MSO prey species, and construction during nesting season could affect foraging behavior or success. The construction activities associated with the bridge have been designed to avoid noise conflicts with known MSO nesting areas. Additionally, replacement activities are highly localized and should have no lasting long-term impacts to MSO population and habitat trends in the GNF.

Northern Goshawk *(Accipiter gentilis)*

Northern goshawks (goshawks) were selected to represent species using ponderosa pine habitat. This species primarily uses late-seral ponderosa pine habitat. Late-seral mixed conifer habitat is also important to this species. Besides being a GNF MIS species, northern goshawk is also a Forest Service Region 3 sensitive species. Goshawks primarily eat small mammals (e.g., squirrels, lagomorphs) and medium-sized birds (e.g., woodpeckers and jays).

Goshawks are dependent on a continual flow of habitat structural types over time to provide necessary habitat characteristics for nesting and to support a wide variety of prey species. To meet this continuous flow of habitat structural types over time the Forest Plan describes desired conditions in ponderosa pine, mixed conifer, spruce-fir, and woodland vegetation communities for landscapes outside goshawk post-fledging family areas (foraging areas), within post- fledging family areas (PFA), and within nesting areas. The GNF is to manage for these desired conditions across the landscape in all areas that are not being specifically managed for a federally list species (such as, areas being managed specifically for the federally listed MSO).

Alternative 1 - No Action

Because there would be no change to habitat under Alternative 1 – No Action, there would be no effect to this species.

Alternative 2 - Modified Proposed Action

Open ponderosa pine forest with a scattered oak understory occurs at all of the NFSR 150 bridge replacement sites. There were no indications of nests present near any of the bridge sites, but goshawks could potentially utilize habitat at all of the bridge replacement sites. The proposed construction activities are highly localized and would not substantially alter the forest habitats at the bridge sites. The roadway along which the bridges occur has been in operation for decades. Assuming that any construction during breeding season would be predicated by a survey and that goshawk is not present at bridge sites during construction, Alternative 2 – Modified Proposed Action should have no effects on population and habitat trends in the GNF.

Gila Trout *(Oncorhnychus gilae)*

Gila trout were selected to represent species using high elevation riparian habitat. This species historically occurred throughout the Gila and San Francisco drainages of NM and Arizona. They were extirpated from many of these areas by the mid 1900's. They have since been re-

introduced to several previously occupied streams. A Gila trout diet includes aquatic insects and other arthropods, as well as small fishes (Rinne 1980). Spawning begins in early spring at lower elevations and continues through the summer at higher elevations.

Alternative 1 - No Action

Because there would be no change to habitat under Alternative 1 – No Action, there would be no effect to this species.

Alternative 2 - Modified Proposed Action

Gila trout are known to occur within Black Canyon drainage in the vicinity of the bridge site (USFS 2009, 2010, 2011). A biological assessment (BA) was prepared to determine potential effects to this species and concluded with a 'may affect' finding. Recommendations for reducing effects are provided in the BA. No suitable perennial aquatic habitat for this species is present at the Indian Canyon, Black Canyon Tributary, or Terry Canyon bridges locations. No indirect downstream effects to this species due to construction at these locations are expected.

Migratory Bird Treaty Act

This section is a discussion and display of the direct, indirect, and cumulative environmental impacts/effects to migratory bird species that could result from implementation of the NFSR Replacement and rehabilitation 150 Bridge project on the. The bridge work and bypass sites are located on and adjacent to the existing NFSR 150 alignment, which forms the eastern boundary of the Gila Wilderness Area and the western boundary of the Aldo Leopold Wilderness Area. The sites occur on the *North Star Mesa, Hay Mesa, Spring Canyon and Middle Mesa, New Mexico* US Geological Survey7.5 minute quadrangle maps.

The Secretary of Agriculture's Policy on Fish and Wildlife (9500-4) directs the Forest Service to "manage habitats for all native and desired nonnative plants, fish and wildlife species to maintain viable populations of each species."

This migratory bird species analysis is based upon literature reviews (including the Forest Plan), GNF data, and bridge site visits. The techniques and methodologies used in this analysis consider appropriate science. The analysis includes a summary of credible scientific evidence which is relevant to evaluating reasonably foreseeable impacts. The analysis also identifies methods used and references scientific sources relied on. The conclusions are based on a scientific analysis that shows a thorough review of relevant scientific information.

Species Considered

Species analyzed include those that are migratory bird species that may occur on the GNF.

Appropriate Science

This evaluation was developed in consideration of appropriate science. For example, it included

older/classic literature and more current literature, and evaluation of applicability of literature from other geographic areas to the Southwest and NM.

Migratory Bird Treaty Act: Executive Order (EO) 13186, signed January 10, 2001, lists several responsibilities of federal agencies to protect migratory birds. Among them, agencies are directed to support the conservation intent of migratory bird conventions by integrating bird conservation principles, measures, and practices into agency activities and by avoiding or minimizing, to the extent practicable, adverse impacts on migratory birds when conducting agency actions. The MOU between Forest Service and USFWS signed December 8, 2008, provides additional direction. The purpose of this MOU is to strengthen migratory bird conservation through enhanced collaboration between the Forest Service and USFWS, in coordination with state, tribal, and local governments. The MOU identifies specific activities for bird conservation, pursuant to EO 13186 including striving to protect, restore, enhance, and manage habitat of migratory birds, and prevent further loss or degradation of remaining habitats on national forest system lands. This includes identifying management practices that impact populations of high priority migratory bird species on national forest system lands. Agencies shall identify potential impacts to migratory birds and their habitats, avoid or minimize adverse impacts, restore and enhance habitats, and evaluate effects of actions on migratory birds. Where they exist, other analyses should be used, such as the New Mexico Partners in Flight Conservation Plan. The New Mexico Partners in Flight has identified highest priority species, by vegetation types (http://nmpartnersinflight.org/). All NM breeding species were scored on global and NM abundance, global and NM breeding distribution, threats to breeding and wintering grounds, global winter distribution and importance of NM for breeding. These species are not necessarily species of concern but do illustrate importance of the area to New Mexican avifauna.

This migratory bird species analysis was compiled by reference to the New Mexico Partners in Flight Conservation Plan highest priority species list. Species with potential habitat at the NFSR 150 bridge sites were selected for analysis (table 13). A habitat impacts and disturbance effects determination was conducted for each of the high priority species for which potential habitat was present at the bridge sites (table 14).

Table 13: New Mexico Partners in Flight (NMPIF) High Priority Migratory Bird Species by Vegetation Type

Habitat Type	Species	NMPIF
Deciduous Riparian	Bell's Vireo	HP
Pinyon-Juniper Woodland	Black-throated Gray Warbler	HP
Ponderosa Pine	Flammulated Owl	HP
Ponderosa Pine, Open Woodland,	Greater Pewee	HP
Mixed-conifer and Ponderosa Pine	Olive Warbler	HP
Deciduous Riparian	Red-faced Warbler	HP
Ponderosa Pine	Grace's Warbler	HP
Deciduous Riparian	Northern Harrier	HP
Deciduous Riparian and Ponderosa Pine	Peregrine Falcon	HP
Deciduous Riparian	Common black-hawk	HP
Deciduous Riparian	Yellow-billed Cuckoo	HP
Deciduous Riparian and Ponderosa Pine	Elf Owl	HP
Deciduous Riparian	Lewis's Woodpecker	HP

Effects Analysis

Alternative 1: No Action

There would be no effects to any of the habitat for any migratory bird species, therefore there would be no effect to any species.

Table 14: Migratory Bird Effects Determination

Vegetation type within the project area	Species	Habitat	Habitat Impacts	Disturbance Effects	Determination
Ponderosa Pine	Flammulated Owl	Pine forests; during breeding season uses small tree cavities	Potential minor loss of roosting and nesting habitat at all bridge locations.	Implementation of bridge reconstruction plan may cause temporary disturbance to nesting and foraging flammulated owls if construction occurs during the nesting season.	Potential disturbance to individuals if construction occurs during breeding season; potential minor loss of habitat in project area; would have no effect to habitat or population trends for this species.
Ponderosa Pine, Open Woodland, Riparian woodland	Greater Peewee	Open pine with oak understory (Photo A)	Potential minor loss of roosting and nesting habitat at all bridge locations.	Implementation of bridge reconstruction plan may cause temporary disturbance to nesting and foraging greater peewees if construction occurs during the nesting season.	Potential disturbance to individuals if construction occurs during breeding season; potential minor loss of habitat in project area; would have no effect to habitat or population trends for this species.

Vegetation type within the project area	Species	Habitat	Habitat Impacts	Disturbance Effects	Determination
Mixed-conifer and Ponderosa pine above 7,000 feet elevation	Olive Warbler	Ponderosa pine and mixed conifer; during breeding season builds cup nests at the terminal ends of high branches	Potential minor loss of roosting and nesting habitat at all bridge locations.	Implementation of bridge reconstruction plan may cause temporary disturbance to nesting and foraging olive warblers if construction occurs during the nesting season.	Potential disturbance to individuals if construction occurs during breeding season; potential minor loss of habitat in project area; would have no effect to habitat or population trends for this species.
Ponderosa Pine	Grace's Warbler	Open mixed pine-oak forest; builds cup nests in high branches, usually in pine trees	Potential minor loss of roosting and nesting habitat at all bridge locations.	Implementation of bridge reconstruction plan may cause temporary disturbance to nesting and foraging Grace's warblers if construction occurs during the nesting season.	Potential disturbance to individuals if construction occurs during breeding season; potential minor loss of habitat in project area; would have no effect to habitat or population trends for this species.
Pinyon-Juniper Woodland	Black-Throated Gray Warbler	Common in dry oak or juniper woodlands; migrants often in riparian forest	The nearest potentially suitable nesting or roosting habitat to the bridge reconstruction areas is pinyon-juniper scrubland more than 500 feet away from Black Canyon Bridge. Migrant riparian habitat present at the Black Canyon bridge location.	Implementation of bridge reconstruction plan is unlikely to cause disturbance to nesting or roosting black-throated gray warblers.	Implementation of bridge reconstruction plan is unlikely to cause disturbance to black-throated gray warblers.

Vegetation type within the project area	Species	Habitat	Habitat Impacts	Disturbance Effects	Determination
Deciduous Riparian	Red-faced Warbler	Shaded canyons along streams within montane pine-oak and fir forests	Potential minor loss of roosting and nesting habitat at the Black Canyon bridge location	Implementation of bridge reconstruction plan may cause temporary disturbance to nesting and foraging red-faced warblers if construction occurs during the nesting season	Potential disturbance to individuals if construction occurs during breeding season; potential minor loss of habitat in project area; would have no effect to habitat or population trends for this species.
Deciduous Riparian	Northern Harrier	Open wetland and riparian woodlands; nests on the ground in open fields or meadows (photo B)	Potential minor loss of roosting habitat at the Black Canyon bridge location	Implementation of bridge reconstruction plan may cause temporary disturbance to foraging common northern harrier.	Implementation of bridge reconstruction plan may cause temporary disturbance to foraging common northern harrier.
Ponderosa Pine and Deciduous Riparian	Peregrine Falcon	Breed in open areas with cliffs present. During migration may be found in many habitats, including along rivers; in general most common in open areas	The project area consists of Ponderosa Pine and Deciduous Riparian forest, which are not the preferred habitat of Peregrine falcons, although they may pass through during migration.	Implementation of bridge reconstruction plan is unlikely to cause disturbance to nesting or roosting peregrine falcons.	Implementation of bridge reconstruction plan is unlikely to cause disturbance to nesting or roosting peregrine falcons.

Vegetation type within the project area	Species	Habitat	Habitat Impacts	Disturbance Effects	Determination
Deciduous Riparian	Common Black-hawk	Nests in tall trees, usually cottonwood.	Potential minor loss of roosting and nesting habitat at the Black Canyon bridge location.	Implementation of bridge reconstruction plan may cause temporary disturbance to nesting and foraging common black-hawk if construction occurs during the nesting season.	Potential disturbance to individuals if construction occurs during breeding season; potential minor loss of habitat in project area; would have no effect to habitat or population trends for this species.
Deciduous Riparian	Yellow-billed Cuckoo	Riparian woods	Potential minor loss of roosting and nesting habitat at the Black Canyon bridge location.	Implementation of bridge reconstruction plan may cause temporary disturbance to nesting and foraging yellow-billed cuckoo if construction occurs during the nesting season.	Potential disturbance to individuals if construction occurs during breeding season; potential minor loss of habitat in project area; would have no effect to habitat or population trends for this species.
Deciduous Riparian	Bell's Vireo	Willow and mesquite thickets near water	Potential minor loss of roosting and nesting habitat at the Black Canyon bridge Location.	Implementation of bridge reconstruction plan may cause temporary disturbance to nesting and foraging Bell's vireo if construction occurs during the nesting season.	Potential disturbance to individuals if construction occurs during breeding season; potential minor loss of Habitat in project area; would have no effect to habitat or population trends for this species.

Vegetation type within the project area	Species	Habitat	Habitat Impacts	Disturbance Effects	Determination
Ponderosa Pine and Deciduous Riparian	Elf Owl	Open dry woodlands and bushy vegetation. Nests in tree cavities.	Potential minor loss of roosting and nesting habitat at all bridge locations.	Implementation of bridge reconstruction plan may cause temporary disturbance to nesting or roosting Elf owl if construction occurs during the nesting season.	Potential disturbance to individuals if construction occurs during breeding season; potential minor loss of habitat in project area; would have no effect to habitat or population trends for this species.
Deciduous Riparian	Lewis's Woodpecker	Dry open pine forests and other habitat with scattered trees	Potential loss of roosting and nesting habitat at all bridge locations.	Implementation of bridge reconstruction plan may cause temporary disturbance to nesting and foraging Lewis's woodpecker if construction occurs during the nesting season.	Potential disturbance to individuals if construction occurs during breeding season; potential minor loss of habitat in project area; would have no effect to habitat or population trends for this species.

Recreation Resources

History

On June 3, 1924 GNF District Forester Frank Pooler designated the Gila Wilderness as America's first designated wilderness area. At the time of designation, the Gila Wilderness included the west half of what is now the Aldo Leopold Wilderness and also included the area of the North Star Mesa road (NFSR 150). A primitive area proposal for the GNF dated January 1, 1930 contained NFSR 150 which was actively being improved at the time so hunters could harvest an explosive population of deer, to provide access to private ranches and for a perceived need for fire protection access. The NFSR 150 was constructed between 1930 and 1933. On June 8, 1933 the Gila Wilderness was re-classified the Gila Primitive Area to the west of NFSR 150 and the Black Range Primitive Area to the east and the corridor of the NFSR 150 was declassified. Most of the Gila Primitive Area was re-classified the Gila Wilderness with the passage of the Wilderness Act of 1964. With the passage of the New Mexico Wilderness Act of 1980, the remaining primitive area was included in the Gila Wilderness and the Black Range Primitive Area was re-classified the Aldo Leopold Wilderness Area.

Effects Analysis

This effects analysis considers the NFSR 150 corridor and adjacent Wilderness areas.

Wilderness

Alternative 1 - No Action

There would be no change to the current wilderness resource as there would be no change to NFSR 150. If the bridges were to deteriorate of time, as predicted, and NFSR 150 became unusable, access to trail heads and other recreational opportunities would be reduced.

Alternative 2 - Modified Proposed Action

Alternative 2 - The Modified Proposed Action does not propose any new access to wilderness areas. Traffic patterns are not expected to change. Access to wilderness trailheads would be maintained.

Recreation

There are two dispersed campgrounds along NFSR 150. People also use the area for hunting turkey, elk, and deer. Camps are often set up in the corridor and people hunt in and outside the wilderness.

Alternative 1 - No Action

There would be no change to recreation opportunities available by motorized access.

Alternative 2 - Modified Proposed Action

There would be no change to recreation opportunities available by motorized access. There would be short term loss of access while NFSR 150 is closed for construction of the bridges in Terry Canyon. Bypass routes would allow continued access during construction and rehabilitation of the Black Canyon, Black Canyon tributary and Indian Creek bridges.

Visual Quality Objectives

Visual quality objectives (VQO) can be defined as being of one of five visual resource management goals: preservation, retention, partial retention, modification, and maximum modification. They are further defined by inventorying character type, variety class, and sensitivity level. They are measured as how they would be viewed from distance zones: foreground, middle ground, or background. The closest is foreground which is normally defined as a distance ¼ to ½ mile from the observer. The idea is to determine how a project at some distance is observed from a viewpoint. In this case the project is NFSR 150 and is where the observer is located. There is nothing in Alternative 2 - Modified Proposed Action that would affect VQOs.

Roadless Areas

Neither Alternative 1, no action, nor Alternative 2, modified proposed action, would have any effect on roadless areas.

Socio-economic Resources

As described in the transportation section of this document, social attributes of NFSR 150, and bridges that are part of it, are for motorized access to a variety of recreational uses, including hunting, hiking, cycling, and general recreation as well as access to trailheads in the nearby wildernesses. In addition to the low to moderate use the road receives from recreational uses, it is also important for access to private land, industry and GNF administration, including access for GNF fire personnel and equipment. NFSR 150 provides the only motorized access to the Meown administrative site, Rocky Canyon Campground, Upper and Lower Black Canyon Camp Ground, and several wilderness trailheads.

Economic impacts of each alternative were described in table 4.

CONSULTATION AND COORDINATION

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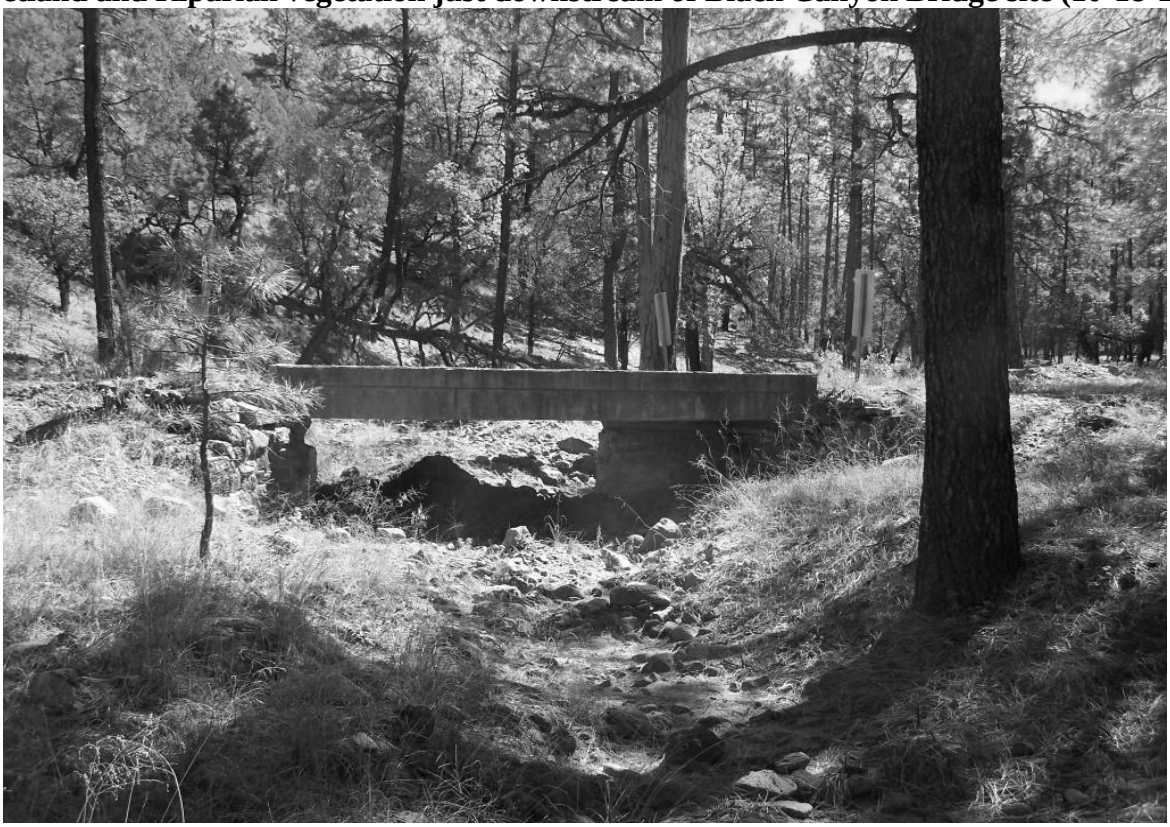
Appendix A – Photos

Indian Creek Bridge site (10-18-11)

Black Canyon Bridge site (10-18-11)

Wetland and Riparian vegetation just downstream of Black Canyon Bridge site (10-18-11)



Black Canyon Tributary site (10-18-11)

Terry Canyon Bridge site 1 (10-18-11)

Terry Canyon Bridge site 2 (10-18-11)

Terry Canyon Bridge site 3 (10-18-11)

Terry Canyon Bridge site 4 (10-18-11)

Terry Canyon Bridge site 5 (10-18-11)