

**ARIZONA GAME AND FISH DEPARTMENT
HERITAGE DATA MANAGEMENT SYSTEM**

Animal Abstract

Element Code: AFCJB37151

Data Sensitivity: No

CLASSIFICATION, NOMENCLATURE, DESCRIPTION, RANGE

NAME: *Agosia chrysogaster chrysogaster* Girard

COMMON NAME: Gila Longfin Dace

SYNONYMS: *Rhynchithys chrysogaster* (Girard), *Agosia metallica* Girard, *Hyborhynchus siderius* Cope, *Zophendum siderium* Jordan

FAMILY: Cyprinidae

AUTHOR, PLACE OF PUBLICATION: *Agosia chrysogaster* Girard. 1856: 187 [23], Proc. Acad. Nat. Sci. Phila. V. 8; ref. 1810.

TYPE LOCALITY: North America, Mexico, state of Sonora, Río Santa Cruz.

TYPE SPECIMEN: Full species: Type - USNM-00000081. J.H. Clark (no date). Syntype MCZ 1957.

TAXONOMIC UNIQUENESS: Only *Agosia* species in Arizona. Two forms occur in Arizona, the Gila form (*A. c. chrysogaster*) and the Rio Yaqui form (*A. chrysogaster* sp. 1).

DESCRIPTION: Full species: Body is “fusiform; with small scales. Adults rarely exceed 65 mm (2.6 in.) standard length. Scales in lateral line 70-90” (Sublette et al. 1990). Head is “thick and blunt. Mouth small, subterminal, oblique; overhung by a bluntly rounded snout; mouth terminates posteriorly at a point under the nares. Back and upper sides silvery gray to olive, sides sometimes with golden flecks; lower sides and abdomen whitish; peritoneum black. Diffuse dusky lateral stripe originates at upper corner of opercle, terminating in a black spot at base of caudal fin.” (Sublette et al. 1990).

AIDS TO IDENTIFICATION: The longfin dace can be distinguished from other cyprinids by a small subterminal mouth, small barbells, and the lack of a dark spot on the anterior part of its triangular dorsal fin (Sublette et al. 1990).

ILLUSTRATIONS:

Black & White photos (Minckley 1973:126)

Color photo (Rinne and Minckley 1991:17)

Line drawing (Sublette et al. 1990:89)

Black & White photos (Sublette et al. 1990:89-90)

Color photo (USGS web site)

Color photo (John N. Rinne, *in*

<http://www.fishbase.org/Photos/PicturesSummary.cfm?ID=2742&what=species>)

Color photo, from Aravaipa Creek (John Rinne, *in*
http://www.utexas.edu/tmm/sponsored_sites/dfc//na/cyprinid/rhinicht/rchrysog/i_rchrys.shtml)

Color photos of female and male (Dean A. Hendrickson, *in*
http://www.utexas.edu/tmm/sponsored_sites/dfc//na/cyprinid/rhinicht/rchrysog/i_rchrys.shtml)

TOTAL RANGE: Native to the Gila, and Bill Williams drainages in Arizona, and the Magdalena, and Sonoyta drainages in Mexico. They were introduced into the Virgin River basin in Arizona (not established), and the Zuni (not established) and Mimbres rivers, Rio Grande basin (below Elephant Butte Reservoir) and Rio Hondo in New Mexico (considered exotic).

RANGE WITHIN ARIZONA: Primarily in the Gila and Bill Williams drainages and introduced into the Virgin River basin, Arizona. Per W.L. Minckley (AGFD Native Fish Diversity Review 1995), distribution has increased in mountainous areas, probably due to climatic trends. The Rio Yaqui form (*A. chrysogaster* sp. 1) occurs on the San Bernardino National Wildlife Refuge and the Willcox Playa and its tributaries (2005 Fish Diversity Review Team).

SPECIES BIOLOGY AND POPULATION TRENDS

BIOLOGY: In response to the onset of a flooding event, longfin dace will move directly into the margins of the current and move back into the channel as discharge declines: they are rarely caught in flood pools or backwaters (Minckley and Barber 1971; Rinne 1975). During drought, they may be found in algal mats or under logs and stones. According to Rinne and Minckley (1991), "It has a remarkable capability to disperse into new habitats, appearing a few hours or days after flow reestablishes in formerly dry stream channels. Longfin dace were once recorded to survive in tiny volumes of water beneath mats of filamentous algae, then reproduce a few days after when summer rains rejuvenated the stream." Maximum life span is three years. This species is highly susceptible to predation, thus removal of non-native species including crayfish from their habitat, is important to the long-term survival of this species in the state (2005 Fish Diversity Review Team).

REPRODUCTION: They may spawn throughout the year but primarily in spring from December to July, and perhaps to September, in low-desert habitats. Most individuals are sexually mature in their first year. The Colorado River longfin dace create saucer-shaped depressions where the eggs are deposited and newly hatched young remain for a brief time, however, these spawning behaviors have not been observed in the Rio Yaqui populations (Rinne and Minckley 1991). Nests are usually excavated in shallow water 2-4 inches (5-20 cm) deep with a slight current and over sandy bottoms; eggs are buried by the spawning act. Nests arrange from 5.9-9.8 inches (15-25cm) in diameter. Hatching occurs in within 4 days. Fry stay in nest until the yolk sac is mostly absorbed before dispersing to shorelines areas. "Fecundity is positively correlated with fish length, weight, ovary weight, and maturity index and therefore is a function of size" (Kepner 1982).

FOOD HABITS: Their diet can be highly variable among populations in different areas. They are omnivorous and opportunistic, feeding primarily on detritus (Minckley 1973, Sublette et al. 1990), but will also feed upon various aquatic invertebrates, zooplankton, and algae depending upon availability. They prefer to feed during the daylight when resources are abundant.

HABITAT: The habitat of longfin dace is wide ranging, from intermittent hot low-desert streams to clear and cool brooks at higher elevations. They tend to occupy relatively small or medium size streams, with sandy or gravelly bottoms; eddies, pools near overhanging banks or other cover. Usually in water less than 0.6 ft (0.2 m) deep with moderate velocities of around 1.1f/s (0.3m/s). They are rarely abundant in large streams or above 5,000 ft (1524 m). Generally found in water less than 75° F (24° C), but are tolerant of high temperatures and low dissolved oxygen. During low water, they may take refuge in moist detritus and algal mats (Sublette et al. 1990).

ELEVATION: Generally less than 4,900 feet (1500 meters), but have been recorded ranging to 6,700 ft (2050 m).

PLANT COMMUNITY: Varied, from desert scrub to the lower end of conifer woodlands.

POPULATION TRENDS: Declining trend. According to the 2005 Fish Diversity Review Team, the trend is declining; populations are losing connection due to the loss of the main-stem populations. They are gone from the main-stem of the upper Gila River, are hard to find in the San Pedro River, and are declining in the upper Verde River. It is felt that the Longfin Dace will probably wink out in many sites including the San Pedro River in the next ten years. The Srank has been left at S3S4, but needs to be re-evaluated in 5 years due to the downward trend. According to NatureServe (2005), population trends are unclear, apparently naturally expanding in some areas while stable or declining in other locations; threats are widespread and ongoing. Individual populations may be moved due to changes in water flow. This species can suffer massive mortalities but has the ability to recover numbers rapidly.

SPECIES PROTECTION AND CONSERVATION

ENDANGERED SPECIES ACT STATUS: Full species: None (USDI, FWS 1996)
Full species: [C2 USDI, FWS 1994]

STATE STATUS: None

OTHER STATUS: Full species: Bureau of Land Management,
Sensitive (USDI, BLM 2000, 2005, 2008,
2010)
Listed Threatened – Full species (Secretaría
de Medio Ambiente 2000)

[Listed Threatened – full species, Secretaría de Desarrollo Social 1994]

MANAGEMENT FACTORS: For the species: Threats include human activities that alter the quality or flow of water. Flood control, groundwater pumping, and irrigation practices, particularly threatens this species. Non-native species (e.g. Red Shiner, crayfish, etc.) are another major threat to Longfin Dace. Removal of non-native species including crayfish, is important to their health and long-term survival.

The upstream aquifer of Aravaipa Creek Canyon needs to be protected, to insure the existence of a healthy population of this species. Over-appropriation or use of the **headward** Sulphur Springs Valley aquifer needs to be guarded against. Maintenance of flow in this stream is highly critical because of the habitation of shallow riffle areas by 5 of the 7 remaining native Cypriniform fishes. (BISON, 2000).

According to Rinne (2004), the effects of fire need to be considered when managing for this species. Specifically, the “Study of the effects of wildfire on fishes and their habitats in the Southwest by the USDA Forest Service, Rocky Mountain Research Station escalated in 2002—one of the worst years for wildfire on record.... Because the fish fauna of this region is 1) low in diversity (Rinne and Minckley 1991), 2) dispersed in isolated reaches of streams (Rinne 1995), 3) rapidly declining due to multiple effects (Rinne 2002, 2003c), and 4) largely comprised of threatened and endangered species of fishes, (Rinne 2003b) forest managers and researchers must collaboratively study and manage this rapidly emerging forest issue.”

PROTECTIVE MEASURES TAKEN: Some protection is given to the population in Aravaipa Creek (and the Turkey Creek tributary) based on management by the Nature Conservancy. But concern exists for the potential for over-pumping of the Sulphur Springs aquifer that supplies this creek.

SUGGESTED PROJECTS: Taxonomy and basic life history studies, additional investigation of reproductive activities (especially in the Rio Yaqui basin), and work to determine the best removal methods of non-native species, are needed. In addition, need new and continuing inventory of their range to determine the status of this species, especially in smaller streams.

LAND MANAGEMENT/OWNERSHIP: BIA - Fort McDowell and San Carlos Reservations; BLM - Havasu, Kingman, Phoenix, Safford and Tucson Field Offices; NPS - Montezuma Castle National Monument; USFS - Apache-Sitgreaves, Coconino, Coronado, Prescott and Tonto National Forests; State Land Department; Sonoita Creek State Natural Area; Cienega Creek Natural Preserve; TNC - Aravaipa Canyon, Cottonwood Spring, Hassayampa River and Muleshoe Ranch Preserves, and Patagonia-Sonoita Creek and Cascabel Community Management Area; Private.

SOURCES OF FURTHER INFORMATION**REFERENCES:**

- Arizona Game and Fish Department Native Fish Diversity Review Team. 1995. Comments from Diversity Review meeting. Arizona State University, Tempe, Arizona.
- Arizona Game and Fish Department Native Fish Diversity Review Team. 2005. Comments from Diversity Review meeting. Arizona Game and Fish Department, Phoenix, Arizona.
- BISON-M, Biota Information System of New Mexico, web site.
<http://nmnhp.unm.edu/bisonm/bisonquery.php>.
- Hendrickson, D.A., W.L. Minckley, R.R. Miller, et al. 1980. Fishes of the Rio Yaqui Basin, Mexico and United States. *Journal of the Arizona-Nevada Academy of Science* 15(3): 73.
- Kepner, W.G. 1982. Reproductive biology of longfin dace (*Agosia chrysogaster*) in a Sonoran desert stream, Arizona. Arizona State University masters thesis. pp. 72.
- Minckley, W.L. 1973. Fishes of Arizona. Arizona Game and Fish Department, Phoenix. pp. 126-128.
- Minckley, W.L. and W.E. Barber. 1971. Some aspects of biology of the longfin dace, a cyprinid fish characteristic of streams in the Sonoran Desert. *Southwest Naturalist* 15(4): 459-564.
- NatureServe Explorer: An online encyclopedia of life [web application]. 2001. Version 1.6. Arlington Virginia, USA: NatureServe. Available: <http://natureserve.org/explorer>. Accessed: November 20, 2002.
- NatureServe. 2005. NatureServe Explorer: An online encyclopedia of life [web application]. Version 4.6. NatureServe, Arlington, Virginia. Available <http://www.natureserve.org/explorer>. (Accessed: December 5, 2005).
- Page, L.M. and B.M. Burr. 1991. A field guide to freshwater fishes: North America, north of Mexico. Houghton Mifflin Company. Boston, Massachusetts. p. 79.
- Pima County Arizona, Priority Vulnerable Species, web site.
<http://www.co.pima.az.us/cmo/sdep/sdep2/pvs.pdfs.s29 fld.pdf>
- Rinne, J.N. 1975. Changes in minnow populations in a small desert stream resulting from naturally and artificially induced factors. *Southwestern Naturalist* 20(2): 185-195.
- Rinne, J.L. and W.L. Minckley. 1991. Native fishes of arid lands: a dwindling resource of the desert southwest. U.S. Department of Agriculture, Forest Service, General Technical Report RM-206. Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colorado. pp. 17-18.
- Rinne, J.N. 2004. Forests, Fish and Fire: Relationships and Management Implications for Fishes in the Southwestern USA. Pages 151-156 in G.J. Scrimgeour, G. Eisler, B. McCulloch, U. Silins and M. Monita. Editors. Forest Land-Fish Conference II – Ecosystem Stewardship through Collaboration. Proc. Forest-Land-Fish Conf. II, April 26-28, 2004, Edmonton, Alberta.
- Secretaría de Desarrollo Social. 1994. Diario Oficial de la Federación. p. 50.
- Secretaría de Medio Ambiente. 2000. Diario Oficial de la Federación. p. 44.
- Sublette, J.E., M.D. Hatch, and M. Sublette. 1990. The fishes of New Mexico. University of New Mexico Press. Albuquerque, New Mexico. pp. 89-91.
- USDI, Bureau of Land Management. 2000. Arizona BLM Sensitive Species List. Instruction Memorandum No. AZ-2000-018.

- USDI, Bureau of Land Management. 2005. Arizona BLM Sensitive Species List.
 USDI, Bureau of Land Management Region 2. 2008. Arizona BLM Sensitive Species List.
 USDI, Bureau of Land Management Region 2. 2010. Arizona BLM Sensitive Species List.
 USDI, Fish and Wildlife Service. 1994. Endangered and Threatened Wildlife and Plants;
 Animal Candidate Review for Listing as Endangered or Threatened Species; Proposed
 Rule. Federal Register 59(219): 58996.
 USDI, Fish and Wildlife Service. 1996. Endangered and Threatened Wildlife and Plants:
 Review of Plant and Animal Taxa that are Candidates for Listing as Endangered or
 Threatened Species. Federal Register 61(40): 7596-7613.
 USGS, Species Fact Sheet, web site.
<http://nas.er.usgs.gov/queries/SpFactSheet.asp?speciesID=639>.

MAJOR KNOWLEDGEABLE INDIVIDUALS:

- Dr. Paul Marsh - Arizona State University, Tempe.
 John Rinne – USFS, Rocky Mountain Research Station, Flagstaff, Arizona. jrinne@fs.fed.us.
 Jeremy Voeltz – Nongame Branch, Arizona Game & Fish Dept. Phoenix.

ADDITIONAL INFORMATION:

Was placed in the genus *Rhinichthys* by Woodman (1992).

“Because the majority of southwestern native fishes are threatened, endangered, or Forest Service sensitive and state-listed species, managers must be vigilant of opportunities to remove fishes from streams whose watersheds are affected by wildfire. There are often very brief (2-3 weeks or less) windows of opportunity to salvage stocks before toxic ash or flood flows result. ... Because most populations of rare, southwestern fishes are isolated and unique genetically they are evolutionary significant units. As such, they cannot be replaced once lost.” (Rinne, 2004).

Revised: 1994-08-10 (MHH)
 1995-01-29 (KLY)
 1997-03-04 (SMS)
 2002-11-20 (RHB)
 2006-03-16 (SMS)

To the user of this abstract: you may use this entire abstract or any part of it. We do request, however, that if you make use of this abstract in plans, reports, publications, etc. that you credit the Arizona Game and Fish Department. Please use the following citation:

Arizona Game and Fish Department. 20XX (= **year of last revision as indicated at end of abstract**). X...X (= **taxon of animal or plant**). Unpublished abstract compiled and edited by the Heritage Data Management System, Arizona Game and Fish Department, Phoenix, AZ. X pp.