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GCDAMP Annual Reporting Meeting Update: Fishes

David Ward

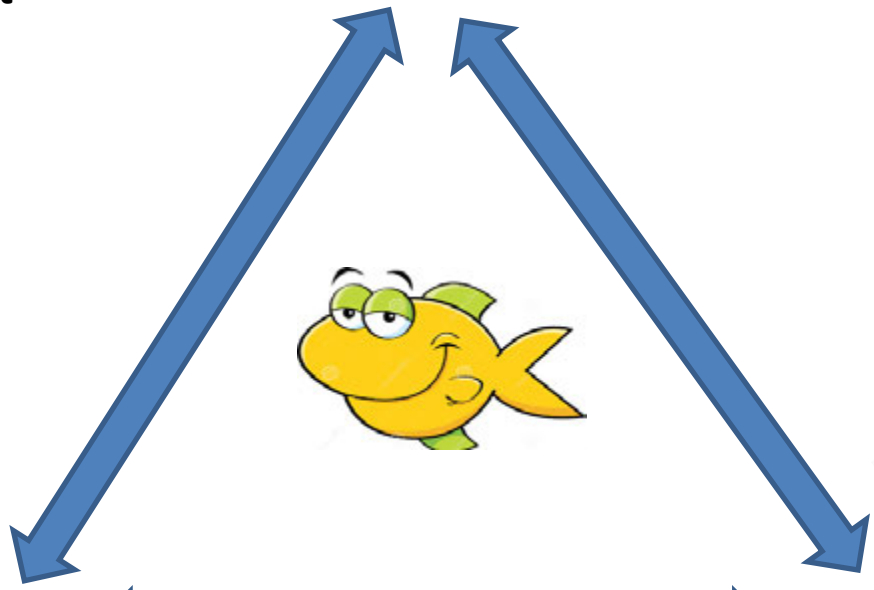




U.S. Department of the Interior
U.S. Geological Survey

Monitoring, Research and Management — Who Does What

Monitoring



Research

Management

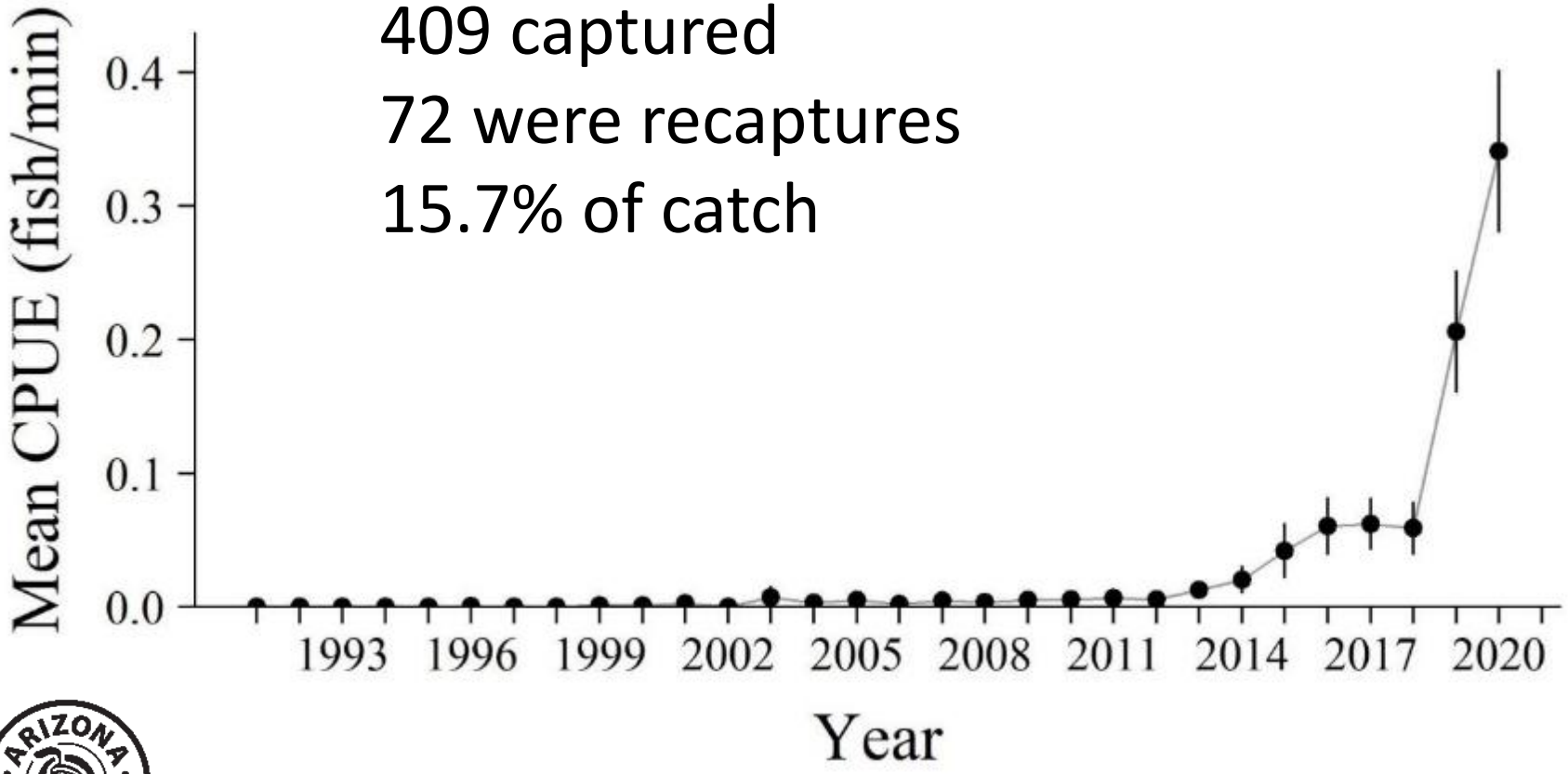
Images downstream of Glen Canyon Dam

Rainbow Trout CPUE

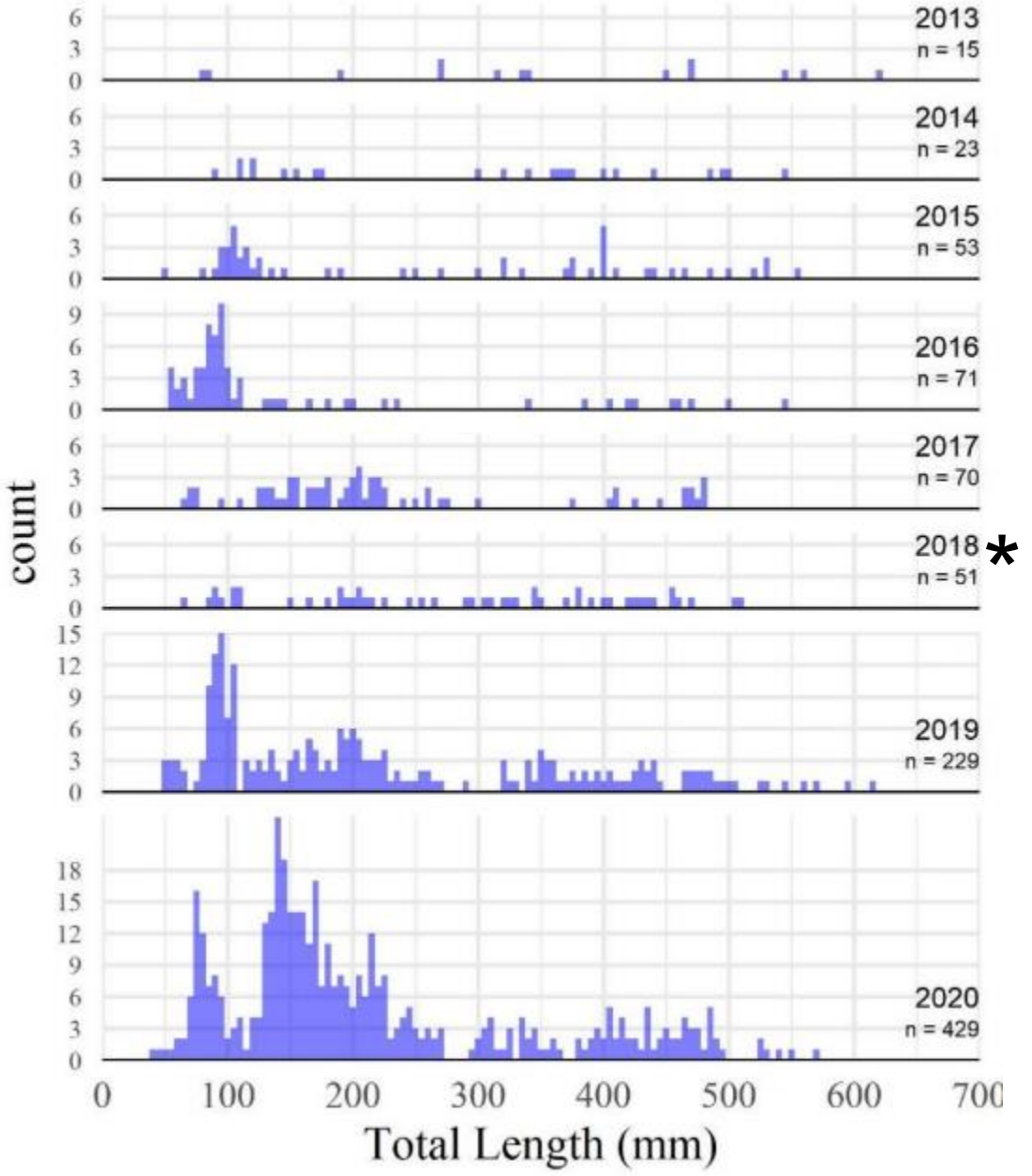
AGFD preliminary data, do not cite

Brown Trout

409 captured
72 were recaptures
15.7% of catch

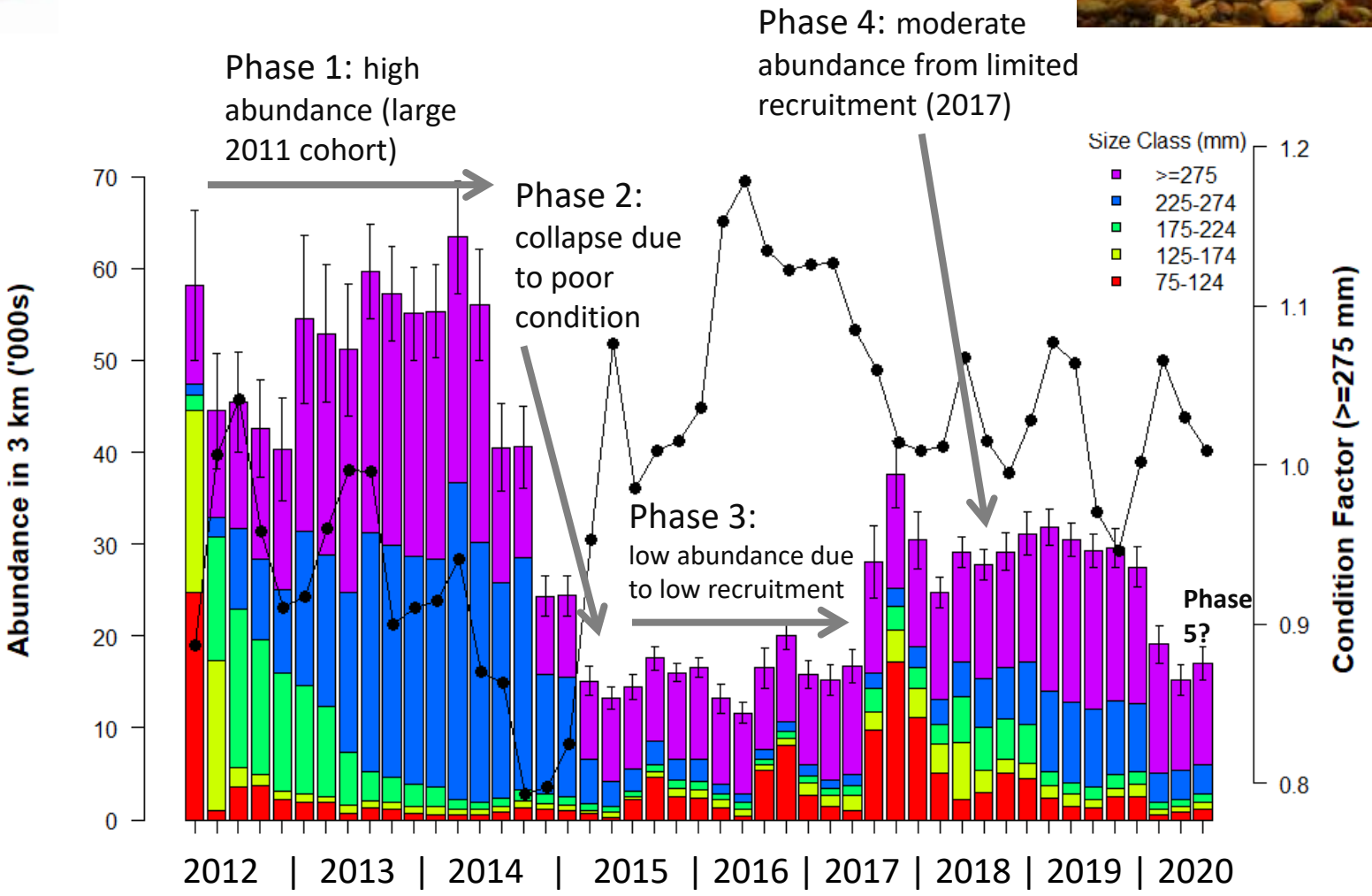


Brown Trout Length



*No Spring trip in 2018

Rainbow Trout Abundance at Lees Ferry



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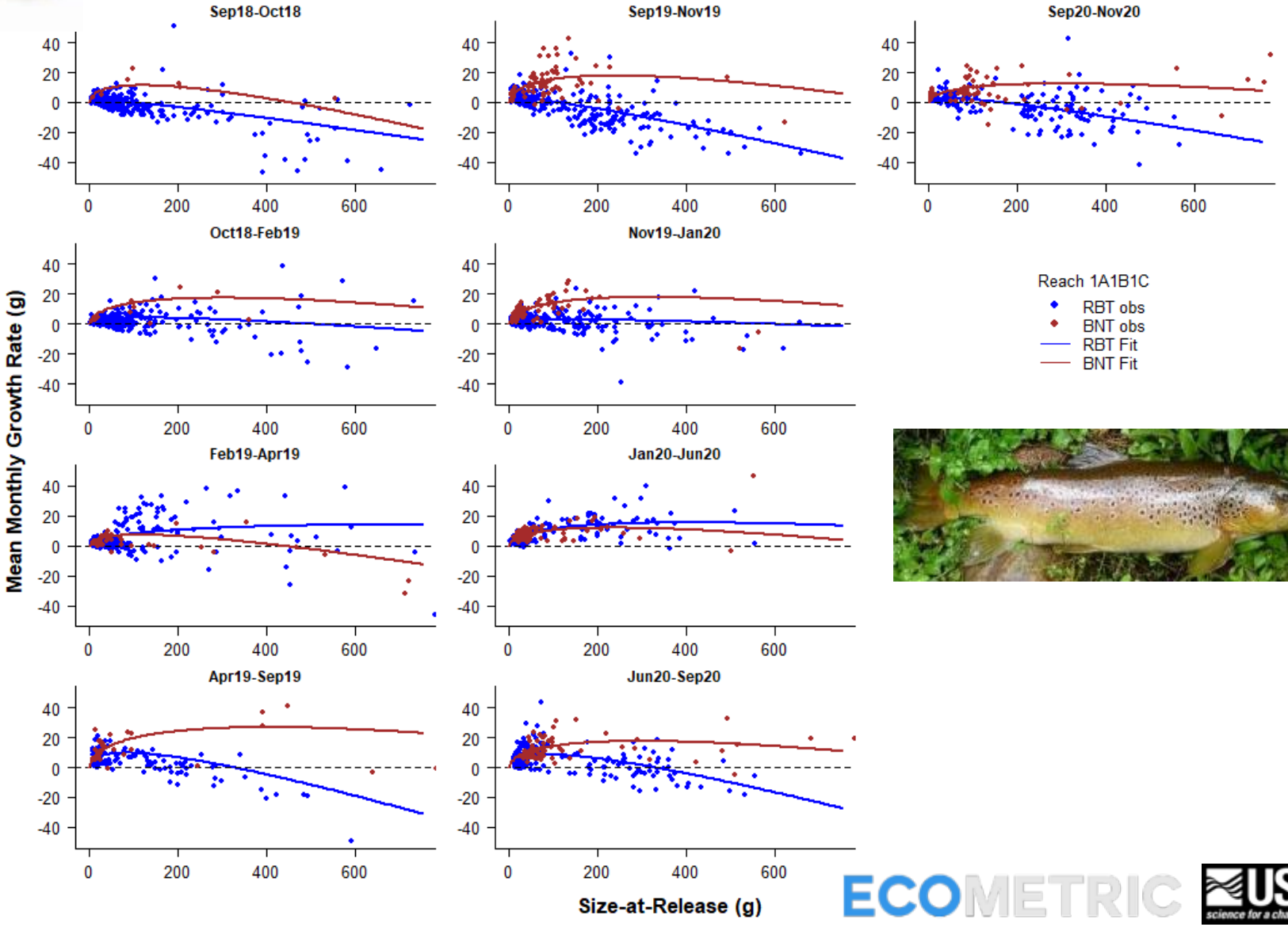
ECOMETRIC

Brown Trout Grow Much Faster than Rainbow Trout, and Rarely Lose Weight



ECOMETRIC

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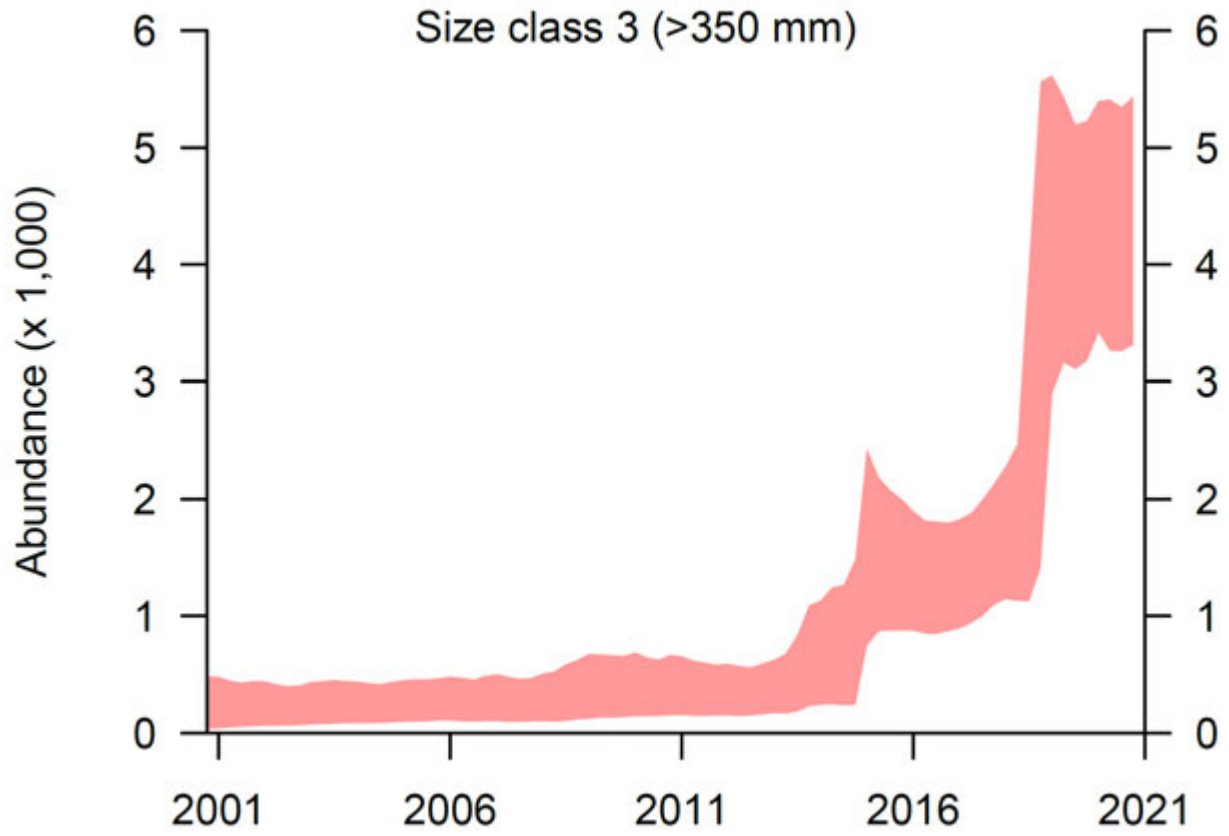
Abundance of largest brown trout stable over last ~2 years.



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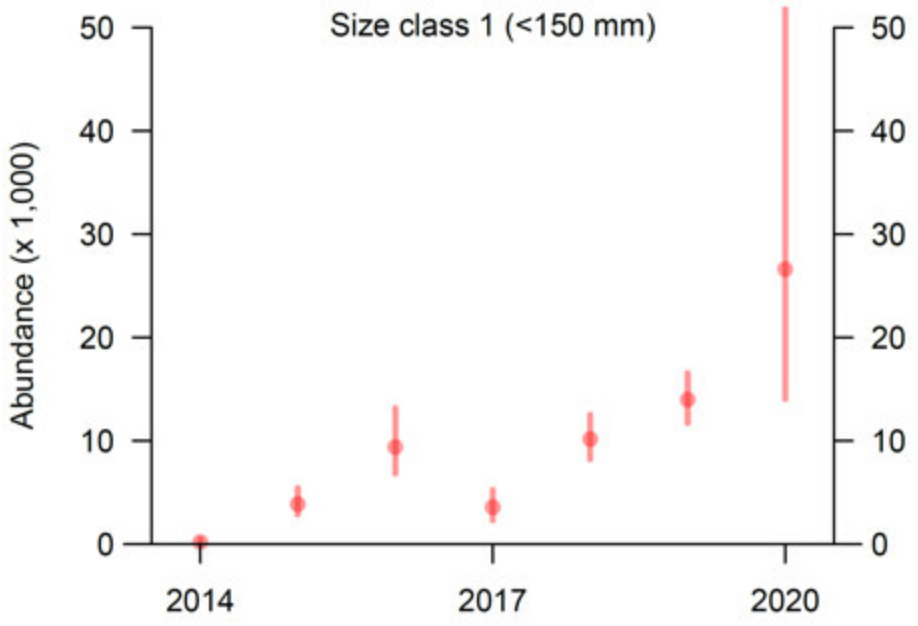
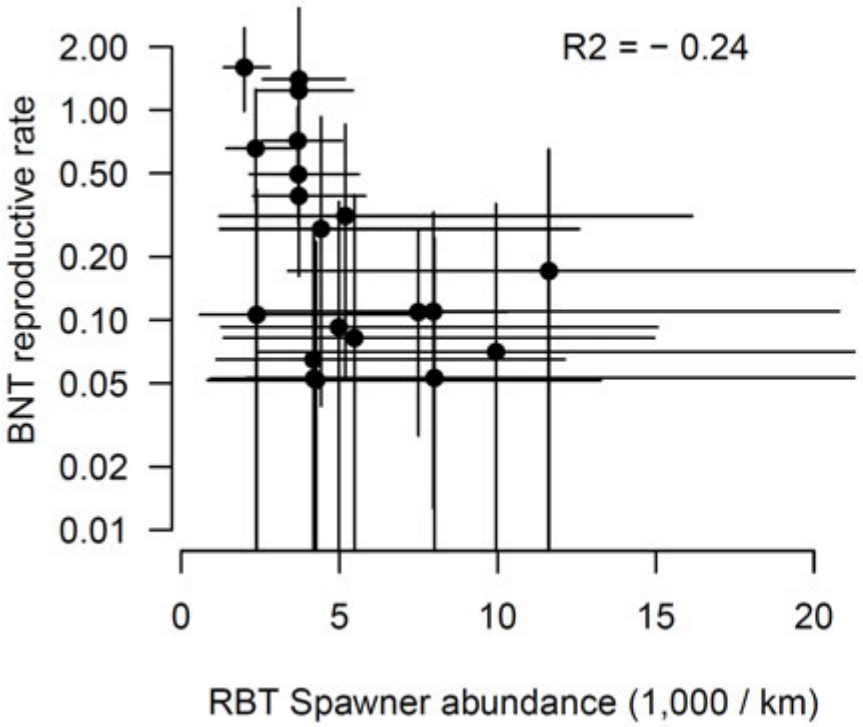
(Preliminary, do not cite)

But BNT recruitment is increasing over last few years

Some evidence that when spawning RBT abundance is low, BNT have high reproduction rates.





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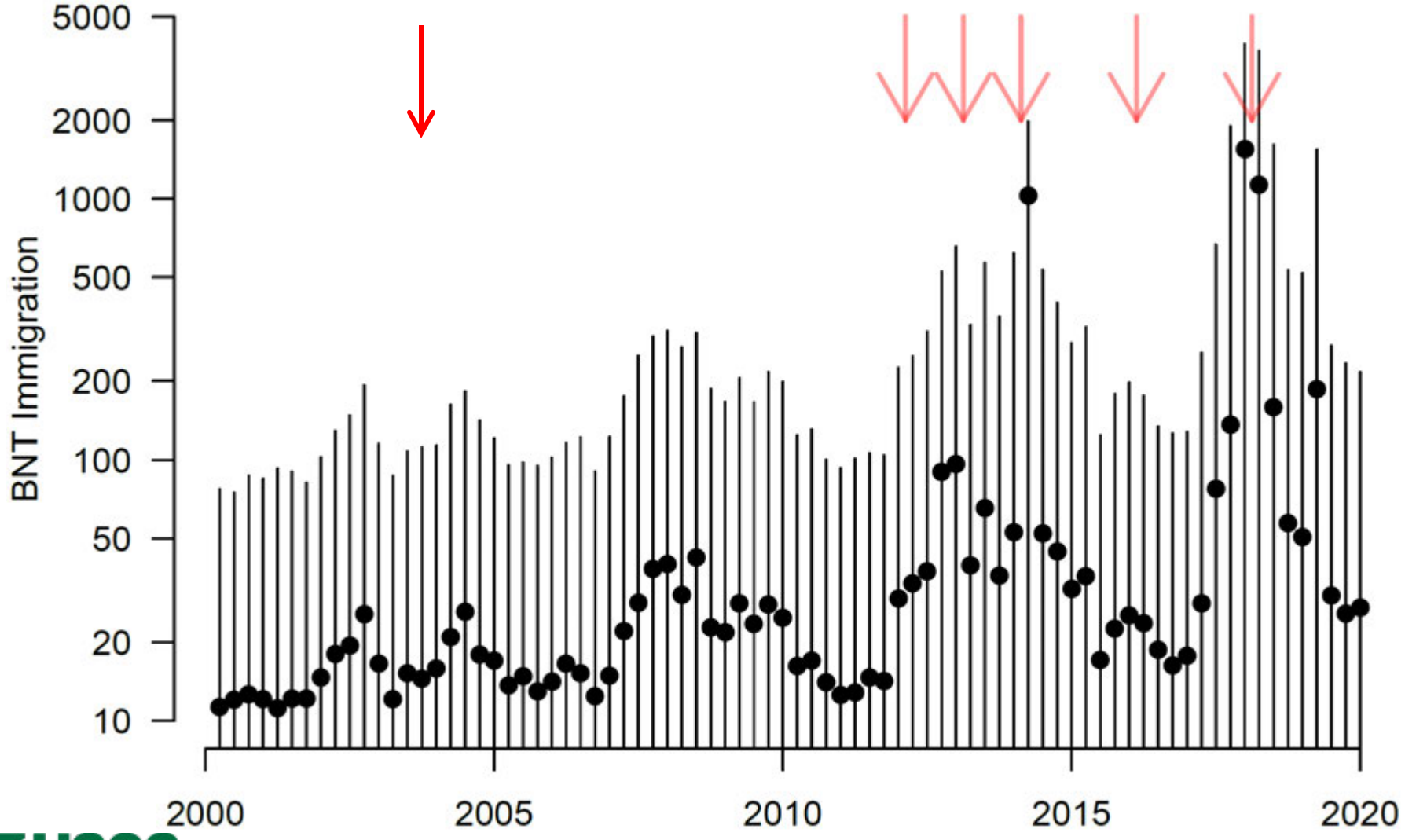
Immigration of large BNT to Lees Ferry was associated with 2 of 6 fall HFE's and 0 of the other 14 fall seasons



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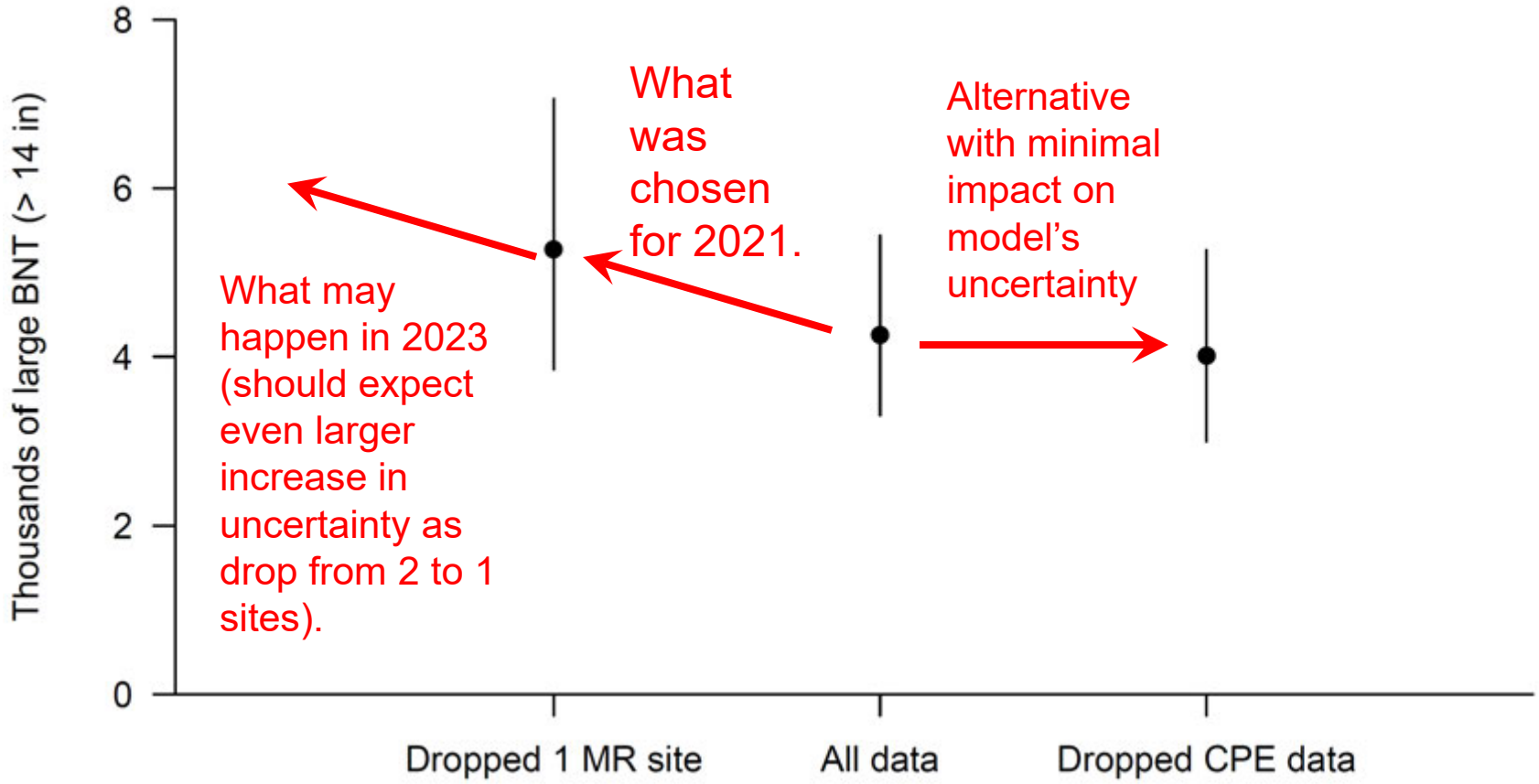
Difficult decisions made for FY21-23 workplan impact ability to measure effectiveness of BNT management



What would our estimate be now if we had stopped collecting some of the data a few years ago?

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Confluence of the Colorado River and Little Colorado River

Trends in Rainbow Trout Abundance at the LCR

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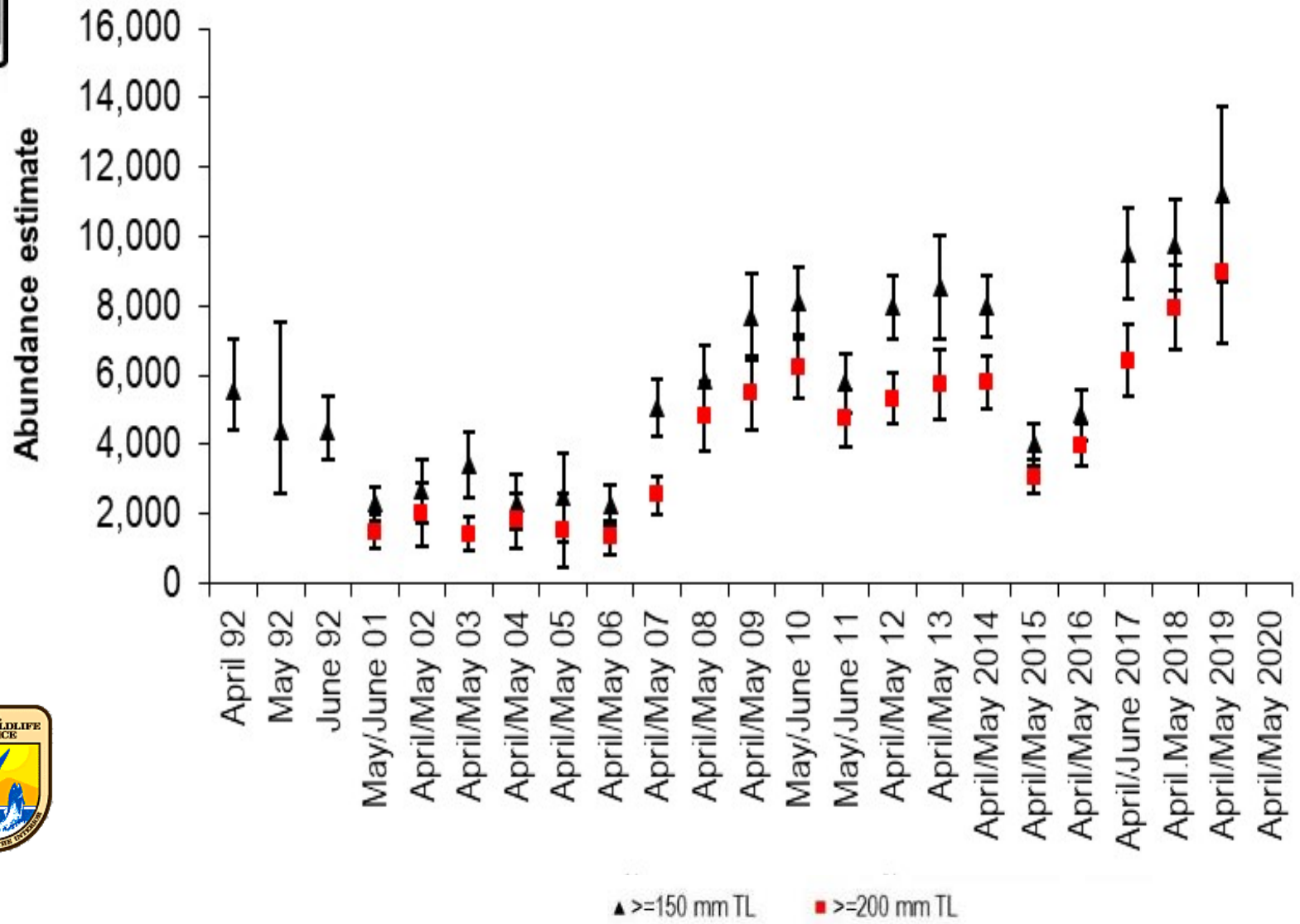
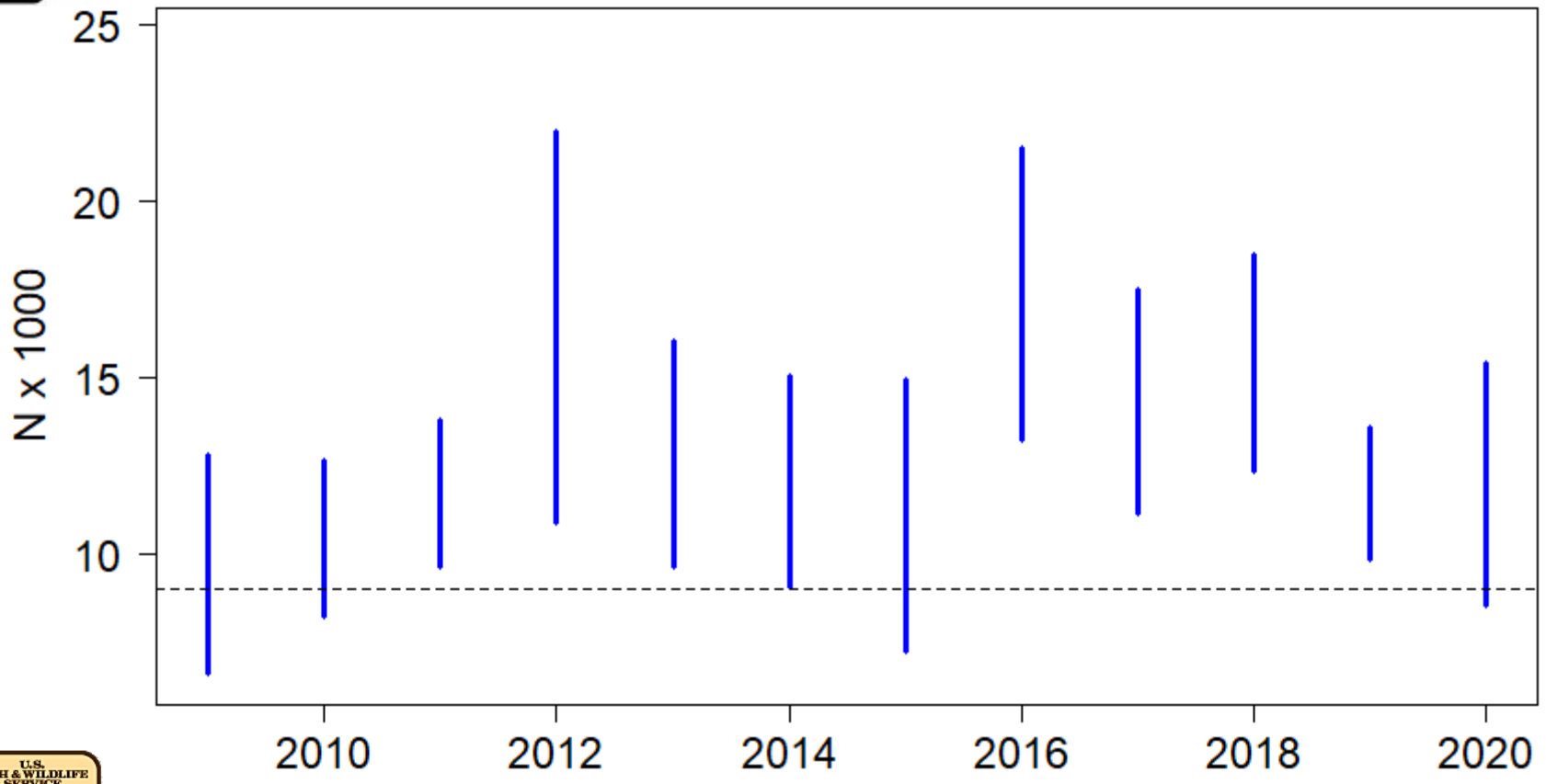
ECOMETRIC

Monitoring in lower 13.57 km of LCR

Annual spring and fall abundances of HBC ≥150 mm and ≥200 mm in lower 13.6 km of LCR

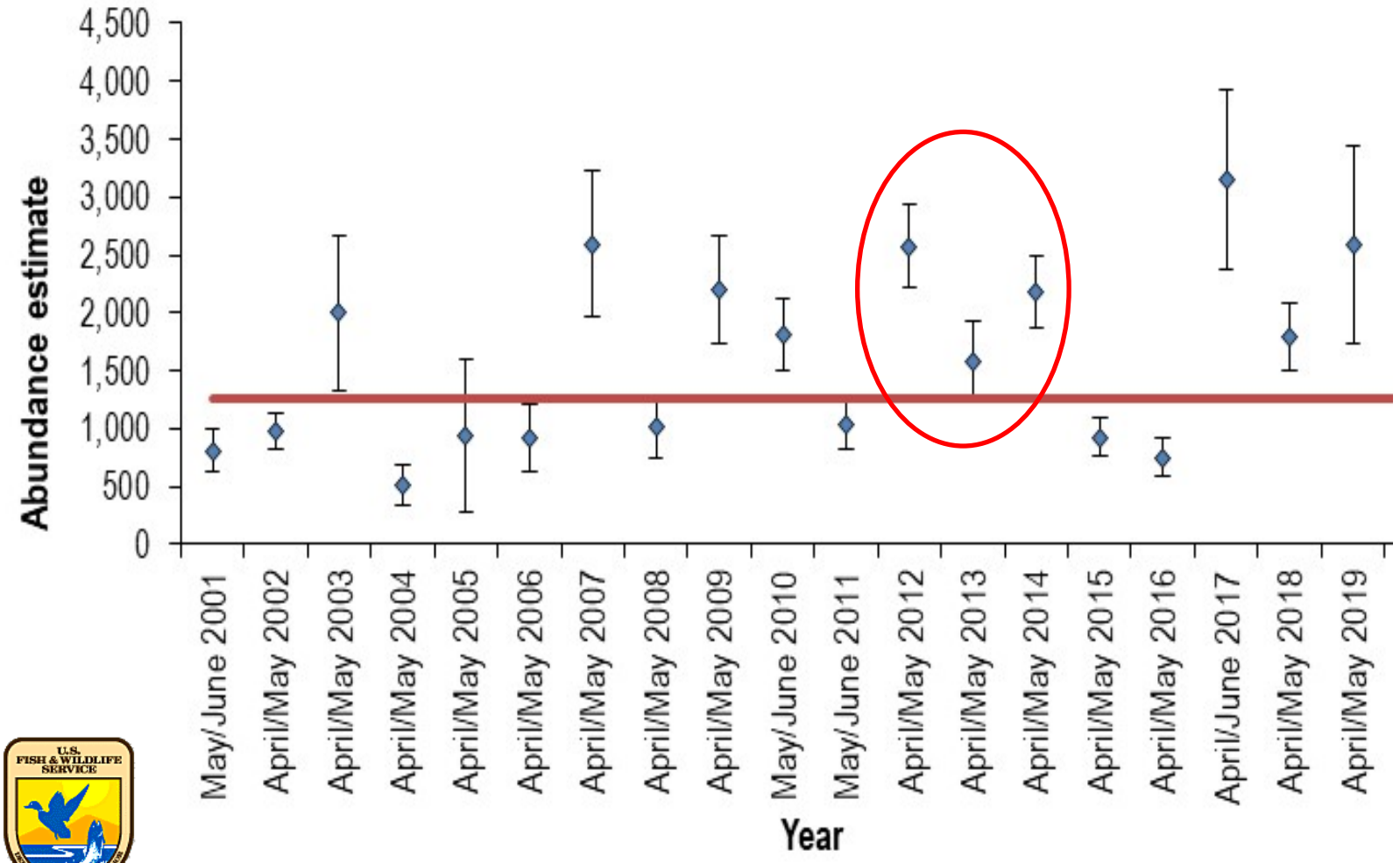


Fall abundances of adult humpback chub (>199mm TL) in the Little Colorado River

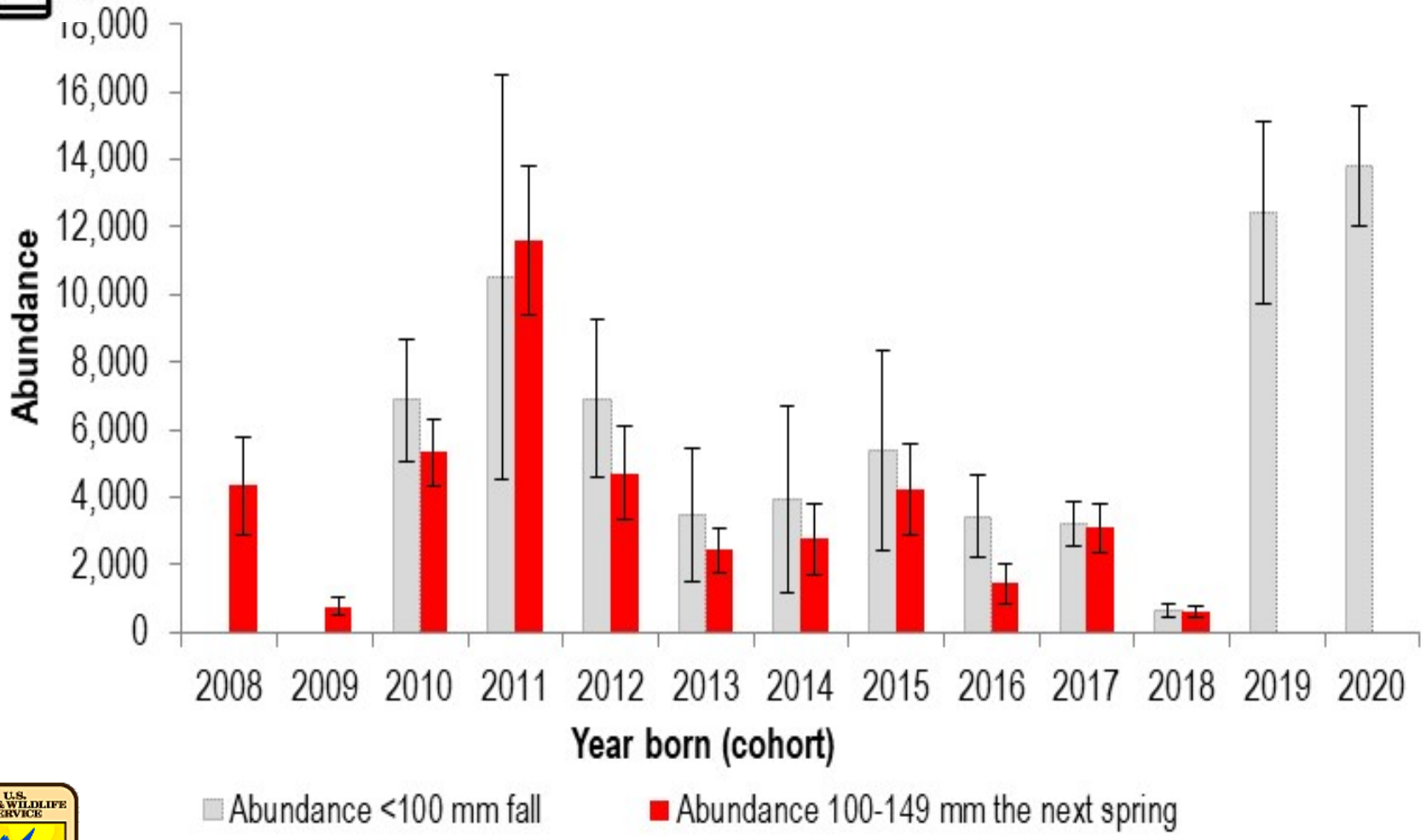


Provisional data. Do not cite.

Spring subadults in LCR (150-199 mm)

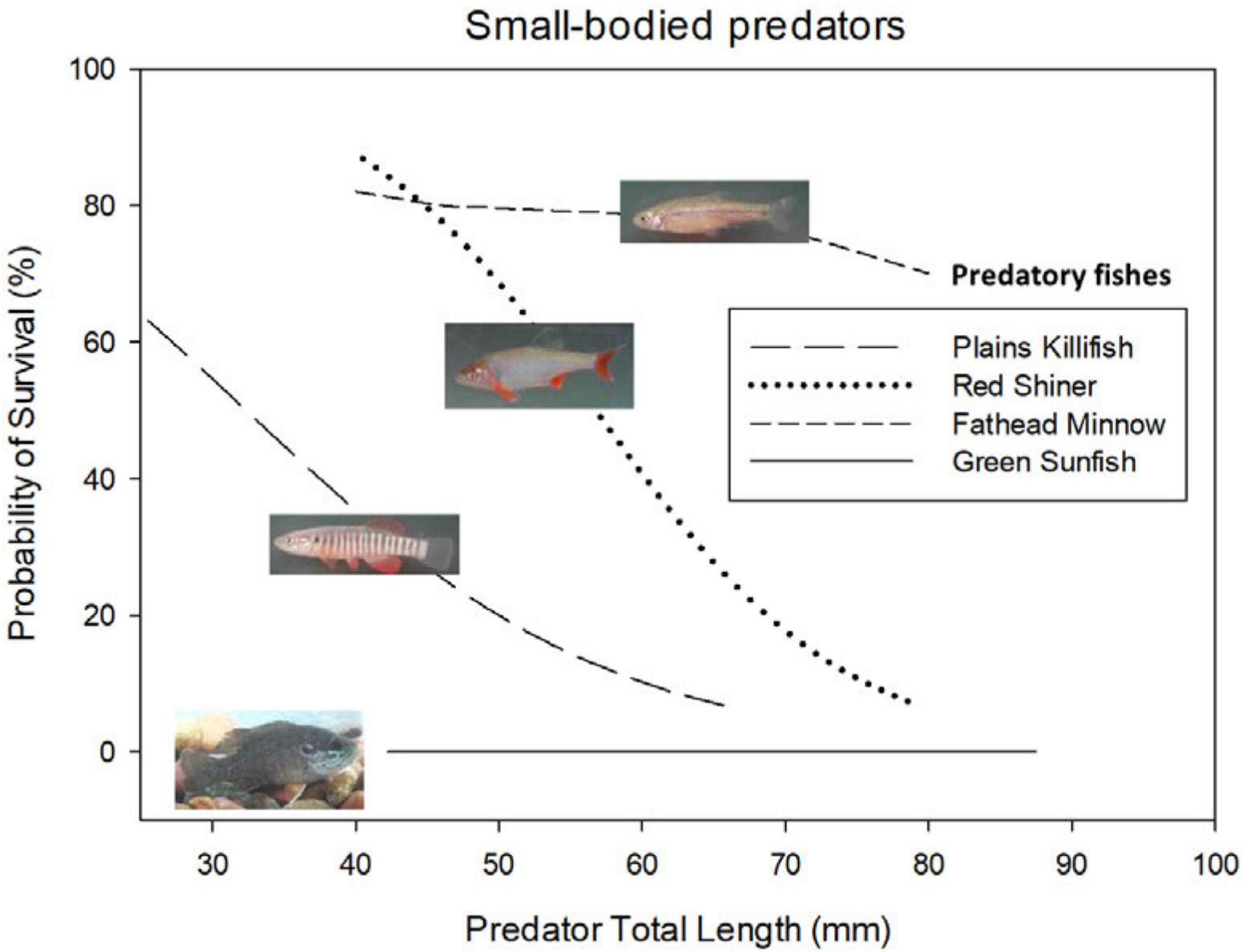


Fall age-0 and next spring age-1 in LCR



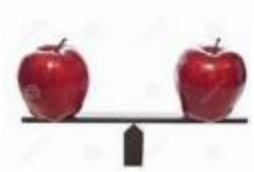
Assessing Risk of Predatory Fishes?

Photo by Jan Boyer
AZGFD



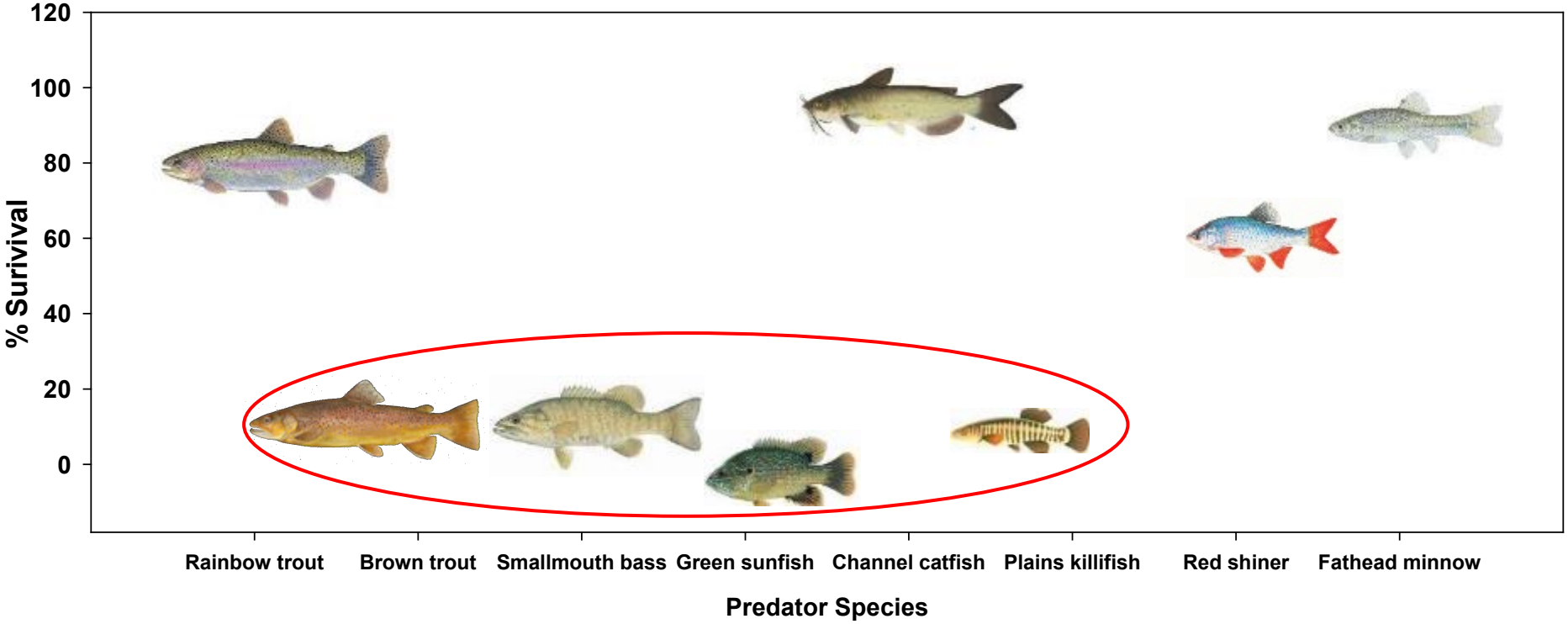
Survival of larval humpback chub (12 mm TL) as predator size increases for four species of small-bodied predatory fish commonly found in the Little Colorado River. Probability of survival calculated using JMP Prediction Profiler, based on 10 replicated 24-hr laboratory trials for each predator species (4 predators and 12 prey in each trial).

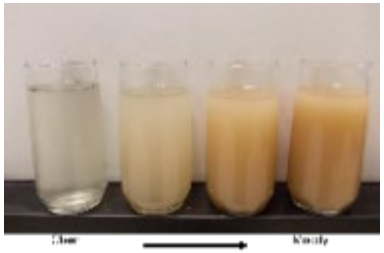
Predation vulnerability



LABORATORY

Predation vulnerability of HBC at 30% of predator size





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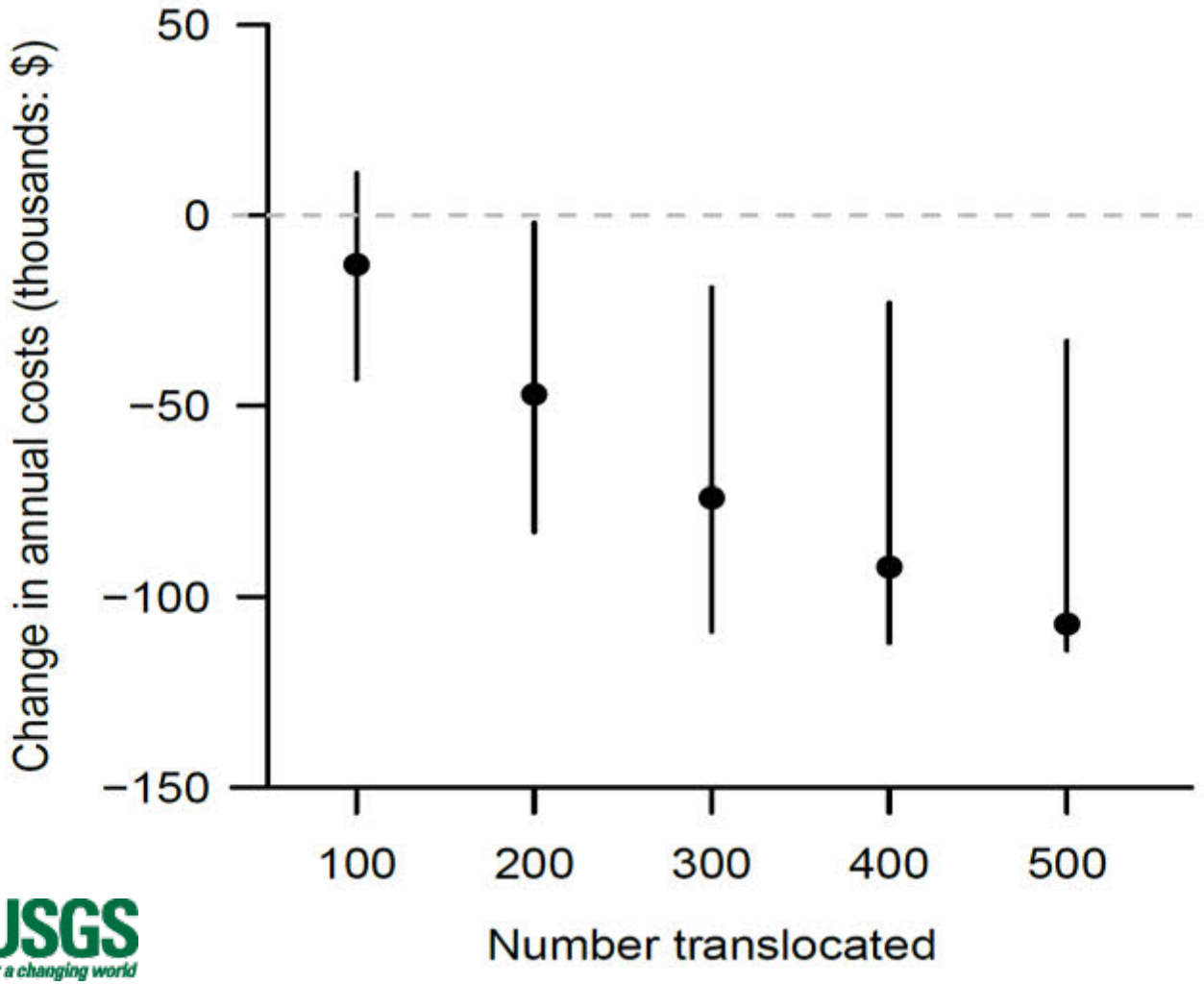
Translocations to above Chute Falls

Translocations decrease the need for trout removals and appear to save money



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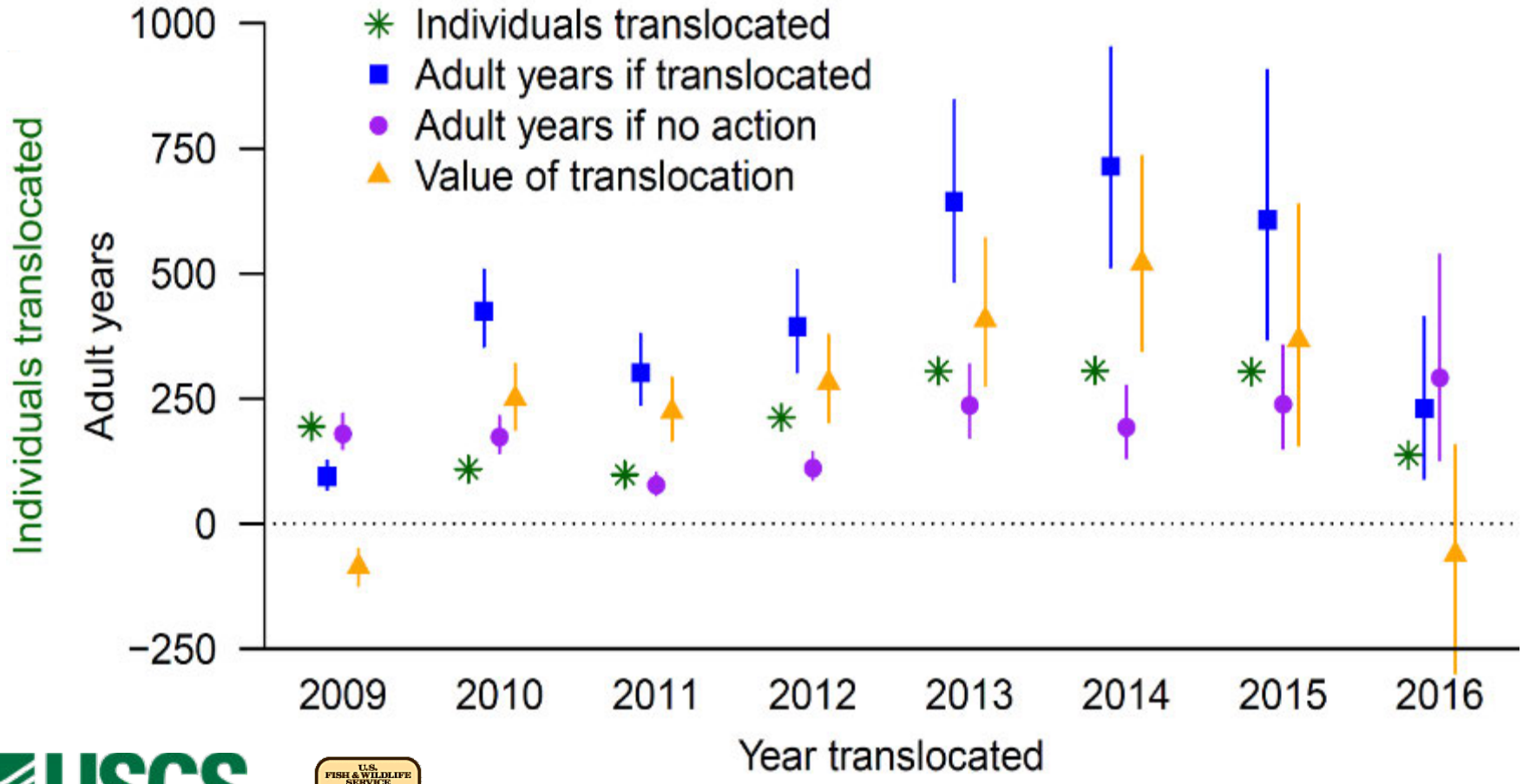
Translocations increase adult abundance in most (but not all) years



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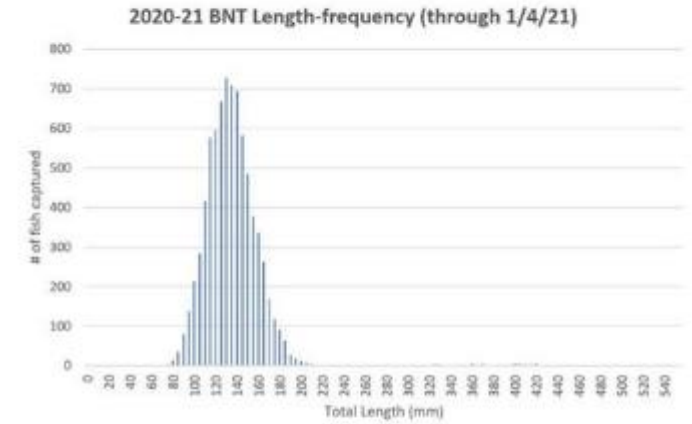
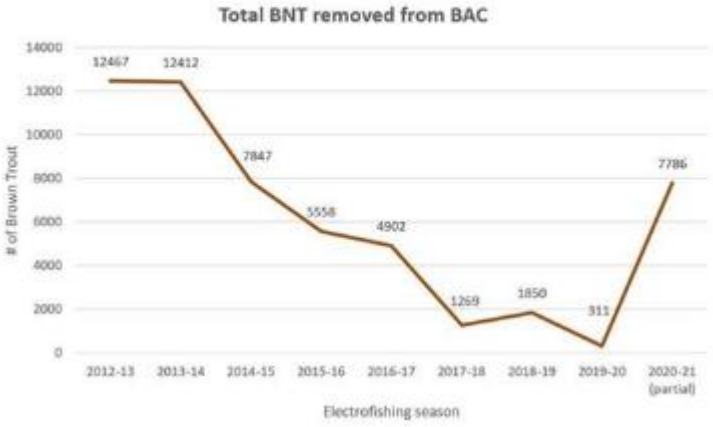
Bright Angel Creek RMI 89

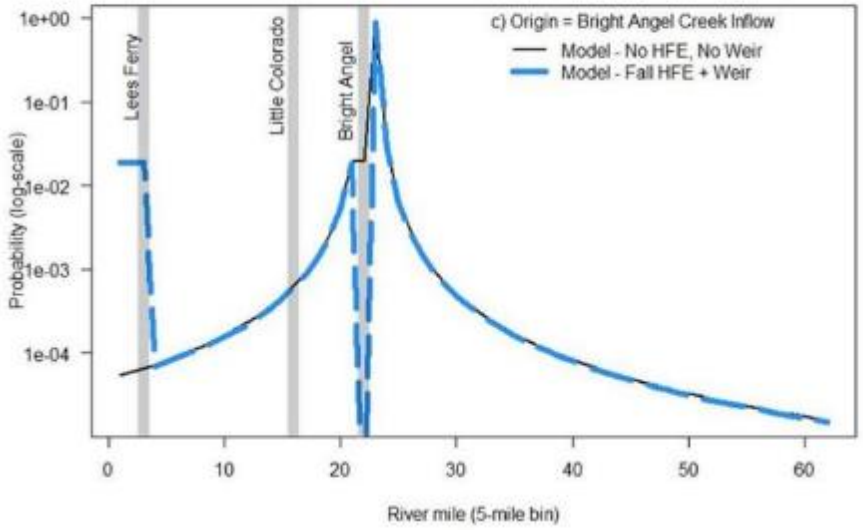
Brown Trout: Bright Angel Creek update and movement modeling

2020-21 Bright Angel Creek Brown Trout resurgence driven by large young-of-year class





Multistate mark-recapture model: fall HFEs increase Brown Trout immigration into Lees Ferry



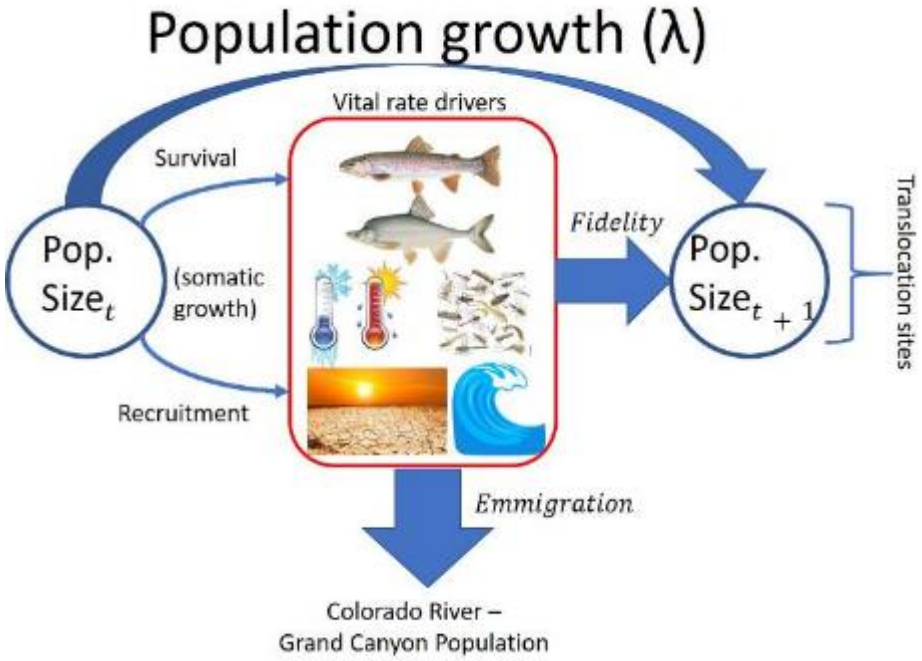
NPS Translocation Activities: 2020

- Bright Angel Creek translocation
  - June 9, 2020
  - 415 juvenile humpback chub, collected in 2019
- Completed:
  - Shinumo Inflow monitoring (2 trips)
  - Havasu monitoring (October)
- COVID cancellations:
  - LCR collection, May-June
  - Havasu spring sampling, May

NPS - Analysis of Tributary Translocations

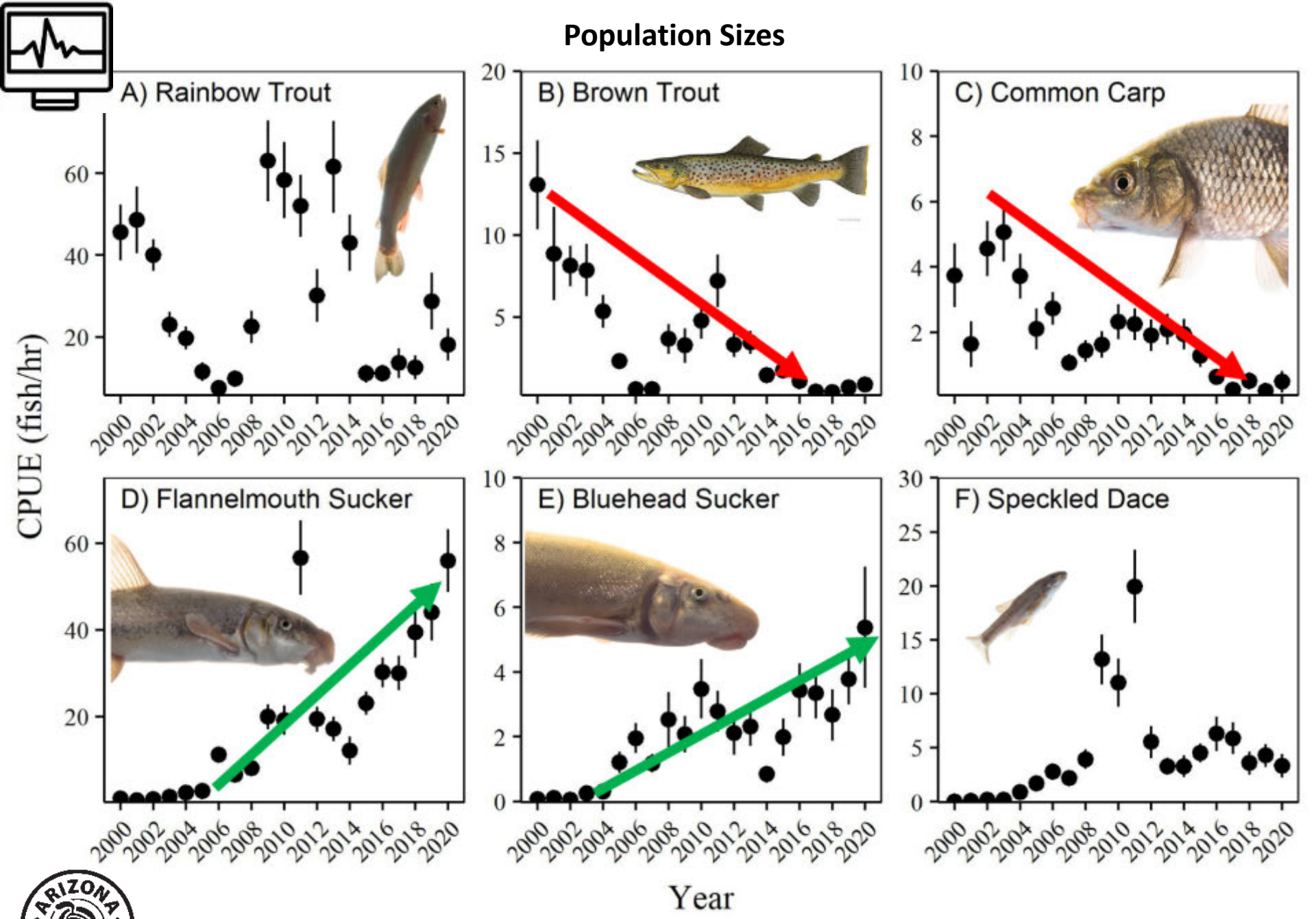
Humpback chub growth and population dynamics driven by:

- Survival/growth comparable to the LCR
- Rainbow trout density (-)
  - Growth –Havasu and Shinumo
  - Recruitment - Havasu
- Monsoon flooding (+)
  - Growth – Havasu and Shinumo
  - Survival – Havasu
  - Exception – flooding following fire (e.g., 2014 Shinumo)
- Humpback chub density (-)
  - Survival and recruitment - Havasu

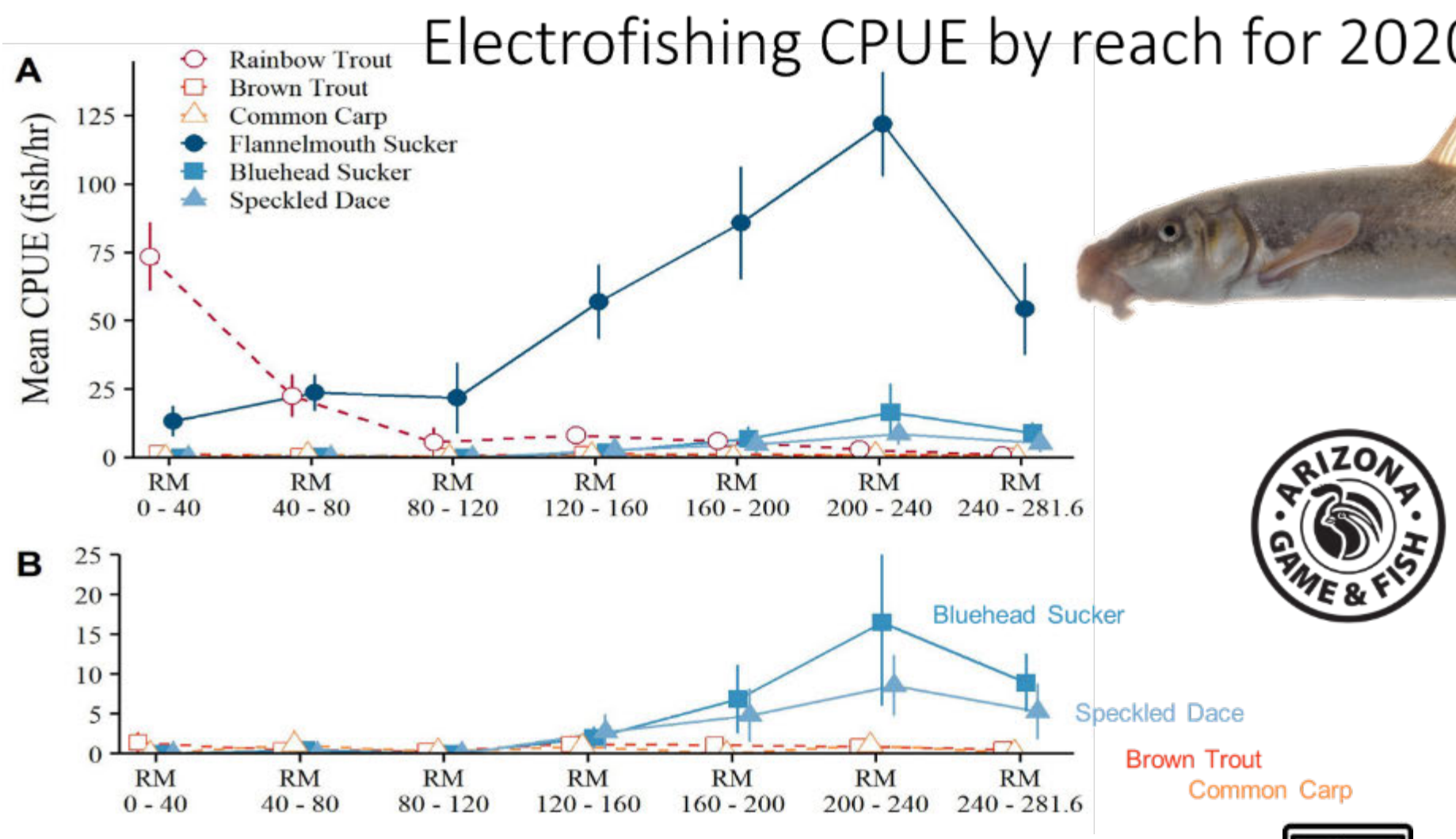


Mainstem Fish monitoring

Population Sizes

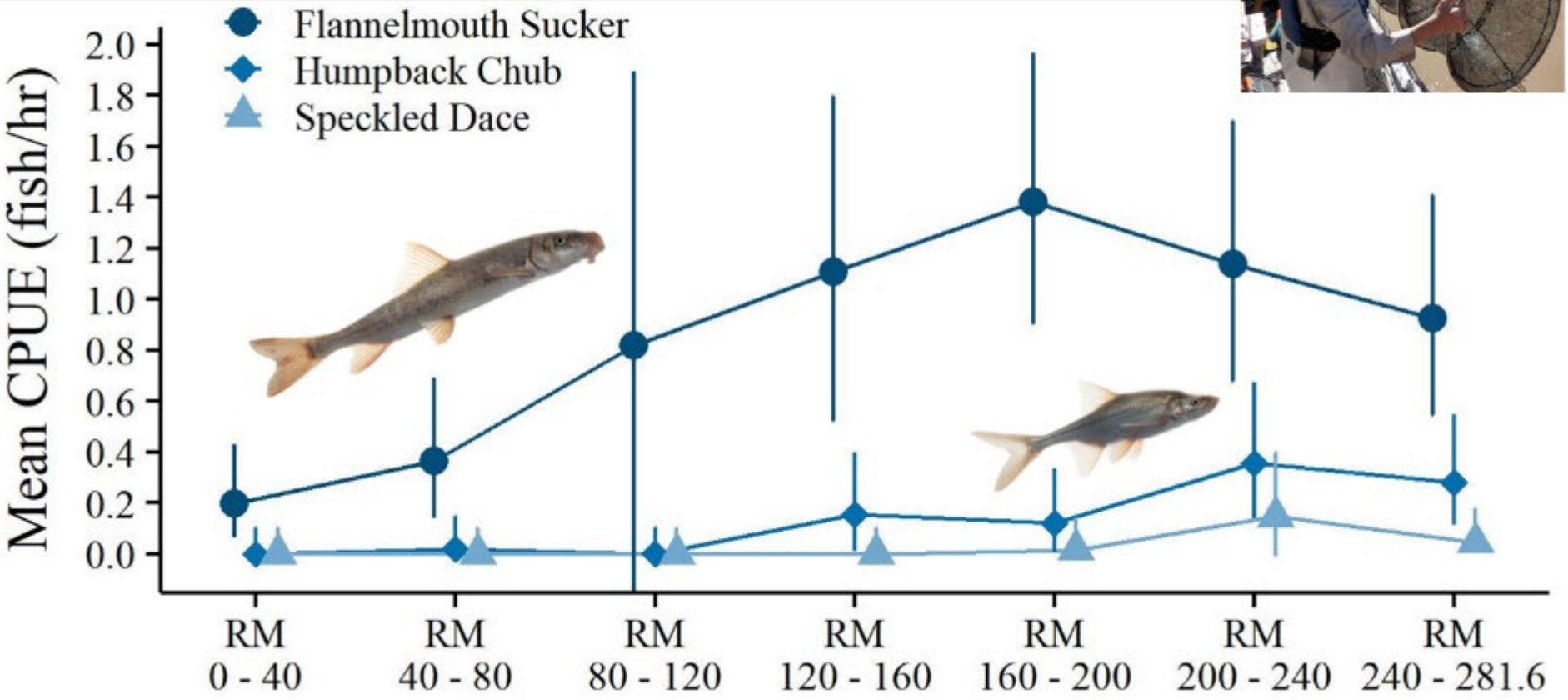


Western Grand Canyon is important for native fish species

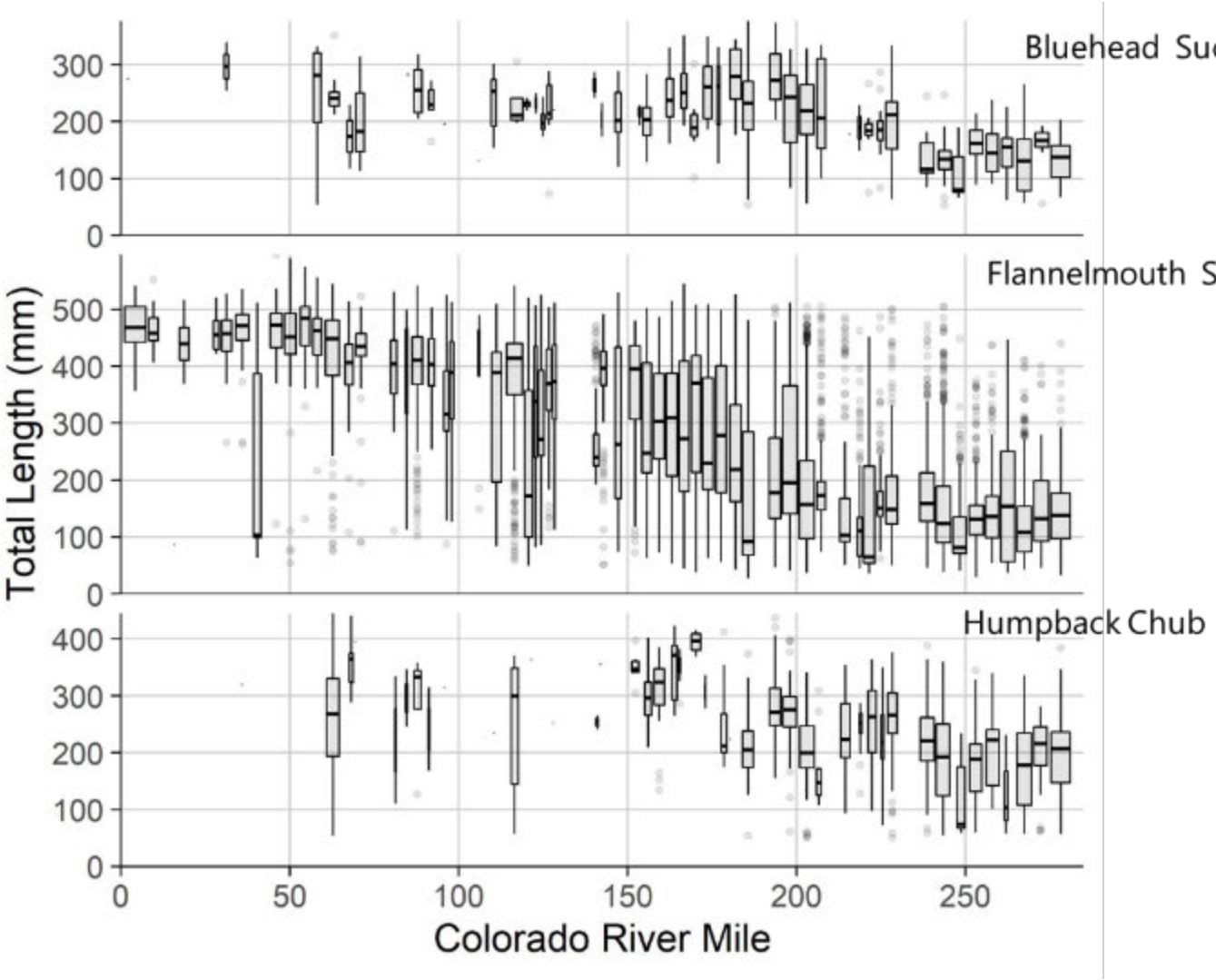


ARIZONA GAME & FISH

Hoop net CPUE by reach for 2020

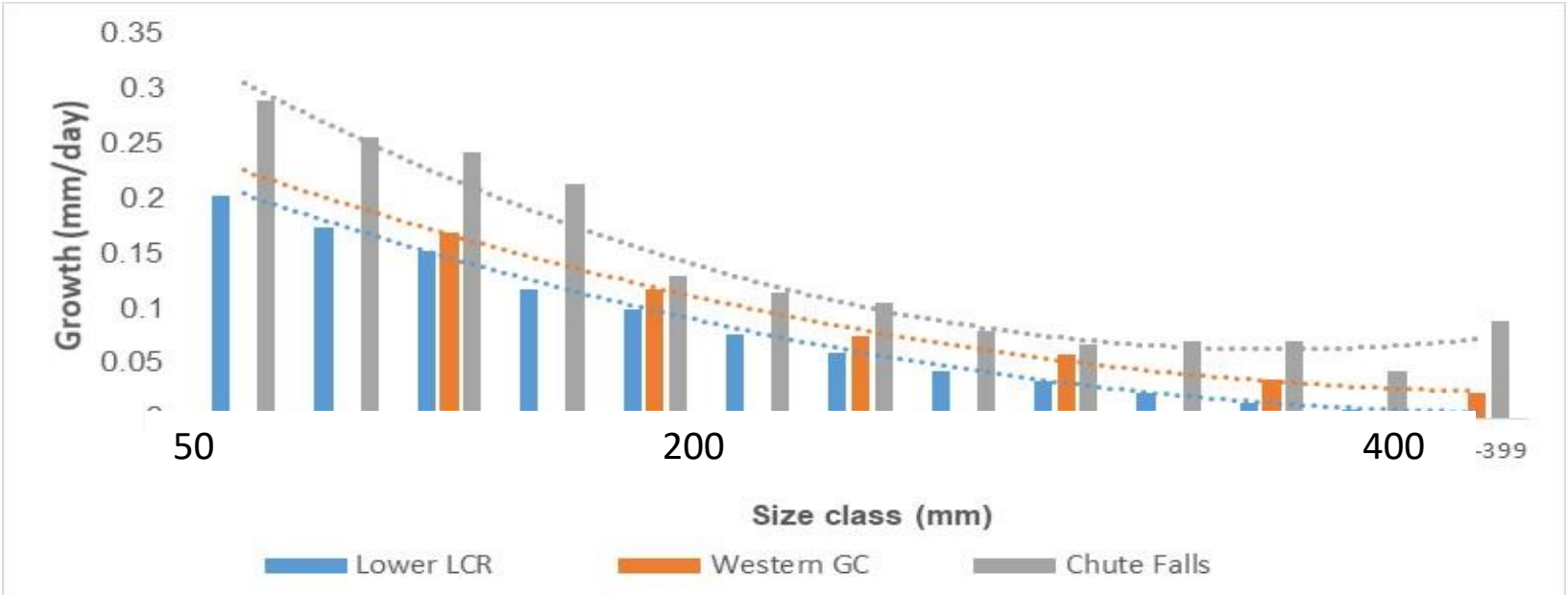


Box plots showing that far western Grand Canyon is important for small juvenile fish (growth, recruitment…)



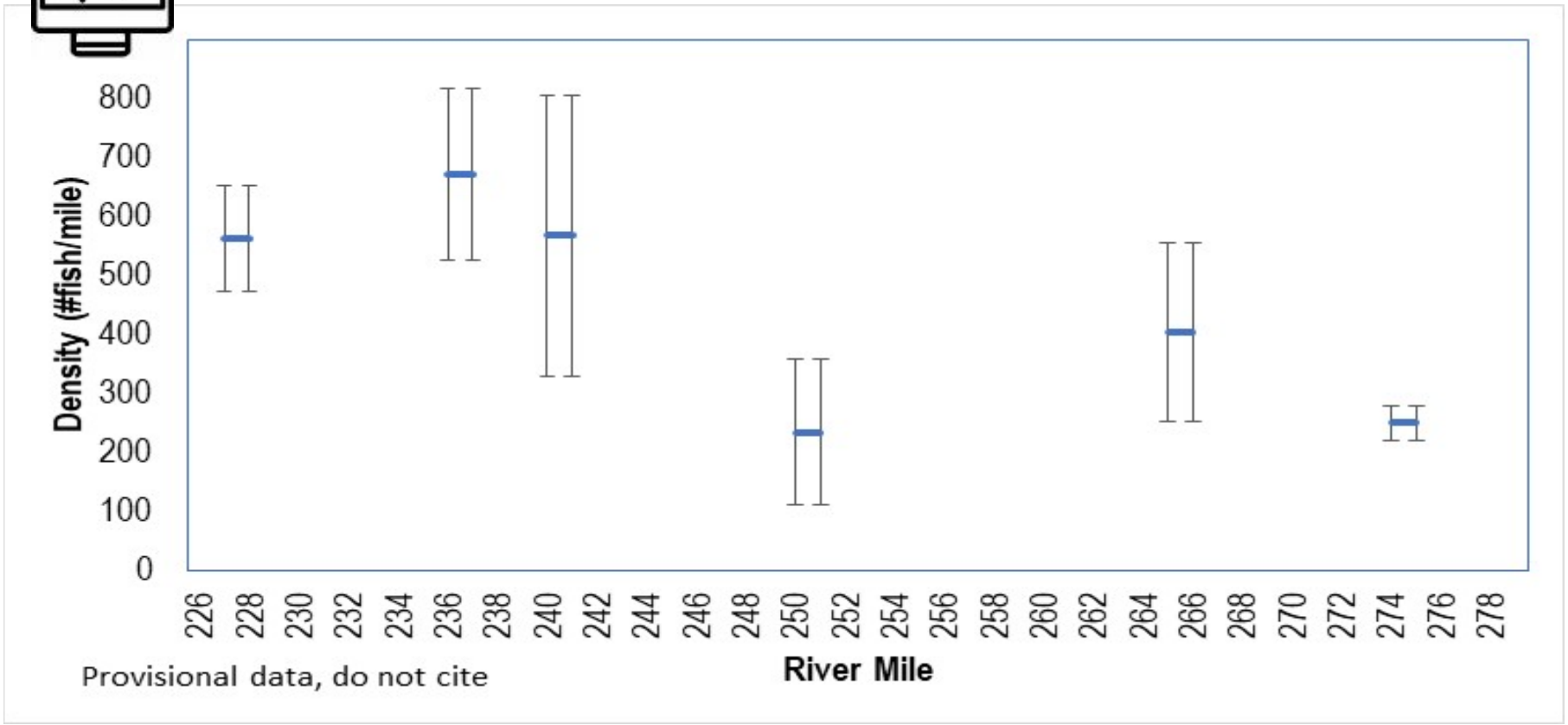
AGFD preliminary data, do no cite. Fish caught 2017-2019, aggregated by ~5 mile sampling reach

Growth in western GC is comparable (or better) than in the Lower Little Colorado River



- Evidence of age-0 production: 2017 cohort was large
- Growth in western Grand Canyon is fast (more like LCR than JCM East)
- Large adults are highly mobile
- Survival in JCM West may be low, but more information is needed about movement
- Need more years of data! (Recall history of JCM East)

Densities (fish/mile) of adult HBC (≥200 mm) within six, 2-mile long mark-recapture reaches between Diamond Creek and Pearce Ferry



Provisional data, do not cite

Pearce Ferry rapid fish assemblage comparison native vs nonnative

Species category	Upstream	Downstream
Native	599	40
Nonnative	9	1023

Native and nonnative fish populations in Pearce Ferry

Why have fish populations changed over time?

Hypotheses

- Water temperatures changed
- Nutrients changed
- Changes to the foodbase
- Changes in predator densities
- Timing of High Flow Events
- Other??


Questions?
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