

Glen Canyon Dam Adaptive Management Work Group
Agenda Item Form
May 22, 2018 Webinar

Agenda Item

Translocation of Humpback Chub into Bright Angel Creek: A Joint Project of Grand Canyon National Park, Bureau of Reclamation, and U.S. Fish and Wildlife Service

Purpose of Agenda Item

To inform attendees of the accomplishment of this milestone toward a Conservation Measure and Recovery Goals.

Action Requested

Information item only; while we will answer questions, no action is requested.

Presenter

Emily Omana Smith, National Park Service Fish Biologist, Grand Canyon National Park

Previous Action Taken

N/A

Relevant Science

[Review of Effective Suppression of Nonnative Fishes in Bright Angel Creek, 2012 - 2017, with Recommendations for Humpback Chub Translocations.](https://www.researchgate.net/publication/324823294_Review_of_Effective_Suppression_of_Nonnative_Fishes_in_Bright_Angel_Creek_2012-2017_with_Recommendations_for_Humpback_Chub_Translocations)

(https://www.researchgate.net/publication/324823294_Review_of_Effective_Suppression_of_Nonnative_Fishes_in_Bright_Angel_Creek_2012-2017_with_Recommendations_for_Humpback_Chub_Translocationshttps://www.researchgate.net/publication/324823294_Review_of_Effective_Suppression_of_Nonnative_Fishes_in_Bright_Angel_Creek_2012-2017_with_Recommendations_for_Humpback_Chub_Translocations)

Summary of Presentation and Background Information

The presenter will review the following topics:

- Conservation Measures - *Humpback Chub Translocation – Reclamation will continue to assist in funding and implementation of translocating humpback chub in the LCR and into tributaries of the Colorado River in Marble and Grand canyons, and in monitoring the results of these translocations. Non-native fish control in these tributaries will be an essential element to translocation, so Reclamation will help fund control of both cold water and warm water non-native fish in tributaries, as well as efforts to translocate humpback chub into these tributaries. Havasu, Shinumo, and Bright Angel creeks will continue to be the focus of translocation efforts and evaluation, although other tributaries may be considered.*
- Trout suppression goals and techniques in Bright Angel Creek
- Results of a peer review of the project.
- Installation of a PIT tag antennae.
- Humpback Chub translocation.
- Future monitoring and trout suppression.

National Park Service
U.S. Department of the Interior
Grand Canyon National Park



Translocation of Humpback Chub into Bright Angel Creek:

A Joint Project of Grand Canyon National Park, Bureau of Reclamation, and U.S. Fish and Wildlife Service

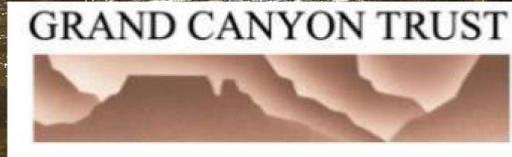
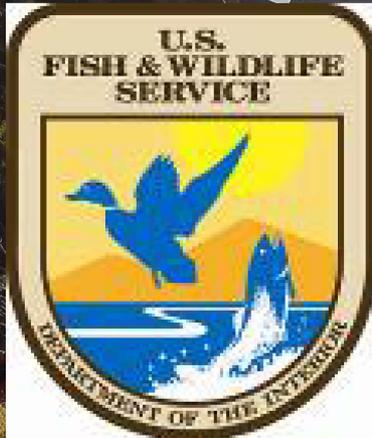
Emily Omana Smith, Brian Healy , Robert Schelly,
Marianne Crawford, Mark McKinstry, Kirk Young



Acknowledgments



**Grand
Canyon
Association**



Funded by Reclamation, NPS, GCA

Humpback Chub

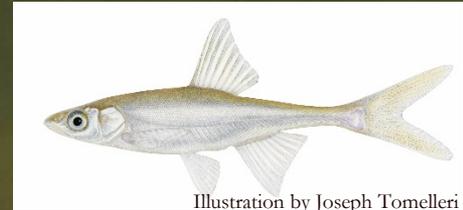


Illustration by Joseph Tomelleri



Photo by George Andjreko, AZ Game & Fish

GRAND CANYON NATIVE FISH RESTORATION

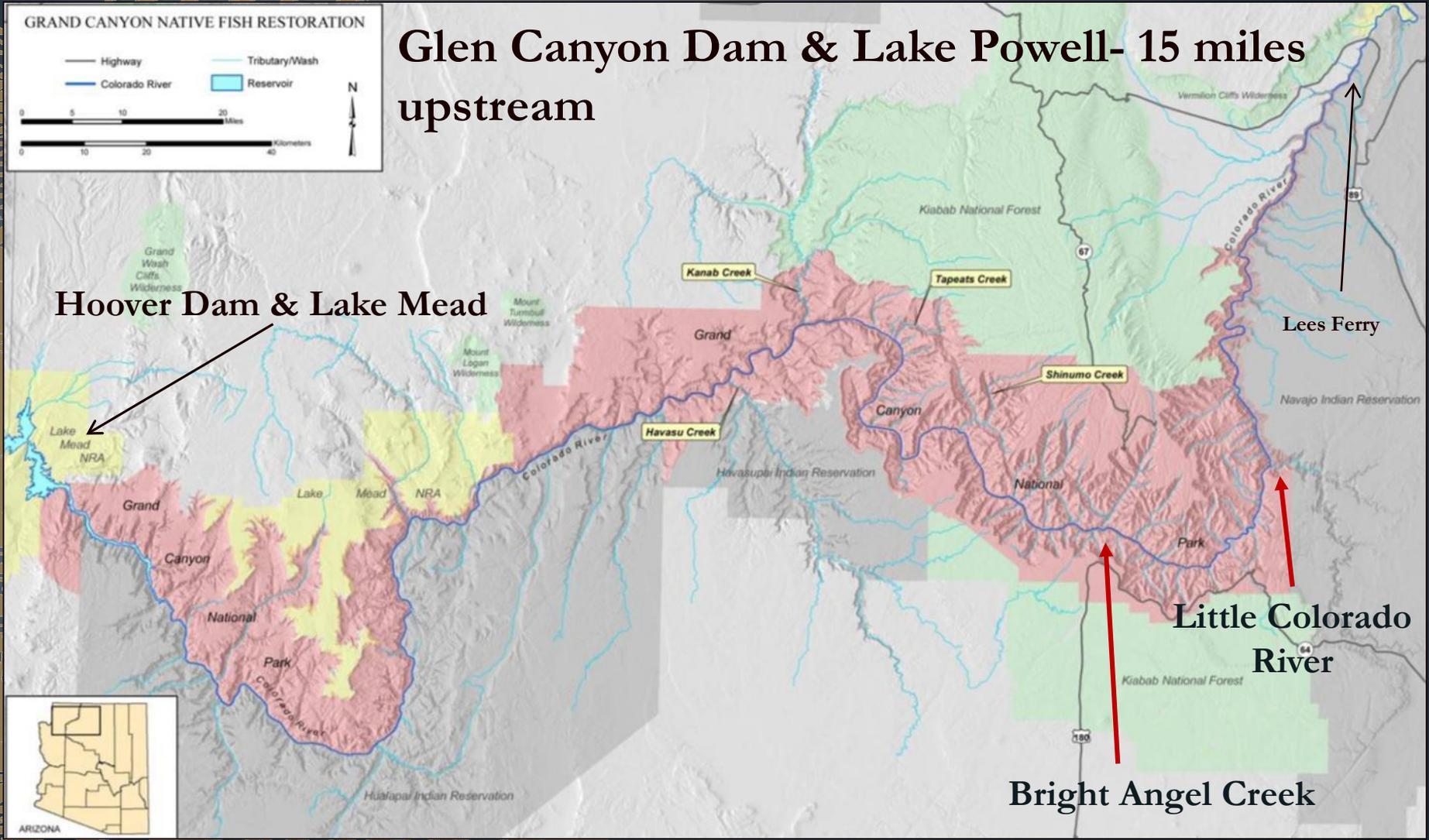
— Highway
 — Colorado River
 — Tributary/Wash
 — Reservoir

0 5 10 20 Miles
 0 10 20 40 Kilometers

N

Glen Canyon Dam & Lake Powell- 15 miles upstream

Hoover Dam & Lake Mead



Lees Ferry

Little Colorado River

Bright Angel Creek

Humpback Chub in Grand Canyon

Largest remaining population

Primary spawning location

Risk of extirpation



Conservation Measures – Humpback Chub

- Glen Canyon Dam Operations Biological Opinion:
 - Control of nonnative fish (Rainbow and Brown Trout)
 - Translocations to Grand Canyon tributaries
 - Focus: Shinumo, Havasu, Bright Angel creeks

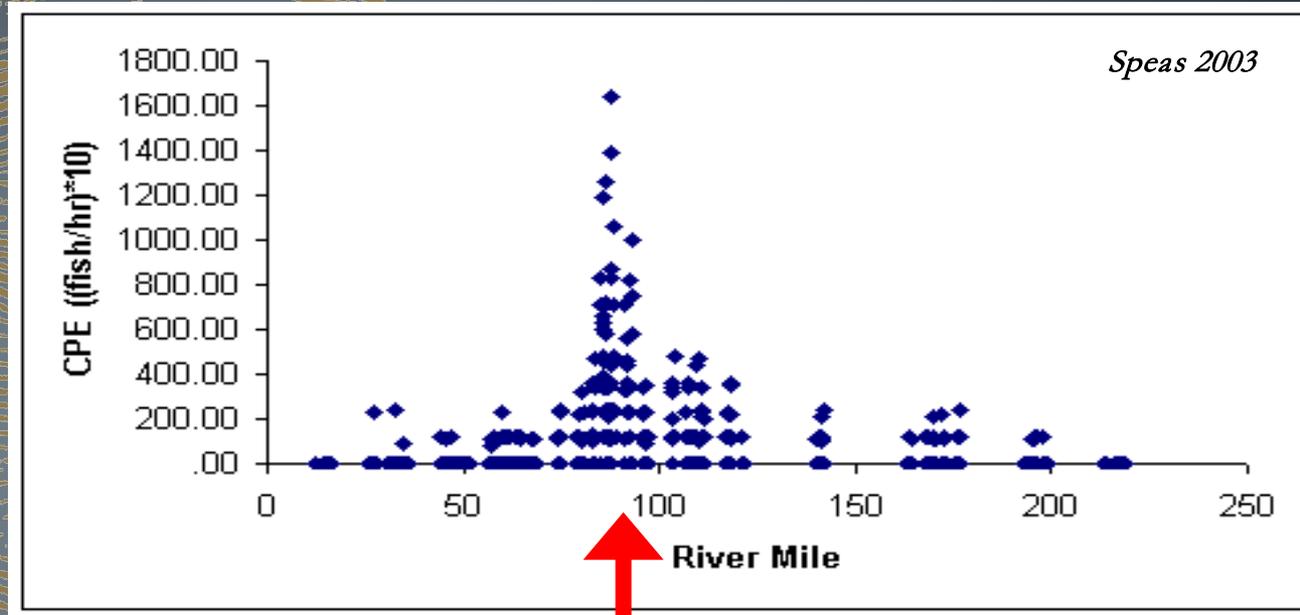


Nonnative Control in/around Bright Angel Creek



- 2010-2018
- Weir
- Backpack electrofishing*
- Mainstem electrofishing*

Why Bright Angel Creek?



Bright Angel Creek Inflow

Primary source of Brown Trout in Grand Canyon*

Brown Trout prey on and compete with native fishes (Whiting et al. 2014, Yard et al. 2011)

Suitable temperature regime for native fish



Methods

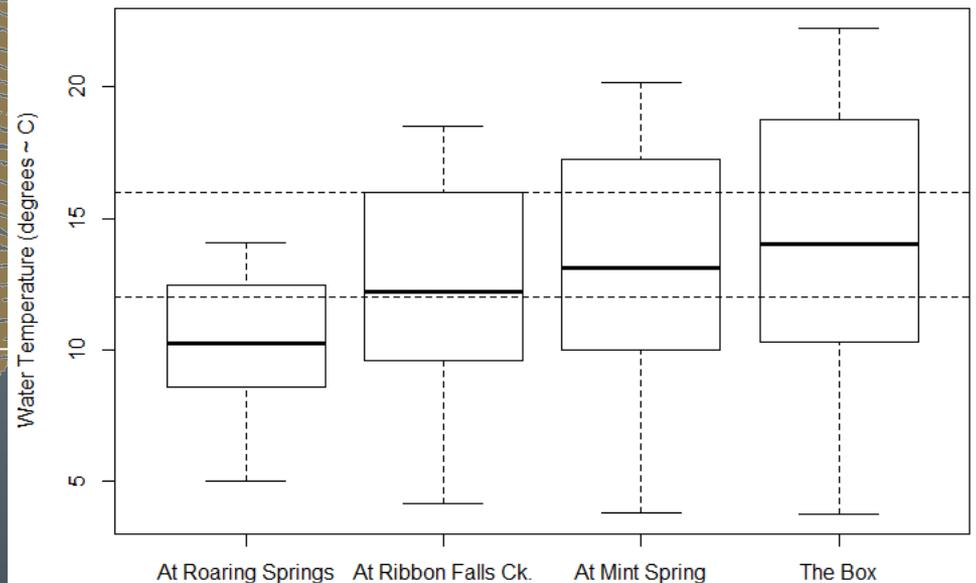


Water Temperature Suitable for Native Fishes

Criteria	Little Colorado River	Bright Angel Creek	Shinumo Creek	Havasu* Creek
Water Quantity (cfs)	250	35	9	63
Temperature Range (°C)	2-25	1-24	1-23	9-23

From Valdez et al. 2000-
evaluated
tributaries for translocation
suitability, relative to LCR

Annual variation in average
daily water temperature at 4
stations in Bright Angel Creek
(5/30/2013- 8/9/2015)



Bright Angel Creek Site

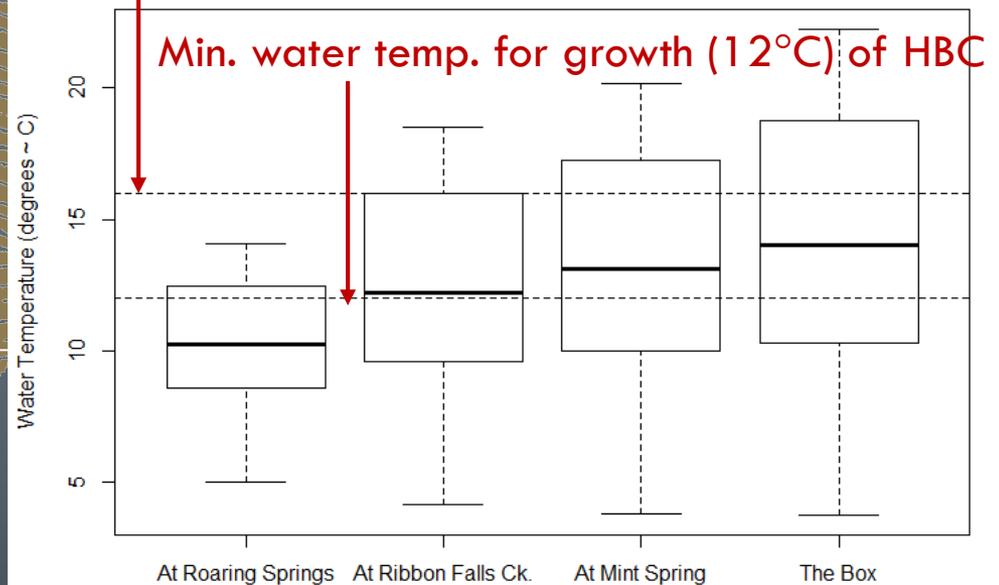
Blair et al., in prep

Water Temperature Suitable for Native Fishes

Criteria	Little Colorado River	Bright Angel Creek	Shinumo Creek	Havasu* Creek
Water Quantity (cfs)	250	35	9	63
Temperature Range (°C)	2-25	1-24	1-23	9-23

From Valdez et al. 2000-
evaluated
tributaries for translocation
suitability, relative to LCR

Min. water temp. for reprod. (16°C) in HBC



Annual variation in average
daily water temperature at 4
stations in Bright Angel Creek
(5/30/2013- 8/9/2015)

Bright Angel Creek Trout Control: Goals and Objectives

- **Goals:**
 - Enhance native fish populations in Bright Angel Creek
 - Reduce risk of predation upon Humpback Chub in Colorado River
 - Foster meaningful tribal relations and integrate perspectives into management
- **Mechanical Removal Objectives:**
 - Reduce trout abundance by 80% (a potential threshold for benefits to native fish would be realized; Mueller 2005)
 - Maintain/improve native fish populations in Bright Angel Creek
 - When trout reduction objective met, translocate Humpback Chub

Adaptive Management and Uncertainties

5- year adaptive management strategy

Uncertainties:

Could we suppress trout using mechanical methods?

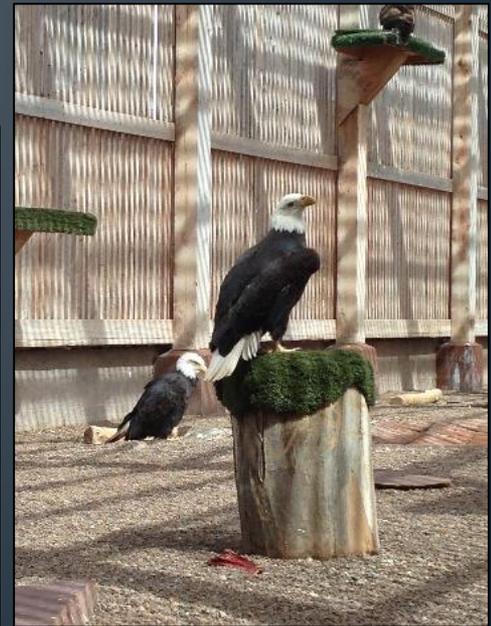
Would potentially negative impacts of electrofishing to native fish outweigh benefits of trout suppression?



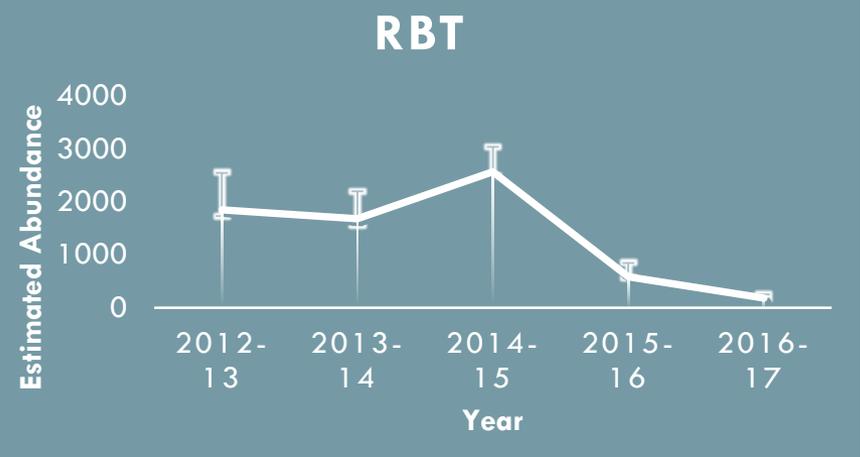
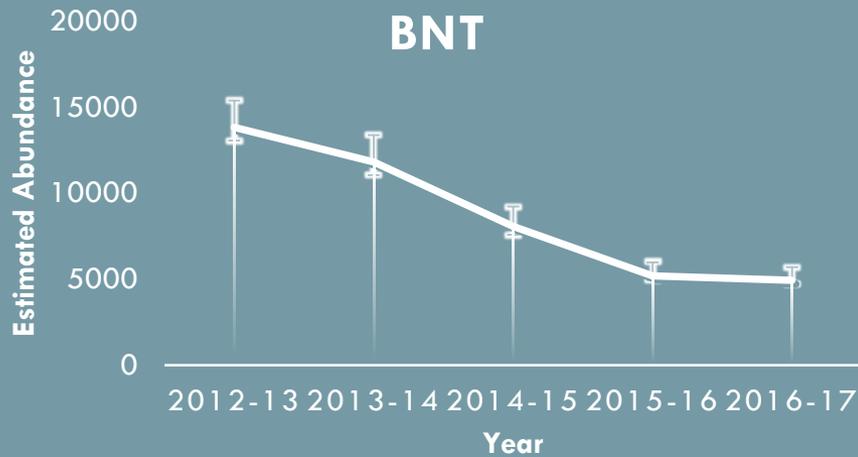
Joe Tomelleri illustrations

Beneficial Use

- Section 106 Consultation: Tribes expressed concern related to taking life
- Memorandum of Agreement stipulation:
 - *“GCNP....will, to the greatest extent feasible, use euthanized trout for human consumption.”*
- Avoided Ribbon Falls Creek and confluence



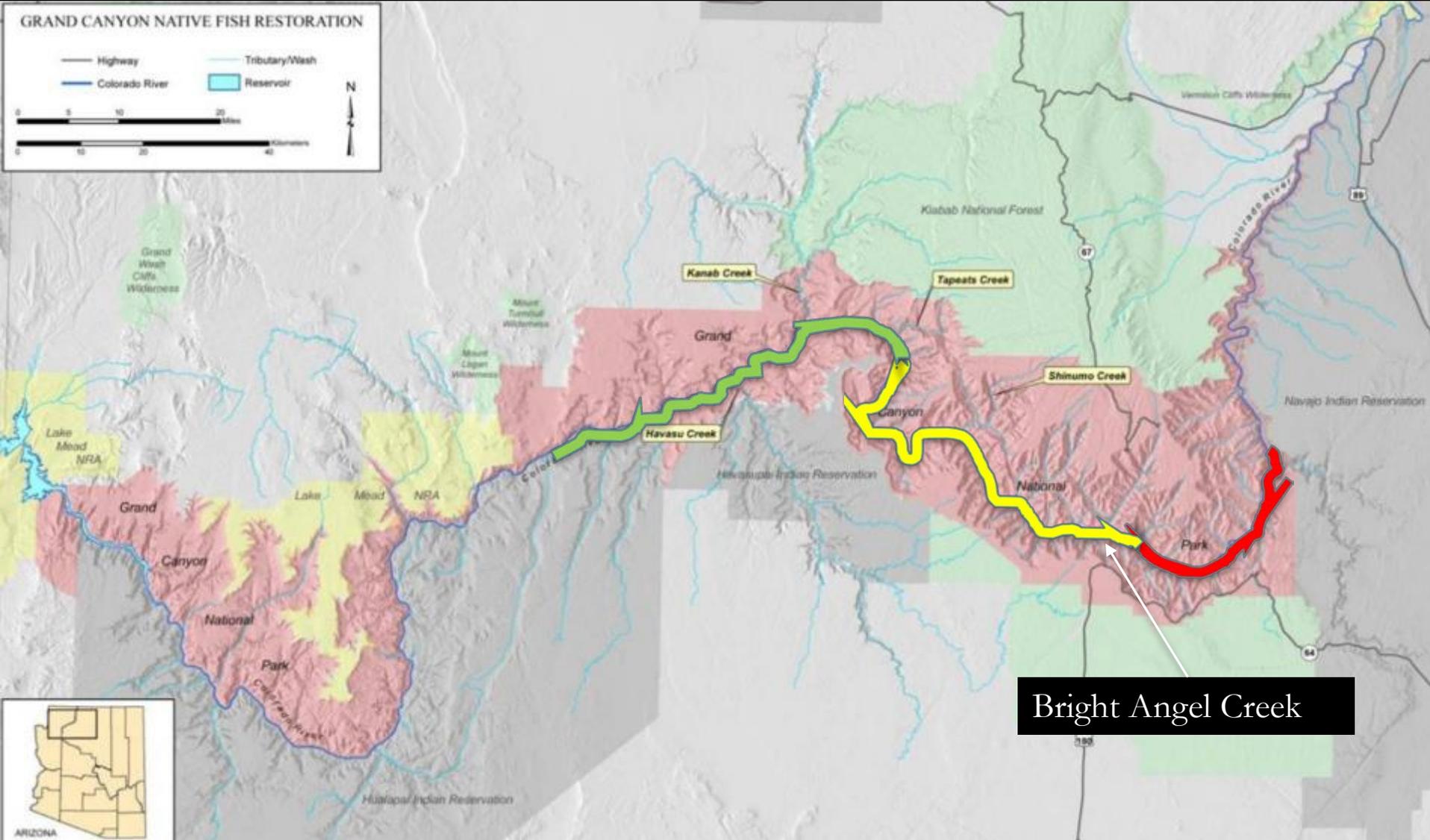
Results



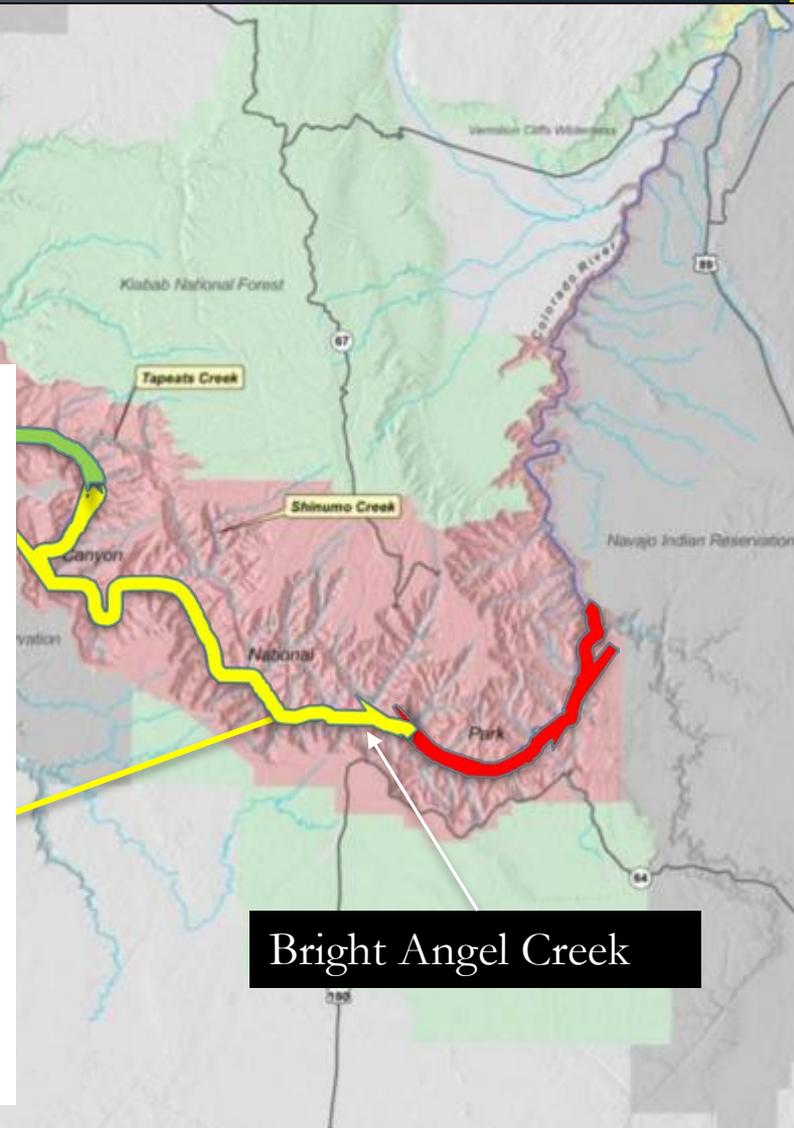
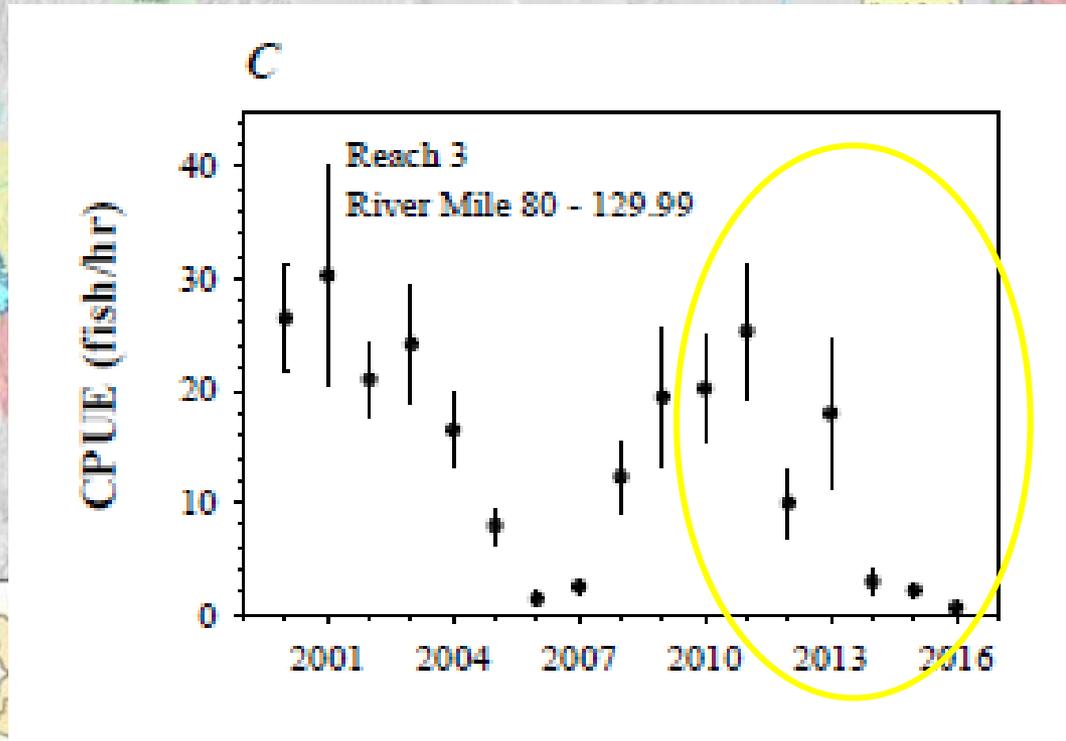
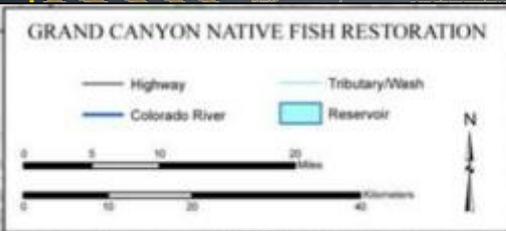
Overall reduction of 64%

Overall reduction of 90%

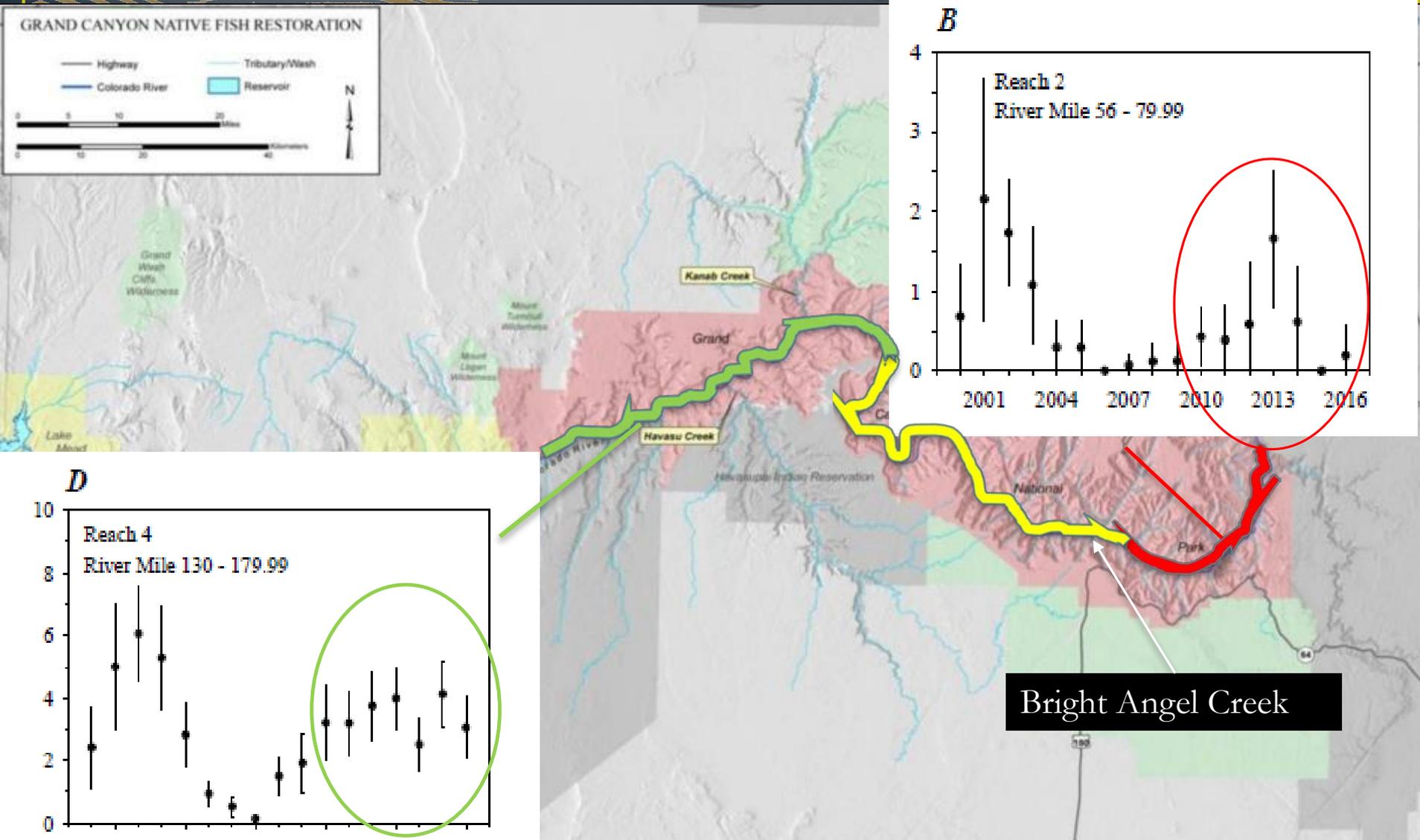
Mainstem Impact



Localized Mainstem Impact



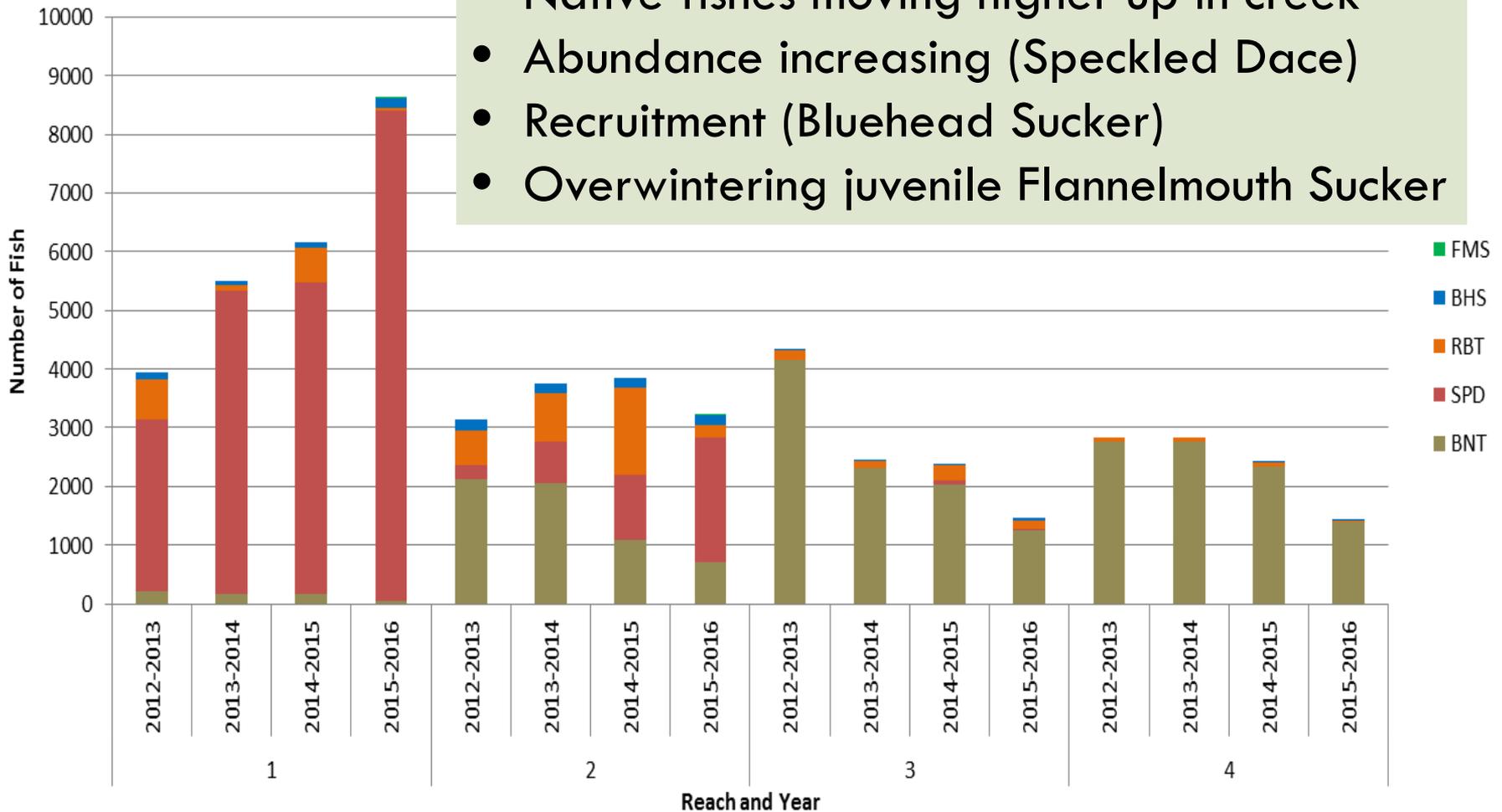
Localized Mainstem Impact- not here



Results- Native Fishes

Catch by Species for Reach and Year

- Native fishes moving higher up in creek
- Abundance increasing (Speckled Dace)
- Recruitment (Bluehead Sucker)
- Overwintering juvenile Flannelmouth Sucker



Review of Effective Suppression of Nonnative Fishes in Bright Angel Creek, 2012 - 2017, with Recommendations for Humpback Chub Translocations

Available for your reading pleasure!
See link on the agenda.

Peer reviewed by Dr. David Braun,
Dr. Phaedra Budy, Dr. Keith Gido, Dr.
Frank Rahel, and Dr. Chris Kitcheyan

Grand Canyon

National Park Service
U.S. Department of the Interior
Grand Canyon National Park



Review of Effective Suppression of Nonnative Fishes in Bright Angel Creek, 2012 - 2017, with Recommendations for Humpback Chub Translocations

Prepared by:

*Brian Healy, Robert Schelly, Clay Nelson¹, Emily Omana Smith, and Melissa Trammell, and
Rebecca Koller*

National Park Service – Grand Canyon National Park

*Report Prepared for the Upper Colorado Region, Bureau of Reclamation, Interagency
Agreement Number: R12PG40034*

*National Park Service, Grand Canyon National Park,
Flagstaff, Arizona
April 27, 2018*

¹ Current address: US Geological Survey - Grand Canyon Monitoring and Research Center, Flagstaff, Arizona

Peer Reviewer Comments (excerpts)



Removal effort was successful.

Proceed with experimental Humpback Chub translocation with careful monitoring.

Consider installation of a PIT tag array.

Continue trout control to avoid a potential for a compensatory response, ...redistribute trout suppression efforts to “hotspots” ..., and/or target areas of high YOY trout abundance.

Time to Translocate!

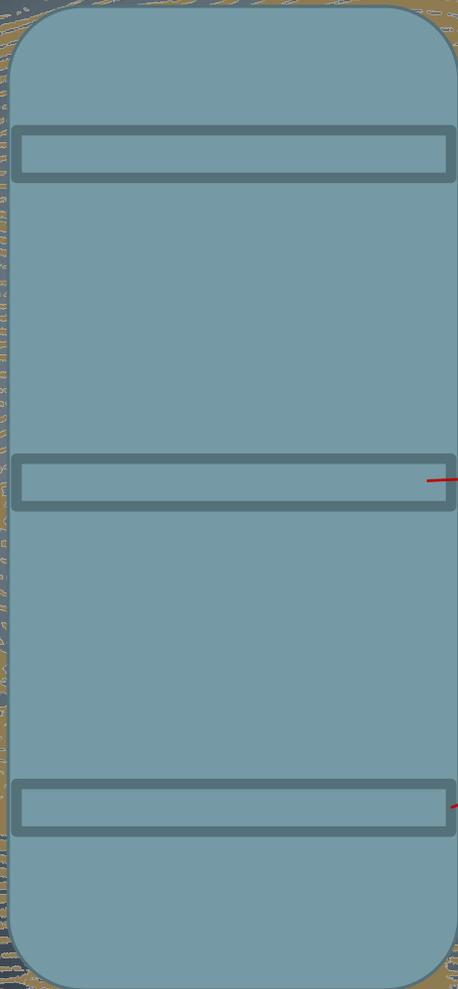
Southwest Native Aquatic
Resources Recovery Center
(USFWS) had adult HBC onsite,
collected from the LCR

Completed appropriate
compliance

Identified appropriate
translocation site



PIT tag Antenna Array



~12 meters



Translocation on May 14, 2018



Southern Native Aquatic Resources and Recovery Center personnel transported ~120 HBC, beginning May 13

USFWS and GRCA loaded fish for helicopter transport from the South Rim

HBC were delivered via helicopter sling to Bright Angel Creek

Translocation on May 14, 2018



Translocation on May 14, 2018





Tributary Translocations in GRCA

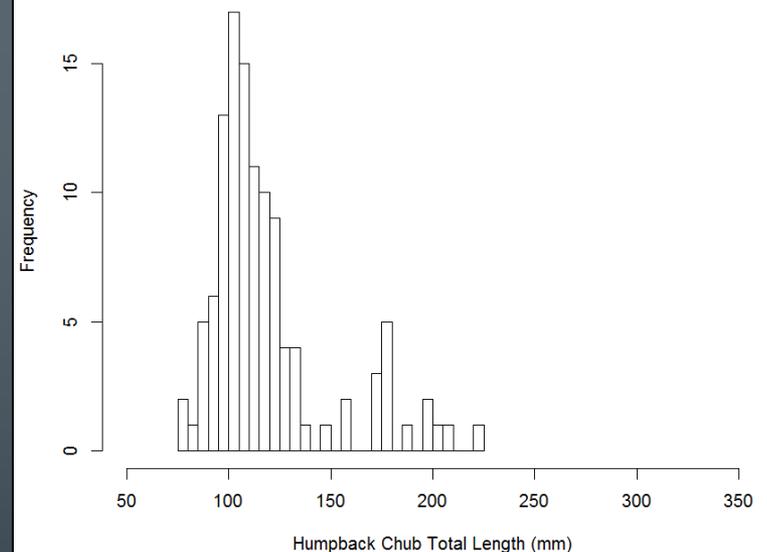
Bright Angel Creek is the 3rd Grand Canyon tributary

Shinumo Creek translocated fish still in the mainstem

Havasu Creek represents a second reproducing population in Grand Canyon



Non-tagged Humpback Chub, Havasu Creek, May 2018, n = 116, Preliminary



An aerial photograph of a river winding through a dense forest. The water is clear, reflecting the sunlight and the surrounding greenery. The trees are a mix of dark green and lighter shades, suggesting different species or stages of growth. The river's path is highlighted by the way the light reflects off its surface, creating a shimmering effect. The overall scene is peaceful and natural.

Questions?

EXPERIENCE YOUR AMERICA