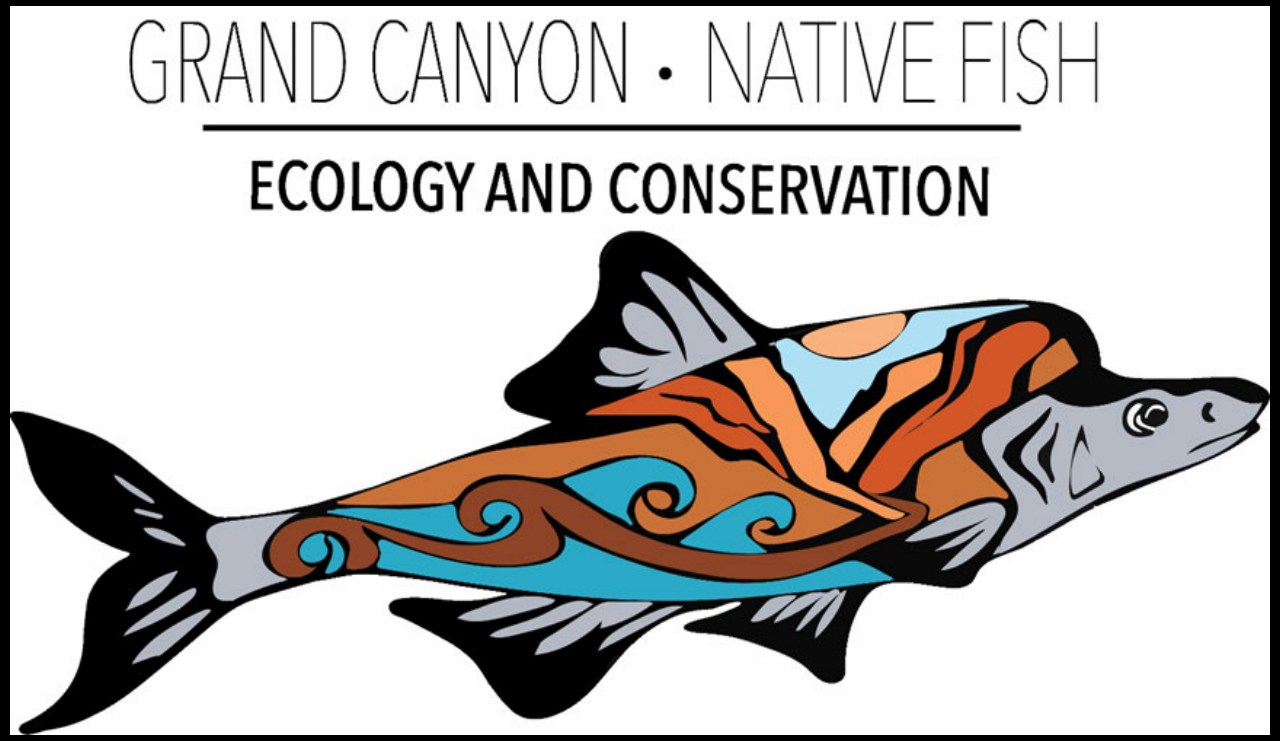
Grand Canyon National Park
Fisheries Program Updates, FY 2022



Emily Omana Smith, Brian Healy, Robert Schelly,
Rebecca Koller

Acknowledgements

- So many hard-working seasonal staff, interns, and volunteers
- Funding and support:

Photos from Amy Martin, Brian Healy, Emily Omana Smith, Melissa Trammell, Della Yurcik, Nicole Klein, Amy Washuta
Fish illustrations by Joe Tomelleri


Today
(speed round)
Humpback Chub Translocation Monitoring
Bright Angel Creek Trout Removal Project
Planned 2023 Activities

Project title: Humpback Chub Translocation

Project elements: Not included in AMP workplan; relates to project G objectives

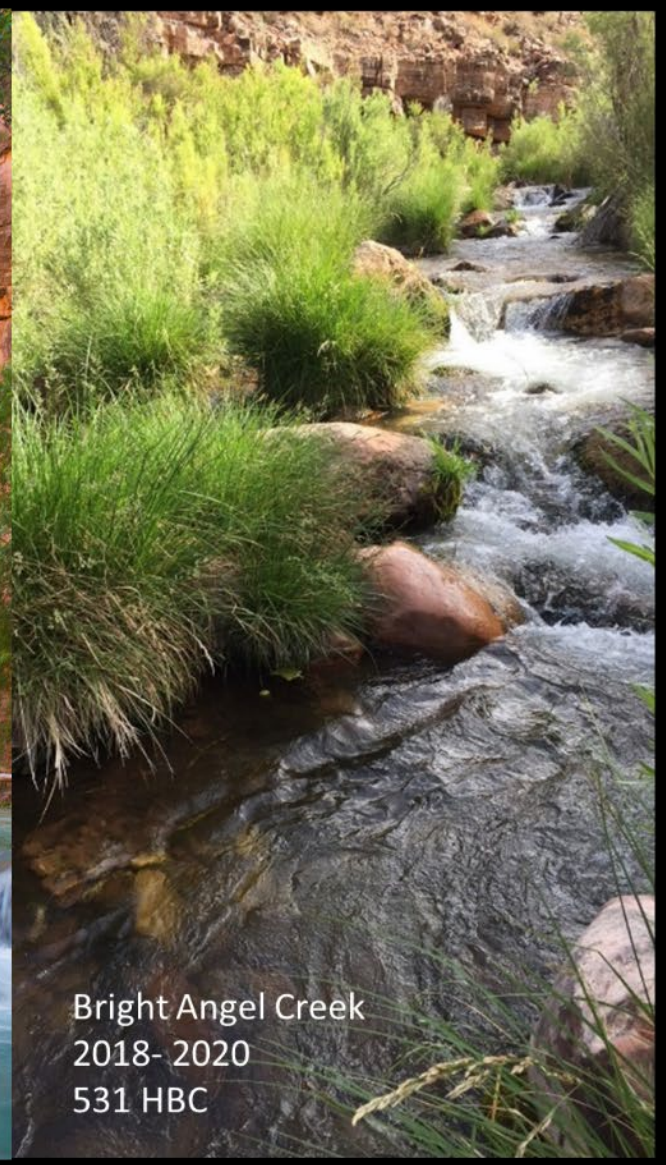
Project Objectives: To establish a second spawning population outside of the LCR or to use tributaries as “grow outs” to augment mainstem populations

Funding Amount & Source: primarily Bureau of Reclamation as well as NPS & Grand Canyon Conservancy

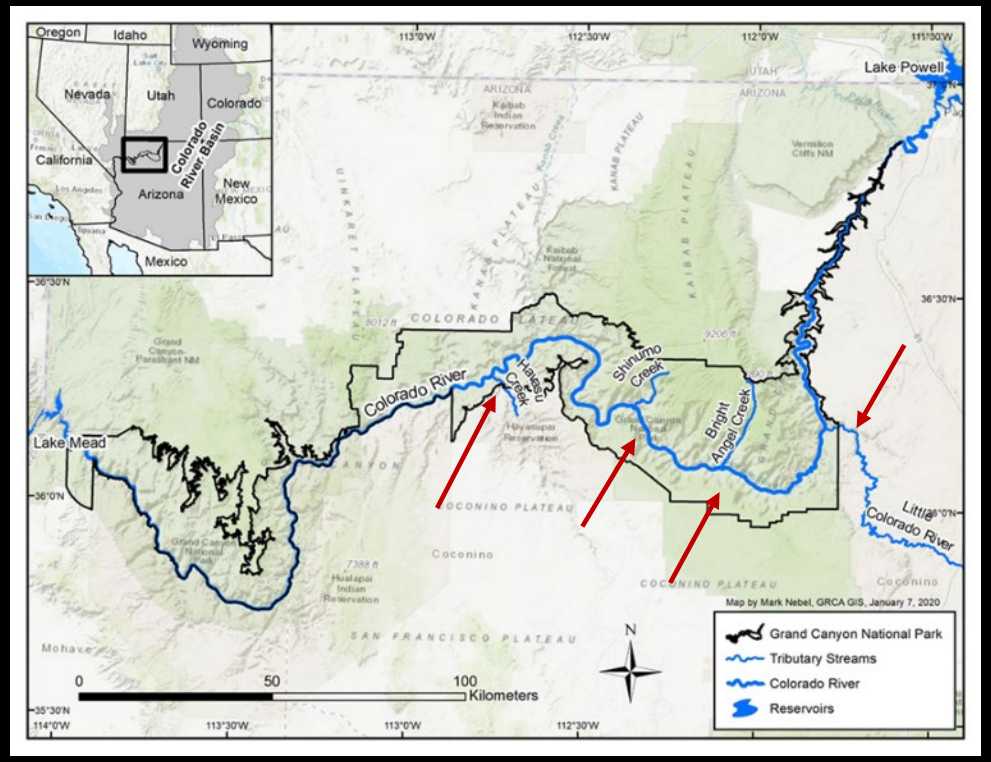
Cooperators: see previous slide

LTEMP goal addressed: Humpback Chub- meet humpback chub recovery goals, including maintaining a self-sustaining population, spawning habitat, and aggregations in the Colorado River and its tributaries below Glen Canyon Dam.

Translocations outside of the Little Colorado River



FY 22 HBC Translocation Activities

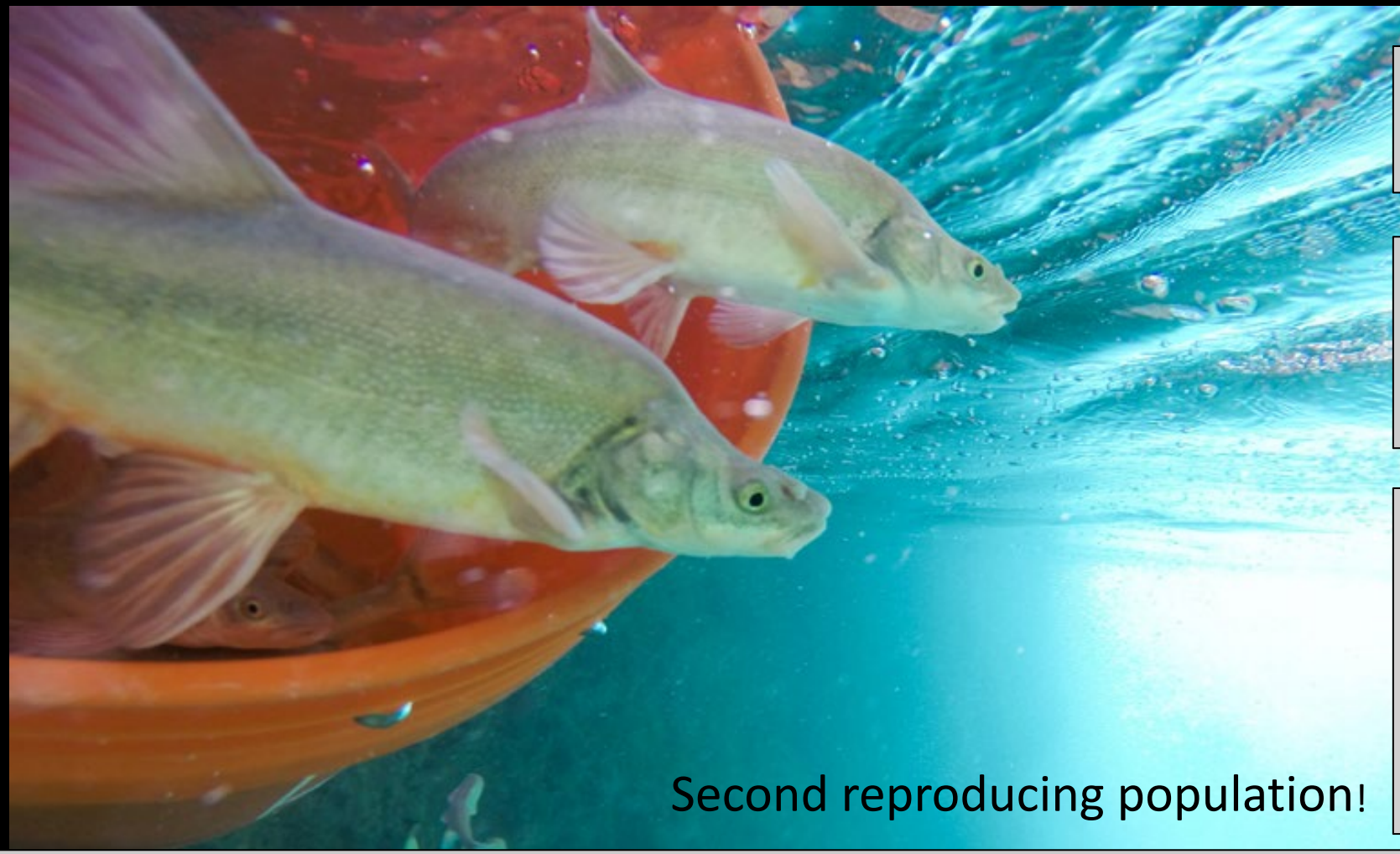


LOCATION	DATES COMPLETED	ACTIVITY
HAVASU CREEK	October 8-11, 2021	Monitoring
HAVASU CREEK	May 12-19, 2022	Monitoring
LITTLE COLORADO RIVER	Cancelled- insufficient HBC for collection	Larval collection
BRIGHT ANGEL CREEK	June 1-8, 2022	Monitoring
BRIGHT ANGEL CREEK, SHINUMO CREEK, HAVASU CREEK INFLOWS	June 15-26, 2022	Monitoring & Surveillance
BRIGHT ANGEL CREEK, SHINUMO CREEK, HAVASU CREEK INFLOWS	August 23- September 2, 2022	Monitoring & Surveillance

Havasu Creek

Havasu Creek

2022 Abundance Estimate= 145
(95% CI 138-170)



Second reproducing population!

Population growth rate for non-translocated HBC= 1.05
(95% C.I. = 0.79 – 1.41)

Mean relative weight= 89.5
(95% C.I. = 87.3 – 91.4)- slightly lower than the standard (100) but similar to past years

No new translocations have occurred since 2016 and abundance estimates have varied, but the population growth rate continues to indicate a stable population.

Bright Angel Creek

Bright Angel Creek

2022 Abundance Estimate= 12 (95% CI 7- 54*)

2018 cohort: n= 116, 104 unique antenna detections*
PIT-tagging hatchery error

2020 cohort: n= 415, 39 recaptured, 15 unique antenna detections

Shinumo- translocated, LCR, and mainstem-tagged HBC also detected

Survival estimate= 3- 11% (95% CI) in 1st season after translocation;

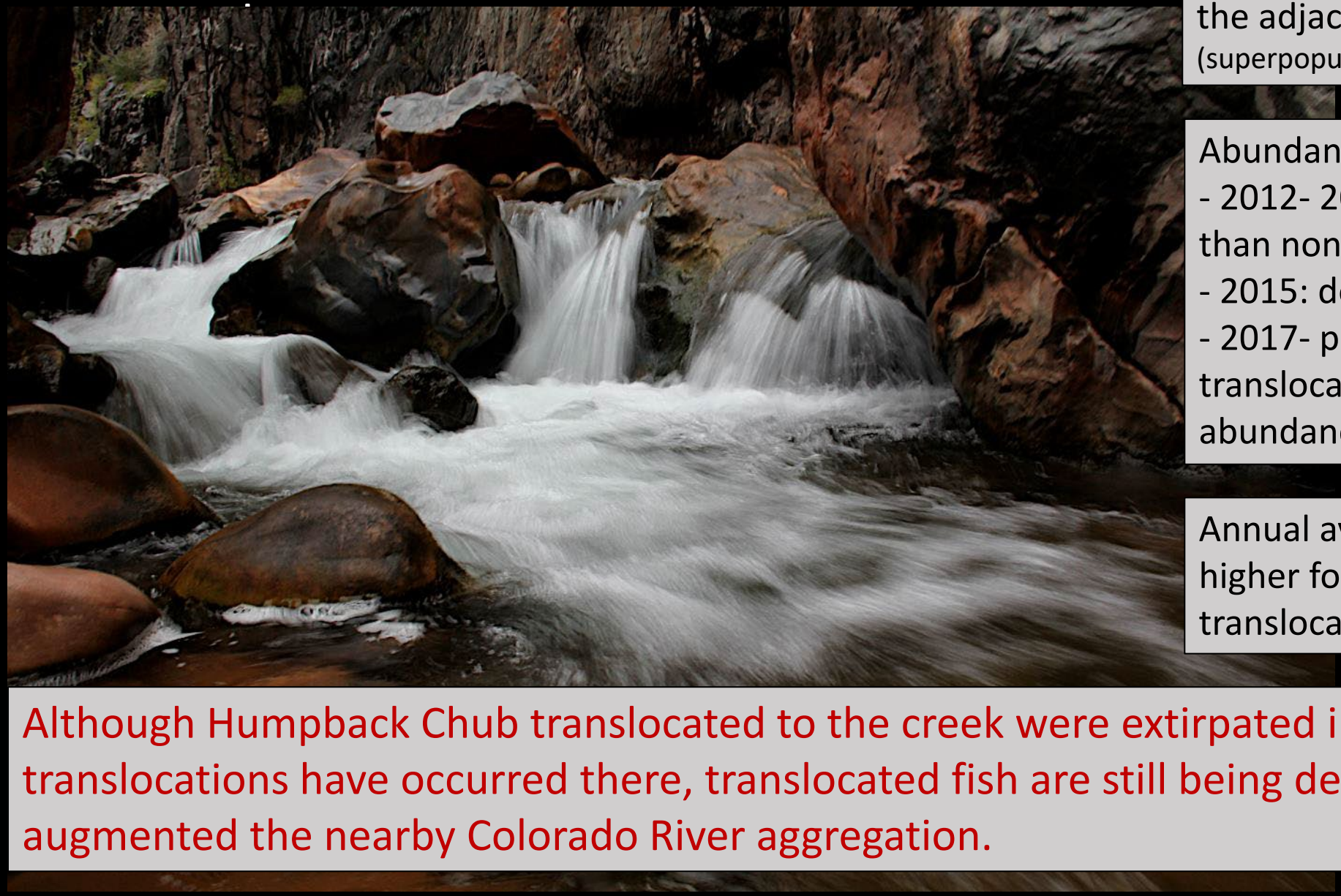
Why low survival?

- Trout predation & competition
- Hydrology
- Handling or electrofishing stress
- Data availability

Additional translocations will help to address hypotheses.

Plan to release a total of 1000 HBC over next several years, recommended in the HBC Genetics Management Plan (USFWS 2010), Comprehensive Fisheries Management Plan (NPS 2013), and Translocation and Refuge Framework (Van Haverbeke et al. 2016).

Shinumo Creek

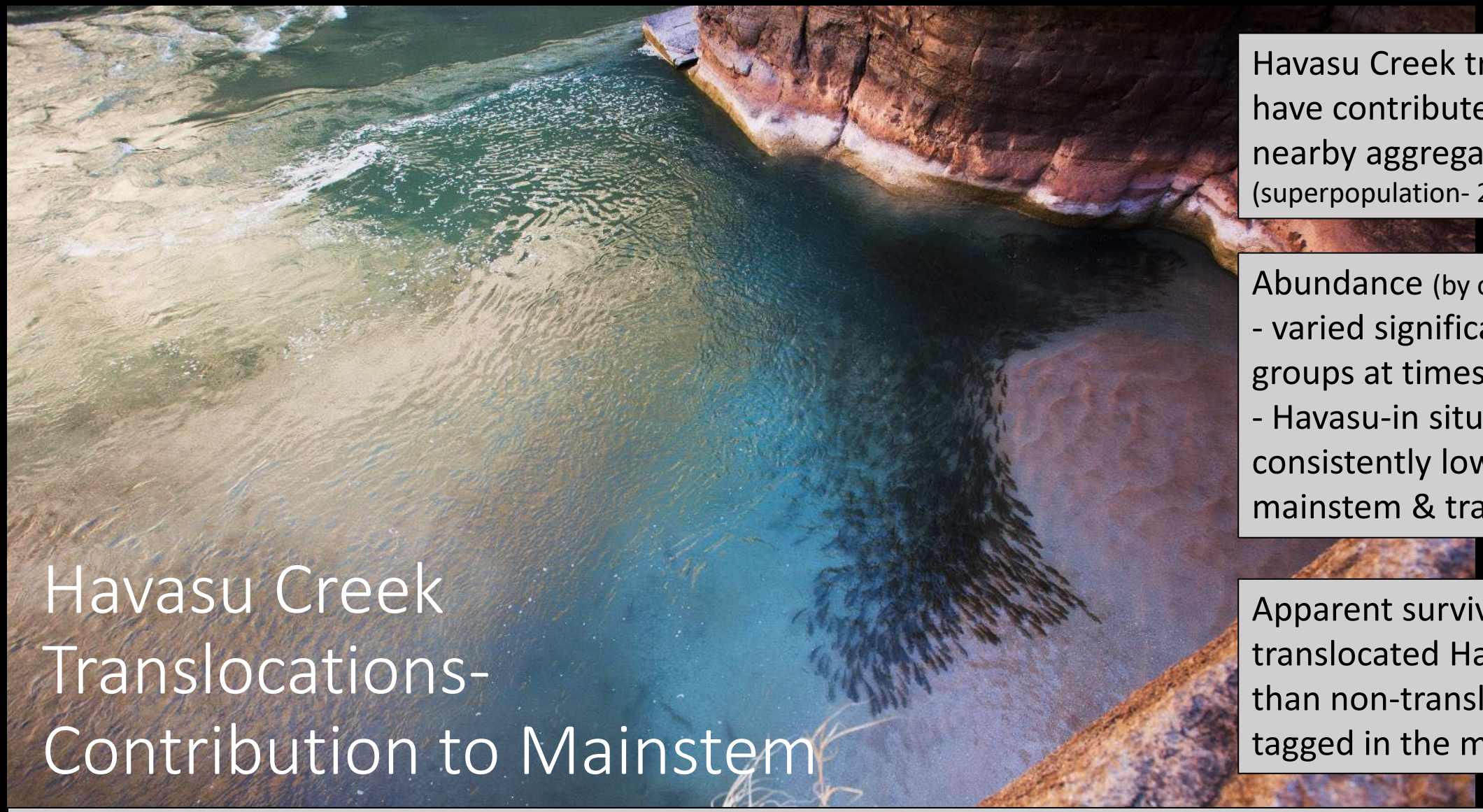


Shinumo Creek translocations contributed 43% of total abundance of the adjacent aggregation (superpopulation- 2010- 2022).

Abundance (by occasion)
- 2012- 2015: higher for translocated than non-translocated
- 2015: downward trend
- 2017- present: translocated & non-translocated fish have similar abundances

Annual average apparent survival was higher for translocated HBC than non-translocated fish.

Although Humpback Chub translocated to the creek were extirpated in 2014 and no new translocations have occurred there, translocated fish are still being detected and have augmented the nearby Colorado River aggregation.



Havasu Creek Translocations- Contribution to Mainstem

Havasu Creek translocations have contributed 24% to the nearby aggregation (superpopulation- 2011- 2022).

Abundance (by occasion)
- varied significantly between groups at times
- Havasu-in situ abundance consistently lower than that of mainstem & translocated

Apparent survival was higher for translocated Havasu Creek HBC than non-translocated fish tagged in the mainstem.

Havasu Creek translocations have resulted in the establishment of a second spawning and recruiting population. Although the last translocation was in 2016, translocations continue to contribute to the mainstem Havasu Creek aggregation.

Today (speed round)

Humpback Chub Translocation Monitoring

Bright Angel Creek Trout Removal Project

Planned 2023 Activities

Project title: Bright Angel Creek Trout Removal

Project elements: Not included in AMP workplan; relates to project H objectives

Project Objectives: To benefit Humpback Chub and other native fishes in the Colorado River by reducing the risk of predation

Funding Amount & Source: Bureau of Reclamation, with other funding from NPS and Grand Canyon Conservancy

Cooperators – see previous slide

LTEMP goals addressed:

- Humpback Chub- Meet humpback chub recovery goals, including maintaining a self-sustaining population, spawning habitat, and aggregations in the Colorado River and its tributaries below Glen Canyon Dam.
- Other Native Fish- Maintain self-sustaining native fish species populations and their habitats in their natural ranges on the Colorado River and its tributaries.
- Nonnative Invasive Species- Minimize or reduce the presence and expansion of aquatic nonnative invasive species.

Project Stipulations

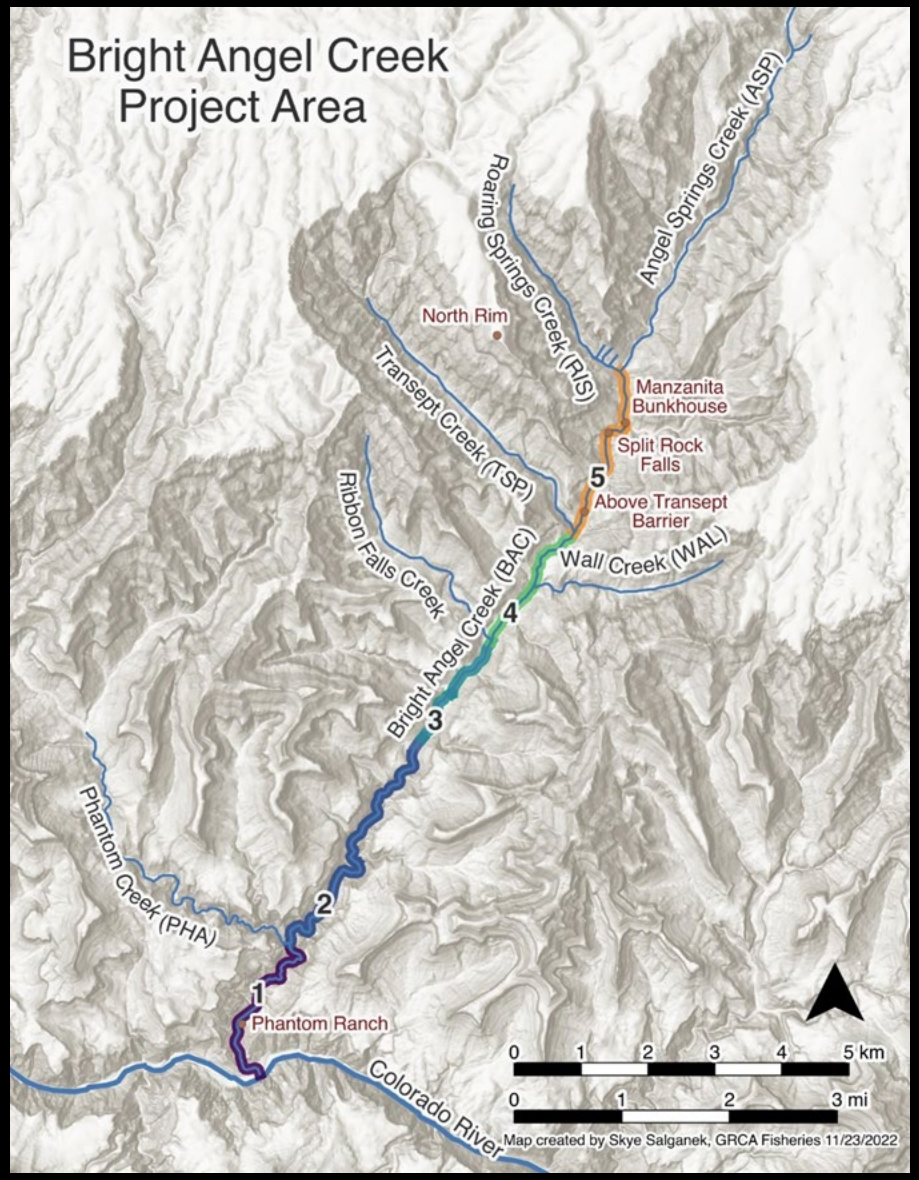
All trout removed are prepared for human consumption (> 200mm) or provided to the Zuni or Navajo aviaries or wildlife conservation organizations[1] for consumption by ceremonial eagles and other animals (< 200mm)

No electrofishing in Ribbon Falls Creek or tributary confluences

Sensitivity training for crews

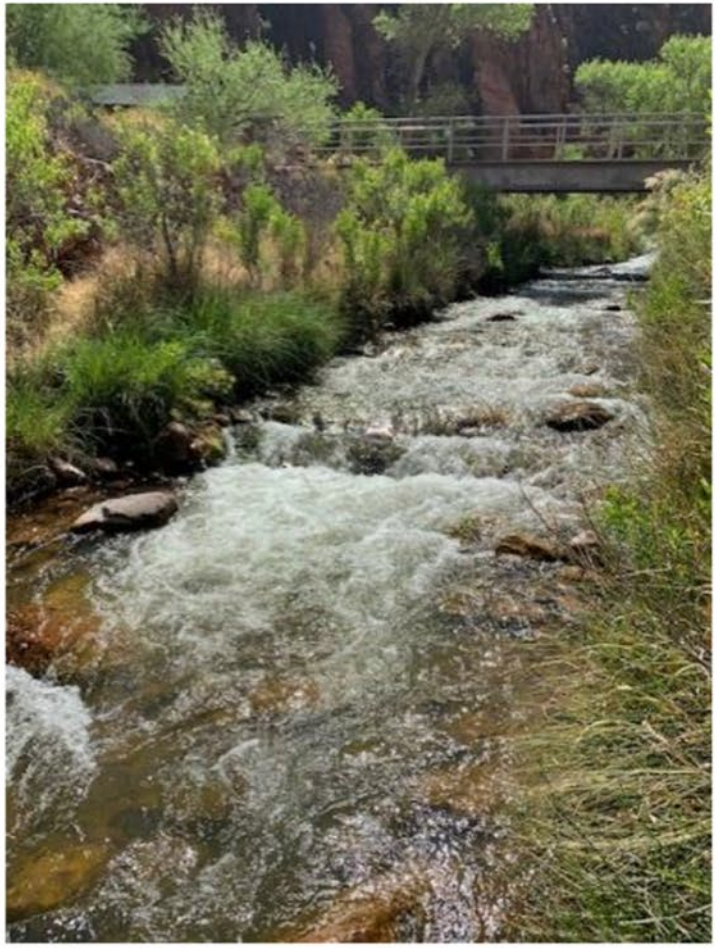
1. due to covid-related restrictions

Bright Angel Creek Backpack Electrofishing



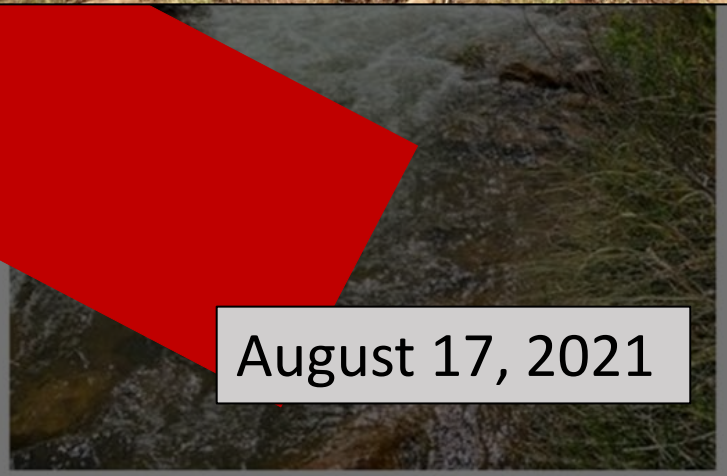
- October 21, 2021–January 22, 2022
- 13 miles of BAC, plus tributaries
- 3-pass depletion sampling in BAC
- 1-pass sampling in tributaries & in high trout density areas

Bright Angel Creek
Weir and fixed PIT antenna array



Grand Canyon is Stochastic!

October 5, 2021



August 17, 2021

Brown Trout

In 2021-22, abundance declined by 55% after 2020-21 surge

Ripe or spent females increased from 2020-21

LF histogram was strongly bimodal

- Age-0 cohort

- Larger fish → evidence of a surviving remnant from 2020-21

Rainbow Trout

declined by

In 2021-22, abundance declined by 74% after 2020-21 surge

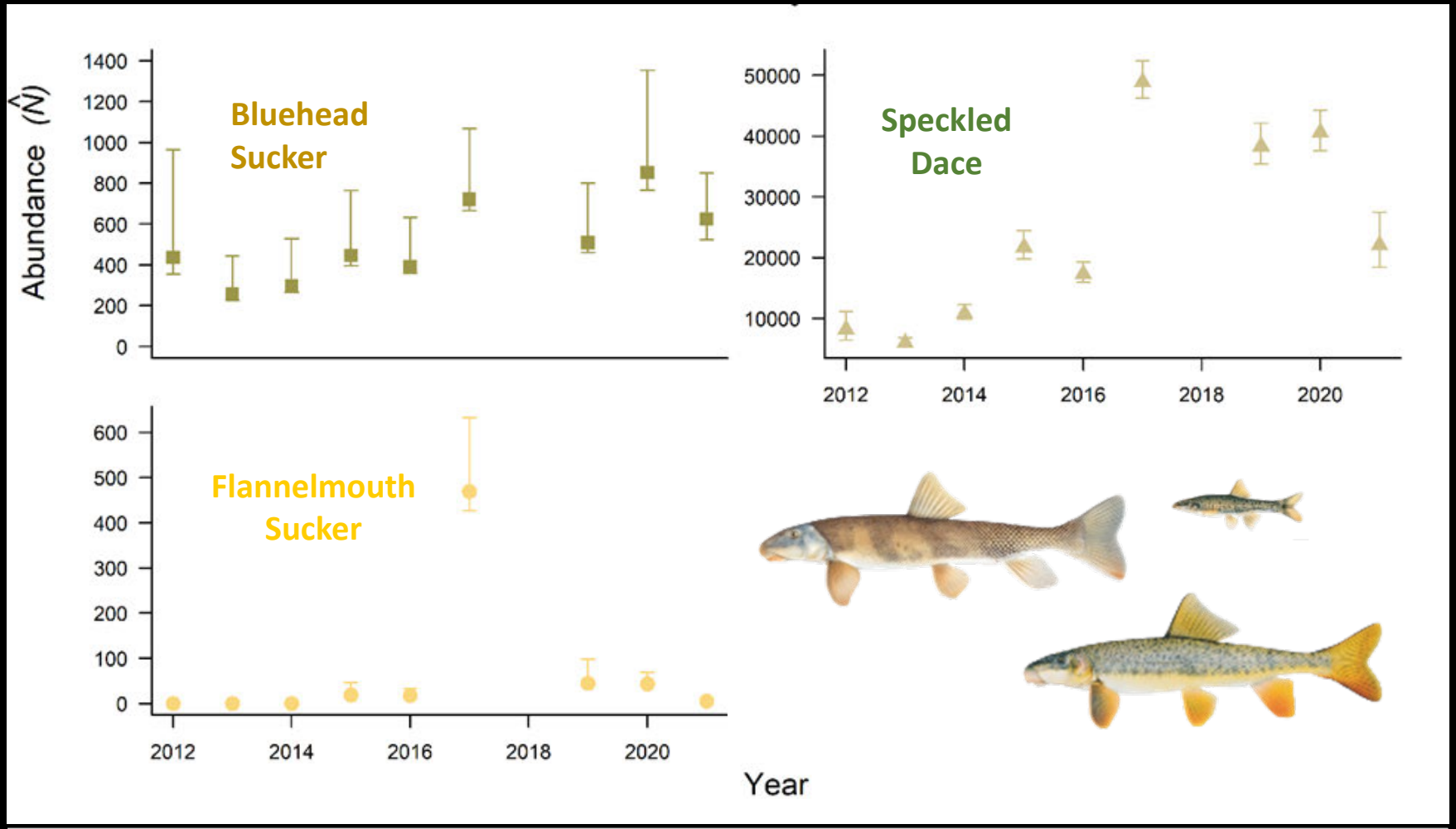
**Angel Springs not included in abundance estimate*

Captures* declined slightly from 2020-21 (from n= 5632 to n= 4216)

More than half captured from the upstream Angel Springs reach where electrofishing is less effective

Evidence of a strong Age-0 cohort in BAC & ASP

Native Fishes



All native fish abundance estimates remain above 2012-13 baseline levels

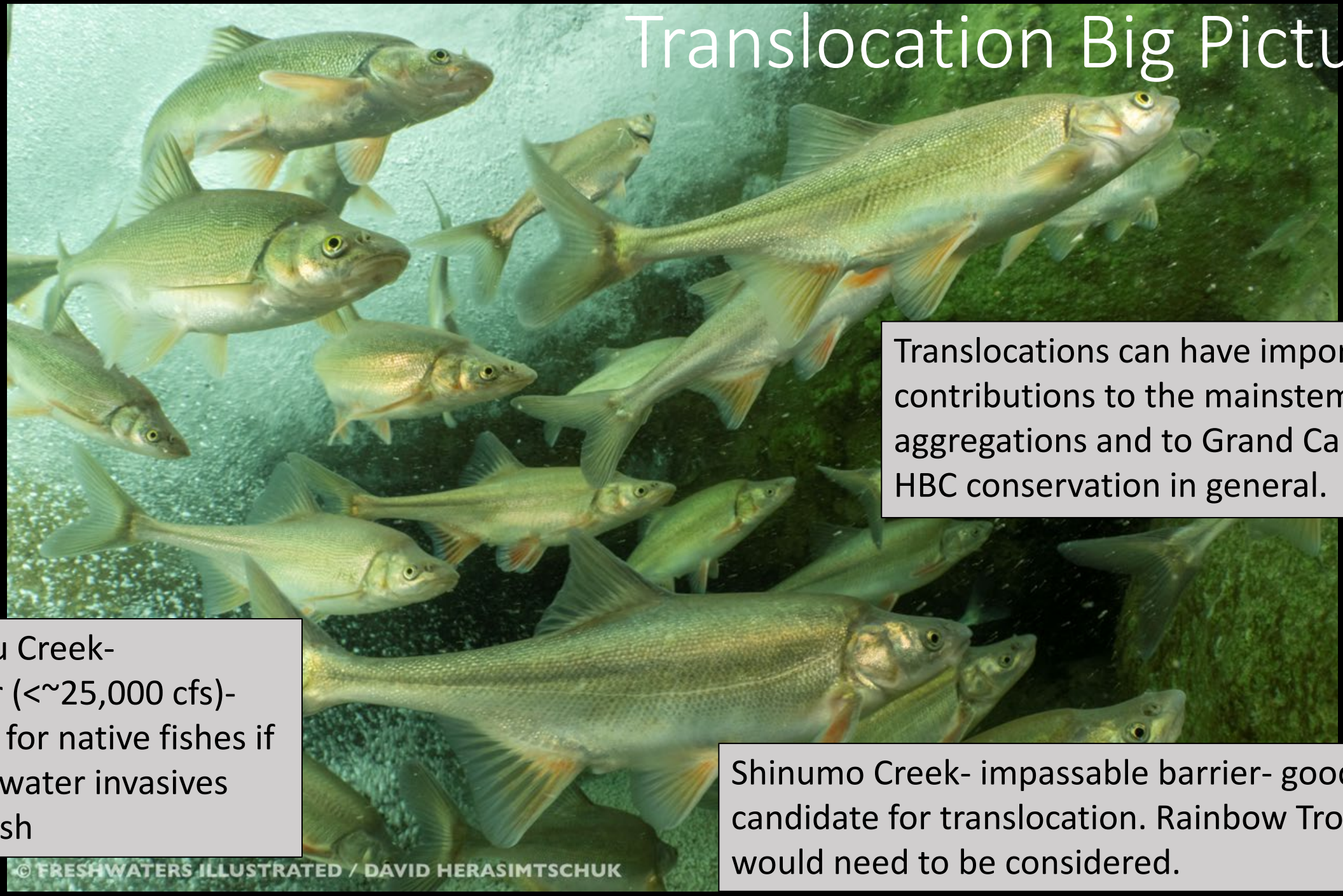
Bluehead Sucker abundance declined by 74% (n=625); no age-0 captured, small cohort of age-1

Speckled Dace abundance declined by 88% (n=22,098); no discrete age-0 peak

Flannelmouth Sucker abundance declined by 74% (n=5)

Humpback Chub captures declined 53% (n= 14); no age-0

Translocation Big Picture



Translocations can have important contributions to the mainstem HBC aggregations and to Grand Canyon HBC conservation in general.

Havasu Creek- barrier (<~25,000 cfs)- refuge for native fishes if warm-water invasives establish

Shinumo Creek- impassable barrier- good candidate for translocation. Rainbow Trout would need to be considered.

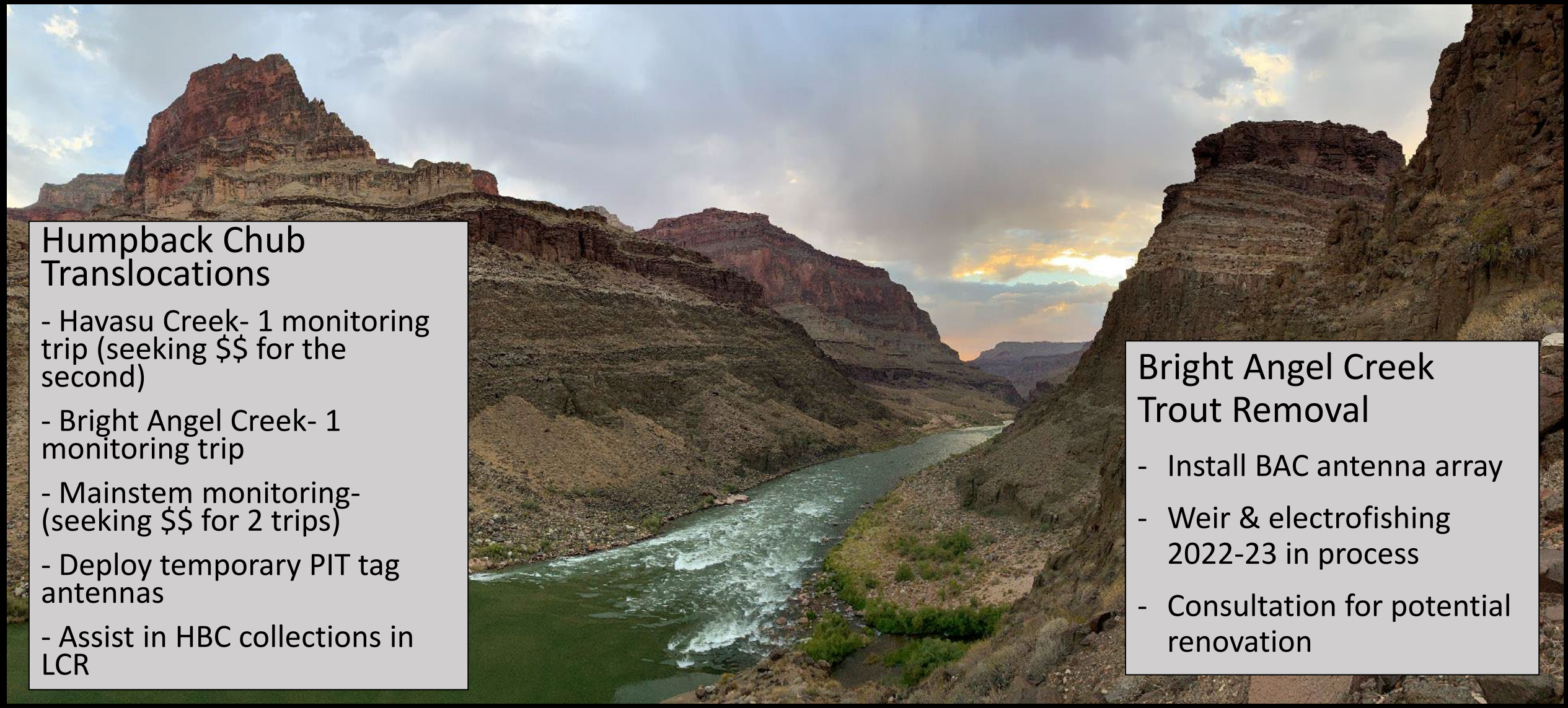
Trout Removal Big Picture

Suppression of the large 2020-21 year-classes for both species has brought trout abundance estimates down to ranges seen after four or five seasons of effort following project initiation.

Continued reproduction of trout in Bright Angel Creek, evident from an abundance of fish captured from an Age-0 cohort, indicates trout suppression will continue to be necessary


Today
(speed round)
Humpback Chub Translocation Monitoring
Bright Angel Creek Trout Removal Project
Planned 2023 Activities

FY 2023 Activities



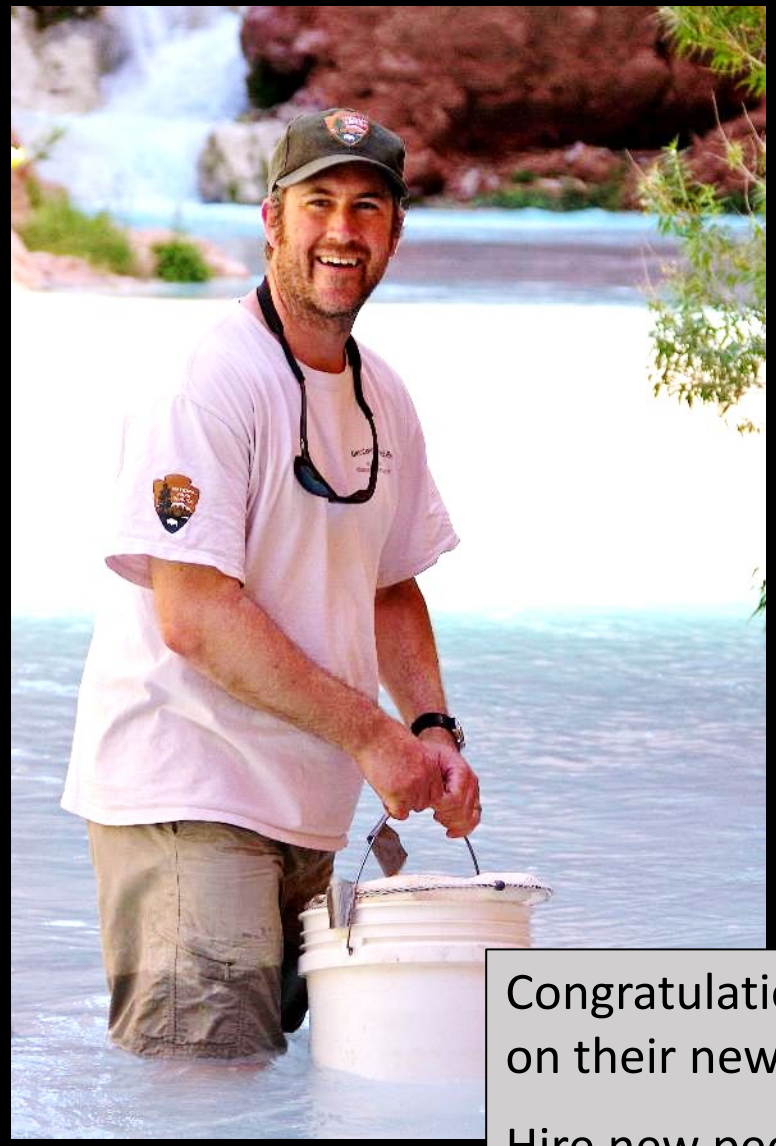
Humpback Chub Translocations

- Havasu Creek- 1 monitoring trip (seeking $$ for the second)
- Bright Angel Creek- 1 monitoring trip
- Mainstem monitoring- (seeking $$ for 2 trips)
- Deploy temporary PIT tag antennas
- Assist in HBC collections in LCR

Bright Angel Creek Trout Removal

- Install BAC antenna array
- Weir & electrofishing 2022-23 in process
- Consultation for potential renovation

More FY 2023



Congratulations to Brian and Bob on their new adventures!

Hire new people!

NPS- funded pilot Razorback Sucker release

Conduct surveillance for warmwater invasives fishes- pursuing multiple funding sources

Questions?

I am happy to talk anytime-

Emily_Omana@nps.gov
928-638-7477