Fisheries review: Annual Reporting FY2021

Charles B. Yackulic, US Geological Survey, Southwest Biological Science Center, Grand Canyon Monitoring and Research Center

with help from

David Ward, Emily Omana Smith, Rob Schelly, Rebecca Koller, Brian Healy, Jan Boyer, David Rogowski, David Van Haverbeke, Maria Dzul, Kirk Young, Mike Pillow, Pilar Wolters, Josh Korman, Mariah Giardina, Crosby Hedden, Lauren Mason-Sarantopulos, Lucas Bair, Lindsey Bruckerhoff, Drew Eppehimer, Kevin Bestgen, Jian Wang, Kim Dibble, Bryce Mihalevich, Jack Schmidt, Michael Yard, and many more
Outline

- Rainbow and brown trout
- Humpback chub & other native fish species
- Warm-water nonnatives
Rainbow Trout relative abundance in Lees Ferry is the lowest ever recorded and not meeting AZGF management targets.

(Preliminary, do not cite)
Brown trout adult abundance in Lees Ferry continues to increase.
Why these trends?

- Brown trout eat different food and have better growth.
- Positive feedbacks in species interactions.
- Increasing aquatic vegetation and perhaps water temperatures may be facilitating shift in species dominance.

(Preliminary, do not cite)
How are rainbow and brown trout doing elsewhere in the system?
Dramatic increase in brown trout in Bright Angel creek in 2020 coincident with minimal spring and monsoon flooding.

*All trout are preserved for beneficial use*

(Preliminary, do not cite)
However, mainstem brown trout abundances below Paria remain low.
Outline

- Rainbow and brown trout
- Humpback chub & other native fish species
- Warm-water nonnatives
Abundance of humpback chub that spawn in Little Colorado River is likely declining over last few years.
There was phenomenal growth in mainstem Colorado River near the Little Colorado River coincident with warmest water temperatures observed in decades.
Abundances of humpback chub appears stable or increasing in western Grand Canyon

Provisional data. Do not cite.
Various data streams suggest other native fish are relatively stable.
Translocation efforts and associated monitoring in Bright Angel, Havasu, and above Chute falls continue. Survival and growth in Havasu and above Chute Falls are very good and newer Bright Angel effort is still being evaluated.
Outline

- Rainbow and brown trout
- Humpback chub & other native fish species
- Warm-water nonnatives
Risks posed by warm-water nonnatives depend on life stage, individual effectiveness and overall abundance and are additive among species.
Some species, like catfish, are likely already impacting humpback chub and other native fish in the Little Colorado River.

Size distribution of channel catfish in the Little Colorado River

(Preliminary, do not cite)
Other species, like smallmouth bass, that are big issues in Upper Basin may increase in coming years.

Inflows – resample 2000 to 2020

Depth vs. water temperature 2000 to 2020

Evaporation, etc. using same equations as CRSS

(Preliminary, do not cite)
Some take-homes

- Lees Ferry fishery is still rainbow trout dominated but trending towards brown trout dominance.

- CRRe is dominated by native fish species in most locations. Humpback chub are likely declining near LCR, but abundant and stable down river.

- Nonnatives that are known to be threats are present in upper and lower parts of CRRe and in tributaries.

- Warmer water likely to lead to dramatic and rapid shifts, some of which may be difficult to reverse.
Thank you!