National Park Service
U.S. Department of the Interior

Grand Canyon National Park

NPS Fisheries Program Updates:
Humpback chub translocations
Brian Healy

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Cooperators

- Funded by Reclamation, NPS, USGS

Background – Humpback Chub Translocations

- USFWS 1994 Biological Opinion – Establish a 2nd "Spawning Aggregation" of humpback chub
- Valdez et al. 2000 – Developed plan for establishing second population of humpback chub in Grand Canyon
- Cons. Measure: USFWS 2008 Biological Opinion – tributary humpback chub translocations
- USFWS 2011 Biological Opinion

Background – Humpback Chub Translocations

Valdez et al. 2000:

- Options Considered:
  - Expand existing mainstem/metapopulation – achieved with Temperature Control Device
  - Tributaries – translocate from the LCR
  - Tributary and Mainstem – initially dropped from consideration
- Tributaries considered:
  - Havasu and Shinumo
  - Bright Angel excluded due to “large number of predators…….”

Background – Humpback Chub Translocations

Translocations - Current Efforts

- Translocations of Juvenile Humpback Chub from the Little Colorado River to Shinumo and Havasu Creeks
- Bright Angel Creek?
  - Continuing trout control

Translocation Goals

- Experimental
- Establish 2nd Spawning Population in Grand Canyon
- Provide rearing habitat for Juvenile Humpback Chub
  - Augmentation of Colorado River Aggregations

Grand Canyon – Translocation Sites

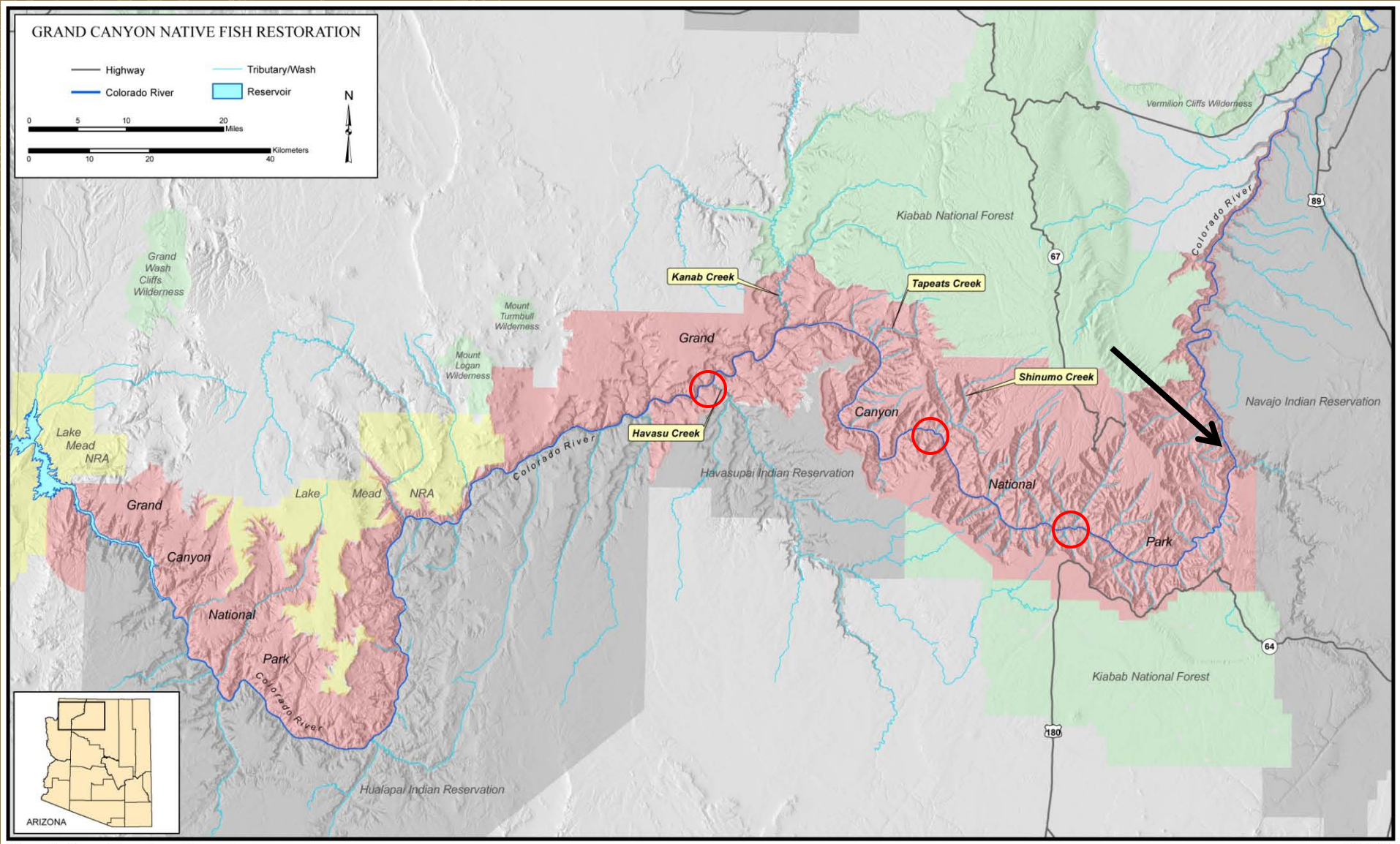

Figure 1. General location of the project area.

Translocation – Evaluation

- Questions:

  Will Translocated Humpback Chub:

  1. Survive/remain?
  2. Grow?
  3. Reproduction?
  4. Contribution to the Maintem Aggregations?

Joe Tomellari

- Field Monitoring Framework:
  - Twice per year
  - Mark-recapture (all fish PIT-tagged at release)
    - "Apparent" Survival Estimates
    - Population Estimates
  - Remote PIT tag Antenna - Emigration (Shinumo only)

Tributary Translocations

Shinumo Creek:

- 302 in June 2009
- 300 in June 2010
- 300 in June 2011

Havasu Creek:

- 242 in June 2011
- 300 in May 2012
- 300 planned for May 2013

Apparent Survival – Havasu Creek

- Latest Estimates:
  - Havasu – October 2012
    - 2011 cohort only
      - Monthly: 0.94 (0.93 – 0.95)
      - Annual: 0.49 (0.41 – 0.56)
    - 2012 cohort: too few sampling occasions (only October 2012)

Amy Martin Photos

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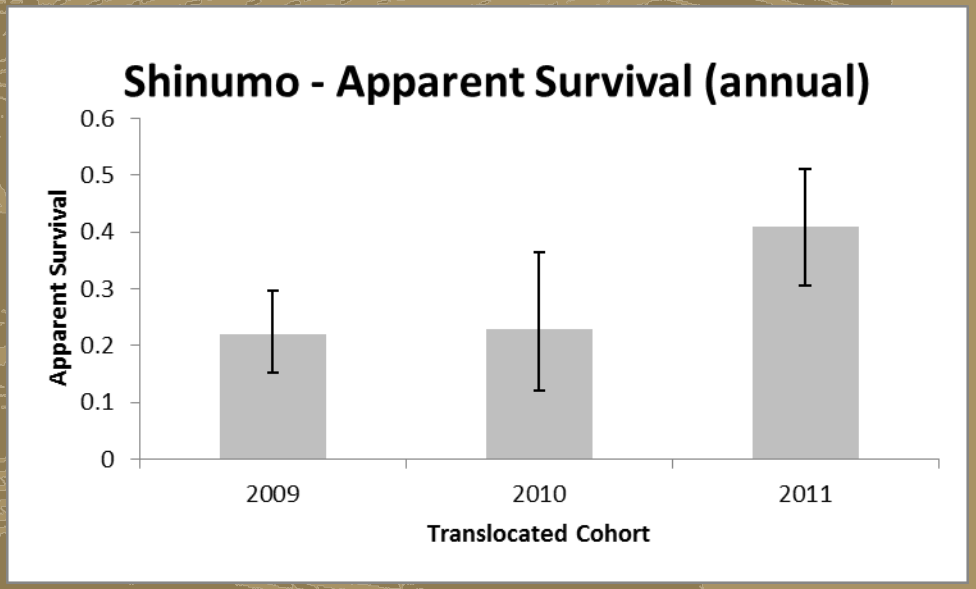
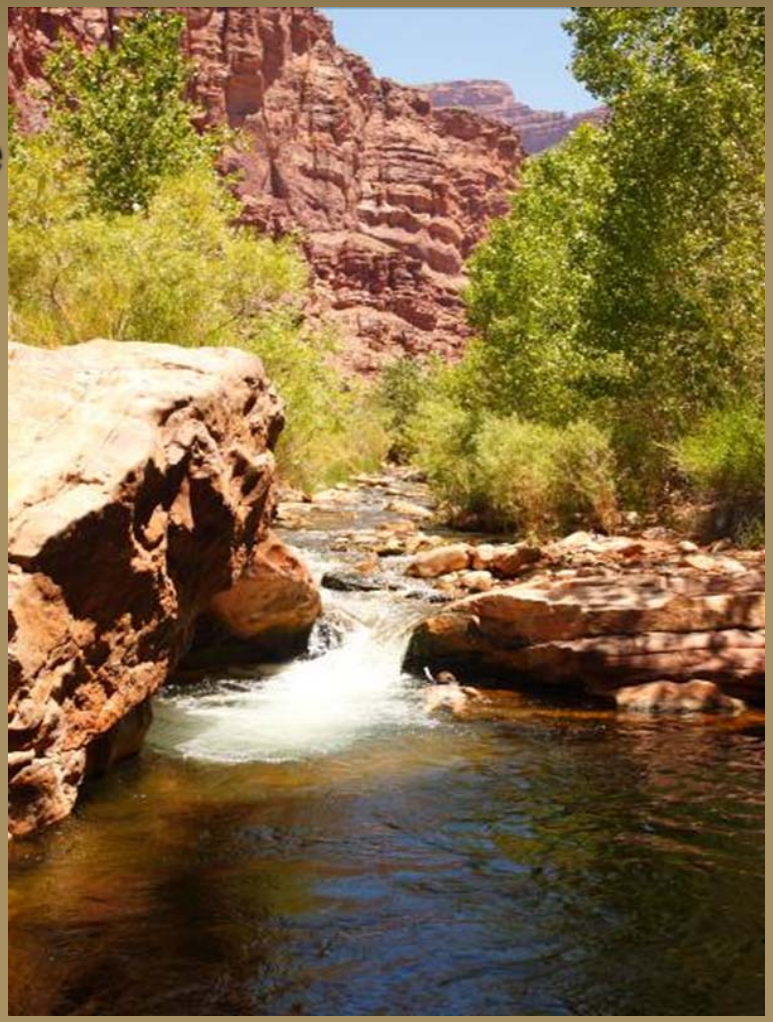
Apparent Survival – Shinumo Creek

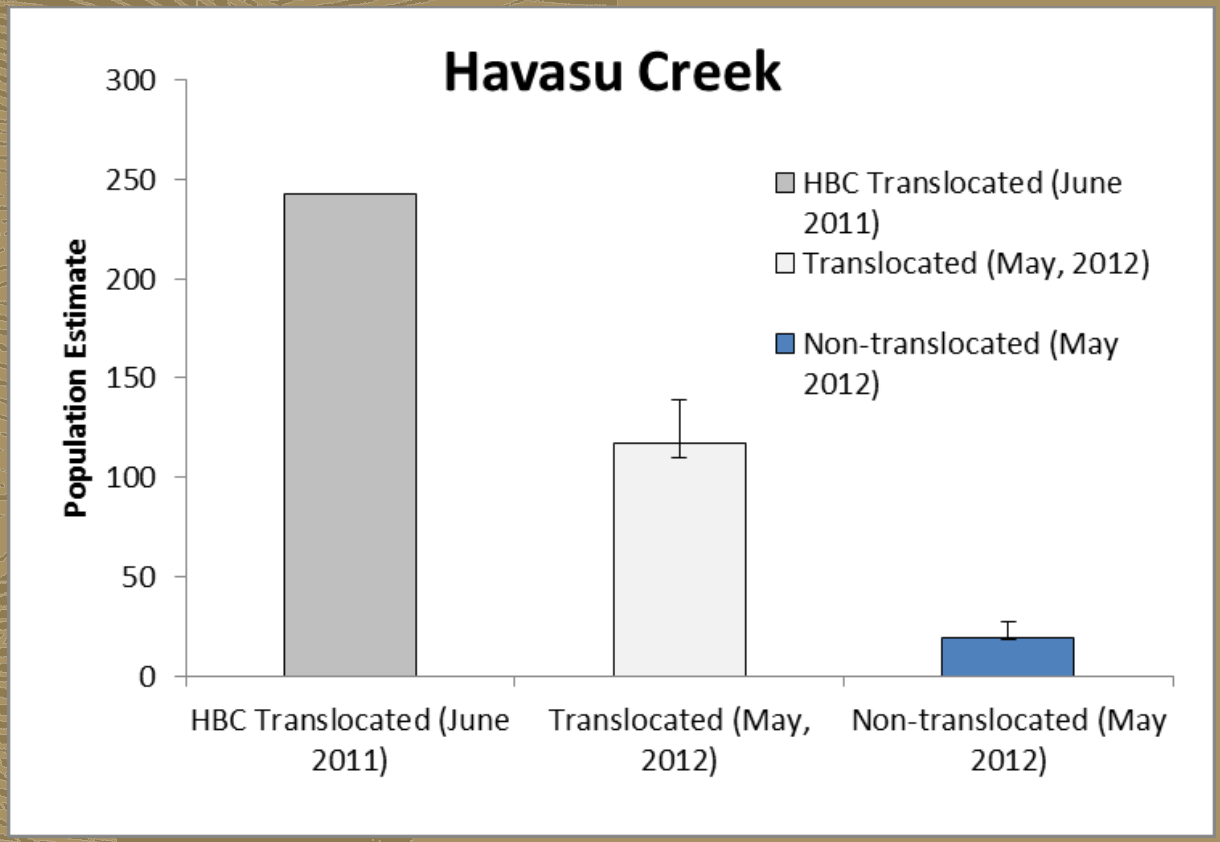
- Latest Estimates:
  - Shinumo – 1 year after release
    - 2009 cohort: 0.22
    - 2010 cohort: 0.23
    - 2011 cohort: 0.41





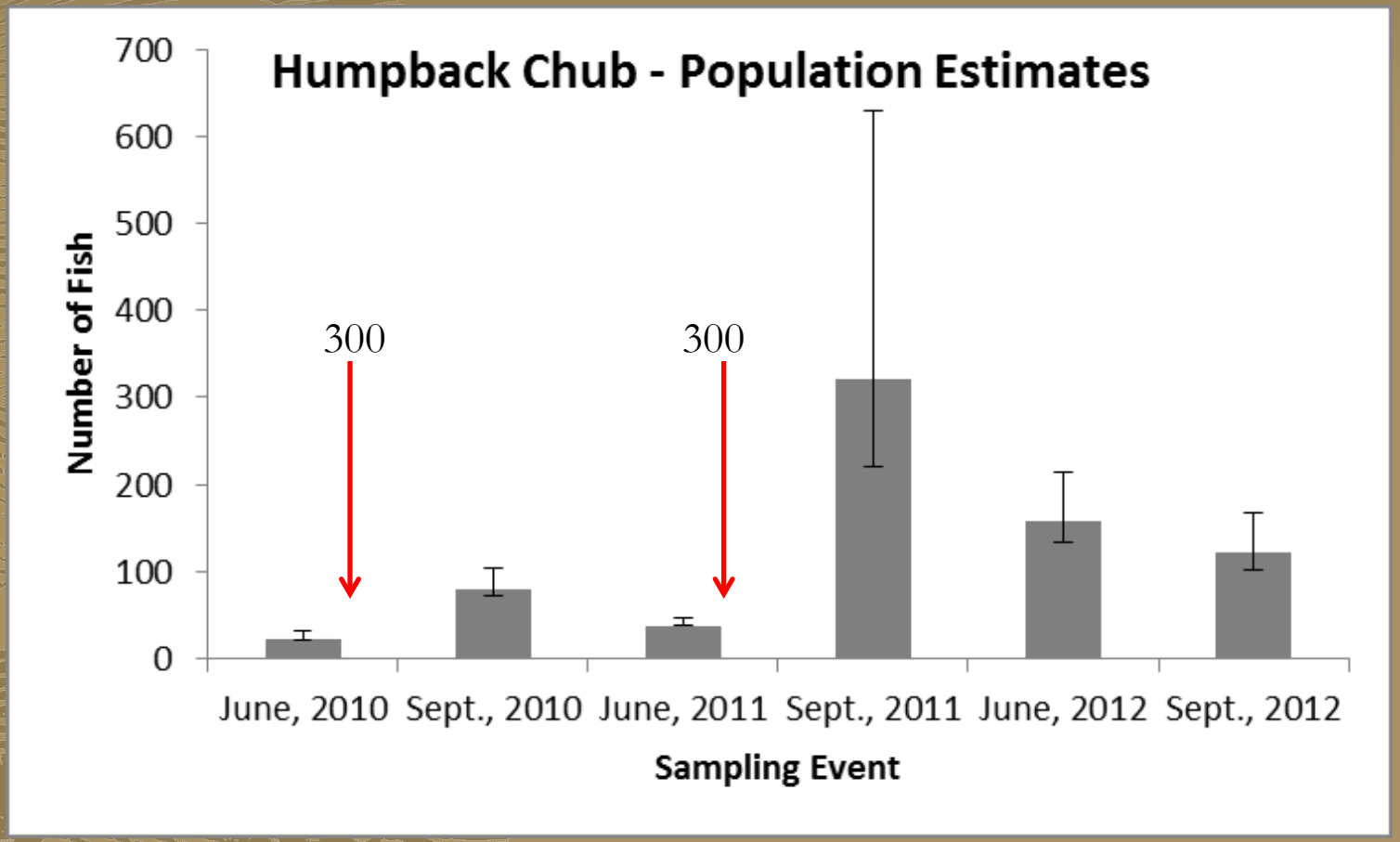
Population Estimates – Havasu Creek

- Once/year: May
- Translocated and Non-translocated Humpback Chub

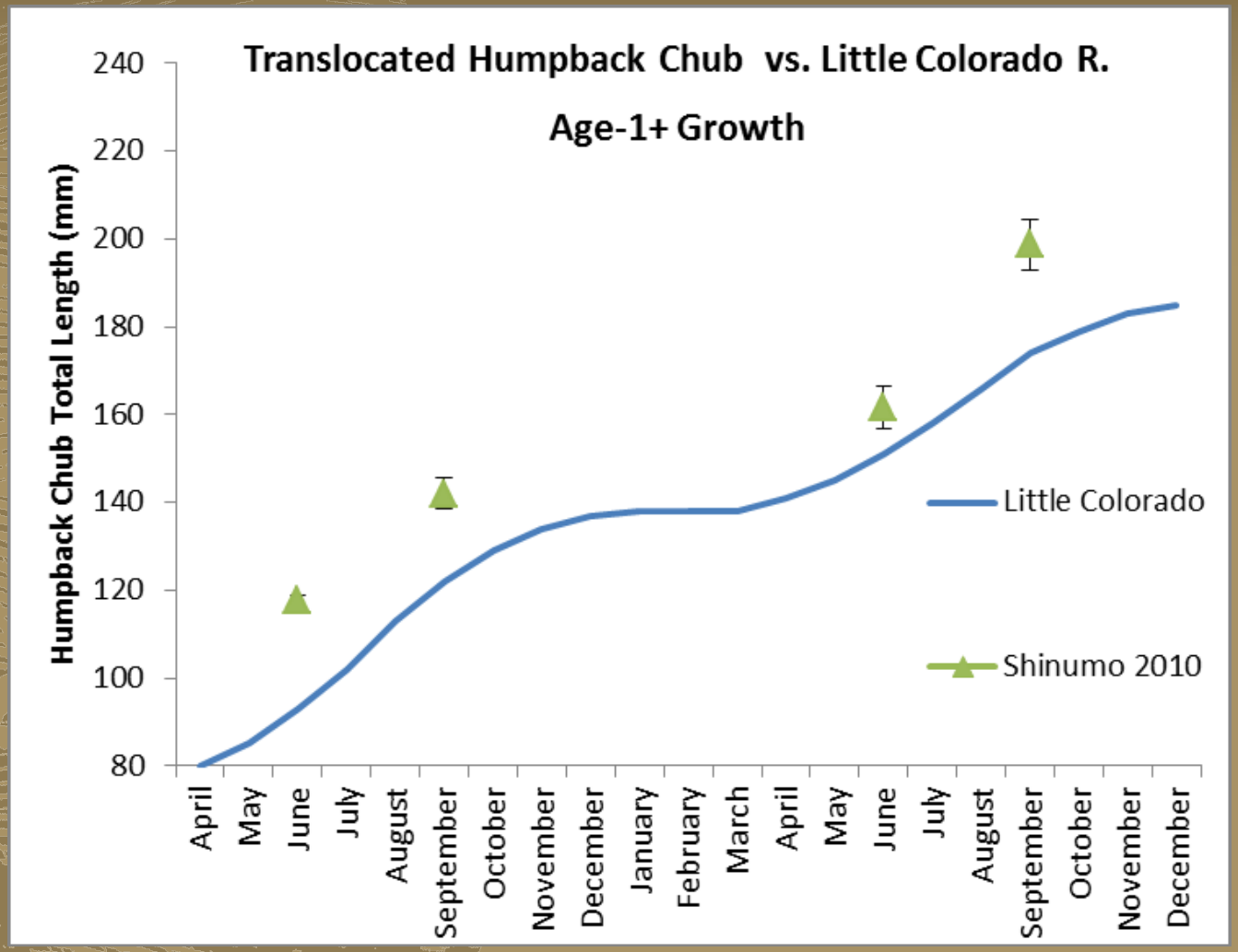


Population Estimates - Shinumo

- Twice/year: June and September (2010-2012)

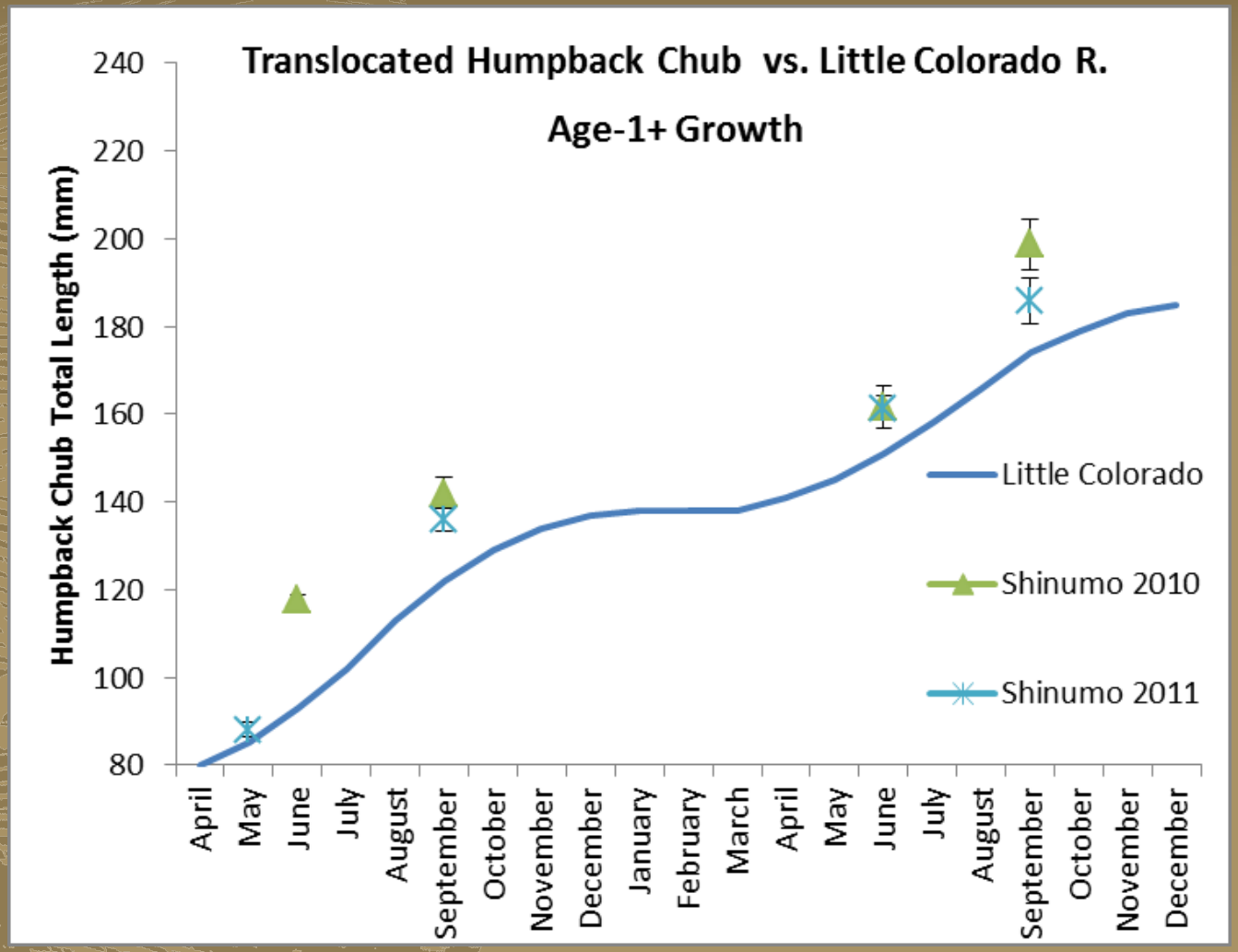


Growth –

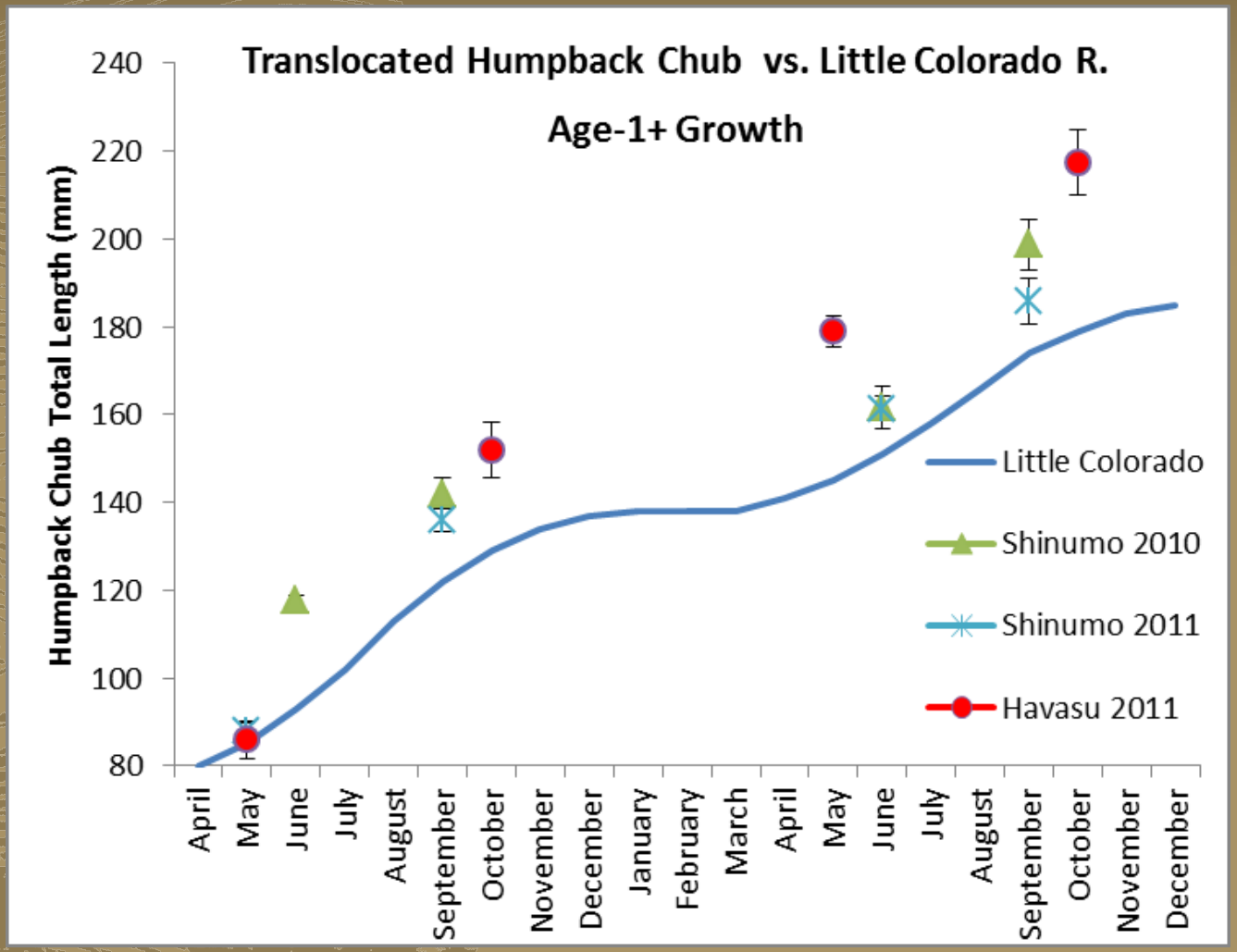


Robinson and Childs 2001 : LCR Growth

Growth –


Translocated Humpback Chub vs. Little Colorado R.
Age-1+ Growth
Humpback Chub Total Length (mm)
240
220
200
180
160
140
120
100
80
April
May
June
July
August
September
October
November
December
January
February
March
April
May
June
July
August
September
October
November
December
Little Colorado
Shinumo 2010
Shinumo 2011

Growth –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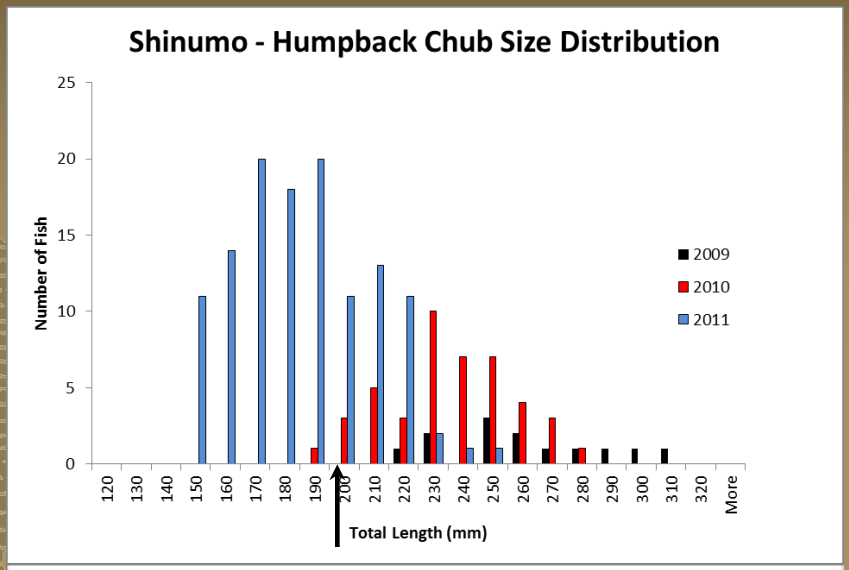
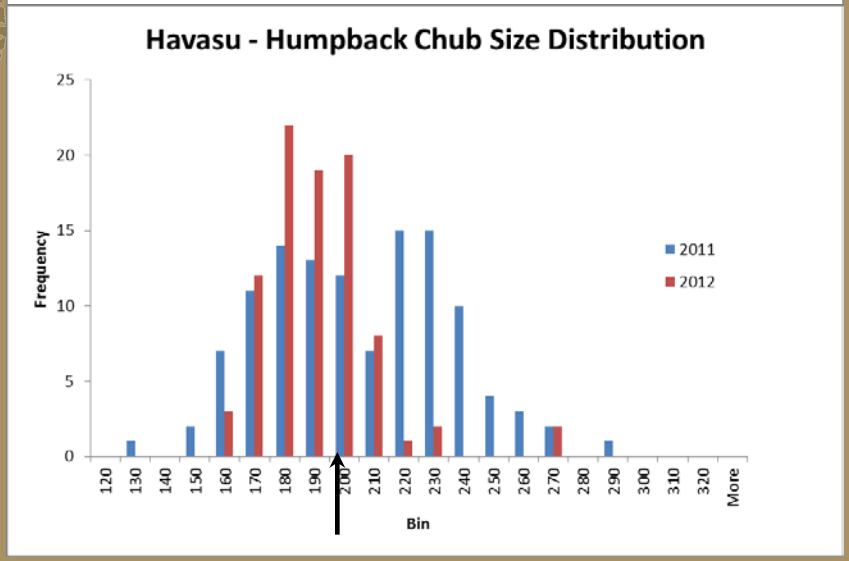
June
July
August
September
October
November
December
Little Colorado
Shinumo 2010
Shinumo 2011
Havasu 2011

Reproduction?

- Shinumo 2012:
  - No ripe fish
  - 82 fish (of 179) > 199 mm
- Havasu 2012:
  - 6 ripe males (7 total)
  - 74 fish (of 206) > 199 mm





Emigration - Shinumo

- 48% as of April, 2012
  - 38% of 2011 cohort
- Antenna efficiency:
  ??
- In progress: 2012 analysis

Will Translocations Augment Colorado River Humpback Chub Aggregations?

- See Bill Persons/Randy VanHaverbeke – GCMRC/USFWS

Reports/Publications

- Spurgeon (2012) Masters thesis. University of Missouri
- Spurgeon et al. (In Prep). Translocations of large river fishes: implications for conservation of endangered humpback chub.
- Trammell et al. 2012. Humpback chub translocation to Havasu Creek, Grand Canyon National Park: implementation and monitoring plan. NPS Natural Resource Report Series.
- Spurgeon et al. (In review). Settlement of humpback chub into novel food webs: considering species interactions in translocation studies. Journal of Aquatic Biology.

Questions?

Growth

Havasu Creek (5-months – 2011)

13.8 mm/30d (0.46 mm/day)

Little Colorado River :

8.8 mm/30d (0.29 mm/day)

(Robinson and Childs 2001)