Glen Canyon Dam Adaptive Management Work Group
Agenda Item Information
August 26-27, 2015

Agenda Item

Havasu Creek Translocation Update

Action Requested

Information item only. We will answer questions; no action is requested.

Presenter

Martha Hahn, Chief, Science & Resource Management, Grand Canyon National Park, National Park Service

Previous Action Taken

See below.

Relevant Science

See below.

Summary of Presentation and Background Information

The Humpback Chub (*Gila cypha*), is a federally endangered cyprinid fish species endemic to the Colorado River basin, with its largest remaining population occurring in nine aggregations within Grand Canyon National Park (GRCA), Arizona (Valdez and Ryel 1995, reviewed in Coggins et al. 2006). Despite recent increases in abundance (Coggins and Walters 2009), the Grand Canyon population remains threatened by habitat modifications related to the construction and operation of Glen Canyon Dam and introduced nonnative fish species. Translocations of Humpback Chub and associated nonnative fish control were established as Conservation Measures in Biological Opinions on the operations of Glen Canyon Dam (USFWS 2008, 2011).

Translocations of juvenile Humpback Chub from the Little Colorado River to other Colorado River tributaries within GRCA is one option proposed to attempt to establish a second population in Grand Canyon (Valdez et al. 2000), as well as meet National Park Service (NPS) mandates for species conservation (NPS 2006), and contribute towards goals and objectives within the Comprehensive Fisheries Management Plan for GRCA (NPS 2013). Translocations may contribute to restoration of native fish communities, and may result in range expansion and the establishment of a second spawning aggregation of Humpback Chub. Translocations and associated nonnative fish control in tributaries also contribute to partially fulfilling the Bureau of Reclamation's commitment to implement conservation measures established under the 2008 and 2011 Biological Opinions for the operation of Glen Canyon Dam (USFWS 2008, 2011). These conservation measures include translocation of Humpback Chub to Shinumo, Havasu, and Bright Angel creeks in GRCA. Objectives of translocations vary by tributary and operate under the adaptive management framework established in the Comprehensive Fisheries Management Plan (2013). Desirable outcomes may include: 1) the establishment of a second spawning and recruiting population in the mainstem or tributary; or 2) sufficient survival and growth to provide a rearing ("grow-out") opportunity to augment the local mainstem aggregation.

From 2011-2015, a total of 1350 Humpback Chub from the Little Colorado River have been translocated into Havasu Creek in GRCA. Monitoring metrics established for translocations included Humpback Chub survival, growth, abundance, evidence of reproduction, and presence in the adjacent mainstem aggregation. Apparent survival of translocated Humpback Chub has remained constant over time in Havasu Creek. Humpback Chub growth rates have been comparable to, and generally greater than, published growth rates found for juvenile Humpback Chub in the Little Colorado River, and greater than growth rates found for Humpback Chub in the Colorado River. Evidence of reproduction of translocated Humpback Chub was found in Havasu Creek in 2012-2015. Large proportions of the total catch of mainstem Humpback Chub have been translocated chub from Havasu or Shinumo creeks, meaning these translocations have augmented mainstem aggregations (GCMRC/USFWS unpublished data). Funding for this project was provided by the Bureau of Reclamation (Upper Colorado Region) and NPS.

Humpback Chub Translocation
Grand Canyon National Park
Havasu Creek

Why Translocate Humpback Chub?

- USFWS 1994 Biological Opinion – Establish a second "spawning aggregation" of Humpback Chub
- Conservation Measures (USFWS 2008 & 2011 Biological Opinions) – tributary Humpback Chub translocations
- NPS Comprehensive Fisheries Management Plan 2013

- Valdez et al. 2000 – Developed plan for establishing second population of humpback chub in Grand Canyon, identifying the top 3 tributaries for translocation

1. Havasu Creek
2. Shinumo Creek
3. Bright Angel Creek

Translocation Goals

- **Establish second spawning population in Grand Canyon**

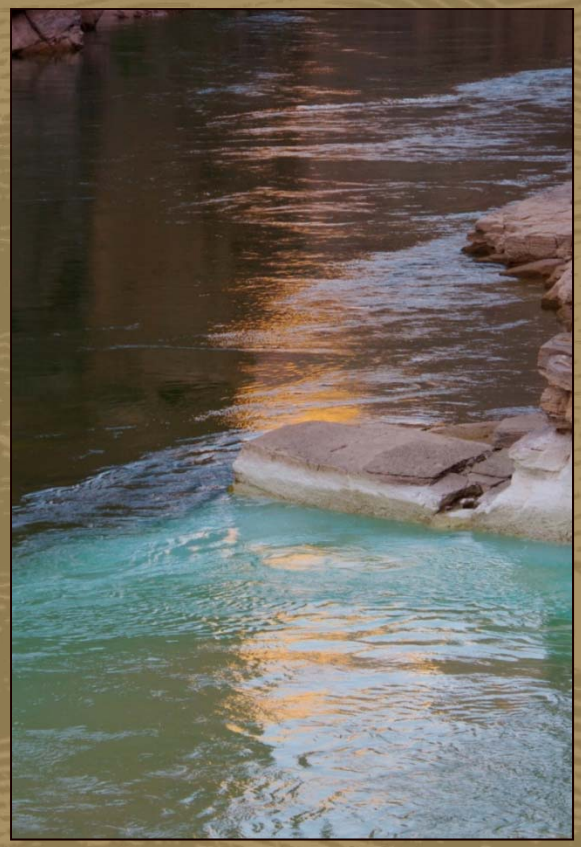
and/or

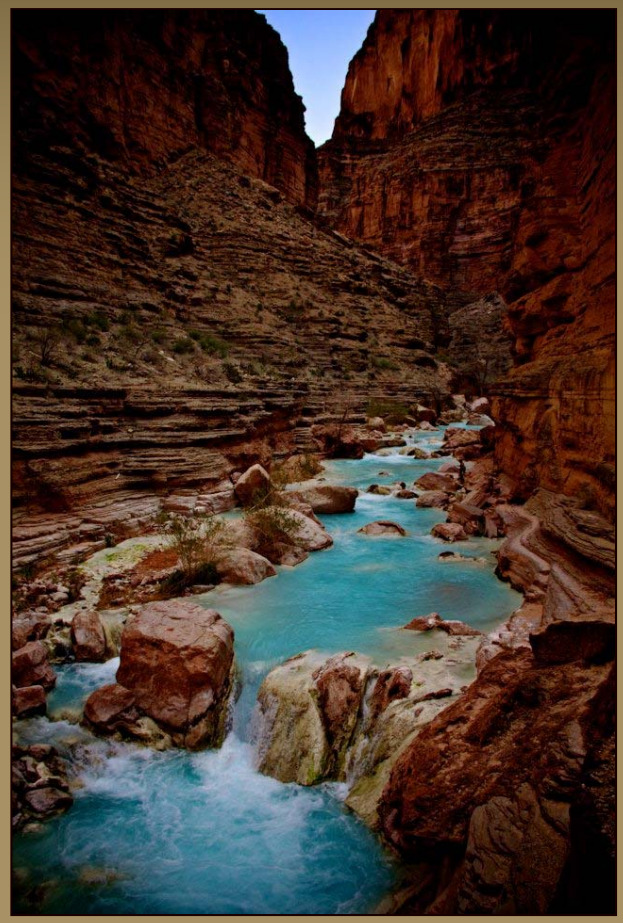
- **Provide rearing habitat for juvenile Humpback Chub -- Augmentation of Colorado River aggregations**

Questions about Translocations

1. Will chub remain & survive?

2. Will chub augment mainstem?





3. How will chub fare in the tributaries?

4. Will chub reproduce?

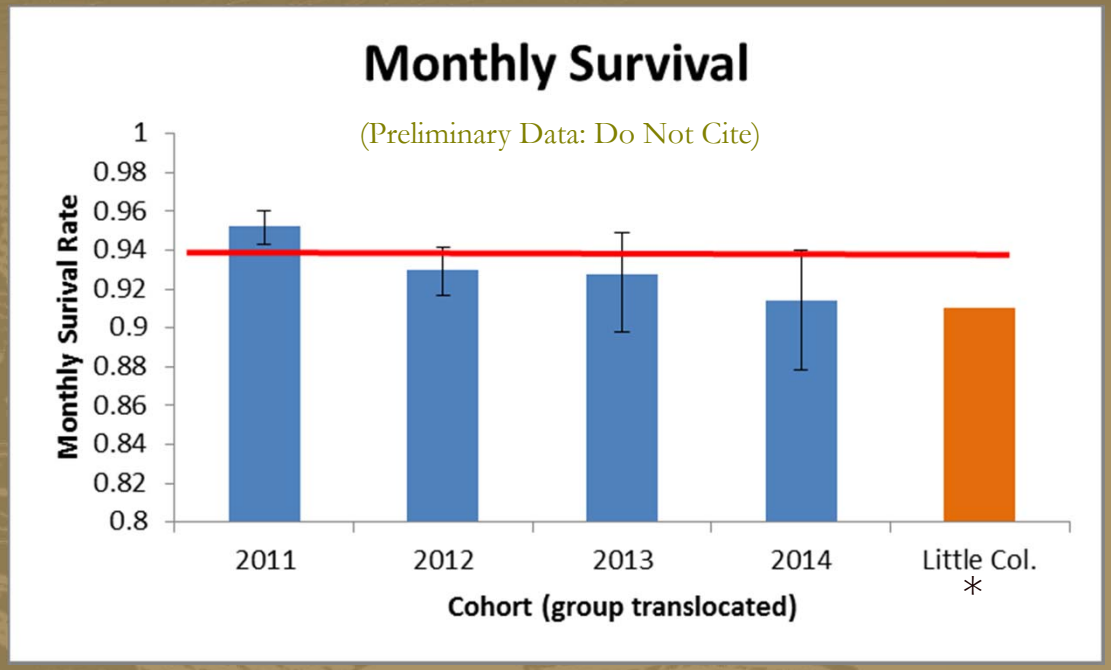
Havasu Creek

Total = 1650 HBC

translocated to date

Hatchery Tagging Date	Average Length (mm)	Average Weight (g)	Release Date	Number Translocated
May 5, 2011	86.1	4.8	June 28, 2011	243
May 10, 2012	124.7	16.7	May 13, 2012	298
May 14, 2013	123.1	14.9	May 9, 2013	300
May 9, 2014	123	16.4	May 14, 2014	300
May 9, 2014	124	16.4	June 5, 2014*	209
May 13, 2015	131	20.3	May 20, 2015	300

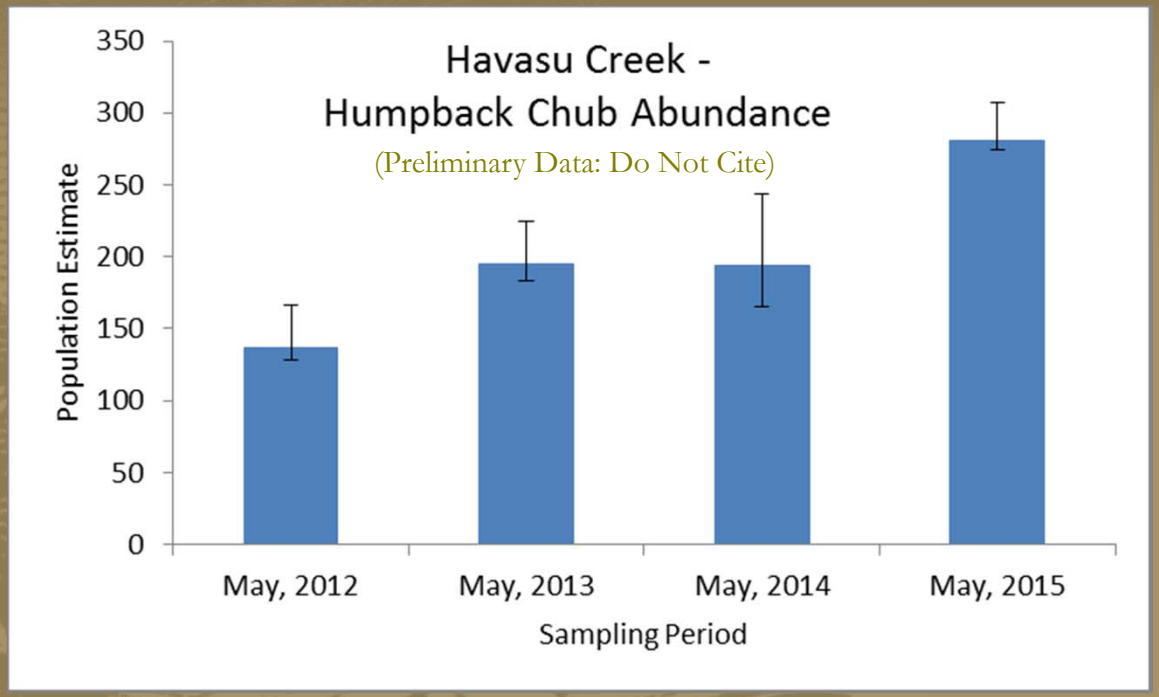
Will chub survive?



Yaculick et al. 2014 (LCR estimate)

- Apparent survival has remained constant in Havasu Creek (includes emigration and survival)

Will chub remain?



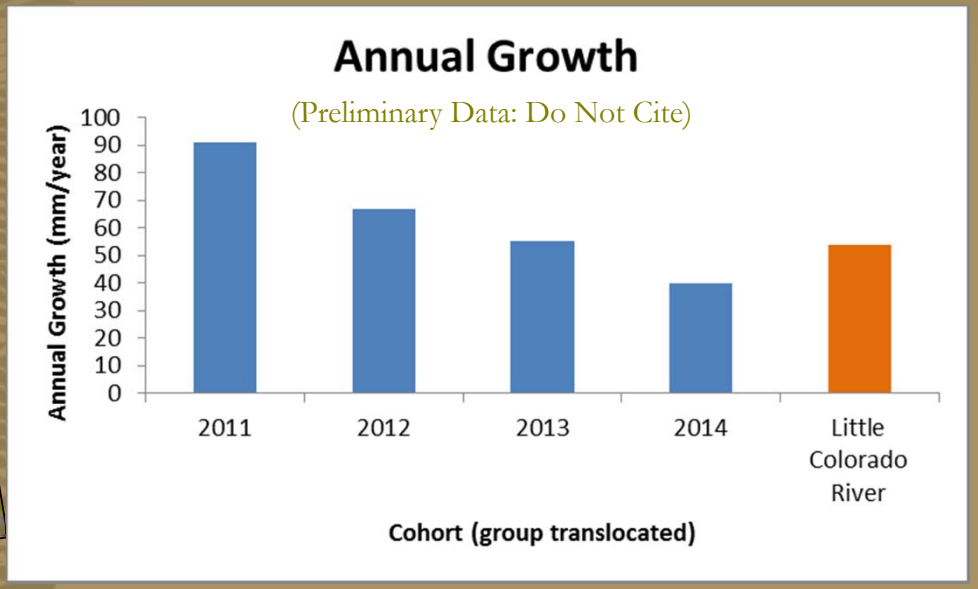
- **Abundance estimates include both translocated and non-translocated Humpback Chub.**
- **Minimum of 200 HBC to be maintained in Havasu Creek if reproduction occurs (USFWS 2010, NPS CFMP 2013)**

Will Translocations Augment Colorado River Humpback Chub Aggregations?

- **NPS 2010-2014: 149 unique translocated chub caught in the mainstem Colorado River, many in multiple years (214 total captures)**

- **3 HBC translocated to Shinumo Creek have been detected in antenna array in the Little Colorado River**

How will chub fare in the tributaries?



LCR juvenile growth: Robinson & Childs 2001

Will chub reproduce in tributaries?

Havasu Creek

- Ripe males and females have been captured

- 2013-2015 YOY and untagged 2 yr/olds have been captured

Reproduction in Havasu Creek

2013-2015

Untagged juvenile Humpback Chub captured in Havasu Creek

Tributary Translocation Summary

1. **Will chub remain & survive ?** ***Yes***

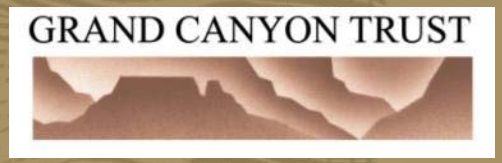
2. **Will chub augment mainstem aggregations?** ***Yes***

3. **How will chub fare in the tributaries?** ***Growth as high or higher than the LCR***

4. **Will chub reproduce?** ***Yes, they are currently reproducing in Havasu Creek***

Cooperators

- Funded by Reclamation and NPS
- Gobs of volunteers contributed thousands of hours



Questions?


Got gravel?