

# The Changing Role of Aquarists in Aquatic Conservation

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**F**or many years aquarists have been frustrated about the loss of aquatic biodiversity. Many fishes around the world are disappearing, in part due to a lack of resources. Meanwhile, many hobbyists spend considerable amounts of time, energy and money keeping and breeding fishes both rare and common. Why not organize dedicated and skilled aquarists to help maintain endangered species and assist with reintroduction programs and species conservation? The Aquatic Conservation Network (ACN) attempted to do just that.

The ACN had its humble beginnings with the inaugural publication of its journal *Aquatic Survival* in 1992. (You can view back issues at [www.peter.unmack.net/acn/as](http://www.peter.unmack.net/acn/as)). Finally, there was an organization dedicated to the conservation of aquatic species by aquarists. For five years, ACN's Board of Directors (primarily through the efforts of Rob Huntley) kept the organization afloat by regular production of *Aquatic Survival*. However, ACN's original goals of establishing captive breeding programs were never fully met (although there was some short-term success with two Malagasy killifishes). This review seeks to examine why the ACN never lived up to its promise, and to discuss how amateur aquarists can still contribute to fish conservation.

## The Elements of a Successful Captive Breeding Program

Four elements are necessary for a breeding program to succeed. You need 1) scientific information on which to base it, 2) a priority list of species to focus on, 3) permits (where necessary) for legal captive rearing, and 4) personnel to administer the program.

Scientific information on captive breeding programs exists in the form of the 1994 publication *Captive Breeding Guidelines* by Rob Huntley and Roger Langton. According to this publication, in order to maintain a high degree of genetic diversity for 40 years or so, one would need to maintain a breeding group of 16 males and 16 females of a given species in 20 aquaria. Even if the number of aquaria or fish were scaled down to one quarter, the volume would still represent a large undertaking by most fishkeeping standards. Moreover, aquarists must worry about introducing diseases into the captive population, keeping the gene pools pure (i.e., avoiding hybridization), or failing to persist in maintaining fishes over the long haul.

Determining which species are the best candidates for captive propagation by amateur aquarists is an important step. A species' conservation priority needs must certainly be considered, but so does the species' suitability for home aquaria. It is important to keep in mind that some species may be difficult (if not impossible) for the average aquarist to breed and raise. This could be due to cold water requirements, large size, difficulties in having the appropriate triggers to induce spawning, or a host of other problematic factors. The species that are easiest to maintain come from warmer water, tend to be small bodied, and are easily spawned and raised (e.g., pupfishes, goodeids, poeciliids, some cichlids). There are also problems with obtaining suitable broodstock that have not already been genetically compromised by inbreeding.

Legal issues also exist. The U.S. Fish and Wildlife Service is generally unwilling to grant aquarists permits to keep species listed under the Endangered Species Act (nor will they work with aquarists on grandfathered species legally obtained prior to listing). Mexican permits may even be more

difficult to obtain. These legal problems effectively eliminate most North American species from consideration.

Finally, you need qualified people to administer the breeding program and help organize the efforts of contributing aquarists. All told, these issues conspire to make such programs difficult, as demonstrated by the failure of ACN to permanently establish a breeding program despite five years of concerted effort.

### A Practical Approach to a Conservation Breeding Program

Despite these obstacles, it is my opinion that a breeding program can still be developed. However, I feel the following conditions must be met for it to succeed. Ideally, the program should deal with local species on a short-term basis (a few generations at most) with specific, well-defined goals (unless the species are extinct in the wild). For example, a program could involve breeding a locally rare species to in order to establish local refuge populations. Such a program would involve aquarists within the same region with backups ready to step in should some participants drop out. Additionally, the program would involve the relevant governmental authorities.

The best example of this approach is Conservation Fisheries, Inc. (CFI) in Knoxville, TN ([www.conservationfisheries.org](http://www.conservationfisheries.org)). CFI is a non-profit organization dedicated to the preservation of aquatic biodiversity in the southeastern United States. CFI has a large facility with over 300 aquaria. They maintain over a dozen species of rare fishes, and several non-threatened species are under culture as surrogates for endangered species they anticipate working with in the future. In addition to captive breeding, CFI also undertakes population monitoring and ecological surveys for locating potential broodstock and to determine the success of reintroductions. One of CFI's best success stories is the reintroduction of duskytail darter (*Etheostoma percnurum*) into Abrams Creek (TN), where reproduction and recruitment of captive-born progeny has been documented.

While a set-up of CFI's scale is beyond any one aquarist's capabilities, it is not beyond the combined capabilities of a group of aquarists if they agree to work on a single species. A good example is the International Killifish Conservation Program (IKCP, [www.ikcp.org](http://www.ikcp.org)). IKCP is a conglomerate of several killifish clubs and independent breeders from around the world who are trying to combine their efforts towards the long-term captive maintenance of certain killifishes. However, this program is still trying to get off the ground as

this type of program requires considerable time and effort to establish. Many IKCP members are already busy trying to run these programs within their respective clubs, such as the American Killifish Association Killifish Conservation Program ([ikcp.killi.org/ikcp.pdf](http://ikcp.killi.org/ikcp.pdf)). The bottom line is, captive breeding is not a trivial undertaking for any organization to attempt.

### Additional Ways Aquarists Can Help

So far I have painted a bleak picture of aquarist involvement in conservation breeding programs (which themselves are unlikely to ever become a common thing). That is not to say aquarists cannot continue to make other contributions to aquatic conservation while still enjoying fishkeeping. In my mind, two areas stand out as having real potential.

First, aquarists can use closely related non-threatened species as surrogates to gain information about the captive husbandry of threatened species. CFI has been using warrior darter (*Etheostoma bellator*) as a surrogate for vermillion darter (*E. chermocki*), and streamline chub (*Erimystax dissimilis*) and blotched chub (*E. insignis*) as surrogates for slender chub (*E. cahni*; see *American Currents*, Fall 2001). Aquarists who breed surrogate species should document their results so other researchers can use this information as a basis for breeding imperiled species. Unfortunately, few aquarists take notes, and most are generally unwilling to write articles regarding their experiences. This is the greatest failure of fishkeepers the world over, despite an abundance of suitable outlets for publishing their observations.

Secondly, some species are already extinct in the wild. The only hope for their survival is captive breeding. Some will argue that if their native habitats are destroyed, what is the point of keeping them? My response is one cannot predict future events. Once a species is lost, it is lost forever; there are no second chances. Granted, there are still problems relating to issues regarding breeding programs (e.g., gene pool size), but any effort directed towards keeping fishes that are extinct in the wild is better than none at all. Several species of fishes now only exist as captive populations (Table 1).

### Other Ways Aquarists Can Make a Difference

Two alternative possibilities exist that might allow aquarists to become more involved in aquatic conservation. The first is *in situ* conservation projects. Fishes do not only exist behind panes of glass; they live in the waterways that surround us all. Many of these waterways have problems of one type or

**Table 1.** Fishes known or believed to be extinct in the wild that still exist as captive populations. This list is complete for North America, but documentation for many species is lacking in other regions, thus it should not be considered comprehensive. Common names are included where possible.

**Family Cyprinidae (carps and minnows)**

*Hemigrammocypripis lini*, garnet minnow (China)

*Tanichthys albonubes*, white cloud mountain minnow (China)

**Family Poeciliidae (poeciliids)**

*Xiphophorus couchianus*, Monterrey platyfish (México)

**Family Goodeidae (goodeids)**

*Empetrichthys latos latos*, Manse Spring poolfish (Nevada)

*Skiffia francesae*, golden skiffia (México)

**Family Cyprinodontidae (pupfishes)**

*Cyprinodon alvarezi*, Potosi pupfish (México)

*Cyprinodon longidorsalis*, La Palma pupfish (México)

*Cyprinodon veronicae*, Charco Palma pupfish (México)

*Megupsilon aporus*, Catarina pupfish (México)

**Family Cichlidae (cichlids)**

*Haplochromis lividus* (Lake Victoria basin)

*Haplochromis (Labrochromis) ishmaeli* (Lake Victoria basin)

*Haplochromis (Prognathochromis) perrieri* (Lake Victoria basin)

*Haplochromis (Yssichromis) "argens"* (Lake Victoria basin)

*Paretroplus menarambo*, pinstripe damba (Madagascar)

*Platytaenioidus degeni* (Lake Victoria basin)

another. Aquarists can get involved in projects to tackle some of these issues.

The Desert Springs Action Committee (DSAC, [www.pupfish.net/dsac](http://www.pupfish.net/dsac)) has taken the *in situ* approach to heart. The organization began when the Bay Area Killifish Club approached the Nevada Division of Wildlife in 1992 to assist with local killifish conservation projects. Within a few years other individuals and clubs became involved and the organization grew. DSAC now undertakes two trips a year to Nevada localities where exotic organisms are removed, vegetation is managed, and populations are counted, among other tasks. These activities provide aquarists with an opportunity to see and handle rare fishes they would otherwise be prevented from doing so due to legal issues. They also get to enjoy the outdoors and, more importantly, do something to help these fishes persist. As far as I am aware, DSAC is the only aquarist organization to undertake this type of work.

If anyone is interested in starting an organization like the DSAC, I would suggest finding a half dozen interested people, then approaching the non-game fish biologist(s) at your local Game and Fish Department. It would also be wise to try and seek out people at your local university who might be working on local fishes. Expect to get some rejections and to volunteer for lesser projects until the authorities develop a trusting relationship with your group. Gently persist and you may eventually succeed.

A second possibility is to establish conservation grants. These grants are given to people undertaking work that will

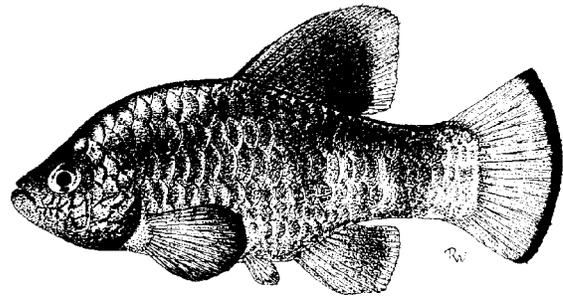


Fig. 1.

La Palma pupfish, *Cyprinodon longidorsalis*.

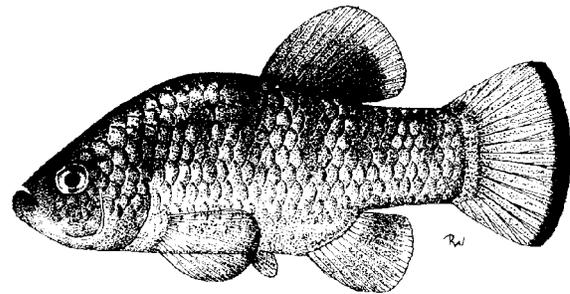


Fig. 2.

Charco Palma pupfish, *Cyprinodon veronicae*.

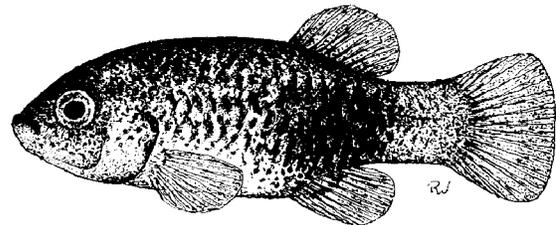


Fig. 3.

Catarina pupfish, *Megupsilon aporus*.

Illustrations by Rudolf H. Wildekamp from *A World of Killies: Atlas of the Oviparous Cyprinodontiform Fishes of the World*.

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further the conservation status of the target organism(s). The following groups have established grant programs: American Cichlid Association, American Livebearer Association, NANFA, Native Fish Conservancy, and the Pacific Coast Cichlid Association. Each organization typically funds work relating to the species that interest them. The advantages of such grants is that clubs can dictate the type of projects to support, choose from a variety of proposals submitted, and can require recipients to publish results in club journals. NANFA has also established a second grant program specifically for environmental education purposes.

The bottom line is, even just a few hundred dollars can go a long way towards getting projects off the ground. It is not going to solve the world's conservation problems, but is a small step in the right direction. Let's get started with small steps of this sort. 🐟