Scientific Name: *Rhinichthys osculus*
Common Name: Speckled dace
BISON No.: 010185

Legal Status:

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

Distribution:

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

Major River Drainages:

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

Status/Trends/Threats (narrative):

Federal (FWS): Species of concern, State NM: Provides limited protection.
According to various authors, the speckled dace formerly occurred from about 1370 m to the highest elevations, but now occurs only above 1830 m (Sublette et al 1990). Land ownership is perhaps the sole remaining securitor of aquatic habitats for native fishes (Rinne 1994). The status of populations is stable in the San Juan, Zuni, San Francisco and Gila drainages of New Mexico (Sublette et al 1990).
Escalation of agricultural development of floodplain areas commenced in the 1950s and placed further demand on surface water resources through water diversion and on aquifers through groundwater mining (Rinne 1994). Increasing human population growth in the southwest was followed by introduction of nonnative species of fishes for sport and biological control (Rinne 1994). Red shiner has affected the distribution and abundance of native fishes of the southwest

(Greger and Deacon 1988). Greger and Deacon (1988) reported that direct competition for food between red shiners and speckled dace at Beaver Dam Wash appears to be likely. Cattle tank or stock pond introductions of species of centrarchids (sunfishes and basses) also have been detrimental to native species (Rinne 1994). The garter snake may be the most important terrestrial predator to speckled dace (John 1964). The greatest potential loss of fish of the year occurs in late summer when the initial flash food induces major reproduction and is then followed by another flash flood (John 1964). Flash floods are an important cause of mortality among fish of the year if they occur while the fish are very small (John 1964). Speckled dace will hybridize with the longnose dace, the only other species of *Rhinichthys* found in New Mexico (Smith 1973).

Distribution (narrative)**:**

The speckled dace is native to all major western drainages west of the Continental Divide (coastal and interior waters) from Columbia River drainage to Colorado River drainage and south to Sonora, Mexico (Lee et al 1981, Sublette et al 1990). Speckled dace are widespread and generally abundant in the Gila River Basin to the north (Minckley 1973). The speckled dace is native to the Gila, San Francisco, Zuni, and San Juan drainages, and was introduced to the Mimbres River during the 1970s (Sublette et al 1990).

Key Distribution/Abundance/Management Areas:

Panel key distribution/abundance/management areas:

Breeding (narrative)**:**

Spawning occurs in early spring or late summer following flash floods, or at both times, depending on water conditions (John 1963). The first spawn was an apparent response to increasing water temperatures and length of daylight, and the spring runoff (from snowmelt in that area), and the second period was attributed to a response to summer rains (John 1963). The spawning of the speckled dace in the Chiricahua Mountains peaks in early spring and late summer, and no activity in between, however, an extended spawning season in southern areas is undoubtedly made possible by the longer warm season (John 1963).

Breeding adults seem to prefer swifter water, particularly the males, and in the late winter and early spring the fish (both sexes) sometimes are numerous in swirling waters behind stones or other obstructions in the swiftest riffles (Minckley 1973). Nests are constructed by males in quiet pools, and flowing water may be essential since spawning has not been observed in standing water (John 1963). John (1963) hypothesized that a fresh supply of water at the right time appears to exert more influence than any other single factor.

When a female enters the cleared area, a cluster of male immediately surrounds her. The female then thrusts the posterior part of the body into the gravel bed and deposits the eggs; the attendant males then release sperm into the gravel (Sublette et al 1990). The eggs are demersal, adhesive, and hatching time is six days at 18-19^{o}C (John 1963). The larvae remain in the gravel interstices

for about seven to eight days (John 1963). The males are very territorial, defending a nest site for a period of days and spawning with females (Minckley 1973).
The observations on the intensity and distribution of spawning suggest indirectly that a given female might spawn more than once a year (John 1963). About 85% of the 2-year olds were sexually mature (John 1964).

Habitat (narrative)**:**

The speckled dace is a bottom dwelling species, which inhabits shallow, rocky, headwater streams with relatively swift flow, sometimes in areas with considerable aquatic vegetation (Sublette et al 1990). The speckled dace is presently rare below about 1,500 meters elevation, but once occurred in the larger streams below that level (Minckley 1973). The speckled dace has a relatively low tolerance for elevated temperatures and reduced oxygen, thus in Arizona, it is found only between 1,800 and 2,100 m elevation (Lowe et al. 1967). Preferred temperature of speckled dace from the Virgin River is believed to be 15.8^{o}C with extremes in modal bounds ranging from 9.5-16.0^{o}C (Deacon et al. 1987). Speckled dace usually live in water less than 0.5 meter deep between 2,000 and 3,000 meters elevation in relatively swift (30-41 cm s $^{-1}$), moderate sized, quiet pool-and-riffle creeks and often congregate below riffles and eddies (Minckley 1973, 1991, Rinne 1992). During low-water stages fish were found mainly in pools (John 1964). The speckled dace characteristically occupies substrate surface to open water (Rinne 1992), and tend to swim actively above the substrate (Barber and Minckley 1966).
Key Habitat Components: riffles, moderate velocity, gravel to cobble substrate, heads of pools immediately below riffles.

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 µS/cm)
- High (750-2000 µS/cm)
- Intermediate (250-750 µS/cm)
- Low (< 250 µS/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 speckled dace is omnivorous, feeding on algae, detrital materials, and smaller aquatic invertebrates, and often forages on the bottom, but sometimes rise to mid-water to eat floating materials (Minckley 1973). Lee et al (1981) reported the speckled dace as typically a bottom browser, feeding on small invertebrates, but also may feed on plant material. However, Greger and Deacon (1988, Minckley 1991) later reported that speckled dace are opportunistic carnivores, feeding heavily on aquatic insects and other invertebrates, and only occasionally on plant materials (Minckley 1991). Greger and Deacon (1988) reported that speckled dace feed primarily on blackfly larvae in February and June and on midge larvae in September and December, and virtually no plants and relatively little detrital material occurred in speckled dace stomachs examined. Schreiber and Minckley (1981) reported that nymphal mayflies comprised 57 percent or more of stomach contents with dipteran larvae being the most common in stomachs of bottom-dwelling speckled dace. Schreiber and Minckley (1981) found only one of 23 food items recorded for speckled dace was a terrestrial origin, further supporting the rarity of surface feeding by this minnow.

Diet category (list):

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

Grazing Effects (narrative):

Arroyo cutting has been attributed, in part, to excessive, uncontrolled livestock grazing and, in part to irrigation diversions in case of the San Simon. Locally in high elevation, small (< 1 cfs) streams in montane meadows negative impacts could occur if grazing intensity was high in spring and early summer during spawning season. Indirectly, in these same habitats, removal of streamside vegetation and streambank damage along with disturbance of substrates in pools and riffles could elevate water temperatures, reduce dissolved oxygen, and instream cover.

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

- Alteration of bank structures
- Alteration of substrate
- Alteration of water regimes
- Altered stream channel characteristics
- Altered aquatic vegetation composition
- Altered bank vegetation structure
- Change in food availability
- Change in water temperature
- Change in water quality
- Habitat fragmentation
- Increased turbidity
- Other biotic factors
- Parasites or pathogens
- Population genetic structure loss
- Range improvements
- Trampling, scratching
- Unknown

Panel causal mechanisms comments:

Authors

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

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