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Bill Stewart, Fish Biologist  
US Bureau of Reclamation  
Lower Colorado River Region, Phoenix Area Office









## Central Arizona Project Canal



- Authorized in 1968
- Constructed: 1973-1993
- 336 Miles
- 1.5 MAF













# BUREAU OF RECLAMATION

## ESA Section 7 Consultation

 United States Department of the Interior  
FISH AND WILDLIFE SERVICE  
P.O. Box 1306  
Albuquerque, New Mexico 87103

In Reply Refer To: R2/ES-SE  
2-21-90-F-119

APR 20 1994



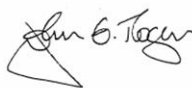
**MEMORANDUM**

To: Regional Director, Bureau of Reclamation, Boulder City, Nevada

From: Regional Director, Region 2

Subject: Final Biological Opinion on the Transportation and Delivery of Central Arizona Project Water to the Gila River Basin (Hassayampa, Agua Fria, Salt, Verde, San Pedro, middle and upper Gila Rivers, and associated tributaries) in Arizona and New Mexico

Attached is the Fish and Wildlife Service's final biological opinion on the subject formal consultation under section 7 of the Endangered Species Act of 1973, as amended. This opinion finds that the action would jeopardize the continued existence of the spiketail (*Meda fulgida*), loach minnow (*Tiaroga cobitis*), Gila topminnow (*Poeciliopsis occidentalis*), and razorback sucker (*Xyrauchen texanus*) and would adversely modify the critical habitat of the spiketail, loach minnow, and razorback sucker. The reasonable and prudent alternative given in this opinion is the product of over 3 years' of negotiation between the Fish and Wildlife Service and the Bureau of Reclamation (BR). We appreciate the efforts of BR to finding a way to conserve the listed species and look forward to working with you on implementation of this opinion. If we can be of further assistance, please contact Sally Stefferud or Tom Gatz in the Arizona Ecological Services State Office, at (602) 379-4720.



Attachment

cc:  
Project Manager, Bureau of Reclamation, Phoenix, AZ  
Director, U.S. Fish and Wildlife Service, Washington, D.C. (DES)  
State Supervisors, Ecological Services State Offices, Arizona and New Mexico  
Project Leader, U.S. Fish and Wildlife Service, Pinetop, AZ  
Assistant Regional Director - Endangered Species, Region 2

In Reply Refer To: AESO/SE  
2-21-90-F-119a

April 17, 2001

**Memorandum**

To: Area Manager, Bureau of Reclamation, Phoenix, Arizona

From: Field Supervisor


Subject: Revised Biological Opinion on Transportation and Delivery of Central Arizona Project Water to the Gila River Basin (Hassayampa, Agua Fria, Salt, Verde, San Pedro, Middle and Upper Gila Rivers and Associated Tributaries) in Arizona and New Mexico and its Potential to Introduce and Spread Nonnative Aquatic Species

This revised biological opinion is in response to a January 3, 2001 request by the Bureau of Reclamation for reinitiation of formal consultation, pursuant to section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*), on transportation and delivery of water through the Central Arizona Project (CAP) in the Gila River basin and its potential to introduce and spread nonnative aquatic species. The Santa Cruz River subbasin of the Gila basin is the subject of a separate consultation and is not addressed here. This biological opinion supercedes the April 15 (transmitted April 20), 1994 biological opinion on the same subject. Reinitiated consultation began on January 3, 2001, the date Reclamation's request was received by the Fish and Wildlife Service.

Reinitiation has been requested as a result of a court order that found the amendments to the 1994 biological opinion to be arbitrary and capricious (see consultation history section). This finding was based primarily upon the delays in implementation of the reasonable and prudent alternative, particularly barrier construction. The court concluded that take in excess of that anticipated by the 1994 opinion, had occurred to spiketail and loach minnow. This revised opinion considers the effects of all implementation delays and of such take, along with all relevant new or additional information that has become available since 1994.


This opinion addresses the possible effects of the action on the endangered Gila topminnow, razorback sucker, desert pupfish, and Colorado squawfish, and the threatened spiketail, loach minnow, and bald eagle. These species were all addressed in the 1994 opinion. In addition, due to new information, the endangered Gila trout, and threatened Apache trout are also species of concern in this opinion. The Chiricahua leopard frog, a proposed threatened species, was considered in your biological assessment, but will not be addressed in this biological opinion.

▲CAP - Gila Basin Nonnatives Issues - Biological Opinion - Reinitiation - April 17, 2001▼

 United States Department of the Interior  
U.S. Fish and Wildlife Service  
Arizona Ecological Services Field Office  
2321 West Royal Palm Road, Suite 103  
Phoenix, Arizona 85021-4951  
Telephone: (602) 242-0210 Fax: (602) 242-2513

In Reply Refer to: AESO/SE  
02-21-90-F-119  
02-21-91-F-406  
22410-2007-F-0081

May 15, 2008



**Memorandum**

To: Area Manager, Bureau of Reclamation, Phoenix, Arizona

From: Field Supervisor

Subject: Reinitiated Biological Opinion on Transportation and Delivery of Central Arizona Project Water to the Gila River Basin in Arizona and New Mexico and its Potential to Introduce and Spread Nonindigenous Aquatic Species

Thank you for your request to reinitiate formal consultation with the U.S. Fish and Wildlife Service (Service) under section 7 of the Endangered Species Act of 1973, as amended (16 U.S.C. 1531 *et seq.*), on transportation and delivery of water through the Central Arizona Project (CAP) in the Gila River basin and its potential to introduce and spread nonindigenous aquatic species. This biological opinion (BO) is a reinitiation of the April 17, 2001, biological opinion for the Gila River basin (Gila BO, 2-21-90-F-119) and replaces the draft Biological Opinion of June 11, 1999, on the same subject for the Santa Cruz River (SCR) subbasin (Santa Cruz BO, 2-21-91-F-406). Your request was dated December 22, 2006, and received by us on December 28, 2006. The consultation request for the Santa Cruz has been withdrawn.

You requested reinitiation of consultation to include the SCR subbasin and to consider impacts to the endangered Gila chub (*Gila intermedia*) with designated critical habitat and threatened Chiricahua leopard frog (*Rana chiricahuensis*). Thus, this BO covers changes to the Gila BO, effects to the Gila chub and Chiricahua leopard frog in the entire Gila River basin, and includes the SCR subbasin.

You requested formal consultation on threatened loach minnow (*Tiaroga cobitis*) with designated critical habitat, threatened spiketail (*Meda fulgida*) with designated critical habitat, endangered Gila topminnow (*Poeciliopsis o. occidentalis*), endangered razorback sucker (*Xyrauchen texanus*) with designated critical habitat, Gila chub with designated critical habitat, and Chiricahua leopard frog. You also requested concurrence with your determination that the proposed action may affect, but is not likely to adversely affect, the threatened Apache trout (*Onchoryhynchus apache*), endangered desert pupfish (*Cyprinodon macularius*), threatened Gila trout (*Onchoryhynchus gilae*), and endangered Sonora tiger salamander (*Ambystoma tigrinum stebbinsi*). We concur with your determinations. The rationale for our concurrences is in Appendix 1.



## Import of Nonnative Fish





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# Mitigation Measures

1. Barriers to Protect Native Fish (12)
2. Native and Nonnative Fish Monitoring
3. Native Fish Restoration (\$275k/yr)
4. Nonnative Fish Control (\$275k/yr)
5. Information and Education



Gila Topminnow  
*Poeciliopsis occidentalis*



Spikedace  
*Mefu fulgida*



Loach Minnow  
*Tiaroga cobitis*



Razorback Sucker  
*Xyrauchen texanus*



Gila Chub  
*Gila intermedia*

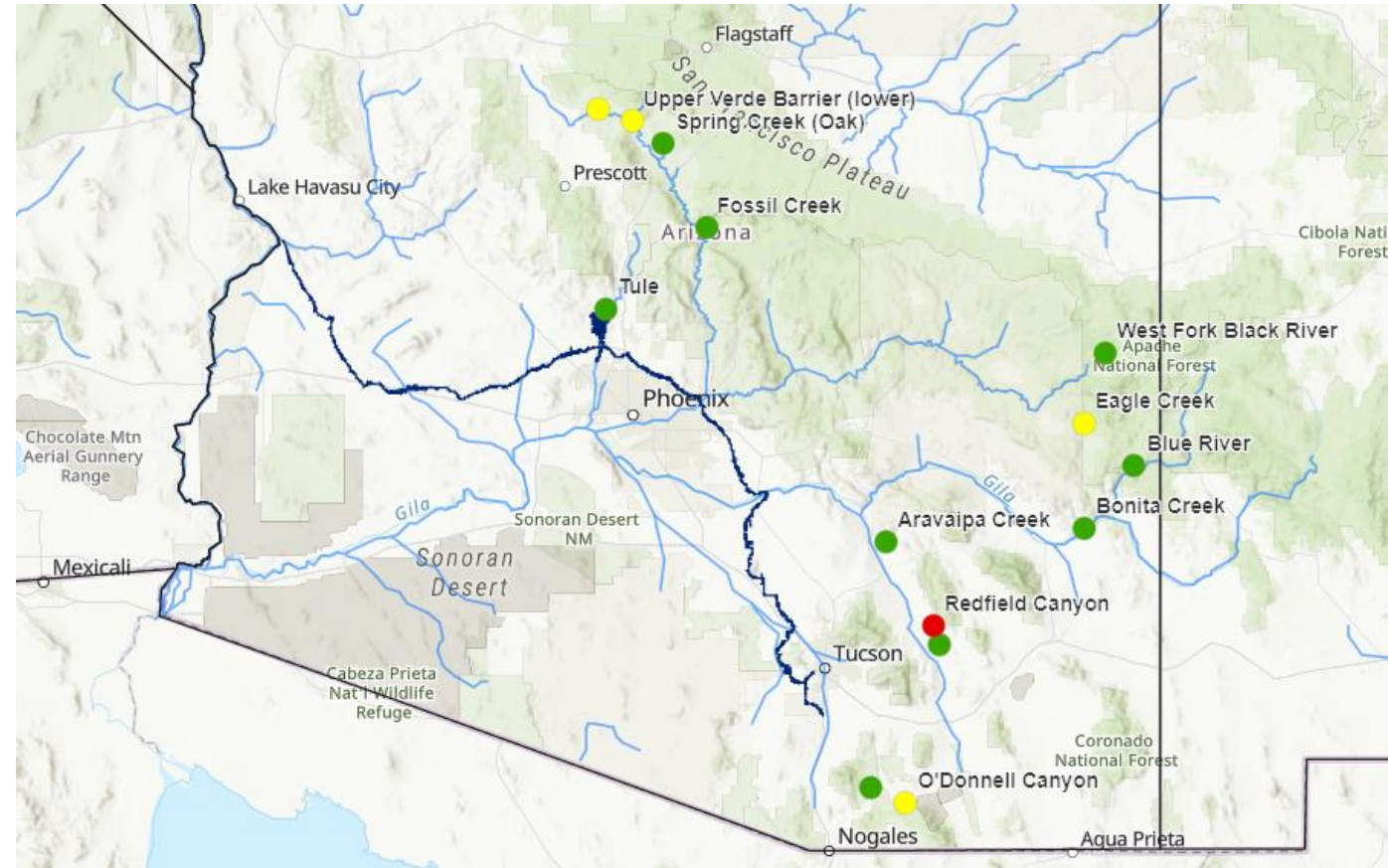




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# Fish Barriers











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# Fish Barriers

(electric barriers)







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# Fish Monitoring



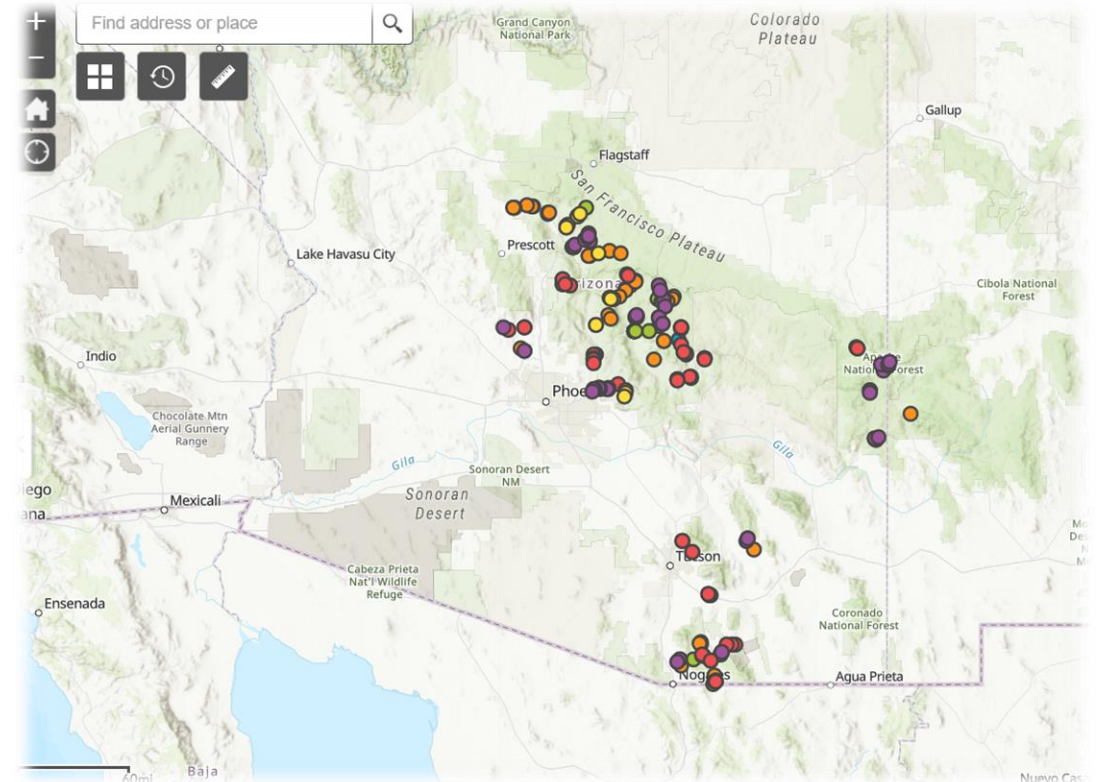




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# Fish Monitoring



<https://usbr.maps.arcgis.com/apps/webappviewer/index.html?id=37b0d0998c0944c5b481bbc14437504a>





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# Native Fish Conservation



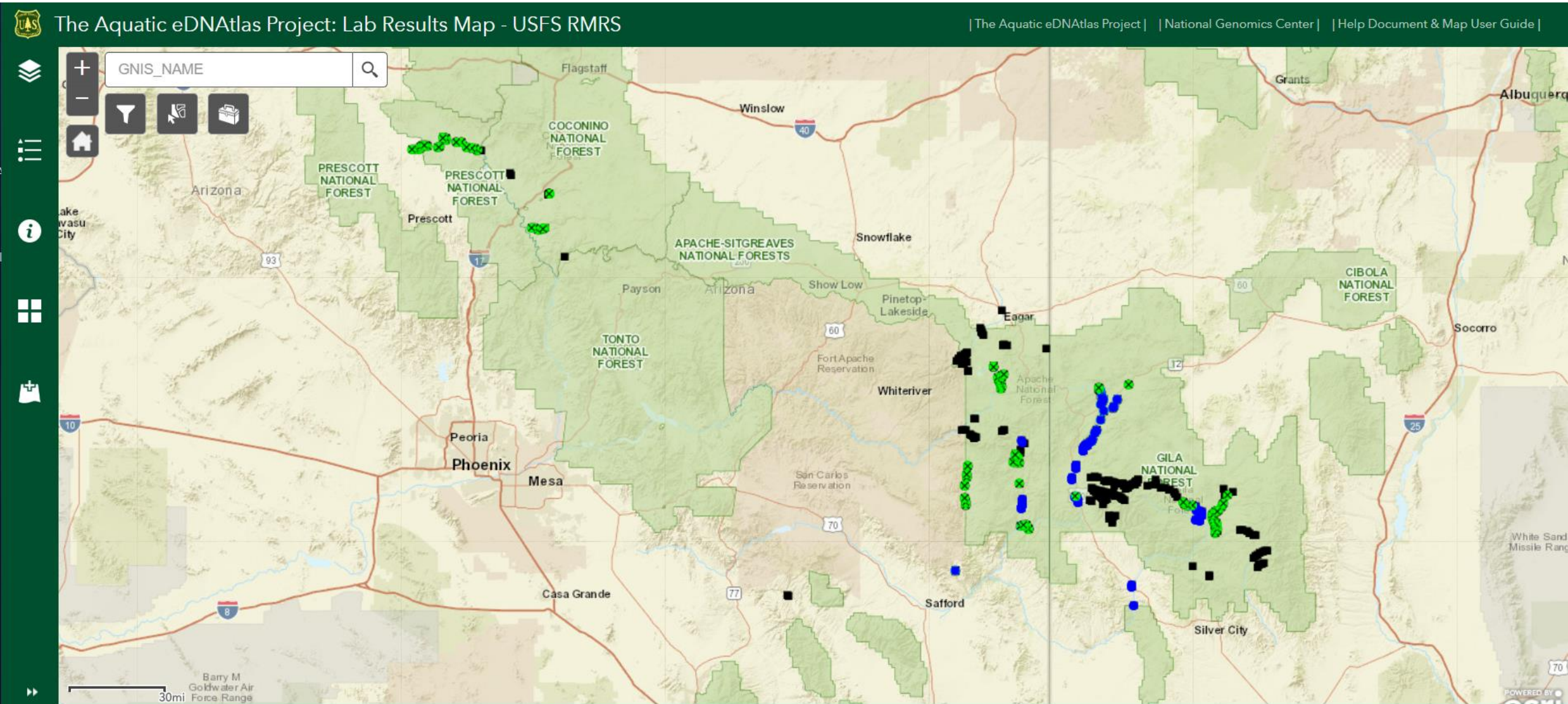


# Native Fish Conservation





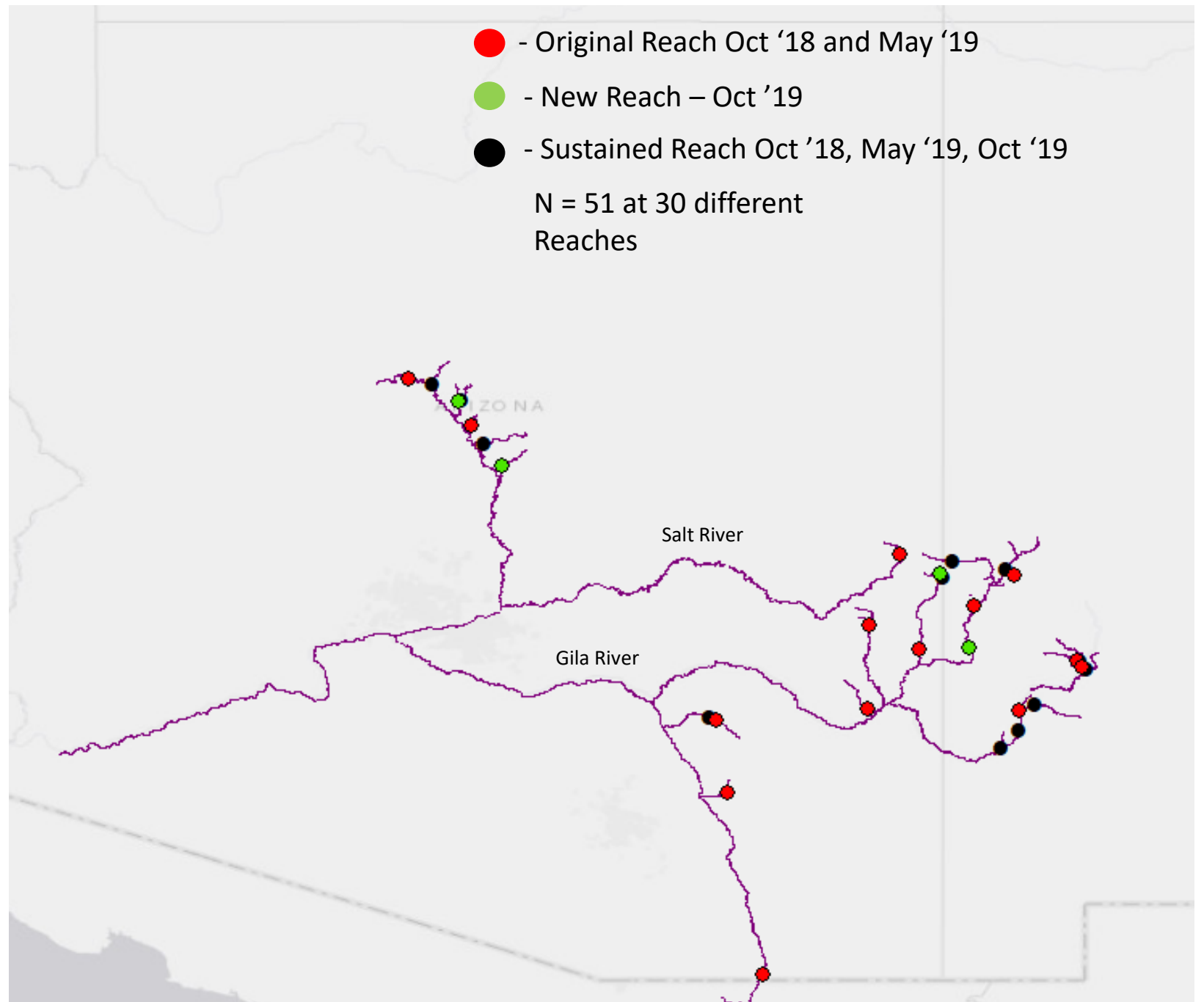
# eDNA project – USFS Rocky Mountain Research Station







Range wide spikedace and loach  
minnow habitat assessment  
project.

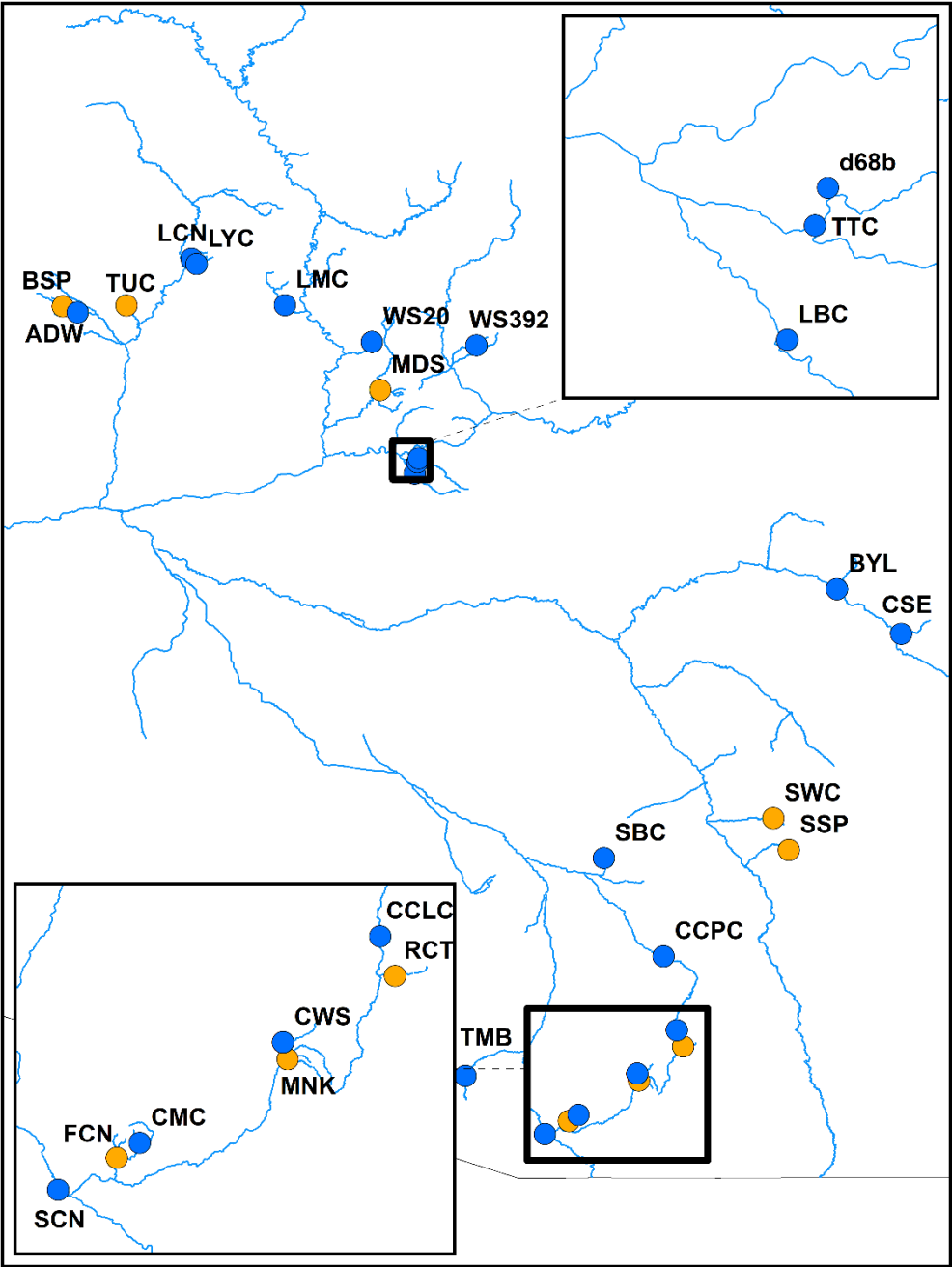
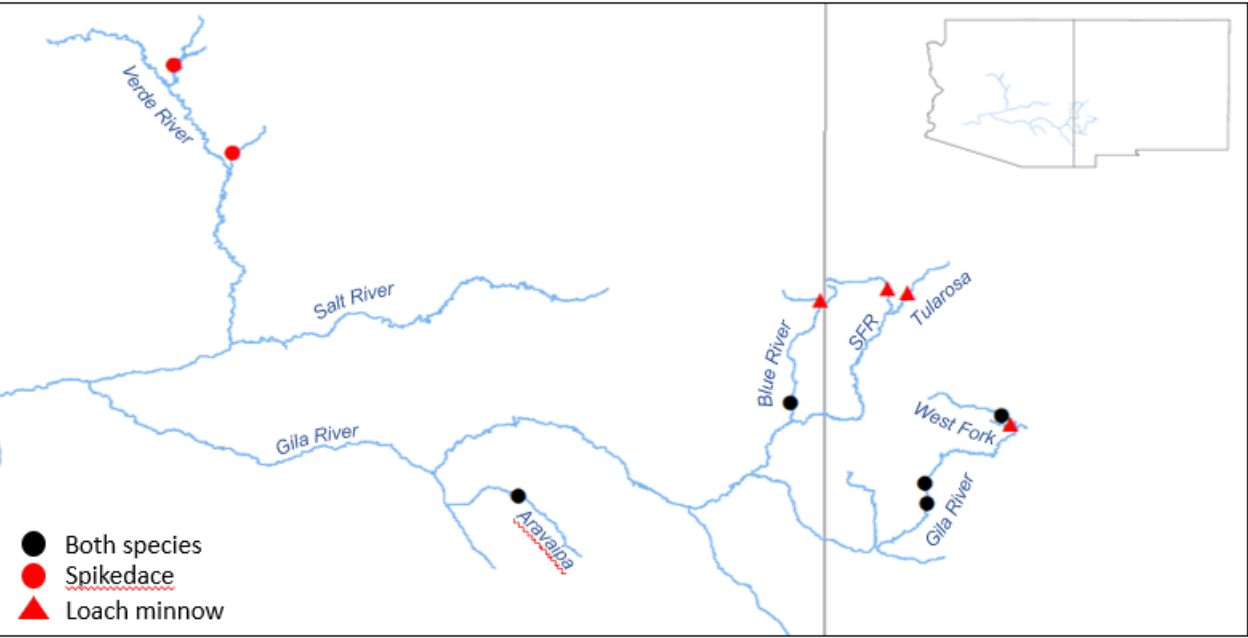




**USFWS-SNARRC (Wade Wilson)** – range wide gila topminnow genetics assessment



**University of New Mexico (Tom Turner)** – rangewide spikedace and loach minnow







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# Nonnative Control

- Arizona
  - Red Tank Draw
  - Blue River\*
  - Redfield Canyon
  - Spring Creek\*
  - Aravaipa Creek
  - Bonita Creek\*
- New Mexico
  - West Fork Gila River





# Developing Trojan Sex Chromosome Carriers (YY males or ZZ females) to Control Nuisance Fish Populations in the Southwest

Chad Teal

USGS AZ Cooperative Fish and Wildlife Research Unit  
chadteal@email.Arizona.edu

Dr. Scott Bonar- USGS AZ Cooperative Fish and Wildlife Research Unit  
Dr. Dan Schill- Fisheries Management Solutions, Inc.  
Dr. Melanie Culver- USGS AZ Cooperative Fish and Wildlife Research Unit  
Dr. Kevin Fitzsimmons- UA Research Professor, Dept of Environmental Science



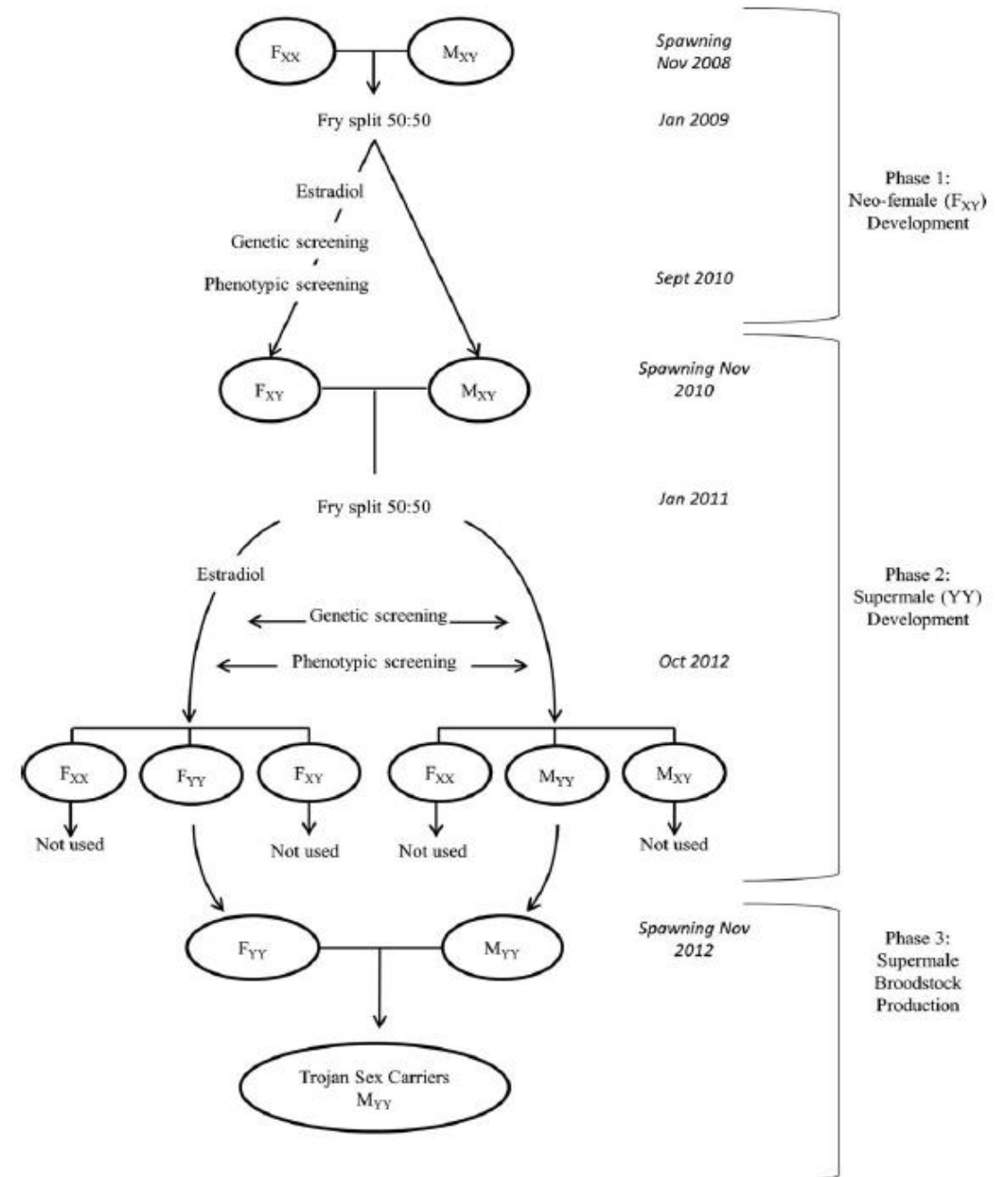




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Schill, D. J., J. A. Heindel, M. R. Campbell, K. A. Meyer and E. R. J. M. Mamer.  
2016. Production of a YY male brook trout broodstock for potential  
eradication of undesired Brook Trout populations. North American Journal  
of Aquaculture 78:72-83.





# AMMONIA: ROAD TO REGISTRATION





# Crayfish Control



## ***Top Candidate***

- Pyblast
  - Most data to support registration
  - Selectivity to early life stages

## ***Needs some data***

- Cypermethrin
- Fipronil

## ***Needs more data***

- Diflubenzuron
- Ivermectin

## ***Non-selective***

- Antimycin-A
- Rotenone

## ***Banned for use***

- Mirex



# Information and Education

## Native Fish in the Classroom

- Development of GRB based Curriculum
- Classroom Tank Supplies
- Classroom Visits
  - Salary/travel for tank set-up, presentations, and activities
- Fish Collection/Release
  - Salary/travel
  - School Bus Rental



Photo Credit: USFWS



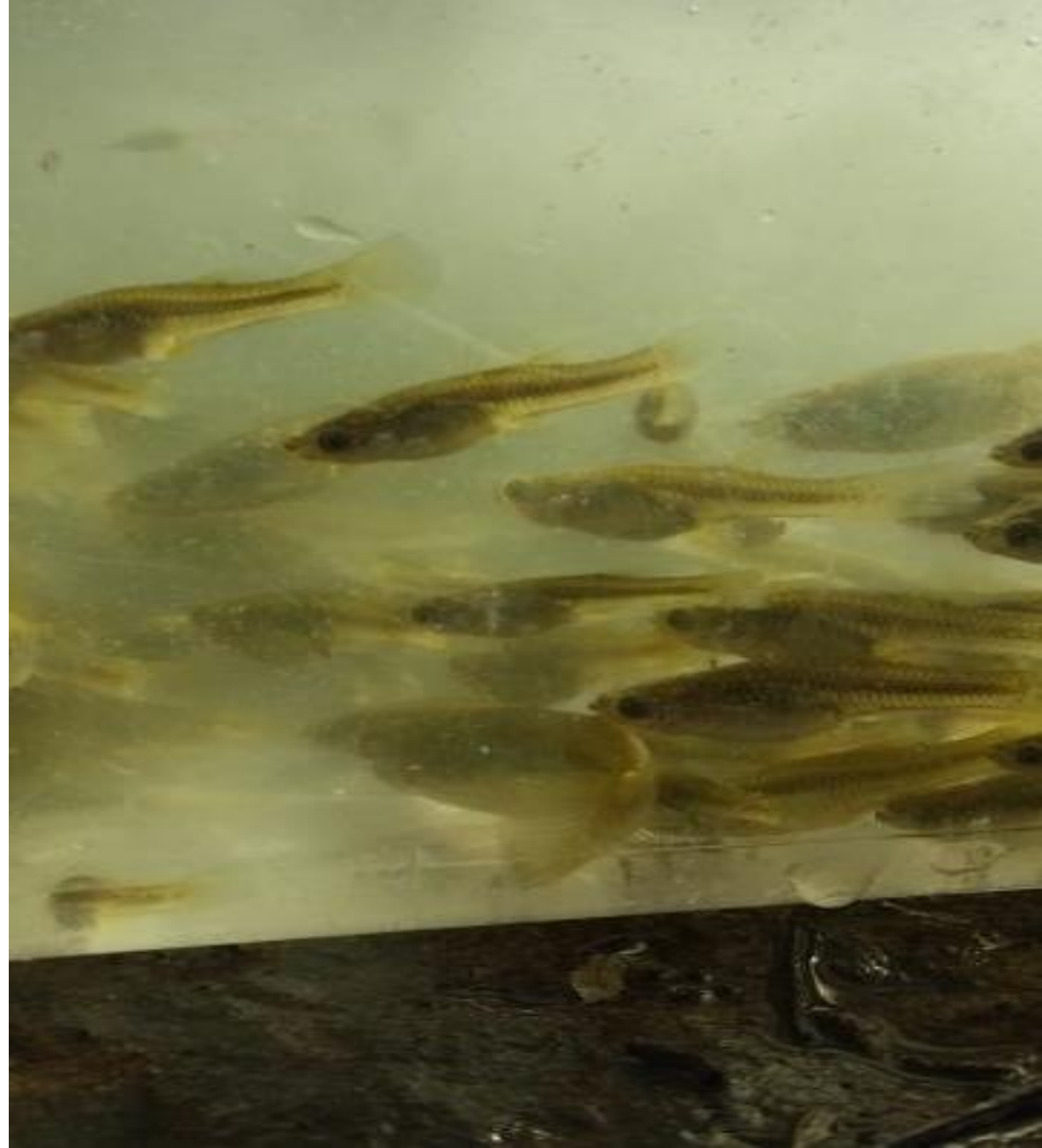
# **Gila Topminnow & Desert Pupfish Citizen Science**

## **AZ Game and Fish:**

- **Host workshops to train individuals in identifying and monitoring Gila Topminnow and Desert Pupfish.**

## **Reclamation:**

- **Purchase monitoring kits that individuals can check out from regional offices to monitor populations.**







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<https://www.usbr.gov/lc/phoenix/biology/azfish/>



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## Lower Colorado Region

Gila River Basin Native Fishes Conservation Program

Reclamation / Lower Colorado Region / Phoenix Area Office / Gila River Basin Native Fishes Conservation Program

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## Gila River Basin Native Fishes Conservation Program



The Gila River Basin Native Fishes Conservation Program (Program) was established to partially mitigate impacts of the Central Arizona Project (CAP) canal on threatened and endangered fishes in the Gila River basin. The primary goals of the Program are to achieve enhanced conservation status of federally protected species and alleviate threats from non-native aquatic species. It is hoped that this website will broaden your understanding of native fish in the Gila River basin and explain in detail the conservation measures that are being implemented through this Program. On this website, you will find information regarding the Program's background, recovery activities, educational opportunities, and administrative processes.

- Background and Guidance
- Projects and Reports
- Information and Education
- Administrative



Map of Gila River Basin Native Fishes Conservation Program project area.



# Questions

A close-up photograph of a small, dark-colored fish, possibly a darter, being held gently in a person's hand. The fish has a white patch on its head and red markings on its fins. The background is blurred, showing what appears to be a natural outdoor setting.

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**Lower Colorado River Region, Phoenix Area Office**  
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**Phone: 623-773-6252**