

Humpback Chub, *Gila cypha*
Captive Breeding/Refugia
Feasibility Report

Submitted to GCMRC by USFWS



A PROPOSAL TO INVESTIGATE THE FEASIBILITY OF DEVELOPING A PROGRAM TO AUGMENT THE POPULATION OF HUMPBACK CHUB (*Gila cypha*) IN GRAND CANYON

- **FEASIBILITY OF ESTABLISHING A SUPPLEMENTAL STOCKING PROGRAM USING WILD CAUGHT YOUNG OF YEAR FISH**
- **FEASIBILITY OF ESTABLISHING A SUPPLEMENTAL STOCKING PROGRAM USING HATCHERY PRODUCED FISH FROM A CAPTIVE BROODSTOCK**
- **FEASIBILITY OF ESTABLISHING A SECOND POPULATION IN TRIBUTARIES OF GRAND CANYON OR EXPANDING THE LITTLE COLORADO RIVER POPULATION**



FEASIBILITY OF DEVELOPING A PROGRAM TO AUGMENT THE POPULATION OF HUMPBACK CHUB continued.....

- **FEASIBILITY OF ESTABLISHING A SUPPLEMENTAL STOCKING PROGRAM USING WILD CAUGHT YOUNG OF YEAR FISH**
 - **1) translocation of fish above Chute Falls (14.2 km) in the Little Colorado River (LCR), and**
 - **2) translocation of fish into Bright Angel, Shinumo, and Havasu creeks in Grand Canyon.**

FEASIBILITY OF DEVELOPING A PROGRAM TO AUGMENT THE POPULATION OF HUMPBAC CHUB continued.....

Translocation of fish above Chute Falls appears to offer potential for a minor gain in the wild census population, but may involve potential genetic risks to the main population of humpback chub in LCR and Grand Canyon. Translocation of fish to other tributaries in Grand Canyon may offer potential for augmenting the mainstem aggregations of humpback chub, and genetic risks appear to be minor.

FEASIBILITY OF DEVELOPING A PROGRAM TO AUGMENT THE POPULATION OF HUMPBACK CHUB continued.....

- **FEASIBILITY OF ESTABLISHING A SUPPLEMENTAL STOCKING PROGRAM USING HATCHERY PRODUCED FISH FROM A CAPTIVE BROODSTOCK**
 - Biological risks involved with broodstock development include (but are not limited to) introgression (loss of among population genetic variability), inbreeding depression, domestication, and potential to decrease the genetic effective population size in the wild population. Basic questions are discussed in relation to broodstock development, and we list hatchery attributes required to raise broodstock fish.

FEASIBILITY OF DEVELOPING A PROGRAM TO AUGMENT THE POPULATION OF HUMPBACK CHUB continued.....

- **FEASIBILITY OF ESTABLISHING A SECOND POPULATION IN TRIBUTARIES OF GRAND CANYON OR EXPANDING THE LITTLE COLORADO RIVER POPULATION**

The primary risks appear to be related to ethological issues, such as lack of anti-predator responses or lack of ability to feed efficiently. In addition, depending on where the fish are released, a potential exists to impact density-dependant dynamics in the wild population.

FEASIBILITY OF DEVELOPING A PROGRAM TO AUGMENT THE POPULATION OF HUMPBACK CHUB continued.....

- **Schedule:**
 - **Feb-May 2003 : Produce Draft Feasibility Study**
 - **June 1, 2003 : Submit Draft Feasibility Study to GCMRC**
 - **July 2003 : Submit Final Feasibility Report to GCMRC**
 - **August 2003: Draft to AMWG & External Peer Review**

FEASIBILITY OF DEVELOPING A PROGRAM TO AUGMENT THE POPULATION OF HUMPBACK CHUB continued.....

- Preliminary Conclusions