





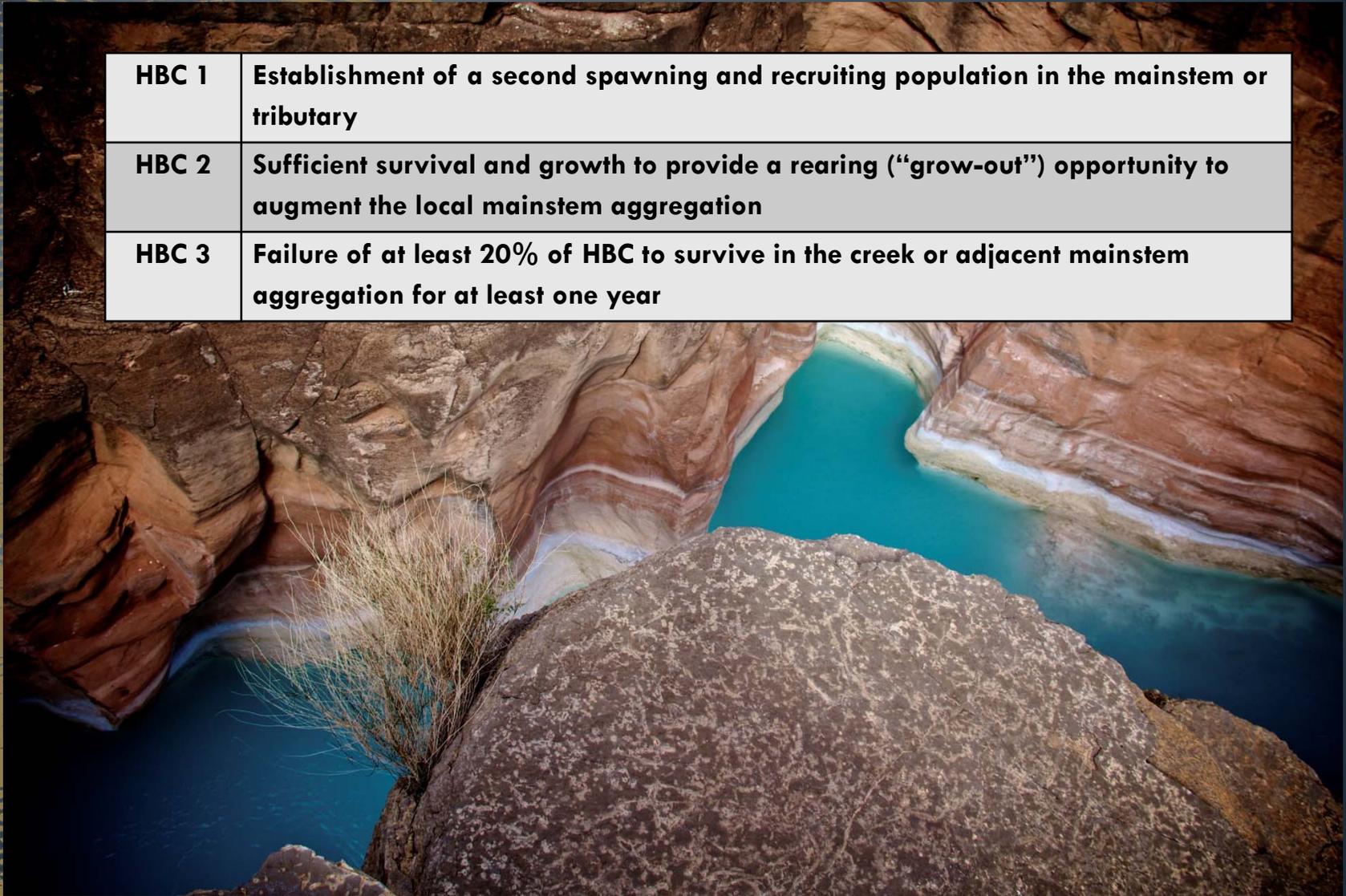
Why Translocate Humpback Chub?

- **USFWS 1994 Biological Opinion –2nd “spawning aggregation” of Humpback Chub**
- **Conservation Measures in USFWS 2008 & 2011 Biological Opinions – tributary Humpback Chub translocations**
- **NPS Comprehensive Fisheries Management Plan 2013**
- **Valdez et al. 2000- establish second population in Grand Canyon**
 1. **Havasu Creek**
 2. **Shinumo Creek**
 3. **Bright Angel Creek, excluded due to “large number of predators...”**



Possible Translocation Outcomes

HBC 1	Establishment of a second spawning and recruiting population in the mainstem or tributary
HBC 2	Sufficient survival and growth to provide a rearing (“grow-out”) opportunity to augment the local mainstem aggregation
HBC 3	Failure of at least 20% of HBC to survive in the creek or adjacent mainstem aggregation for at least one year





Translocation Tasks- continued

4. Monitor translocated Humpback Chub and fish community in creeks and nearby Colorado River mainstem

- a. Survey twice annually
- b. Survey the mainstem Colorado River annually- GCMRC/FWS & NPS
- c. Remove non-native fish captured during surveys



Trammell et al. 2012. Humpback Chub Translocation to Havasu Creek, Grand Canyon National Park: Implementation and Monitoring Plan

Translocation Monitoring Metrics

- A** Retention of translocated humpback chub over the first year
- B** Similar or increased juvenile survival relative to the Little Colorado River and mainstem Colorado River near the Little Colorado River inflow
- C** Similar or increased growth rates relative to the Little Colorado River and mainstem Colorado River near the Little Colorado River inflow
- D** Contribution to and retention of translocated fish to an adjacent mainstem aggregation
- E** Evidence of successful reproduction (presence of larval or young-of-year fish)
- F** Evidence of recruitment to mature size



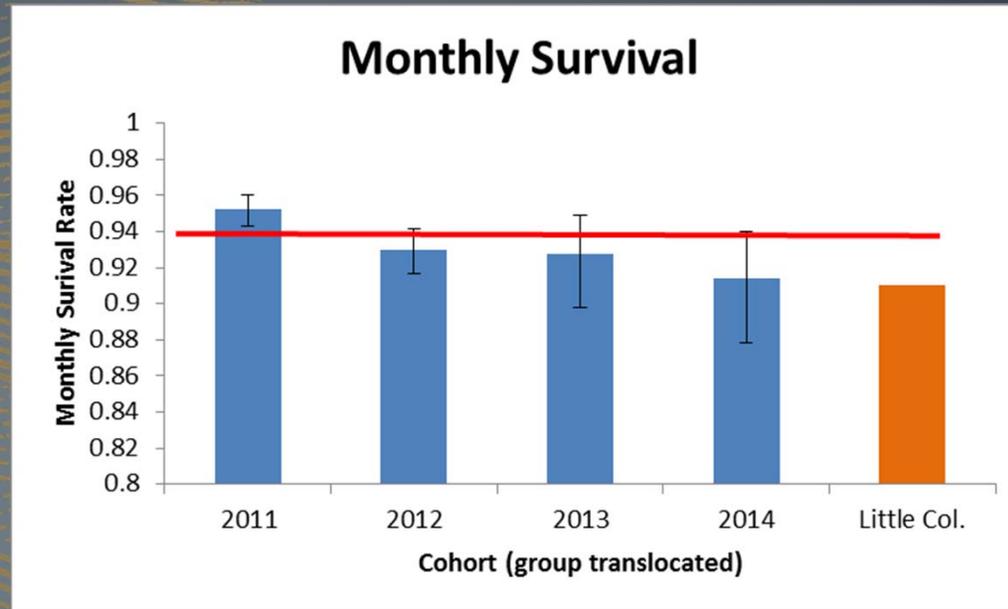








Outcome B- Apparent Survival



LCR estimate from Yackulic et al. 2014

Red line = average monthly survival of all translocated cohorts

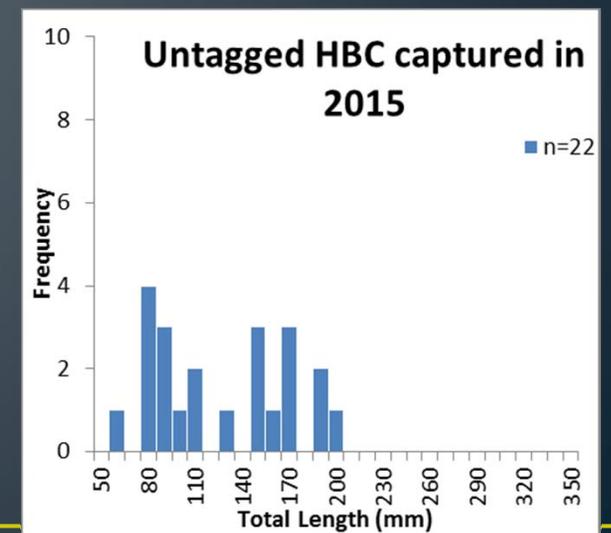
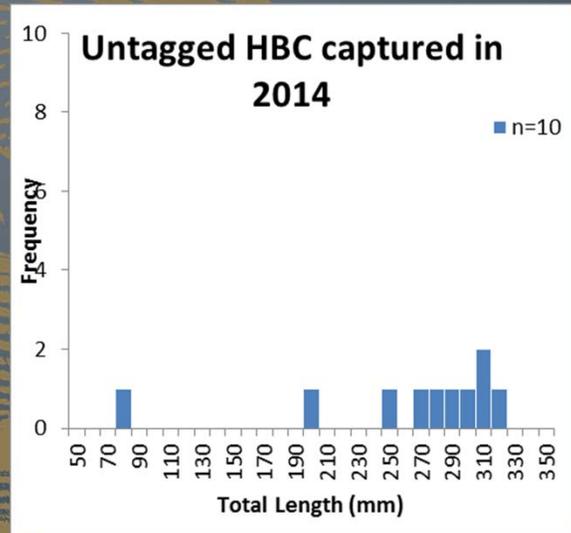
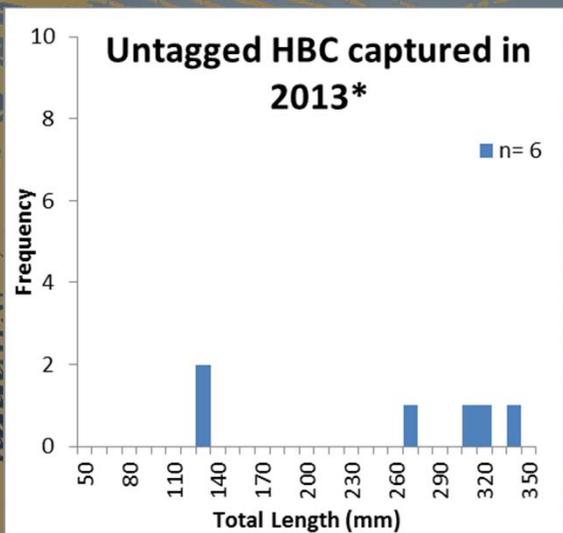
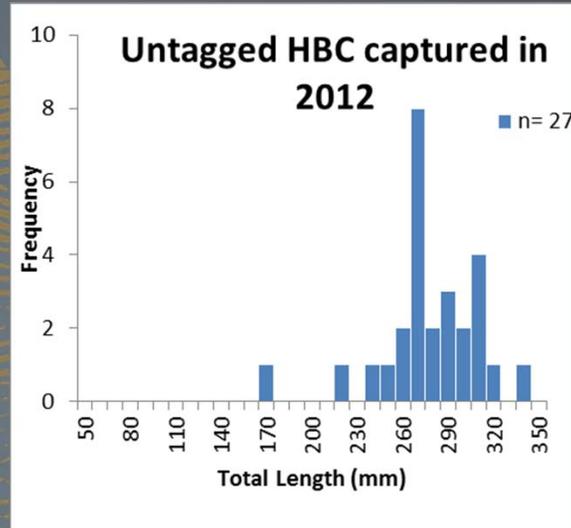
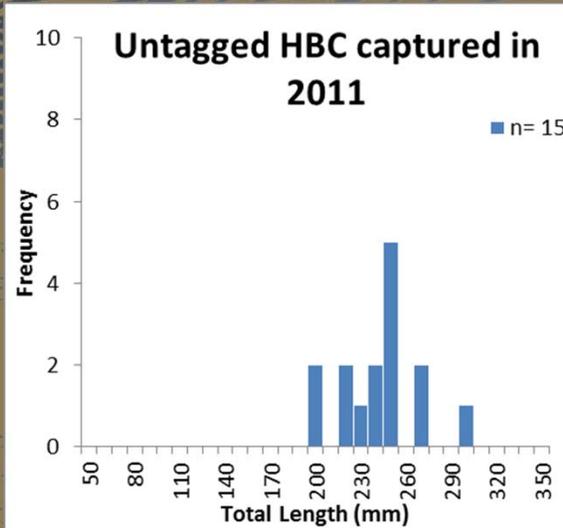
- Fisheries Management Plan Goal = 20% annual/ 87.5% monthly
- ✓ Similar survival relative to Little Colorado River and nearby mainstem (which is higher, Yackulic et al. 2014)
- May 2016 sampling event will provide 2015 survival estimate- new release location







Outcome E- Evidence of Reproduction Untagged HBC, by Capture Year





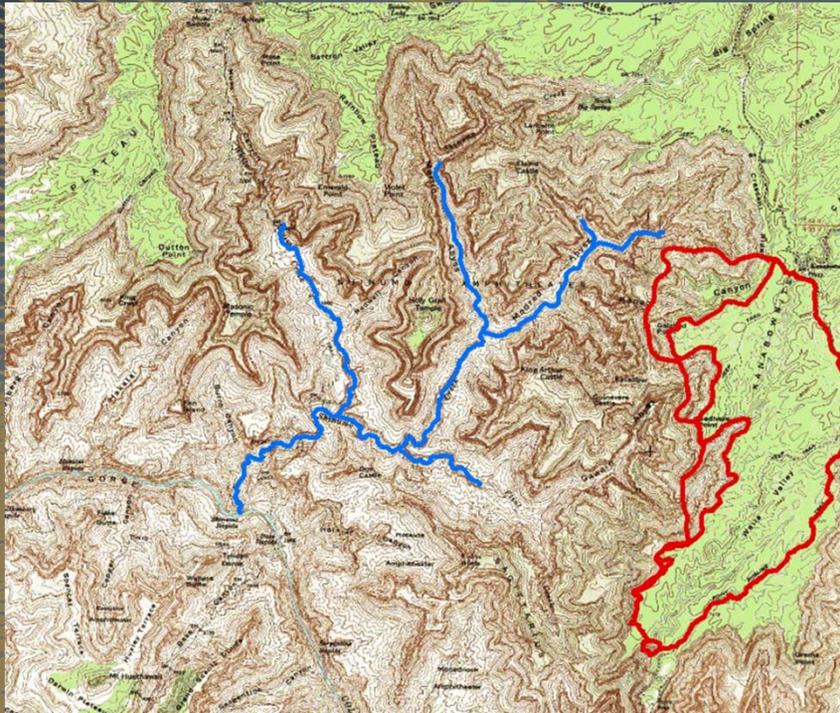
Havasu Creek- Next Steps

- Outcome 1: Establishment of a second spawning and recruiting population in the tributary → achieved if monitoring detects evidence of successful reproduction and/or evidence of recruitment to mature size.
- Triggers additional HBC translocations to maintain genetic diversity (see FWS 2010)
 - Minimum of 200 adults maintained
 - At least 10 migrants/ generation (or add additional 10)
 - 45-1000 released over a generation (10 years)





Galahad Fire, 2014



Started by lightning in May and then managed; burned approximately 6500 acres and 10% of the watershed

Two floods caused severe flood disturbance & widespread deposition of charred wood & ash

- Water level appeared to have risen at least 12 -15 feet above baseflow
- Riparian vegetation reduced by approximately 80-90%
- At least one archeology site damaged (Bass Camp)
- Macroinvertebrate densities and taxa richness significantly reduced
- Fish community reduced by 99%
- No Chub or Bluehead Suckers remained



Shinumo Creek Drainage

- Two Fall 2014 trips into Merlin & Modred Abyss
 - concluded that the heavy localized rainfall on top of burned areas and flooding caused the likely extirpation of all HBC and BHS from the watershed
 - RBT present in Merlin Abyss, providing a source for recolonization as habitat recovers





