



Native Fish Management Plan

Valle Caldera National Preserve

Natural Resource Report NPS/XXXX/NRR—201X/XXXX



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East Fork Jemez River, Valle Caldera National Preserve, NPS

Credit: C. Nicolas Medley, NPS

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Natural Resource Report NPS/XXXX/NRR—201X/XXXX

C. Nicolas Medley

Fish Program, Water Resources Division
National Park Service
1201 Oakridge Drive, Suite 250
Fort Collins, CO, 80525

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Executive Summary

The Valle Caldera National Preserve Native Fish Management Plan (FMP, Plan) explains the regulatory and policy basis of the National Park Service's role in managing fish and fishing within units of the NPS, and identifies the management goals, objectives, strategies and major activities necessary for the conservation, and appropriate recreational use of the regionally native fish community within Valle Caldera National Preserve (VALL), New Mexico, U.S.A. The species' of primary management interest consist of the Rio Grande cutthroat trout (*Oncorhynchus clarkii virginalis*, RGCT), Rio Grande chub (*Gila pandora*, RGC), Rio Grande sucker (*Catostomus plebeius*, RGS), and longnose dace (*Rhinichthys cataractae*, LND).

The Plan identifies a programmatic framework that would (1) restore, and maintain the regional native fish community in the two primary watersheds within VALL (San Antonio Creek (SAC), East Fork of the Jemez River (EFJ)), including two genetically pure "conservation populations" of RGCT, and (2) provide unique opportunities for visitors to experience wildlife viewing and recreational fishing for RGCT within its native range, to the extent that such opportunities do not conflict with other NPS management policies.

NPS manages and regulates the use of lands within VALL and cooperates and consults closely with NMDGF to manage for mutually beneficial goals that are consistent with NPS management policies. However, much of the land within the proposed native fish conservation project area is outside the administrative boundary of VALL but administered by the Santa Fe National Forest (SFNF), whose fish and wildlife is managed and regulated by New Mexico Department of Game and Fish (NMDGF) under a Memorandum of Understanding (USFS SW Region 2014). Accordingly, the major actions identified in the Plan can only be implemented through a close, cooperative relationship with, and agreement between NPS, SFNF, and NMDGF, in consultation with other stakeholders and interested parties.

The Plan proposes to chemically remove non-native brown and rainbow trout from streams within VALL and the adjoining Santa Fe National Forest (SFNF) by treatment with the piscicide, rotenone, a plant derived chemical extract. While the primary target species is non-native trout, chemical removal will also result in the removal of other currently extant native fishes, but in doing so, it also provides the necessary conditions to restore the entire native fish community to VALL streams in the absence of non-native fish.

It is proposed that the native fish community will be restored in two primary phases. Phase 1 will remove non-native trout from SAC above a fish barrier in Ice Cave Canyon, and the reestablishment of the native fish community, sourced from EFJ (RGC, RGS, LND), and regional sources of RGCT. Phase 2 will involve the removal of non-native trout from EFJ above Jemez Falls, and the reestablishment of native fish sourced from the previously restored native fish assemblage, or their offspring, from SAC. The Plan also considers the removal non-native trout from Sulphur Creek and Redondo Creek in VALL by extending native fish restoration downstream to Soda Dam on the Jemez River. While highly speculative and uncertain, its inclusion identifies the Preserves long-term goal to restore the native fish community to all streams within VALL, should the opportunity arise. Other

proposed native fish management strategies include fish community population monitoring, genetic management, habitat restoration, and visitor education and outreach about the importance of native fish conservation.

The Plan aligns future native fish management at VALL with National Park Service (NPS) Management Policies (NPS 2006), the natural resource management goals of VALL (NPS 2018), and the fisheries goals of the Santa Fe National Forest (SFNF). The Plan is consistent with the Department of the Interior (DOI) Fish and Wildlife Policy: State-Federal Relationships. 43CFR24.1 (DOI 2003), and the recently published DOI Memo (DOI 2018) and Secretarial Order 3356; Hunting, Fishing, Recreational Shooting, and Wildlife Conservation Opportunities and Coordination with States, Tribes, and Territories (DOI 2017) that requires federal agencies to enhance conservation stewardship in collaboration with the States, improve the management of game species and their habitats, and increase opportunities for outdoor recreation.

The Plan is also consistent with the native fish conservation goals of both VALL, SFNF, and the NMDGF as described in the Conservation Agreement for the Rio Grande Cutthroat Trout in the States of Colorado and New Mexico (RGCT Conservation Team, 2013a), and the associated Conservation Strategy (RGCT Conservation Team, 2013b), and the Conservation Agreement for the Rio Grande Chub and Rio Grande Sucker (RGC and RGS Conservation Team, 2018), to which the NPS Intermountain Regional Office, the SFNF, and NMDGF are all signatories.

At this time, other than the general desire of all parties to identify and describe the broad opportunities to restore native fish to SAC and EFJ, and to pursue them as funding and resources become available, no specific commitments have been made to implement the actions identified in this plan. In fact, unless the federal parties find the funding and manpower to move forward without the lead of the state, native fish restoration will likely not occur until NMDGF has completed their higher priority restoration actions for the Pecos strain of RGCT. However, by identifying the Preserves future fish management goals, and a suite of connected actions to accomplish them, it is hoped that the VALL Native Fish Management Plan will serve as a long-term foundation for the conservation of the regionally native fish community within the Preserve. Until that time, the NPS, in coordination with NMDGF will continue to manage fish resources at VALL consistent with the previously identified NMDGF management goals that emphasize providing a high quality, recreational wild trout fishery and conserving the extant RGC/RGS population (NMDGF 2016).

Legislative and Management History

Valle Caldera National Preserve (VALL), located in Los Alamos County in the State of New Mexico was established as unit of the National Forest System by the Valles Caldera Preservation Act of July 25, 2000 (Public Law 106-248, Sec 101), to “protect and preserve for future generations the scientific, scenic, historic, and natural values of the Baca ranch, including rivers and ecosystems and archaeological, geological, and cultural resources; and to provide opportunities for public recreation” (Figure 1).

The groundbreaking legislation that provided for the federal purchase of the 89,900-acre ranch also created a unique experiment in public land management, that required the property to be managed as “a demonstration area for an experimental management regime adapted to this unique property which incorporates elements of public and private administration in order to promote long term financial sustainability, and to provide for sustained yield management of Baca ranch for timber production and domesticated livestock grazing, insofar as is consistent with the other purposes of the Act.”

From the outset, it was recognized that the unique nature of the Valles Caldera, and the potential uses of its resources with different resulting impacts, warranted a management regime uniquely capable of developing an operational program for appropriate preservation and development of the land and resources of the Baca ranch in the interest of the public. Accordingly, the Act stated that the experimental management regime should be provided by the establishment of the Valle Caldera Trust, to direct management of the Preserve:

1. “to provide management and administrative services for the Preserve;
2. to establish and implement management policies which will best achieve the purposes and requirements of this title;
3. to receive and collect funds from private and public sources and to make dispositions in support of the management and administration of the Preserve; and
4. to cooperate with Federal, State, and local governmental units, and with Indian tribes and Pueblos, to further the purposes for which the Preserve was established.”

On December 20, 2005, the initial Act was amended in The Valles Caldera Preservation Act of December 20, 2005 (Public Law 109-132, Sec. 1) to allow the acquisition of outstanding mineral interests within the Preserve.

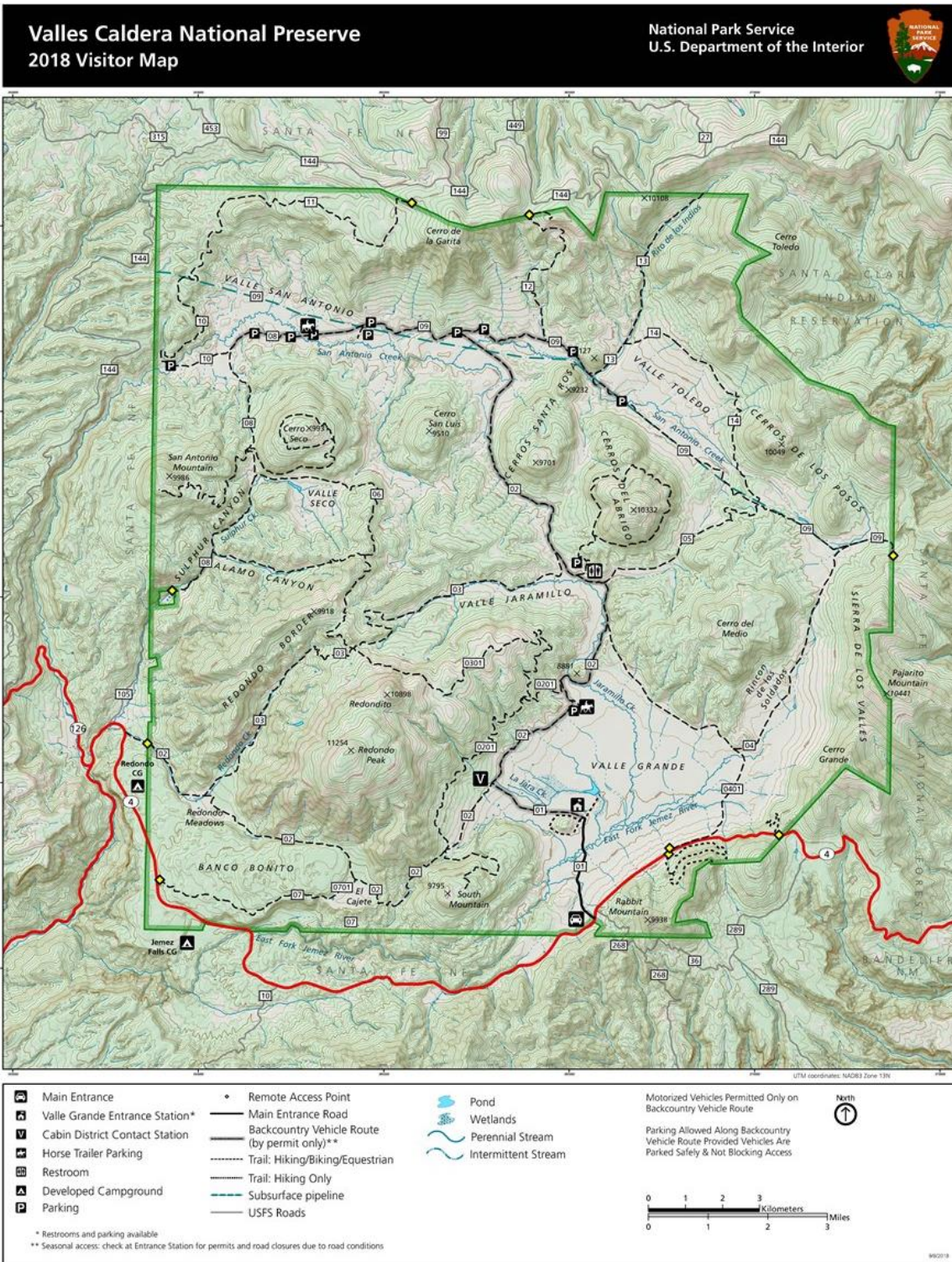


Figure 1. Map of administration boundaries of VALL. (Credit: NPS).

From the beginning, it was recognized that the need to balance generating income sufficient for the Preserve to be self-sustaining, while adequately protecting and preserving the unique natural and cultural resources of the Preserve would be challenging. Accordingly, on December 19, 2014, with

the recognition that the Preserve warranted greater protection to properly conserve its unique resources, the enactment of the National Defense Authorization Act for Fiscal Year 2015 (Public Law 113-291, Sec. 3043) established the Valles Caldera National Preserve as a unit of the National Park System “to protect, preserve, and restore the fish, wildlife, watershed, natural, scientific, scenic, geologic, historic, cultural, archaeological, and recreational values of the area.”

The legislation called for a period of transitional management by the Trust, which ended on September 30, 2015, at which time the Preserve came under the management of the National Park Service to be administered in accordance with the laws generally applicable to units of the National Park System, including (I) the National Park Service Organic Act (16 U.S.C. 1 et seq.) and, (II) the Act of August 21, 1935 (16 U.S.C. 461 et seq.)

Physiographic and Ecological Setting

Valles Caldera is located deep within the Jemez Mountains in north-central New Mexico. The 88,900-acre preserve encompasses almost the entire volcanic caldera and is mostly surrounded by the Santa Fe National Forest. The Pueblo of Santa Clara shares a boundary with the preserve along the northeast rim of the caldera. Bandelier National Monument is an adjacent neighbor to the southeast (Figure 2.).

The preserve is located in the Jemez volcanic field at the intersection of two major fault systems, the Rio Grande Rift and the Jemez Lineament. This volcanic field has been active for more than 14 million years, but the current 12- to 15-mile-wide circular caldera depression was created by a spectacular volcanic eruption about 1.25 million years ago. Since that time, an additional 15 eruptions and magmatic intrusive events have created numerous volcanic domes within the caldera, including the major central resurgent dome, Redondo Peak, which is 11,254 feet high (Figure 3.). The caldera is dormant, but not extinct, and still displays signs of volcanic life with hot springs and boiling sulphuric acid fumaroles (For more information: <http://www.nmnaturalhistory.org/volcanoes/valles-caldera-jemez-volcanic-field>). Another distinctive feature of the preserve is the large grassland meadows, or “valles” in Spanish, remnants of lakebed sediments from a series of interglacial lakes that periodically filled the Caldera since its initial formation (Goff 2009).

The juxtaposition of large grassland meadows surrounded by rounded forest-covered volcanic domes provides the distinctive natural landscape that led to the name of Valles Caldera (Figure 3). The high-elevation ecosystems, ranging from 8,000 to 11,254 feet high, combine abundant rainfall, mixed-conifer forests, and deep rich soils to support a great diversity of animals, plants, fungi, and other organisms including herds of several thousand elk and healthy populations of mountain lions, bears, and coyotes. For thousands of years American Indians have used the caldera for hunting game, small mammals and waterfowl, fishing, collecting an abundance of seeds, nuts, and berries, and gathering various plants for medicine and ceremonies.

The signature resource for these indigenous peoples was obsidian. This high-quality volcanic glass gathered at extensive quarries in and near the caldera yielded valuable materials for spear points, arrowheads, knives, and scrapers. Obsidian artifacts from the last 12,000 years are abundant throughout the preserve and are found in ancient quarries, campsites, and even seasonally occupied small villages.

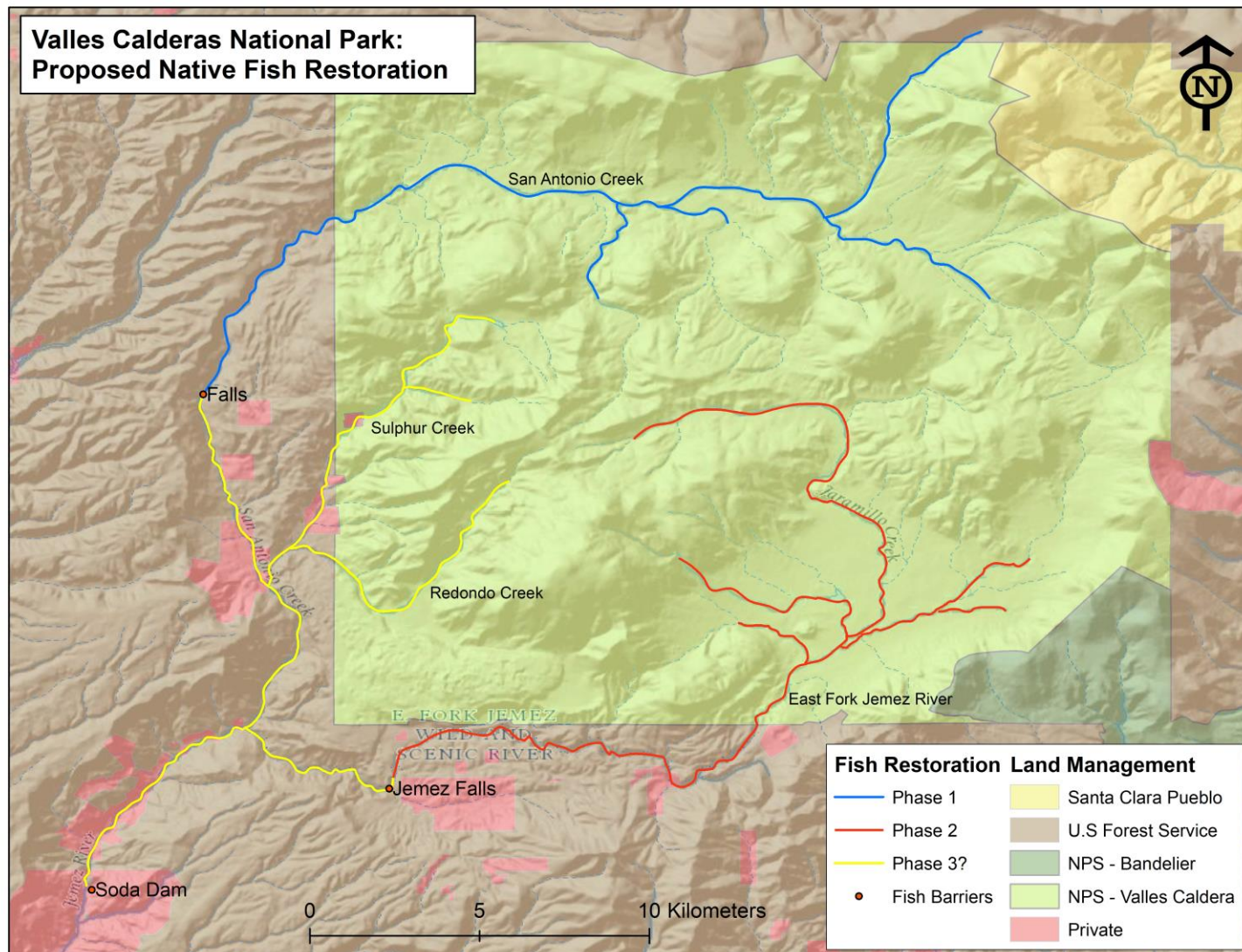


Figure 2. Map of VALL administrative boundaries and land management responsibility of adjacent lands. Map also identifies location of fish barriers and stream reaches within each proposed phase of native fish restoration (Credit: Jamie Hoover, NPS).

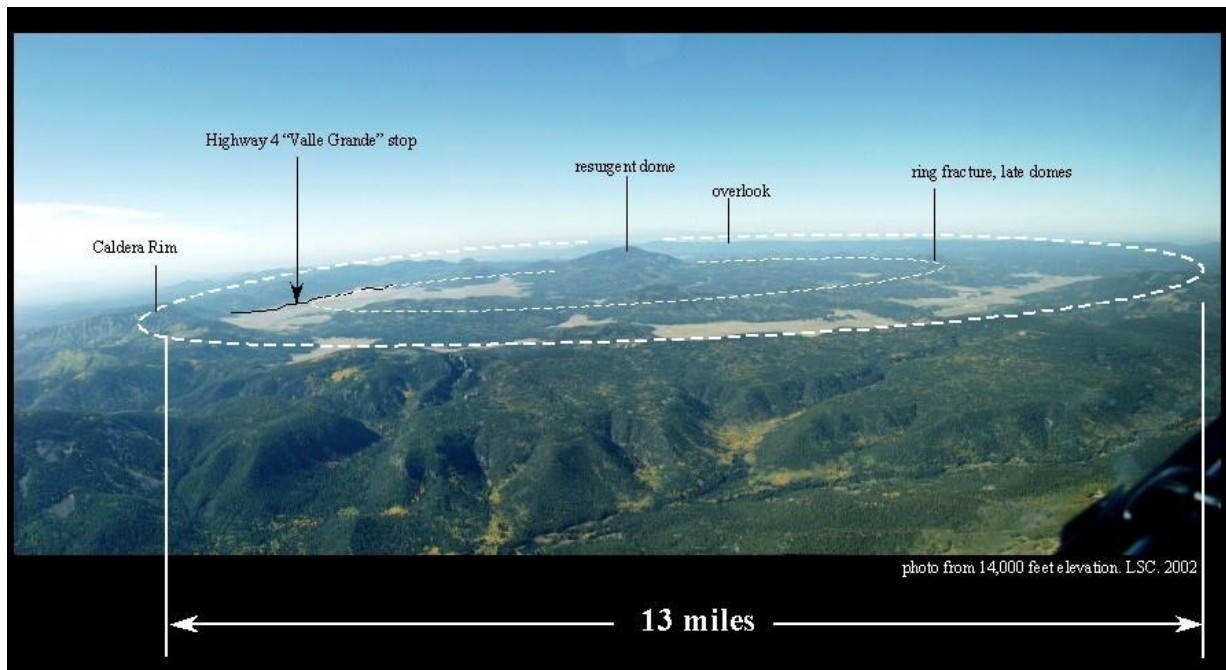


Figure 3. Ariel photograph, looking south, showing outline of volcanic caldera within which are large grassland “Valles” interspersed with volcanic domes. (Credit: Dr. Larry Crumper, NM Natural History Museum).

Numerous American Indian tribes and pueblos in the region have deep historic and cultural connections to the caldera that are expressed today through ceremonial activities, rich oral histories, and sacred traditions. Valles Caldera also chronicles the history of New Mexico’s enchantment and exploitation—from 19th century land use after the Treaty of Guadalupe Hidalgo and sheep grazing under the partido system to subsequent cattle grazing, timber harvesting, and geothermal exploration. Beginning as a land grant in 1860, private ownership was held by a series of four families. The early name, Baca Location No. 1, was established at the beginning of the Cabeza de Baca era (1860–1899), and the lands were used for sheep grazing. During the Otero era (1899–1917) sheep grazing was increased, supplemented by ventures into sulphur mining and tourism at a location known as Sulphur Springs on the land grant’s western boundary. Sheep grazing peaked and then was replaced by cattle ranching during the Bond era (1917–1962). The last private owners (1962–2000) were the Dunigan family, who continued cattle operations while pursuing diversified ventures such as exploration of geothermal potential, movie filming, raising thoroughbred horses, and recreational fishing and elk hunting. Although logging had begun in the 1930s, it was dramatically increased in the early 1960s by non-landowners who held rights to the timber. By the time the Dunigans were able to halt the clear-cut logging in the early 1970s, the overwhelming majority of old-growth forests had been cut and more than 1,000 miles of logging roads had been built through the forests.

The preserve offers a landscape in which to explore the dynamics of high elevation ecosystem stability and resilience in the context of changing climate conditions. Although the natural beauty of the caldera has persisted, the land-use practices of the 19th and 20th centuries, including overgrazing,

clear-cut logging, and road building, have left a legacy of unhealthy forests, riparian damage, degraded wetlands, and reduced stream function. Numerous wildlife species were extirpated from the area as well.

Today's approach to ecological restoration builds on the lessons learned from this history and seeks to regain balance between human uses and natural processes. The preserve is an ecosystem in recovery. Major wildfires in 2011 and 2013 burned 60% of the preserve, and today the contrast in recently burned areas between old-growth forest and dense, second-growth forests provides a compelling demonstration of the value of landscape restoration to promote biotic integrity and biodiversity, while improving watershed function and reducing the potential for future catastrophic wildfires.

Waterbody Descriptions

Two major streams flow within VALL; San Antonio Creek (SAC), and the East Fork of the Jemez River (EFJ), both originating a short distance from one another, on the west slope of the Sierra de los Valles on the east side of the preserve (Figure 1.). Near their source, they flow in opposite directions: SAC flows north, and the EFJ flows south, before they both turn to flow west following the inside rim of the Caldera. SAC continues to turn anti-clockwise, to flow south through the Santa Fe National Forest (SFNF) near the west boundary of the Preserve; the EFJ continues to flow clock-wise before exiting the Preserve on the south boundary and continues flowing west through SFNF on the south boundary of the Preserve (Figure 2). The two streams meet at Battleship Rock, just outside the south-east corner of the Preserve, where it becomes the Jemez River, having formed an almost complete circle largely defined by the circular shape of the Caldera.

Two smaller streams; Sulphur Creek and Redondo Creek, originate on the west side of the Preserve. Both flow in a general southwest direction before meeting just outside the west border of the Preserve, before then joining SAC. A prominent feature of Sulphur Creek is the presence of the Sulphur Springs hydrogeothermal area which consists of a series of acid-sulfate hot springs, fumaroles, and mudpots on the western flank of the Redondo Creek resurgent dome (see https://openei.org/wiki/Valles_Caldera_-_Sulphur_Springs_Geothermal_Area).

SAC is approximately 30.5 miles long from headwaters on the west side of the preserve, to its confluence with the EFJ, of which approximately 18.5 miles is within the Preserve. Its only major tributary within the Preserve is the Rito de los Indios which flows from the northern inner rim of the Caldera.

EFJ is approximately 21.5 miles long from its headwaters to the confluence with SAC, of which 9 miles are within the Preserve. Its primary tributaries are Jamarillo Creek and La Jara Creek. In 1990, 11 miles of the EFJ, from the boundary of VALL, downstream to the confluence of SAC were designated as a Wild and Scenic River (WSR) pursuant to the Wild and Scenic Rivers Act (WSRA).

Fish Barriers: The location of barriers to upstream fish migration are important considerations when restoring native fish communities, because they allow for the establishment of rare fish populations above the barrier without out risk of invasion by non-native species from below.

Natural barriers to fish movement exist on both SAC and EFJ within SFNF land. On SAC a presumptive barrier exists in Ice Cave Canyon, approximately one mile below San Antonio Hot Springs (Figure 2, Figure 4.). Above the barrier, the creek and its major tributaries are all located within federal lands administered by the NPS and USFS.

In the Box Canyon of the EFJ, a series of 37 chutes and falls creates many potential barriers to upstream fish movement (SFNF 2002a, Figure 5.). The highest, and most downstream of these falls, Jemez Falls, is high enough to be a reliable barrier to upstream fish migration under all reasonable flow conditions. Above Jemez Falls the river and its major tributaries are again located within federal lands administered by the NPS and USFS, with the exception of a short reach of EFJ that

flows through a private inholding within the Wild and Scenic reach of EFJ, south of the Preserve (Figure 2).

A further reliable fish barrier exists at Soda Dam on the mainstem of the Jemez River, approximately 2 miles below Battleship Rock (Figure 6.). The presence of this barrier provides an opportunity to extend native fish restoration to all streams within VALL should the opportunity arise.

It has also been suggested that hot, chemical laden water originating from the Sulphur Spring geothermal area may be a barrier to fish movement at low flows in Sulphur Creek. However, it is unlikely to be a permanent fish barrier at all expected flows due to the dilution of Sulphur Springs outflow during Spring runoff. The documented presence of brown trout in upper Sulphur Creek, which are unlikely to have been stocked at this location, would perhaps support this presumption.

Furthermore, numerous small impoundments constructed to provide livestock water exist on many of the headwater streams within the Preserve. Most are created by low head dams which may also function as fish barriers. While the Preserve is working to identify which ponds may, or may not, be removed in the future as part of their ecosystem restoration efforts, their current presence may be very useful in defining river subreaches that may be sequentially treated during the fish restoration project. It is also possible that some of the existing road culverts may temporarily be modified to create temporary fish barriers during the restoration process.



Figure 4. Presumptive fish barrier in Ice Cave Canyon on San Antonio Creek. (Credit: SFNF, USFS).



Figure 5. Jemez Falls on East Fork Jemez River. (Credit: SFNF, USFS).



Figure 6. Soda Dam on Jemez River. (Credit: C. Nicolas Medley, NPS).

Hydrology: Streamflows are characterized by high seasonal spring flows caused by melting of the winter snowpack typically peaking late May to early June, followed by lower summer flows maintained by headwater springs and regular monsoon events in July through September. Low flows usually persist from late summer until the snowmelt in the spring.

Flows in the Wild and Scenic River reach of EFJ within SFNF are protected by a 2009 Partial Final Judgement and Decree granting a federally reserved, non-consumptive, instream flow water right; an outcome of the general adjudication of all water rights in the Jemez River system. The right is for the maintenance of all the outstandingly remarkable values for which the EFJ was designated as a WSR pursuant to the WRSA, including scenic values, recreation, fisheries and riparian habitat.

Geomorphology: Comprehensive inventories of both rivers were conducted by the Santa Fe National Forest shortly after the ranch was acquired by the federal government while still under the authority of the U.S. Forest Service (SFNF 2002, SFNF 2003). In their upper reaches, the streams flowing off the rim of the Caldera are small, steep and shallow, with a narrow floodplain. In the upper reaches of the watershed, groundwater fed springs release water at the toe of this steep slope creating large flat wetland meadows. However, as water accumulates these meadows quickly transition to narrow stream channels that meander through the broad “valles” so characteristic of the preserve.

Before significant human influence, the meadow streams in VALL were generally narrow, deep, single thread channels that meandered through a wide, alluvial floodplain (Rosgen stream classification type E). The channels banks were high and stable composed of fine sediments stabilized with deep-rooted grass-like herbaceous wetlands vegetation and montane grasses, with no, or little woody riparian vegetation. The spring water would have been extremely clear and the river bed clearly visible. The substrate was predominantly small cobbles and gravels with smaller areas of sands.

The results of the stream inventories showed that while some parts of the streams were considered healthy and functioning at the time of the survey, many areas showed significant impacts from historic cattle grazing and other poor land management practices, with unstable eroding banks, increased width/depth ratios, and streambed aggradation from the accumulation of fine sediments.

Beginning in the mid-19th Century, intense grazing by cows and sheep reduced vegetative cover in both the upper watersheds and the floodplain and severely trampled streambanks. Watershed disturbance decreased the infiltration capacity of the soil and increased the frequency and magnitude of large flows. Reduced streambank stability and increased flows caused severe streambank erosion, greatly increasing the availability of sediment that then caused the river to widen, aggrade, and migrate laterally across the floodplain. In many places, channel widening increased channel capacity. The subsequent inability of flood flows to dissipate their energy by flowing onto the floodplain promoted further channel bank erosion and widening. In some reaches, increased migration led to channel avulsions, which shortened the length of the river and steepened the river channel. The increased slope of the channel initiated local channel incision that lowered the elevation of the channel bed further promoting abandonment of the historical floodplain (see cover photograph).

While the above described events clearly occurred in many reaches of VALL streams, in other reaches the impacts, while severe, were not sufficient to cause the stream to abandon its historic planform to the extent that it would lead to severe channel incision. Consequently, since 2003, streambank condition has improved in many reaches throughout the watershed as grazing has been better managed. Streambanks have begun to stabilize and rebuild, and the channel continues to narrow in some reaches encouraging the flushing of fine sediments and revealing the larger, round cobble substrate beneath indicating the lower elevation and character of the historic streambed. As the stream meanders through lush mountain meadows, in those areas where the stream channel is stable, miles of pools and overhanging banks are created, providing excellent stream habitat. It is anticipated that under the current management regime, the conditions of VALL streams will continue to improve.

Water Quality: Historically, water quality and stream habitat have suffered as a consequence of poor watershed practices associated with grazing and logging (SFNF 2002a, SFNF 2003). Consequently, both SAC and EFJ were listed on the New Mexico Clean Water Act 303d Report (NMED-SWQB 2018) as stream reaches not meeting their designated use sufficient to protect “High Quality Cold Water Aquatic Life”, being impaired by excessive temperature, turbidity, nutrients and aluminum. The first three water quality parameters are directly related to the impacts of grazing and logging, and subsequent changes in stream habitat. Aluminum is thought to be naturally high within VALL, a consequence of the geothermal activity still occurring within the preserve. Accordingly, VALL streams are the subject of numerous planning activities to improve water quality and stream habitat (JWRAS 2005, SFNF 2011, SFNF 2002a SFNF 2003). Upon improved management and the implementation of watershed best management practices, water quality and stream habitat is improving.

Fish Presence

Standardized fish monitoring began in 2002, after purchase of the Baca Ranch by the federal government. Since that time, eight species of fishes have been documented in VALL (SFNF 2002, SFNF 2003, USGS 2018). Five co-occurring fish species are regionally native to the upper Rio Grande: Rio Grande cutthroat trout (RGCT, *Oncorhynchus clarki virginalis*), Rio Grande chub (RGC, *Gila Pandora*), Rio Grande sucker (RGS, *Catostomas plebius*), longnose dace (LND, *Rhinichthys cataractae*), and fathead minnow (*Pimephales promelas*) (Calamuso and Rinne 1996). Three non-native trout are extant within the Preserve; brown trout (*Salmo trutta*), rainbow trout (*Oncorhynchus mykiss*), and an occasional rainbow x cutthroat trout hybrid (*O. mykiss* X *O. clarkii*), all present due to historical stocking within the Preserve (Table 1.).

Table 1. Fish documented in VALL streams (SFNF 2002, SFNF 2003, USGS 2018). * FHM may not be native to VALL but are native to the Jemez River watershed.

Common Names	Scientific Name	Family	Nativity
Rio Grande chub	<i>Gila pandora</i>	Cyprinidae	Native
Rio Grande sucker	<i>Catostomas plebius</i>	Cyprinidae	Native
longnose dace	<i>Rhinichthys cataractae</i>	Cyprinidae	Native
fathead minnow	<i>Pimephales promelas</i>	Cyprinidae	Native*
Rio Grande cutthroat trout	<i>Oncorhynchus clarki</i>	Salmonidae	Native
rainbow trout	<i>Oncorhynchus mykiss</i>	Salmonidae	Non-native
brown trout	<i>Salmo trutta</i>	Salmonidae	Non-native
cutthroat trout hybrid	<i>O. mykiss</i> X <i>O. clarkii</i>	Salmonidae	Non-native

Four fish species (RGCT, RGC, RGS, LND) are likely native to VALL, but there is some uncertainty concerning their native distribution within preserve streams. FHM, while native to the basin, is perhaps not native to the preserve and its presence may be due to a bait bucket introduction as a result of recreational fishing. Both primary creeks within the preserve have healthy reproducing populations of non-native brown and rainbow trout.

The native fish of primary recreational interest is the Rio Grande cutthroat trout (RGCT) which is no longer present in the Preserve. RGCT are often found sympatric with RGC, RGS and LND which are currently extant in both SAC and EFJ within VALL. All are of considerable conservation interest within the region. Accordingly, VALL is proposing to restore the full regional native fish community to the preserve.

The available information regarding the historic fish community in VALL is summarized in the SFNF Stream Inventory Reports for SAC (SFNF 2002) and the EFJ (SFNF 2002a). Much of the following summary is taken from those sources.

Trout

Trout were first observed in VALL in 1892. A USFS cultural report states that mountain streams fed “Los Valles” and the streams “teem with mountain trout.” However, fish stocking did not occur in

New Mexico until 1896 (Sublette et al., 1990) indicating that the trout reported must have been native Rio Grande cutthroat trout.

During 1936, a creel census was conducted throughout the state in US Forest Service waters. Included in this report is a stocking history for the EFJ. During the years 1932-36, 88,300 rainbow trout and 13,500 Yellowstone cutthroat were stocked. During 1936 the creel census recorded that 30% of the fish caught were rainbow, 50% were Yellowstone cutthroat, and 20% were brown trout. No RGCT were caught in the EFJ. Unfortunately, this report does not say where the creel census was conducted or where the fish were caught or stocked. One can conclude that brown trout were stocked prior to 1932. The data also suggests that RGCT may have been extirpated by the late 1930's.

Currently, there are no reproducing populations of RGCT in the preserve. It is almost certain that the species extirpation is the result of habitat degradation; predation and competition from brown trout and rainbow trout, and; hybridization with rainbow trout. Past monitoring clearly shows that the stocking of non-native trout (brown trout and rainbow trout) in VALL streams likely caused the extirpation of native Rio Grande cutthroat trout populations with VALL, and continues to greatly reduce the abundance and distribution of other, currently extant native fish. The documented reduction of non-native trout, and the concomitant increase in native fish in the Jemez River in response to the Las Conchas Fire and the Thompson Ridge Fire, demonstrates that competition and predation greatly limits the native fish community, a finding also recently reported in the Pecos River within Pecos National Historical Park (NMDGF 2015).

The only recently documented occurrence of RGCT is an occasional fish caught during annual surveys that are likely hatchery strays introduced with rainbow trout stocking that still occurs in EFJ and SAC, downstream of the preserve (R Parmenter, NPS, pers comm, 2019). The reports of cutthroat x rainbow hybrids is likely the occasional fish that are the result of historic stocking of both Yellowstone cutthroats and rainbow trout.

Other Fish

Other than the absence of RGCT, both SAC and EFJ currently have a healthy native fish community below, and above the barrier falls on each stream.

With the exception of RGCT again, the EFJ above Jemez Falls has the full complement of historically extant native fish species (RGC, RGS, LND, FHM), that also occur below the barrier (Table 2. Figure 7.). This suggests that the barrier likely formed after colonization of the upper reaches of EFJ within VALL, or that the fish community was established by another mechanism.

Table 2. Summary of fish species presence/absence and distribution, below and above natural barriers on VALL streams. BT: brown trout (*Salmo trutta*); RBT: rainbow trout (*Oncorhynchus mykiss*); WS: white sucker (*Catostomus commersonii*).

Nativity	Status	San Antonio Creek		East Fork Jemez River	
		Below Barrier	Above Barrier	Below Barrier	Above Barrier

Native	Historically Extant	RGCT, RGC, RGS, LND, FHM ^a	RGCT, LND	RGCT, RGC, RGS, LND, FHM ^a	RGCT, RGC, RGS, LND, FHM ^a
Native	Currently Extant	LND, RGC, RGS, FHM ^a	LND, RGCB, RGSb, FHM ^{a, b}	LND, RGC, RGS, FHM ^a	LND, RGC, RGS, FHM ^a
Native	Currently Absent	RGCT	RGCT	RGCT	RGCT
Non-native	Currently Extant	BT, RBT, WS	BT, RBT	BT, RBT, WS	BT, RBT

^a Possibly not native to VALL streams.

^b Introduced in 2007.

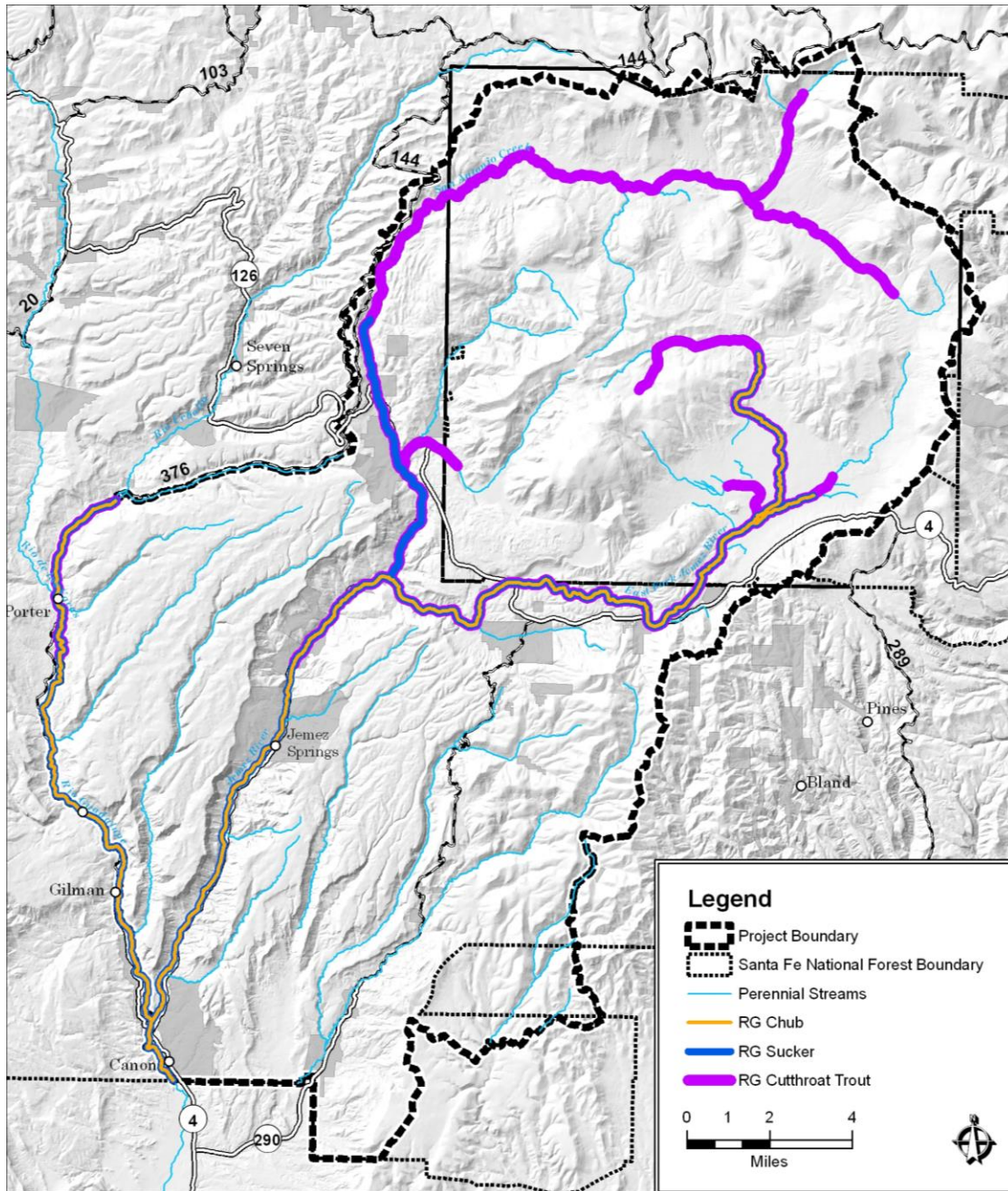


Figure 7. Map showing streams occupied by native Rio Grande chub and sucker, and the presumed historical occurrence of Rio Grande cutthroat trout (not currently occupied by RGCT), prior to the 2007 introduction of RGC and RGS into SAC. (Credit: SFNF, USFS).

The presence of the complete historic regional native fish assemblage above Jemez Falls in the EFJ contrasts with the absence of three regionally native species in SAC above the fish barrier in Ice Cave Canyon, which, prior to a 2007 introduction of RGC, RGS, and FHM, contained only LND and non-native trout. Prior to 2007, the barrier defined the upstream distribution of RGC, RGS, and non-native white sucker (*Catostomas commersonii*) and suggests that the falls is a reliable barrier to upstream movement of fish with relatively poor swimming ability. However, the relatively low

height of the barrier, suggests that it may not be a reliable barrier to RGCT that were historically extant above the barrier.

How RGC, RGS, and FHM were able to cross the numerous, larger barriers in EFJ, but unable to negotiate the single, smaller barrier in SAC, might suggest a different hydrogeologic history for each drainage (Figure 7.). It is also possible that the presence (or absence) of native fish species, including historically documented RGCT, above the barriers in both SAC and EFJ might be due to other mechanisms other than upstream movement, including anthropogenic introduction, head water capture of nearby streams, and perhaps subsequent loss of some historically present species due to the presence of non-native predatory trout and habitat degradation. However, the latter appears unlikely because the entire native fish community is still extant in the EFJ despite the presence of brown trout. The presence of LND above the barrier on SAC suggests that it may not be a barrier at all flows, though it is also possible that their presence may be due to a recent bait bucket introduction, a hypothesis that perhaps explains the presence of FHM in EFJ.

A definitive explanation for the documented historic distribution of native fish in VALL will likely remain elusive. However, until additional information is available to confirm the nativity of FHM (e.g. phylogenetic and phylogeographic analyses using mitochondrial *cyt b* gene/S7 ribosomal protein coding nuclear gene sequencing; see Ballesteros-Nova et al. 2019), they will be considered native.

Fish Community Dynamics and the Importance of Fire

Wildland fire is an important natural process at VALL. In the last decade, fire has been the dominant factor structuring both terrestrial and aquatic ecosystems, and two fires; the 2011 Las Conchas Fire, and the 2013 Thompson Ridge Fire burnt over 60% of the Preserve, precipitating a cycle of impact and recovery, and played an important role in determining the state of natural resources at the park.

Of particular concern is the impact of fire on aquatic systems and its subsequent negative impact on native fish both within New Mexico (see NMDGF webpage at <http://www.wildlife.state.nm.us/fishing/native-new-mexico-fish/rio-grande-cutthroat-trout/>).

A wildfire risk assessment written by The Nature Conservancy (TNC 2013) for NMDGF to assess the risk of fire on extant RGCT populations through the state supports this concern, and concluded;

“As wildfires in New Mexico have become larger, more frequent, and more intense, the negative impact they have on natural resources has also increased. The Rio Grande cutthroat trout is a valued sportfish and species of conservation concern in New Mexico that is threatened by wildfires themselves and the flooding and debris flows that often occur afterward. Such catastrophic events can eliminate entire populations and leave stream habitats unsuitable to fish for several years. To better understand how wildfire could affect Rio Grande cutthroat trout, The Nature Conservancy was contracted to conduct a wildfire risk assessment for all known populations.

Models using landscape scale variables (e.g., forest type, years since last burn) were developed to determine wildfire risk, the likelihood of a catastrophic flow event, and the intensity or severity of such an event. Overall risk was then calculated by combining these risk factors into a single index.

The risk of wildfire, debris flows, and overall risk was determined for each Rio Grande cutthroat trout population, but also at the watershed scale (e.g., Upper Rio Grande, Canadian Headwaters).

The models showed that 86 percent of Rio Grande cutthroat trout populations are at extreme or high risk of wildfire and catastrophic debris flows. In the Upper Rio Grande watershed, which contains 28% of all Rio Grande cutthroat trout water, all populations are either at extreme risk or the upper level of high risk of wildfire and debris flows. Only one population of the 118 total populations is at low risk. Such areas of low risk tended to occur at lower elevations, but most Rio Grande cutthroat populations occur at higher elevations.”

Results of this modeling effort showed that while VALL streams do not currently contain native RGCT, all were at extreme or high risk of catastrophic wildfires that could lead to extirpation of the extant fish community, including sympatric native species such as RGC and RGS (http://www.wildlife.state.nm.us/download/fishing/rio-grande-cutthroat-trout/wildfire-risk/RGCT-Wildfire-Risk-Assessment-Part_2.pdf).

Long-term (2003 – 2018) fish population monitoring conducted by Dr Colleen Caldwell of United States Geological Survey – New Mexico Cooperative Fish and Wildlife Research Unit of New Mexico State University (USGS-NMCFWR-NMSU) showed that the 2011 and 2013 fires caused a significant reduction in trout populations in both SAC and EFJ (USGS 2018). This led to a subsequent “predator release” of non-game fishes resulting in increased native fish abundance in response to decreased predation and competition. However, within 7 years, trout numbers had recovered, accompanied by a decrease in native fish populations. A similar increase in native RGC in response to the loss of non-native trout after fire has been observed on the Pecos River within Pecos National Historic Park (NMDGF 2015).

While these results suggest that it is unlikely that a future fire will be severe enough to entirely extirpate fish communities within VALL streams, native fish populations are clearly at risk from wildfire and debris flows (TNC 2013).

Native species historically extant within VALL

Four fish species are regionally native to the upper Rio Grande basin, and considered native to VALL, and proposed for (re)introduction subsequent to the removal of non-native trout. (Note: While fathead minnow (FHM, *Pimephales promelas*) are native to the basin, their nativity to East Fork Jemez River in VALL is uncertain. The species presence is more likely the result of a recent bait bucket introduction. At this time, VALL does not propose to reestablish FHM in EFJ until such time that their nativity is confirmed).

Rio Grande cutthroat trout (*Oncorhynchus clarkii virginalis*, RGCT)



Figure 8. Rio Grande cutthroat trout. (Credit: New Mexico Department of Game and Fish).

- Native to Upper Rio Grande Basin and Jemez River watershed. Extirpated from SAC, EFJ and Redondo/Sulphur Creek within VALL (SFNF 2002a, SFNF 2003).
- Current Status: Uncommon and a conservation concern (Bakevich et al 2019, Pritchard and Cowley 2006, TNC 2016). Regulated species in NM with Range-wide Conservation Strategy and Agreement (RGCT Conservation Team 2013a, 2013b).
- Body form: Streamlined, robust body, with terminal mouth. Grows to 500 mm when conditions allow, but generally does not exceed 300 mm in small habitats.
- Feeding Strategy: Visual predator. Midwater, drift feeder. Feeds on aquatic and terrestrial insects, small fish, and opportunistically on a wide variety of prey.
- Temperature Tolerance: Coldwater species. Temperature tolerance to 80 °F.
- Habitat/Substrate Use: Variable, but generally cobble, gravel and pool/riffle/glide stream habitat in higher elevation rivers/streams, and cold lakes. Requires well-oxygenated water.
- Reproductive Strategy: Spring spawner, over large gravel. Deposits eggs in excavated nest in moving water, in highly-oxygenated environment.

Rio Grande chub (*Gila pandora*, RGC)



Figure 9. Rio Grande chub. (Jennifer Mack, Pajarito Environmental Education Center).

- Native to the Upper Rio Grande Basin, and Jemez River watershed. Currently extant to SAC and EFJ and its tributaries within VALL.
- Current Status: Uncommon, and a conservation concern (Rees et al. 2005. NMDGF SWAP SGCN Cat. 1 2016) with Range-wide Conservation Agreement (RGC and RGS Conservation Team 2018), and RGC Conservation Strategy (RGC and RGS Conservation Team 2020a). USFWS was recently sued by Wild Earth Guardians to list the species under federal Endangered Species Act (Wild Earth Guardians 2013).
- Body Form: Streamlined, robust body, up to 250 mm, with terminal mouth.
- Feeding Strategy: Visual predator. Midwater, drift feeder. Feeds on aquatic and terrestrial insects, small fish, and opportunistically on a wide variety of prey (occupies similar ecological niche as trout species, but in more downstream habitats).
- Temperature Tolerance: Coolwater/warm water species. Temperature tolerance to 90 °F.
- Habitat/Substrate Use: Variable, but generally cobble, gravel/sand and pool/riffle/glide stream habitat. Co-exists with trout species in upper range, but range extends further downstream, and species is tolerant of wide range of water and habitat conditions.
- Reproductive Strategy: Early summer, communal, spawner, over gravel in well-oxygenated environment.

Rio Grande sucker (*Catostomus plebeius*, RGS)



Figure 10. Rio Grande sucker. (Credit: Carson National Forest, NM).

- Native to the Upper Rio Grande Basin, and Jemez River watershed. Currently extant to SAC and EFJ and its tributaries within VALL. Not present in SAC and Redondo Creek within VALL.
- Current Status: Uncommon and a conservation concern (Rees and Miller 2005, NM SWAP SGCN Cat. 1 Species 2016) with Range-wide Conservation Agreement (RGC and RGS Conservation Team 2018) and RGS Conservation Strategy (RGC and RGS Conservation Team 2020b). USFWS was sued by Wild Earth Guardians to list the species under federal Endangered Species Act (Wild Earth Guardians 2014).
- Body Form: Small sucker species, with terete, moderately dorsoventrally compressed body, ventral mouth, rarely exceeding 200 mm.
- Feeding Strategy: Well-developed cartilaginous mouth ridge adapted for scraping rocks. Diet consists of periphyton, benthic insect larvae, and detritus and plant material.
- Temperature Tolerance: Uncertain, but likely a wide temperature tolerance, up to 90 °F.
- Habitat/Substrate Preference: Uncertain, but often found in mid-elevation, transitional, streams with moderate gradient, pool/glide habitat, over gravel substrate. Likely tolerant of low dissolved oxygen, high turbidity and high temperature.
- Reproductive Strategy: Uncertain, but likely early Summer (May to July), communal, spawner, over clean gravel, when water temperature 51 – 60 °F.

Longnose Dace (*Rhinichthys cataractae*, LND)

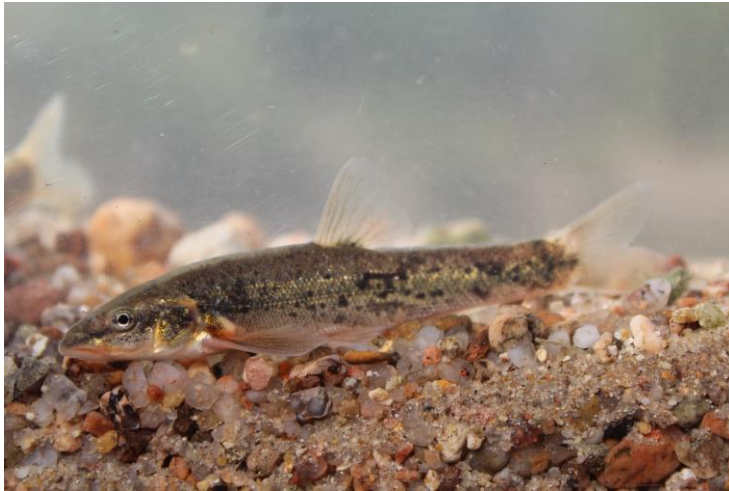


Figure 11. Longnose dace. (Credit: Colorado Parks and Wildlife).

- Native to the Upper Rio Grande Basin, and Jemez River watershed. Currently extant to SAC and EFJ and its tributaries within VALL.
- Current Status: Common. Most widely distributed fish in North America.
- Body Form: Small minnow (< 100 mm). Body adapted for benthic living in rocky, fast flowing streams. Fusiform body, long nose, large reverse-aerofoil fins keep fish on bottom of stream.
- Feeding Strategy: Omnivore, generalist. Opportunistic. Eats algae, and aquatic and terrestrial insects.
- Temperature Tolerance: Prefers cool water streams in mid-elevation stream reaches, but wide temperature tolerance.
- Habitat/Substrate Use: Prefers shallow, fast moving riffles, with large rocky cobble/gravel substrate.
- Reproductive Strategy: Males create and defend territories to attract females. Typically spawn in rocky substrate, in early summer (May to August) when water temperatures reach 60 °F.

Fathead minnow (*Pimephales promelas*, FHM)



Figure 12. Fathead minnow. (Credit: United States Geological Survey).

- Native to Upper Rio Grande Basin and lower Jemez River watershed. Widely distributed in North America. Currently extant in EFJ, but absent from SAC. Possible bait-bucket introduction to Preserve, but currently population considered native.
- Current Status: Common and widely introduced as bait for recreational fishing.
- Body Form: Robust, moderately deep-bodied minnow, rarely exceeding 75 mm.
- Feeding Strategy: Generalist. Benthic and water column feeder. Omnivorous and opportunistic. Feeds on detritus, plankton, insect larvae, and plant material.
- Temperature Tolerance: Wide temperature tolerance, up to 95 °F.
- Habitat/Substrate Preference: Slow moving streams and lentic habitat, often over silt/sand. Tolerant of low dissolved oxygen, high turbidity and high temperature.
- Reproductive Strategy: Spring, Summer spawner. Eggs deposited on underside of hard objects when water temperature exceeds ~64 °F.

NPS Mission and Management Policies

NPS Mission

“The National Park Service preserves unimpaired the natural and cultural resources and values of the national park system for the enjoyment, education, and inspiration of this and future generations. The Park Service cooperates with partners to extend the benefits of natural and cultural resource conservation and outdoor recreation throughout this country and the world.”

Natural Resource Management Mission (Chapter 4, NPS Management Policies 2006): Preserving park natural resources is one of the core responsibilities of NPS managers. The NPS has distilled this responsibility into a separate natural resources mission statement: “The National Park Service will preserve and protect the natural resources, processes, systems, and values of units of the national park system in an unimpaired condition to perpetuate their inherent integrity and to provide present and future generations with the opportunity to enjoy them.”

NPS Natural Resource Management Policies

To achieve the NPS Mission, the NPS creates laws to regulate the management and use of park resources, including fish and fishing. However, it is the NPS management policies that provide guidance on the appropriate standards and thresholds for protection. Such policies form the basis of park regulations that protect resources consistent with the NPS mission, and ensure that all parks are managed and regulated in a consistent and proper manner in pursuit of NPS goals. Adherence to policy is mandatory for all NPS employees, unless specifically waived or modified by the Secretary, the Assistant Secretary [of Department of Interior], or the Director [of the NPS].

NPS policies that pertain to the management of native aquatic resources, and the management and regulation of fishing are located throughout the current version of NPS Management Policies (Appendix 1). Superintendents have the primary responsibility to ensure that fishing in parks is managed consistent with management policies and to direct their staffs to enforce federal fishing regulations, including adopted state regulations, and to review and amend regulations as necessary to fulfill the NPS mission and comply with the Organic Act.

The following is an abridged summary of the important management policies relevant to the management and regulation of aquatic species, fish and fishing in parks, including VALL. Apart from a few words used to preserve the context, the text is quoted directly from the NPS Management Policies. The most recent, complete service-wide policies may be found at: <http://www.nps.gov/policy/mp/policies.html>

Chapter 1: The Foundation

The National Park Service must manage park resources and values in such manner and such means as will leave them unimpaired for the enjoyment of future generations

The Laws Generally Governing Park Management: (M.P. 1.4.1) The most important statutory directive for the National Park Service is provided by interrelated provisions of the [NPS Organic Act](#)

of 1916 and the [NPS General Authorities Act of 1970](#), including amendments to the latter law enacted in 1978

The key management-related provision of the Organic Act is as follows:

[The National Park Service] shall promote and regulate the use of the Federal areas known as national parks, monuments, and reservations hereinafter specified...by such means and measures as conform to the fundamental purpose of the said parks, monuments, and reservations, which purpose is to conserve the scenery and the natural and historic objects and the wild life therein and to provide for the enjoyment of the same in such manner and by such means as will leave them unimpaired for the enjoyment of future generations.

The NPS Obligation to Conserve and Provide for Enjoyment of Park Resources and Values:

(M.P. 1.4.3).The fundamental purpose of all parks also includes providing for the enjoyment of park resources and values by the people of the United States Congress, recognizing that the enjoyment by future generations of the national parks can be ensured only if the superb quality of park resources and values is left unimpaired, has provided that when there is a conflict between conserving resources and values and providing for enjoyment of them, conservation is to be predominant.

What Constitutes Impairment of Park Resources and Values: (M.P. 1.4.5) The impairment that is prohibited by the Organic Act and the General Authorities Act, in the professional judgment of the responsible NPS manager, would harm the integrity of park resources or values, including the opportunities that otherwise would be present for the enjoyment of those resources or values.

Unacceptable Impacts: The impact threshold at which impairment occurs is not always readily apparent. Therefore, the Service will apply a standard that offers greater assurance that impairment will not occur. The Service will do this by avoiding impacts that it determines to be unacceptable. These are impacts that fall short of impairment, but are still not acceptable within a particular park's environment. (M.P. 1.4.7.1)

Chapter 4: Natural Resource Management

Management of Native Animals (Fish): The NPS will maintain as parts of the natural ecosystems of parks, all fishes and other aquatic species native to park ecosystems by (1) preserving and restoring the natural abundances, diversities, dynamics, distributions, habitats and behaviors of native fish populations and the communities and ecosystems where they occur; and (2) minimizing human impacts on native fish populations, communities and ecosystems, and the processes that sustain them (NPS MP 4.4.1).

Management of Threatened or Endangered Plants and Animals: (M.P. 4.4.2.3) The Service will undertake active management programs to inventory, monitor, restore, and maintain listed species' habitats; control detrimental nonnative species; manage detrimental visitor access; and reestablish extirpated populations as necessary to maintain the species and the habitats upon which they depend;

The National Park Service will inventory, monitor, and manage state and locally listed species in a manner similar to its treatment of federally listed species to the greatest extent possible. In addition,

the Service will inventory other native species that are of special management concern to parks (such as rare, declining, sensitive, or unique species and their habitats) and will manage them to maintain their natural distribution and abundance.

Harvest of Plants and Animals by the Public: (M.P. 4.4.3) Habitat manipulation for harvested species... will not include the artificial manipulation of habitat to increase the numbers of a harvested species above its natural range in population levels.

Management of Non-Native (Exotic) Species: (M.P. 4.4.4) Exotic [fish] species will not be allowed to displace native [fish] or other aquatic native species, if displacement can be prevented. All exotic fish species that are not maintained to meet an identified park purpose will be managed – up to and including eradication- if control is prudent and feasible (M.P. 4.4.4.2).

The NPS will manage exotic (nonnative or invasive) species by eradicating their populations if 1) control is prudent and feasible, and 2) the exotic species interferes with natural processes and the perpetuation of natural features, native species, or natural habitats (M.P. 4.4.4.2).

The NPS will manage fishing activities (see MP 8.2.2.5) and may encourage the intensive harvesting of exotic fish species in certain situations when needed to meet park management objectives (NPS MP 4.4.3).

Watershed and Stream Processes: (M.P. 4.6.6) The NPS will also manage watersheds as complete hydrologic systems and minimize human-caused disturbances....The NPS will protect watersheds and stream features primarily by avoiding impacts on watershed and riparian vegetation and by allowing natural fluvial processes to proceed unimpeded (NPS 2006).

Chapter 8: Use of the Parks

The Service will focus special attention on visitor enjoyment of the parks while recognizing that the NPS mission is to conserve unimpaired each park's natural and cultural resources and values for the enjoyment, education, and inspiration of present and future generations.

Fishing: (M.P. 8.2.2.5) Recreational fishing will be allowed in parks when it is authorized or not specifically prohibited by federal law provided that it has been determined to be an appropriate use per section 8.1 of these policies. When fishing is allowed, it will be conducted in accordance with applicable federal laws and treaty rights, and non-conflicting state laws and regulations. The Service will manage fishing activities to achieve management objectives. Before the Service issues regulations or other restrictions, representatives of appropriate tribes and state and federal agencies will be consulted to ensure that all available scientific data are considered in the decision-making process. Any such regulations or other restrictions will be developed with public involvement and in consultation with fish and wildlife management agencies as appropriate, consistent with departmental policy at 43 CFR Part 24, and as described in section 4.4.3.

NPS Management of Fishing

The fundamental purpose of the national park system begins with a mandate to conserve park resources and values for the benefit and inspiration of all people of the United States, and to regulate their use accordingly.

Native fish have biological, recreational and cultural heritage values and play critical roles in maintaining the ecological health of NPS area ecosystems. Fish are unique in the NPS; they are the only animal that may be caught and harvested in parks by general regulation (36CFR2.3). Fishing, and the management of fish resources (including non-native fish) to provide fishing opportunities, is an activity that has the potential to alter the abundance, size and age structure, and behavior of native fish populations with consequences for ecosystem function. The National Park Service allows fishing as a means of providing for public enjoyment and customary and traditional use, but must ensure that it is managed, and regulated in a manner that avoids unacceptable impacts and impairment of park resources.

Where fishing is allowed, it is recognized that there will be impacts to park resources. However, park Superintendents are responsible for ensuring that the impacts associated with fishing are not in conflict with the fundamental purpose of conserving native species and functioning ecosystems. As NPS Management Policies (2006) make clear, parks must determine when and where fishing is an appropriate use, determine the nature of that use, and develop monitoring and assessment tools, standards, and indicators to determine if fishing is causing impacts that may lead to impairment. It is the responsibility of parks to establish the level at which the impacts resulting from fishing become unacceptable, and if evidence indicates that such impacts are occurring, to take all measures within NPS authority to ensure that the threshold is not reached.

Any apparent conflict is resolved by adherence to the underlying principles that guide the development of all NPS management policies. In cases of uncertainty as to the impacts of activities on park natural resources, park managers must ensure that conservation will be predominant when there is a potential conflict between the protection of resources and their use. In doing so, a park must “employ a tone that leaves no room for misunderstanding the National Park Service’s commitment to the public’s appropriate use and enjoyment, including education and interpretation, of park resources, while preventing unacceptable impacts.”

Important Note: Fishing management in this context is concerned not only with the direct impacts of fishing on native fish populations, but also the impacts of past management activities on native species (e.g., stocking of non-native sports fish and the subsequent impacts to native fish).

NPS Regulation of Fishing

Fishing is allowed in all parks as a traditional activity unless specifically prohibited. Unless otherwise provided in law, fishing in national parks is managed and regulated by the National Park Service under the authority provided in the NPS Organic Act. Regulations within NPS units strive to permit reasonable use and enjoyment of fish resources without compromising the health and biological diversity of native species and aquatic ecosystems. Areas inside park boundaries may be

closed to fishing to protect spawning and nursery areas, threatened and endangered fish species or other resources that are at risk due to habitat loss or over-fishing.

By regulation (36CFR1), fish are defined as “any member of the subclasses Agnatha, Chondrichthyes, or Osteichthyes, or any mollusk or crustacean in salt water.” Therefore, fishing regulations cover all fin-fish in both fresh and salt water. Other taxa (e.g. horseshoe crabs), and freshwater mollusks and crustaceans (freshwater crayfish) are considered “wildlife,” and cannot be fished for, or harvested unless specifically allowed by regulations addressing wildlife.

Fishing in national parks is conducted in accordance with the **NPS Service-wide general fishing regulations**, published in the Code of Federal Regulations at 36 CFR §2.3 (Appendix I). The NPS has determined that these regulations are widely applicable and provide for the proper use of fisheries resources in all NPS units. Unless otherwise provided for in statute (e.g. law that created the park), or subsequently modified by the park, the general fishing regulations apply in all park waters, at all times, unless modified by special park regulations.

State regulations are adopted as federal regulations under 36 CFR § 2.3(a) to the extent that they do not conflict with the NPS general regulations. Where there is a conflict between an adopted state regulation and the general federal regulations, the federal regulation applies. In order to reduce the opportunity for conflicts between federal and state regulations, NPS policy encourages NPS units to adopt fishing regulations that are at least, or more restrictive than state regulations.

For many parks, the federally adopted state regulations are the only ones that an angler needs to be aware of. However, 36 C.F.R. §§ 1.2, and 1.5 provides the authority for parks to further modify the general fishing regulations to meet park specific management goals or when the NPS general fishing regulations and state regulations, by themselves, are inadequate to protect park fish resources consistent with the NPS conservation mission. Permanent “**Special Park Regulations**” can be found in the Code of Federal Regulations at 36 CFR §7 and 36 CFR §13 (Alaska).

Sometimes, in order to protect important resources, it is necessary for a park to adopt temporary or emergency fishing regulations. These are published in the **Superintendents Compendium**; the annual compilation of designations, closures, permit requirements, and other restrictions made by the Superintendent, in addition to what is contained in the NPS General Fishing Regulations (36CFR§2.3) and Park Special Regulations (36 CFR §7 and §13). Regulations that may be changed from year to year to better protect fish resources, may also be published here.

Cooperation with States and Others

Fishing regulations in units of the NPS are established in consultation with state game and fish agencies. Although park managers are ultimately responsible for managing fish and aquatic ecosystems, and regulating their use, Department of the Interior regulations (43 CFR § 24.1) encourage the development of cooperative agreements with states and requires the preparation of fish and wildlife management plans in cooperation with state fish and wildlife agencies and other Federal agencies when appropriate. (DOI 2003). Memoranda of Understanding (MOU) and joint fishery management plans are encouraged for parks with fishery resources that are in common or continuous

with those managed by states or other entities. These documents should be used to articulate goals and objectives and define management and regulatory responsibilities.

The approach is further encouraged in the recently published DOI Secretarial Order 3356 (DOI 2017); Hunting, Fishing, Recreational Shooting, and Wildlife Conservation Opportunities and Coordination with States, Tribes, and Territories, that requires federal agencies to enhance conservation stewardship in collaboration with the States, improve the management of game species and their habitats, and increase opportunities for outdoor recreation.

Park staff are encouraged to work with local communities and other user groups in the management of fisheries through cooperative conservation principles found in NPS Management Policies (2006). Such coordination is identified as a best practice in Director's Order #75A: Civic Engagement and Public Involvement (See Management Policies § 1.6-1.8) and may be required as part of the public participation process involved in compliance with NEPA.

Fishing Management and Regulation in VALL

NPS Federal Management Authority

Upon passage of the 2014 National Defense Authorization Act for Fiscal Year 2015, VALL became a unit of the National Park System. With respect to the management of fish and fishing, the act stated:

Hunting, fishing, and trapping.-

(A) In general.--Except as provided in subparagraph (B), the Secretary shall permit hunting, fishing, and trapping on land and water within the Preserve in accordance with applicable Federal and State law.

(B) Administrative exceptions.--The Secretary may designate areas in which, and establish limited periods during which, no hunting, fishing, or trapping shall be permitted under subparagraph (A) for reasons of public safety, administration, or compliance with applicable law.

(C) Agency agreement.--Except in an emergency, regulations closing areas within the Preserve to hunting, fishing, or trapping under this paragraph shall be made in consultation with the appropriate agency of the State having responsibility for fish and wildlife administration.

(D) Savings clause.--Nothing in this section affects any jurisdiction or responsibility of the State with respect to fish and wildlife in the Preserve.

Cooperative Regulation between NPS and the State of New Mexico

Fish and fishing in VALL is managed in close cooperation with the State of New Mexico to meet mutually agreeable goals consistent with numerous federal and state fish management agreements to which both the park and state are signatories (see VALL Natural Resource Planning Priorities below).

To regulate fishing consistent with the fishing policies of the NPS, VALL works in close consultation with the State, which has promulgated many of the state fishing regulations that apply in

VALL. VALL has also promulgated temporary fishing regulations under the authority of the Superintendents Compendium to provide additional protections to fish resources under its jurisdiction. Non-conflicting state regulations are then adopted as federal regulations consistent with 36CFR§ 2.3(a) of the NPS general fishing regulations, to the extent that they did not conflict with the Superintendents Compendium and other NPS general fishing regulations.

Valles Caldera National Preserve allows, but does not provide outfitter or guide services. Only authorized outfitters or guides are permitted to conduct business within the preserve. To become authorized, outfitters and guides must first obtain a Commercial Use Authorization (CUA) through the Valles Caldera National Preserve prior to conducting any business within the preserve.

Within VALL streams, the following fishing regulations currently apply:

NPS General Fishing Regulations: At this time, all the federal NPS General Fishing Regulations (36CFR2.3) are in effect in VALL (Appendix I).

NPS Park Specific Regulations: At this time, no permanent, park specific regulations have been promulgated by VALL

Regulations promulgated under the authority of the Superintendents Compendium: At this time, in addition to the NPS General Fishing Regulations, the park has promulgated federal fishing regulations under the authority of 36CFR1.5 to further protect park fish resources. The following regulations apply:

36 CFR §2.3 – FISHING

- Fishing is allowed on all waters within the Park in accordance with New Mexico State laws and the following NPS regulations and conditions:
- Angler must pay entrance fee to the Park and obtain a [free] Park permit issued at the Valle Grande entrance station.
 - Angler must have in their possession a valid New Mexico Department of Game and Fish fishing license [and Habitat Management and Access Validation (HMAV) stamp].
 - All nets must be sanitized prior to being used in any Park waters. (Whirling Disease)
 - The use of waders is not permitted in any Park waters. (Whirling Disease)
 - Only artificial flies and lures with barbless-point, single hooks are permitted.
 - Live bait is prohibited.

In addition, VALL recommends that recreational and sports fishers help prevent the spread of parasites by not transporting fish from one body of water to another, not disposing of fish bones or entrails in any body of water, and ensuring boots and shoes are clean before moving between different bodies of water.

New Mexico State Regulations: Within VALL, non-conflicting state regulations have been adopted as federal fishing regulations consistent with 36CFR2.3(a). In addition to the States general fishing regulations that apply in VALL, all streams within VALL are currently designated as, and regulated by NMDGF, as "Green Chile" Special Trout Waters (STW)." STW's are managed to enhance the unique angling opportunities and promote high-quality fishing experiences.

Within Green Chile waters:

- Only artificial flies and lures with single, barbless hooks are permitted.
- Daily bag limit of two trout.

In addition, SAC within SFNF lands, from the San Antonio Hot Springs pedestrian bridge upstream 2.0 miles to the Valles Caldera National Preserve boundary, have also been designated as "Green Chile" Special Trout Waters.

It is anticipated that fishing regulations for VALL will continue to be developed in close cooperation between NPS and the NMDGF to achieve mutually agreeable management goals, and promulgated by the State and adopted by the NPS consistent with 36CFR2.3(a).

Enforcement of Fishing Regulations

VALL is a concurrent jurisdiction park. Concurrent jurisdiction exists when both the state and federal governments have authority over a particular area. Usually this occurs when a state has ceded land to the United States but has reserved to itself the right to exercise its state authority, so that both federal and non-conflicting state laws apply. In parks with concurrent jurisdiction, both the state and federal governments may prosecute those who violate their respective laws.

At VALL, the NPS generally enforces the fishing regulations, but the state may enforce violations of state regulations to the extent that they do not conflict with federal regulations.

Cooperative Management between SFNF and the State of New Mexico

Fish and fishing in lands outside VALL, but within lands administered by the SFNF are also managed in close cooperation with the State of New Mexico.

The legal and regulatory framework underlying the cooperative relationship between the SFNF with the State is very similar to that of the relationship between the NPS and the State. However, the standards for which they are managed are different. The NPS has the responsibility to manage lands "unimpaired for the enjoyment of future generations," whereas USFS lands are managed for "sustainable uses".

While the management goals and policies of each agency are broadly similar, the USFS has recognized that the state has the primary responsibility to manage and regulate fish and wildlife populations within national forests, but retains the responsibility to manage the habitat. The terms of such an arrangement are usually outlined in regional, statewide, or forest level Memorandums of

Understanding. In contrast, the NPS has generally retained the primary responsibility to regulate fishing in lands under their authority, in order to manage to the perceived higher standard of protection required by the NPS.

Such a situation exists with VALL, where the NPS general fishing regulations and park specific regulation apply, in addition to federally adopted, non-conflicting state regulations. On SFNF lands adjacent to VALL, under the term of an MOU between the state and the USFS Southwest Region (MOU 2014) only state regulations apply.

Standards and Thresholds to Prevent Unacceptable Impacts

NPS Management Policies (2006) make clear that the primary statutory responsibility of the NPS is to leave park resources unimpaired. The impact threshold at which impairment occurs is not always apparent. Therefore, the NPS ensures that impairment does not occur by managing to avoid “unacceptable impacts” that may lead to impairment, and identifies management standards and thresholds as benchmarks that must be attained.

NPS policy requires that recreational fishing should not cause unacceptable impacts to natural resources, including the VALL native fish community. By identifying and staying within carrying capacities, Superintendents can manage park uses that may unacceptably impact the resources and values for which the parks were established (NPS MP 2006 8.2.1). Narrative qualitative standards have been identified in NPS and include:

- Preservation of the natural abundances, diversities, dynamics, distributions, habitats and behaviors of native fish populations and minimize human impacts on native fish populations, (see NPS MP 4.4.1).
- Management of visitor carrying capacity; the type and level of visitor use that can be accommodated, while sustaining the desired resource and visitor experience conditions in the park.

Management Plan

Purpose of Management Plan

The VALL Native Fish Management Plan provides a programmatic foundation for the future long-term management of native fish populations within VALL. The purpose of the Plan is to implement a management approach that will ensure the restoration, conservation, and protection, of a fish community native to the Preserve, while providing opportunities for visitor enjoyment and recreational fishing, consistent with the NPS Mission, and NPS Management Policies (NPS MP 2006).

Need for Management Plan

The need for the Plan is for VALL to manage the extant fish community and fishing consistent with the Range-wide Conservation Agreements for RGCT, RGC, and RGS, NPS missions, goals, and current NPS management policies to; protect native, and rare and at-risk species; restore such populations to preclude listing under the Endangered Species Act, and; provide opportunities for the public to enjoy the resources, such as recreational fishing and wildlife viewing.

Need for Cooperation and Consultation

VALL manages the lands within its administrative boundaries but cooperates and consults with NMDGF to manage VALL for mutually beneficial goals that are consistent with NPS statutory responsibilities and management policies. However, much of the land outside VALL, but within the proposed project area, is under the administrative authority of the Santa Fe National Forest (SFNF), whose fish and wildlife is managed and regulated by New Mexico Department of Game and Fish (NMDGF) under a Memorandum of Understanding (USFS SW Region 2014). Accordingly, the major actions identified in the Plan can only be implemented through a close, cooperative relationship with, and agreement between NPS, SFNF, and NMDGF, and consultation with stakeholders and interested parties.

The VALL Native Fish Management Plan aligns future native fish management at VALL with National Park Service (NPS) Management Policies (NPS 2006), the natural resource management goals of VALL, and the fisheries goals of the Santa Fe National Forest (SFNF). The Plan is consistent with the Department of the Interior (DOI) Fish and Wildlife Policy: State-Federal Relationships. 43CFR24.1 (DOI 2003), and the recently published DOI Memo (DOI 2018) and Secretarial Order 3356; Hunting, Fishing, Recreational Shooting, and Wildlife Conservation Opportunities and Coordination with States, Tribes, and Territories (DOI 2017) that requires federal agencies to enhance conservation stewardship in collaboration with the States, improve the management of game species and their habitats, and increase opportunities for outdoor recreation.

The Plan is also consistent with the native fish conservation goals of both VALL, SFNF, and the NMDGF as described in the Conservation Agreement for the Rio Grande Cutthroat Trout in the States of Colorado and New Mexico (RGCT Conservation Team, 2013a), and the associated Conservation Strategy (RGCT Conservation Team, 2013b), and the Conservation Agreement for the Rio Grande Chub and Rio Grande Sucker (RGC and RGS Conservation Team, 2018), to which the NPS Intermountain Regional Office, the SFNF, and NMDGF are all signatories.

VALL Natural Resource Planning Priorities

The VALL Foundation Document (NPS 2018) provides a basis for future planning and management decisions and is the park's most important planning document. The core components include a description of the park's purpose, significance, fundamental resources and values, other important resources and values, and interpretive themes. The Foundation Document also includes special mandates and administrative commitments, an assessment of planning and data needs identifies planning issues, planning products to be developed, and the associated studies and data required for park planning.

Significance statements, fundamental resources and values, interpretive themes, and special mandates identified in the VALL Foundation Document related to the management of fish and the habitats on which they depend, and the regulation of fishing, include:

Park Significance Statements. Significance statements express why a park's resources and values are important enough to merit designation as a unit of the national park system. VALL has identified "Valles Caldera's distinct topographic mosaic of expansive valley meadows, lush forested volcanic domes, meandering valley streams, and old growth Ponderosa pine groves are in striking contrast to the arid New Mexico landscapes at lower elevations. With caldera vistas from rim to rim, elk and *other wildlife viewing*, dark night skies, winter skiing, *excellent hunting and fishing opportunities*, and *backcountry solitude*, *the landscape provides extraordinary year-round recreational opportunities and visitor experiences.*"

Fundamental Resources and Values (FRVs). FRV's are those features, systems, processes, experiences, stories, scenes, sounds, smells, or other attributes determined to warrant primary consideration during planning and management processes because they are essential to achieving the purpose of the park and maintaining its significance. Fundamental resources and values are closely related to a park's legislative purpose and are more specific than significance statements. Fundamental resources and values help focus planning and management efforts on what is truly significant about the park. One of the most important responsibilities of NPS managers is to ensure the conservation and public enjoyment of those qualities that are essential (fundamental) to achieving the purpose of the park and maintaining its significance. If fundamental resources and values are allowed to deteriorate, the park purpose and/or significance could be jeopardized. VALL has identified the restoration of "*robust native fish and wildlife populations*" as FRV's associated with restoration of the Preserves degraded ecosystem.

Interpretative Themes: Interpretive themes are often described as the key stories or concepts that visitors should understand after visiting a park. VALL has identified "Valles Caldera's grassland valleys, lush forested volcanic domes, *meandering streams*, old growth Ponderosa pine groves, abundant wildlife, dark night skies, and backcountry solitude invite an innate, personal restoration and spiritual connection to the land" as Interpretative Themes supported by the presence of native fish as an important component of a naturally functioning ecosystem.

Special Mandates: Special mandates are requirements specific to a park that must be fulfilled. Mandates can be expressed in enabling legislation, in separate legislation following the establishment of the park, or through a judicial process.

Special mandates concerning the management and regulation of fish and fishing, the 2014 enabling legislation for Valles Caldera National Preserve provides direction concerning administration and general management, visitor access and other uses, ecological restoration, development of a science and education program, hunting and fishing opportunities, and include:

- Permit hunting, fishing, and trapping in accordance with applicable federal and state laws;
- Establish a science and education program that includes research and interpretation, supports ecological restoration and science-based adaptive management, and promotes outdoor educational experiences.

Identified Planning Needs

To implement the core elements of the VALL Foundation Document, VALL has identified important planning and data needs related to protecting fundamental resources and values, park significance, and park purpose associated with wildlife resources, including fish, and their recreational use.

To address the proper management of fish resources, VALL has identified the development of a Wildlife Management Plan as a high priority planning need. A wildlife (and fish) management plan, developed in a landscape-level ecosystem context, would inform and guide programmatic decisions concerning wildlife and fish habitat conservation, landscape restoration, and programs for recreational fishing. In addition, it would address specific questions regarding reintroduction of native fish species, and protection and recovery of endangered and threatened species and the conservation of at risk fish species and their habitats. A wildlife management plan would serve to engage the public and consult with associated Indian tribes and pueblos when considering how to manage wildlife species in the preserve.

The VALL Native Fish Management Plan is intended to address all the planning needs related to the future management of fish and fishing with VALL. Among other topics, such a plan should address the conservation and management of native, at risk, Rio Grande cutthroat trout, Rio Grande chub, and Rio Grande suckers, including the expansion of the species' distribution within the Preserve. The plan would also address the management and regulation of recreational fishing opportunities within the park.

Other priority planning needs identified in the Foundation Document that may relate to fish and fishing management include:

- Hunting [and Fishing] Management Plan, to allow for public fishing consistent with other NPS laws, policies and regulations
- Invasive Species Management Plan and an Integrated Pest Management Plan to manage and eliminate and/or mitigate the impact of non-native species that prevent the park from meeting identified fish management goals

- Reintroduction of Rio Grande Cutthroat Trout Plan to guide the reintroduction of the park's native trout species, and other native fish species within VALL. The plan would assess the interaction of native fish with presently extant non-native species, evaluate differing approaches, and provide an opportunity for tribal and public input.
- Visitor Use Management Plan to address increased visitation and recreational fishing use, and propose appropriate measures to manage and mitigate its effects on the preserve's other values.

State of New Mexico Planning Priorities

The New Mexico State Wildlife Action Plan (NMDGF SWAP 2016) was written in fulfillment of the requirements of the State Wildlife Grants program (Title IX, Public Law 106-553 and Title 1, Public Law 107-63). The SWAP is the State's blueprint for improving the knowledge about native wildlife and plants, the threats they face, and strategies to conserve them. The purpose of this federal law is to provide federal financial assistance to states to assist them in their efforts to improve and secure the status of Species of Greatest Conservation Need (SGCN) so that they do not require protection via federal or state listing regulations. These species are typically listed or proposed as threatened or endangered at the federal or state level, face urgent threats, have high ecological and conservation value.

In New Mexico, Rio Grande cutthroat trout is managed as a protected species under Chapter 17 NMSA. It was previously considered a SGCN (NMDGF SWAP 2006), but progress towards recovering the species, and the USFWS decision (Southwest Center for Biological Diversity 1998 2016, USFWS 2014) to not list the species under the federal Endangered Species Act, precluded its state listing as a SGCN in 2016. All trout with the characteristic red slash on its throat are subject to a reduced bag limit of two fish per day for recreational angling. Several populations are subject to special trout water regulations, which include catch-and-release, artificial fly or lure only, single barbless hook, and reduced bag limits. Waters in or near Rio Grande cutthroat trout conservation populations are not stocked with non-native trout species. If a conservation population is secured with a functional migration barrier, sterile, 7 triploid rainbow trout (*Oncorhynchus mykiss*) may be stocked in appropriate downstream areas. NMDGF does not allow private stocking of nonnative trout within areas that could jeopardize existing conservation populations. NMAC 19.35.7.15 requires disease free certification for all private and public hatcheries who wish to import fish for release into waters of the State. In addition, NMDGF does not stock any salmonid that is positive for a pathogen described in NMAC 19.35.7.15. (RGCT Conservation Team 2013b)

The NM State Wildlife Action Plan (NMDGF SWAP 2016) identifies the Rio Grande chub and Rio Grande sucker, as SGCN, Cat. I "Immediate Priority Species (I); species for which the Department has identified conservation needs and/or projects to be implemented as soon as resources are available. This category may include species with conservation efforts that have already been initiated, or that are currently undergoing planning and scheduling for out-year implementation. Considerations include species status and trends in New Mexico, complimentary management efforts that have been initiated or funded, and opportunities to improve the overall status of the species. This category includes species that have completed a 12-month review for listing under the federal

Endangered Species Act (ESA) and are Proposed or Candidate species for listing under ESA, and thus may be subject to state conservation actions attempting to preclude the need for federal listing.” (NMDGF SWAP 2016).

USFS and Santa Fe National Forest Planning Priorities

The MOU between NMDGF and the USFS Southwest Region (MOU 2014) within which the SFNF is located, identifies the general planning priorities for the Region which include:

“Section V.H. Conservation/Recovery of Species. The Parties will coordinate efforts for the conservation of the state’s list of threatened and endangered species, including Species of Greatest Conservation Need, Species of Economic and Recreational Importance, federally listed species, and U. S. Forest Service designated species [RGCT, RGC, RGS].

“Section V.I. Fish and Wildlife Population Management. The Parties will coordinate on proposals for establishing, transplanting, and supplementing fish and wildlife populations to or from NFS lands following the processes outlined within this MOU.”

More specific management priorities for the Santa Fe National Forest adjacent to VALL are identified in the East Fork of the Jemez River Wild and Scenic River Management Plan (SFNF 2002b) and have been further incorporated into the Santa Fe National Forest Plan (SFNF 2010). The purpose of the plans is to define the direction for managing the Santa Fe National Forest for the next 10-15 years, and provides for multiple use and sustained yield of goods and services from the Forest in a way that maximizes long-term net public benefits in an environmentally sound manner. All extant native fish species in VALL are listed as “sensitive” by the U.S. Forest Service.

SFNF Forest Wide Management Direction

The forest wide management plan identifies the general goals for all forest lands and includes the following goals concerning the management and conservation of sensitive native species, including those in streams that flow from VALL.

- “Continue to emphasize threatened, endangered, and sensitive species for studies.
- Continue to emphasize coordination with State and other Federal agencies.
- In cooperation with the New Mexico Department of Game and Fish and the U.S. Fish and Wildlife Service, jointly review the threatened, endangered, and sensitive species program to identify species priority, direction, and joint opportunities.
- Adhere to applicable interagency conservation plans and agreements for sensitive species. Current examples include: Jemez Mountains Salamander Cooperative Management Plan, Arizona Willow Conservation Agreement, and Conservation Agreement for Rio Grande Cutthroat Trout. (Note: SFNF is also a signatory to the RGC and RGS agreement, though these agreements were signed subsequent to the finalization of the 2010 Forest Management Plan)

- Inventory, evaluate, and improve areas of streams, lakes, and wet lands for cold water fisheries, especially the Rio Grande Cutthroat trout, water fowl and other water-related habitats.
- Continue activities to improve Rio Grande Cutthroat habitat with the objective of securing the species. Develop Rio Grande Cutthroat trout fisheries within selected areas identified in conjunction with the New Mexico Department of Game and Fish.”

Jemez Wild and Scenic River Management Area: Fisheries, Water and Riparian

The specific goals outlined in the WSR Management Plan for native fish and their habitat in the East Fork of the Jemez River include:

- “In cooperation with managers of the Valles Caldera National Preserve, work to develop a management program for improving water quality and meeting water quality standards in the headwaters of the East Fork (outside the designated corridor). Work together to avoid impoundments or diversions in the headwaters of the river that would interrupt the natural hydrologic process and prevent periodic bank overflow.
- Restore and maintain riparian and stream conditions in accordance with properly functioning condition guidelines, including those for sediment, large woody debris, pool development, pool quality, width/depth ratios, and stream-bank stability.
- Stabilize stream banks that have been denuded and take measures to maintain long-term stream bank protection.
- Enhance pool development and fish habitat quality by adding large woody debris to the river system. Ensure this activity will not adversely impact the free-flowing characteristics of the WSR.
- In cooperation with managers of the Valles Caldera National Preserve and New Mexico State Game and Fish, work toward improving fish habitat conditions to meet the designated use as a “high quality cold water fishery”, and consider the opportunity for returning the East Fork to an entirely native fishery, including Rio Grande cutthroat trout, Rio Grande chub, Rio Grande sucker, longnose dace and fathead minnow.
- Utilize the latest agency-approved scientific methods to conduct periodic inventories and prioritize resource improvement work along the river.”

U.S. Fish and Wildlife Service

The USFWS considers the RGCT to be of conservation need, but at this time, in response to a federal Endangered Species Act listing petition, has determined that the listing of the species under the federal ESA is “not warranted” (USFWS 2014) due to the development and continuing implementation of the regional, multi-stakeholder RGCT Conservation Agreement and implementing strategy in lieu of listing (RGCT Conservation Team 2013a, 2013b), to which USFWS, NPS, SFNF and NMDGF are all signatories.

The primary action contemplated in the Conservation Strategy is the creation of 11-20 “Conservation Populations” of RGCT; populations of RGCT with 10 percent or less introgression (hybridization)

from nonnative trout, within the 10 year life time of the agreement. 3-5 of these are proposed to be in the Lower Rio Grande Geographic Management Unit (GMU), in which VALL is located.

Other Planning Considerations

Both RGS and RGC have also been the subject of petitions to the USFWS to list the fish under the ESA, which determined that “there was substantial information that the petitioned action may be warranted”, but to date, no final decision has been made (Wild Earth Guardians 2013, 2014). Both species are currently managed under regional conservation plans which may preclude their future listing (RGC and RGS Conservation Team 2018) to which NPS, SFNF and NMDGF are signatories. A final decision on listing the species’ is not expected until 2024

Conservation actions identified in the Regional Conservation Plans applicable to VALL include;

- Restoring and enhancing native fish populations within their native range
- Restricting introduction of nonnative fish species near existing populations
- Restricting spread of disease and invasive species
- Regulating angling and enforcing fishing regulations
- Securing and enhancing watershed conditions
- Conducting public outreach
- Coordinating with partners to maximize effectiveness of native fish conservation efforts by coordinating signatory agency efforts toward achieving common management goals

Opportunity for Aquatic Species Restoration

SFNF, NMDGF, the NPS consider the conservation of all four regionally native fish species to be a conservation priority and are interested in partnering to expand the range of all four species within VALL. With State and SFNF support, the removal of non-native trout, and the reintroduction of complete native fish community (RGCT, RGS, RGC and LND) into available habitats within VALL is considered a park conservation priority.

Upon designation of VALL as a unit of the NPS (2014) there is now a clear mandate for the NPS to align the management of VALL streams with the native species conservation policies of the NPS (NPS 2006) and to work with NMDGF and SFNF in a cooperative, multi-agency effort to conserve and restore the native fish community to VALL.

While it is uncertain whether all regionally native species were native to all stream reaches within VALL, the current presence of non-native trout; the established recreational importance of native trout; the opportunity for further introductions of the native Rio Grande fish community; and considerable interest from state fish managers, other federal agencies and interested stakeholders (public, Trout Unlimited, the Nature Conservancy), provide a compelling case to manage all aquatic habitats within VALL for “native” fish restoration.

Additionally, the protected status of the Preserve, and the occurrence of long stretches of stream with excellent fish habitat, creates the opportunity to restore large populations of RGCT and other native fish resilient to extirpation.

While the argument could be made that some streams within VALL might be kept fishless for the benefit of other wildlife values, the reality is that the resources, public support, and inter-agency cooperation required to conduct such a removal would not be available if the potential recreational and conservation gains were not fully realized.

Accordingly, VALL is proposing to pursue all opportunities to remove non-native fish species presently in VALL and recreate the regional Rio Grande native fish community to the four drainages (SAC, EFJ, Sulphur Creek, Redondo Creek) where non-native trout are currently extant.

Unacceptable Impact Thresholds

NPS policies require that VALL seek a balance between the dual mandate to protect park natural resources while providing for visitor enjoyment and recreational fishing without creating unacceptable impacts (for example, the establishment of fishing trails, or an increased mortality of native game fish), and set visitor carrying capacity accordingly.

With respect to the fish and fishing, and associated aquatic resources at VALL, the following benchmarks have been identified as initial management objectives. It is proposed that visitor carrying capacity regarding recreational fishing be assessed using the following direct and surrogate indicators and thresholds, should circumstances lead park managers to believe that impacts from fishing may be occurring:

Size Structure: Multiple year classes of trout including young of year

Density: > 80 trout/acre of habitat

Riparian Vegetation: Permanent bare ground along the river margin of a magnitude and intensity at that does not recover between fishing seasons.

It is anticipated that the identified unacceptable impact thresholds may not always be monitored as part of a regular monitoring plan but will be used as a threshold to implement corrective management actions should natural resource managers believe unacceptable impacts may be occurring. These thresholds may be adjusted in the future through an adaptive management process if monitoring results indicate the need.

Goals of VALL Native Fish Management Plan

- Conserve, protect, and restore the aquatic ecosystem, including the regional native fish community, consistent with the NPS mission and NPS Biological Management Policies
- Partner with state agencies, tribes, and other stakeholders to protect and conserve at risk and rare native fish species to preclude listing under the federal Endangered Species Act
- Provide recreational fishing opportunities to fish for regionally native species, and regulate fishing, to extent that it does not create unacceptable impacts to the aquatic ecosystem.

Management Strategies

In order to address the impact of non-native trout on native fish in VALL and focus fish management towards the conservation of native fish, the VALL Native Fish Management Plan proposes to implement conservation and management strategies to restore the full native fish community to VALL streams. The primary action proposed in this Native Fish Management Plan is the removal of non-native trout and introduction of regionally native RGCT, LND, RGC, RGS, and FHM (once nativity is confirmed) to SAC and EFJ.

In overview, non-native trout will be removed from the two major drainages flowing within VALL (and SFNF); SAC and EFJ, downstream to fish barriers, and then managed for the establishment of the complete regional native fish assemblage (RGCT, RGC, RGS, LND and FHM), and the provision of recreational fishing to the extent that it does not conflict with other natural resource management goals. The Plan proposes to chemically remove non-native trout by treatment with the piscicide, rotenone, a plant derived chemical extract. While the primary target species is non-native trout, chemical removal also necessitates that removal of other currently extant native fishes, but in doing so, it also provides the necessary conditions to restore the entire native fish community to VALL streams in the absence of non-native fish.

The restoration of native fish within the two major watershed within VALL will occur in two phases (See Figure 2). In Phase 1, it is proposed that native fish will be restored to SAC. This watershed was chosen to be treated first because the entire reach to be restored is wholly within lands administered by the NPS and SFNF. Upon successful removal of all non-native fish, pure, native RGCT, not currently extant within VALL, will be acquired from local sources and released into SAC. The remainder of the native fish assemblage (RGC, RGS, LND, FHM) will be restored using fish from EFJ (dependent upon disease free status), and later augmented with additional fish salvaged from EFJ from within VALL, immediately prior to the treatment of this river to remove non-native fish (Phase 2). Upon restoration of the native fish assemblage in SAC, the native fish assemblage will then be restored to the EFJ downstream to Jemez Falls (Phase 2). Upon removal of all non-native fish, the native fish assemblage will be reestablished from fish acquired from the previously restored SAC.

While the restoration of SAC and EFJ has been presented in two sequential phases, the final details on how to proceed may allow for the treatment of sub-reaches of each creek to be conducted concurrently.

Once Phase 1 and 2 are complete, a third phase could be implemented to extend the native fish restoration downstream to Soda Dam on the mainstem of the Jemez River. Until such time, the two minor drainages within VALL; Sulphur Creek and Redondo Creek cannot be restored and will primarily be managed to provide recreational fishing opportunities for currently extant, non-native fish. However, once the two major creeks have been restored downstream to their respective fish barriers, both Sulphur Creek and Redondo Creek may then be restored to remove non-native fish as part of a larger project to extend native fish restoration downstream to Soda Dam (Phase 3), should the opportunity arise. The decision to continue the restoration is greatly dependent upon the longterm management goals of NMDGF and SFNF, and will require considerable discussion and coordination with private landowners along the river. However, including this goal in the VALL Native Fish Management Plan clarifies VALL's intent to manage Sulphur Creek and Redondo Creek, consistent with the NPS policies to restore native communities, should the opportunity arise.

1. Develop a comprehensive Implementation Plan and Cooperative Agreement between Valle Caldera National Monument and Preserve, New Mexico Department of Game and Fish, Santa Fe National Forest and other stakeholders, to restore the full native fish assemblage to San Antonio Creek, East Fork Jemez River and other streams within Valle Caldera and surrounding SFNF lands.

While this native fish plan identifies the primary fish management goals and objectives, and outlines the major strategies and actions required to restore the native fish community within lands administered by VALL, much of the land within the proposed project area is administered by the SFNF. To ensure the successful implementation of a project this size on lands administered by two federal agencies in cooperation with the state game and fish management agency, a detailed site-specific Implementation Plan will be required for each watershed.

A similar, watershed-wide native fish restoration was recently completed by NMDGF in the Upper Rio Costilla Watershed. The environmental compliance documents, supporting technical appendices, and the successful implementation of the project, provide an excellent model of how to approach a large watershed-scale fish restoration (NMDGF 2006, NMDGF 2007). Similar to the Rio Costilla restoration, the restoration of SAC will likely be implemented over several years by the placement of temporary fish barriers and the treatment of several shorter subreaches, starting at the top of the watershed and working downstream. The exact location of the temporary fish barriers, the length of treatment reaches, will likely be dependent upon the presence of existing low head dams and road culverts. The Implementation Plan will establish the proposed subreaches to be treated and the timeline for their treatment as a necessary step in the environmental compliance process.

Furthermore, while the RGCT Conservation Agreement (RGCT 2013a) and the RGC and RGS Conservation Agreement (2018) establishes the general goals, and the manner by which the partners to the agreements will operate, it is also anticipated that a project specific Cooperative Agreement

may be needed to establish clear roles and responsibilities of the cooperating partners in the implementation of this project.

At this time, other than the general desire of all parties to identify and describe the broad opportunities to restore native fish to SAC and EFJ, and to pursue them as funding and resources become available, no specific commitments have been made to implement the actions identified in this plan. In fact, unless the federal parties find the funding and manpower to move forward without the lead of the state, native fish restoration will likely not occur until NMDGF has completed their higher priority restoration actions for the Pecos strain of RGCT. However, by identifying the fish management goals, and a suite of connected actions to accomplish them, it is hoped that the VALL Native Fish Management Plan will serve as a long-term foundation for the conservation of the regionally native fish community within the Preserve.

2. Establish regional native fish community to watersheds within VALL and surrounding SFNF lands

Phase 1: Restoration of San Antonio Creek

1a: Treat San Antonio Creek watershed with piscicide (Rotenone) to remove all non-native trout

The first of the two primary projects proposed in this VALL Native Fish Management Plan is the removal of non-native trout from SAC by piscicide (rotenone) application, and the restoration/introduction of native RGCT, and reintroduction of the native fish community, to the entire SAC watershed above the falls within Ice Cave Canyon on the SFNF (or another constructed barrier site, as appropriate). SAC was chosen to restore first because the entire project area is located within federal land administered by NPS and USFS, and the treatment is not complicated by the presence of FHM of uncertain nativity.

Application of the chemical piscicide rotenone is the preferred, and only feasible method for removing fish from SAC because alternative mechanical methods (e.g., electrofishing or trapping) are ineffective in streams and lakes of this size. While the full project details are not finalized, the project will require considerable planning and resources, and several years to fully implement. It is proposed that NMDGF will be the lead agency conducting the treatment. They are an essential cooperator with VALL and SFNF, have conducted many of these projects in the past, and have the technical, policy and compliance expertise necessary to accomplish the project. However, if funding and resources are available, it is possible that either the NPS or SFNF could take the lead on implementing the action.

Prior to treatment, it is anticipated that as many fish as possible will be salvaged. RGC, RGS, and LND that were established in 2007, will be captured by electrofishing and used to establish additional populations, or released into EFJ. For example, salvaged native fish from SAC can be used to reestablish the regional native fish assemblage in Frijoles Creek and Capulin Creek in Bandelier National Monument (BAND), a core goal of the BAND Native Fish Management Plan

(NPS-BAND 2019). It is also anticipated that the current restrictions on the harvest of regulated gamefish would be suspended by NMDGF, and SAC would be open to unrestricted harvest to ensure that fish were used as beneficially as possible.

The treatment will likely occur in late Summer or Fall when flows are low, requiring the least amount of piscicide. Rotenone, formulated and sold as “CFT Legumine,” will be applied to a concentration of 1ppm. Stream reaches will be treated for at least 4 hours using drip stations, site specific spraying, and other application methods as necessary. Once the piscicide treatment reaches the fish barrier, rotenone will be neutralized to ensure that the treatment does not extend beyond the barrier.

NMDGF, in cooperation with federal agency staff will conduct the necessary state environmental compliance process for application of a piscicide to New Mexico waters (Appendix II, NMED-SWQB 2019), and will provide staff that are certified in the use of piscicides. VALL and SFNF as federal agencies will undertake any remaining environmental compliance needs for actions taken on their respective lands under their administrative authority, including National Environmental Policy Act review (Appendix III). NPS will also develop an Integrated Pest Management (IPM) Plan (Appendix II) and issue a pesticide use permit in compliance with the NPS Pesticide Use Proposal System (PUPS).

At this time, it is uncertain if the falls is a reliable barrier to upstream fish migration. If there is a need to improve the barrier, the NMDGF will do so under the administrative framework outlined in the RGCT Conservation Strategy, obviating the need for a federal permit from the SFNF, and allowing the falls to be modified under a NEPA Categorical Exclusion and Decision Memo (Cecil Rich, SFNF Fish Biologist, Pers. Comm. 2019,). A similar Decision Memo was used to implement the construction of a fish barrier on the Rio Costilla (USFS SW Region 2017).

1b: Establish regionally native fish assemblage (RGCT, RGC, RGS, LND, and FHM) to San Antonio Creek, including the establishment of a “conservation population” of pure RGCT.

After removal of all non-native trout, the full native fish assemblage; RGCT, RGC, RGS and LND, will be restored to SAC. Stocking will occur when it is confirmed that all non-native fish have been removed, and the aquatic insect/zooplankton community has recovered sufficiently to support introduced native fish.

RGCT for SAC will be sourced from other genetically pure populations, or from brood stock derived from eggs collected from such populations. It will likely take several years to produce enough fish to adequately stock all habitats within the SAC watershed.

The remainder of the native fish assemblage (RGC, RGS, LND) will be restored using previously salvaged fish sourced from EFJ from within VALL. Initially, this may occur any time after non-native fish have been removed, but the treated SAC also provides a place to put the native fish that will be salvaged from the EFJ immediately prior to the treatment of this river to remove non-native fish in Phase 2.

At this time, it is recommended that FHM should not be reestablished to SAC until the EFJ population is confirmed to be native. Though the species is native to more downstream reaches of the Jemez basin, it is uncertain, and unlikely to have been native to VALL streams, and the contemporary presence of the species in EFJ is more likely due to establishment by a “bait bucket” introduction during recreational fishing. However, it may be reintroduced in the future if it is determined beyond a reasonable doubt that it was likely native to VALL streams. The rationale for not establishing the species in treated streams at the time is based upon the fact that it can always be introduced at a future time if determined appropriate, but it cannot be removed without retreating the stream.

Phase 2: Restoration of East Fork Jemez River

Subsequent to the restoration of SAC, VALL proposes to restore the native fish community to the EFJ, downstream to Jemez Falls, in a similar manner as described for SAC in Phase 1. Unlike SAC which is wholly in federal lands, a short section of EFJ flows through a private inholding within the WSR which will require the project proponents to coordinate with the private landowner.

2a: Treat East Fork Jemez River watershed with piscicide to remove all non-native trout

The general approach will be similar to that used to restore SAC (see 1a for details). However, prior to the piscicide treatment of EFJ, all native fish (RGC, RGS, LND) that can be reasonably salvaged, will be captured from EFJ and used to establish the native fish community within SAC (see 1b). RGCT will be sourced from SAC; other local genetically pure populations; or from appropriate brood stock. It should be noted that EFJ should not be treated until a decision is made about the nativity of FHM, or some alternative provision is made to conserve the population.

2b: Establish regionally native fish assemblage (RGCT, RGC, RGS, LND) to East Fork Jemez River, including a “conservation population” of pure RGCT

After the successful treatment of EFJ, and confirmation that all non-native fish have been removed, the native fish community will be re-established using EFJ fish (or their offspring) previously released into SAC.

Phase 3: Possible Restoration of Sulphur and Redondo Creek, downstream to Soda Dam on the mainstem of the Jemez River.

After restoration of the native fish assemblage to the two primary watersheds within VALL downstream to their respective barriers on SFNF land, there will be an opportunity to continue to restore the native fish community within SFNF and private land, downstream to the next fish barrier; Soda Dam on the mainstem of the Jemez River. To accomplish this, the native fish assemblage in the two smaller watersheds within VALL; Sulphur Creek and Redondo Creek, will also need to be restored.

The decision to continue the restoration is greatly dependent upon the wishes of NMDGF and SFNF, and will require considerable discussion and coordination with private landowners on the river frontage. But, including this goal in the VALL Native Fish Management Plan clarifies VALL’s intent

to manage Sulphur Creek and Redondo Creek, consistent with the NPS policies to restore native communities should the opportunity arise. However, until that time, it is proposed that these small creeks be managed for recreational fishing for non-native fish consistent with the current NMDGF fishing regulations.

Extending the restoration downstream provides several significant advantages. Increasing the size of the restoration creates a larger population of fishes, over a larger area, which is less susceptible to disturbances (e.g. fire) that may lead to extirpation. Creating a native fish population, for which the upper reaches are protected by two barriers, also provides additional protection against the upstream movement of non-natives should the middle barriers be compromised. It also provides additional protections against losing the entire population should the lower barrier be compromised, or if someone should move non-native fish above the lower barrier. The possibility of such an illegal movement of non-native trout above the middle barriers is also greatly reduced, because there will not be a local source of non-native trout immediately below the barrier.

3. Implement genetic monitoring program

Populations of native fish in SAC and EFJ will be isolated from other larger populations and may be susceptible to genetic drift over time. To prevent genetic drift often associated with isolated populations, a small number of fish from the original donor fish populations, or from other populations as appropriate, may be introduced into SAC and EFJ if the best available science so requires.

4. Monitor park fish communities and conduct research within VALL to further native fish conservation goals

Monitoring the successful establishment of the native fish community is essential to the success of the project, and is required by NPS Management Policies (NPS MP 8.2.2.1). Monitoring can show if fish survive and spawn, and potentially identify what factors may be limiting to population persistence (e.g. juvenile habitat).

Monitoring

Monitoring is expected to follow the same cooperative program, between VALL and NMDGF, USGS, other federal agencies (SFNF-USFS, BLM), and other interested stakeholders (TU). The following monitoring is currently ongoing:

- Monitor the status and trends of non-native trout populations in SAC and EFJ
- Monitor the status and trends of native fish populations in SAC and EFJ
- Monitor the impact of non-native trout predation and competition on abundance of native fish populations
- Monitor the impacts of, and recovery from fire on native and non-native fish communities

After treatment of VALL streams to remove non-native fish, the following additional monitoring is recommended:

- *Recovery of the macroinvertebrate community to ensure that sufficient food is available to maintain introduced native fish community*
- *Confirm that no non-native fish remain after treatment*

After establishment of the native fish community, the following monitoring is recommended:

- *Monitor status of native fish populations*
- *Document the presence and amount of natural reproduction and need for supplemental stocking*
- *Research limiting factors for persistence of native fish populations*
- *Monitor the impact of fishing on native fish community*

In the event of future fire:

- *Monitor to confirm status of fish prior to reestablishment*
- *Monitor recovery of stream geomorphology and riparian vegetation recovery*

Research

- *Establish the nativity of FHM in EFJ prior to treatment by phylogenetic and phylogeographic analyses using mitochondrial cyt b gene and/or S7 ribosomal protein-coding nuclear gene sequencing; see Ballesteros-Nova et al. 2019)*

5. Protect and restore native fish habitat

To fully conserve native species, it is important to protect the habitat on which they depend, and the natural functions and processes that create and maintain it. At this time, there are few specific restoration needs within SAC and EFJ that have not already identified in watershed planning documents (JWRAS 2005, SFNF 2011, SFNF 2002a, SFNF 2003). It is anticipated that under the new management regime, and the implementation of several types of watershed-wide best management practices, VALL streams can, and will recover naturally from long-term grazing and logging practices on the Preserve. However, VALL will continue to monitor stream conditions and react to identified threats, such as impacts of the 2011 Las Conchas Fire and 2013 Thompson Ridge Fire accordingly, to protect stream habitat.

General types of habitat restoration practices that have been identified within VALL that promote healthy watersheds and streams, include:

- *Removal of impoundments that impact stream flows in upper watersheds, that are not needed for other management purposes*
- *Removal and/or replacement of culverts that impact stream flows and promote erosion*
- *Closure, re-routing, and revegetation of roads to reduce erosion and remove sediment sources that impact stream habitat*

- *Management of grazing practices to promote streambank stability*
- *Management of fish intensity and distribution of recreational fishing to reduce impacts to riparian vegetation from overuse*

6. Manage and regulate fishing within VALL to protect native fish resources while providing appropriate opportunities for visitor enjoyment

While fishing is allowed in parks, and it is acknowledged that some impacts associated with recreational fishing will occur, fishing must be conducted and regulated in such a manner as to prevent unacceptable impacts to native fish and their habitat. NPS Management Policies mandate that VALL should manage park fish resources to preserve the natural abundances, diversities, dynamics, distributions, habitats and behaviors of native fish populations and minimize human impacts on native fish populations, (see NPS MP 4.4.1).

Currently NMDGF, in consultation with VALL, promulgates fishing regulations for VALL waters that are then adopted by the park as federal regulations, consistent with the NPS general fishing regulations (36CFR2.3a). Further protections, above and beyond those provided by the state are also contained within 36CFR2,3(a) and within the Superintendents Compendium. It is anticipated that this arrangement will continue, and VALL will work cooperatively with NMDGF to promulgate state fishing regulations that protect native fish resources consistent with NPS Natural Resource Management Policies.

Attributes of the RGCT fishery that should be considered for protection include;

- *The protection of the natural age structure of fish populations, including the natural abundance of large, mature RGCT that provide a unique fishing opportunity, have a disproportionate positive impact to potential juvenile natural recruitment, and can be used to provide brood stock to other regional conservation efforts.*
- *Special regulations to limit injury and mortality associated with fishing, including limits on the numbers and sizes of fish that may be harvested, and gear restrictions to limit hooking injury and mortality.*

Accordingly, VALL intends to regulate fishing in such a manner that recreational fishing does not unacceptably impact native fish communities. If information becomes available that suggests that the thresholds for unacceptable impacts may be exceeded, VALL, under the authority of the Superintendents Compendium may promulgate temporary fishing regulations to address the problem.

At this time, VALL anticipates that once native fish are established, fishing within restored Preserve streams will be regulated in a similar manner proposed for streams within the adjoining Bandelier National Monument and will include;

- *Fishing in a manner that is largely consistent with state regulations*
- *Catch and release fishing in some reaches of restored native fish streams to provide anglers with the opportunity to catch large RGCT, as appropriate*

- *Use of artificial flies and lures, and barbless hooks*
- *The possible closure of some river reaches to reduce visitor-angler conflicts in high use visitor areas, and to provide a reference reach for comparison to fished reaches (see NPS MP 4.2.1) in order to assess potential recreational angling impacts.*

Some units of the NPS that have limited fishing resources and high visitor use have implemented fishing permit systems to control and monitor fishing use (e.g. Pecos National Historical Park, NM). When the preserve first opened to anglers in 2009, in anticipation of high initial angler interest, VALL implemented a permit system that divided 10 miles of SAC in to 11 fishing beats, allowing two anglers per beat per day (maximum of 22 anglers per day).

At this time, VALL does not have a fishing permit system specifically to control the intensity of recreational fishing. The only “restriction” applies to anglers who want to drive their personal vehicles into the backcountry to fish the SAC, Rito de los Indios, or Jaramillo Creek, who must obtain a free backcountry vehicle permit. Permits are limited and available seasonally as conditions allow. Backcountry vehicle permits are not required to fish any preserve waters accessed by foot, bike or horse. Fishing is permitted year-round as long as streams are not frozen.

However, if park managers believe that the intensity of fishing is such that the thresholds for an unacceptable impact to native fish, or their habitat, may be occurring, it may reconsider a permitting system at such time.

7. Cooperate with state and federal natural resource agency and other stakeholders to further native fish conservation goals of VALL

VALL will continue to seek areas of mutual interest and to foster excellent working relationships between NMDGF, SFNF, American Indian Tribes and other stakeholders with common interests and goals. Additionally, the preserve, by itself, does not have the personnel and resources to conduct the proposed projects and the monitoring and research to support them. Consequently, it will always need to rely on cooperative efforts between nearby NPS units, USGS, NMDGF and other interested stakeholders (TU) if it is to be successful in its native fish management goals.

To this end, VALL will:

- *Conduct annual coordination meetings with interested stakeholders:*
 - *Cooperate with stakeholders to implement the goals of the Rio Grande Cutthroat Trout Conservation Agreement and Conservation Strategy, and the Rio Grande Chub and Rio Grande Sucker Conservation Agreements and Strategies.*
 - *Attend annual, Rio Grande Cutthroat Trout Conservation Team meeting, and the Rio Grande Chub and Rio Grande Sucker Conservation Team meeting.*
 - *Meet annually with the Santa Fe National Forest to further improve and enhance coordination regarding management actions in the Rio San Antonio and EF Jemez River watersheds.*

- *Communicate regularly with other NPS units (Bandelier National Park, Pecos National Historical Park, Great Sand Dunes National Park and Preserve) to share information and research findings, and to coordinate and assist each other concerning the management activities associated with the conservation and recovery of at risk Rio Grande fish species.*
- *Seek to develop written MOU's identifying the roles and responsibilities of both state and federal agencies to implement the VALL Native Fish Management Plan, including the regulation and enforcement of fishing within VALL*
- *Consult with American Indian tribes and pueblos in the region that have deep historic and cultural connections to VALL*

8. Create opportunities and materials for education and outreach concerning the protection and conservation of VALL fish and aquatic resources

Such outreach efforts may include:

- *The development of informational brochures and posters*
- *Publication of fishing regulations that include why special regulations are needed to protect native fish resources within VALL*
- *Publication of web-based articles on park and cooperator webpages*

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Appendix I: NPS General Service-Wide Fishing Regulations

36CFR § 2.3 Fishing.

- (a) Except in designated areas or as provided in this section, fishing shall be in accordance with the laws and regulations of the State within whose exterior boundaries a park area or portion thereof is located. Non conflicting State laws are adopted as a part of these regulations.
- (b) State fishing licenses are not required in Big Bend, Crater Lake, Denali, Glacier, Isle Royale (inland waters only), Mammoth Cave, Mount Rainer, Olympic and Yellowstone National Parks.
- (c) Except in emergencies or in areas under the exclusive jurisdiction of the United States, the superintendent shall consult with appropriate State agencies before invoking the authority of § 1.5 for the purpose of restricting or closing park areas to the taking of fish.
- (d) The following are prohibited: (1) Fishing in fresh waters in any manner other than by hook and line, with the rod or line being closely attended. (2) Possessing or using as bait for fishing in freshwaters, live or dead minnows or other bait fish, amphibians, non preserved fish eggs or fish roe, except in designated waters. Waters which may be so designated shall be limited to those where non-native species are already established, scientific data indicate that the introduction of additional numbers or types of non-native species would not impact populations of native species adversely, and park management plans do not call for elimination of non-native species.
- (3) Chumming or placing preserved or fresh fish eggs, fish roe, food, fish parts, chemicals, or other foreign substances in fresh waters for the purpose of feeding or attracting fish in order that they may be taken.
- (4) Commercial fishing, except where specifically authorized by Federal statutory law.
- (5) Fishing by the use of drugs, poisons, explosives, or electricity.
- (6) Digging for bait, except in privately owned lands.
- (7) Failing to return carefully and immediately to the water from which it was taken a fish that does not meet size or species restrictions or that the person chooses not to keep. Fish so released shall not be included in the catch or possession limit: *Provided*, That at the time of catching the person did not possess the legal limit of fish.
- (8) Fishing from motor road bridges, from or within 200 feet of a public raft or float designated for water sports, or within the limits of locations designated as swimming beaches, surfing areas, or public boat docks, except in designated areas.
- (e) Except as otherwise designated, fishing with a net, spear, or weapon in the salt waters of park areas shall be in accordance with State law.

(f) Authorized persons may check fishing licenses and permits; inspect creels, tackle and fishing gear for compliance with equipment restrictions; and inspect fish that have been taken for compliance with species, size and other taking restrictions.

(g) The regulations contained in this section apply, regardless of land ownership, on all lands and waters within a park area that are under the legislative jurisdiction of the United States.

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Appendix II: Compliance for the Use of a Piscicide within VALL

State Compliance

NMDGF will be lead agency for conducting the piscicide treatments within VALL. The State of New Mexico has developed regulations for proper oversight and use of piscicides, and created a streamlined permitting process to reduce the regulatory burden of implementing such projects for non-native fish control prior to restoration of native fish populations. The following New Mexico State Water Quality Standards apply:

20.6.4.16 PLANNED USE OF A PISCICIDE: The use of a piscicide registered under the Federal Insecticide, Fungicide, and Rodenticide Act (FIFRA), 7 U.S.C. Section 136 et seq., and under the New Mexico Pesticide Control Act (NMPCA), Section 76-4-1 et seq. NMSA 1978 (1973) in a surface water of the state, shall not be a violation of Subsection F of 20.6.4.13 NMAC when such use is covered by a federal national pollutant discharge elimination system (NPDES) permit or has been approved by the commission under procedures provided in this section. The use of a piscicide which is covered by a NPDES permit shall require no further review by the commission and the person whose application is covered by the NPDES permit shall meet the additional notification and monitoring requirements outlined in Subsection G of 20.6.4.16 NMAC. The commission may approve the reasonable use of a piscicide under this section if the proposed use is not covered by a NPDES permit to further a Clean Water Act objective to restore and maintain the physical or biological integrity of surface waters of the state, including restoration of native species.

A. Any person seeking commission approval of the use of a piscicide not covered by a NPDES permit shall file a written petition concurrently with the commission and the surface water bureau of the department. The petition shall contain, at a minimum, the following information:

- (1) Petitioner's name and address;
- (2) Identity of the piscicide and the period of time (not to exceed five years) or number of applications for which approval is requested;
- (3) Documentation of registration under FIFRA and NMPCA and certification that the petitioner intends to use the piscicide according to the label directions, for its intended function;
- (4) Target and potential non-target species in the treated waters and adjacent riparian area, including threatened or endangered species;
- (5) Potential environmental consequences to the treated waters and the adjacent riparian area, and protocols for limiting such impacts;
- (6) Surface water of the state proposed for treatment;
- (7) Results of pre-treatment survey;

- (8) Evaluation of available alternatives and justification for selecting piscicide use;
- (9) Documentation of notice requesting public comment on the proposed use within a 30-day period, including information as described in Paragraphs (1), (2) and (6) of Subsection A of 20.6.4.16 NMAC, provided to:
 - (a) local political subdivisions;
 - (b) local water planning entities;
 - (c) local conservancy and irrigation districts; and
 - (d) local media outlets, except that the petitioner shall only be required to publish notice in a newspaper of circulation in the locality affected by the proposed use.
- (10) Copies of public comments received in response to the publication of notice and the petitioner's responses to public comments received;
- (11) Post-treatment assessment monitoring protocol; and
- (12) Any other information required by the commission.

B. Within 30 days of receipt of the petition, the department shall review the petition and file a recommendation with the commission to grant, grant with conditions or deny the petition. The recommendation shall include reasons, and a copy shall be sent to the petitioner by certified mail.

C. The commission shall review the petition, the public comments received under Paragraphs (9) and (10) of Subsection A of 20.6.4.16 NMAC, the petitioner's responses to public comments and the department's technical recommendations for the petition. A public hearing shall be held if the commission determines there is substantial public interest. The commission shall notify the petitioner and those commenting on the petition of the decision whether to hold a hearing and the reasons therefore in writing.

D. If the commission determines there is substantial public interest a public hearing shall be held within 90 days of receipt of the department's recommendation in the locality affected by the proposed use in accordance with 20.1.3 NMAC, Adjudicatory Procedures - Water Quality Control Commission. Notice of the hearing shall be given in writing by the petitioner to individuals listed under Subsection A of 20.6.4.16 NMAC as well as to individuals who provided public comment under that subsection at least 30 days prior to the hearing. 20.6.4 NMAC 20

E. In a hearing provided for in this section or, if no hearing is held, in a commission meeting, the registration of a piscicide under FIFRA and NMPCA shall provide a rebuttable presumption that the determinations of the EPA Administrator in registering the piscicide, as outlined in 7 U.S.C. Section 136a(c)(5), are valid. For purposes of this Section the rebuttable presumptions regarding the piscicide include:

- (1) Its composition is such as to warrant the proposed claims for it;

- (2) Its labeling and other material submitted for registration comply with the requirements of FIFRA and NMPCA;
- (3) It will perform its intended function without unreasonable adverse effects on the environment; and
- (4) When used in accordance with all FIFRA label requirements it will not generally cause unreasonable adverse effects on the environment.
- (5) “Unreasonable adverse effects on the environment” has the meaning provided in FIFRA, 7 U.S.C. Section 136(bb): “any unreasonable risk to man or the environment, taking into account the economic, social, and environmental costs and benefits of the use of any pesticide.”

F. After a public hearing, or commission meeting if no hearing is held, the commission may grant the petition in whole or in part, may grant the petition subject to conditions, or may deny the petition. In granting any petition in whole or part or subject to conditions, the commission shall require the petitioner to implement posttreatment assessment monitoring and provide notice to the public in the immediate and near downstream vicinity of the application prior to and during the application.

G. Any person whose application is covered by a NPDES permit shall provide written notice to local entities as described in Subsection A of 20.6.4.16 NMAC and implement post-treatment assessment monitoring within the application area as described in Subsection F of 20.6.4.16 NMAC.

[20.6.4.16 NMAC - Rn, Paragraph (6) of Subsection F of 20.6.4.12 NMAC, 05-23-2005; A, 05-23-2005; A, 03-02-2017]

NPS Compliance

NPS Integrated Pest Management (IPM) and Pesticide Use Proposal System (PUPS)

IPM is a science-based decision-making process that guides park managers when investigating a pest situation, and its treatment. Treatments are based on an understanding of the biology of the pest and use the least-toxic treatment that is effective. The NPS Integrated Pest Management (IPM) program oversees the park’s management of plant and animal pests. A 'pest', as defined by NPS policy, is “any organism that interferes with the purpose of a park or that threatens human health or safety”. Non-native, predatory fish that would otherwise not be present, are considered “pests” in the context of this Plan.

An NPS permit to use a pesticide (or piscicide) within a national park service unit will be required and will be obtained as part of the IPM, through the NPS Pesticide Use Proposal System (PUPS) review process. An IPM plan will be developed in coordination with the NPS Intermountain Regional Office IPM Program. It is anticipated that the detailed implementation plan submitted to the Colorado Department of Health by CPW will provide the basis for much of the IPM Plan.

Appendix III: National Environmental Policy Act (NEPA) Compliance to Adopt and Implement the Native Fish Management Plan

In order to implement the activities identified in this Plan, the NPS is required to conduct a suite of environmental reviews. The following is a brief discussion of the major legal and regulatory requirements that must be met for the implementation of activities identified in the Plan.

National Environmental Policy Act (NEPA)

The National Environmental Policy Act (NEPA) was signed into law on January 1, 1970. NEPA requires federal agencies to assess the environmental effects of their proposed actions prior to making decisions. This policy requires the federal government to use all practicable means to create and maintain conditions under which man and nature can exist in productive harmony.

Section 102 in Title I of the Act requires federal agencies to incorporate environmental considerations in their planning and decision-making through a systematic interdisciplinary approach. Specifically, all federal agencies are to prepare statements assessing the environmental impact of federal actions that may affect the environment. If the agency determines that the action will not have significant environmental impacts, the agency will publish a Categorical Exclusion (CE), or an Environmental Assessment (EA) and issue a Finding of No Significant Impact (FONSI).

A CE is a class of actions that a Federal agency has previously determined do not individually or cumulatively have a significant effect on the human environment and for which, therefore, neither an environmental assessment nor an environmental impact statement is normally required. The use of categorical exclusions can reduce paperwork and save time and resources. Many planning and restoration actions typically implemented by the NPS may, at the park Superintendents discretion be covered by existing NPS CE's.

An EA is an analysis to determine whether or not a federal action is a "major federal action significantly affecting the quality of the human environment." The EA leads either to the decision to do an Environmental Impact Statement (EIS) or to a Finding of No Significant Impact (FONSI). A FONSI is a document that presents the reasons why the agency has concluded that there are no significant environmental impacts projected to occur upon implementation of the action. If the EA determines that the environmental impacts of a proposed Federal action will be significant, then an Environmental Impact Statement is prepared. Significant impacts must be considered in the context of the environment in which the proposed action occurs, and the intensity of the action, but generally involve impacts that are large in scale, permanent, or include an irretrievable commitment of resources which can't be mitigated.

The NPS is also required to meet the directives of: (1) August 15, 2017, Executive Order 13807; Establishing Discipline and Accountability in the Environmental Review and Permitting Process for Infrastructure Projects; and (2) August 31, 2017, DOI Secretarial Order 3355; Streamlining National Environmental Policy Act Reviews and Implementation of Executive Order 13807. The Orders are

intended to improve the efficiency of the environmental review process by setting page and time limitations for environmental documents.

VALL is subject to the provisions of NEPA, and is required to evaluate the impacts of implementing the VALL Native Fish Management Plan. The Plan is a high level, programmatic document that identifies a wide range of activities that will be implemented as funds and opportunities become available. Accordingly, adoption of the Plan is considered a broad administrative document which in itself is considered to have no significant environmental impacts. Additionally, all the specific actions contemplated are generally consistent with existing NPS Categorical Exclusions (CE, see below). However, if it is determined that an action proposed in the plan is not covered under an existing CE, the impacts associated with its implementation will be analyzed in an EA. If it is found that no significant impacts will occur, the CE or EA is approved and signed by the park Superintendent or Intermountain Regional Director, as appropriate.

Use of Categorical Exclusions

Many activities identified in the Plan are anticipated to be covered under existing NPS NEPA Categorical Exclusions (CE). Any action not covered by existing CE's will undergo further project specific environmental compliance and review before implementation, as appropriate.

It is anticipated that the reintroduction of non-controversial native species can be conducted under NPS NEPA Categorical Exclusion (CE) 3.4 (E) 3: Actions Related to Resource Management and Protection: Restoration of noncontroversial native species into suitable habitats within their historic range and elimination of exotic species.

This CE should only be used when the action under the CE would result in no, or minor impacts. The Environmental Screening Form should be used to determine the level of potential impacts. This CE is from 43 CFR § 46.210 and 516 DM 12. NPS Directors Order 12, Section 3.4.

Fish community monitoring activities may be covered under at least two CE's: CE 3.3 Y, and 3.4 (E) 5.

CE 3.3. CEs for Which No Formal Documentation is Necessary

Y. Day-to-day resource management and research activities.

Guidance: This CE applies to cultural and natural resource management and research activities that have no impact on the human environment and that are not otherwise listed in section 3.4.

3.4 (E). Actions Related to Resource Management and Protection for Which a Record is Required

5. Nondestructive data collection, inventory (including field, aerial, and satellite surveying and mapping), study, research, and monitoring activities.

Habitat Restoration: Removal of certain dams to restore stream flow and reconnect stream reaches, will be covered under CE 3.4 (E). Actions Related to Resource Management and Protection for

Which a Record is Required: 4. Removal of non-historic materials and structures in order to restore natural conditions.

Other activities not covered by the EA for implementation of the Plan or CE's will undergo additional environmental review as appropriate.

ESA: Informal consultation with USFWS for ESA

The federal Endangered Species Act requires that federal agencies must ensure that their actions do not cause harm to threatened and endangered species. It is anticipated that VALL will coordinate with the USFWS through an informal interagency consultation, and seek a letter of concurrence that the use of a piscicide to remove of non-native fish will not have any adverse effects on listed species.

National Historic Preservation Act (NHPA)

Section 106 of the National Historic Preservation Act of 1966 (NHPA) requires Federal agencies to take into account the effects of their undertakings on historic properties, and afford the Advisory Council on Historic Preservation a reasonable opportunity to comment. Certain dams within VALL may have potential historic and cultural significance and will need to undergo Section 106 review if proposed for removal or the outlet modified to restore natural stream flow.

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The Department of the Interior protects and manages the nation's natural resources and cultural heritage; provides scientific and other information about those resources; and honors its special responsibilities to American Indians, Alaska Natives, and affiliated Island Communities.

NPS XXXXXX, Month Year

National Park Service
U.S. Department of the Interior



[Natural Resource Stewardship and Science](#)

1201 Oakridge Drive, Suite 150
Fort Collins, CO 80525

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