GCMRC 2019 Annual Reporting Meeting Preview – Part 1

Adaptive Management Work Group Meeting
March 6-7, 2019

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U.S. Geological Survey
Southwest Biological Science Center
Grand Canyon Monitoring and Research Center

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

Overview

- A bit on the fishy side
  - More diversity in Mike's talk tomorrow
- Emphasis on recent results and long-term trends
- HFE assessment – next week
- Bug flows update

USGS

(*March 6, 2019*)

Humpback Chub

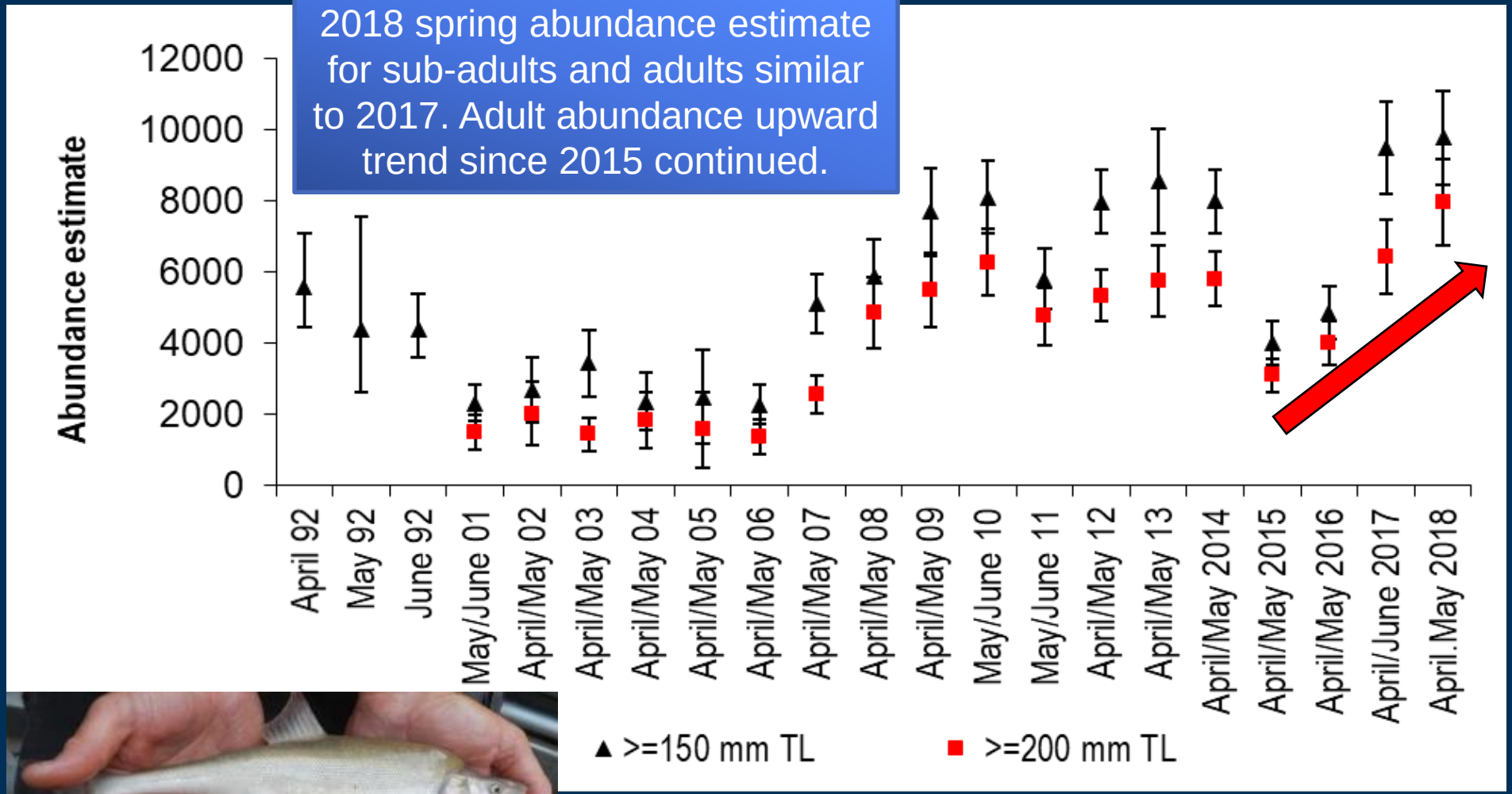
(*March 6, 2019*)

USGS

(*March 6, 2019*)

Spring Abundance of Adult Humpback Chub: Little Colorado River

2018 spring abundance estimate for sub-adults and adults similar to 2017. Adult abundance upward trend since 2015 continued.



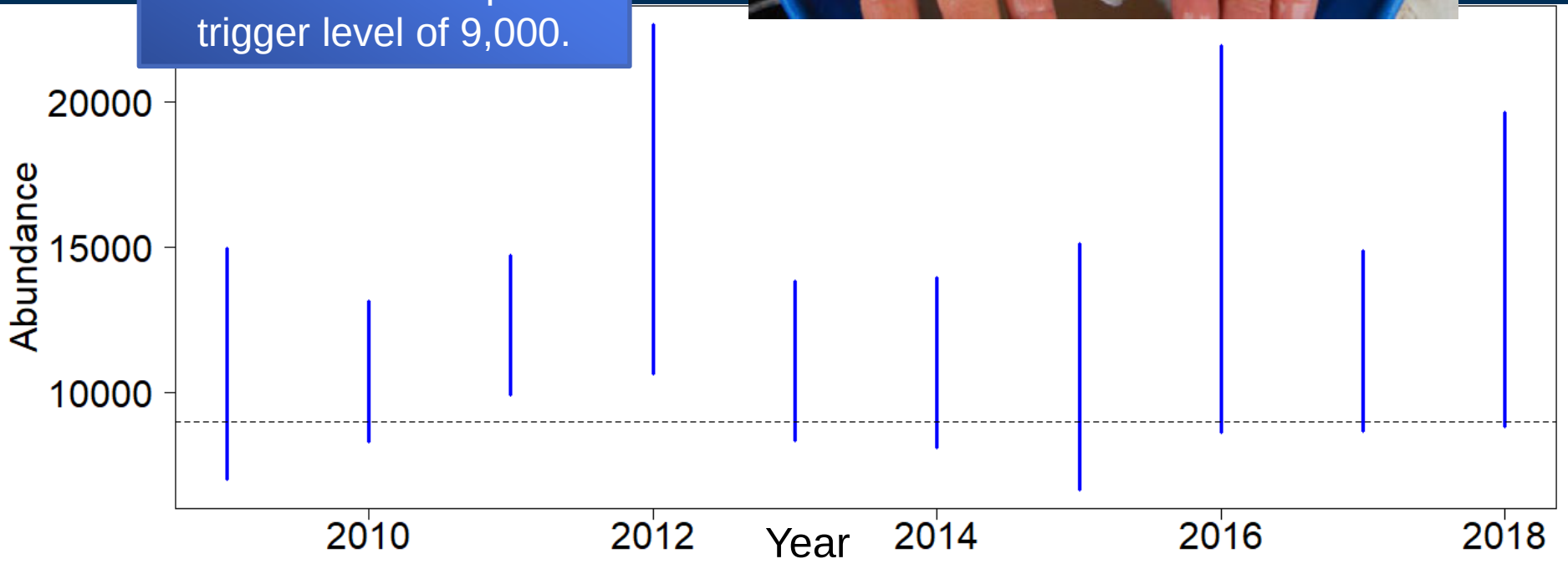
(*Preliminary Data from VanHaverbeke et al. USFWS. 2018. Do Not Cite.*)

USGS

(*March 6, 2019*)

Adult Humpback Chub Abundance
(Adults ≥ 200mm TL in Little Colorado River aggregation)

Adult abundance as estimated in multi-state model is stable (or increasing slightly) and exceeds 2016 BiOp tier-1 trigger level of 9,000.



Vertical lines represent 95% confidence intervals.

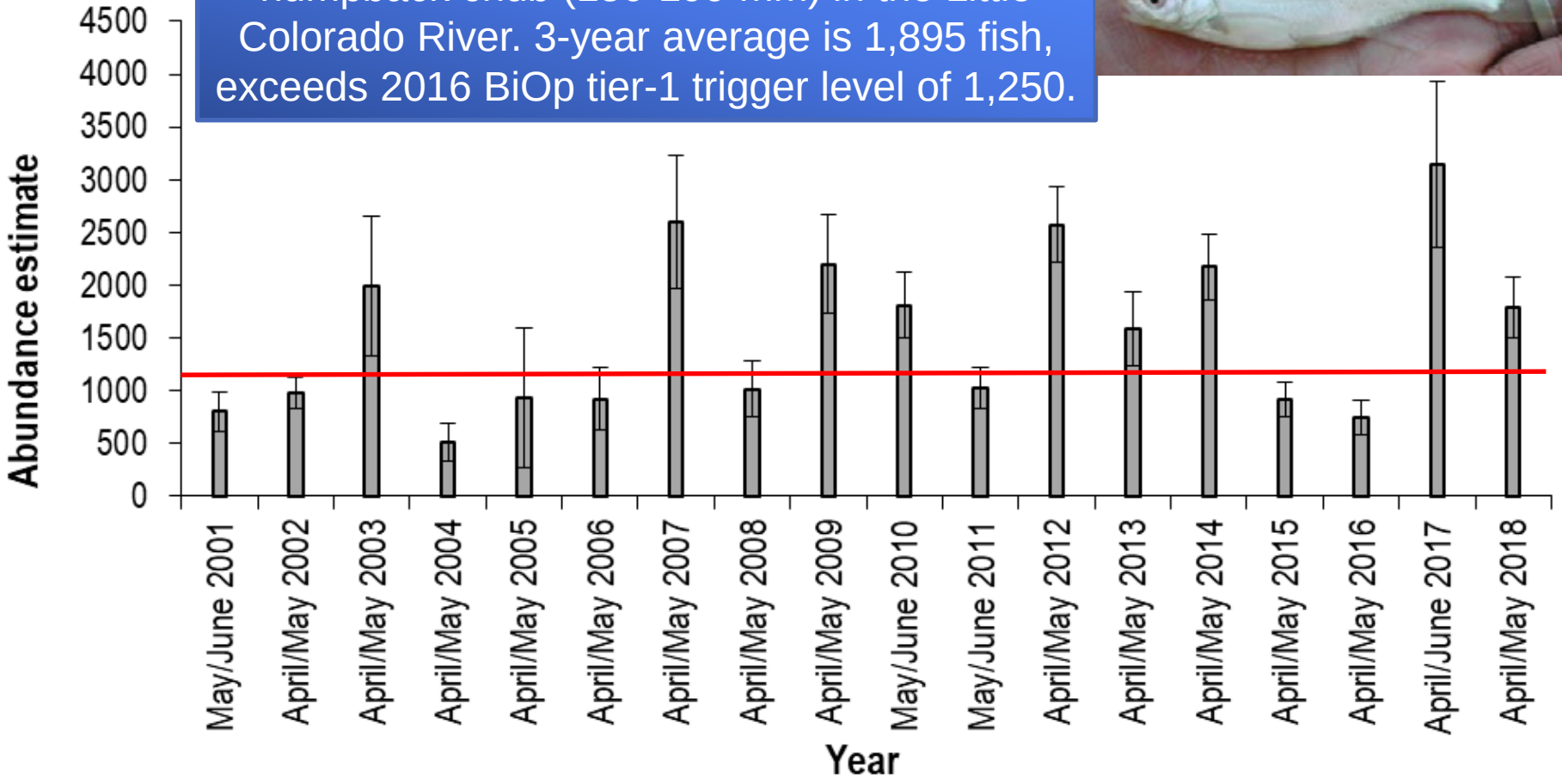
USGS

(USGS Preliminary Data, 2019. Do Not Cite.)

(*March 6, 2019*)

Spring Abundance of Sub-Adult Humpback Chub: Little Colorado River

2018 spring abundance estimate for sub-adult humpback chub (150-199 mm) in the Little Colorado River. 3-year average is 1,895 fish, exceeds 2016 BiOp tier-1 trigger level of 1,250.



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(*March 6, 2019*)

(Preliminary Data from VanHaverbeke et al. USFWS. 2018. Do Not Cite.)

Fall Abundance of Sub-Adult Humpback Chub: Colorado River – JCM Reach

Fall abundance estimates for sub-adult humpback chub (150-199 mm) in the mainstem Colorado R. near Little Colorado R. confluence. 3-year average exceeds 2016 BiOp tier-1 trigger level of 810.

Vertical lines represent 95% confidence intervals.

USGS

(USGS Preliminary Data, 2019. Do Not Cite.)

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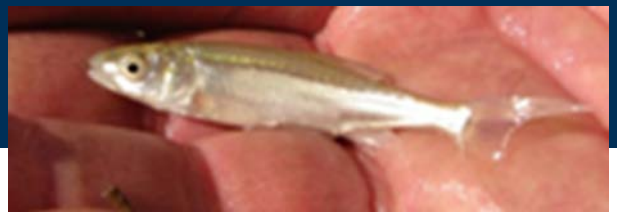
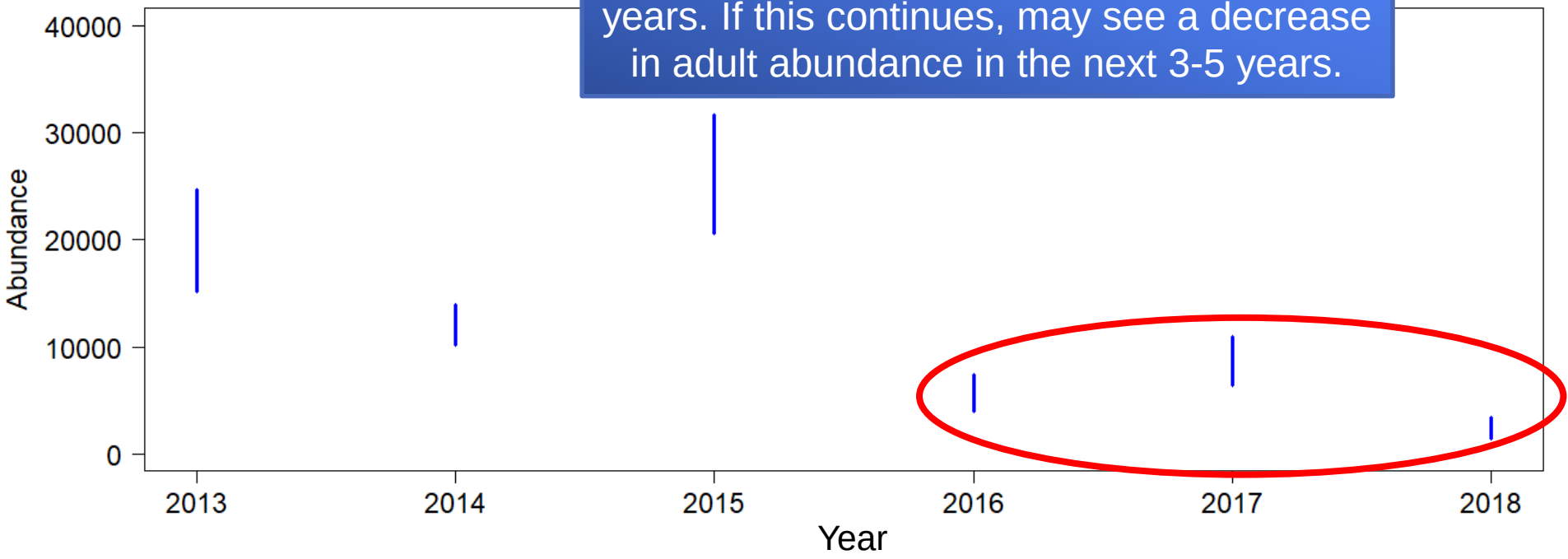
July Abundance of Age-0 Humpback Chub: Little Colorado River



Although adult abundance is steady (or possibly increasing slightly), little age-0 production seen in the LCR for the past 3 years. If this continues, may see a decrease in adult abundance in the next 3-5 years.



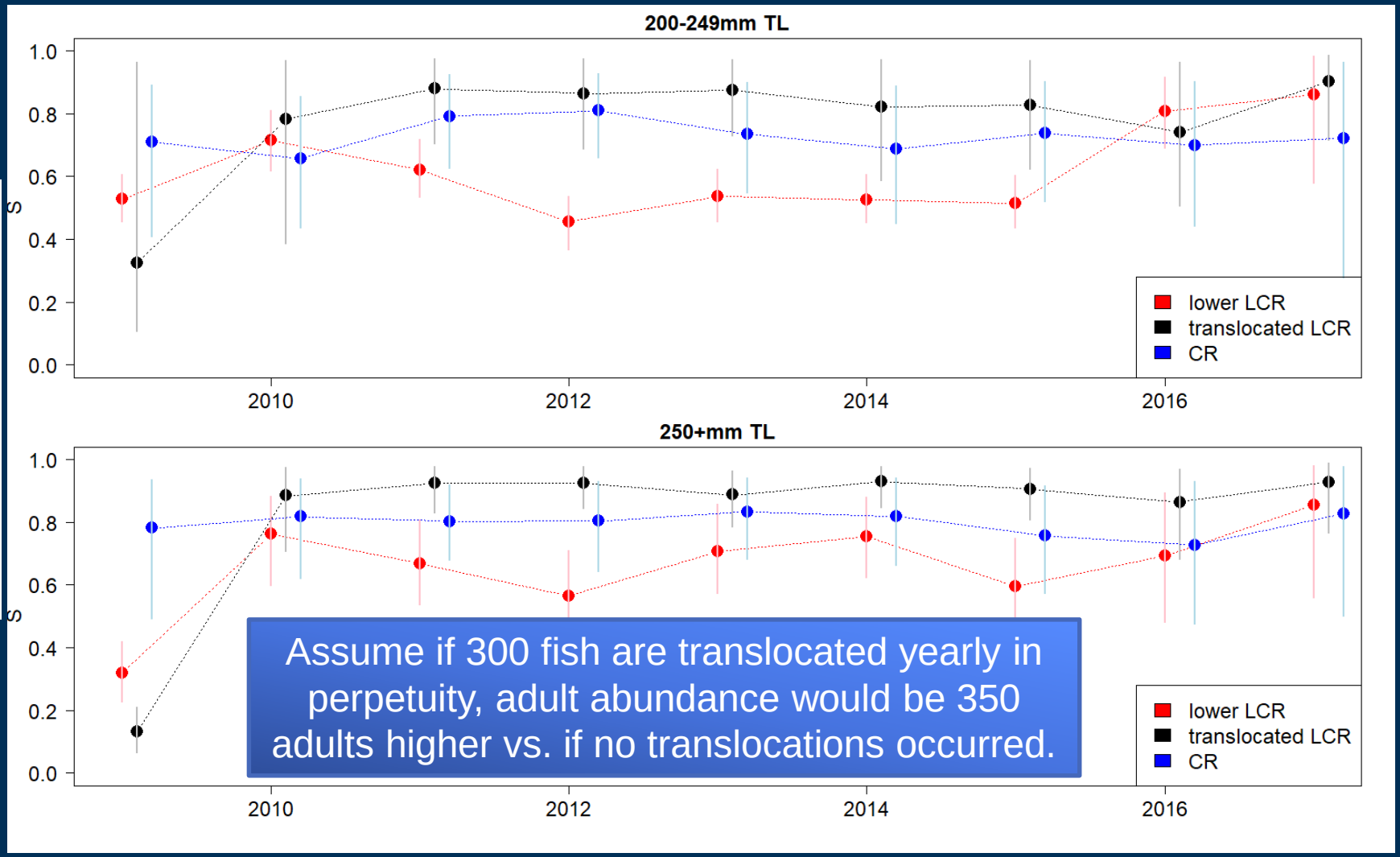
Vertical lines represent 95% confidence intervals.

USGS

(USGS Preliminary Data, 2019. Do Not Cite.)

(*March 6, 2019*)

Apparent Survival Humpback Chub: Translocated vs Not Translocated



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(*March 6, 2019*)

(USGS and USFWS Preliminary Data, 2019. Do Not Cite.)

NPS Tributary Native Fish Restoration: Bright Angel Creek and Havasu Creek

- Nonnative trout removals
- Humpback chub translocations
- Multiple monitoring metrics: abundance, survival, recruitment

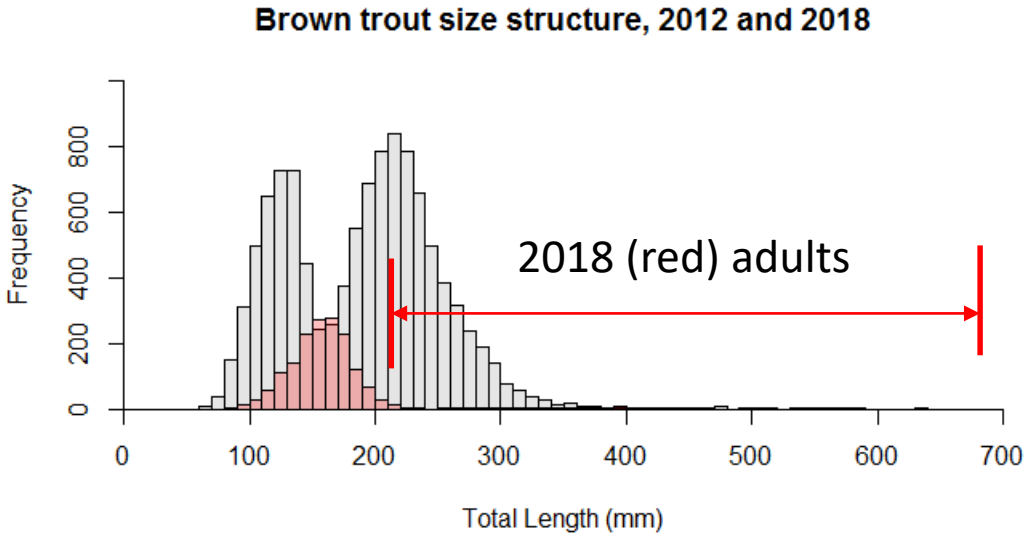
(*Slide courtesy Brian Healy, NPS*)

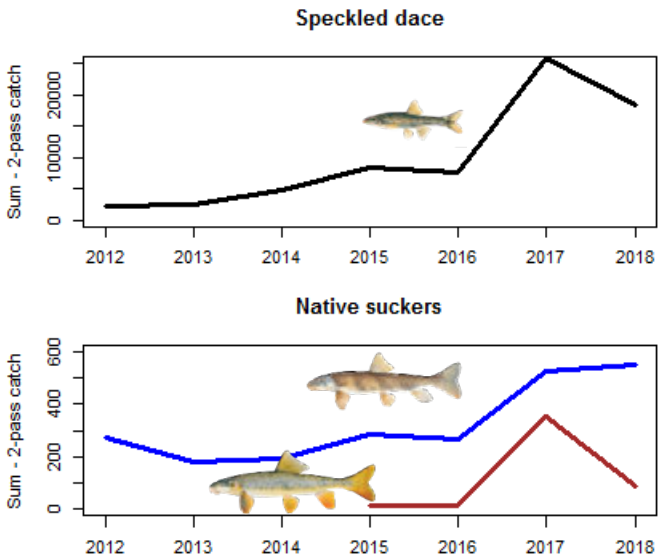
USGS

(*March 6, 2019*)

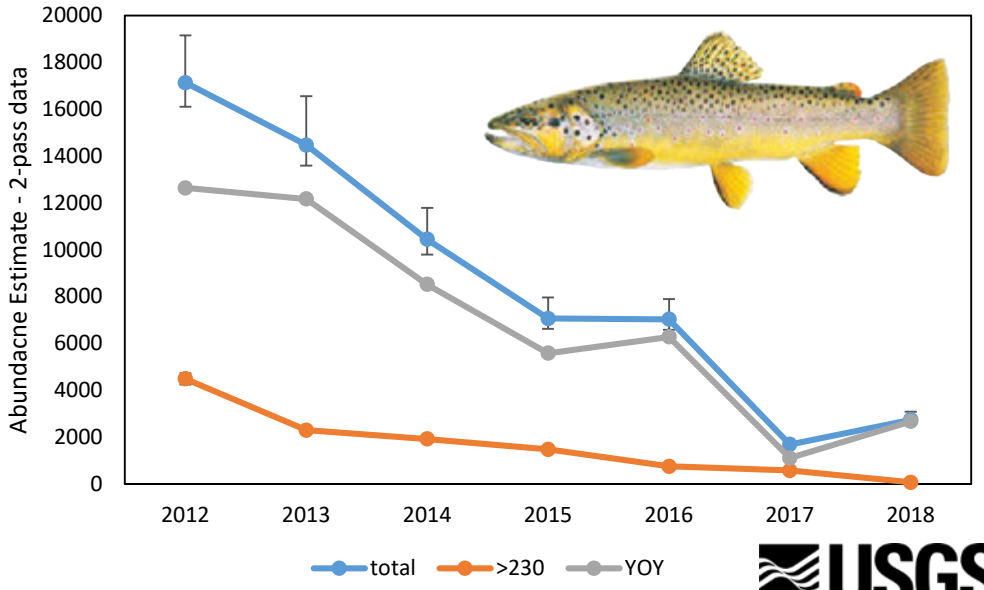
Bright Angel Creek: Trends

- Strong BNT year class in 2018: likely due to ideal (low) flows during spawning/incubation
- Very few adult BNT remaining
- 2018 BNT abundance = 84% decline since 2012 (>90% in 2017)
- Weak year classes of native fishes (likely due to drought)





Bright Angel Creek: total, young-of-year, adult abundance



(Slide courtesy Brian Healy, NPS. Preliminary data, do not cite)

USGS

(March 6, 2019)

Bright Angel Creek: Trends, cont.

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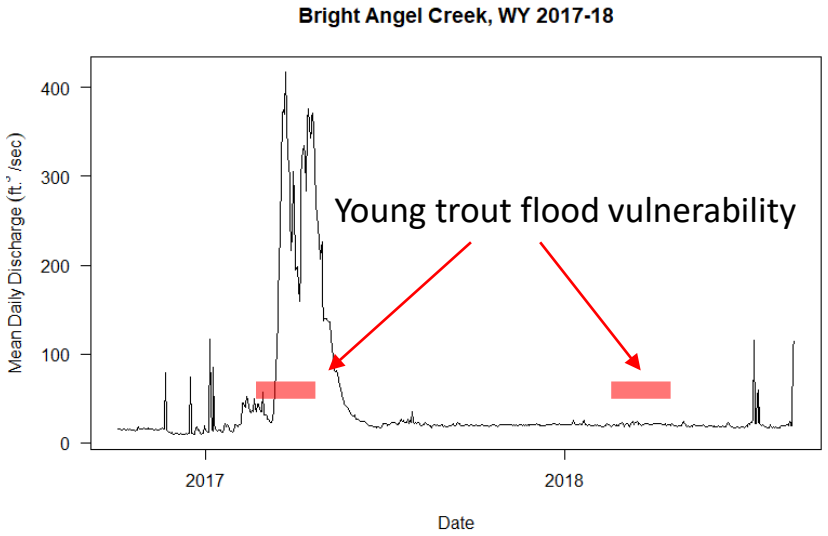

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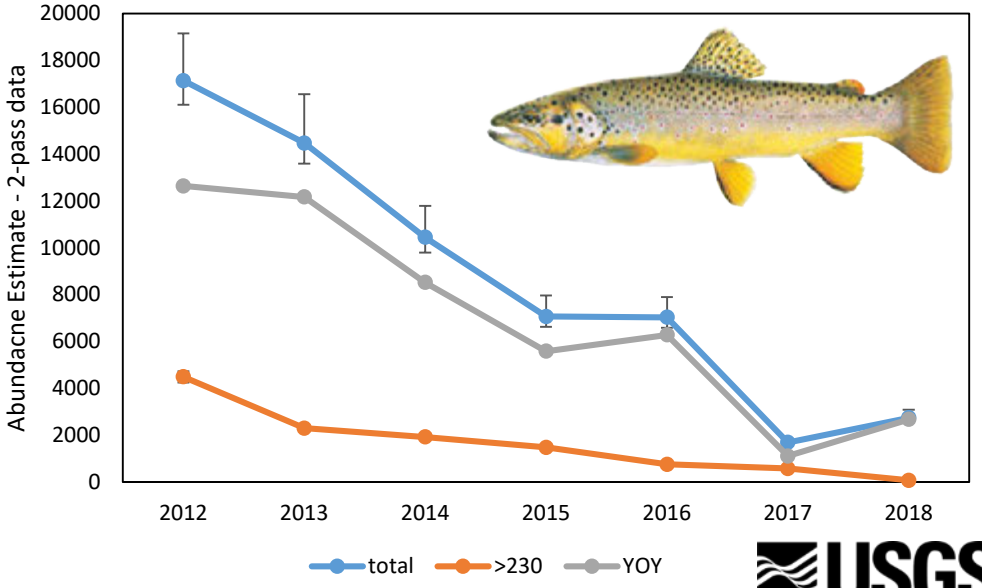

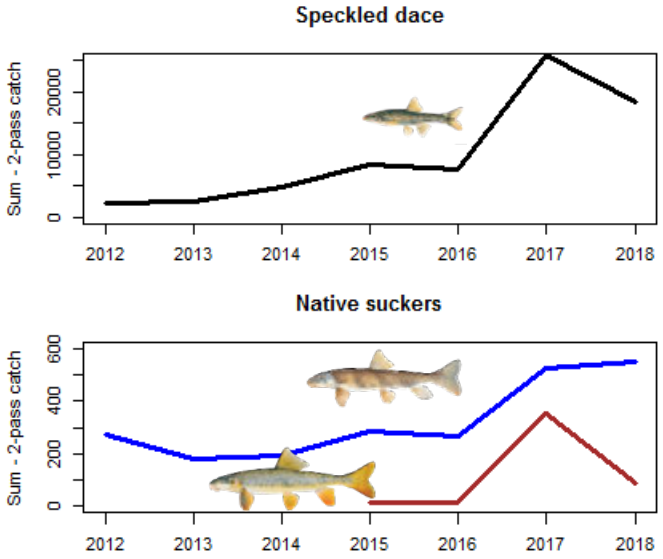

(Slide courtesy Brian Healy, NPS. Preliminary data, do not cite)

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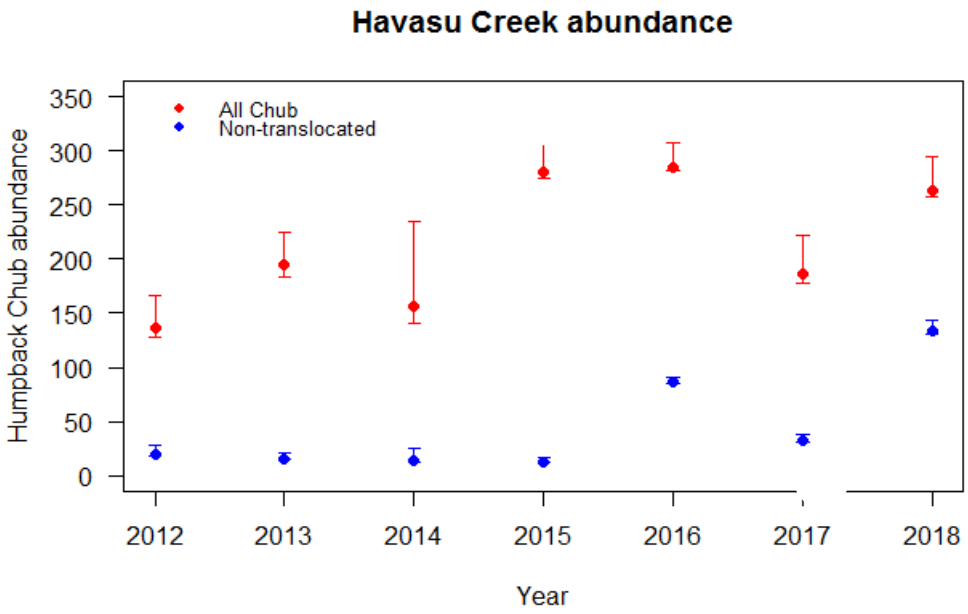
Humpback chub translocations

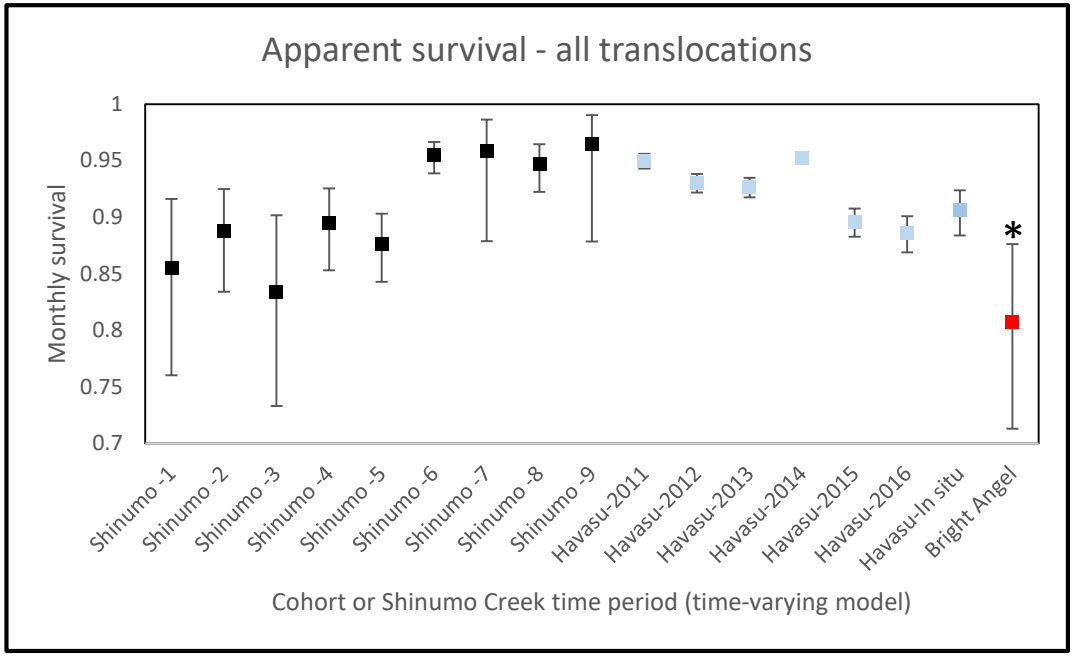
Havasu Creek:

- Population estimate ~300
- Non-translocated/fish produced *in situ* catch continues to increase (~50% of abundance estimate in May, 2018)

Bright Angel Creek:

- May, 2018, Released 116 adult humpback chub (mean TL =257 mm)
- Preliminary apparent survival ~80%; estimate will change with additional data
- Comparable to some





*BAC - Preliminary estimate

(Slide courtesy Brian Healy, NPS. Preliminary data, do not cite)

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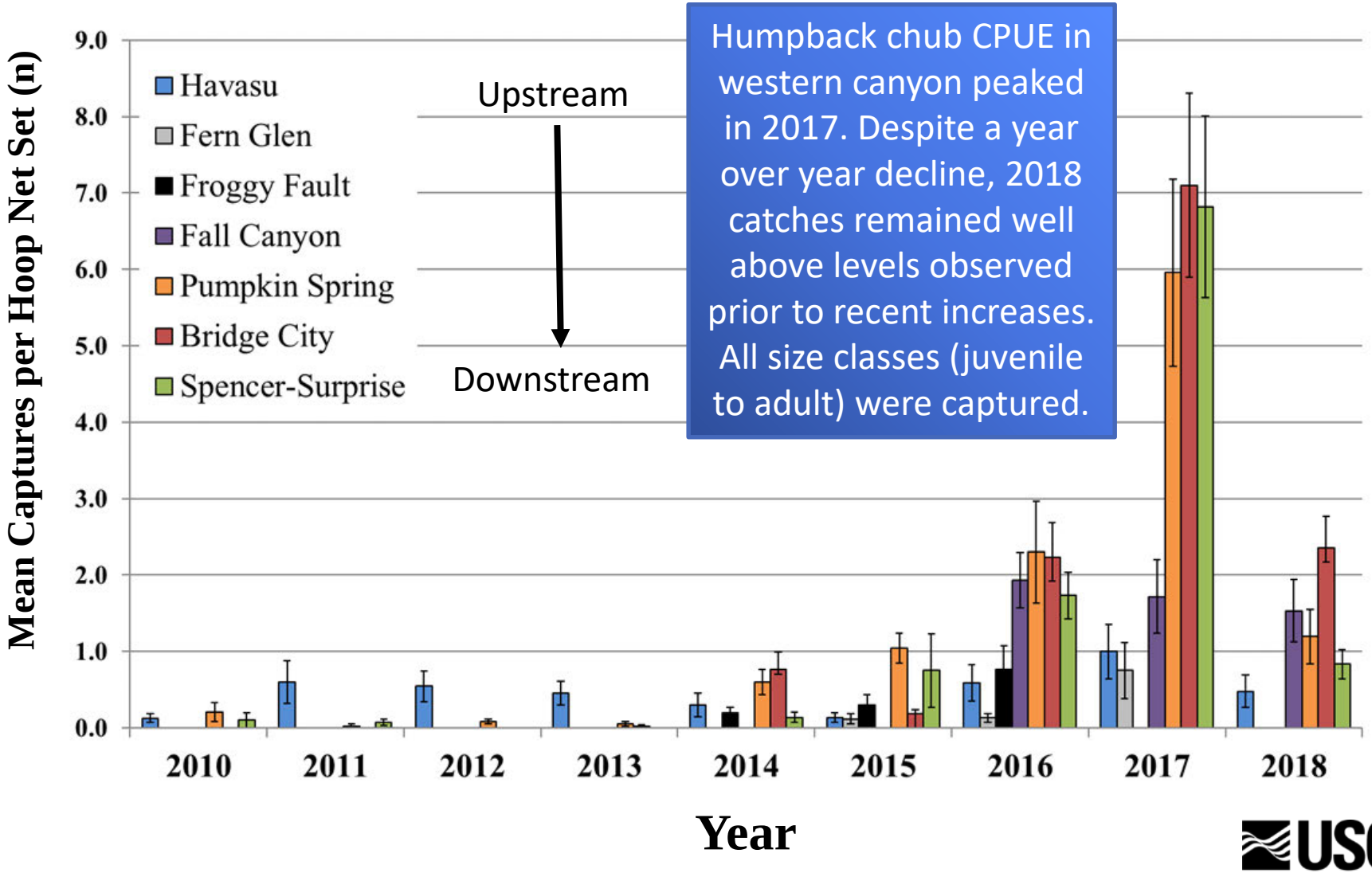
Humpback Chub CPUE by year in western Grand Canyon



(Preliminary Data from VanHaverbeke et al. USFWS. 2018. Do Not Cite.)

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Rainbow Trout and Brown Trout

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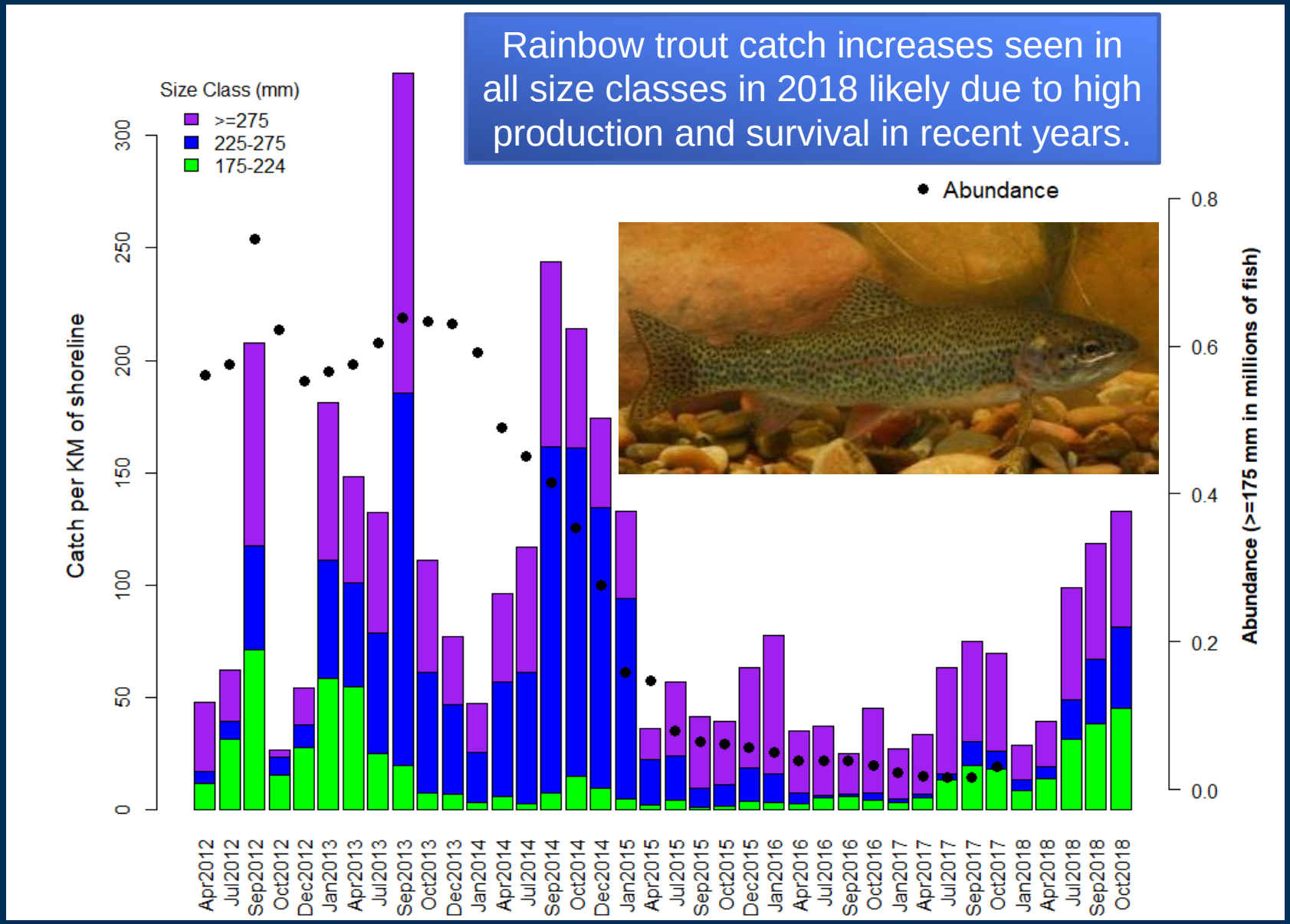
Rainbow Trout (≥ 175 mm FL) - Glen Canyon

Rainbow trout catch increases seen in all size classes in 2018 likely due to high production and survival in recent years.

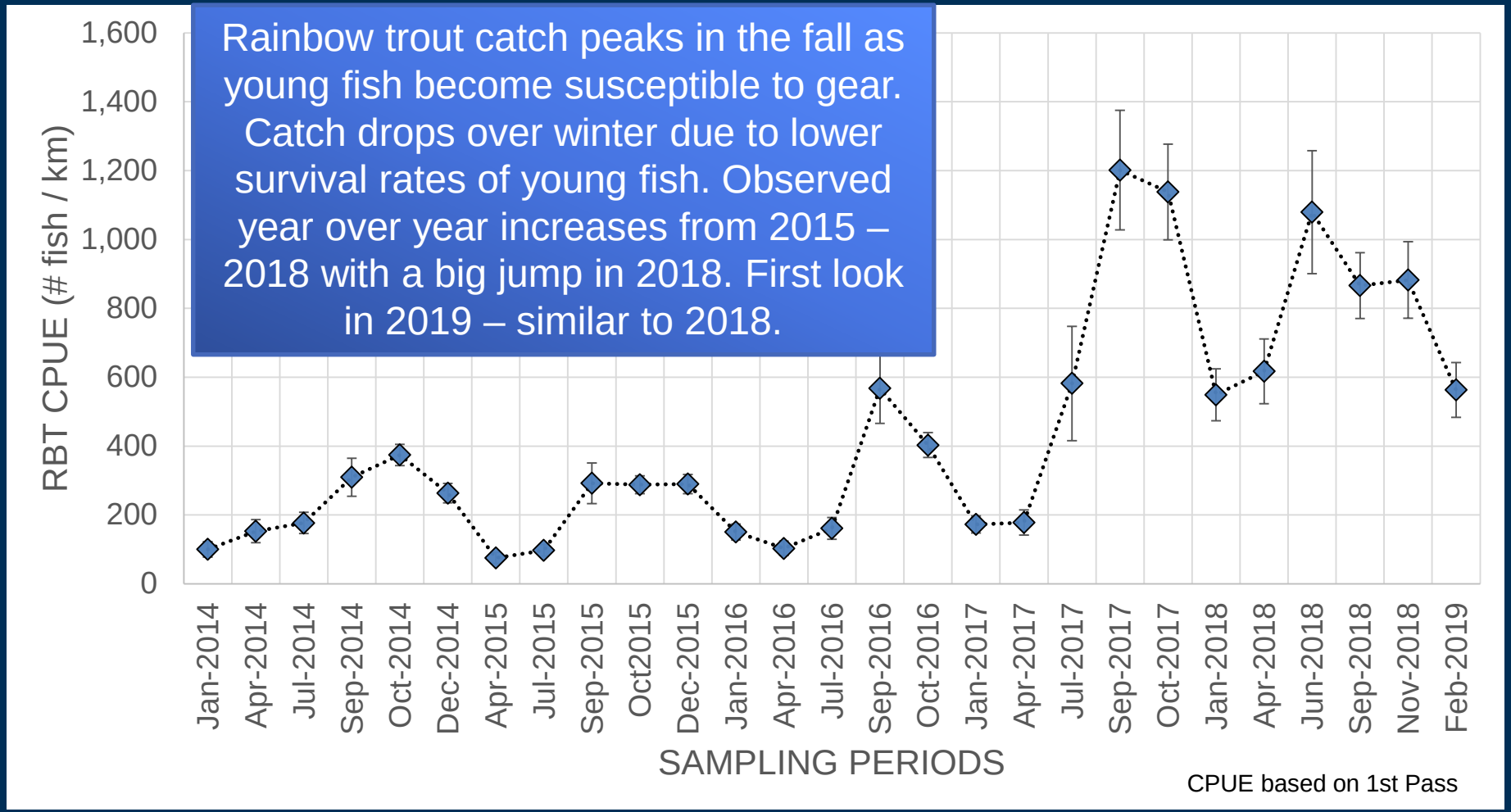


USGS

(Preliminary data from Yard and Korman, 2018. Do Not Cite.)

(*March 6, 2019*)

Rainbow Trout (all sizes) - Glen Canyon Catch Per Unit Effort (CPUE)



USGS

(Preliminary data from Yard and Korman, 2018. Do Not Cite.)

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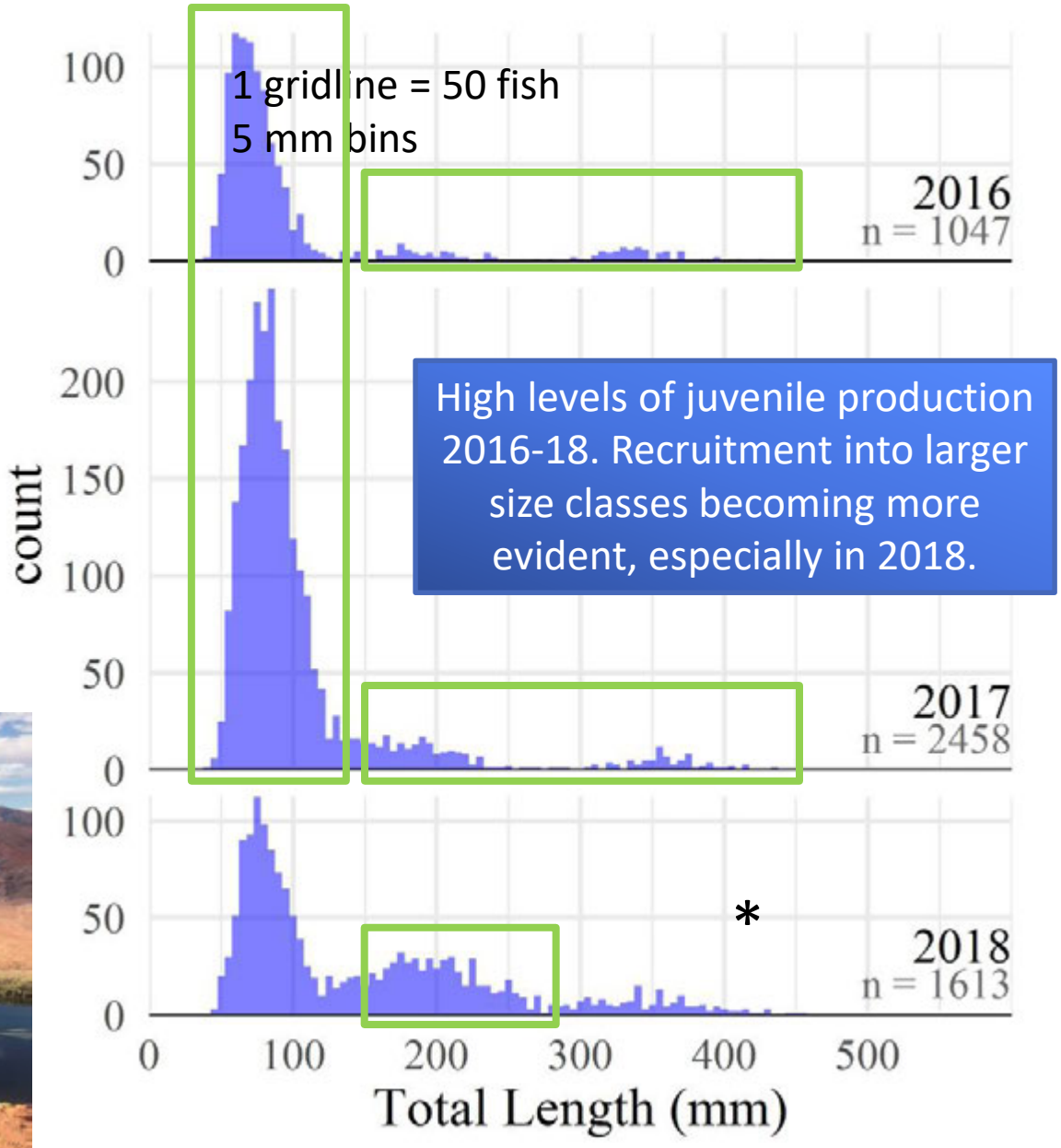
Lees Ferry Rainbow Trout length frequency histograms



*No Spring trip in 2018

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(Preliminary Data from Rogowski et al. AGFD. 2019. Do Not Cite.)

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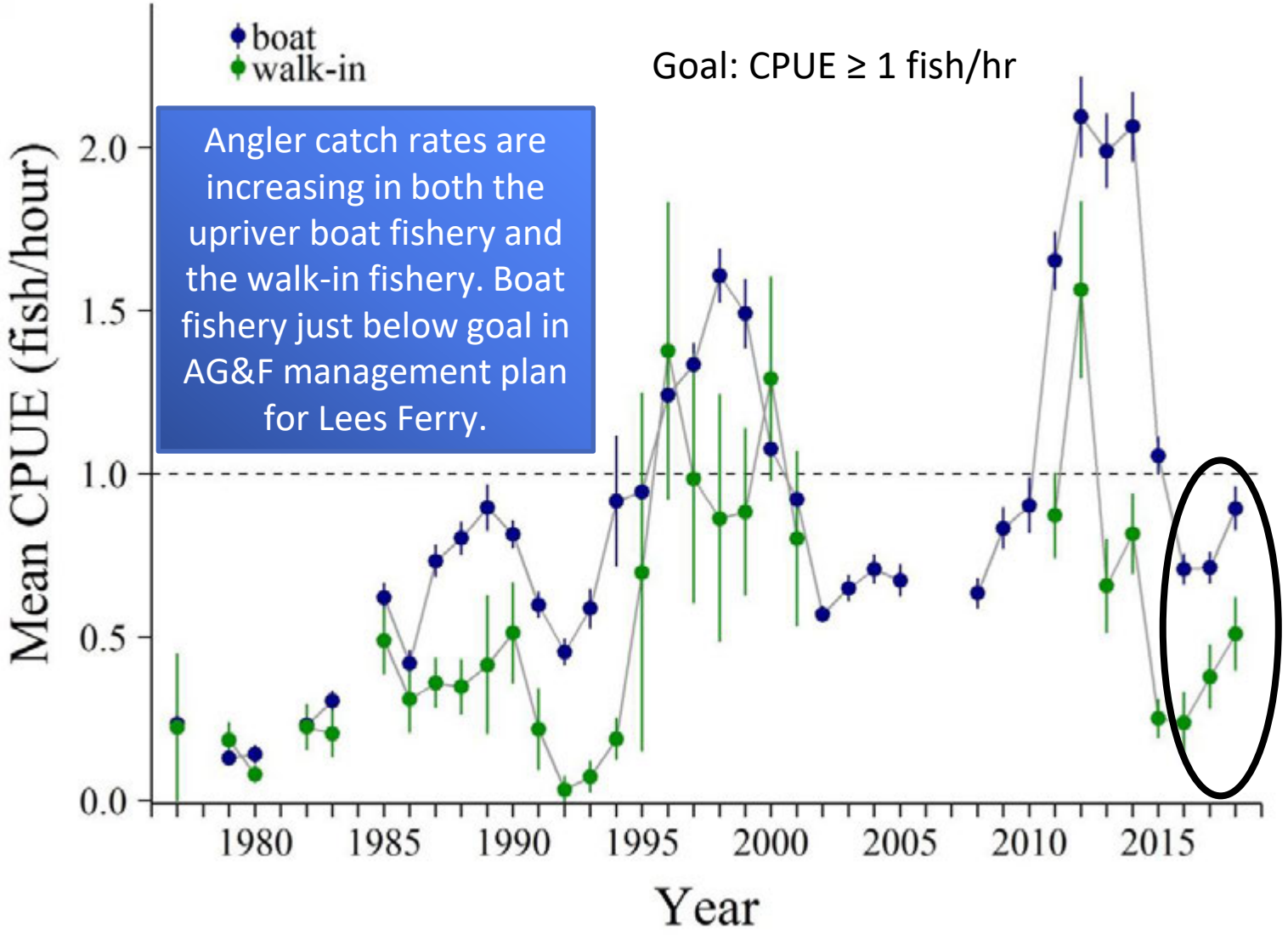
Lees Ferry Rainbow Trout angler CPUE



Goal: Angler catch rate ≥ 1 Rainbow per hour

(Preliminary Data from Rogowski et al. AGFD. 2019. Do Not Cite.)

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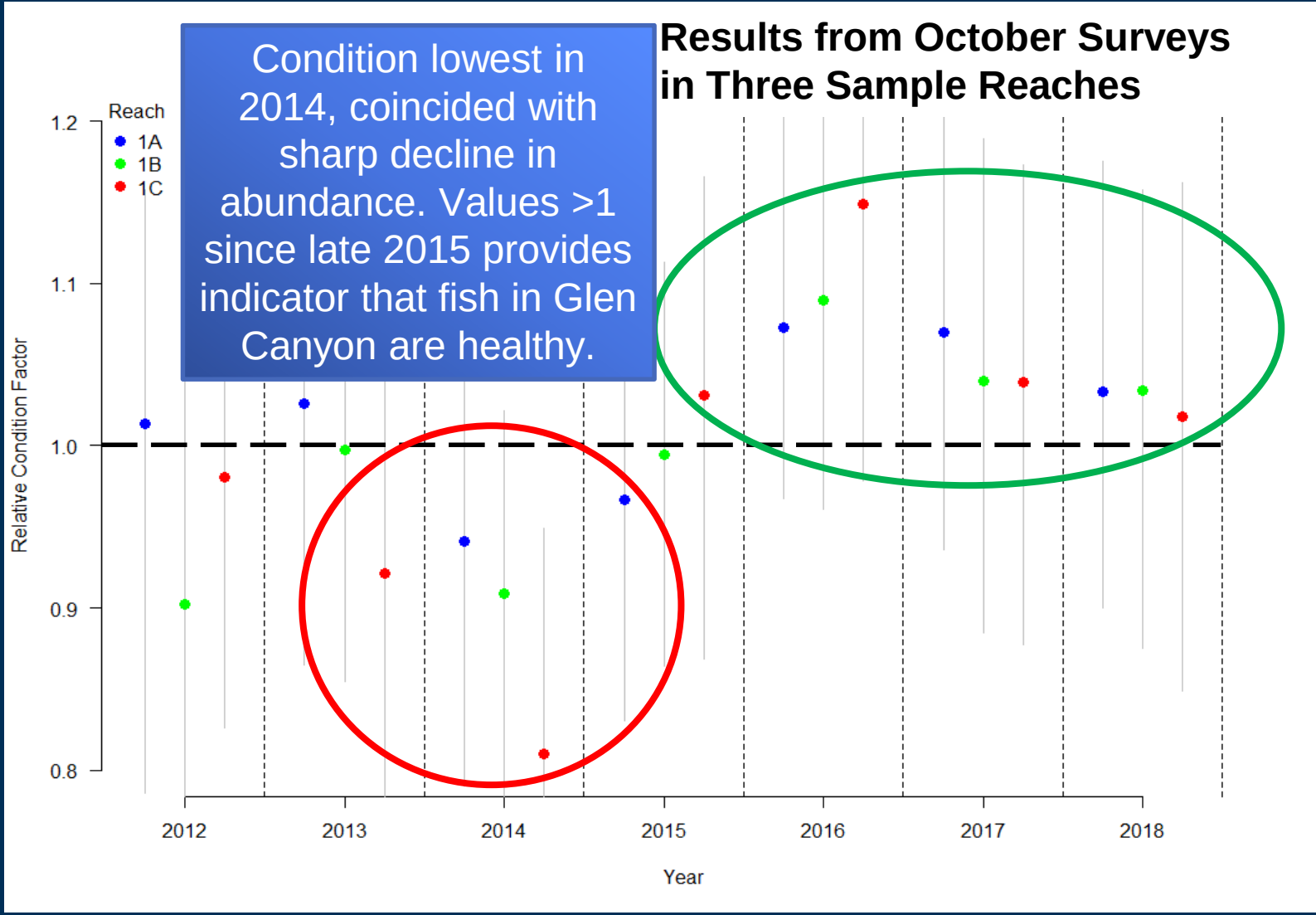
Rainbow Trout - Glen Canyon
Relative Condition Factor (300 mm fish)



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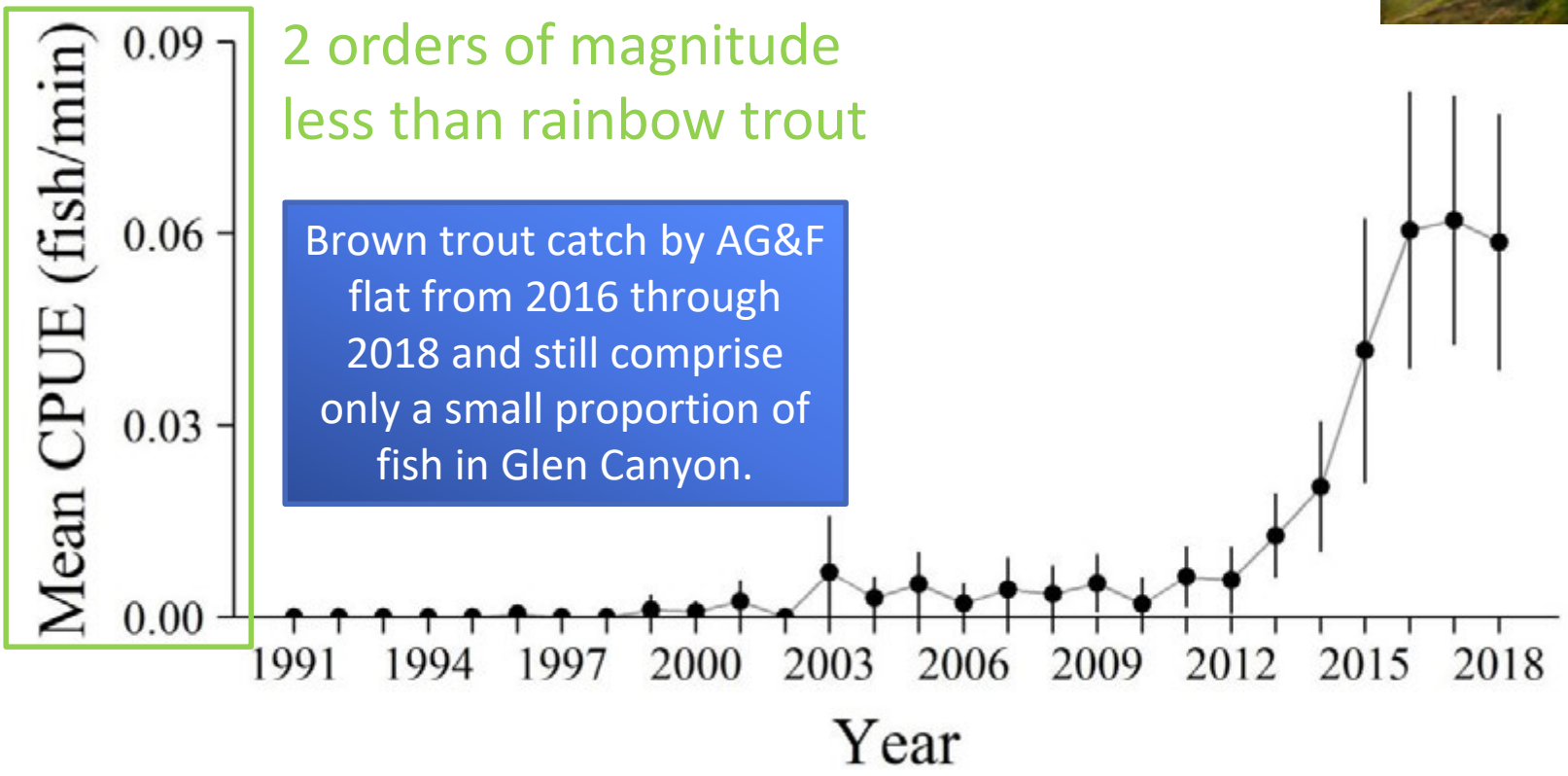
(Preliminary data from Yard and Korman, 2018. Do Not Cite.) (*March 6, 2019*)

Brown Trout CPUE

2 orders of magnitude
less than rainbow trout

Brown trout catch by AG&F flat from 2016 through 2018 and still comprise only a small proportion of fish in Glen Canyon.



- 51 captured
  - Released 9 in TRGD reaches (5 tagged, 4 recaptures)
  - Removed 42 elsewhere (including 2 recaptures)

(Preliminary Data from Rogowski et al. AGFD. 2019. Do Not Cite.)

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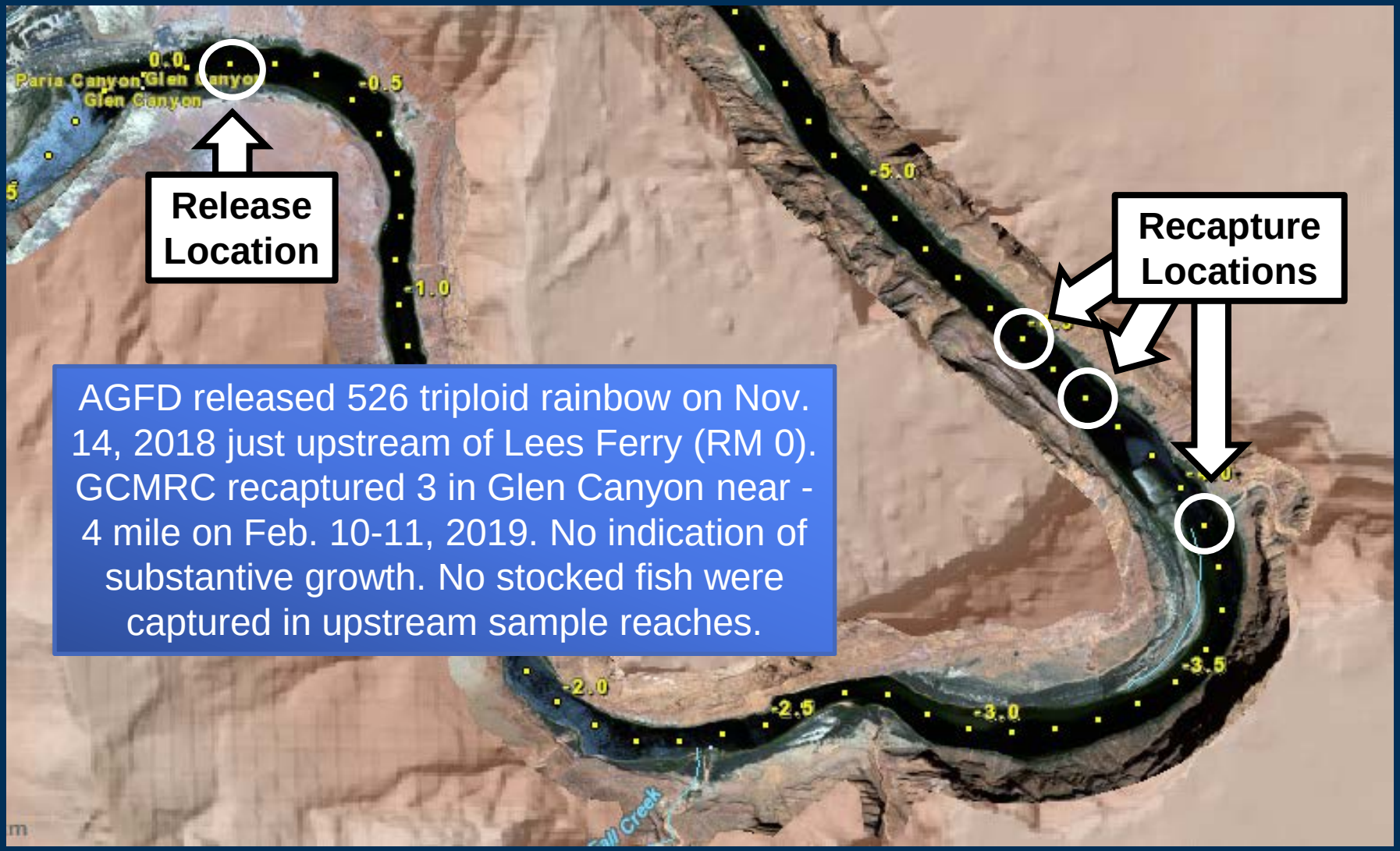
Stocked Triploid Rainbow Trout - Glen Canyon



Bug Flows

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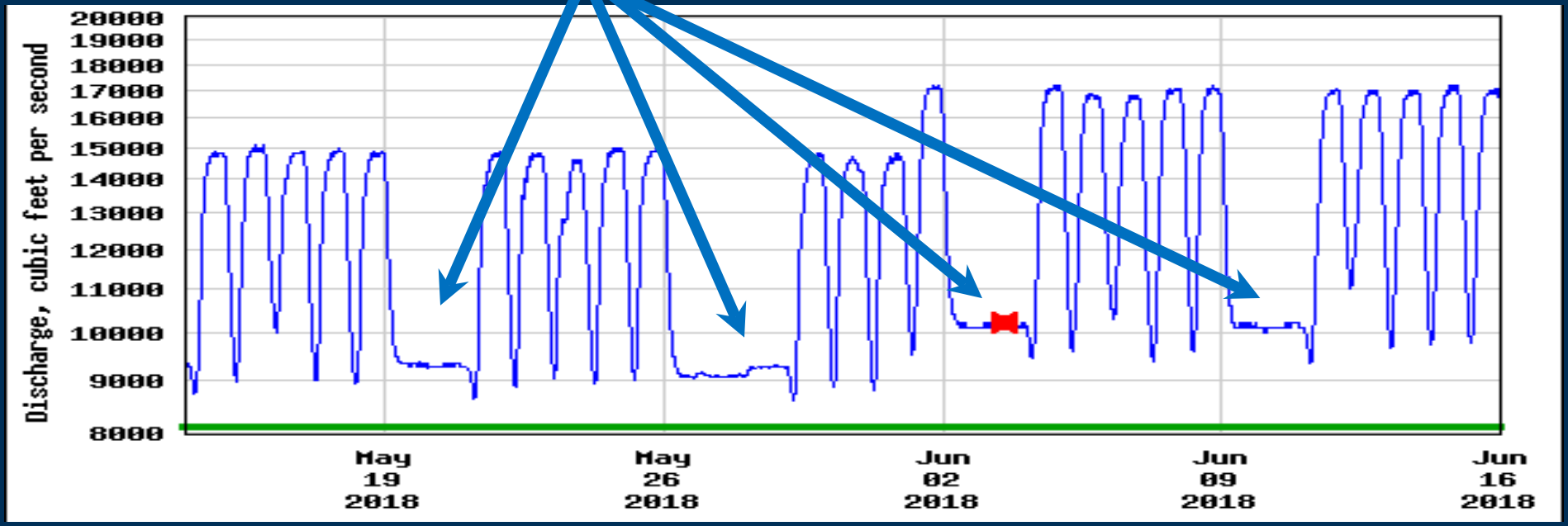
What is a Bug flow?

- “Give bugs the weekends off”
- Weekend stable low flows from May-August
- Eggs laid on weekends never dry

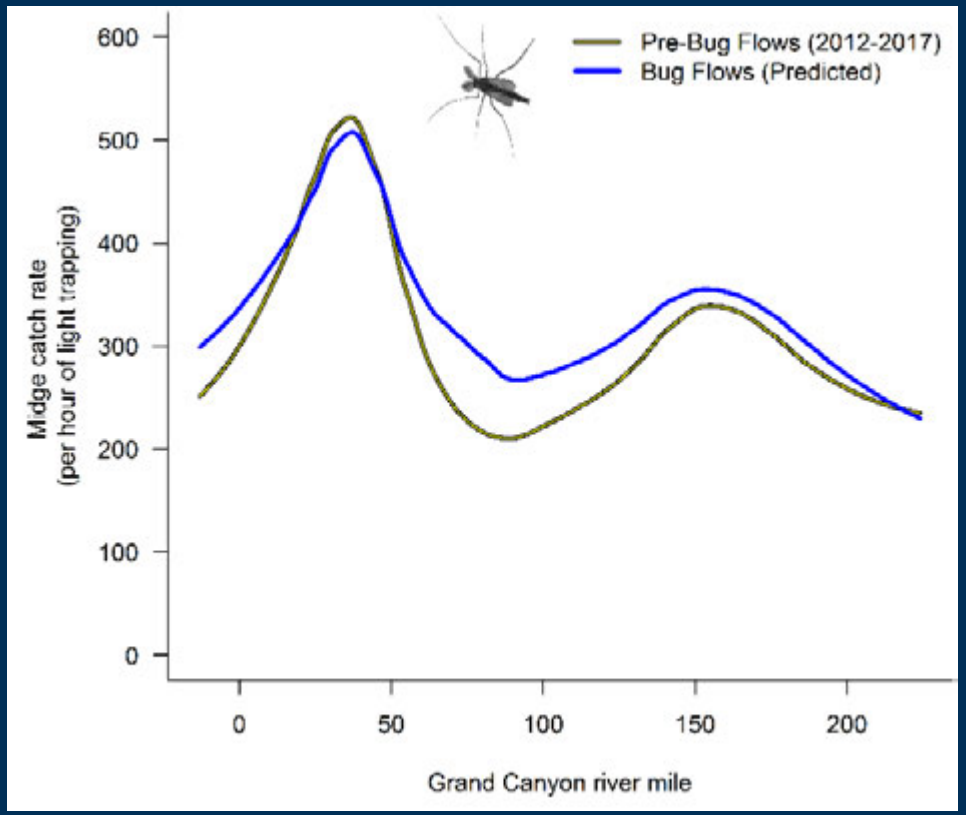


USGS

https://waterdata.usgs.gov/az/nwis/uv?site_no=09380000

Midge spatial catch pattern (prediction)

- Midge spatial pattern due to hydropower releases
- Bug Flows should minimize effect
- Troughs, particularly, should flatten



USGS

(USGS Preliminary Data, 2019. Do Not Cite.)

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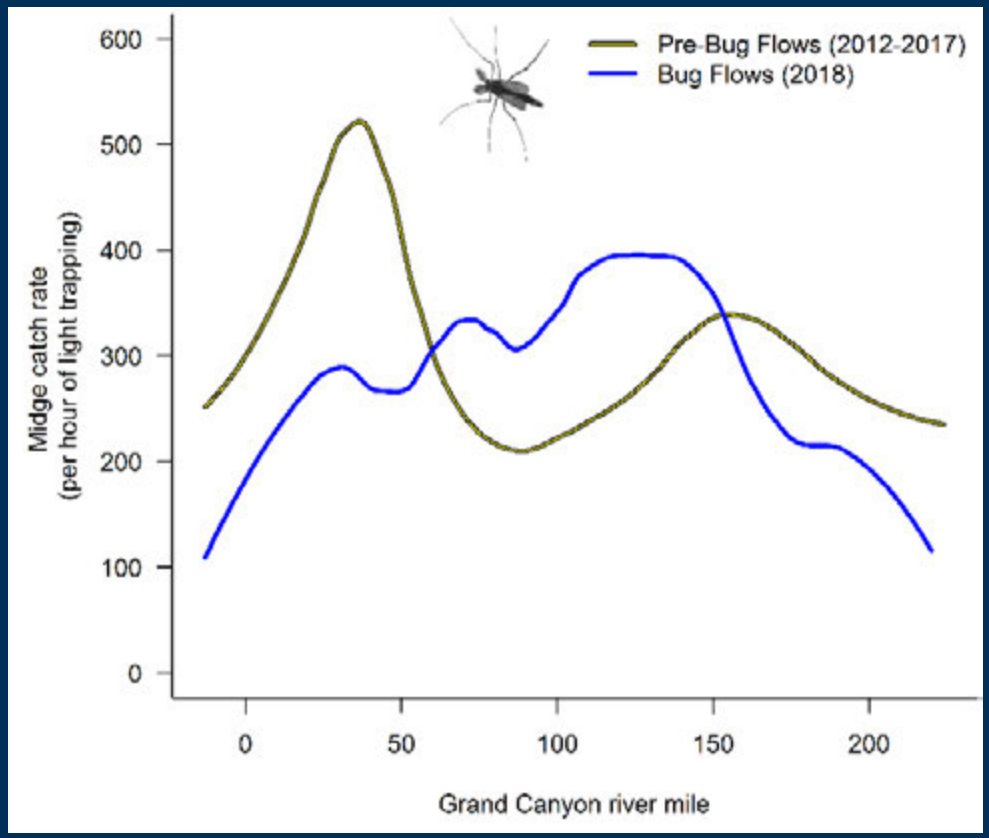
Midge spatial catch pattern (result)

- Spatial pattern evened out in 2018
- Effect should be stronger if bug flows approved for 2019 (after a year of bug growth)
- 3 years of bug flows recommended by GCMRC to test hypothesis



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(USGS Preliminary Data, 2019. Do Not Cite.)

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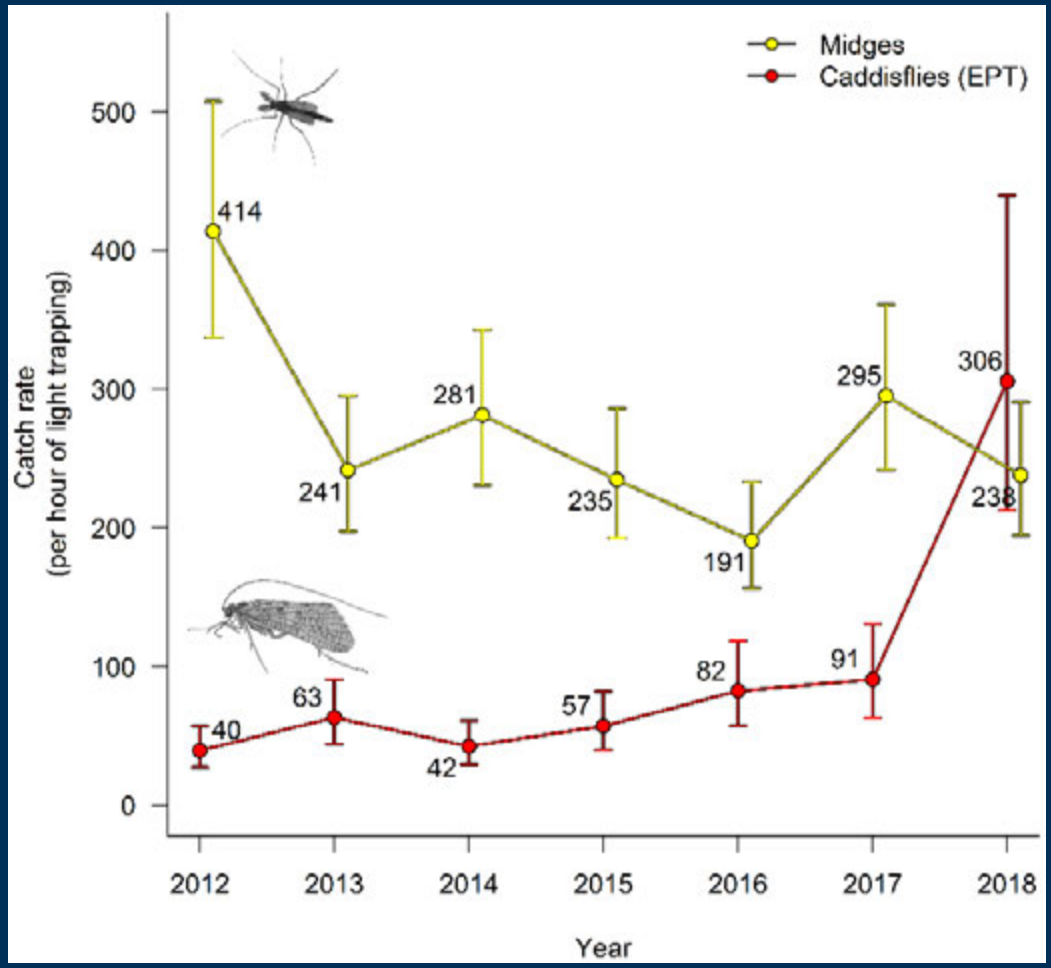
Yearly light trap patterns

- Midges stable
- Caddisflies take off in 2018
- Caddisflies now approximate midge densities



(USGS Preliminary Data, 2019. Do Not Cite.)

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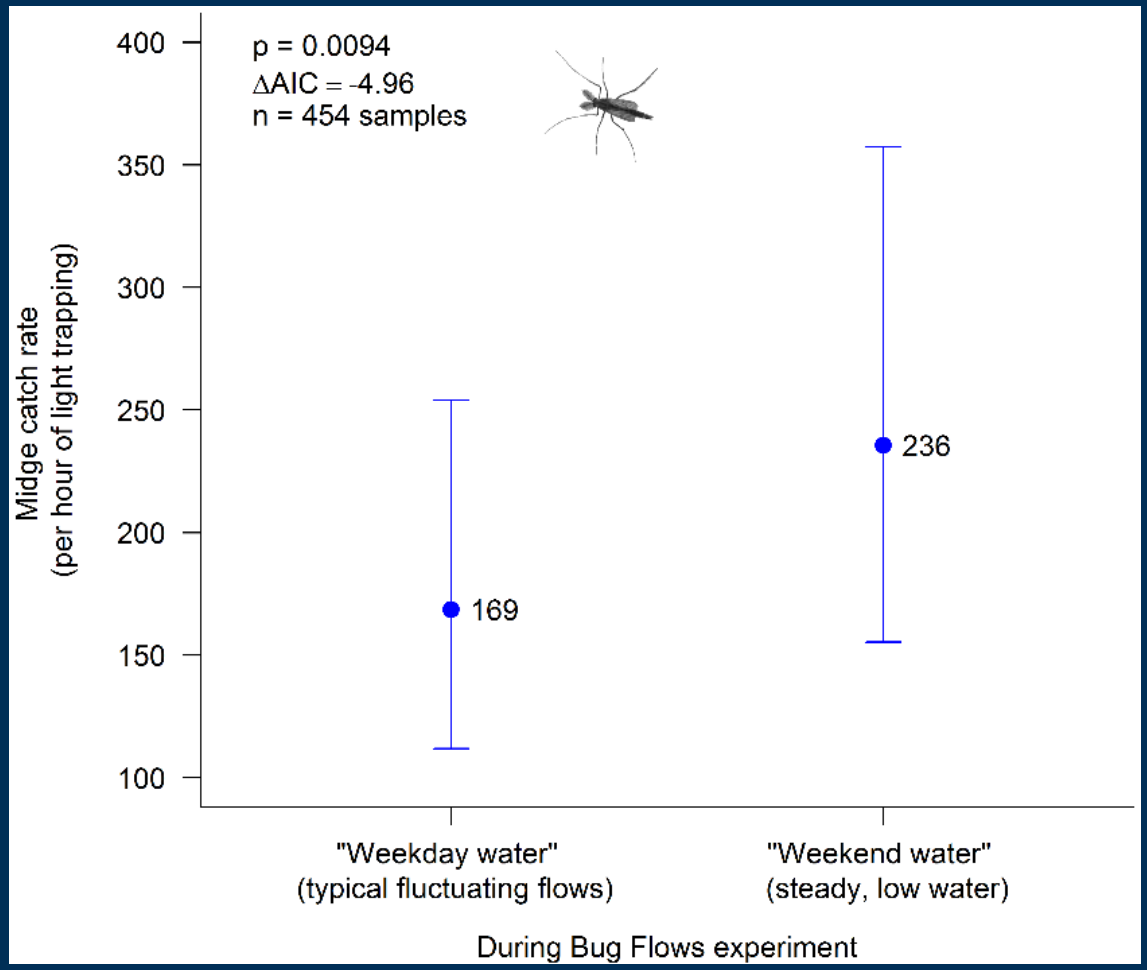
Bug Flows weekdays vs. weekends

- Midge adults more abundant on weekends
- Behavioral response to steady, low flows?
- Some evidence angling improved during bug flows. Response of fish and/or anglers?



Acknowledgements

- U.S. Department of the Interior, Bureau of Reclamation and the Glen Canyon Dam Adaptive Management Program
- Arizona Game and Fish Department
- National Park Service
- US Fish and Wildlife Service
- Ecometric Research, Inc.
- U.S. Geological Survey, Southwest Biological Science Center, Grand Canyon Monitoring and Research Center

USGS

(*March 6, 2019*)


Questions?
USGS
(March 6, 2019)