

Final Environmental Assessment

For

Candidate Conservation Agreement with Assurances

for the

Rio Grande Cutthroat Trout

on Vermejo Park Ranch

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1.0 INTRODUCTION

This Environmental Assessment (EA) has been prepared in accordance with the requirements of the National Environmental Policy Act [42 U.S.C. 4321 *et seq.*](NEPA) to address the impacts on the environment from the implementation of the proposed Candidate Conservation Agreement with Assurances (CCA) for the Rio Grande cutthroat trout. The CCA has been developed to support the issuance of a section 10(a)(1)(A) Enhancement of Survival Permit (Permit) and implementation of conservation for the Rio Grande cutthroat trout (*Onchorhynchus clarki virginialis*) in New Mexico and Colorado.

The proposed Federal action is whether to approve the CCA and issue a Permit, pursuant to section 10(a)(1)(A) of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*)(ESA). Vermejo Park Ranch (Applicant; Permittee) has applied for the Permit for the conservation activities to be implemented within the range of the Rio Grande cutthroat trout on their lands. The U.S. Fish and Wildlife Service's (Service) Preferred Alternative includes the issuance of the section 10(a)(1)(A) Permit.

In 2007, the Service completed an EA for the Upper Rio Costilla Watershed (New Mexico Department of Game and Fish (NMDGF) 2007) that covered the effects to physical, biological, and cultural resources and socioeconomic conditions that resulted from restoring the fish community to the upper Rio Costilla watershed, which includes Vermejo Park Ranch. All of the on-the-ground work included in the CCA for Rio Grande cutthroat trout on Vermejo Park Ranch was considered in that EA, and the work has begun and will continue. This EA evaluates the issuance of the Permit to Vermejo Park Ranch for those conservation activities that are already occurring independent of the proposed action.

If and when a species is proposed for listing and is ultimately listed pursuant to the ESA, it triggers both a regulatory and a conservation responsibility for Federal, State, and private landowners, or other cooperators, as appropriate. These responsibilities stem from section 9 of the ESA that prohibits "take" (*i.e.* harass, harm, pursue, shoot, wound, kill, trap, capture, or collect, or attempt to engage in any such conduct) of a listed species. Along with the section 9 prohibitions, Federal agencies must ensure that their actions will not jeopardize the continued existence of the listed species or destroy or adversely modify designated critical habitat. Furthermore, under section 7(a)(1), Federal agencies shall utilize their authorities to further the purposes of the ESA. The Service represents the Federal action agency considering the proposed action.

The purpose of this CCA is for Vermejo Park Ranch to commit to implement conservation measures for Rio Grande cutthroat trout in order to receive assurances from the Service that additional conservation measures will not be required and additional land, water, or resource use restrictions will not be imposed should the species become listed in the future. Conservation measures include removing nonnative species and increasing the Rio Grande cutthroat trout population numbers so that they are capable of migrating among Rio Costilla tributaries.

The implementation of this CCAA and the approval of the requested Permit would provide a mechanism for implementing and monitoring conservation strategies for the Rio Grande cutthroat trout that are not explicitly addressed or applicable by any other mechanism in New Mexico and Colorado. Consequently, any conservation strategies undertaken by Vermejo Park Ranch would be measured above and beyond current conservation strategies or management of this species. A future decision to list this species would take into consideration actions planned and/or implemented prior to listing pursuant to this CCAA, as well as land use prescriptions contained in any associated documents and the likelihood that they would be implemented with emphasis on threats facing the Rio Grande cutthroat trout. Vermejo Park Ranch has applied to the Service for an enhancement of survival permit pursuant to section 10(a)(1)(A) of the ESA. The permit application includes a proposed CCAA for the Rio Grande cutthroat trout. Vermejo Park Ranch proposes to be the sole non-Federal Permit holder and will be responsible for implementing the CCAA. The States of Colorado and New Mexico will be cooperators, providing assistance in the implementation of the CCAA. New Mexico and Colorado will not be issued a section 10(a)(1)(A) permit pursuant to this CCAA.

Sections 2, 7, and 10 of the ESA allow the Service to enter into this CCAA. Section 2 of the ESA states that encouraging interested parties, through Federal financial assistance and a system of incentives, to develop and maintain conservation programs is a key to safeguarding the Nation's heritage in fish, wildlife, and plants. Section 7 of the ESA requires Federal agencies, including the Service, to review programs that it administers and to utilize such programs in furtherance of the purposes of the ESA. By entering into this CCAA, the Service is utilizing its Candidate Conservation Programs to further the conservation of the Nation's fish, wildlife, and plants. Lastly, section 10(a)(1)(A) of the ESA authorizes the issuance of permits to "enhance the survival" of a listed species.

The benefits of the conservation measures to be implemented by Vermejo Park Ranch include restoration and maintenance of a self-sustaining population of Rio Grande cutthroat trout on non-Federal lands. In return, the CCAA provides a mechanism of assuring Vermejo Park Ranch that no additional conservation measures, other than those agreed upon in the CCAA, will be required of them if the Rio Grande cutthroat trout becomes listed as threatened or endangered under the ESA.

1.1 Description of the Proposed Action

The proposed action is the issuance of an ESA section 10(a)(1)(A) Enhancement of Survival permit and implementation of a CCAA that would result in the conservation of the Rio Grande cutthroat trout on the Vermejo Park Ranch in southern Colorado and northern New Mexico.

Under the CCAA, some examples of actions that may be taken on the ground for Rio Grande cutthroat trout include the following:

- Eliminate nonnative fish that compete with native trout.
- Maintain habitat quality for native trout.
- Reestablish and maintain viable populations of Rio Grande cutthroat trout.

These conservation measures will address the threats to Rio Grande cutthroat trout in the Covered Area by removing nonnative species and preventing their immigration back into the watershed, reintroducing genetically pure Rio Grande cutthroat trout to the streams within the Covered Area, and working with the Cooperators to manage and monitor Rio Grande cutthroat trout populations.

1.2 Description of the Applicant

The Vermejo Park Ranch is owned by Vermejo Park LLC, a limited liability corporation, and was purchased in 1996. The 590,823-acre (2,391 square kilometer [km²]) ranch is said to be the largest privately owned, contiguous tract of land in the U.S. It is one of the West's premier hunting, fishing, and nature tourism resorts.

The NMDGF and CPW are cooperators in the CCAA as they have jurisdiction in their respective states for game fish regulation and management. The, applicant, and cooperators are collectively considered "Participants" in this conservation effort.

1.3 Need for the Proposed Action

This action is needed to protect and conserve the Rio Grande cutthroat trout through reducing threats that this species faces while providing a mechanism to authorize incidental take of Rio Grande cutthroat trout, should it be listed pursuant to the ESA, for the non-Federal landowners who voluntarily participate and continue conservation activities under a potential Enhancement of Survival Permit.

1.4 Decision to be made by the Responsible Official

The scope of the analysis in this Environmental Assessment (EA) covers the direct, indirect, and cumulative environmental effects of approving this CCAA; issuing a section 10(a)(1)(A) permit; and anticipated future effects of implementation of the Agreement (including the incidental take authorization). The decisions to be made are which alternative to implement and whether the alternative to be implemented will have a significant effect on the human environment, which would require the preparation of an Environmental Impact Statement.

1.5 Covered Area

The Covered Area for this CCAA is all waters of the Rio Costilla watershed on lands owned and managed by Vermejo Park Ranch in Costilla County, Colorado, and Taos County, New Mexico. Perennial waters within this area include the #1 or Costilla Creek, #2 or Casias Creek, East Fork Costilla Creek, West Fork Costilla Creek, #1 Lake, #2 Lake, the Glacier Lakes, the Seven Lakes complex, Casias Lakes, Beaver Lake, Long Canyon Creek, Santistevan Creek, Costilla Reservoir, Costilla Creek immediately downstream of the reservoir, and their associated tributaries (approximately 35,000 acres, 63 stream miles, and 15 lakes) (Figure 1). These waters occur in the Upper Rio Grande watershed in the Casias Creek–Costilla Creek (Hydrological Unit Code 130201010103) and Comanche-Costilla Creek (Hydrological Unit Code 130201010104) subwatersheds.

1.6 Covered Species

The historical distribution of Rio Grande cutthroat trout is not known with certainty. It is assumed that Rio Grande cutthroat trout occupied all streams capable of supporting trout in the Rio Grande, Pecos River, and Canadian River basins (Alves et al. 2007). The Pecos River is a tributary of the Rio Grande, so a historical connection between the two basins likely existed. Although no early museum specimens document its occurrence in the headwaters of the Canadian River, it is almost certainly native there as well (Behnke 2002). Because there are remnant Rio Grande cutthroat trout populations throughout the headwaters of the Rio Grande Basin, historically, these fish most likely dispersed through the mainstem Rio Grande into its tributary streams.

There are approximately 105 Rio Grande cutthroat trout populations that are considered to be core (less than 1 percent introgressed (hybridized with other trout species) or conservation populations (less than 10 percent introgression) distributed in high elevation streams of New Mexico and Colorado (Alves et al. 2007). These populations occupy approximately 10 percent of historical habitat and face a variety of threats including fragmentation and isolation, small population size, presence of nonnative trout, whirling disease, poor habitat conditions, fire, drought, and the effects of climate change.

A comprehensive database (referred to as “2010 database” in this finding) is compiled annually of all the data on Rio Grande cutthroat trout collected that year by fisheries professionals having specific knowledge of Rio Grande cutthroat trout. According to that database, the Costilla Creek population is the 9th (out of 30) largest core population, and its habitat is rated as good to excellent (2010 database). With implementation of the conservation measures, this population will likely become the largest population rangewide. The Rio Grande cutthroat trout was listed as a Federal candidate species under the ESA in 2008 (73 FR 27900, Service 2008). A Federal candidate species is a species that the Service has determined warrants listing under the ESA but that listing is precluded by other activities; therefore, the Rio Grande cutthroat trout does not have section 9 illegal take protections under the ESA. The species is a Species of Greatest Conservation Need in New Mexico (NMDGF 2006), a Species of Special Concern in Colorado (Colorado Division of Wildlife 2010), and regulated by game fish laws in both states (New Mexico Statutes Annotated 1978; Colorado Revised Statutes 1985).

1.7 Duration of Action

The section 10(a)(1)(A) Enhancement of Survival permit will have a 25-year duration.

2.0 PURPOSE AND NEED FOR ACTION

The purpose of the proposed action is entering into a CCAA with Vermejo Park Ranch, NMDGF and CPW that will help conserve the Rio Grande cutthroat trout with the intention that such conservation might help preclude the need to list this species pursuant to the ESA. The purpose contemplates the following:

- Developing, coordinating, and implementing conservation actions to reduce and eliminate known threats to the Rio Grande cutthroat trout;

- Supporting ongoing efforts to reestablish and maintain viable populations of Rio Grande cutthroat trout in currently occupied and suitable habitats; and
- Encouraging development and protection of suitable Rio Grande cutthroat trout habitat by giving the Applicant incentives to implement specific conservation measures

The need for the action is to conserve species that are candidates for listing pursuant to the ESA. Under a CCAA, a property owner voluntarily commits to implement specific conservation measures on non-Federal lands for species covered by the agreement. If the species is listed, then the Applicant would have a high degree of certainty that additional restrictions would not be placed on their otherwise legal activities.

3.0 DESCRIPTION OF ALTERNATIVES

3.1 ALTERNATIVE A - No Action

Under the No Action Alternative, the Service would not enter into a conservation agreement with Vermejo Park Ranch, NMDGF, and CPW. In addition, conservation measures above and beyond those directed by existing Federal, State, and local laws, policies, or regulations may not be implemented. This does not mean that no activities would be undertaken, but that they would be undertaken at levels and under circumstances similar to the present.

3.2 ALTERNATIVE B - Approval and Implementation of a CCAA (Preferred Alternative)

The preferred alternative would involve the approval and implementation of a CCAA between the Service, Vermejo Park Ranch, NMDGF, and CPW to address the conservation needs of the Rio Grande cutthroat trout. The Service would issue a permit under ESA section 10(a)(1)(A), in accordance with 50 CFR 17.22 and 17.32 (d), that would provide Vermejo Park Ranch with authorization for incidental take of Rio Grande cutthroat trout and regulatory assurances should the species be listed under the ESA in the future. The proposed permit would authorize incidental take of Rio Grande cutthroat trout resulting from otherwise lawful activities on the lands and waters covered under the CCAA, consistent with management under the CCAA. The permit will become valid if and when the Covered Species is listed as endangered or threatened. Such activities may include, but are not limited to fishing, hunting, road maintenance, prescribed burning, grazing, farming, water resource development and management, construction and maintenance of structures and utilities, forest management (e.g., timber harvest and thinning activities), gravel and rock removal, mineral, oil and gas development, recreation, and related ranch activities. Vermejo Park Ranch would implement the conservation measures described in the CCAA including:

Eliminate Nonnative Fish

1. In cooperation with NMDGF, Vermejo Park Ranch will install temporary upstream migration barriers on their lands and waters to prevent the threat of upstream

migration of nonnative fishes into restored stream sections and to facilitate nonnative removal efforts.

2. Vermejo Park Ranch will purchase the piscicides (antimycin and/or Rotenone) needed to remove nonnative fish from waters on the covered lands and waters, excluding Costilla Reservoir.
3. Vermejo Park Ranch will discontinue stocking of nonnative trout into the Covered Area.

Maintain Habitat Quality

4. Vermejo Park Ranch will conduct land-use activities in the Covered Area in a way that minimizes negative impacts on fish populations and habitats, including:
 - Using best management practices during land-use activities;
 - Employing erosion and siltation control techniques when necessary during land management, infrastructure maintenance, or land-use activities in or along stream corridors to maintain habitat quality;
 - Conducting riparian monitoring to assess impacts of domestic grazing, if present; and
 - Complying with NMDGF and CPW angling restrictions on all waters within the Covered Area.

Reestablish and Maintain Viable Populations

5. In cooperation with NMDGF and CPW, Vermejo Park Ranch will work to restore and manage viable populations of Rio Grande cutthroat trout on Vermejo Park Ranch including:
 - Providing controlled access to the Covered Area to NMDGF and CPW for purposes of planning and conducting population restoration efforts, monitoring restored populations, and enforcement of state angling regulations;
 - Reestablishing and reconnecting populations of Rio Grande cutthroat trout in the headwaters of the Rio Costilla to reestablish a genetically diverse metapopulation more likely to withstand demographic and environmental stochasticity.
 - Monitoring restored Rio Grande cutthroat trout populations;
 - Maintaining temporary fish migration barriers until they are removed or no longer needed; and
 - Conducting fishery monitoring activities described in the Biological Monitoring Section of the CCAA.

In addition the cooperators would:

New Mexico Department of Game and Fish:

1. Implement the State's Costilla Implementation Plan (NMDGF 2005), which describes how population restoration should proceed.
2. Coordinate activities among the Participants to enable successful completion of proposed restoration.
3. Oversee and implement removal of nonnative fishes within the Covered Area.

4. Attempt to restore and manage viable populations of Rio Grande cutthroat trout in suitable waters within the Rio Costilla watershed. These activities would include:
 - Restocking Rio Grande cutthroat trout into restored sections of the Covered Area.
 - Coordinating with the Participants to propose and enforce angling regulations established by the New Mexico Game Commission in the Rio Costilla watershed to manage for viable Rio Grande cutthroat trout populations.
5. Purchase piscicides to remove nonnative fish from Costilla Reservoir.
6. Conduct fishery monitoring activities in New Mexico described in the Biological Monitoring Section of the CCAA.

Colorado Parks and Wildlife:

1. Work with the Participants to manage self-sustaining populations of Rio Grande cutthroat trout in the East and West Fork Costilla Creek.
2. Manage Glacier Lake #1 to provide recreational fishing opportunities.
3. Conduct fishery monitoring activities in Colorado described in the Biological Monitoring Section of the CCAA.

4.0 AFFECTED ENVIRONMENT

The Covered Area for this CCAA is all waters of the Rio Costilla watershed on lands owned and managed by Vermejo Park Ranch in Costilla County, Colorado, and Taos County, New Mexico. Resources considered for analysis under this EA included vegetation, wildlife, listed, proposed, and candidate species, land use and ownership, air quality, noise pollution, water resources, cultural resources, and socioeconomics. Of these, the resources selected for further evaluation include vegetation, wildlife, listed, proposed, and candidate species, land use and ownership, water resources, cultural resources, and socioeconomics. The remaining resources were excluded from further consideration because the proposed action would be expected to have either no effect or the effects to these resources would be insignificant.

4.1 Vegetation

The Covered Area includes three major vegetation types: montane grasslands around the Costilla Reservoir, subalpine coniferous forest, and alpine tundra (Dick-Peddie 1993).

Between 2,680 and 3,660 meters (m) (8,800 and 12,000 feet [ft]) elevation are grasslands and meadows interspersed with mixed conifer and subalpine conifer forests. The most extensive tracts of subalpine-montane grassland and meadow, as here defined, lie within the Costilla Creek valley. Included is a prominent outwash plain north of the Costilla Reservoir that covers over 1,200 ha (3,000 acres). Bunchgrasses such as *Festuca arizonica* (Arizona fescue) and *Danthonia parryi* (Parry's oatgrass) dominate drier areas of these subalpine grasslands, while *Poa pratensis* (Kentucky bluegrass) and *Juncus arcticus* var. *balticus* (Baltic rush) are common in mesic to wet areas. Other prominent graminoids include *Carex* spp. (sedge), *Elymus elymoides* var. *brevifolius* (Barkworth squirreltail), *Festuca thurberi* (Thurber's fescue), *Koeleria macrantha* (prairie junegrass), and *Poa fendleriana* ssp. *fendleriana* (muttongrass) (Legler 2010).

At elevations between 2,990 and 3,660 m (9,800 and 12,000 ft) are subalpine forests dominated by *Abies arizonica* (corkbark fir), *Picea engelmannii* var. *engelmannii* (Engelmann spruce), and *P. pungens* (Colorado blue spruce) (Legler 2010)

Alpine tundra dominates the crest of the Sangre de Cristo Range above 3,660 m (12,000 ft) elevation. The most common taxa are *Dasiphora fruticosa* (shrubby cinquefoil), *Ribes montigenum* (gooseberry currant), *Salix planifolia* (diamondleaf willow), and *S. reticulata* var. *nana* (snow willow).

Legler (2010) documented 1,094 different plant species on the Vermejo Park Ranch, which include nearly 25 percent of all native New Mexican plants. Twenty-six species previously unknown to New Mexico landscapes were discovered, as were two new species: a showy alpine *Phlox* and a diminutive fern-like plant in the genus *Botrychium*.

Vermejo Park began a concerted effort in 2008 to develop a holistic riparian restoration plan. The long-term goals for this effort are to restore critical and severely impacted watercourse areas in order to improve trout habitats and promote keystone species such as beaver (*Castor canadensis*).

4.2 Wildlife

Wildlife native to the southern Rockies, such as elk (*Cervus canadensis*), mule deer (*Odocoileus hemionus*), black bear (*Ursus americanus*), pronghorn antelope (*Antilocapra americana*), mountain lions (*Puma concolor*), bobcats (*Lynx rufus*), coyotes (*Canis latrans*), and prairie dogs (*Cynomys* spp.) can be found in the Covered Area. Black-footed ferrets (*Mustela nigripes*) and bison (*Bison bison*) have been reintroduced to the Vermejo Park Ranch. In the Covered Area, bison were reintroduced for the first time in 2011 with the expectation of light grazing in the area in the future.

Ranch staff have catalogued over 180 bird species that include shore birds such as sandhill cranes (*Grus canadensis*), raptors such as golden eagles (*Aquila chrysaetos*) and bald eagles (*Haliaeetus leucocephalus*), and songbirds like the hermit thrush (*Catharus guttatus*) (Vermejo Park Ranch 2012).

Bald eagles are no longer federally listed (72 FR 37346), but they are still protected by the Bald and Golden Eagle Protection Act (16 USC 668-668c). Bald eagles are present in the Rio Costilla watershed. Migratory and juvenile eagles are commonly seen near Costilla Reservoir in the spring and summer months. Bald eagles are water oriented, but can be found in various habitat types from mid-elevational montane forests to pinon-juniper and lower elevational shrublands. They prefer large trees near a ready supply of fish (majority of diet), but commonly take small mammals, birds (waterfowl), or eat carrion. It is unlikely that bald eagles use the creek as a primary food source; however it is probable that if a substantial number of fish carcasses were relatively accessible they would opportunistically feed upon on them.

Golden eagles occur primarily in areas of mountain cliffs or canyons. In the west, they are often associated with rimrock terrain adjacent to open desert or grassland areas. Suitable nesting sites may exist within a variety of surrounding habitats, from desert to mountain areas, although dense forests tend to be avoided. Most common nesting areas in New Mexico are steep-walled mountain canyons. Although cliffs are the most common nesting substrate, trees or man-made structures are also sometimes used. Many nests have a wide view of surrounding area or are on prominent escarpments. Proximity to hunting grounds is an important factor in nest-site selection (Kochert et al. 2002). Golden eagles typically forage in open grassland or shrubland habitat, and tend to avoid agricultural areas. Although capable of killing large prey, including small ungulates and young domestic livestock, this species subsists primarily on rabbits, hares, ground squirrels, and prairie dogs.

Fish present within the Rio Costilla watershed include brook trout (*Salvelinus fontinalis*), brown trout (*Salmo trutta*), rainbow trout (*Onchorhynchus mykiss*), cutthroat trout hybrids (*O. clarkii* spp.), longnose sucker (*Catostomus catostomus*), longnose dace (*Rhinichthys cataractae*), and white sucker (*Catostomus commersonii*).

4.3 Listed, Proposed, and Candidate Species

There are nine federally listed or candidate species in Taos County, New Mexico. Of these, only the Rio Grande cutthroat trout, Canada lynx (*Lynx canadensis*), New Mexico meadow jumping mouse (*Zapus hudsonius luteus*), and Mexican spotted owl (*Strix occidentalis lucida*) may occur in the habitats found in the Covered Area.

Rio Grande cutthroat trout are one of 14 recognized subspecies of cutthroat trout native to western North America. The Rio Grande cutthroat trout is considered the southernmost subspecies of cutthroat trout, and it thrives in clear mountain streams that provide clean spawning gravel, feeding and resting sites, and food in the form of aquatic and terrestrial invertebrates (Sublette et al. 1990). Ideal habitat conditions have been altered in many locations by human activities including grazing, mining, logging, road building, and agriculture. Since the late 19th century, stocking of nonnative trout has been a common practice throughout the western states. Brook trout and brown trout outcompete the native cutthroats for prime habitat areas (Griffith 1988). Rio Grande cutthroat trout populations currently occupy less than 10 percent of their original range (Stumpff and Cooper 1996).

Canada lynx require large areas containing boreal forest habitat, generally greater than 100 km² (40 square miles [mi²]) (Hoving 2001) to ensure that sufficient high-quality snowshoe hare (*Lepus americanus*) habitat is available and to ensure that lynx may move freely among patches of suitable habitat and among subpopulations of lynx. Lynx use coarse woody debris, such as downed logs, root wads, and windfalls, to provide denning sites with security and thermal cover for kittens (Mowat et al. 2000; Squires and Laurion 2000). In New Mexico, lynx have dispersed from Colorado into the San Juan and Sangre de Cristo mountain ranges. Because of the long dispersal distances exhibited by lynx, the species may occasionally be found on the Covered Area. The proposed action is unlikely to affect the Canada lynx because: 1) they are habitat generalists that do not typically inhabit riparian areas where the bulk of project activities

would occur, 2) the lynx's primary prey, snowshoe hare, is not a riparian species, and 3) it is unlikely a resident lynx population occurs in New Mexico.

The New Mexico meadow jumping mouse is generally associated with montane meadow systems with perennial streams and dense vegetation. It is found in the Jemez and Sacramento Mountains as well as the Rio Grande valley (Frey and Malaney 2009). One confirmed record of New Mexico meadow jumping mouse in the Sangre de Cristo Mountains is from the Williams Lake area, beyond the Covered Area (Hafner et al. 1981).

The Mexican spotted owl is most common in mature, old-growth forests throughout its range (Ganey 1992), and preferred habitat characteristics include multilayered (uneven-aged) stands, snags, and downed woody debris (Service 1995). Spotted owls can be found in many types of forested ecosystems (e.g., Douglas fir, redwood, ponderosa pine, fir-spruce, etc.) if suitable habitat components are present. They typically inhabit mature coniferous habitat, often in association with riparian areas. Migration is seasonal; they move upslope in the spring and down in the fall. Nesting occurs, in tree cavities, in the tree canopy, or on cliff ledges at 1,825–2,500 m (6,000+ ft) elevation. Critical habitat for Mexican spotted owl is not found within the Covered Area (69 FR 53182, Service 2004). The proposed action is unlikely to affect Mexican spotted owls as 1) they do not inhabit the riparian area where the bulk of project activities would occur, 2) foraging activity is nocturnal a time when project activities would be limited, and 3) the owl or the owl's primary prey are not dependent on aquatic biota for food.

4.4 Land Use and Ownership

Lands within the Covered Area are owned by Vermejo Park Ranch and used for recreational hunting and fishing, and bison grazing. The mineral rights are owned by El Paso Energy; there is currently a Mineral Extraction Agreement in place categorizing the Rio Costilla basin as a sensitive area where no drilling for oil and gas may occur.

4.5 Water Resources

Waters in the Covered Area are used by native wildlife, livestock, and for recreational purposes such as fishing and ecotourism. The flow regime in the Rio Costilla is relatively predictable, characterized by a large spring runoff from snowmelt that peaks in May and June and subsequently tapers sharply to base flow conditions (U.S. Geological Survey 2012). The flow on the mainstem Rio Costilla is regulated by releases from Costilla Dam administered by Rio Costilla Cooperative Livestock Association. Flows are low through nongrowing seasons (October – April) and increase during the irrigation season. Cold, clear, high dissolved oxygen, and low nutrients are characteristic of water quality in the Rio Costilla watershed (Smolka 1987). Though water temperature and clarity are both generally low, indicating good water quality, water quality in the Rio Costilla watershed is variable. Loss of riparian vegetation shade can increase stream temperatures (Durham et al. 2007). The Ranch has several riparian restoration projects underway that should improve temperature conditions in these creeks.

Groundwater in the Covered Area is used for livestock tanks, staff residential housing, and tourist lodges. There are three wells in the Covered Area. There is currently a groundwater monitoring program in place.

4.6 Cultural Resources

Humans inhabited areas within the project area for over 10,000 years, based on early remains of humans discovered in nearby Folsom, New Mexico. Pueblo cultures developed in the area approximately 1,100 year ago. Large tracts of the project area were originally part of the Maxwell and Sangre de Cristo Land Grants (NMDGF 2007). Vermejo Park Ranch was purchased by Turner Enterprises, Inc. in 1996. The Upper Rio Costilla Watershed EA included search of the Archaeological Resources Management System database for the region surrounding the project area, which identified the number and types of historic properties previously found in the region. This search could also indicate if any historic properties were located in the areas of ground disturbance (barrier construction) and would provide an estimate of the types and frequencies of properties that might be anticipated in the project area. Results of this search indicated the presence of 81 previously recorded historic properties in the immediate region surrounding the project area. Of these sites, the majority are historic structures and historic mines (n = 60) and the remainder include historic trash dumps, a stage stop, the Costilla Dam construction camp, prehistoric structures, and prehistoric lithic artifact scatters.

4.7 Socioeconomics

Executive Order 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-income Populations, mandates that Federal agencies identify and address, as appropriate, disproportionately high and adverse human health or environmental effects of programs on minority or low-income individuals. Because the Covered Area is owned by one entity and there are only minor off-property indirect impacts, we did not identify any socioeconomic effects from the action.

5.0 ENVIRONMENTAL CONSEQUENCES

5.1 ALTERNATIVE A: NO ACTION

Under the No Action Alternative, the Service would not approve a CCAA for the Covered Species nor issue a section 10(a)(1)(A) permit to cover management activities specified in the CCAA. Management activities may not be undertaken to improve the watershed for the protection and enhancement of native fish populations and other threatened, endangered, or candidate species that rely on aquatic and riparian resources.

Specifically, management of existing aquatic sites would be consistent with current land uses, with the majority of these sites managed in association with recreation, livestock grazing, mining, and oil/gas exploration. Land use of upland vegetation communities would be related to existing land uses, ranging from livestock ranching to mining. Any modifications to existing

habitat would occur to meet the needs of the Applicant. Stream improvements for the Covered Species may not occur under this alternative. Habitat modification may still occur to facilitate management of recreation or livestock needs. Additionally, control of nonnative aquatic predators and competitors may not occur.

5.1.1 Vegetation

No change in the current impacts to vegetation communities from those described above are expected under this alternative. Any loss of vegetation that provides habitat for the Covered Species would be incidental to existing land uses or through the desires of the Applicant.

5.1.2 Wildlife

No change in the current impacts to wildlife, as described above, is expected under this alternative. Although Vermejo Park Ranch currently manages for native species, including Rio Grande cutthroat trout, conservation of the Covered Species may not necessarily be part of the considerations in any management of existing wildlife.

5.1.3 Listed, Proposed, and Candidate Species

No change in the current impacts to listed, proposed, or candidate species, as described above, is expected under this alternative. Conservation of the Rio Grande cutthroat trout may not necessarily be part of the considerations in any management of listed, proposed, or candidate species within the Covered Area, and a large population of Rio Grande cutthroat would not necessarily be established on Vermejo Park Ranch.

5.1.4 Cultural Resources

No change in the current impacts to cultural resources, as described above, is expected under this alternative.

5.1.5 Land Use

No change in the current impacts to land use, as described above, is expected under this alternative. Any protection of habitat for the Covered Species would be incidental to existing land uses or through the desires of the Applicant.

5.1.6 Water Resources

No change in the current impacts to water resources, as described above, is expected under this alternative. Any protection of habitat for the Covered Species would be incidental to existing land uses or through the desires of the Applicant.

5.2 Alternative B: Approve CCAA and Issue Permit (Preferred)

The action under this alternative would be the approval of the CCAA and issuance of the section 10(a)(1)(A) permit. Implementation of the CCAA would be a result of the approval of the CCAA and permit issuance, which would have indirect effects on the environment.

5.2.1 Vegetation

The Applicant will conduct land-use activities in the Covered Area in a way that minimizes negative impacts on Rio Grande cutthroat trout populations and habitats, including using conservation measures, such as employing erosion and siltation control techniques when necessary during land management, infrastructure maintenance, or land-use activities in or along stream corridors to maintain habitat quality and conducting riparian monitoring to assess impacts of livestock grazing, if present.

Indirect effects of issuing the Permit and CCAA implementation are likely to consist of both short-term negative and long-term beneficial impacts on vegetation in the Covered Area. Management of existing riparian areas to reduce impacts from livestock grazing should enhance vegetation in these areas. Ranch management in accordance with conservation measures would also likely improve vegetation in existing habitats, or maintain the existing vegetation. Thus, conservation measures should result in improvements, in both quantity and quality, of shoreline and emergent vegetation, as well as the upland watershed. The cumulative impacts of implementing the proposed CCAA on vegetation communities should be beneficial.

5.2.2 Wildlife

No activity directly related to the issuance of this Permit and CCAA implementation should negatively impact wildlife in the Covered Area. Removal and control of nonnative predators and competitors on wildlife are ongoing independent of the proposed action, and the effects were evaluated in the Upper Rio Costilla Watershed EA (NMDGF 2007), which found that the proposed action would not result in any long term effects on aquatic, wetland, or riparian habitat, although very small short term impacts may occur, such as riparian grass trampling as field staff traverses through the riparian area for mechanical removals and piscicide applications. In addition, burial pits for piscicide-exposed fish are located beyond the high water mark on the floodplain and away from jurisdictional wetlands. Equipment would disturb vegetation during barrier construction but would be short-term and limited to immediate areas around the barrier site.

Target fish species typically do not inhabit wetland habitats and thus mechanical removals and piscicide applications would not be necessary in most wetlands. Where wetlands are adjacent to an area inhabited by fish, mechanical removal and piscicide application may be necessary. Such activities would not alter wetland hydrology or vegetation. Mechanical removals would reduce the abundance of resident fishes. Application of piscicides in the project area should result in mortality of all remaining fish not removed during mechanical removal efforts. Small species (such as dace and minnows) have survived multiple applications of antimycin in some instances or have been completely removed in others (Rinne and Turner 1991, Stefferud et al. 1992). Native longnose dace are being collected, stocked in unaffected

waters, or held offsite during the piscicide applications. Pure Rio Grande cutthroat trout present in the stream segment are being collected and held offsite during the piscicide applications.

Reduction in the abundance of certain groups of aquatic macroinvertebrates is likely following piscicide treatments. Because of their short life cycles (Anderson and Wallace 1984), good dispersal ability (Pennak 1989) and generally high reproductive potential, aquatic invertebrates are capable of rapid recovery from disturbance (Jacobi and Degan 1977; Boulton et al. 1992; Johnson and Vaughn 1995; Matthaei et al. 1996; Nelson and Roline 1996). Most studies have found that at proposed levels, antimycin minimally affects most aquatic invertebrates found in streams and standing waters though this varies depending upon taxa considered (Walker et al. 1964; Herr et al. 1967; Schnick 1974a; Houf and Campbell 1977). Certain invertebrates are sensitive to the proposed treatment levels of antimycin, including *Cladocera* and *Copepoda* (zooplankton), *Amphipoda* (scuds), and some species of mayflies and caddisflies (Schnick 1974a). However, populations of these taxa have been found to be only temporarily diminished following treatment (Schnick 1974a; Jacobi and Degan 1977). Effects of antimycin on benthic macroinvertebrates were monitored for previous treatments in Costilla Creek and Powderhouse Creek within the Rio Costilla watershed. The data indicates a temporary reduction in macroinvertebrate density post-treatment, but density recovered to pre-treatment levels within one year of the piscicide treatment. Number of taxa and EPT (Ephemeroptera, Plecoptera, Trichoptera) taxa richness remained similar for pre, post, and subsequent years of sampling. Such recovery occurred during a low water year for the 2002 Costilla Creek project indicating rapid macroinvertebrate recovery even during drought periods. The effects of rotenone on macroinvertebrates also depends upon the taxa considered (Engstrom- Heg et al. 1978). Anderson (1970) reported that a rotenone treatment had little effect on the zooplankton community with most variations in species composition and abundance caused by factors other than rotenone application. Cook and Moore (1969) reported that the application of rotenone has little lasting effect on the non-target insect community of a stream.

Based upon data collected from previous restorations within the Rio Costilla watershed and existing literature, application of a piscicide would have no long-term effect on aquatic macroinvertebrate density or diversity. Results from previous restoration projects within the project area indicate macroinvertebrate community recovery within one year. The stream restoration actions are implemented in segments, and therefore limit piscicide effects to only a portion of the project area in a single year. Piscicide applications in other subsegments does not occur until the next field season. As a result, macroinvertebrate communities are recovered or in the process of recovery by the time a piscicide is applied in another stream segment. Macroinvertebrate recolonization is also possible from upstream and downstream portions of the watershed. Upper Little Costilla Creek, Grassy Creek, one unnamed tributary to Comanche Creek, one unnamed tributary to Casias Creek, and one unnamed tributary to Costilla Creek will not receive piscicide treatments (~8.5 miles) and thus the macroinvertebrate community in these headwater habitats would be unaffected by the proposed action. These stream segments would serve as additional sources for macroinvertebrate recolonization.

5.2.3 Listed, Proposed, and Candidate Species

Other than the Rio Grande cutthroat trout, no direct impacts to listed, proposed, and candidate

species are anticipated from the issuance of the Permit and CCAA implementation under this alternative. Indirect impacts to listed, proposed, and candidate species would generally occur when implementing the management activities identified in the CCAA (such as ranching and recreational activities), during the reestablishment of Covered Species, or through habitat improvements.

Covered Species

The preferred alternative would likely result in substantial benefit to the Covered Species by improving watershed conditions and reestablishing an additional self-sustaining population of cutthroat trout. These changes should promote conservation of the Covered Species and incidental take is likely to be minor relative to the anticipated net conservation benefit of the CCAA.

Potential actions associated with this alternative are the removal of nonnative predators and competitors and the reestablishment of Covered Species populations. Reestablishment of Covered Species in appropriate aquatic sites is a major management activity of this alternative. Reestablishments will be accomplished with individuals from existing captive populations or thriving wild populations. They will be placed in unoccupied habitats or to augment existing populations within the Covered Area. Reestablishments are proposed to assist in meeting conservation goals. Therefore, these actions would be beneficial to the continued existence of the Covered Species existence in the wild. The CCAA should also be successful in encouraging similar recovery actions on private lands within the range of the Covered Species by providing an example to private landowners and tribes of what is expected as well as the assurances provided.

Vermejo Park Ranch will be permitted to allow recreational fishing for Rio Grande cutthroat trout on their lands in accordance with NMDGF regulations. Recreational fishing has not been identified as a threat to the species, and viable populations of Rio Grande cutthroat trout are able to withstand the small amount of fishing pressure. The benefits of a fishery include public education about the species.

Capture, handling, holding, moving, and reestablishment of Rio Grande cutthroat trout is ongoing independent of the proposed action, and the effects were evaluated under the Upper Rio Costilla Watershed EA (NMDGF 2007). This EA found that salvage and holding native fish in live cars, lakes, or hatcheries does produce some risk to individual fish but the effects are minimal. Fish are commonly held in live cars during field work and negligible mortality occurs. Transferring Rio Grande cutthroat trout to a hatchery poses some risk as wild fish do not easily acclimate to hatchery conditions (e.g. hatchery feed, higher fish density, homogeneous surroundings). However, the use of live feed and reduced fish density compensates for some of the stress experienced by the fish.

Immediately after restoration activities in a stream segment, that water would be fishless. To expedite the fishery recovery process, native species are stocked on multiple occasions and with multiple size classes. Restocking generally occurs the following field season. A post-restoration population of Rio Grande cutthroat trout within the Rio Costilla

watershed (upper Rio Costilla) reached pre-treatment trout abundance just three years post-restoration (C. Kruse, pers. comm.) despite low water years during population expansion. Reproduction by stocked Rio Grande cutthroat trout was noted just two years after restoration.

Other listed, proposed, or candidate species

Under this alternative, changes in management of aquatic sites should reduce the negative impacts from land-use activities on aquatic, riparian, and upland listed, proposed, or candidate species. The management activities should result in long-term improvements of the vegetation communities and limit impacts from existing land use through conservation measure implementation.

Reestablishment of Rio Grande cutthroat trout within their historical range should not result in impacts to upland or riparian species but is likely to positively impact aquatic species by reestablishing the native community to the streams. There are no other listed, proposed, or candidate aquatic species in the Covered Area.

5.2.4 Cultural Resources

There are no direct impacts related to the issuance of this Permit and CCAA implementation that could potentially impact cultural resources. Ground-disturbing activities such as fish barrier installation and removal, nonnative removal, and fish stocking are ongoing independent of the proposed action, and the effects were evaluated in the Upper Rio Costilla Watershed EA (NMDGF 2007). It was found that most traffic would occur on established roads and trails, with some trampling of vegetation when personnel are working in or along the wetted stream corridor. Digging fish burial pits would disturb the ground within the floodplain, thus unlikely to disturb any site of historical significance. In the event that objects or sites with potential to be historically or culturally important are discovered during project activities, care would be taken to avoid any or further disturbance of the site until notification of the proper authorities. Additionally, because sites of historic significance in the Rio Costilla drainage are generally located away from the stream corridor (e.g., in upland or terraces adjacent to the stream) and the proposed action would be temporary and non-invasive, cultural and historical resources would not be affected by the treatment activities.

Fish barrier construction would require archeological clearance from the State Historic Preservation Office. Prior to construction, an archaeologist conducts a Class III intensive pedestrian inventory (survey) to identify or re-document any historic properties in the areas of the proposed ground disturbance. Such properties, if found, would be evaluated for their potential to be included in the National Register of Historic Properties. If a historic or archaeological site is found within the proposed barrier site, the barrier would be relocated to avoid adverse effects.

Additionally, indirect impacts of CCAA implementation could occur from construction of new or modification of existing stock tanks, wells, and pipelines. Any construction activities would be part of the normal infrastructure improvements related to private ranch operation. Therefore, the impacts from these activities are not completely associated with this alternative and are

common to both alternatives. Any maintenance of existing structures is anticipated to be within the previously disturbed areas and would not impact cultural resources. Other ranch activities will need to be reviewed at the project level in accordance with local, State, and Federal law. It is anticipated that any potential adverse effects to cultural resources will be mitigated in accordance with the State Historic Preservation Office requirements. Therefore, it is anticipated that no significant local or cumulative impact to cultural resources is likely to occur under this alternative.

Because of the unique relationship between tribal governments and the Federal government (Department of Interior Secretarial Order 3206), representatives of interested tribal governments were identified and allowed to review drafts of this EA and the proposed CCAA if requested. Five tribal entities have connection to Taos County, New Mexico, and Costilla County, Colorado: the Apache Tribe of Oklahoma, Comanche Nation, Jicarilla Apache Nation, Kiowa Tribe of Oklahoma, and Taos Pueblo. If representatives of the tribal governments identify themselves as interested parties, they will be notified of any cultural resources discovered during project planning or implementation that could potentially be impacted through CCAA implementation.

5.2.5 Land Use

No activity directly related to the issuance of this Permit and CCAA implementation should impact existing land use. Angling will continue as it has in the past and will be regulated by NMDGF. No significant indirect effects are expected from CCAA implementation, as it was developed to be compatible with the current land uses. No impacts are anticipated on land use by reestablishment of Covered Species into aquatic sites, or the removal and control of nonnative predators and competitors.

5.2.6 Water Resources

No activity directly related to the issuance of this Permit and CCAA implementation should impact water resources. Nonnative fish removal and barrier construction are ongoing independent of the proposed action, and the effects were evaluated in the Upper Rio Costilla Watershed EA (NMDGF 2007). The proposed action would not alter water delivery, timing, or quantity within the watershed and therefore no effect is expected. Precipitation would continually dictate water quantities within the watershed.

Construction of fish barriers requires temporary diversion of water around the construction area but does not affect water quantity. Barriers are designed to impound a minimum amount of water with little to no effects on the channel morphology. Most temporary barriers utilize existing culverts that currently do not impound water. Any modification would produce no effect on water impoundment or flow but merely inhibit fish passage. Barrier construction may affect water quality temporarily, as increased turbidity occurs during construction. Pooling of water above the barrier may cause slight increases in water temperature, though design would minimize pooling. No long-term effects on water quality would occur from installing permanent or temporary barriers as turbidity increase would be ephemeral.

Water quality would be temporarily affected by increased foot traffic during mechanical removals. During electrofishing removal efforts, project staff must wade within the stream channel. Wading disturbs the stream substrate, temporarily increasing turbidity. Once the crew has passed through a section, turbidity quickly returns to normal conditions.

Application of a piscicide temporarily affects water quality. Piscicide treatment times are scheduled during low flow periods (generally mid-June to October) to minimize the amount of piscicide required to complete the proposed action. Individual applications of piscicides last between 4 and 8 hours. Piscicide concentrations of antimycin and rotenone needed for trout restoration projects typically range between 8-12 parts per billion active ingredient (ppb a.i.) and 50-100 ppb a.i., respectively. Actual concentrations required in the Rio Costilla watershed vary depending upon onsite water quality, results of field bioassays, and target species. The actual amount of piscicide applied to a water depend upon water volume at treatment time. Because the amount of piscicide used is volume dependent, drought has no effect on piscicide concentration used but merely reduces the total amount applied. Potassium permanganate is typically applied at 1-4 parts per million (ppm) depending upon piscicide concentration and background potassium permanganate demand.

Piscicides being used in the upper Rio Costilla watershed are Fintrol (Antimycin A), CFT Legumine (Rotenone), and Prentox Fish Toxicant Powder (Rotenone). All products are registered as restricted use pesticides with the U.S. Environmental Protection Agency (USEPA) under the Federal Insecticide, Fungicide, Rodenticide Act (7 U.S.C. 136 et seq. (1996) and the New Mexico Department of Agriculture under the New Mexico Pesticide Control Act (NMSA 1973, 76-4-1 et seq.), and supporting regulations (NMAC 21.17.50). Registration as a restricted use pesticide limits pesticide use to prevent “unreasonable adverse effects on the environment” NMSA 1973, 76.4.1(R).

Antimycin is derived from naturally occurring bacteria and has been used in fish control projects for nearly 40 years. Antimycin A interferes with oxygen transfer at the cellular level and is particularly effective on fish (Schnick 1974a). The deployment of Fintrol follows label instructions and NMDGF protocols. Antimycin rapidly decomposes in water with sunlight intensity, temperature, pH (Schnick 1974a), stream turbulence (Tiffan and Bergersen 1996), and stream gradient (oxidation) affecting decomposition rate.

Rotenone is commercially extracted from plants in the Leguminosae family (Finlayson et al. 2000). Rotenone is widely used for fish control and sampling; it inhibits oxygen transfer at the cellular level and is particularly effective on fish (Schnick 1974b). The deployment of rotenone follows label instructions and NMDGF protocols. Rotenone readily degrades in water with hydrolysis, photolysis, temperature, organics, and pH all affecting decomposition rate (Schnick 1974b). Any changes in water quality from the application of piscicides and potassium permanganate would be temporary. Piscicides can be neutralized with potassium permanganate which hastens the degradation process.

During treatment, humans, livestock, and wildlife could be exposed to piscicide treated water. Ingestion of normal quantities of water during peak treatment would have no effect on humans, livestock, or wildlife. There would be no effect on the ability to safely ingest wildlife or

livestock exposed to piscicide treated waters (Ling 2003) . No contamination of groundwater is anticipated to result from this project. Piscicides degrade rapidly and bind readily to sediments, which limits the ability to leach into groundwater aquifers (e.g. Dawson et al. 1991). In California, researchers did not detect rotenone or any of the other organic compounds in the formulated products in wells that were placed in aquifers adjacent to and downstream of rotenone applications (Finlayson et al. 2001).

NMDGF obtained approval from the New Mexico Water Quality Control Commission (NMAC 20.6.4.16) to use piscicides in this project. A hearing, pursuant to NMAC 20.6.4.16, was held in Costilla, New Mexico, on February 22, 2006. The New Mexico Water Quality Control Commission approved the petition for the proposed action at their August 8, 2006 meeting for a period of five years, with a renewal . NMDGF obtained a renewal of the approval at the May 8, 2012 meeting. Approval by the New Mexico Water Quality Control Commission indicates that the proposed action complies with NMAC 20.6.4.16 and other applicable NM water quality regulations. Application of a piscicide to a water of the United States in accordance with the Federal Insecticide, Fungicide, and Rodenticide Act is not a pollutant under the Clean Water Act (CWA) (70 FR 5093, 71, FR 68483, Fairhurst v. Hagener 422 F.3d 1146 (9th Cir. 2005)). Degradation of piscicides is expedited by application of potassium permanganate which neutralizes piscicides with sufficient contact time. Because stream segments must be subdivided for implementation, piscicides are only be present on a given day within a portion of the stream.

Because the Rio Costilla watershed is located in the headwaters of a small portion of the Rio Grande drainage, all of the water eventually flows downstream towards municipalities and residences. The towns of Costilla and Amalia obtain their municipal water from wells. Other private drinking water wells are located below the project terminus point. One well within the project area, near Costilla Lodge, is used for drinking water. By the time project water reaches municipal or well locations, adequate dilution and degradation of piscicide (active and inert ingredients) would have occurred. Supplemental detoxification with potassium permanganate hastens neutralization and virtually eliminates any possibility of acute or chronic exposure to humans or wildlife. Potassium permanganate is commonly used to treat drinking water at the concentrations used for piscicide neutralization (Ling 2003).

Indirect impacts of CCAA implementation may result in improvements to water quality and quantity within and downstream of the Covered Area. Changes in land-use management should improve or maintain vegetative structure in aquatic, riparian, and upland communities. This in turn should improve soil stability and water infiltration, and slow runoff. All existing water rights would be given preference and will need to comply with State approval processes. No impacts on water resources are anticipated from the reestablishment of Covered Species.

6.0 CUMULATIVE EFFECTS

Cumulative impacts include the combined effect of past and present activities, specific planned projects, and other reasonably foreseeable future actions that are reasonably certain to occur, regardless of what agency or entity or person undertakes such other actions, within the project area. The Federal action agency (the Service) must determine whether impacts of the proposed

action, in this case the approval and implementation of the CCAA for Rio Grande cutthroat trout, when taken together with other actions would result in a significant environmental impact.

Ongoing activities within the Covered Area, such as recreational use, livestock grazing, agricultural activities, and oil and gas development could continue to have adverse impacts on the resources (i.e., soils, vegetation, wildlife, listed, proposed, and candidate species, and land use and ownership) identified and analyzed in this EA, with or without the approval and implementation of a CCAA. However, the conservation measures proposed in the CCAA (Preferred Alternative) would have net beneficial impacts to the environment, such as the removal of nonnative fish from the stream system and the restoration of native species.

Potential adverse cumulative effects may occur throughout the Covered Area should the CCAA not be approved and implemented; for example, Vermejo Park Ranch may choose not to reintroduce Rio Grande cutthroat trout to all of the restored streams, limiting the establishment of a large, connected population.

Livestock grazing, mining, and oil and gas exploration in the Covered Area increase overall surface disturbance. Consequently, stream habitat quality may decline. However, habitat changes facilitated by these activities can be minimized through implementation of conservation measures. These cumulative beneficial impacts would serve to minimize or completely eliminate some of the threats to the Covered Species.

Climate change

In an October 9, 1997, memorandum, the Council on Environmental Quality (CEQ) issued draft guidelines on how global climate change should be treated in NEPA documents. The CEQ guidance called on Federal agencies to consider in NEPA documents how major Federal actions could affect sources and sinks of greenhouse gases and how climate change could potentially influence such actions. The CEQ bases this guidance on the NEPA regulations, which mandate that all reasonably foreseeable environmental impacts of the proposed Federal action have to be considered in the NEPA document. The CEQ considers that there is adequate scientific evidence that indicates that climate change is a reasonably foreseeable impact of greenhouse gas emissions.

Furthermore, in November 2007, the Intergovernmental Panel on Climate Change (IPCC) issued its Fourth Assessment Report, which concluded that evidence of global warming is now unequivocal. Some of the IPCC's findings in this report included rising temperatures, rising sea levels, and retreating arctic ice. The IPCC's conclusions have been widely accepted as representing the consensus of opinion in the scientific community. According to the Environmental Protection Agency, global mean surface temperatures have increased 0.6 to 1.2 degrees Fahrenheit between 1890 and 1996. The nine warmest years in this century have all occurred within the last 14 years.

In consultation with leading scientists from the Southwest, the New Mexico Office of the State Engineer prepared a report for the Governor of New Mexico (New Mexico Office of the State

Engineer 2006), which made the following observations about the impact of climate change in New Mexico:

- (1) Warming trends in the American Southwest exceed global averages by about 50 percent;
- (2) Models suggest that even moderate increases in precipitation would not offset the negative impacts to the water supply caused by increased temperature;
- (3) Temperature increases in the Southwest are predicted to continue to be greater than the global average; and
- (4) The intensity, frequency, and duration of drought may increase.

Neither alternative is likely to contribute to the amount of greenhouse gas emissions in the atmosphere and the associated impacts of global climate change because the activities occurring on the Covered Area do not emit greenhouse gases or, in the case of oil and gas exploration, will not change under either alternative.

7.0 CONCLUSION

As a result of the analyses contained within this final EA, it is anticipated that Alternative B (Approval of a CCAA and Issuance of a Permit) will provide the greatest benefit to the resources within the Covered Area. The Preferred Alternative and its associated activities are not anticipated to have a significant effect on the human environment. Therefore, we intend to issue an enhancement of survival permit allowing Vermejo Park Ranch to implement the preferred alternative (Alternative 2), as it is described in the final CCAA and EA. Our decision is based on a thorough review of the alternatives and their environmental consequences. Implementation of this decision entails the issuance of the permit, including all terms and conditions governing the permit. Implementation of this decision requires that Vermejo Park Ranch adhere to the conservation measures specified in the CCAA in good faith through the duration of the CCAA and permit.

8.0 COORDINATION AND PREPARATION

The preparation of this EA was a coordinated effort between the Service, NMDGF, CPW, and the Applicant. The following individuals assisted in the preparation of this environmental assessment:

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Public notification of the availability of the Draft Environmental Assessment and Candidate Conservation Agreement with Assurances was published in the *Federal Register* on January 25, 2013. We received no request for draft documents from concerned agencies and no public comments were received.

Requests for additional information can be submitted to:
U.S. Fish and Wildlife Service
New Mexico Ecological Services Field Office
2105 Osuna Road NE
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