# AMWG Desired Future Condition

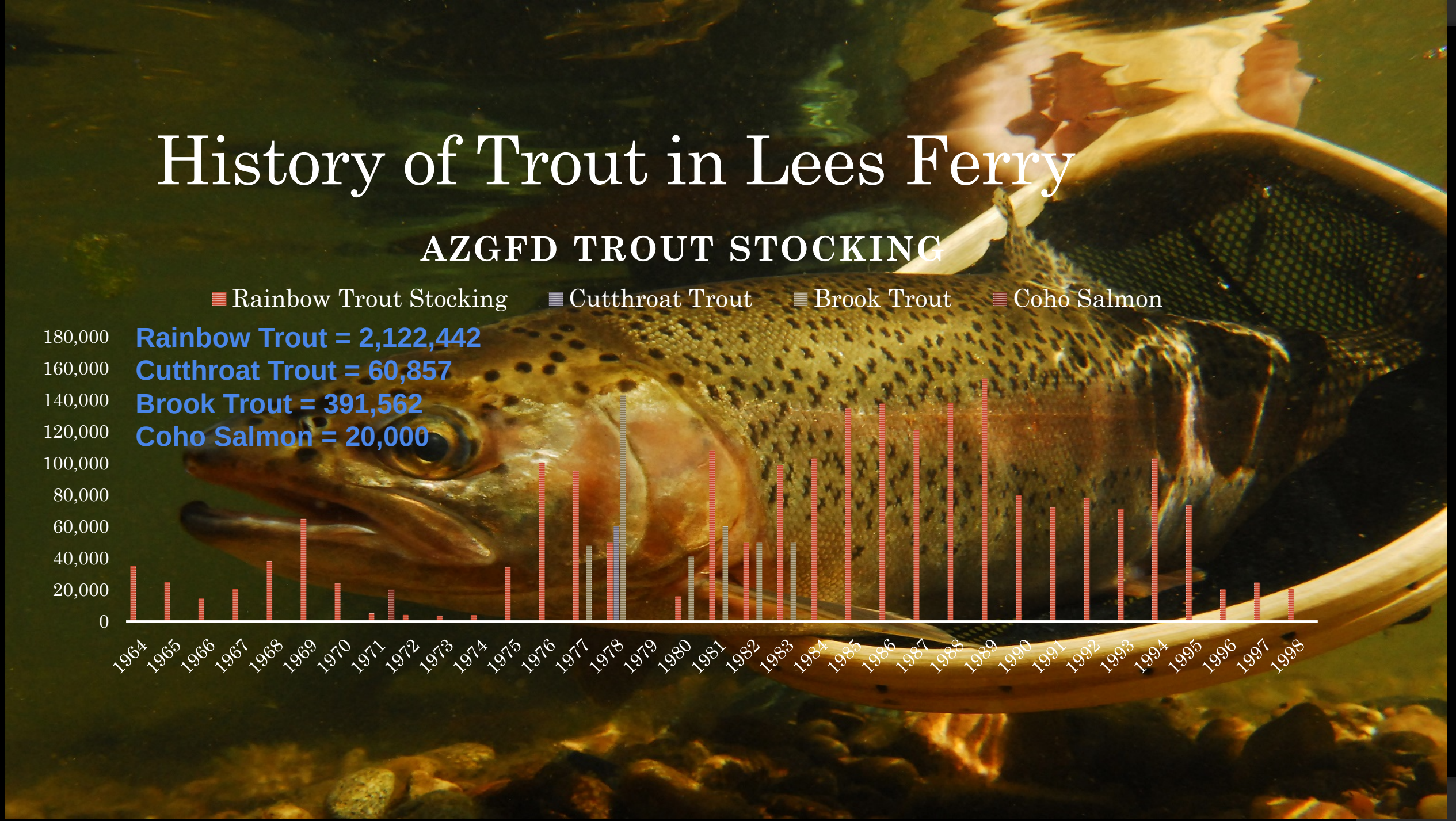
A high quality trout fishery in GCNRA, as further described in the Recreation DFC that does not adversely affect the native aquatic community in GCNP

# Shared Fishery Goals for the lower Colorado River – NPS/AGFD

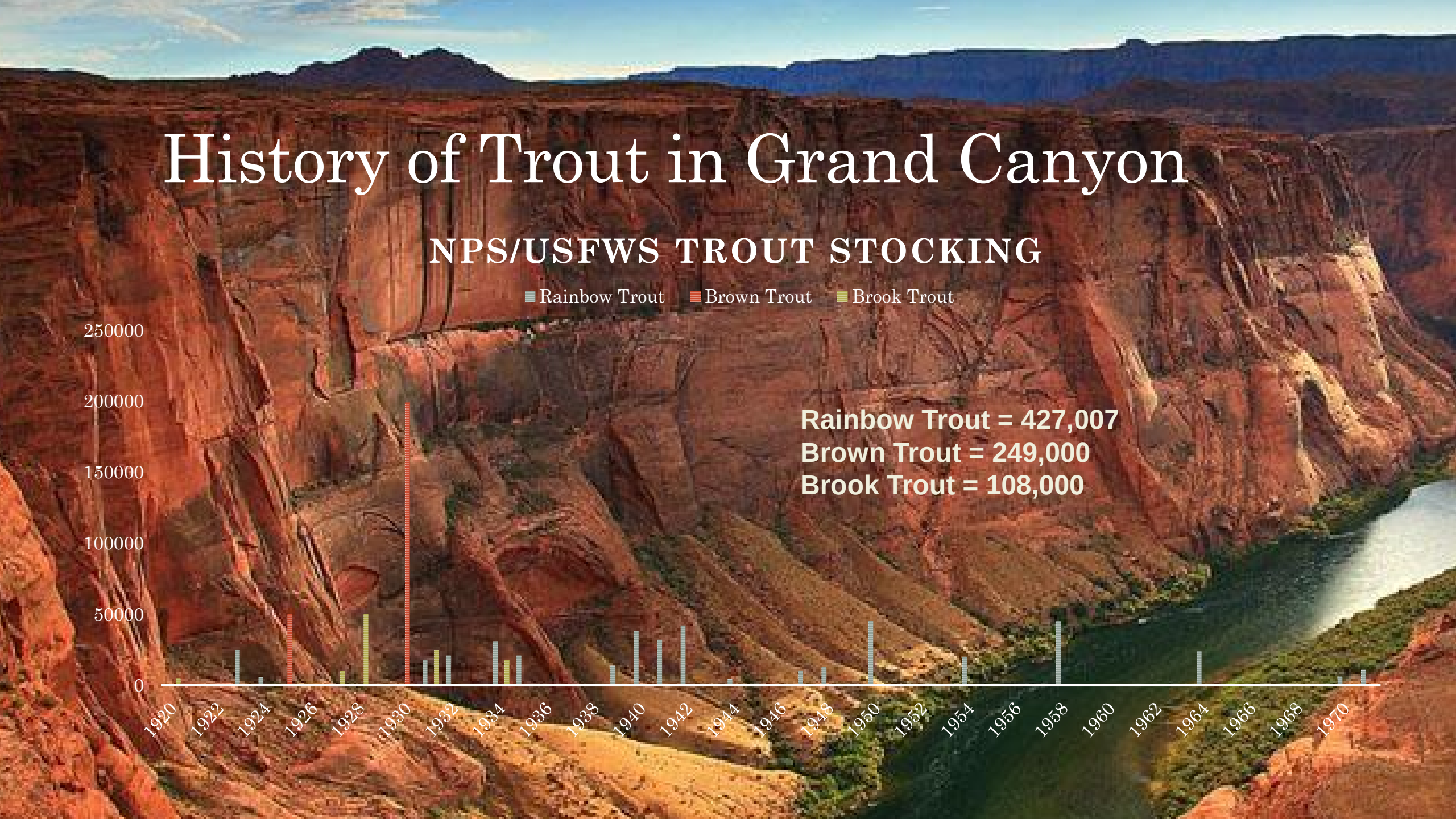
**1. Maintaining a quality recreational Rainbow Trout fishery in Lees Ferry**

**2. Maintaining healthy populations of all native fish (including Humpback Chub and Razorback Sucker) populations in the lower Colorado River**

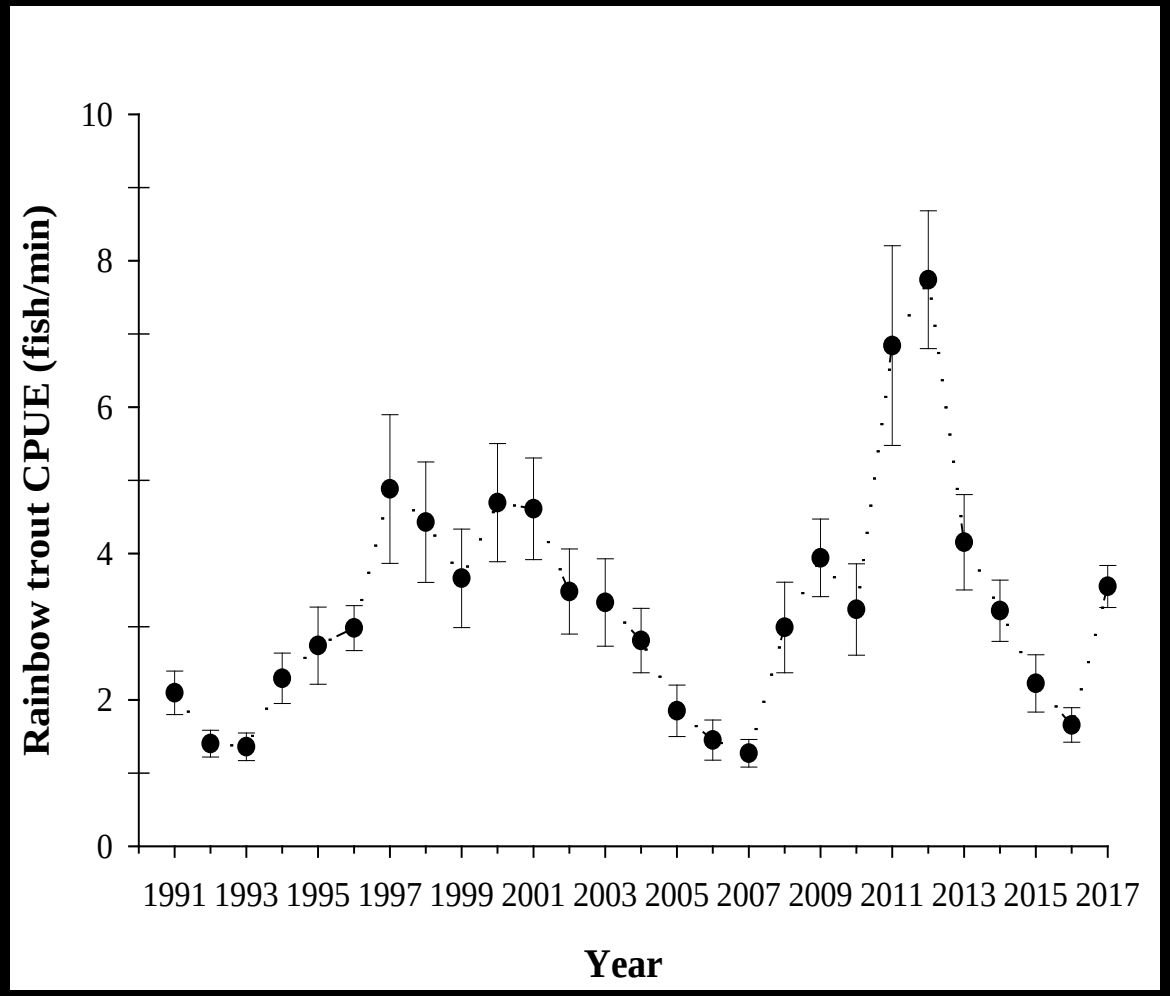
# History of Trout in Lees Ferry



# History of Trout in Grand Canyon

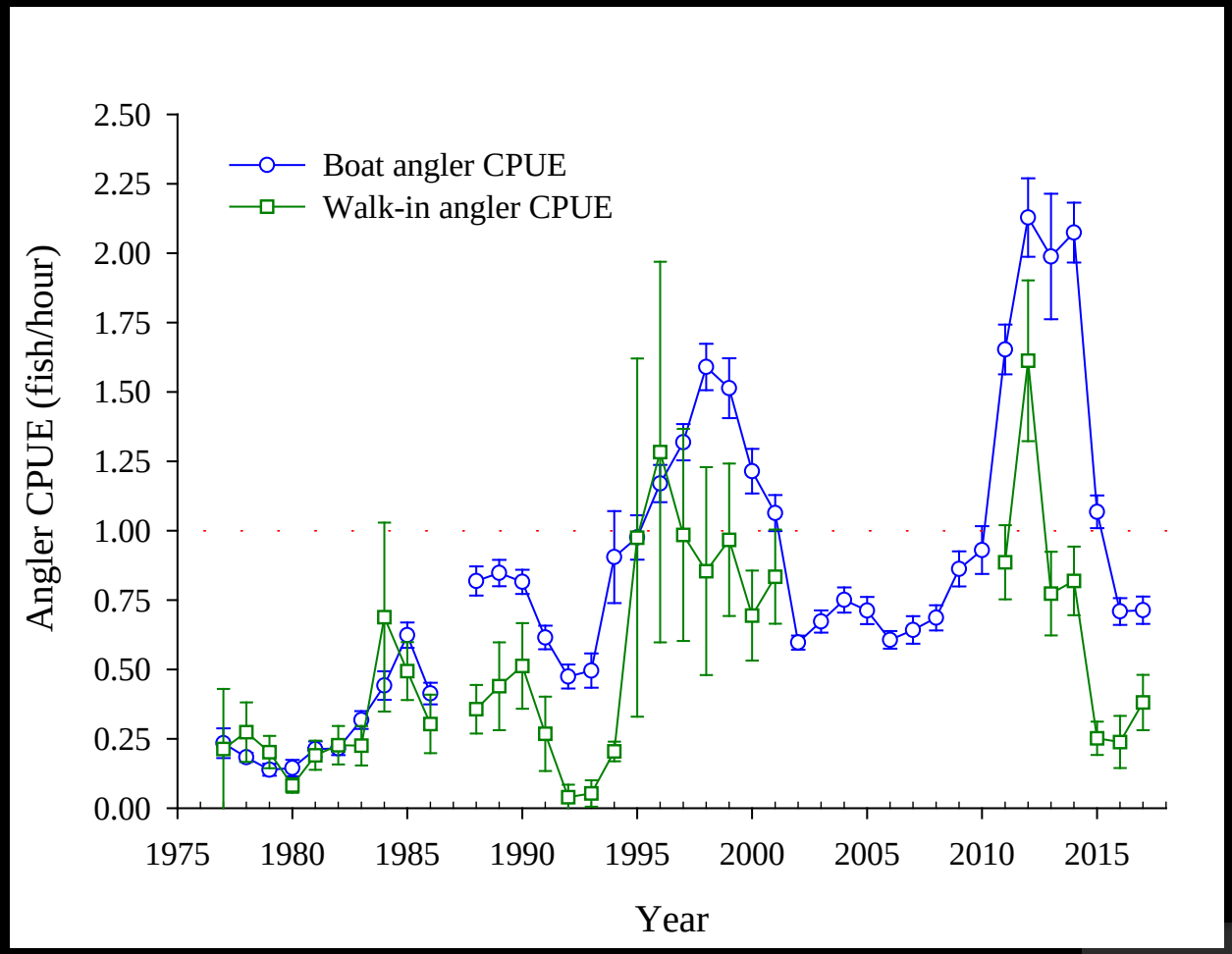


# Rainbow Trout Population Trends in Lees Ferry

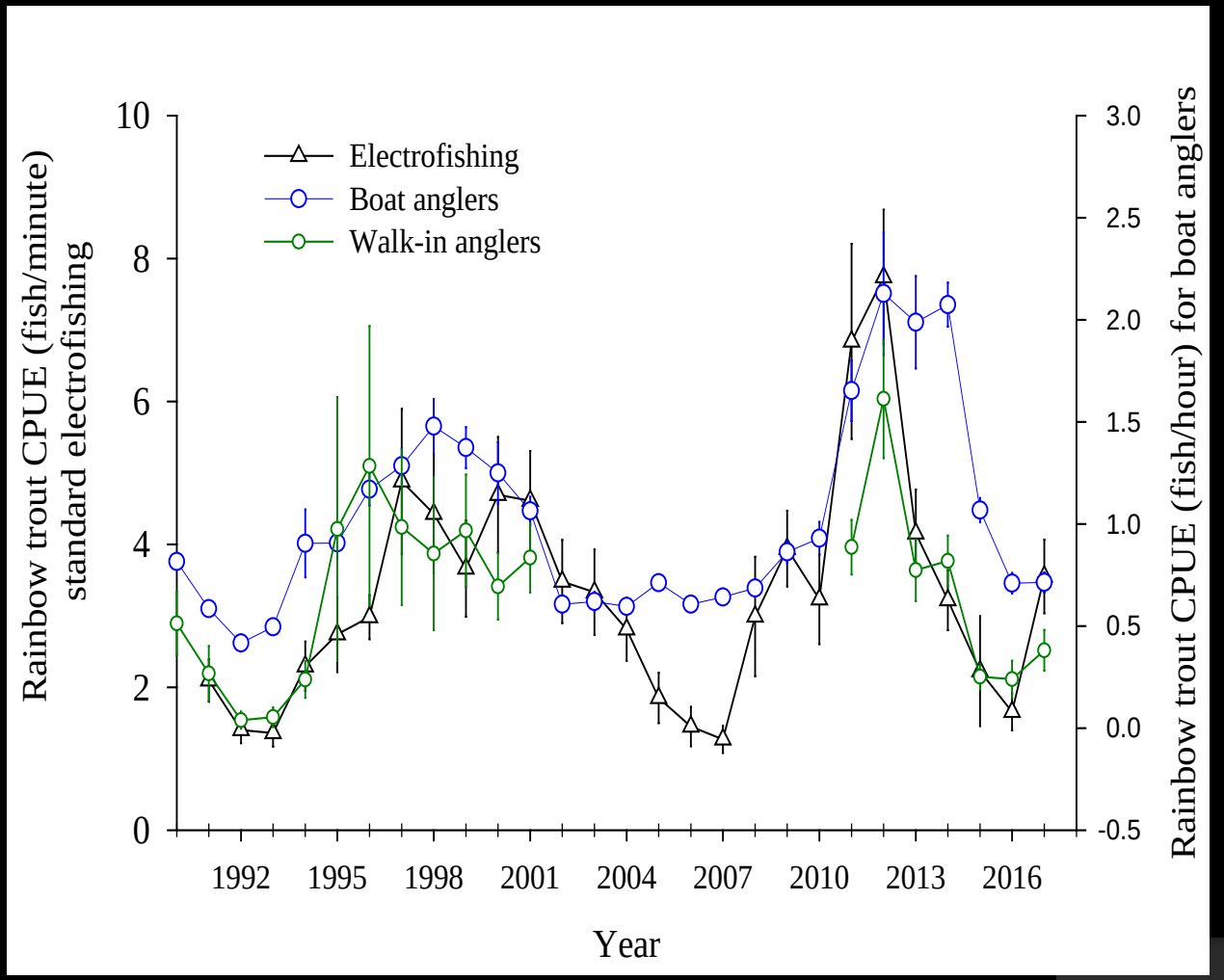



4 fold decline in CPUE from 2012 - 2016

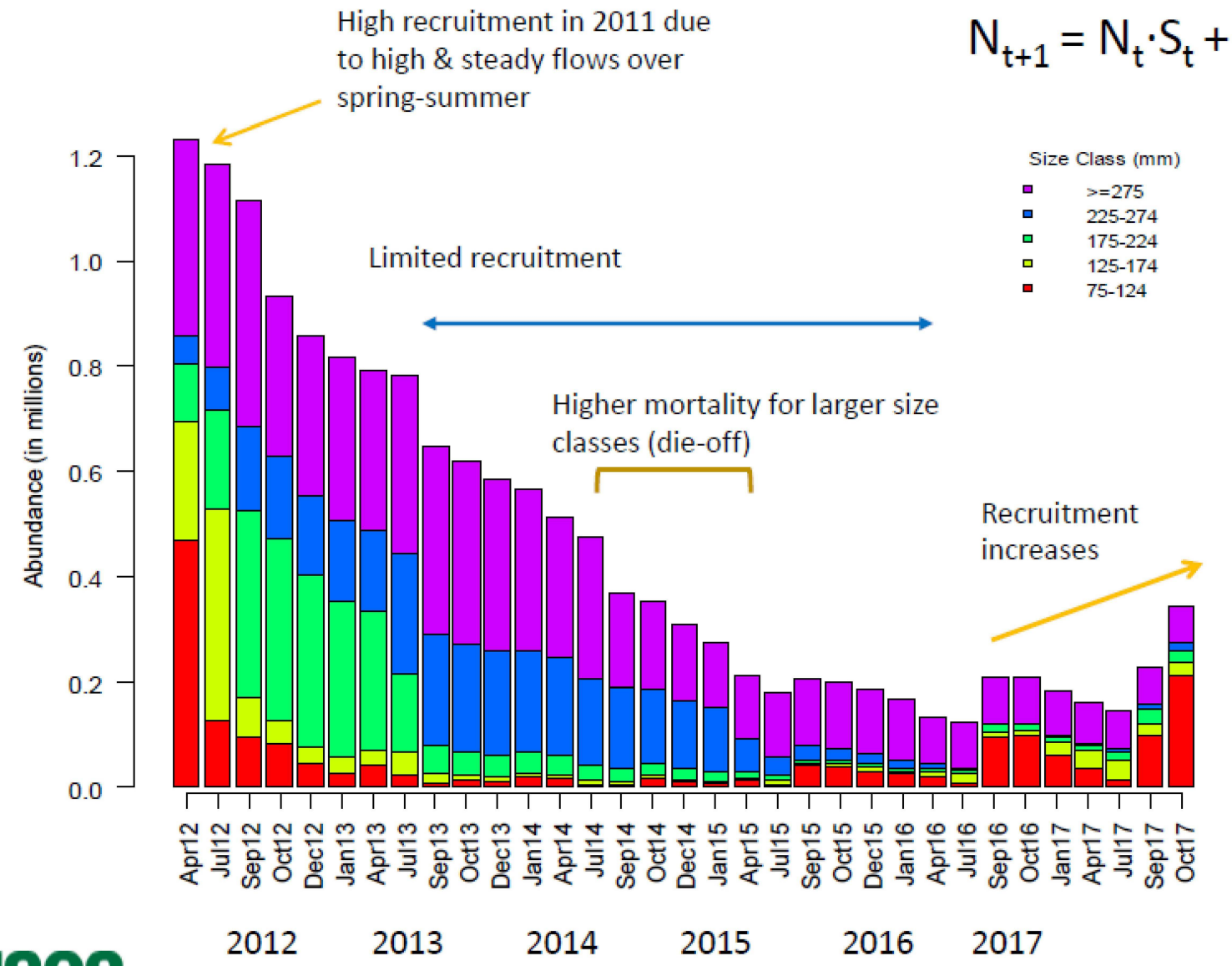
# Catch rates < 1 fish per hour – 2014 - 2017



# Angler catch rates correlate with electrofishing trends



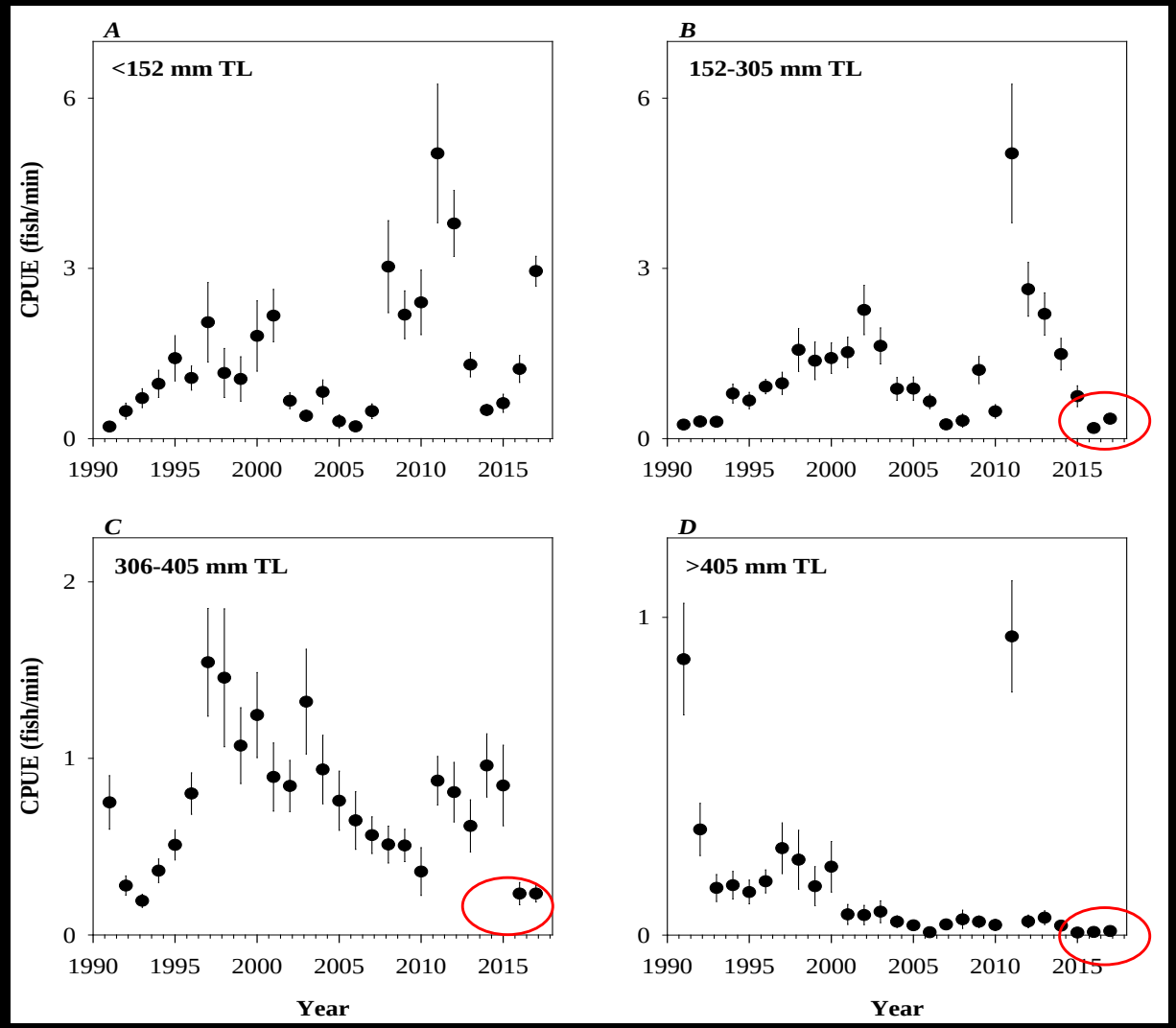
# Rainbow Trout Abundance in Glen Canyon



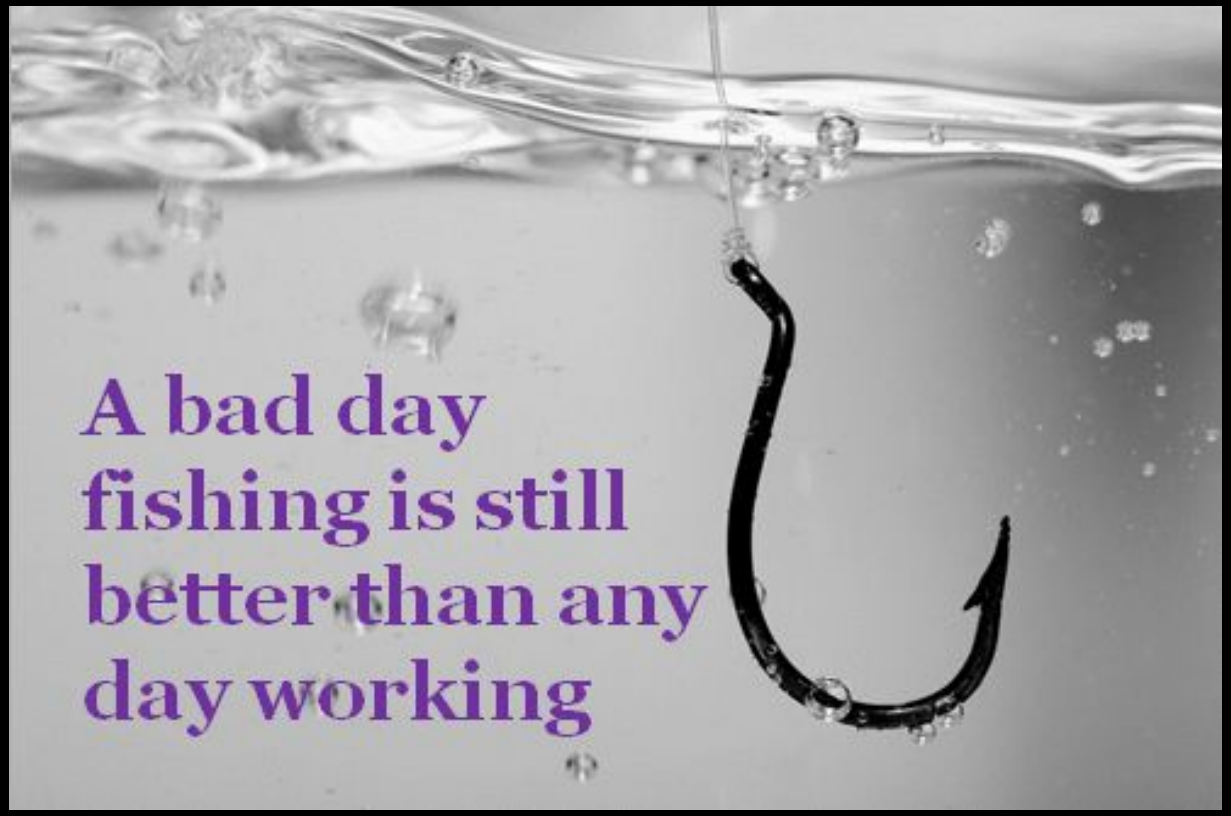

USGS science for a changing world

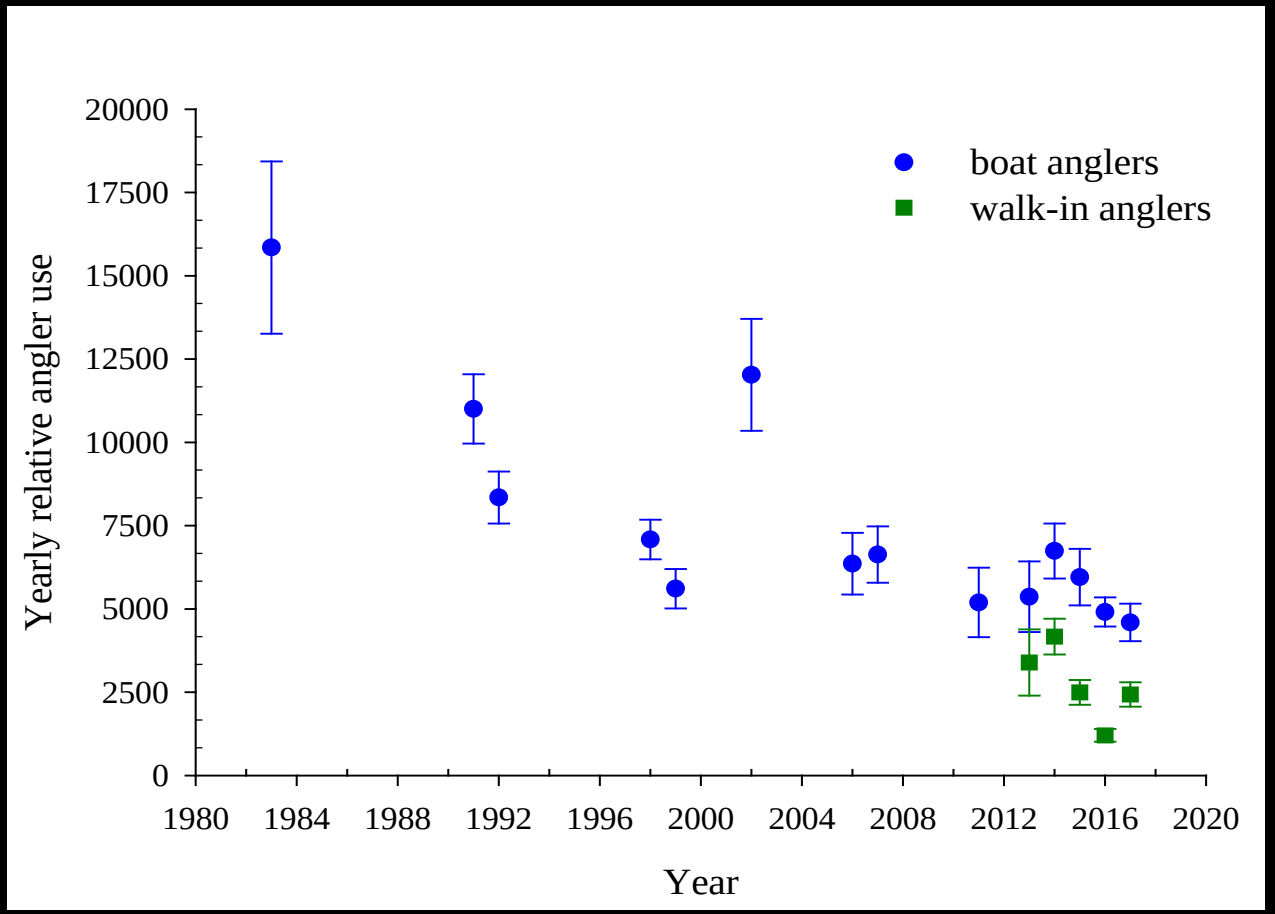
(Preliminary data from Korman and Yard 2017. Do Not Cite.)

# “Catchable” population of Rainbow Trout is still depressed



# Poor catch rates = less angler use (>35% decline)



# 2015 Lees Ferry Management Plan

| **OBJECTIVE – Provide a quality trout fishing experience with catch frequency commensurate with the Blue Ribbon status of the fishery.** | | |
|---|---|---|
| **Angler Catch Rate** | Angler catch rate ≥ 1 Rainbow Trout per hour | • Stocking<br>• HFEs<br>• Change in regulations |

# AGFD plans to stock 16,000 triploid Rainbow Trout annually with focus timeframe between April 1st and October 15th

# AZGFD/USFWS Approach

2018 – One year cooperative agreement with USFWS

2019 – 2038 – Nonnative stocking procedures manual, consistent with Upper Basin Program

# Biological Evaluation – Adverse Effects and Potential Take

1. "The term 'take' means to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect, or to attempt to engage in any such conduct." 16 U.S.C. § 1532(19)

2. "Harm . . . means an act which *actually kills or injures wildlife*. Such act may include significant habitat modification or degradation where it **actually** kills or injures wildlife by significantly impairing essential behavioral patterns, including breeding, feeding or sheltering." 50 CFR § 17.3.

3. "Harass . . . means an intentional or *negligent act or omission* which creates the **likelihood** of injury to wildlife by annoying it to such an extent as to significantly disrupt normal behavioral patterns which include, but are not limited to, breeding, feeding, or sheltering." 50 CFR § 17.3.

# 4 Lenses to evaluate “Take” using Grand Canyon and Western U.S. big river Published Literature

1. What is the estimated survival rate of triploid Rainbow Trout stocked into Lees Ferry?
2. How many stocked triploid Rainbow Trout are expected to out-migrate downstream to habitats occupied by Humpback Chub?
3. How many Humpback Chub would be ingested by the out-migrating stocked triploid Rainbow Trout?
4. What will be the effect of this stocking on the Humpback Chub population?

# 1) What is the estimated survival rate of triploid Rainbow Trout stocked into Lees Ferry?

- Studies have shown stocked catchable trout in rivers and streams experience greater than 95% mortality rate, and persist less than three months post-stocking (Miller 1952, Walters et al. 1997; Bettinger and Bettoli 2002, High and Meyer 2009, Quinn and Kwak 2011).

Assumption made:

95% mortality over 90 days

# 2) How many stocked triploid Rainbow Trout are expected to out-migrate downstream to habitats occupied by Humpback Chub?

(c) Estimates of the mean percentage moving from release to recapture reach.

| | Recapture reach | | | | | Outside of release reach | |
|---|---|---|---|---|---|---|---|
| Release reach | I | II | III | IVa | IVb | All | IVa+IVb |
| I | 99.87 | 0.08 | 0.02 | 0.01 | 0.01 | 0.13 | 0.02 |
| II | 0.49 | 98.67 | 0.57 | 0.14 | 0.12 | 1.33 | 0.27 |
| III | 0.05 | 0.24 | 99.30 | 0.24 | 0.17 | 0.70 | 0.41 |
| IVa | 0.02 | 0.06 | 0.23 | 91.88 | 7.81 | 8.12 | |
| IVb | 0.00 | 0.01 | 0.03 | 1.71 | 98.24 | 1.76 | |

Korman et. al. 2016

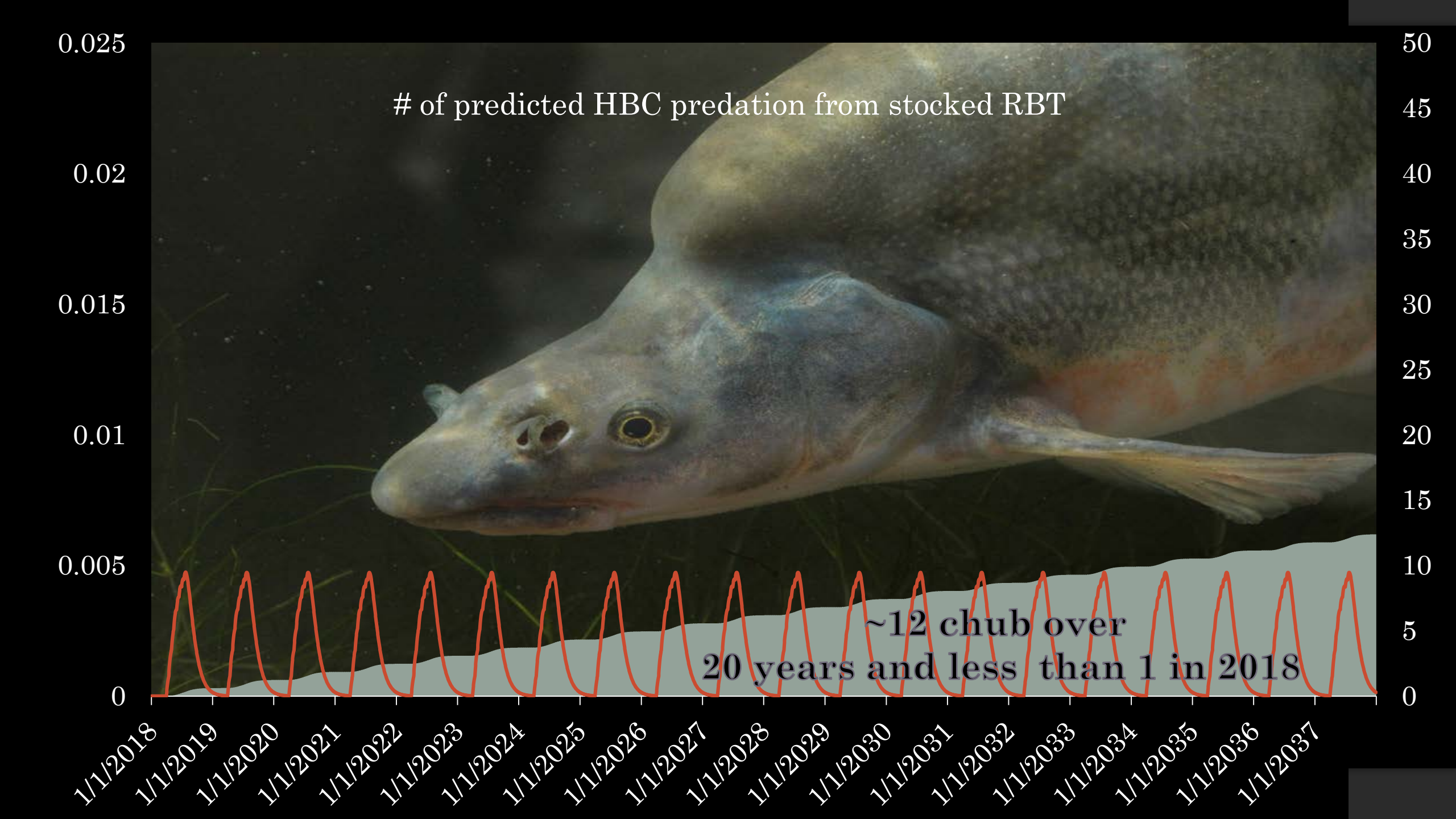
Assumption made: .11% out-migration to reaches II-III and .02% out-migration to reaches IVa and IVb over a 90 day period

# 3) How many Humpback Chub would be ingested by the out-migrating stocked triploid Rainbow Trout?

Yard et al. 2011, estimated a piscivory rate for Rainbow Trout upstream and downstream of the LCR of 4 fish and 10 fish ingested per year respectively. Of those fish, 27.3% were documented to be Humpback Chub.

David Ward, USGS study results indicate between a 47% and 22% reduction in predation by hatchery raised triploid Rainbow Trout versus wild diploid Rainbow Trout.

Assumption Made: A correction factor of 22% was used resulting in an annual estimated annual piscivory of 3.12 and 7.8 fish ingested per Rainbow Trout upstream and downstream of the LCR respectively. Of those fish, 27.3% are assumed to be Humpback Chub.


# of predicted HBC predation from stocked RBT
~12 chub over
20 years and less than 1 in 2018
0.025
0.02
0.015
0.01
0.005
0
50
45
40
35
30
25
20
15
10
5
0
1/1/2018
1/1/2019
1/1/2020
1/1/2021
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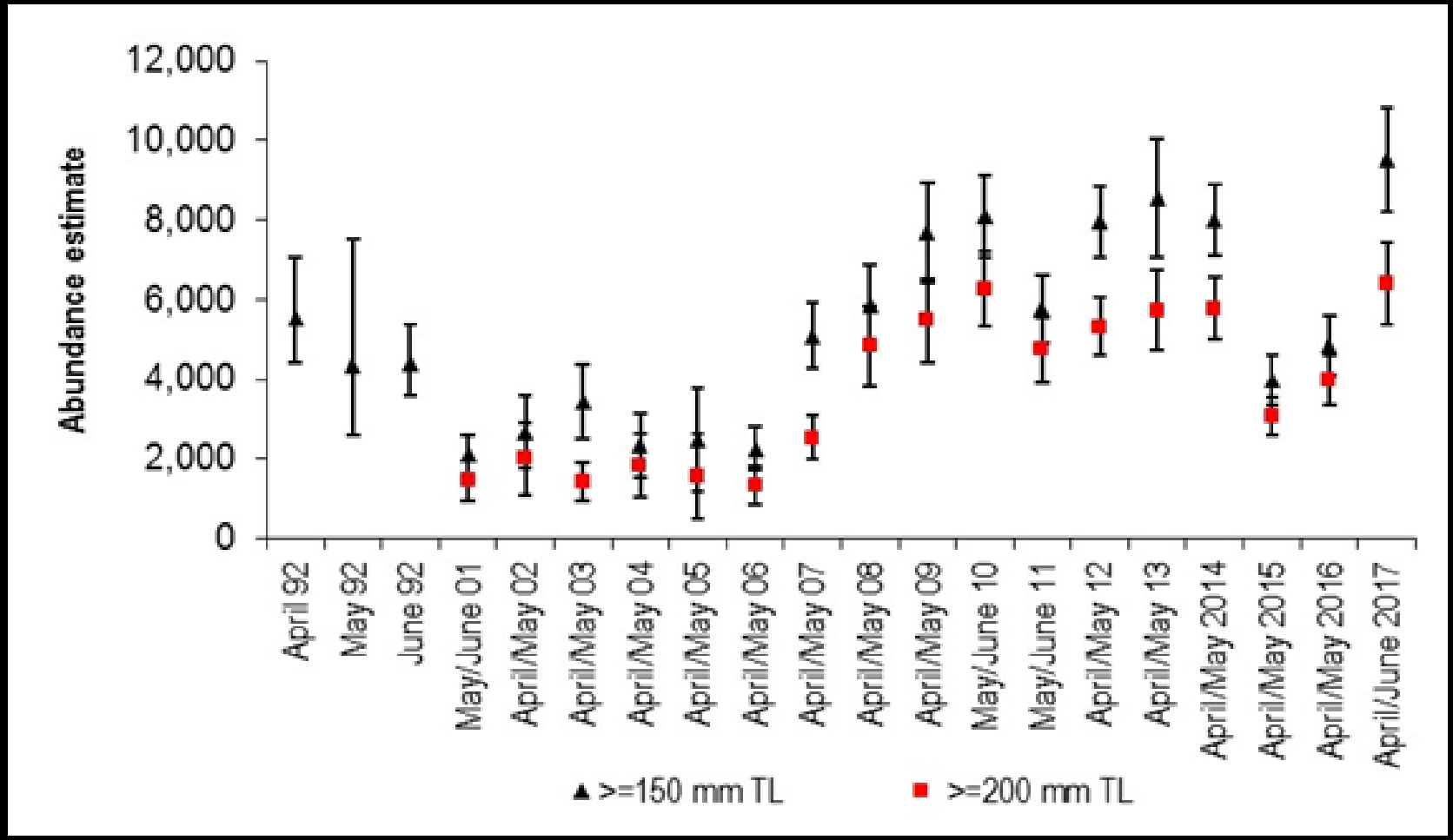
1/1/2037

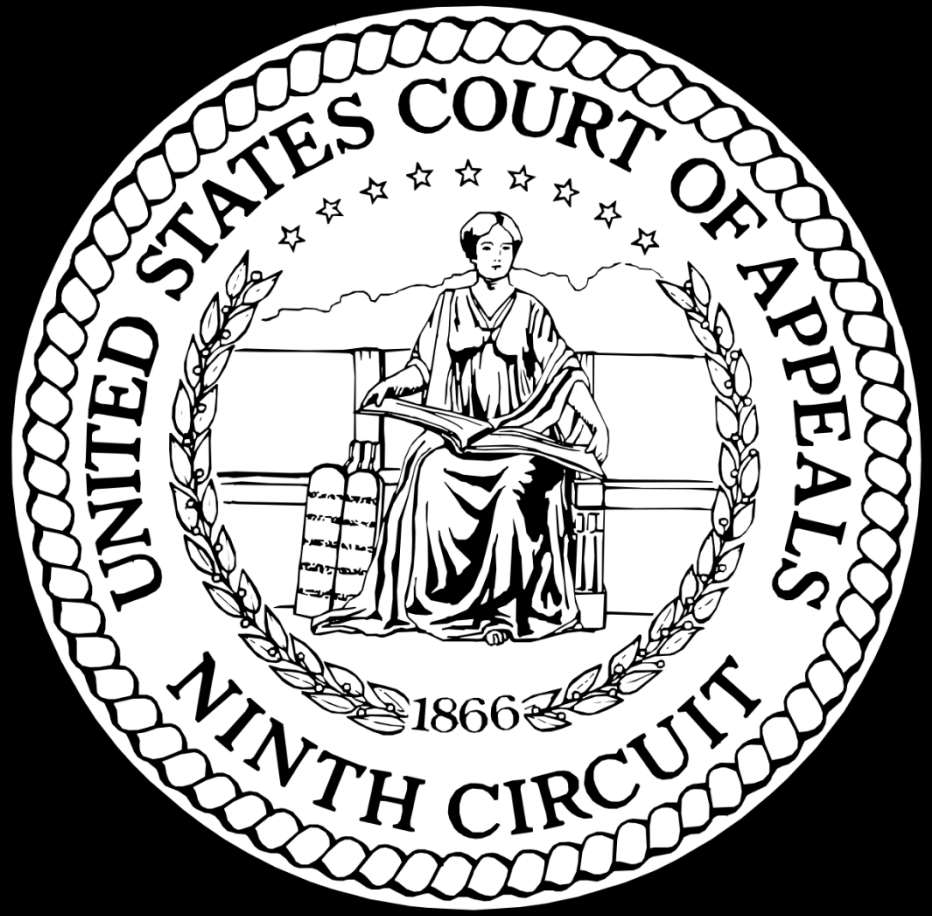
# 4) What will be the effect of this stocking on the Humpback Chub population?

# Humpback Chub abundance exceeds 10,000 adults!

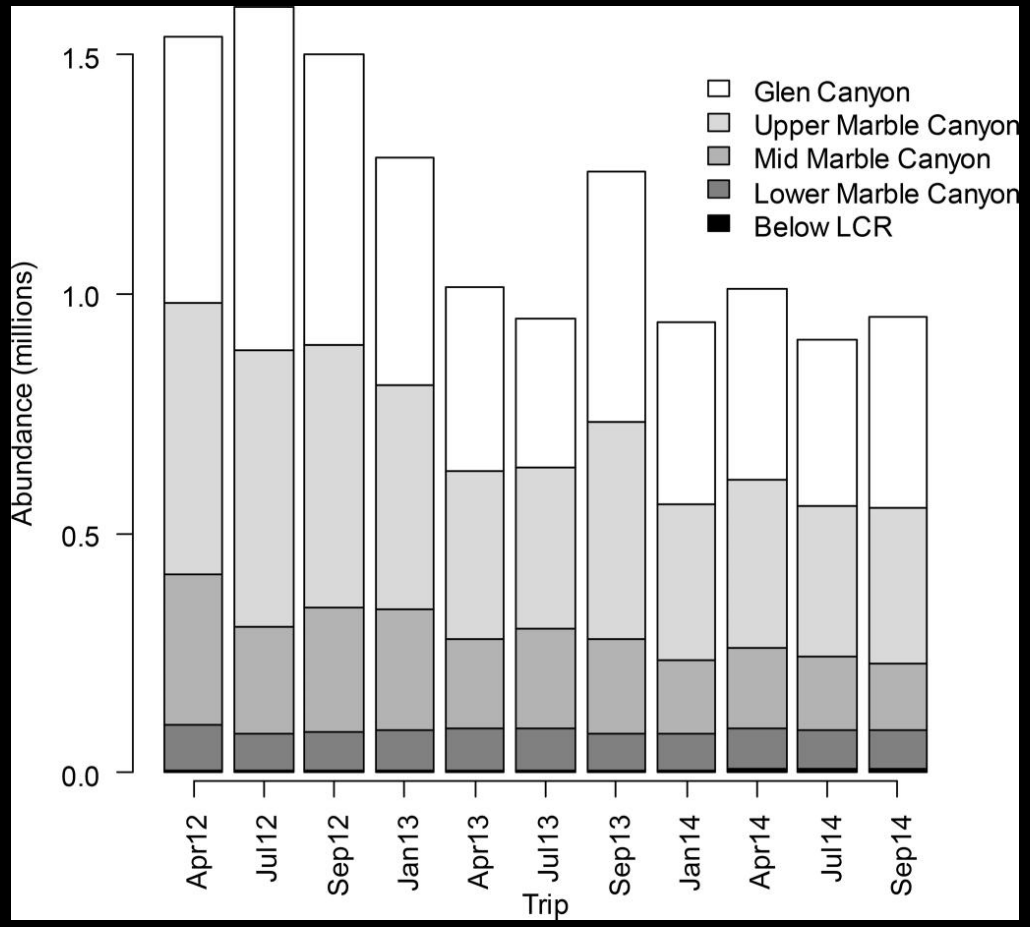


# Requisite Level of Impact

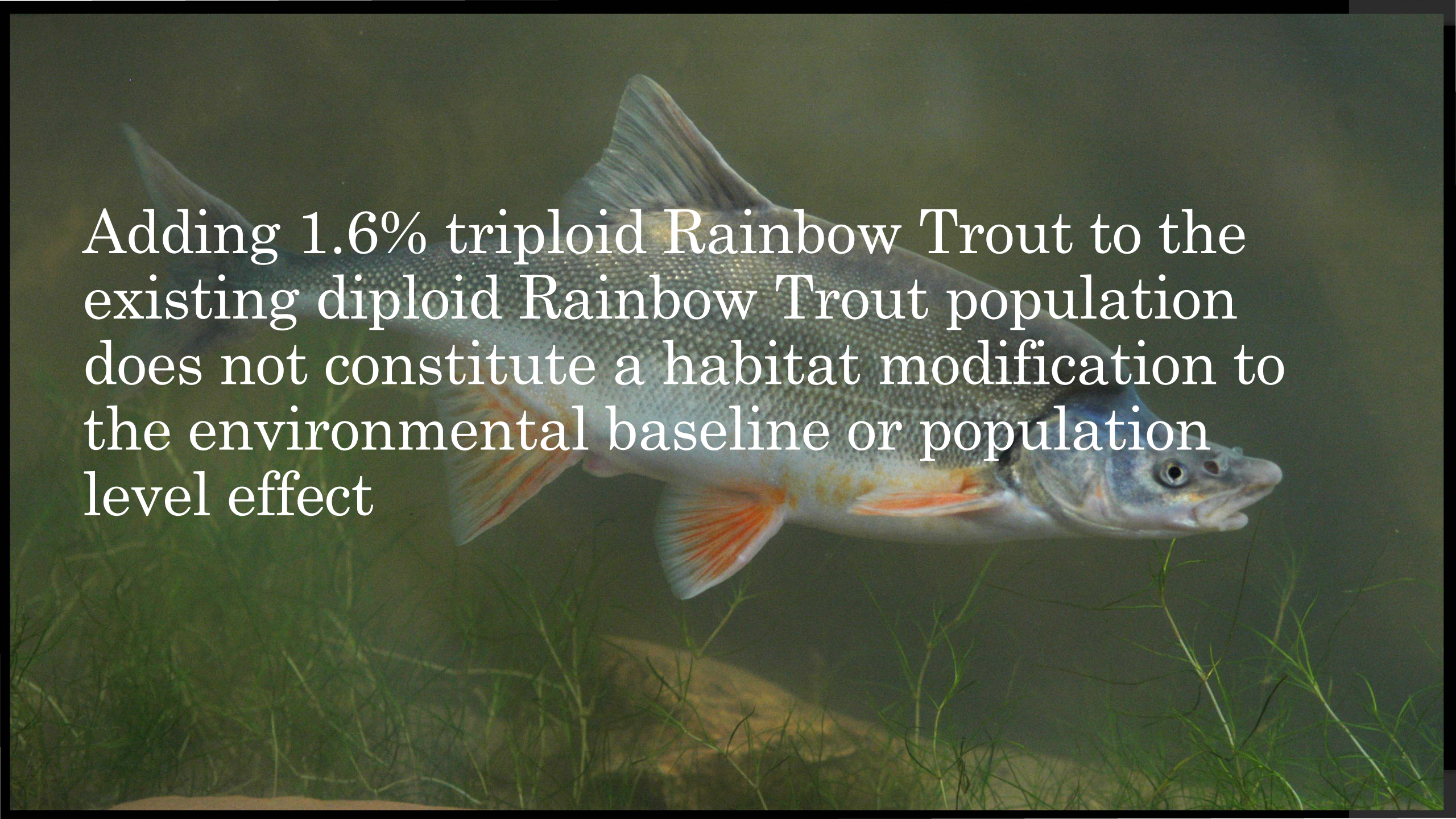
District Court (E.D. Cal, 2010) says that 9th Circuit cases say that harm by habitat modification requires proof of a population-level impact to listed species



# Over 1 million diploid Rainbow Trout




Korman et. al. 2016



Adding 1.6% triploid Rainbow Trout to the existing diploid Rainbow Trout population does not constitute a habitat modification to the environmental baseline or population level effect

# Conservation Measures

1. AGFD will host annual reporting meeting
2. AGFD will not stock more than 5,000 Rainbow Trout per month
3. All stocked trout will be left pelvic fin clipped
   - If funding and compliance is available PIT tags will be used and a PIT tag array will be placed in the Grand Canyon
4. The Department will assist the Service in monitoring 30 mile spring for Humpback Chub
5. Off ramp stockings at between 8000-9500 individuals (rates still TBD)
6. Monitor Lees Ferry Rainbow Trout Objectives via creel and electrofishing trend survey
7. Monitor downstream under existing planned surveys – any suspected stocked trout will be evaluated for triploidy or PIT tags

# Next Steps

1. Finalize Cooperative Agreement with USFWS for 2018
2. USFWS will finalize compliance for 2018
3. Public Meeting March 5th in Marble Canyon
4. Stocking for 2018 to begin Spring
5. Begin nonnative stocking procedures manual for the State of Arizona
6. Initiate EA and Section 7 on Arizona specific nonnative stocking procedures manual
7. Execute MOU on Arizona specific nonnative stocking procedures manual

It’s all about balance!
Questions?