

TECHNICAL NOTES

U.S. DEPARTMENT OF AGRICULTURE WYOMING SOIL CONSERVATION SERVICE

Biology No. 306

January 1986

Subject: GREEN SUNFISH*

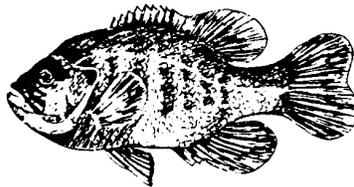
General

The green sunfish (Lepomis cyanellus) is native from the Great Lakes region south to Mexico and has been introduced both east of the Appalachian Mountains and west of the Rocky Mountains. The species is established in nearly every suitable habitat in the Western United States and is nearly ubiquitous within its native range. Green sunfish hybridize with longear (L. megalotis), orangespotted (L. humilis), and redbreast (L. auritus) sunfishes, bluegill (L. macrochirus), and pumpkinseed (L. gibbosus).

Age, Growth, and Food

The maximum age, length, and weight of green sunfish is about 10 years, 276 mm, and 408 g, respectively. Age at maturity ranges from 1 to 3 years, depending on geographic locale. Males and females mature at minimum lengths of 4.5 and 66 mm, respectively.

Adult green sunfish feed principally on insects, crayfish, and fish. Terrestrial and aquatic insects appear to be the most important food items. Fry initially eat zooplankton and subsequently eat aquatic insects, fish eggs, and entomostraca as they grow larger. The juvenile diet is similar to that of the adult. Growth is usually faster in downstream river areas, where population densities are lower, than in upstream areas.



Prepared by: Richard Rintamaki, State Biologist


State Resource Conservationist

*Information taken from Ecoregion M3113 Handbook and Habitat Suitability Index Models, Wildlife Species Narratives (literature searches), U.S. Fish and Wildlife Service, various dates between 1978-1984.

Reproduction

Spawning has been noted at temperatures between 19° and 31°C with initial spawning usually occurring at 20° to 22°C. The male clears a nest area of about 30 cm in diameter and guards the nest. Green sunfish nest at a depth of 4 to 35 cm on a firm substrate of gravel or sand near rocks, logs, and vegetation.

Specific Habitat Requirements

Green sunfish typically inhabit pool areas of streams, and optimal riverine habitat consists of at least 50 percent pool area. Species abundance is positively correlated with percent vegetative cover. Two researchers attributed reductions in game fish populations, which included green sunfish, to reductions in sheltered areas consisting of logs, brush, and gravel. More than 80 percent cover is assumed to be suboptimal because it provides too much protection for green sunfish prey. Green sunfish have been found at a wide range of gradients varying from 0.2 to 5.7 m/km; however, they are most abundant at lower (≤ 2 m/km) gradients. They prefer small- to medium-sized (<30 m width) streams.

Green sunfish also thrive in lacustrine environments. Optimal habitat consists of fertile lakes, ponds, and reservoirs with extensive (>20 percent of lacustrine surface area) littoral areas. Optimal cover within littoral areas is similar to riverine criteria. One study reported a significant positive correlation between TDS levels of 100 to 350 ppm and sportfish (which included sunfishes) standing crop.

Water quality criteria for green sunfish in both riverine lacustrine environments are outlined as follows. High species abundance is positively correlated with moderate (25-100 JTU) turbidities, although the species occurs in both clear and turbid water. Dissolved oxygen (D.O.) requirements are presumably similar to those of the bluegill sunfish. Thus, optimal D.O. levels are >5 mg/l and lethal levels are ≤ 1.5 mg/l. Using one researchers criteria for freshwater fish, optimal pH range is from 6.5 to 8.5. Assuming green sunfish exhibit similar responses to pH levels as do bluegill, mortality may occur at pH levels ≤ 4.0 or ≥ 10.35 . If green sunfish have salinity tolerances similar to those of bluegill, optimal salinities are <3.6 ppt and green sunfish will not tolerate salinities >5.6 ppt.

Adult. The temperature preference for adult green sunfish is 28.2°C and, when possible, they avoid temperatures above 31°C or below 26°C. Green sunfish have been found in the field at temperatures as high as 36°C. Growth and food conversion efficiency increased as temperature increased from 13.2° to 28°C.

Adults are found in low current velocity areas. Based on catch data, preferred current velocities are ≤ 10 cm/sec, but adults will tolerate velocities up to 25 cm/sec.

Embryo. Optimal temperature for spawning and subsequent development ranges from 20° to 27°C. Spawning will not occur below 19°C or above 31°C. Optimal spawning substrate corresponds to a predominance (≥ 50

percent) of sand and gravel. Green sunfish spawn at depths of 4 to 35 cm; consequently, reservoir drawdown should not exceed 1 m during spawning to ensure optimal embryo development and survival.

Fry. Optimal temperatures for fry range from 18° to 26°C. The range of tolerance for bluegill fry is 10° to 36°C, and it is assumed that green sunfish fry tolerances are similar. Optimal current velocities are ≤5 cm/sec, and fry avoid areas with velocities exceeding 8 cm/sec.

Juvenile. Specific requirements for juveniles are assumed to be the same as those for the adult life stage.