

Scientific Name: *Oncorhynchus apache*

Common Name: Apache trout

BISON No.: 010582

Legal Status:

- | | | |
|---------------------------------------|------------------------------|------------------------------|
| ➤ Arizona, Species of Special Concern | ➤ ESA, Proposed Threatened | ➤ New Mexico-WCA, Threatened |
| ➤ ESA, Endangered | ➤ ESA, Threatened | ➤ USFS-Region 3, Sensitive |
| ➤ ESA, Proposed Endangered | ➤ New Mexico-WCA, Endangered | ➤ None |

Distribution:

- | | |
|---|---------------------------|
| ➤ Endemic to Arizona | ➤ Southern Limit of Range |
| ➤ Endemic to Arizona and New Mexico | ➤ Western Limit of Range |
| ➤ Endemic to New Mexico | ➤ Eastern Limit of Range |
| ➤ Not Restricted to Arizona or New Mexico | ➤ Very Local |
| ➤ Northern Limit of Range | |

Major River Drainages:

- | | |
|------------------------|-----------------------------|
| ➤ Dry Cimmaron River | ➤ Rio Yaqui Basin |
| ➤ Canadian River | ➤ Wilcox Playa |
| ➤ Southern High Plains | ➤ Rio Magdalena Basin |
| ➤ Pecos River | ➤ Rio Sonoita Basin |
| ➤ Estancia Basin | ➤ Little Colorado River |
| ➤ Tularosa Basin | ➤ Mainstream Colorado River |
| ➤ Salt Basin | ➤ Virgin River Basin |
| ➤ Rio Grande | ➤ Hualapai Lake |
| ➤ Rio Mimbres | ➤ Bill Williams Basin |
| ➤ Zuni River | |
| ➤ Gila River | |

Status/Trends/Threats (narrative):

Federal: Threatened, Forest Service: Sensitive, State AZ: Threatened.

Apache trout is mostly restricted to areas above 2500 m in the headwaters of the Salt River drainage (Harper 1976). Native populations of Gila trout occur in Main Diamond, South Diamond, McKenna, and Iron creeks and Spruce Creek all of NM (Behnke 1992).

The historic range has been drastically reduced by physical modifications of the habit (Rinne and Minckley 1985, Minckley 1991).

The major threat to this native trout was introduction of a nonnative species, rainbow trout, resulting in hybridization and loss of purity of populations and competitive displacement (Minckley 1973, Behnke and Zarn 1976, Rinne and Minckley 1985). Only 25% of 35 streams sampled contained pure populations of *S. apache* (Lee et. al. 1981). By the 1970s, genetic

contamination had reduced pure strain Apache trout to less than 5.0 % of its former range (Minckley 1991).

Distribution (narrative):

Historically the Apache trout was present in upper Salt River (Black and White rivers) and headwaters of Little Colorado River (Lee et al 1981, Minckley 1991). Now occurs naturally primarily in a small montane streams and cienegas in headwaters (2500+m) of Black and White river drainages of east-central Arizona (Lee et al 1981, Rinne and Minckley 1985). Apache trout persists in pure form most frequently in headwater streams above 2,100 m elevation on the White Mountain Apache Reservation (Rinne and Minckley 1985). Until 1920 the Arizona trout was the only trout species in the White Mountains of Arizona and was common throughout the upper Salt and Little Colorado River drainages (Miller 1972). In the 1950s, the Arizona Game and Fish Department determined that the fish had been forced back to a few headwaters above 3,000 m in elevation (Minckley 1973). The estimated distribution of Apache trout comprised about 950 km of stream habitat, today this has been reduced to about 50 km (Behnke 1992).

Key Distribution/Abundance/Management Areas:

Panel key distribution/abundance/management areas:
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Breeding (narrative):

Apache trout mature in three years (Lee et. al. 1981)
Apache trout spawn in March, April, and May (Minckley 1973, Lee et. al. 1981). Spawning occurs in saucer-shaped depressions excavated by the female in flowing water, the female deposits between 200 and 600 eggs and the eggs are covered with gravel after fertilization (Minckley 1973). Incubation lasts for 5 or 6 weeks (Minckley 1973, Lee et. al. 1981). Fry emerge at 20-25 mm SL in 60 days and display downstream nocturnal migration (Lee et al. 1981).

Habitat (narrative):

The Apache trout is found in small, clear, cold brooks, which flow through marshy cienegas and coniferous forests (Minckley 1973). Large individuals live in pools, while smaller ones remain near obstructions or other cover such as overhanging trees or brush in runs and riffles (Minckley 1991). The Apache trout is primarily found in small montane streams and cienegas in headwaters above 2500m (Lee et. al. 1981).

Breeding Season:

- | | | |
|------------|-------------|------------|
| ➤ January | ➤ June | ➤ October |
| ➤ February | ➤ July | ➤ November |
| ➤ March | ➤ August | ➤ December |
| ➤ April | ➤ September | |
| ➤ May | | |

Panel breeding season comments:

Aquatic Habitats:**Large Scale:**

- Rivers
- Streams
- Springs
- Spring runs
- Lakes
- Ponds
- Sinkholes
- Cienegas
- Unknown
- Variable

Small Scale:

- Runs
- Riffles
- Pools
- Open Water
- Shorelines

Panel comments on aquatic habitats:

Important Habitat Features (Water characteristics):**Current**

- Fast (> 75 cm/sec)
- Intermediate (10-75 cm/sec)
- Slow (< 10 cm/sec)
- None
- Unknown
- Variable

Gradient

- High gradient ($> 1\%$)
- Intermediate Gradient (0.25-1%)
- Low Gradient ($< 0.25\%$)
- None
- Unknown
- Variable

Water Depth

- Very Deep (> 1 m)
- Deep (0.25-1 m)
- Intermediate (0.1-0.25 m)
- Shallow (< 0.1 m)
- Unknown
- Variable

Panel comments on water characteristics:

Important Habitat Features (Water Chemistry)

Temperature (general)

- Cold Water (4-15°C)
- Cool Water (10-21°C)
- Warm Water (15-27°C)
- Unknown
- Variable

Turbidity

- High
- Intermediate
- Low
- Unknown
- Variable

Conductivity

- Very High (> 2000 $\mu\text{S}/\text{cm}$)
- High (750-2000 $\mu\text{S}/\text{cm}$)
- Intermediate (250-750 $\mu\text{S}/\text{cm}$)
- Low (< 250 $\mu\text{S}/\text{cm}$)
- Unknown
- Variable

Panel comments on water chemistry:

Important Habitat Features (Structural elements):

Substrate

- Bedrock
- Silt/Clay
- Detritus
- Sand
- Gravel
- Cobble
- Boulders
- Unknown
- Variable

Cover

- Rocks, boulders
- Undercut banks
- Woody debris
- Aquatic vegetation
- Rootwads
- Not important
- Overhanging vegetation
- Unknown
- Variable

Panel comments on structural elements:

Diet (narrative):

The Apache trout is very active during the day, which if true, could enable it and brown trout to partition their environment and lessen competition (Robinson & Tash 1979). Apache trout feed on aquatic macroinvertebrates, especially mayflies, stoneflies, and caddisflies. The species are size limited in headwater streams by physical size of habitat.

Diet category (list):

- Planktivore
- Herbivore
- Insectivore
- Piscivore (Fish)
- Omnivore
- Detritivore

Grazing Effects (narrative):

Livestock compact and denude marshes and meadows, trample stream banks, and remove riparian vegetation (Minckley 1991). The only direct information available on Apache trout and grazing are from one grazing allotment, the West Fork, Apache Sitgreaves National Forest. Based on enclosure studies, stream drying and lack of clean spawning substrate in meadow reaches appear to be more limiting than ungulate grazing. Excessive fines that could result from bank disruption and removal of vegetation on the watershed is potentially the most likely indirect affect on Apache trout. Adults could be indirectly affected by reduction in food supply resulting from excessive fines (> 30%) and reduction in aquatic macroinvertebrates. In addition, removal of nearstream and streambank vegetation could reduce terrestrial invertebrates as a food source.

Panel limiting habitat component relative to grazing and comments:
Panel assessment: Is this species a priority for selecting a grazing strategy? Throughout the species' distribution in New Mexico and Arizona YES NO UNKNOWN In key management area(s) YES NO UNKNOWN

Principle Mechanisms Through Which Grazing Impacts This Species (list):***May be Revised***

- | | | |
|---|---|--|
| <ul style="list-style-type: none"> ➤ Alteration of bank structures ➤ Alteration of substrate ➤ Alteration of water regimes ➤ Altered stream channel characteristics ➤ Altered aquatic vegetation composition | <ul style="list-style-type: none"> ➤ Altered bank vegetation structure ➤ Change in food availability ➤ Change in water temperature ➤ Change in water quality ➤ Habitat fragmentation | <ul style="list-style-type: none"> ➤ Increased turbidity ➤ Other biotic factors ➤ Parasites or pathogens ➤ Population genetic structure loss ➤ Range improvements ➤ Trampling, scratching ➤ Unknown |
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Panel causal mechanisms comments:
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Authors

- **Draft:** Rinne, J.N. and Magaña, H.A.
- **GP 2001:**
- **GP 2002:**
- **Revision:**

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