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FIRST NORTH AMERICAN RECORD OF
CICHLASOMA MANAGUENSE (PISCES: CICHLIDAE)

Paul C. Marsh¹, Thomas A. Burke², Bruce D. DeMarais³, and Michael E. Douglas³

ABSTRACT.—An established population of a neotropical cichlid fish, *Cichlasoma managuense*, was found in a spring pool in the Virgin River basin, Utah. Presence of this predatory species poses an additional threat to the native fish fauna of the Virgin River, which already has suffered multiple impacts of water development and introduced fishes.

Thirty-three *Cichlasoma managuense* (Günther) were seined from a thermal spring pool in the Virgin River basin of southwestern Utah on 13 September 1988. Specimens were 5.0–22.0 cm standard length (SL) and 4–278 gm (ASU 11861). The habitat, locally known as Boiler Spring, is adjacent to Interstate Highway 10 in the community of Washington (NW 1/4, S14, T42S, R15W, Washington County, Utah).

Cichlasoma managuense (guapote tigre or “jaguar guapote”) is among the giant predatory cichlids or “true guapotes” of Central America and the Caribbean (Loiselle 1980). Its historic range includes Atlantic drainages of Central America from southern Costa Rica north to Río Patuco, Honduras (Miller 1966, 1976). The species has been introduced into Lake Amatitlan, Guatemala, the Río Chameleón basin of northern Honduras, and lakes Liopango and Coatepeque, El Salvador (Bleicke 1972). Popular among aquarists, it was first imported to the United States in 1964 (Loiselle 1973, 1980). This represents the first documented feral occurrence of *C. managuense* in natural waters of North America.

The true guapotes are large, brightly colored, carnivorous cichlids ecologically equivalent to North American freshwater basses of the genus *Micropterus*. Guapotes are characterized by large, oblique, strongly protractile jaws, armed anteriorly with enlarged pseudocanine teeth. Adult *C. managuense* attain lengths of 40 (females) to 50 cm (males) SL. Natural habitat typically is turbid, slow-moving water over soft bottoms, although it is closely associated with rocky substrates in the

Great Lakes of Nicaragua (McKaye 1977). Breeding occurs in a variety of places, from small tributaries of large rivers to flooded marshes (Bleicke 1972); fecundity is 50,000–60,000 ova/kg body weight (Villa 1982).

Boiler Spring is a natural limnocrone, which discharges about 0.015 m³/sec through a modified outlet channel; mid-pool water temperature was 20 C in January. The spring pool was approximately circular (diameter ca 10 m), with sides sloping abruptly to a maximum depth of 1.5 m. Its bottom was centrally of sand and marginally of organic material. The site was shaded by nonnative salt cedar (*Tamarix* sp.) and palms (*Washingtonia filifera*), which ringed the pool. Introduced guppy (*Poecilia reticulata*, not collected) is the only other fish known from the pool (T. Hickman, personal communication). The main channel of the Virgin River is 2.75 km downflow, but it is unknown whether the two waters are confluent.

Southwestern springs have long been utilized as rearing or release sites for tropical and other nonnative fishes (Miller and Alcorn 1946, Hubbs and Deacon 1964, Courtenay and Deacon 1982, 1983, Deacon and Williams 1984, Courtenay et al. 1985). Many of these same habitats are (or were) occupied by native fishes, including isolated, endemic species or subspecies. Often, the result of nonnative fish introductions is extirpation of local populations. In some cases endemic species have been exterminated (Deacon et al. 1964, Minckley 1973, Courtenay et al. 1985), a result attributed primarily to direct predation (Meffe 1985). A similar relationship between

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native and exotic fishes has been demonstrated throughout the Southwest (Miller 1961, Minckley and Deacon 1968). It thus is alarming that highly predatory jaguar guapotes were established in a habitat within the Virgin River system, which contains an imperiled native fauna. We do not know if any native animals originally inhabited Boiler Spring.

Six native fishes occupy the Virgin River basin: speckled dace (*Rhinichthys osculus yarrowi*), woundfin (*Plagopterus argenteus*), Virgin River spinedace (*Lepidomeda m. mollispinis*), Virgin River roundtail chub (*Gila robusta seminuda*), flannelmouth sucker (*Catostomus latipinnis*), and desert sucker (*Pantosteus clarki*). The dace and two suckers are represented in main channel vs. springs and spring-fed tributaries by two or more distinct "forms" that are not yet taxonomically defined (W. L. Minckley, personal communication). Woundfin is federally listed as endangered, and the chub is a candidate for that category. Recent invasion of the Virgin River by red shiner (*Notropis lutrensis*) has resulted in dramatic declines in distribution and abundance of woundfin (Cross 1985, Deacon 1988). A suite of other nonnative fishes has been recorded from the system, representing additional threats to the native fauna.

Utah Division of Wildlife personnel attempted on 14 September 1988 to eliminate *C. managuense* from Boiler Spring (D. Knight, personal communication). Although several hundred were killed, treatment with both explosives and rotenone was unsuccessful in eradicating the animal (T. Burke, unpublished data). Moreover, local testimony indicated that *C. managuense* was present in other habitats, and at least one breeding population is established in a local private pond.

Cichlid fishes in general do not survive temperatures below about 10 C for more than a few days (Chervinski and Dor 1982). *Cichlasoma managuense* has likely been present in Boiler Spring for several years, with its overwintering enabled by warm temperatures in the pool. If access to the Virgin River were attained, the fish could spread in summer and survive cold seasons by occupying warm-water inflows that exist along the stream channel. Thermal tolerance data are wanting for *C. managuense*, but its establishment in rela-

tively cool, high-elevation Lake Amatitlan, Guatemala, suggests that the species may have a lower lethal limit than other cichlids, a characteristic that enhances mobility and probability of establishment elsewhere. Presence of this cichlid is especially worrisome because of its predatory habit and the explosive reproductive potential afforded by its advanced parental care patterns (Breder and Rosen 1966, Loiselle 1982). Although impacts have not been demonstrated, potential exists for predation and other negative interactions between *C. managuense* and the native fauna. Attempts should thus be directed toward location and complete elimination of *C. managuense* from the system.

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