Translocation of humpback chub (*Gila cypha*) above Chute Falls, Little Colorado River

Pamela Sponholtz, Dennis Stone
Arizona Fish and Wildlife Conservation Office

Glen Knowles
Ecological Services
Chute Falls Project

- December 2002 Biological Opinion “to increase survival from floods, reduce predation…”
  - Up to 300 fish
- November 2004 Biological Opinion “increase survival from high mortality area to good nursery area”
  - Up to 600 fish
HBC distribution

- Physical Barrier: Chute Falls
  - Robinson (1996)
- Chemical Barrier: CO₂ levels
  - Mattes (1993); Strength (1997)
- Do migrate but are pushed downstream via floods and/or rising CO₂ concentrations
- Lack of imprinting
Objectives

1) Determine if transplanted humpback chub can survive and remain above Chute Falls
2) Determine if humpback chub will grow above Chute Falls
3) Determine if any transplanted YOY humpback chub will recruit to adulthood above Chute Falls
4) Determine if a humpback chub spawning population will develop above Chute Falls
5) Develop population estimates for fish above Chute Falls
Translocations

- August 2003, 2004, 2005
- Collect 50-100mm HBC near confluence
- Implanted with visible elastomer tags
- Released 1148 HBC above Chute Falls
The 2003-05 findings were insightful...

- Translocated humpback chub were growing extremely fast
- Many were becoming reproductive adults
- Many “unknown origin” chub were caught by fall 2005!
- Could have been previously translocated, progeny thereof, and/or upriver migrants

350 mm female
at 16.2 km
Translocation and Monitoring Trips

Mean Total Length (mm)

- Translocated 2003
- Translocated 2004
- Translocated 2005

Translocation and Monitoring Trips

TR03, FA03, SP04, TR04, FA04, SP05, TR05, FA05, SP06, SP07
Growth Rates for Translocated HBC

Growth rate (mm/month +/- SE)

2003 2004 2005

Lower 14km LCR
2006-2007 Captures

- Numerous adult humpback chub that were freely releasing gametes
- Three non-translocated YOY progeny
- Four adult humpback chub moved above Chute Falls that had originally been captured, tagged, and released below Chute Falls
- Fish above Chute Falls, appear to be moving downstream
Recapture trip (June 26-July 2, 2007)

YOY chub
Humpback chub are migrating downriver

Translocations

<table>
<thead>
<tr>
<th>Month</th>
<th>Above Chute Falls</th>
<th>U. Atomizer to Chute</th>
<th>Low. to Up. Atomizer</th>
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<tbody>
<tr>
<td>June 2000</td>
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<td>June 2006</td>
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<td>June 2007</td>
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Population Estimates

Abundance Estimate (SE)

- Lower Atom to Chute Falls
- Above Chute Falls

For 2006:
- Abundance Estimate: 700

For 2007:
- Abundance Estimate: 500
Benefits of Chute Falls Project

- Increased abundance of HBC
- 2yr old fish >200mm
- Reduced mortality of YOY chubs
- Increased historical range by 4km
- Better understanding of life history
Lower LCR Population Estimates for fish < 200mm
Benefits of Chute Falls Project

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Why we propose translocations in 2008 and 2009

- Conservation Measure for 2008 BO
- Increase survivorship of small fish..offset losses in the mainstem
- Chute Falls fish have slightly less genetic diversity than Willow Beach fish
- Fewer fish above Chute Falls, geomorphology may limit numbers moving upstream

Draft Genetics Management Plan Recommendations:
  » Provide for an influx of fish to span a generation (long lived fish)
  » Establish a reasonable approximation of a natural population
  » Normal size, age distribution and gene flow from donor source
  » Additional 300 YOY should be moved in 2008
2007

Below Chute (Marking trip)

Above Chute (Marking trip)

Below Chute (Recap trip)

Above Chute (Recap trip)

Number of Unique Humpback Chub

Total Length (mm)
The Future

• Maintain Chute Falls population until:
  • Mainstem reproduction increases and replaces Chute Falls contribution
  • Other tributaries and translocations are completed
  • Spawning and rearing occurs in other parts of the Canyon outside of the LCR

• Continuing monitoring above Lower Atomizer:
  • In conjunction with monitoring that occurs in Lower 14km of the LCR
  • Until number of fish above falls is no longer important from a recovery and conservation perspective