

Lower Colorado River Multi-Species Conservation Program



Balancing Resource Use and Conservation

Establishing a Refuge Population of
Endangered Humpback Chub
(*Gila cypha*) at the Dexter National Fish
Hatchery and Technology Center

2010 Progress Report



March 2011

Lower Colorado River Multi-Species Conservation Program Steering Committee Members

Federal Participant Group

Bureau of Reclamation
U.S. Fish and Wildlife Service
National Park Service
Bureau of Land Management
Bureau of Indian Affairs
Western Area Power Administration

Arizona Participant Group

Arizona Department of Water Resources
Arizona Electric Power Cooperative, Inc.
Arizona Game and Fish Department
Arizona Power Authority
Central Arizona Water Conservation District
Cibola Valley Irrigation and Drainage District
City of Bullhead City
City of Lake Havasu City
City of Mesa
City of Somerton
City of Yuma
Electrical District No. 3, Pinal County, Arizona
Golden Shores Water Conservation District
Mohave County Water Authority
Mohave Valley Irrigation and Drainage District
Mohave Water Conservation District
North Gila Valley Irrigation and Drainage District
Town of Fredonia
Town of Thatcher
Town of Wickenburg
Salt River Project Agricultural Improvement and Power District
Unit "B" Irrigation and Drainage District
Wellton-Mohawk Irrigation and Drainage District
Yuma County Water Users' Association
Yuma Irrigation District
Yuma Mesa Irrigation and Drainage District

Other Interested Parties Participant Group

QuadState County Government Coalition
Desert Wildlife Unlimited

California Participant Group

California Department of Fish and Game
City of Needles
Coachella Valley Water District
Colorado River Board of California
Bard Water District
Imperial Irrigation District
Los Angeles Department of Water and Power
Palo Verde Irrigation District
San Diego County Water Authority
Southern California Edison Company
Southern California Public Power Authority
The Metropolitan Water District of Southern California

Nevada Participant Group

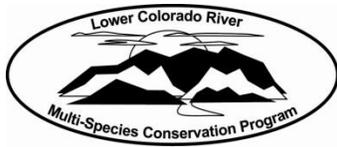
Colorado River Commission of Nevada
Nevada Department of Wildlife
Southern Nevada Water Authority
Colorado River Commission Power Users
Basic Water Company

Native American Participant Group

Hualapai Tribe
Colorado River Indian Tribes
Chemehuevi Indian Tribe

Conservation Participant Group

Ducks Unlimited
Lower Colorado River RC&D Area, Inc.
The Nature Conservancy



Lower Colorado River Multi-Species Conservation Program

Establishing a Refuge Population of Endangered Humpback Chub (*Gila cypha*) at the Dexter National Fish Hatchery and Technology Center

2010 Progress Report

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Multi-Species Conservation Program
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INTRODUCTION

The purpose of this project is to develop a captive population (refugia) for protecting and/or enhancing the wild population of humpback chub in the Grand Canyon as outlined in the Humpback Chub Recovery Plan (U.S. Fish and Wildlife Service.1990). This project employs a conservation and management action to protect the species against potential future catastrophic loss in its primary habitat in the Little Colorado River (LCR). A refuge population of humpback chub is essential to help meet future species needs due to the recent decline of the Grand Canyon population to its lowest level in over a decade. In the fall/winter of 2008, the U.S. Fish and Wildlife Service (USFWS) began establishing a refuge population of Grand Canyon humpback chub at the Dexter National Fish Hatchery and Technology Center (Dexter NFH& TC), Dexter, New Mexico in collaboration with the Bureau of Reclamation, USFWS Arizona Fish and Wildlife Conservation Office, and the National Park Service in fulfillment of Work Task C14, Humpback Chub Program Support, under the Fish Augmentation portion of the Lower Colorado River Multi-Species Conservation Program.

Dexter NFH&TC contains the expertise, infrastructure, security and biohazard backup systems to provide appropriate care for the fish and reduce risk of loss. The genetic refuge and captive propagation program being developed and implemented at the facility, follows guidelines outlined in the September 5, 2008 USFWS “Genetic Management Plan for Captive and Translocated Endangered Humpback Chub in the Lower Colorado River Basin”. The plan includes a broodstock management strategy for the Grand Canyon population.

This project is conducted under the authority of the Endangered Species Act. The US Fish & Wildlife Service’s “Policy Regarding Controlled Propagation of Species Listed under the Endangered Species Act” (65 FR 56916) addresses the housing of refuge populations, as well as captive propagation activities. All of the safeguards recommended in said policy are followed, with the ultimate goal being to protect the genetic integrity of wild humpback chub.

PROJECT GOAL

Establish and maintain a humpback chub refuge stock from fish collected from the LCR. Maintain the stock in a secure environment and protect against catastrophic loss in the wild or captivity and ensure the stock is available for propagation to augment the wild population if the need arises.

OBJECTIVES

- (1) Develop, maintain and staff facilities at Dexter NFH&TC necessary to implement refuge stock requirements identified in the “Genetic Management Plan for Captive and Translocated Endangered Humpback Chub in the Lower Colorado River Basin” (USFWS September 5, 2008).
- (2) Establish a 500 to 1000 adult fish refuge stock from fish collected from the LCR (2008-2012).
- (3) Transfer (38-99Year Class (YC)) adult humpback chub from Willow Beach NFH to Dexter NFH&TC.
- (4) Evaluate and refine fish culture, marking and transport methodologies for wild caught humpback chub.
- (5) Complete acute toxicity tests on humpback chub larvae and juveniles (90-160 mm) to determine median lethal concentration (LC50) of potassium chloride.

STUDY AREA

All fish culture and maintenance activities were completed at the USFWS, Dexter NFH & TC located in the Pecos River Valley of southeastern New Mexico which is approximately 322 km southeast of Albuquerque, 32km south of Roswell, and 1.6 km east of Dexter on State Road 190. This project utilizes as many as eleven 568 L fiberglass tanks and associated systems in the newly built Isolation/Quarantine building and two 2,273 L fiberglass tanks in the Fish Culture building. Once the fish reach the target PIT tagging size they will be reared and maintained in one 19,408 L outdoor raceway and two .041-.101 ha outdoor lined ponds.

METHODS

Project partners collect 300+ (50 – 120 mm total length (TL)) humpback chub from the LCR, Grand Canyon in late-July/August or October. The age-0 fish are collected in the lower 3 km of the river, upstream from the confluence with the mainstem Colorado River on Navajo Nation lands. Following collection, the fish are transported to the Dexter NFH&TC by truck for quarantine and eventual incorporation into the refuge stock. All fish are handled with the best animal husbandry practices available. Transport follows guidelines described in the USFWS Protocols for Biological Investigations developed by Dr. Gary Carmichael, retired U.S. Fish & Wildlife Service employee. Upon arrival Dexter staff provides on-site monitoring for the species. The fish are counted and placed in 3’ diameter fiberglass tanks for disease treatment and

quarantine for 6 months. Nylon tank covers are placed on all tanks to stop fish from jumping out. Aeration and oxygen are supplied to the tank to ensure that oxygen levels are maintained at ≥ 6 ppm. The fish are treated twice with Praziquantel at 2 ppm for 24 hours static bath to control and remove cestodes. Dexter staff also administered 1 hour salt baths (uniodized), followed by static bath treatments of formalin at 125-150 ppm to control external bacteria, parasites and aquatic invasive species. These procedures continue for several weeks depending on the life cycle of the parasite being treated. A daily log recording water quality, temperature, treatments and comments on fish health is maintained.

Following completion of the quarantine period and two weeks prior to being moved to outdoor raceways, each fish is marked with a passive integrated transponder (PIT) tag and a tissue sample collected for future genetic identification and differentiation from natural recruitment that may occur in the rearing units. Staff monitor water quality (DO, pH, conductivity, and temperature) daily using a Yellow Springs Instruments (YSI) meter and record all water quality parameters, observations and mortalities daily. Fish are fed a combination of live, frozen and formulated feeds.

PROJECT RESULTS

On October 12-13, 2008 Dexter NFH&TC began the development of a humpback chub refuge population in collaboration with Bureau of Reclamation, National Park Service, and U.S. Fish and Wildlife Service partners. In 2009 Dexter staff developed PIT tagging protocols for the species and completed the draft USFWS “Genetic Management Plan for Captive and Translocated Endangered Humpback Chub in the Lower Colorado River Basin”. In 2010, year 3 of a 5 year captive propagation program to develop a refuge population of humpback chub at Dexter was successfully completed. The Dexter refuge stock currently contains 657 fish, (Table 1). In addition to the refuge population the facility is maintaining 38 humpback chub broodfish and 37 F1’s received from Willow Beach NFH, Willow Beach, AZ on January 15, 2009. These fish were part of a collection of wild age-0 humpback chub taken from the LCR in July 1999 to conduct temperature /growth studies. They were captured near Salt Camp which is approximately 10 km upstream of the confluence with the Colorado River and transported to the Willow Beach NFH. This group of fish are being held separate from the refuge stock until genetic screening and genotyping of all individuals is conducted in 2012 and Dexter staff determine if they can be added to the refuge stock.

Table 1. Composition of humpback chub refuge stock at Dexter NFH&TC, Dexter, NM.

Collection Date	Number	Age class
July- October 2008	277	2
July- October 2009	205	1
July 2010	175	<1
Total	657	

2010 ACCOMPLISHMENTS

In July and October of 2009 Dexter received a total of 513 young of year, wild caught humpback chub. The fish were collected in the LCR Boulders Reach from river km 3.0 (Powell Camp) to river km 1.17 (Queens Throne) above the gage pool using baited mini hoopnets and seines. In May of 2010, 505 fish were PIT tagged with 134Khz tags and 6 non- humpback chub individuals removed from the group. Following tagging 300 fish were sorted for the Shinumo Creek translocation effort and 205 fish added to the refuge stock. At the time of tagging the fish averaged 121mm in total length and 15.3 grams each.

Ninety days prior to stocking, the fish destined for Shinumo Creek were conditioned to .30 ft per/second water velocity in the fish culture tanks. On June 23, 2010 Dexter staff successfully hauled the 300 PIT tagged humpback chub to the South Rim of the Grand Canyon. Upon arrival the fish were transferred to ice chests and helicoptered into Shinumo Creek by National Park Service personnel. Delivery of these fish completed the second stocking of fish for the Shinumo Creek translocation project. This multi-agency translocation project will enable biologists to assess the feasibility of using translocation to establish offsite refuge populations and additional aggregations of humpback chub in the Grand Canyon.

On July 15, 2010 Dexter received an additional 178 young of year humpback chub collected from the LCR, Grand Canyon. Upon arrival the fish were placed in quarantine following a slow water exchange to acclimate them to Dexter's water quality and water temperature. The fish averaged 1.02 grams each and 49.2mm in length. The fish were counted into two, 3' circular round tanks containing a 0.5% salt and 10ppm oxytetracycline solution. No immediate mortalities were observed during or after transport. The fish were quarantined for 4 weeks and received scheduled treatments for internal and external parasites and bacteria. Following the quarantine period, 175 fish were added to the captive broodstock. Three mortalities were collected during this period. No additional fish were brought on station in 2010 due to the detection of largemouth bass virus (LMBV) at Dexter during the station's annual fish health inspection.

DISCUSSION

Year 2010 marks the second year of a three year agreement and 5 year program to develop and establish a humpback chub refuge population at Dexter NFH &TC. The refuge stock was inventoried in October, 2010 and is comprised of 657 individuals from three year classes. Dexter staff achieved 98.5% survival for all groups (combined) of fish that were brought on station and reared for a minimum of 8 months. Annual survival rates for each year class were calculated and ranged from 97.7% to 99.6% (Table 2). Indoor and outdoor facilities are used to maintain and culture the fish. When held indoor the fish are cultured in 18.0° to 22.5°C water and grow an average of .21mm in length per day. The minimum PIT tagging target size of 100mm in total length is achieved in six months. At the time of tagging the fish have averaged 125-128mm in total length and 15.3-18.61 grams. PIT tags are injected intraperitoneal and tag retention has ranged from 98-100% with 100% survival.

Table 2. Inventory and survival rates of humpback chub cultured at Dexter NFH&TC.

Collection Year	# Received at Dexter	# Provided for Shinumo Creek Translocation	# Added to Dexter Refuge	Non-target species	Mortality	% Survival
2008	597	300	277	6	14	97.7
2009	513	300	205	6	2	99.6
2010	178	0	175	0	3	98.3
Totals	1,288	600	657	12	19	98.5

No additional fish were brought on station in 2010 following the detection of LMBV in one lot of bonytail, the 2008 year class, and in the refuge population of Gila topminnow during the station's annual fish health inspection, conducted in September. All other species and lots of fish on the station tested negative for any pathogens based on U.S. Fish and Wildlife Service protocols, and those of the American Fisheries Society – Fish Health Section Blue Book standards. The identification of this reportable fish pathogen changed Dexter's fish health classification from (Class A) pathogen free to LMBV positive and restricted the movement of fish in and out of the facility until a determination can be made on how to proceed with receiving and stocking fish.

Immediately following the diagnosis of the pathogen, action was taken by isolating the infected fish in the quarantine facilities at Dexter NFH&TC. Dexter staff worked with several agencies to determine the fate of the infected fish which were consequently euthanized, taken off station and buried at a local landfill. In addition, staff began disinfecting all fish culture facilities and equipment as per the Office International des Epizooties (OIE) disinfection protocols. All indoor fish culture tanks and associated fish culture and transport equipment were chlorinated at 200mg/l for one hour and floors and walls treated with potassium peroxymonosulphate (Virkon). The two affected ponds were dried out, allowed to sun bake and treated with lime & chlorine during the week of September 20, 2010. Several conference calls were arranged to facilitate notification to all partners.

PROPOSED SCHEDULE

In 2011, Dexter will continue developing and maintaining the humpback chub refuge population. The goal is to reach 1,000 unique wild caught individuals by 2012. To-date the refuge stock consists of 657 fish from the 2008, 2009 and 2010 year classes. The program is well on track to building the 1,000 fish refuge stock by 2012. Dexter is tentatively scheduled to receive the next shipment of LCR wild caught young of year humpback chub in July, 2011. Acute toxicity tests on humpback chub larvae and juveniles (90-160 mm) to determine median lethal concentration (LC50) of potassium chloride were not conducted in 2010 and are scheduled to begin in May, 2011.

**DEXTER NATIONAL FISH HATCHERY & TECHNOLOGY CENTER
BUDGET:**

Project Charges

17% Admin Overhead	\$11,324.72
O&M Labor Costs	\$12,030.70
Materials and Supplies	\$ 3,645.61
Fish Health	\$ 4,300.00
Feed	\$ 5,697.71
Utilities & Equipment Maintenance	\$ 2,170.42
Travel	\$ 386.00
Total Expended as of 3-2011	\$39,555.16

Projected Charges

O&M Labor Costs	\$18,060.84
Materials and Supplies	\$ 2,000.00
Fish Health	\$ 1,500.00
Utilities & Equipment Maintenance	\$ 4,500.00
Travel	\$ 1,000.00
Total Projected Costs	\$27,060.84
Total Project Funds for 2010	\$66,616.00

LITERATURE CITED

U.S. Fish and Wildlife Service. 1990. Humpback chub (*Gila cypha*) Recovery Plan:
U.S. Fish and Wildlife Service, Mountain-Prairie Region (6), Denver, Colorado.