

1. Species: Rio Grande Chub (*Gila pandora*)

2. Status: Table 1 summarizes the current status of this species or subspecies by various ranking entity and defines the meaning of the status.

Table 1. Current status of <i>Gila pandora</i>		
Entity	Status	Status Definition
NatureServe	G3	<i>Species is Vulnerable</i> At moderate risk of extinction or elimination due to a fairly restricted range, relatively few populations or occurrences, recent and widespread declines, threats, or other factors.
CNHP	S1?	<i>Species is Critically Imperiled</i> At very high risk of extinction or elimination due to very restricted range, very few populations or occurrences, very steep declines, very severe threats, or other factors.
Colorado State List Status	SGCN, Tier 1	Species of Greatest Conservation Need
USDA Forest Service	R2 Sensitive	R2 Regional Forester's Sensitive Species
USDI FWS ^b	None	N/A
^a Colorado Natural Heritage Program.		
^b US Department of Interior Fish and Wildlife Service.		

The 2012 U.S. Forest Service Planning Rule defines Species of Conservation Concern (SCC) as “a species, other than federally recognized threatened, endangered, proposed, or candidate species, that is known to occur in the plan area and for which the regional forester has determined that the best available scientific information indicates substantial concern about the species' capability to persist over the long-term in the plan area” (36 CFR 219.9). This overview was developed to summarize information relating to this species' consideration to be listed as a SCC on the Rio Grande National Forest, and to aid in the development of plan components and monitoring objectives.

3. Taxonomy

Genus/species *Gila pandora* is accepted as valid (ITIS 2015).

4. Distribution, abundance, and population trend on the planning unit [12.53.2,3,4]:

The historical range of the Rio Grande chub is thought to have included most streams in the Rio Grande and Pecos River basins and the San Luis Closed Basin (Sublette et al. 1990, Zuckerman and Bergersen 1986, Zuckerman and Langlois 1990, all cited in Rees et al. 2005). This species is likely extirpated from the mainstem Rio Grande and now is found only in tributary streams (Bestgen et al. 2003 cited in Rees et al. 2005). Currently, the species occurs within the planning area in the Alamosa drainage, Hot Creek, and Swale Lake (CPW no date) (Table 2).

Although there are currently small populations in many parts of its historical range in USFS Region 2, the overall numbers of Rio Grande chub are reduced by as much as 75 percent (Bestgen et al. 2003).

Table 2. Known Occurrences within the Planning Area

Conejos Peak RD:	Alamosa Drainage from Silver Lakes to Terrace Reservoir
	Hot Creek
Divide RD:	Swale Lake

5. Brief description of natural history and key ecological functions [basis for other 12.53 components]:

The Rio Grande chub is a versatile species able to inhabit both riverine and lacustrine habitats. It has been known to thrive at elevations up to 11,370 ft. (Zuckerman and Langlois 1990). It is usually found in pools with overhanging banks and brush, and is known to prefer cool, fast-flowing reaches with gravel or cobble substrate. Bestgen et al. (2003) found chubs at sites where cobble, gravel, sand and silt were the most common substrate types, and chubs were most often found at sites where sand was the dominant substrate and least often found at sites with cobble substrate (Rees et al. 2005).

Stream populations of Rio Grande chub spawn in riffle habitat without building nests and provide no parental care after egg laying (Koster 1957 cited in Rees et al. 2005). No information is available on the behavior of this species during spawning. The Rio Grande chub is also reported to reproduce in lakes, but this spawning has never been observed (Zuckerman and Langlois 1990).

Based on the condition of the females, breeding could take place from March through June. Another spawning period was hypothesized for autumn, but the apparent breeding condition of the females could have been caused by early maturation of gametes in preparation for the spring breeding season. Zuckerman and Langlois (1990) speculated that the population in Hot Creek, in the Rio Grande drainage, might have an additional autumnal spawning period, due to the presence of female specimens at this time that appeared to be gravid (Rees et al. 2005).

The Rio Grande chubs is omnivorous and known to feed on aquatic and terrestrial insects, crustaceans, other small invertebrates, small fish, plankton, and some vegetation (Koster 1957 cited in Rees et al. 2005).

6. Overview of ecological conditions for recovery, conservation, and viability [12.53 7, 9?, 10, 11, 12]:

The Rio Grande chub is vulnerable due to reduction of stream flows, fragmented habitat associated with water diversions and barriers, increased sediment loads, reduction of riparian habitat from heavy grazing, and predation and competition from non-native fishes. Rees et al. (2005) identify the following management considerations for conservation of the species:

- protection and restoration of riparian areas
- minimization of sediment input due to anthropogenic causes (e.g., road building, timber harvest)
- maintenance of channel stability and natural fluvial dynamics
- removal of non-native fish species including predatory species i.e. northern pike.
- Increased habitat connectivity (removal of barriers i.e. removal of improperly installed culverts with Aquatic Organism Passage structures)

7. Threats and Risk Factors:

The primary threats to the Rio Grande chub generally result from anthropogenic events. Water diversion projects have resulted in flow regime changes in both tributary and mainstem rivers and streams. Construction of diversion dams and reservoirs has degraded and fragmented habitats and caused passage barriers. The introduction of non-native species has increased predation of and competition with the Rio Grande chub. Other threats to this species include land use changes and local development and excessive grazing in riparian zones, which reduce the natural stream ecosystem function (Rees et al. 2005).

Native fish communities in the Rio Grande Basin have been greatly reduced as a result of human activities during the last 100 years (Bestgen et al. 2003). These mechanisms can be separated into two general categories: 1) habitat degradation that includes habitat loss, modification, and/or fragmentation and 2) interactions with non-native species.

Habitat loss typically occurs when streams are dewatered due to water use practices. Habitat fragmentation is often a result of dewatering, but it can also be caused by the creation of barriers to fish passage such as dams and diversions. Habitat modification includes not only aspects discussed under fragmentation and loss, but also includes modification of stream channels due to channelization, scouring, or sedimentation; changes in temperature and flow regimes; and alterations to water chemistry related to pollution. Land use practices that can impact stream channels include construction of roads through highly erodible soils, improper timber harvest practices, irrigation, and overgrazing in riparian areas (Rees et al. 2005). As climate change progresses and temperatures continue to rise, it is expected that water levels will continue to decrease. Further reduction of water levels in already stressed systems combined with increased water temperatures may further reduce available habitat for Rio Grande chubs in the Rio Grande Basin.

Competition with and predation by non-native species are two more extensive threats to Rio Grande chub population health and viability. Non-native predators such as northern pike and brown trout occur in many of the drainages that currently or historically contained Rio Grande chub. Introduced species, such as common carp and white sucker compete with Rio Grande chub for food resources (Rees et al. 2005).

8. Key literature:

Colorado Parks and Wildlife (CPW). No date. J. Alves, preparer. Rio Grande chub, fact sheet. Unpublished report. 6 pp.

Bestgen, K.R., R.I. Compton, K.A. Zelasko, and J.E. Alves. 2003. Distribution and status of Rio Grande chub in Colorado. Larval Fish Laboratory Contribution 135, Larval Fish Laboratory, Department of Fishery and Wildlife Biology, Colorado State University, Fort Collins, Colorado. 59 pp.

Rees, D.E., R.J. Carr, and W.J. Miller. 2005. Rio Grande Chub (*Gila pandora*): a technical conservation assessment. [Online]. USDA Forest Service, Rocky Mountain Region. Available: <http://www.fs.fed.us/r2/projects/scp/assessments/riograndechub.pdf> [07/06/2015].

Zuckerman, L.D. and E.P. Bergersen. 1986. Aquatic Ecology and Management of Wilderness Streams in the Great Sand Dunes National Monument, Colorado. U.S. Forest Service General Technical Report INT No. 212:221-231.