

Scientific Name: *Lepidomeda mollispinis mollispinis*

Common Name: Virgin Spinedace

BISON No.: 010172

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, State AZ: Endangered.

Threats to the Virgin spinedace include; habitat destruction, parasites, and non-native fishes. High discharge from localized storms disperse spinedace downstream for considerable distances (Rinne 1971). Dewatering streams, water depletions, introduction of non-indigenous fish, and habitat degradation through agricultural and recreational uses have been identified as the primary factors involved in the reduction of the range of the species (Valdez et al 1991). Lack of stable instream flows and low water levels as a result of diversions cause changes in water temperature, affect aquatic vegetation, and alter water chemistry and dissolved oxygen levels (UDNR 1995).

Distribution (narrative):

The Virgin spinedace is restricted to the Virgin River system, UT-AZ-NV (Miller and Hubbs 1960, Minckley 1973, Lee 1981), the Virgin spinedace also occurs in the Little Colorado River and in isolated springs of the ancient White River drainage of eastern NV (Minckley 1991). The Virgin spinedace currently occupies approximately 60-63% of historic habitat, nearly all being in UT. Populations no longer exist in NV and few individuals remain in AZ. The species occupies approximately 117 km of tributary streams of the mainstem Virgin River (UDNR 1995).

Key Distribution/Abundance/Management Areas:

Panel key distribution/abundance/management areas:

Breeding (narrative):

Spawning by Virgin spinedace occurs in spring through early summer in the Santa Clara River and tributaries. One-year and two-year-old fish spawn only once in a season, but there is some evidence that older females may spawn twice within a relatively short period of time. A group of males congregate near the lower ends of pools, and females move to the males to spawn on or near the bottom (Minckley 1973). Spawning of Virgin spinedace occurs from March to early June, and some continuing sporadically through July. Mature after one year (age group I) and most recruitment stock produced from these individuals. Older females (age group III) may produce two complements of ova a season. Few fish live longer than one year, but occasionally some survive into their third year (Lee 1981). Spawn in spring and summer. Male breeding colors are mostly seen as yellowish or reddish orange at the base of paired fins (Minckley 1991). Virgin spinedace have a life-span of about three years, and the fish reaches sexual maturity at one year. Annual spawning of the Virgin spinedace has been observed from April through June at mean daily water temps of 13-17 C and day lengths of about 13 hours (UDNR 1995).

Habitat (narrative):

Virgin spinedace are frequently found in pools with some type of protection such as undercut banks, boulders or debris (Rinne 1971). Virgin spinedace are found living in cool, clear tributaries to the mainstream Virgin, and generally in areas, which are moderately swift, but have scattered pools (Miller and Hubbs 1960, Minckley 1973). Virgin spinedace are typically found in clear, cool, swift streams that have interspersed pools, runs, and riffles (Deacon et al 1979). Virgin spinedace have also been documented to prefer shear zones between high (100cm/sec) and low (10 cm/sec) velocities containing cover (Deacon et al 1979). Although found in mainstream, spinedace prefer lower to middle reaches of tributaries, most often associated with clear, cool, relatively swift streams comprised of pools, runs, and riffles. Shaded pools (0.5-2.0 m deep) and runs most often frequented (Lee 1981). Virgin spinedace are usually found in pools and runs and are adapted to feed actively at various water levels (Miller and Hubbs 1960). In late winter Virgin spinedace are occasionally captured in riffles (Angardi et. al. 1991). Inhabit quiet water of pools and eddies below riffles and runs (Minckley 1991).

Breeding Season:

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

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):

Rinne (1971, Minckley 1973, Lee 1981, Minckley 1991) reported that the Virgin spinedace was primarily insectivorous except when insects are scarce, at which time (late summer to fall) plant material was included in the diet. They feed on substrate, in mid-water areas, and at or near the surface, and may be considered opportunistic in over-all feeding habits and foods eaten (Minckley 1973). Greger and Deacon (1988) reported that the Virgin spinedace is largely carnivorous. Angardi et al (1991) reported that stomach items were almost exclusively macroinvertebrates, larvae of stratiomyid *Euparyphus* (soldier flies) were consistently among the most important food items, adult ephemeropterans (mayflies) and trichopterans (caddisflies) and larval *Hydropsyche* (caddisflies). Virgin spinedace feed primarily in the morning (0605 and 0925) and reduced feeding at night. Virgin spinedace is a specialized feeder with respect to drift and fed primarily on chironomid larvae (midges) were most important taxa in the drift (Angardi et. al. 1991).

Diet category (list):

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

Grazing Effects (narrative):

Virgin spinedace are frequently found in cool, clear pools with some type of protection such as undercut banks, boulders or debris. Grazing by livestock has the potential to eliminate this protection and cause a further decline in the species. Angardi et. al. (1991) in their study found a correlation between cattle grazing and benthic communities. They found that site 1 was more sedimented than site 2 as a result of greater livestock use, which may have accounted for the different benthic communities at the sites. The Virgin spinedace is specialized feeder for part of the year and disruption of its food supply could force it into an unfavorable environment and hasten its demise. Given that the Virgin spinedace is a short-lived species disturbance of localized habitat by livestock or large mammals may have a long-term affect on the species.

Panel limiting habitat component relative to grazing and comments:
<p>Panel assessment: Is this species a priority for selecting a grazing strategy?</p> <p>Throughout the species' distribution in New Mexico and Arizona</p> <p style="text-align: center;">YES NO UNKNOWN</p> <p>In key management area(s)</p> <p style="text-align: center;">YES NO UNKNOWN</p>

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 |
|---|---|--|

Panel causal mechanisms comments:
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Authors

- **Draft:** Magaña, H.A.
- **GP 2001:**
- **GP 2002:**
- **Revision:**

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