The Feasibility of Augmenting the Grand Canyon Population of Humpback Chub (*Gila cypha*)

by

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The humpback chub
Rationale

• Report stemmed from AMWG request to determine feasibility of establishing a captive broodstock.

• Report was extended to include growing out wild caught age-0 fish for release back into the wild, and translocations.
Closed abundance estimates in Little Colorado River since 1992

![Graph showing abundance over time]
Three alternatives discussed:

1. Development of a captive broodstock.

2. Capture of wild age-0 fish for grow out and release back into the wild.

3. Translocations above Chute Falls and to other tributaries in Grand Canyon.
Captive broodstock: two approaches

• 1. Captive broodstock for use as a genetic refugium – risk free.

• 2. Captive broodstock used for stocking back into the wild – numerous biological risks involved.
Biological risks of captive broodstock:

• Introgression

• Inbreeding depression

• Decreasing the wild Ne at large

• Domestication
Prerequisites of captive broodstock program:

• Will likely require a facility large enough to hold several thousand fish.

• Will need a quarantine facility.

• Development of a formal captive broodstock management plan.
Where to begin right now

- The Willow Beach fish (~ 80 are left) can function as a beginning point.
- This will require some genetics work being completed or that will need to be performed.
Captive broodstock:

- Needs to be identified in a Recovery Plan as a recovery option.

- Should be a last resort based on USFWS/NOAA policy statements, and the scientific community at large.

- Basically, habitat restoration should be a first priority before captive broodstock.
Grow out of wild caught age-0 fish for supplemental stocking

- Advantages – bypasses many of the more serious risks associated with captive broodstock.

- Risks – Some minor risks associated with ethology, and density dependant issues in the wild.
Strategy

• Collect wild age-0 fish from the Little Colorado River.

• Grow in captivity under natural rearing conditions until 150+ mm

• Release back into the wild on an annual basis.
Potential objectives

• Maintain populations at levels found in 2000.

• Recover fish to levels found in early 1990s.
Modeling: ~1,400 fish/year
Translocations

- Above Chute Falls
- Other tributaries in Grand Canyon
Chute Falls

• Activities already begun

• Risks – some risks for eventual inbreeding

• Benefits – Population expansion, range expansion, promotes a self-sustaining population.
Other Tributaries

- Havasu, Shinumo, and Bright Angel

- There may be potential for large abundance increases if combined with mechanical removal
Priority Conclusions

- Translocations already begun.
- Grow out of age-0 may require 1,000-5,000 fish per year to achieve goals, but is relatively risk free.
- Captive broodstock should be last resort because of high potential for biological risks.
Thank you!

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