Environmental Assessment

Trabuco Aquatic Organism Passage Restoration

Trabuco Ranger District, Cleveland National Forest
Orange and Riverside Counties, California
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Chapter 1
Introduction

1.1 BACKGROUND

This environmental assessment ("EA") has been prepared in accordance with the National Environmental Policy Act of 1969 (NEPA), as amended; 7 CFR part 1b; 36 CFR 220; 40 CFR parts 1500 to 1508; the Forest Service Manual parts 1920 and 1950; and the Forest Service Handbook part 1909.12. This EA will assess the environmental effects of implementing the proposed action and alternatives to the proposed action on the biological, physical and human environment. Analysis contained in this EA tiers to specialist reports in the project record, including but not limited to the biological assessment and the watershed report.

1.2 PROPOSED ACTION

1. **Trabuco Creek** -Replace four low-water hardened crossings in Trabuco Canyon with bridges. Each bridge will be constructed to fit the needs of that site and will accommodate a 100- year flood.
2. **Trabuco Creek –** Remove all in-stream dams.
3. **Los Alamos Creek -** Remove one hardened crossing and replace it with a bridge. The current structure is on South Main Divide Road where it crosses Los Alamos Creek. The new bridge will be constructed to accommodate a 100-year flood.
4. **San Mateo Creek** - Remove a hardened concrete crossing on the Tenaja Falls Trail that crosses San Mateo Creek and is within the San Mateo Canyon Wilderness.

The total area to be permanently occupied by the reconstructed road and trail crossings and the reconstructed road approaches is approximately 2.5 acres or about ½ acre per crossing. The footprint of the reconstructed crossings is expected to be slightly larger than that of the existing crossings that will be replaced. In addition, at Trabuco Creek in-channel work may extend as far as 500 feet upstream and downstream of the existing crossings to allow for restoration of a natural gradient to the stream. This may temporarily disturb up to 9 acres of habitat.

1.3 PURPOSE AND NEED FOR ACTION

1.3.1 Trabuco Canyon

The road into Trabuco Canyon is in Orange County on the west side of the Trabuco Ranger District. The first few miles of the road are outside the national forest boundary. Four hardened stream crossings exist within the national forest boundary. The current crossings are concrete slabs, some of which have bases that contain one or more culverts approximately 12 inches in diameter.

The crossings currently act as instream dams that prevent or impede the passage of aquatic organisms. The culverts frequently become clogged with debris, causing water to back up in the stream channel and eventually flood across the top of the crossing. Some culverts are rusting and have collapsed. The flooding contributes to erosion alongside and within the road bed. Fish and other aquatic species are impeded or prevented from moving upstream because the crossings are generally higher on one side, resulting in a "waterfall" drop that can range from three or four to more than 10 feet. The first of these crossings is approximately two-thirds of a mile east of the national forest boundary. The remainders of the crossings are within a 2.5-mile stretch of the road.

The creek contains the remnants of manmade dams that were originally designed to create pools for fish habitat. Due to safety concerns, the doors to the dams were removed. However, most of the dams themselves are still intact. The dams present a potential barrier to fish passage during times of low water flow. Each dam would be examined to determine if removal or partial removal is necessary to facilitate aquatic organism passage.

Trabuco Canyon contains a number of recreation residence cabins and has an extremely high volume of other recreationists, including hikers, mountain bikers, horseback riders, and people taking a drive in the woods.

Historically, Trabuco Creek was an important steelhead trout fishery. It also contained arroyo chub, and has arroyo toads downstream of the dams. Both the southern steelhead and the arroyo toad are listed as endangered species. Steelheads traditionally swim out to the ocean and then return upstream to spawn, after which they may return to the ocean. The fry will generally remain in the stream for year or more and then swim to the ocean.

Although no steelhead currently reside in Trabuco Creek, the species has been found swimming at the confluence of Arroyo Trabuco and San Juan Creek, which connects to the ocean. Trabuco Creek is one of the main tributaries to Arroyo Trabuco. If sufficient rainfall should allow the steelhead to swim upstream, the crossings and the dams would be barriers for the endangered fish.

1.3.2 Los Alamos Canyon

The South Main Divide Road, also known as the Wildomar Road, crosses Los Alamos Creek in the southern portion of the ranger district. This crossing often floods after heavy rainfall. The crossing consists of a concrete slab over a concrete base with culverts that allow for water flow. However, these culverts frequently become obstructed with debris, damming the stream and causing water to flood across the roadway. Los Alamos Creek drains into San Mateo Creek, which is a major historical fishery for steelhead trout. The crossing is a barrier to native fish movement.

1.3.3 San Mateo Creek (Tenaja Falls Trail Crossing)

Removing the hardened crossing on the Tenaja Falls Trail where the trail crosses San Mateo Creek would restore an additional 3.5 miles of stream and habitat for endangered southern steelhead and other sensitive aquatic organisms. Removal of this barrier would help restore the wilderness character of this portion of the San Mateo Canyon Wilderness Area and would also help to return the creek to its proper functioning condition.

1.4 LAND MANAGEMENT PLAN DIRECTION

This environmental analysis complies with the Cleveland National Forest Land Management Plan ("LMP"). The proposed project area lies within Silverado Place, Elsinore Place, and the San Mateo Place as identified in the LMP.

1.4.1 Trabuco Canyon

Trabuco Canyon lies within the Silverado Place. The desired condition for the Silverado Place is to maintain the area as a natural-appearing landscape that functions both as a backdrop for southern Orange County and a refuge for communities and the unique natural resources sheltered in the canyons. Trabuco Canyon lies within the developed area interface land use zone. The program emphasis for the Silverado Place includes improving road maintenance for safety and to accommodate contemporary firefighting vehicles, as well as maintaining a road network to support the demand for scenic driving.

1.4.2 Los Alamos Canyon

Los Alamos Canyon lies within the Elsinore Place. The desired condition for the Elsinore Place is to maintain the area as an undeveloped island in rapidly developing southern Riverside County, and as a natural appearing urban backdrop to the Interstate 15 and Ortega Highway corridor. Most of Los Alamos Canyon lies within the back country non-motorized land use zone. The road and the crossing themselves are in the back country land use zone. The program emphasis for the Elsinore Place is to provide a variety of recreation experiences and to improve road conditions.

1.4.3 San Mateo Creek (Tenaja Falls Trail Crossing)

The Tenaja Falls Trail crossing over San Mateo Creek lies within the San Mateo Place. The desired condition for the San Mateo Place is to maintain a predominantly naturally evolving landscape that functions as an undeveloped day use wildland and wilderness

retreat for southern Orange and Riverside counties. The Tenaja Falls Trail crossing is in the existing wilderness land use zone. The program emphasis for the San Mateo Place is to maintain the undeveloped, primitive and semi-primitive character of the area, and to conserve opportunities for solitude and challenges within the wilderness.

1.4.4 National Goals

Priority goals for the Forest Service as provided in the Forest Service National Strategic Plan include: (1) providing outdoor recreation opportunities, and (2) improving watershed conditions.

1.4.5 Goal 6.2 in the Land Management Plan

Goal 6.2 in the LMP deals with biological resource conditions (LMP, Part 1, pp. 44 to 45). In particular, this goal instructs the Cleveland NF to provide ecological conditions to sustain viable populations of native and desired nonnative species. The desired condition is to conserve habitats for federally listed species, and to recover listed species or to ensure that listed species are progressing toward recovery. Habitats for sensitive species and other species of concern are to be managed to prevent downward trends in populations and habitat capability, and to prevent federal listing. Flow regimes in streams that provide habitat for threatened, endangered, proposed, candidate, and/or sensitive aquatic species and riparian-dependent species should be enhanced or maintained so that they are sufficient to allow the species to persist and complete all phases of their life cycles.

1.5 DECISION TO BE MADE

The responsible official will decide whether to implement the proposed action, either in whole or in part; to implement an alternative to the proposed action; or to take no action.

Chapter 2
Alternatives

2.1 INTRODUCTION

The Cleveland National Forest is required by NEPA to analyze the proposed action and a no-action alternative. In addition, other alternatives to the proposed action were developed as a result of intra-agency, interagency, and public scoping. As outlined below, some of these alternatives were carried through the analysis process while others were eliminated from further study.

2.2 SCOPING

A synopsis of the project proposal appeared continually in the Cleveland National Forest Quarterly Schedule of Proposed Actions (SOPA) beginning in January 2011. Scoping letters were sent to all individuals who have expressed an interest in Trabuco Ranger District projects. Legal notices were placed in both the *Riverside Press-Enterprise* and the *Orange County Register*. Additional scoping occurred internally among USDA-Forest Service specialists and specialists from other state and federal agencies.

2.3 ISSUES

Scoping identified two issues regarding the proposed action, each of which is addressed in project design actions in section 2.5.1 below. The two issues are:

1. Keeping the crossings open during construction.
2. How will the creek be channeled once it passes beneath the new bridges?

2.4 ITEMS COMMON TO ALL ALTERNATIVES

A number of items would be common to all alternatives. These are:

1. Stream simulation will be used to ensure that the stream channel shape and gradient at each crossing is similar to the natural channel structure occurring along typical unmodified segments of the stream.
2. Best management practices (BMPs) for road and crossing construction would be met. BMPs would be in with standards and guidelines described in the Forest Service Handbook, Water Quality Management for Forest System Lands in

California, Best Management Practices (2000) and with Caltrans Storm Water Quality Handbook, Construction Site Best Management Practices Manual (November 2000).

3. Consultation would occur with the California Department of Fish and Game regarding any possible stream alteration, and with the Army Corps of Engineers regarding a Section 404 permit.
4. This project would be funded in whole or part by a source other than appropriated road maintenance dollars. The project cannot be implemented until funding has been secure, therefore implementation may occur over a two- to five-year period. The environmental documentation would be reviewed prior to implementation to ensure that all determinations and conclusions are still applicable and that no new information has been discovered that would significantly alter either the decision or the projects as proposed.
5. All crossings over Trabuco Creek on national forest land below the structure to be replaced would be examined prior to implementation to determine if they can support the equipment necessary to construction of the new structure and removal of the old structure. Where necessary improvements to the roads and crossings would be implemented to facilitate work on the new structure.
6. A geo-technical engineer would prepare a report for each location to determine the proper gradient and measures to be used to ensure the proper functioning of the stream after the new structures have been put into place and the old structures have been removed. This report would include information on whether to remove or alter the instream dams.
7. The scenic integrity objective ("SIO") for each crossing site is rated as high. Therefore, only temporary drops of more than one SIO level may be made during and immediately following project implementation providing the drop not exceed three years in duration. Finished structures would meet scenic and visual objectives for the area.

2.5 ALTERNATIVES

2.5.1 Alternative 1, Proposed Action

The Trabuco Ranger District proposes to remove six hardened crossings and to remove instream dams. Specifically, the proposal would:

1. Trabuco Creek -Replace four low-water hardened crossings in Trabuco Canyon with bridges. Each crossing will be constructed to fit the needs of that site and will accommodate a 100- year flood.
2. Trabuco Creek - Remove all in-stream dams.
3. Los Alamos Creek - Remove one hardened crossing and replace it with a bridge. The current structure is on South Main Divide Road where it crosses Los Alamos Creek. The new bridge will be constructed to accommodate a 100-year flood.
4. San Mateo Creek - Remove a hardened concrete crossing on the Tenaja Falls Trail that crosses San Mateo Creek and is within the San Mateo Canyon Wilderness. This crossing may eventually be replaced by a structure designed to support foot and horse traffic. If implemented, the trail bridge will be addressed in a separate analysis.

A map of the project area is included in Appendix B.

Actions common to all crossings

1. Stream simulation will be used to ensure that the stream channel shape and gradient at each crossing is similar to the natural channel structure occurring along typical unmodified segments of the stream.
2. Some road re-alignment will be necessary at each crossing. The amount of footage involved should be between 50 and 100 feet on each end of the new structure. Vegetation may need to be removed at some of the crossings.
3. Traffic will be allowed to continue to use the current crossing while the new crossings are installed. There may be some slight delays. Once the new structure is in place then the old structure will be removed and the new structure will be opened to traffic. One possible exception to this is the crossing at Tenaja Falls. The location for placement of a new structure is limited. Since this is located in a federally designated Wilderness mechanized activities will be limited in scope while the existing crossing is removed.
4. Temporary dewatering may be required and there may be some diverting of flow for as long as a week. However, the intent is to remain outside of the stream channel
5. Scenic objectives for all areas will be met
6. Best management practices (see Appendix A) will be followed in the design and construction of the crossing.

7. Stream banks will be stabilized where necessary to minimize erosion and slopes will be tiered to minimize rock fall and slides. Riprap or gabians would be used to protect bridge abutments. Approximately 40 linear feet of reinforcement would be needed per bridge abutment. Revegetation of the area after construction would also increase bank stability.
8. Exclusion fencing will be established around the project to protect sensitive species.
9. All construction equipment will be washed prior to commencing construction to minimize the spread of non-invasive species in accordance with NS-8 Vehicle and Equipment Cleaning, Caltrans Storm Water Quality Handbooks, Construction Site Best Management Practices Manual (Appendix A).
10. Width and length of the structure would conform to current hydrologic design standards and meet the Forest Service Transportation Structure Handbook requirements for designing a "long-term structure" to last a minimum of 50 years.
11. The project is expected to occur over the course of 5-7 years. Environmental documents will be reviewed to determine if new species have been listed, or any other actions have occurred which cause a change in the decision. If no change would occur, the review will be noted and the project will continue.
12. The total area to be permanently occupied by the reconstructed road and trail crossings and the reconstructed road approaches is approximately 2.5 acres or about ½ acre per crossing. The footprint of the reconstructed crossings is expected to be slightly larger than that of the existing crossings that will be replaced. In addition, at Trabuco Creek in-channel work may extend as far as 500 feet upstream and downstream of the existing crossings to allow for restoration of a natural gradient to the stream. This may temporarily disturb up to 9 acres of habitat.

2.5.1.2 Specific actions

The following specific actions, based on the terms and conditions from a previous consultation with the U.S. Fish and Wildlife Service regarding a bridge construction project at Pine Valley Creek, would be implemented to protect arroyo toads during project implementation. These actions would apply specifically to the San Mateo and Los Alamos locations.

1. Exclusion fencing and pitfall traps shall be installed around the site perimeter, including access roads, of the Los Alamos and San Mateo crossings as a precautionary measure. Installation of the exclusion fence and installation and operation of pitfall traps shall occur for at least 21 days prior to the initiation of construction activities. Exclusion fencing shall be made of water permeable material and shall be used to delineate the limits of the project area and, if needed, the project footprint. A site diagram, site photographs, and report summary showing the placement of the fencing and pitfall traps and

documenting their effectiveness, shall be submitted to the Carlsbad Fish and Wildlife office at least seven days prior to the actual implementation of the Los Alamos and San Mateo creek crossing projects.

2. All field personnel shall be educated about the sensitive biological resources associated with the sites.

3. Any excavated material at the sites that is not used for the project shall be disposed of at a suitable site.

4. A water pollution control plan, in the event of inclement weather, shall be developed to address water quality downstream of the Los Alamos and San Mateo creek crossings. This plan shall include actions to provide protective covering for excavated areas or soil stockpile areas. Sandbag berms shall be placed upstream to temporarily redirect the flow of water away from the footings and abutments while they are under construction.

5. The qualified biologist who is monitoring the sites shall inspect the construction area for arroyo toads. Prior to any construction activity, a qualified biologist shall conduct a briefing session for personnel involved in the project. If arroyo toads are found, the field personnel or project leader shall contact the qualified biologist. The qualified biologist shall relocate the arroyo toads out of the project area into nearby suitable habitat. No later than 30 days after completion of the proposed project, the qualified biologist shall provide a written report documenting the number of arroyo toads removed from the project area, date and time of capture, specific location of capture, approximate size and age of individuals, and description of relocation sites.

6. A restoration plan for the temporarily impacted areas shall be submitted to the Carlsbad Fish and Wildlife office for approval at least seven days prior to the actual implementation of the project. The restoration plan shall include, but is not limited to, techniques used to restore native habitats, success criteria, monitoring parameters and schedule, and remedial measures in the event success criteria are not achieved. Annual monitoring reports shall be submitted documenting the progress and success of restoration and enhancement efforts.

2.5.1.3 General resource protection measures

Resource protection measures and design criteria developed to protect and enhance aquatic habitat conditions and avoid or reduce adverse effects to federally listed species and Forest Service sensitive fish and wildlife species are included in the fisheries and wildlife biological assessment and biological evaluation. A summary of some of those

measures that relate to reducing soil disturbance, impacts to vegetation, and the spread of noxious weeds are included below:

1. All applicable Best Management Practices (BMPs) for stream crossing replacement listed in the contract specifications would be adhered to throughout construction.
2. Ground-disturbing activity, such as heavy equipment use, would not occur during wet weather conditions.
3. Permanent and temporary spoils would be stored in a manner to prevent sediment delivery to any watercourse during and after project construction.
4. All disturbed areas—including equipment storage and staging areas, disturbed stream banks, and spoils disposal sites—would be revegetated with native grass, forbs, and tree species immediately after project construction.
5. Equipment cleaning would be required to reduce the potential for introduction of noxious weeds into the project area.

2.5.1.4 Spill prevention

1. A spill prevention plan that details precautionary, preventative, and spill response measures sufficient to prevent resource damage from any fuels, lubricants or hydraulic fluids used or stored on site would be developed. The plan shall include provisions for: (1) safely refueling equipment outside the 100-year floodplain; (2) storing any fuels, lubricants, or hydraulic fluids offsite or outside the 100-year floodplain and contained to prevent accidental spillage if containers are compromised; (3) emergency response measures adequate to rapidly contain and clean up any spills in a timely manner to prevent dispersal and contamination of soils or water resources, including onsite availability of a spill kit containing absorbent pads, booms, and a leak-proof container for storing contaminated spill cleanup materials; and (4) a reporting requirement that the Forest Service and any necessary emergency responders be notified immediately of any spills, with the stipulation that the spill and all response measures be thoroughly documented and delivered as soon as possible to the Cleveland NF hazardous materials coordinator. The Forest Service and other regulatory agencies may order cessation of operations, and cleanup and abatement if hazardous spills occur.

2. Self-contained sewage and grey water facilities shall be present and the project operator shall ensure and demonstrate that the sewage containment system is in good operating condition.

3. Temporary concrete wash-out facilities, consisting of a depression or pool constructed of straw bales or sand bags lined with plastic shall be constructed at the flat staging areas away from the stream channel. Accumulated concrete waste shall be disposed of, along with the plastic liner, in the appropriate manner.

2.5.1.5 Spoils and fill

If excavated material is to be reused during construction, it shall be stored at the existing flat staging areas to prevent sediment transport towards the stream.

2.5.2 Alternative 2, No Action

The current crossings would remain in place. No action would be taken to accommodate aquatic passage. The instream dams in Trabuco Creek would remain in place.

2.6 ALTERNATIVES CONSIDERED BUT NOT ANALYZED IN DETAIL

Two alternatives were considered by the interdisciplinary team but were eliminated from detailed analysis because they did not adequately address the purpose and need for the project.

2.6.1 Alternative 3, Current structures plus fish ladders

This alternative would leave the current structures in place at each location. A bridge would be built over each crossing and a fish ladder would be added to facilitate aquatic passage. This alternative includes the following design criteria:

1. Removing vegetation at the crossings to accommodate new bridges.
2. Because the bridges would be built over the current structures, traffic flow would be interrupted or delayed to accommodate the placement of the new overhead structures. One possible exception to this would be the crossing on Tenaja Falls Trail. The location for placement of a new structure is limited because it is found in a federally designated wilderness area.
3. Scenic objectives for all areas affected would be met.
4. Best management practices would be followed in the design and construction of the crossing.
5. Exclusion fencing would be established around the project to protect sensitive species.
6. All construction equipment would be washed prior to commencing construction to minimize the spread of non-invasive species in accordance with NS-8 Vehicle and Equipment Cleaning, Caltrans Storm Water Quality Handbooks, Construction Site Best Management Practices Manual.
7. Width and length of the new structure would conform to current hydrologic design standards and meet the Forest Service Transportation Structure Handbook requirements for designing a “long-term structure” to last a minimum of 50 years. The new crossing at Tenaja Falls Trail would meet the same handbook standards.

8. Motorized equipment which would include but not be limited to backhoe, bull dozer, and cranes will be used to remove the old structure and install the new structure.

This alternative might maintain the current riparian condition over the short term, but it might not do so over the long term. During periods of heavy rainfall, current structures have a high degree of failure because the water level increases on the upstream side of the structures until the road is breached. Under these circumstances, roads can washout and adjacent stream banks can undergo severe erosion. In fact, many current structures have already been undermined by previous storms sometime in the past. Because they commonly sustain damage during heavy rains, they would continue to sustain damage and both the bridges and the fish ladders may require repair or replacement. This alternative would not permit the stream gradient to be restored, nor would it permit the stream to return to its proper functioning condition.

Due to the reasons cited above, this alternative does not meet the purpose and need, therefore it was not analyzed in detail.

2.6.2 Alternative 4, Replace existing crossings with concrete arches, except at Tenaja Falls Trail

Under this alternative, existing structures would be removed and replaced with pre-cast concrete arches with a wider opening at the stream crossing and an open bottom. The arches would be placed in the same location as the existing crossing. The road would be closed to all vehicle traffic during construction. New footings would be installed on each end for the placement of the arches. Rock or soil material for use as fill would be brought from other locations because there is an insufficient supply located of suitable material in Trabuco Canyon. The crossing at Los Alamos Creek would require some supplement to the soils from outside the immediate area.

Neither Trabuco Canyon Road nor South Main Divide (also known as Wildomar) roads would be realigned. The width and length of the concrete arch would conform to current hydrologic design standards and meet the Forest Service Transportation Structure Handbook requirement for designing a “long-term structure” to last a minimum of 50 years.

All actions taken in Alternative 1 to protect sensitive species or species of concern would apply to this alternative. Construction equipment and vehicles would be washed prior to construction to minimize the spread of non-native invasive species. A separate design would be employed to replace the Tenaja Falls Trail crossing because no motorized traffic needs to be accommodated at that location.

A concrete arch would require impacts to a larger area to accommodate the new structure and would have increased impacts to the stream channel, riparian species, and aquatic species.

Due to the reasons cited above, this alternative does not meet the purpose and need, therefore it was not analyzed in detail.

The following was considered for all alternatives except the no action alternative: Because the crossing at San Mateo Creek is within the San Mateo Wilderness one method that could be utilized to remove and install a structure would be to do it by hand, using tools like picks, shovel and sledge hammerss. Both removal and installation would be labor intensive and would require a large crew and would take months to remove the old structure. Since the crossing is made of concrete, it would be necessary to hand carry the old materials from the site out to the trail head which sits outside of the wilderness a distance of approximately 1/8 of a miles.
The primary reason behind replacing the current structure is to facilitate the passage of aquatic organisms,(fish and other native species). In order to accomplished this the current structure must be removed and replaced with a structure that would be above the water. A concrete structure with abutments that sit outside of the creek will be the best way to accomplished this. The effects on the stream using this method would:

- Lead to increase sediment disturbance and an increase in turbidity within the stream.
- Release of contaminants and toxic materials.
- Change in channel morphology and hydrology.
- Loss and/or reduction of steelhead habitat (e.g., migration, spawning, and rearing habitat).
- Loss of habitat for other aquatic species

Thes affects would occur during the removal and the reconstruction phases. The removal and replacement of a crossing using non mechanical method would not be cost effective nor would it be less of an impact on the soil and the hydrology and other resources.
The secondary reason is for the health and safety of forest visitors. Currently, when high water covers the crossing, some trail users go upstream and try to cross by boulder and rock hopping across the creek. This is unsafe as the rocks are unstable and can lead to individuls falling in the creek and the boulders are large and one must climb up and down to reach aspot to ford the creek.. This has also lead to vegetation denuding along the banks of the creek where forest visitor have walked trying to find a safe crossing.

Using this method would not enchance the wilderness character due to the direct and indirect effects the action would cause to the native species and the threatened and endangered species and the critical habitat for an endangereed species.

2.6 ALTERNATIVE COMPARISON

Table 2.1 Summary of the differences between alternatives 1 and 2.

Historic data indicate that the current crossing alignments in Trabuco Canyon may not be in the original flow direction of the stream. Alternative 1 would allow for maximum flexibility in realigning the stream back to its original flow direction and pattern. With a longer life expectancy than Alternative 2 and the most effective cost benefit, this alternative would be the most economical and environmentally feasible. Alternative 1 would enhance the effectiveness of the crossings.

Table 2.1: Comparison of alternatives analyzed in detail.

Criteria	Alternative 1 Proposed Action	Alternative 2 No Action
Preservation of natural streambed and removal of barriers to aquatic organism passage	Yes	No
Minimal traffic delays	Yes	Not applicable
Adequately accommodate flow	Yes	No
Life expectancy	75 years	Expired
Meet Forest Service design requirements	Yes	No
Estimated construction cost per bridge	$707,000	Not applicable
Equivalent uniform annual cost per bridge	$36,284	Not applicable

The integrity of three of the existing structures in Trabuco Creek is already compromised by degradation of the pipe culverts and undermining. One of these known as the Pear Tree crossing was damaged by the rains of December 2010. The fourth is in better condition because it is a newer structure that is less than 10 years old.

The Los Alamos crossing, although showing signs of wear, is still operational. Portions of the crossing were replaced after severe damage caused by heavy rainfall in 1995 and 1996.

The crossing at Tenaja Falls Trail over San Mateo Creek is being undermined by water flow that is eroding soil on both ends of the crossing. This erosion causes additional sediment to enter the stream during periods of high rainfall. During heavy rains and high water flows the crossing is covered by water and unsafe for travel. The depth of the water on the crossing can be as deep as two to three feet. This situation generally persists until about mid-summer. When the crossing is flooded forest visitor generally try to travel further upstream to cross and rejoin the trail. However the journey upstream requires visitor to boulder hop across boulders that are in some case five feet or more in diameter.

Alternative 2 would ultimately result in the failure of the existing crossings to support vehicular, mountain bike, horse, or foot traffic at the Los Alamos and Trabuco crossings.

This would continue the current cycle of repair or replacement of the current structures whenever the area experiences heavy rainfall.

Only foot and horse traffic would be affected by the failure of the crossing on the Tenaja Falls Trail across San Mateo Creek. After the crossing was no longer available, no connection between the Tenaja Falls Trail going south and the Tenaja Falls Trail going north would exist. This trail provides a connection to two other trails one of which is popular with horse riders. Morgan Trail and Fisherman's Camp Trail and the San Mateo Trails. Failure of this crossing could affect trail use on approx ¼ to 1/3 of the trails within the wilderness.

Chapter 3
Affected Environment

3.1 TRABUCO CANYON

Trabuco Canyon is located in Orange County in the Santa Ana Mountains. The Forest Service portion of the canyon is between five and six miles long, from the top of North Main Divide Road westward to the national forest boundary, for an area of approximately 6171 acres. The canyon is narrow and almost V-shaped in sections with a narrow valley floor. Trabuco Creek runs through the valley. The headwaters of the creek start above Yeager Mesa and continue past the national forest boundary into Arroyo Trabuco.

Trabuco Creek is a tributary of San Juan Creek, which flows to the Pacific Ocean. Historically, all four structures in Trabuco Canyon that are proposed for replacement have required frequent maintenance, and all structures inhibit aquatic organism passage.

Crossing 1 is 0.35 kilometers (0.22 miles) upstream from the national forest boundary on Road 6S13. At the time of the field survey in May 2011, the water drop from the top of the structure to the bottom was 1.35 meters (4.5 feet). See Figure 1 in Appendix A. A longitudinal profile was surveyed for 57.4 meters (189 feet) downstream and 75.3 meters (247 feet) upstream of the crossing, along with one cross section below and two cross sections above the crossing. Some 34 percent of the surveyed reach consisted of "slow" (glide and pool) water while the remaining 66 percent consisted of swift water (riffles and runs).

The slope upstream of crossing is between 1.0 and 1.5 percent. There is evidence of backflow above the crossing where a mid-channel bar has formed and which extends for approximately 26 meters (85 feet) upstream. Here the channel is also slightly enlarged, with a width of 11.1 meters (36 feet) from right to left edge of water. Further upstream, another cross sections show the channel to be more confined, with a width of 7.2 meters (24 feet). Downstream of the crossing, the channel becomes more confined, with a width of 5.3 meters (17 feet), and the slope increases to approximately 2.5 percent.

Crossing 2 is 0.10 kilometer (0.62 miles) upstream from Crossing 1. At the time of the field survey in May 2011, the water drop from the top of structure to bottom was 1.68 meters (5.5 feet). Longitudinal profile surveys for crossings 2 and 3 were done together because they were in close proximity. Similar to Crossing 1, it is evident that the crossings are causing a backwater effect. However, it is clear from the longitudinal profile that the grade steepens further upstream.

Crossing 3 is 1.30 kilometers (0.81 miles) upstream from Crossing 2. At the time of survey, the water drop from the top of the structure to bottom was 1.71 meters (5.6 feet). A small manmade dam was identified directly above the highest cross section above the crossing.

Crossing 4 is 1.25 kilometer (0.78 miles) upstream from Crossing 3. At the time of survey, the water drop from the top of structure to bottom was 1.79 meter (5.8 feet). Directly upstream of the crossing several unstable banks were identified. Here the channel widens from being more confined upstream. There is also a small manmade dam upstream of the first cross section.

Steelheads have been reported near the mouth of Arroyo Trabuco. Steelheads have not been found in either Trabuco or Holy Jim creeks in over a decade, although Trabuco Creek historically was a steelhead stream. The creek is currently stocked annually with rainbow trout by the California Department of Fish and Game. During high water, the creek can run up to 10,000 cubic feet per second.

Road 6S13, which is dirt, crosses the creek five times. The crossing at the confluence of Holy Jim and Trabuco creeks was replaced by a bridge approximately four years ago. Three of the crossings are hardened crossings and one is a concrete structure. During periods of heavy rain, water flows across the top of these crossings. With the exception of the bridge, none of the current crossings were designed to facilitate aquatic organism passage.

Vegetation in the canyon is a mix of riparian species, including mule fat, alders, sycamores, and oaks, as well as remnants of domestic vegetation, including fig trees, geraniums, and lilies. Non-native vegetation is also found in the area, including vinca, giant reed, and agave. At the top of the canyon, vegetation is dominated by big cone Douglas-fir. Predominant soils in the canyon are derived from crystalline granitic rocks. The area contains rock outcroppings and granitic boulders. The type of soils combined with the slopes make the erosion in the canyon a hazard.

The canyon also contains a number of recreation residence cabins. The cabins start approximately 500 feet before the intersection of Holy Jim and Trabuco creeks and continue up the canyon. Although recreation residence cabins are not permitted as primary residences, they can be occupied at any time during the year unless otherwise restricted. The canyon is popular with hikers, mountain bikers, and casual visitors out for a drive. Trabuco Canyon provides the quickest access to the Holy Jim Trail.

3.2 LOS ALAMOS CANYON

Los Alamos Canyon is in Riverside County within the Elsinore and Santa Ana mountains. Los Alamos is a U-shaped valley with a creek running through the middle. Slopes on the sides of the valley are between 65 and 85 percent and tend to be rocky on the eastern side. On the west side of canyon vegetation is sparser and tends to be more chaparral. Vegetation in Los Alamos Canyon is riparian, alder, ash, mule fat, sycamore, and coast live oak. Vegetation at the crossing is predominantly mule fat with an occasional ash.

The soils in the canyon are Cienaba-Rock Outcrop Complex, Friant fine sandy loam, Las Posas gravelly loam, Soboba cobbly loam and Riverwash, areas of unconsolidated alluvium. The crossing is approximately 12 miles south of the Ortega Highway (see Figure 2 in Appendix A). The headwaters of Los Alamos Creek begin off-forest on private land and continue until its confluence with San Mateo Creek.

SAN MATEO CREEK

San Mateo Canyon begins in Riverside County and ends in San Diego County. The canyon runs through the Santa Ana and Santa Margarita mountains and is located in a federally designated wilderness. The canyon is V-shaped at its beginnings and then as it descends in elevation the valley floor widens into a U-shape valley with small vegetated islands in the middle of the creek. It eventually becomes a wide flat stream as it flows through Camp Pendleton and into the Pacific Ocean. Elevation ranges from 2800 feet to less than 800 feet. The creek bed is a mix of bedrock and sand and cobble. As the canyon descends toward the ocean the walls become rocky and steep.

The stream crossing is the remnant from the old road, which prior to the wilderness designation in 1984 was used by private land owners who have in holdings that are surrounded by the San Mateo Wilderness by other forest users.

The stream in the vicinity of the crossing is dominated by cobble-sized rock and bedrock. Due to the relatively low gradient and vast majority of pool features, features above and below the crossing are considered to be a compound pool. Vegetation in San Mateo Canyon is a mix of alder, mule fat, sycamore, and coast live oak. Vegetation at the crossing is predominantly mule fat with cattails growing in the stream channel. Soils in the canyon are Friant fine sandy loam, and Riverwash, areas of unconsolidated alluvium.

The crossing is approximately 14 miles south of the Ortega Highway. Steelheads have already started to migrate up San Mateo and have been found in Devils Canyon. The creek also contains several other species including southwestern arroyo toad, southwestern pond turtle, western toad, and two-stripe garter snake.

Chapter 4
Environmental Consequences

4.1 ALTERNATIVE 1, PROPOSED ACTION

Alternative 1 is summarized in Chapter 2.

4.1.1 Biological consequences

The total area to be permanently occupied by the reconstructed road and trail crossings and the reconstructed road approaches is approximately 2.5 acres. The footprint of the reconstructed crossings is likely to be slightly larger than the footprint of the existing crossings. In addition, at Trabuco Creek in-channel work may extend as far as 500 feet upstream and downstream of the existing crossings to allow for restoration of a natural stream gradient. This may temporarily disturb up to nine acres of habitat.

4.1.1.1 Effects to arroyo toads

Direct effects: At the Trabuco Canyon crossings, no direct effects are expected from Alternative 1 because arroyo toads do not occur in the project area. The nearest occurrences of the species have been near the national forest boundary 0.5 to 2.0 miles downstream from the project area.

At the Los Alamos and San Mateo creek crossings, direct effects may result from the proposed action due to ground disturbance and construction activity in occupied habitat. Construction equipment could injure or kill toads during project work.

***Indirect effects*:** At the Los Alamos and San Mateo creek crossings, indirect effects may include minor increases in erosion and quantities of sediment in the stream during construction. This could harm or kill any toad eggs in the immediate downstream area.

At the Trabuco Creek crossings, indirect effects of the project may include minor increases in erosion and quantities of sediment in the stream during construction. Due to the distance between the project area and the areas currently inhabited by arroyo toads, the indirect effects related to erosion are expected to be too small to measure. The long-term effect of the project will be beneficial as it will allow for more natural stream flows and deposition rates.

***Cumulative effects*:** The Endangered Species Act defines cumulative effects as those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur in the action area of the federal action subject to consultation.

Future federal actions would be analyzed through separate Section 7 consultations and are not considered in this section.

The upper reaches of the San Mateo Creek watershed have extensive development of rural residential housing. Large areas have been cleared for construction and the upper watershed contributes a significant amount of sediment to Tenaja Creek and to a lesser degree, to Los Alamos Creek. The proposed project would contribute negative effects to downstream habitats due to soil disturbance and erosion associated with construction.

The upper reaches of Trabuco Creek have recreation facilities including a trailhead, trails, and a recreation residence cabin tract. These areas are a potential source of sediment and water pollution. All upstream facilities are managed by the Forest Service and have been addressed in previous consultations. Because there are no private or non-federal actions in the upper watershed, and because the proposed project is not expected to have direct or indirect effects on arroyo toads, the current project is not expected to contribute to cumulative effects on the species.

During reconstruction of road and trail crossings at Trabuco, Los Alamos, and San Mateo creeks, water quality would be protected and have insignificant changes as a result of implementing best management practices, standards and guides, and the project design standards developed to minimize effects to aquatic resources.

Due to the presence of occupied arroyo toad habitat at the project sites on Los Alamos and San Mateo creeks, and the potential for damage to individual toads associated with project activities, the Cleveland NF biologist determined that the reconstruction of these crossings may adversely affect arroyo toads. Over the long term the project would have a beneficial effect because the project would allow more natural water flows and sediment deposition along streambanks.

Due to the distance between the Trabuco Canyon project areas and occupied arroyo toad habitat, the Cleveland NF biologist determined that the reconstruction of these crossings will have no effect on arroyo toads. Over the long term the project would have a beneficial effect beause the project would allow more natural water flows and sediment deposition along streambanks

4.1.1.2 Effects to steelhead trout

***Direct and indirect effects*:**

1.Trabuco Creek crossings: No direct or indirect effects are expected from the proposed action, as steelhead cannot currently access the portion of the stream that is on National Forest System lands. The nearest occurrences have been near the confluence of Trabuco Creek and San Juan Creek about 15 miles downstream from the project area.

2. Los Alamos Creek crossing and San Mateo Creek crossing: Implementation of the proposed project could result in direct and indirect effects on southern steelhead. Impacts associated with the above activities include:

1. Increase in sedimentation and turbidity.
2. Release of contaminants and toxic materials.
3. Noise and disturbance.
4. Temporary change in channel morphology and hydrology.
5. Loss and/or reduction of steelhead habitat (e.g., migration, spawning, and rearing habitat).

Possible project effects from bridge and road construction include impairment of fish survival due to contaminants; reduction of spawning or rearing habitat through increased input of sediment; temporary impairment of fish passage and reduced availability of habitats resulting from changes in channel morphology and hydraulics; reduction of fish habitat through removal and destruction of cover; and disturbance, injury, or mortality of individual fish resulting from work in and adjacent to bodies of water or as a result of fish salvage and relocation efforts.

***Cumulative effects*:** The Endangered Species Act defines cumulative effects as those effects of future state or private activities, not involving federal activities, that are reasonably certain to occur in the action area of the federal action subject to consultation. Future federal actions would be analyzed through separate Section 7 consultations and are not considered in this section.

Trabuco Creek: Reconstruction of road crossings and removal of fish dams at Trabuco Creek is expected to have no effect on Southern California Steelhead due to the distance of the project area from occupied or accessible steelhead habitat and the implementation of Best Management Practices, standards and guides, and the project design standards to minimize effects to fisheries resources.

A biologist has determined that the reconstruction of these crossings will have no adverse effects on Southern California Steelhead. Over the long-term the project will have a beneficial effect as the project will allow steelhead passage after other downstream barriers are removed.

Los Alamos and San Mateo Creeks: Reconstruction of the road crossing at Los Alamos Creek and removal of the existing crossing at San Mateo Creek is expected to have temporary adverse effects on Southern California Steelhead due to potential impairment of fish survival caused by potential contaminants; reduction of spawning or rearing habitat through increased input of sediment; temporary impairment of fish passage and reduced availability of habitats resulting from temporary changes in channel morphology and hydraulics; temporary reduction of fish habitat through removal and destruction of

cover; and disturbance, injury, or mortality of individual fish resulting from work in and adjacent to bodies of water or as a result of fish salvage and relocation efforts.

A biologist has determined that these projects may affect and are likely to adversely affect Southern California Steelhead over the short term, during and after construction. Over the long-term the project will have a beneficial effect as the project will allow for steelhead passage to upstream habitat that is currently not accessible.

Direct, indirect, and cumulative effects to all other threatened, endangered or purposed species: No known occupied habitat for any other threatened, endangered, or purpose species. Nor is there any critical habitat for any other known threatened, endangered or purposed species. Therefore, no affects are expected to occur to any other threatened, endangered or purposed species.

4.1.1.3 Effects to sensitive species

Table 4.1 lists sensitive species that have potential to occur in the project areas.

Table 4.1: Sensitive species that may occur in the project areas.

Plants	**Los Alamos and San Mateo**	**Trabuco**
Sticky dudleya (*Dudleya viscida*)	Potential	No potential
Heart-leaved pitcher sage (*Lepechinia cardiophylla*)	Potential	Potential
Chaparral beargrass *(Nolina cismontana)*	Potential	Potential
San Miguel savory *(Satureja chandleri)*	Potential	Potential
Wildlife		
Coastal rosy boa (*Lichanura trivirgata roseofusca*)	Potential	Potential
Two-striped garter snake (*Thamnophis hammondii*)	Potential	Potential
San Diego mountain kingsnake (*Lampropeltis zonata pulchra*)	Potential	Potential
San Diego ring-necked snake (*Diadophis punctatus similis*)	Potential	Potential
San Diego horned lizard (*Phrynosoma coronatum blainvillei*)	Potential	Potential
California legless lizard (*Anniella pulchra*)	Potential	Potential
Southwestern pond turtle (*Emys marmorata pallida*)	Potential	Known
Arroyo chub (*Gila orcuttii*)	Potential	Known
Pallid bat (*Antrozous pallidus*)	Potential	Potential
Townsend's big-eared bat (*Corynorhinus townsendii*)	Potential	Potential
Western red bat (*Lasiurus blossevillii*)	Potential	Potential

Two sensitive wildlife species are known to occur in the project area. The arroyo chub occurs in Trabuco Creek, within and adjacent to the creek crossings. The southwestern pond turtle occurs in Holy Jim Creek, upstream from the creek crossings. All the sites contain potential habitat for nine additional sensitive wildlife species, including the coastal rosy boa, two-striped garter snake, San Diego mountain kingsnake, San Diego ring-necked snake, San Diego horned lizard, California legless lizard, pallid bat, Townsend's big-eared bat, and western red bat.

Plants: No sensitive plants were located during field surveys. No effects on sticky dudleya, San Miguel savory, heart-leaved pitcher sage, and chaparral beargrass are anticipated as a result of project implementation.

Wildlife: Arroyo chubs were observed in Trabuco Creek during field visits. Southwestern pond turtle is known to occur in the Holy Jim/Trabuco Creek area. The project area contains potential habitat for nine additional sensitive wildlife species, as shown in Table 4.1. These species may be affected by project implementation. In addition, California coast range newts were observed at Trabuco Creek and potential habitat for these newts was present at Los Alamos Creek. These newts have a limited distribution in southern California.

***Loss and/or alteration of habitat*:** All species listed above are known or expected to occur in the project areas. Coastal rosy boa, San Diego horned lizard, California legless lizard, and southwestern pond turtle all require at least temporarily friable soils that allow burrowing for refugia. Compaction of these soils due to the construction of bridge abutments or roadways effectively precludes their use by these species. The total area to be occupied by the reconstructed road and trail crossings is approximately 2.5 acres. The footprint of the reconstructed crossings is likely to be slightly larger than that of the existing crossings that would be replaced. In addition, at Trabuco Creek in-channel work may extend as far as 500 feet upstream and downstream of the existing crossings to allow for restoration of a natural gradient to the stream. This may temporarily disturb up to nine acres of habitat.

***Direct effects*:** Demolition of existing crossings and construction of new crossings may cause mortality of any sensitive species that are known or may occur in the project areas. Arroyo chub, southwestern pond turtle, coastal rosy boa, two-striped garter snake, San Diego mountain kingsnake, San Diego ring-necked snake, San Diego horned lizard, and California legless lizard potentially could be run over by construction traffic at the project sites. Direct effects may occur due to accidental spills or deliberate release of chemical contaminants. These effects would be short term. Over the long term, restoration of stream gradients and opportunities for fish passage would have a beneficial effect on wildlife species in the project area.

Indirect effects: The project may include minor increases in erosion and quantities of sediment in the stream during construction. The long-term effect of the project would be beneficial because it would allow for more natural stream flows and deposition rates.

***Cumulative effects*:** Threatened, endangered, and sensitive species are currently affected by recreational activity, man-made stream structures and diversions, introduced exotic plant and animal species, recreation and trail activities and road and vehicle impacts. These activities can result in direct mortality or habitat alteration or loss. The proposed project may add to these effects by temporarily increasing vehicular traffic and disturbing habitat in the project area.

Heavy equipment would be needed to complete construction and transport materials to and from the sites. Construction vehicles may increase road mortality of threatened, endangered and sensitive species throughout Trabuco Canyon and along Los Alamos and San Mateo creeks. Construction vehicles can also increase the spread of exotic "weedy" plants by transporting seeds from one disturbed site to another in their tires and undercarriages. Construction sites would have areas of disturbed soil preferred by fast-growing, high-reproducing exotic plant species. Construction traffic may also increase the chance of hazardous chemical spills on the access roads. These chemicals may indirectly enter the stream channel; organisms may be killed or displaced as the result of chemical exposure. The proposed project may contribute to cumulative effects on species in the project vicinity.

Plants: No sensitive plant species were observed during the field survey. Reconstruction of road and trail crossings at Trabuco, Los Alamos, and San Mateo creeks is expected to have no effect on sticky dudleya, San Miguel savory, heart-leaved pitcher sage, and chaparral beargrass.

Wildlife: Two sensitive wildlife species are known to occur in the project area. Arroyo chub occurs in Trabuco Creek, in and adjacent to the road crossings. Southwestern pond turtle occurs in Holy Jim Creek, upstream of Trabuco Creek, and is likely to occur in Trabuco Creek. All sites contain potential habitat for nine additional sensitive wildlife species, as shown in Table 4.1.

Based on the loss of habitat, potential for direct mortality, and indirect and cumulative effects that are expected to occur, the Cleveland NF biologist determined that reconstruction of road and trail crossings at Trabuco, Los Alamos, and San Mateo creeks may affect individual arroyo chubs, southwestern pond turtles, coastal rosy boas, two-striped garter snakes, San Diego mountain king snakes, San Diego ring-necked snakes, San Diego horned lizards, California legless lizards, pallid bats, Townsend's big-eared bats, and western red bats. Based on the relatively small acreage affected by the project, the Cleveland NF biologist determined that project implementation is not likely to result in a trend toward federal listing or a loss of viability for these species.

4.1.1.4 Effects to management indicator species

Table 4.2 lists management indicator species that occur in the project area.

Table 4.2: Management indicator species.

Species	Indicators of management	Relevance to project
Mountain lion	Fragmentation	Occurs in project area
Mule deer	Healthy diverse habitats	Occurs in project area
Arroyo toad	Aquatic habitats	Does not occur in immediate project area
Song sparrow	Riparian habitats	Occurs in project area

Effects of Alternative 1 on the mountain lion: Reconstruction of six stream crossings is not expected to contribute to habitat fragmentation. The project would not reduce the amount of habitat available for this species. The proposed project is not expected to contribute to habitat and population trends for mountain lion.

Effects of Alternative 2 on the mountain lion: Selection of Alternative 2 would not contribute to habitat fragmentation and would not reduce the amount of habitat available for this species.

Effects of Alternative 1 on the mule deer: Reconstruction of six stream crossings is not expected to contribute to habitat fragmentation. The project would not reduce the amount of habitat available for this species. The proposed project is not expected to contribute to habitat and population trends for mule deer.

Effects of Alternative 2 on the mule deer:
Selection of Alternative 2 would not contribute to habitat fragmentation and would not reduce the amount of habitat available for this species.

Effects of Alternative 1 on the song sparrow: Reconstruction of six stream crossings is not expected to contribute to habitat fragmentation. The project would not reduce the amount of habitat available for this species. The proposed project is not expected to contribute to habitat and population trends for song sparrow

Effects of Alternative 2 on the song sparrow: Selection of Alternative 2 would not contribute to habitat fragmentation and would not reduce the amount of habitat available for this species.

4.1.1.5 Effects to migratory birds

Effects of Alternative 1 on migratory birds: Given the limited effect of the project on riparian habitat, implementation may affect some migratory bird species or their

associated habitats. Potential impacts to migratory species would be minimized by doing vegetation clearing outside of the nesting season whenever possible.

4.1.2 Soil/hydrology consequences

Stream surveys and visual assessments of the locations by Forest Service hydrologists were conducted over the period of two weeks in May 2011. Surveys included cross sections and longitude sections as well as pebble counts and streambank stability surveys. Soils were also evaluated. The crossings were also seen and evaluated by a Forest Service geotechnical engineer. Additional surveys may be conducted to further understand stream processes, confirm and better delineate work areas, and to complete stream restoration designs.

Trabuco Creek is a perennial stream and is part of the Arroyo Trabuco Hydrologic Unit Code ("HUC") 6 Watershed. At the crossings proposed for reconstruction, both Los Alamos and San Mateo creeks are considered intermittent streams. The project areas are in the Upper and Middle San Mateo Creek watersheds. The surrounding area is characterized by steep chaparral-covered slopes. Along Trabuco, Los Alamos, and San Mateo creeks, the vegetation type is oak-sycamore-alder woodland with other riparian species, such as willow and poison oak. Trabuco Canyon soils are mapped as Riverwash and Soboba cobbly loamy sand. Los Alamos and Tenaja Falls soils are mapped as Riverwash.

Direct effects: Direct effects of the stream restoration and alternative crossings would not be significant. Construction would occur during off-peak water flow periods and have limited impacts on water flow and transportation of sediment downstream. Any changes would not negatively impact beneficial uses or cause disruption of habitat and/or stream processes. Effects to soils would be limited to the direct impact areas of construction. Detrimental impacts would be range from limited to very minor due to the small areas involved, the best management practices in place, and the during- and post-construction erosion and sediment control (re-vegetation of the sites).

Positive direct effects would result from restoring the natural stream processes and eliminating direct vehicle contact with water because vehicles would no longer enter the stream channel. These would have positive benefits to water quality and to sediment delivery to the streams.

Indirect effects: No significant negative indirect effects would occur through the process of stream simulation and the construction of the alternative crossings and bridges. Positive effects of the natural stream processes as well as eliminating habitat fragmentation would benefit the watershed and result in a greater functioning to the watershed.

Cumulative effects: With the best management practices in place, as well as the limited negative direct and indirect effects, the negative cumulative effects would not be significant. All beneficial uses of water would be met and improvements to the watershed condition would result.

With respect to water resources, beneficial uses of water, watershed condition, and stream and riparian habitat condition and quality, a need exists to restore stream connectivity and natural routing processes. Flows, bedload routing, and debris transportation over the next few decades would further affect hydrologic processes, fisheries habitat, and threaten the integrity of Forest Service roads. However, the proposed projects would restore hydrologic connectivity without significantly increasing cumulative effects in the project watersheds.

4.1.2.1 Erosion and water quality risk and effects analysis

Implementation of the project would meet the long-term benefits outlined by regulatory agencies and as described below.

Floodplains: Executive Order 11988 provides direction to avoid adverse impacts associated with the occupancy and modification of floodplains. Floodplains are defined by this order as the "lowland and relatively flat areas adjoining inland and coastal waters including flood-prone areas of offshore islands, including at a minimum that area subject to a 1 percent (100-year recurrence) or greater chance of flooding in any one year."

Relative to floodplain impacts the project would result in meeting the goal of restoring the floodplain function at both crossing sites. Currently the crossing can only convey natural flows and associated bedload and debris during smaller storm events, before backwatering upstream begins. Currently flows higher than five-year flow begin backwatering at the inlets of the crossings, resulting in debris plugging and deposition of larger sized particles, which artificially alters the upstream floodplains. The crossings then overtop and erode, depositing additional sediment into the stream.

The project is consistent with the direction set forth in Executive Order 11988.

Wetlands: Executive Order 11990 was promulgated to avoid adverse impacts associated with destruction or modification of wetlands. Wetlands are defined by this order as "areas inundated by surface of ground water with a frequency sufficient to support and under normal circumstances does or would support a prevalence of vegetative or aquatic life that requires saturated or seasonally saturated soil conditions for growth and reproduction. Wetlands generally include swamps, marshes, bogs, and similar areas such as sloughs, potholes, wet meadows, river overflows, mud flats, and natural ponds."

The projects would occupy the existing road fill foot prints and would not alter or affect wetland habitats. Therefore, this project is consistent with the direction set forth in Executive Order 11990.

Municipal watersheds: A municipal watershed is defined in FSM 2542.05 as a watershed that "serves a public water system as defined in the Safe Drinking Water Act of 1974, as amended (42 U.S.C. §§ 300f, et seq.); or as defined in state safe drinking water statutes or regulations."

There are municipal water systems downstream of the project as defined in FSM 2542.05. The limited area of the treatment, mitigation measures, and best management practices would result in no significant effect to municipal watersheds.

Project-related erosion risks: The current condition assessment shows an increasing trend for potential culvert plugging and overtopping of the roads. The engineered streambed mix would be installed to restore the natural channel gradient in the outlet area of the current culverts. The implementation of the design, erosion control, and best management practices would minimize the risk of significant surface erosion and would prevent even minor erosion from reaching the stream channel.

Watershed management goals for this project, which include maintenance of water quality and watershed condition, would be met. The proposed project complies with the standards and guidelines described in the Forest Service Handbook, Water Quality Management for Forest System Lands in California, Best Management Practices (2000), Region 5 Soil Quality Analysis Standards (1995), and Cleveland NF Land Management Plan (2005). The proposed project would not detrimentally degrade watershed resources beyond above stated guidelines due to characteristics of the landscape involved and limited area of the proposed projects. Negative direct, indirect, and cumulative effects would be limited with the management requirements and best management practices described in the EA and in the watershed report in the project record.

4.1.5 Cultural resource consequences

An analysis of the potential for effects to historic properties associated with the proposed project is found in the heritage reources report prepared in association with the proposed project by the Cleveland NF heritage program manager. The report analyzes the removal and replacement of six hardened stream crossings and 4 instream dams and the ground disturbance associated with project activities.

The heritage report was prepared to comply with the National Historic Preservation Act and in accordance with the stipulations of the *First Amended Regional Programmatic Agreement among the USDA Forest Service, Pacific Southwest Region, California State Historic Preservation Officer, and Advisory Council on Historic Preservation Regarding the Process for Compliance with Section 106 of the National Historic Preservation Act*

for Undertakings on the National Forests of the Pacific Southwest Region ("Programmatic Agreement").

Based on the results of the analysis of the potential for effects to historic properties associated with the proposed project contained in the heritage report, there would be no effect to historic properties associated with the implementation of the proposed project, because none are located in the defined area of potential effects. The project may be implemented as proposed in accordance with the Programmatic Agreement and the requirements of Section 106 of the National Historic Preservation Act and 36 CFR 800.

Trabuco Creek contains the remnants of several rock and concrete dams, some or all of which may be over 50 years old and which have not been evaluated for their potential eligibility for nomination to the National Register of Historic Places. Prior to implementing removal of the dams an analysis would be conducted to determine if any of the dams are historic properties. If historic properties were identified as a result of that analysis, appropriate actions to mitigate the potential for effects to historic properties associated with that action would be completed prior to implementation, in accord with the stipulations of the Programmatic Agreement and Section 106 of the National Historic Preservation Act.

In the event that the scope or design of the proposed project were to be changed, analysis of the changes and any associated potential for effects to historic properties would be conducted by the Cleveland NF heritage program manager prior to implementation of those changes.

If any previously unrecorded cultural resources were inadvertently discovered during implementation of the proposed project, all project-related activities in the vicinity of the discovery would cease, appropriate steps to secure and protect the discovery would be taken, the Cleveland NF heritage program manager would be notified, and the process defined in Stipulation V of the Programmatic Agreement would be implemented.

Any identification of human remains during the implementation of the proposed project would result in the implementation of the same procedures describe above, as well as the implementation of the procedures for the protection and determination of the proper disposition of human remains stipulated in the Native American Graves Protection and Repatriation Act. Suspended project activities in the vicinity of the inadvertent discovery of any cultural material or human remains would be resumed only with the written permission of the Cleveland NF heritage program manager.

4.1.6 Recreation consequences

Implementation of this alternative would intermittently disrupt recreation activities in the canyon. Traffic delays may occur. An exact estimate of the time delay is unknown at this time. Passage across the current structures would still be possible for the duration of the project. Recreationists who wish to use the trail and those who wish to use their

recreation residence cabins during the construction phase would have access. The old structures would not be removed until the new bridges are in place. Some delays may be expected while equipment is on the roadway working on the bridges or the slope adjacent to the bridge. Equipment used during the construction of the bridges may infringe on several of the parking spaces at the Holy Jim Trailhead. No current time estimates exist for the duration of construction activities at each site.

The Los Alamos crossing would continue to be open to traffic, although, there may be some delays. The crossing at Tenaja Falls would require temporary closure of Tenaja Trail and Tenaja Falls Trail until the new crossing is in place. Because the falls are a popular destination recreationists would be temporarily impacted. It is unknown at this time how long the closure would be needed.

4.1.7 Emergency access/fire consequences

Road access would still be available for emergency vehicles. Direction from a fire plan written for this project would be followed.

4.2 ALTERNATIVE 2, NO ACTION

This alternative would not require any alterations or removals for the dams in Trabuco Creek, nor would any of the crossings be replaced to facilitate passage by aquatic organisms. The current structures would remain in place.

4.2.1 Effects at the Los Alamos, San Mateo, and Trabuco locations

Direct, indirect, and cumulative effects to the arroyo toad and steelhead trout: No known occupied arroyo toad habitat would be directly affected by implementing this alternative. No known occupied steelhead habitat would be directly affected by implementing this alternative. Sediment movement would still occur during heavy rainfall and flooding. This could have some effect on the habitat for both the arroyo toad and steelhead trout. Effects to the arroyo toad may be washing away reproductive habitat through excess flows caused by a back-up of water behind the current crossing structures, especially when the flow overwhelms the crossing and rushes downstream. No indirect effects are expected to occur to steelhead because the crossings make it difficult if not impossible for steelhead to migrate upstream to their historical habitat. At some point, since there is no maintenance done on the crossing over San Mateo, the continued erosion will cause the crossing to fail. The result of a failure will be that a large amount of concrete and concrete dust will flow downstream to disrupt arroyo toad and steelhead trout habitat. One direct effect when this occurs will be that a number of arroyo toads and a number of steelhead trout have the potential to suffocate.

Direct, indirect, and cumulative effects to all other threatened, endangered or proposed species: No other known occupied habitat for any other threatened, endangered, or

proposed species. Nor is there any designated critical habitat for any other threatened, endangered species. Therefore, no effects are expected to occur to any other threatened, endangered or proposed species or their designated critical habitat.

Direct, indirect, and cumulative effects to sensitive species: Based on the loss of habitat, potential for direct mortality, and indirect and cumulative effects that could occur, it is possible no action at the crossings at Trabuco, Los Alamos, and San Mateo creeks may affect individual arroyo chubs, southwestern pond turtles, coastal rosy boas, two-striped garter snakes, San Diego mountain king snakes, San Diego ring-necked Snakes, San Diego horned lizards, California legless lizards, pallid bats, Townsend's big-eared bats, and western red bats. However, the determination was made that for sensitive species, this alternative would not lead to a trend toward federal listing for any sensitive plant or wildlife species or their habitat.

Direct, indirect, and cumulative effects to migratory birds: Implementing this alternative would have no effects on migratory birds.

Direct, indirect, and cumulative effects to management indicator species: Implementing this alternative would have no effects on management indicator species.

Direct, indirect, and cumulative effects to invasive species: The spread of non-native species is expected to continue because seeds are often spread by animals. No new invasive species are expected as a result of implementing this alternative.

Direct, indirect, and cumulative effects to hydrology: The current condition assessment shows an increasing trend for potential culvert plugging and overtopping of the roads. The condition of most of the current structures indicates that at some point in the future they will fail. When this occurs, the banks of the creeks would be subject to slumping and sliding. Erosion likely would increase the amount of sediment in Trabuco Creek, at least during the rainy season.

Direct, indirect, and cumulative effects to cultural/heritage resources: No Section 106 review is needed to implement this alternative**.**

Direct, indirect, and cumulative effects to recreation: Implementation of this alternative would not directly disrupt recreation activities in the canyons. However, indirect effects may result from the crossings failing due to continued heavy rains, which may produce temporary overflow that runs across the top of the structures, making them dangerous or impassable to pedestrians, horses, and vehicles. Access to the majority of recreation residence cabins in Trabuco Canyon involves using the crossings over the creek. The trailhead and access for Holy Jim Trail is located on the east side of the creek. The crossing itself may limit passage by hikers, mountain bikers, and horseback riders, especially during times when the creek has water.

Direct, indirect, and cumulative effects to emergency access/fire: If the structures fail or are weakened by heavy water flow, emergency vehicles would be unable to cross the creek.

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Appendix A: Photographs

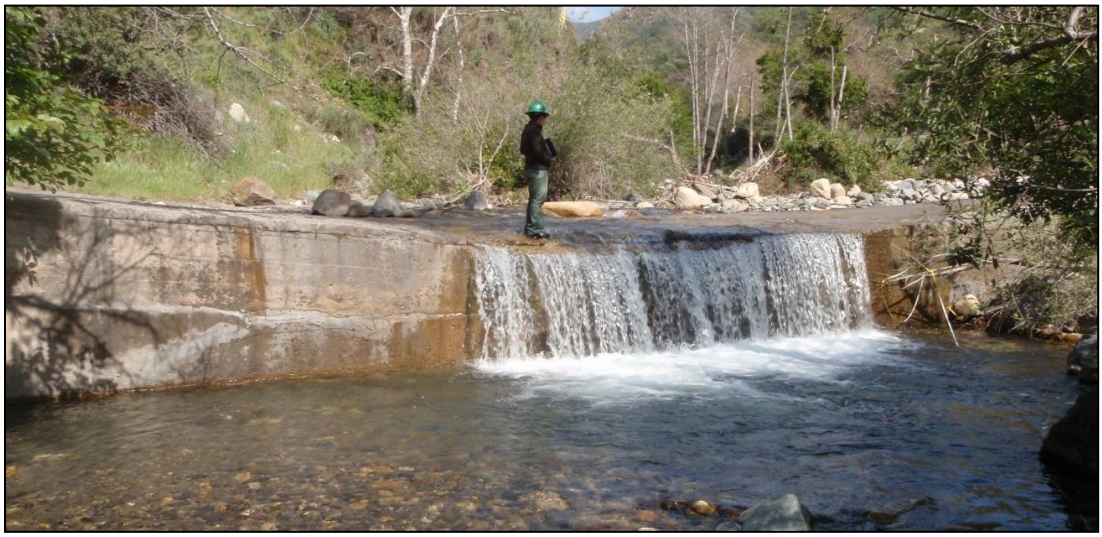

Figure 1: Crossing 1 in Trabuco Canyon.

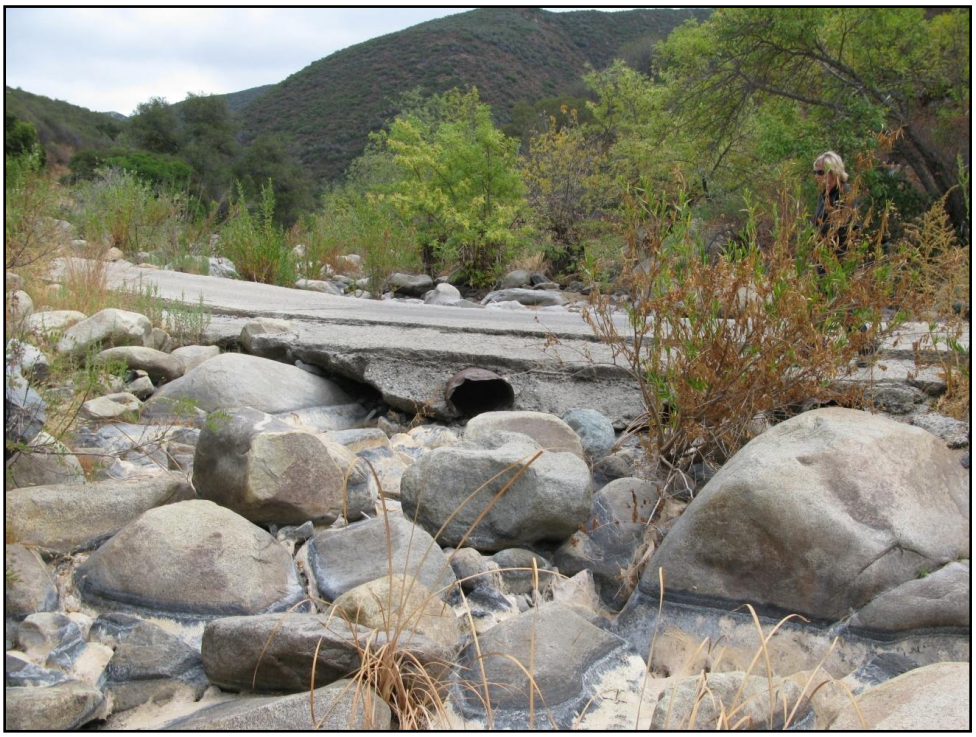

Figure 2: Crossing over Los Alamos Creek.

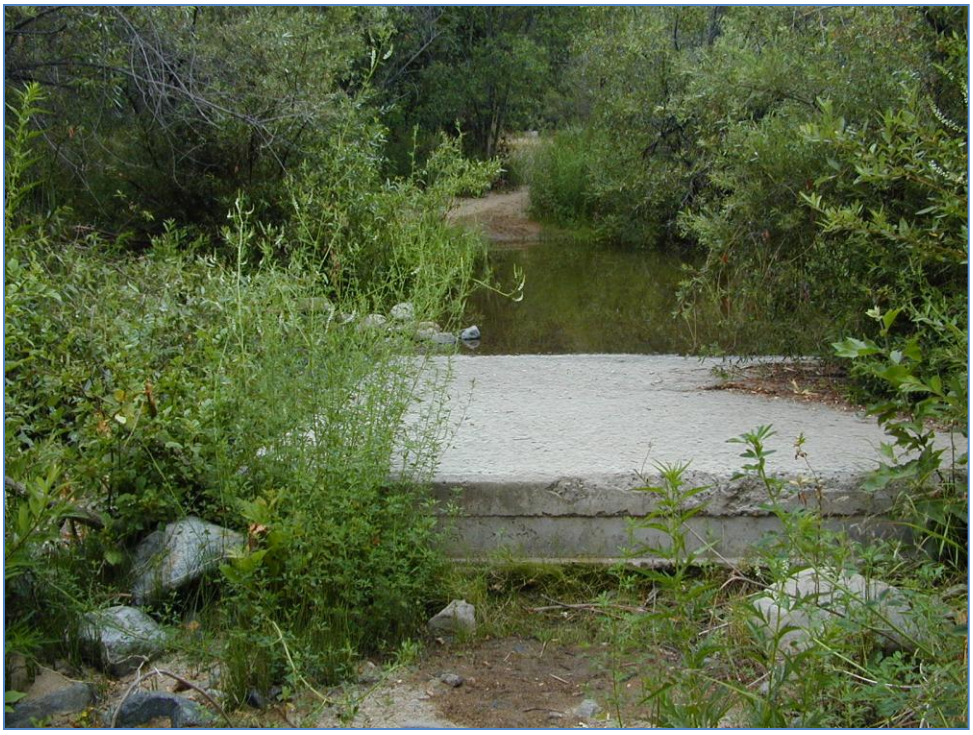

Figure 3: Tenaja Falls Trail Crossing.

Figure 4: Washed-out crossing along Trabuco Creek.

Appendix B: Project Maps