RAZORBACK SUCKER *XYRAUCHEN TEXANUS* RESEARCH AND MONITORING IN THE COLORADO RIVER INFLOW AREA OF LAKE MEAD AND THE LOWER GRAND CANYON, ARIZONA AND NEVADA, 2019

RON KEGERRIES [1], BRANDON ALBRECHT [1], RON ROGERS[1], ADAM BARKALOW[2], SUSAN WOOD[2], MARTINIQUE CHAVEZ[2], MARK MCKINSTRY [3], BRIAN HEALY [4], JAMES STOLBERG [5], EMILY OMANA SMITH [4]

([1] BIO-WEST, INC.; [2] AMERICAN SOUTHWEST ICHTHYOLOGICAL RESEARCHERS, LLC; [3] U.S. BUREAU OF RECLAMATION, UPPER COLORADO REGION; [4] U.S. NATIONAL PARK SERVICE; [5] LOWER COLORADO RIVER MULTI-SPECIES CONSERVATION PROGRAM)

COOPERATORS

U.S. DEPARTMENT OF THE INTERIOR
BUREAU OF RECLAMATION

BIO-WEST

Lower Colorado River
Multi-Species Conservation Program

ASIR
American Southwest Ichthyological Researchers, L.L.C.
American Southwest Ichthyological Researchers

NEVADA DEPARTMENT OF WILDLIFE

ARIZONA GAME & FISH

Museum of Southwestern Biology

NATIONAL PARK SERVICE

Ceiba ADVENTURES
RIVER OUTFITTING SERVICES

U.S. FISH & WILDLIFE SERVICE
DEPARTMENT OF THE INTERIOR

LAKE MEAD RAZORBACK SUCKER WORKGROUP

OBJECTIVES

CONTINUE CRI MONITORING

- Same methods used since 2010 and similar to long-term monitoring
- Includes opportunistic sampling in the Colorado River upstream to Pearce Ferry Rapid

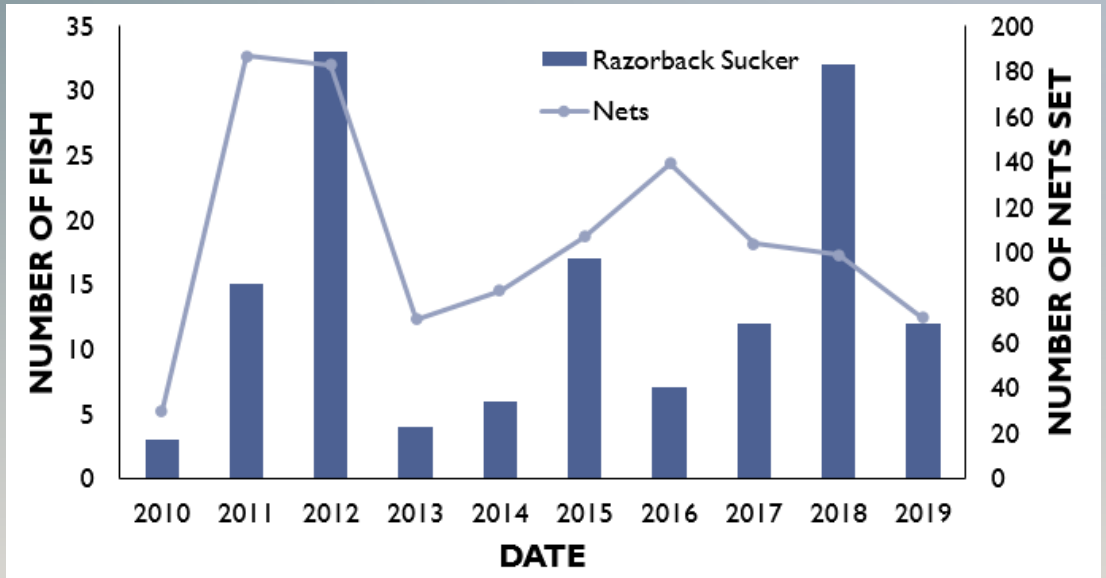
DETERMINE RAZORBACK SUCKER USE OF GRAND CANYON

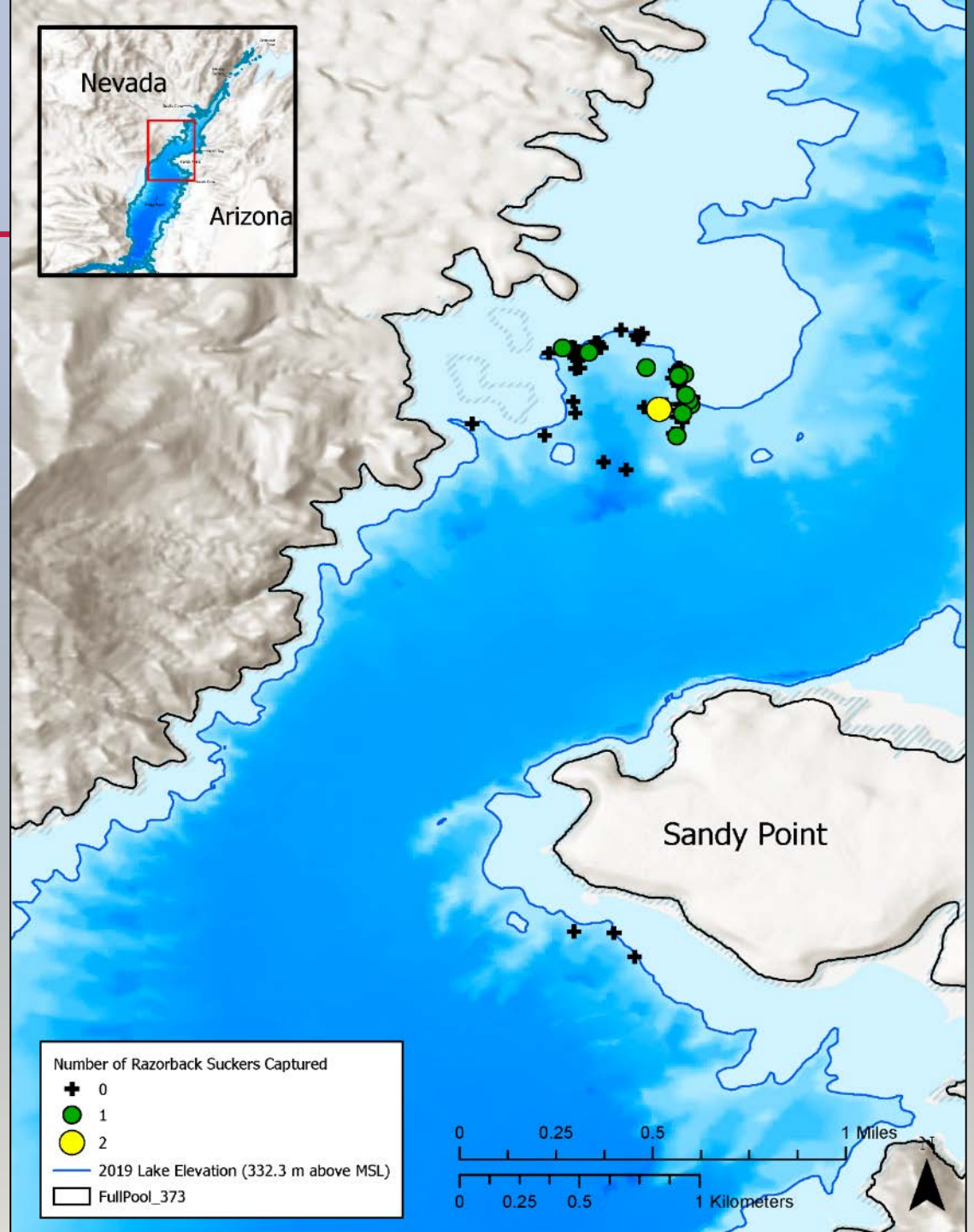
- Sonic and acoustic telemetry
- Larval and small-bodied fish community sampling (seining)
- Assess Razorback Sucker reproduction and recruitment
- Explore the linkage between the CRI and Grand Canyon

CRI NETTING

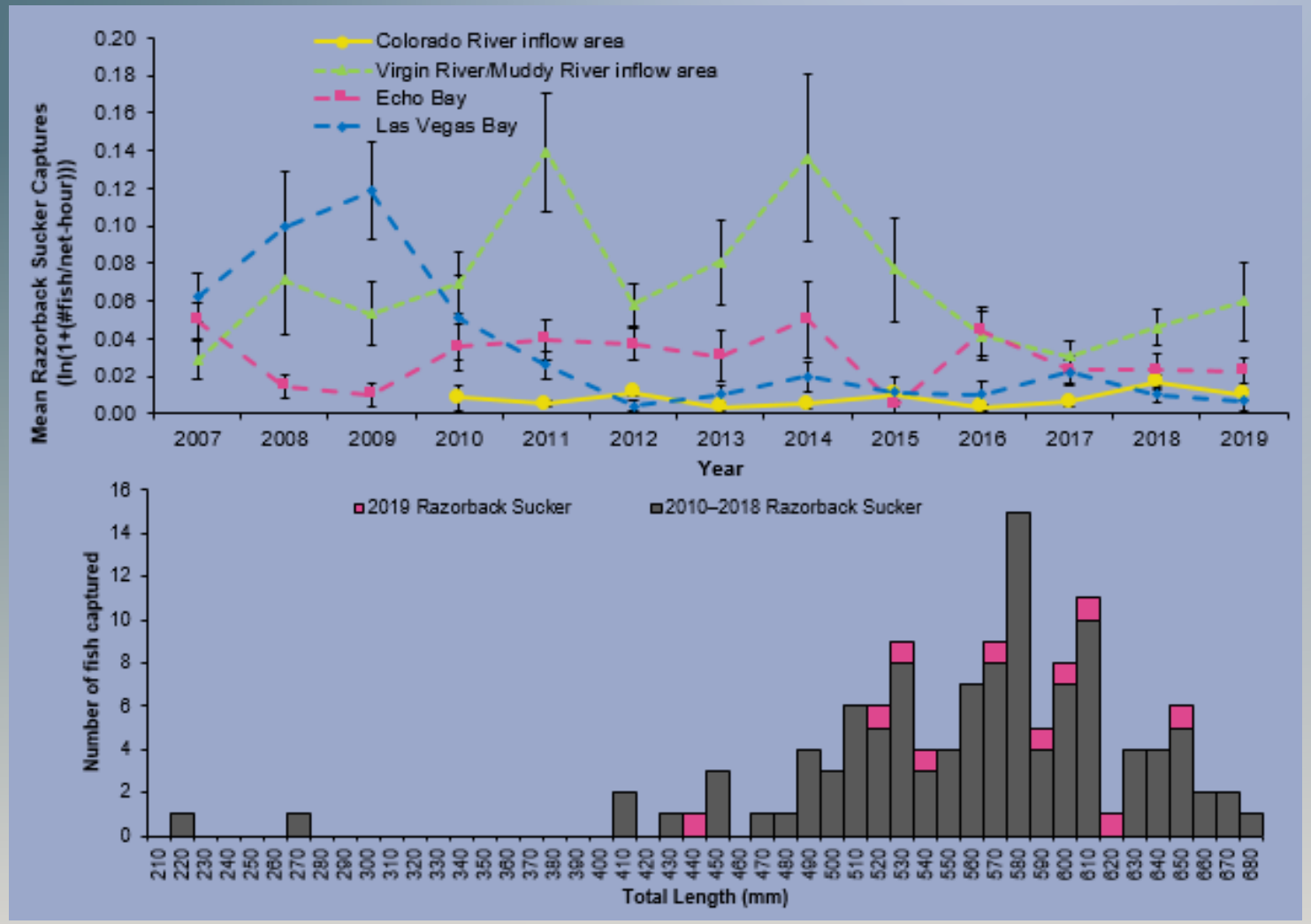
2019

- 12 Razorback Sucker captured
  - 10 unique
  - 4 new, wild
  - 1 juvenile (432mm)
- 16 Hybrid and 76 Flannelmouth





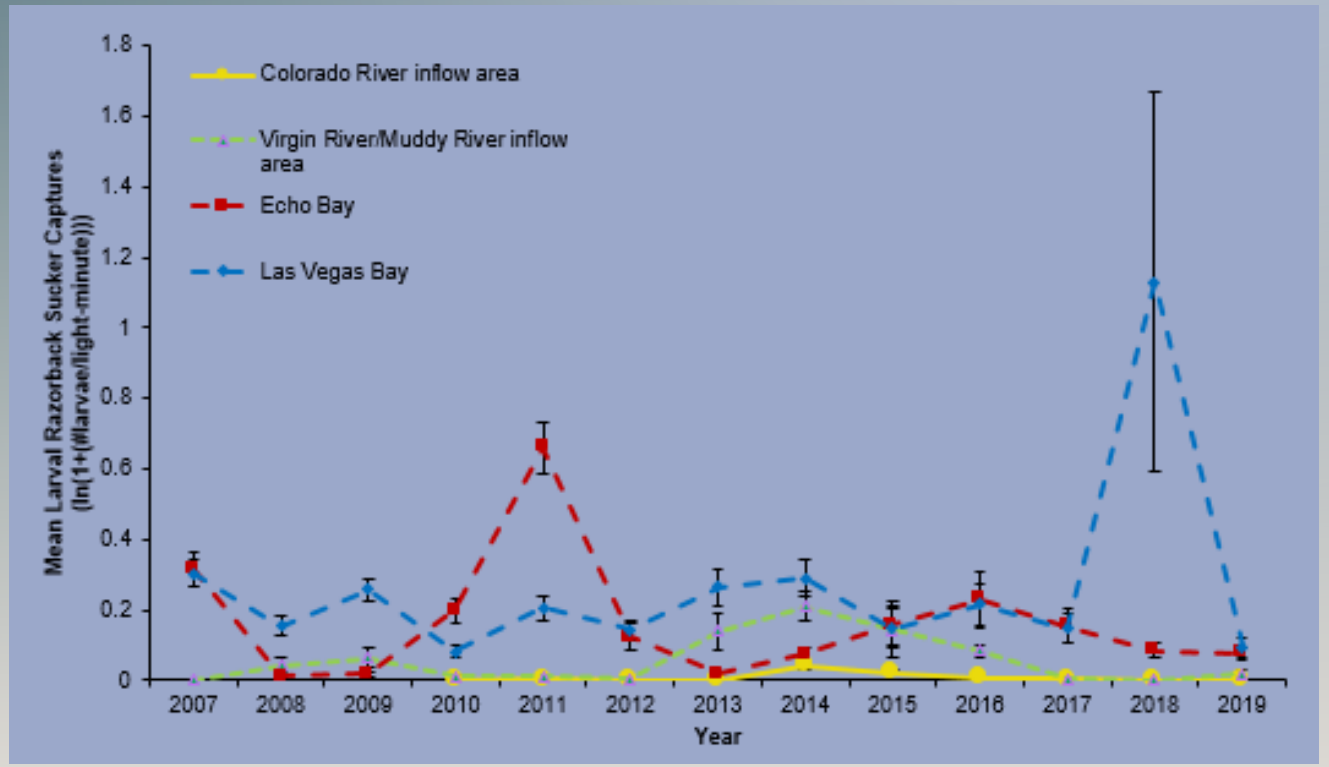
CRI NETTING

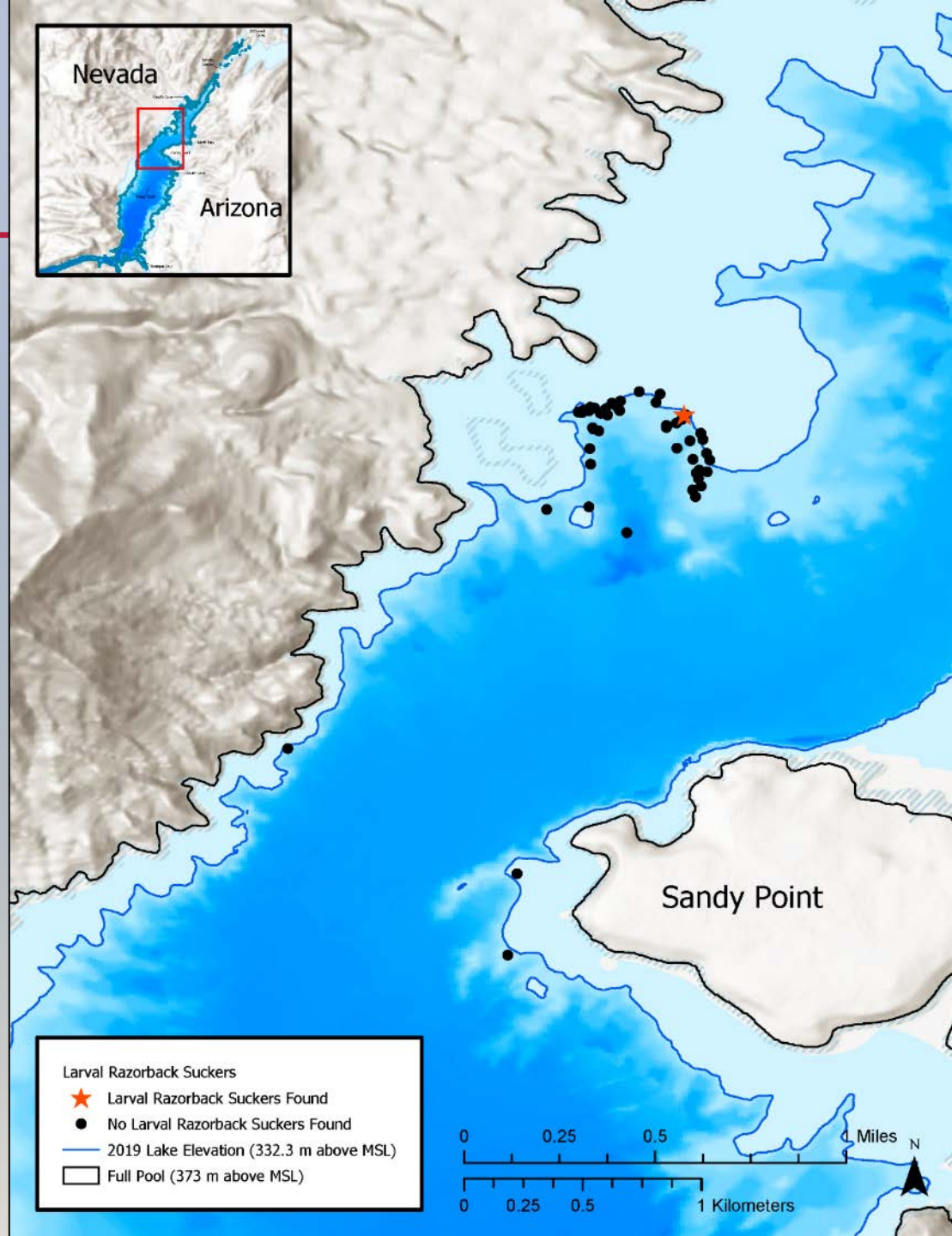


- One of the highest Razorback Sucker catch rates to-date.
- Higher than LVB.
- 2019: 432 to 641 mm (TL)
- Since 2010 *n*=116, 215–674 mm (TL).
- Mean annual growth: 10.1 mm (±0.68) (2010–2019: 8.4–31.9 mm per year).

CRI LARVAL

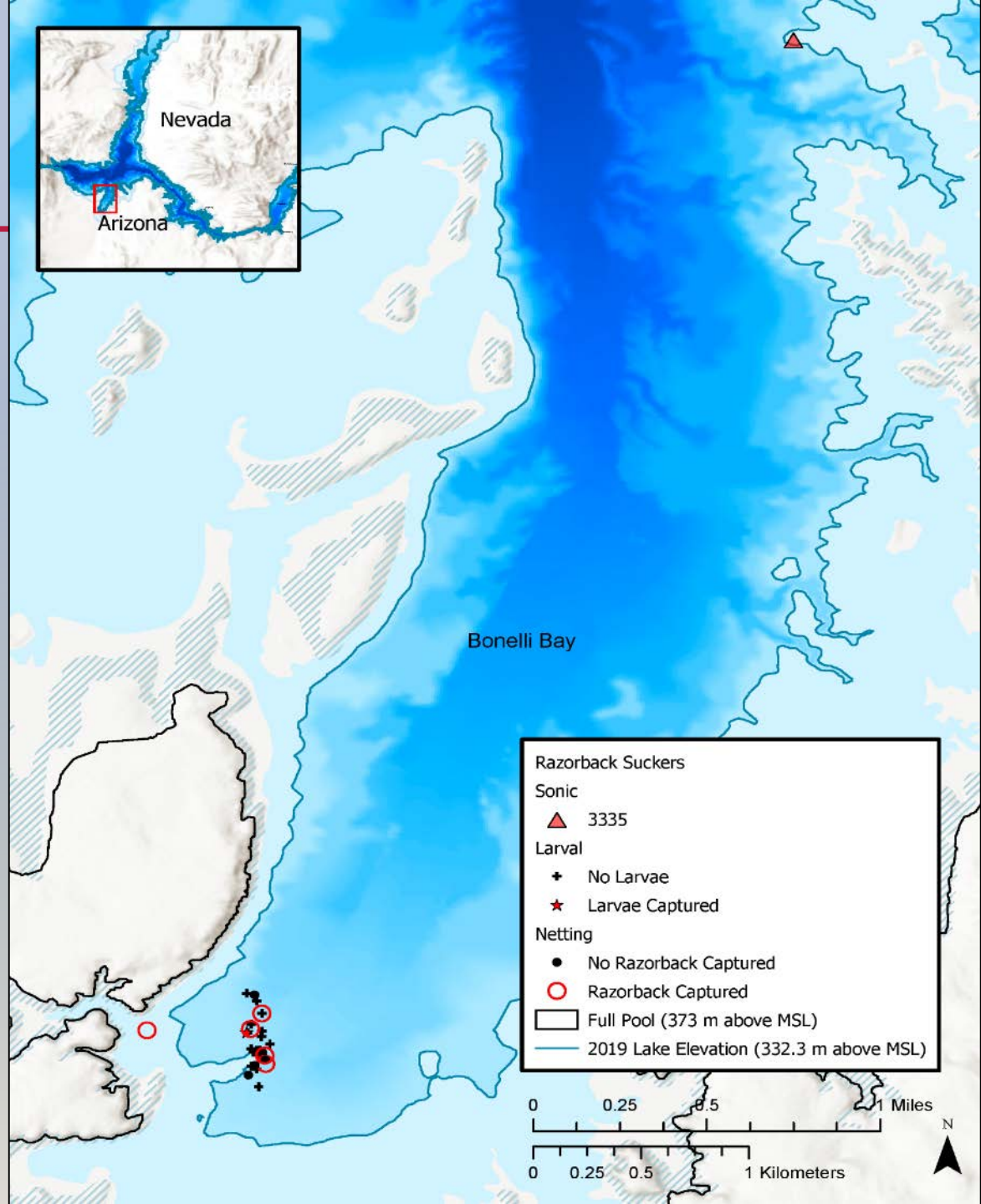
- 1 Razorback Sucker larvae captured
  - April 17, 2019
  - 19.4°C



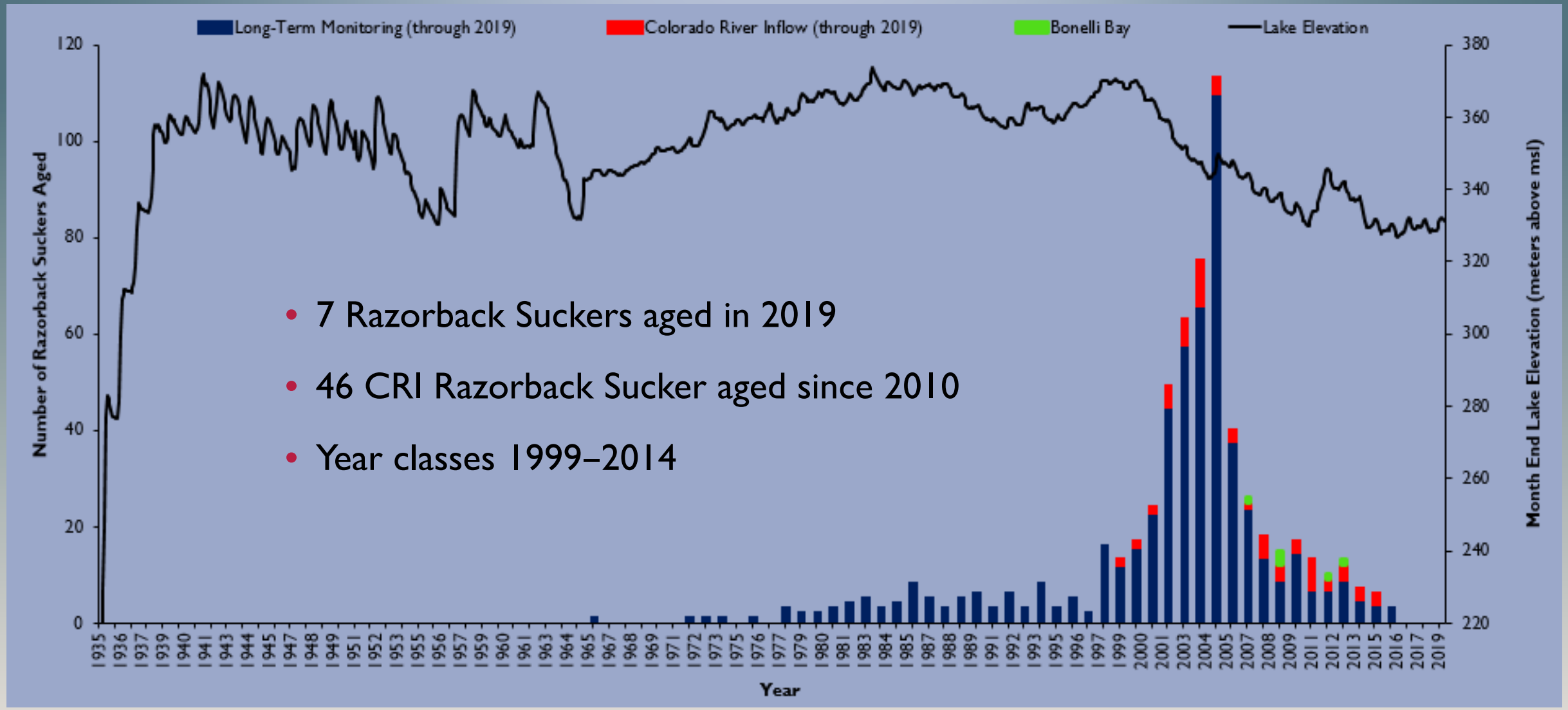


ADDITIONAL EFFORTS

- PEARCE to CRI
  - 204 native fish captured (59.5% of catch), mostly Flannelmouth Suckers
- BONELLI BAY (NDOW/BIO-WEST)
  - 121.2 net hours
  - 16 Razorback Suckers (15 unique; 571–700 mm TL)
  - All new, wild fish (one captured twice in 2019); 5 female, 10 male
  - Six aged (age-6, 7, 10, and 12)
  - Two Razorback Sucker larvae captured
  - Two fish implanted with sonic transmitters

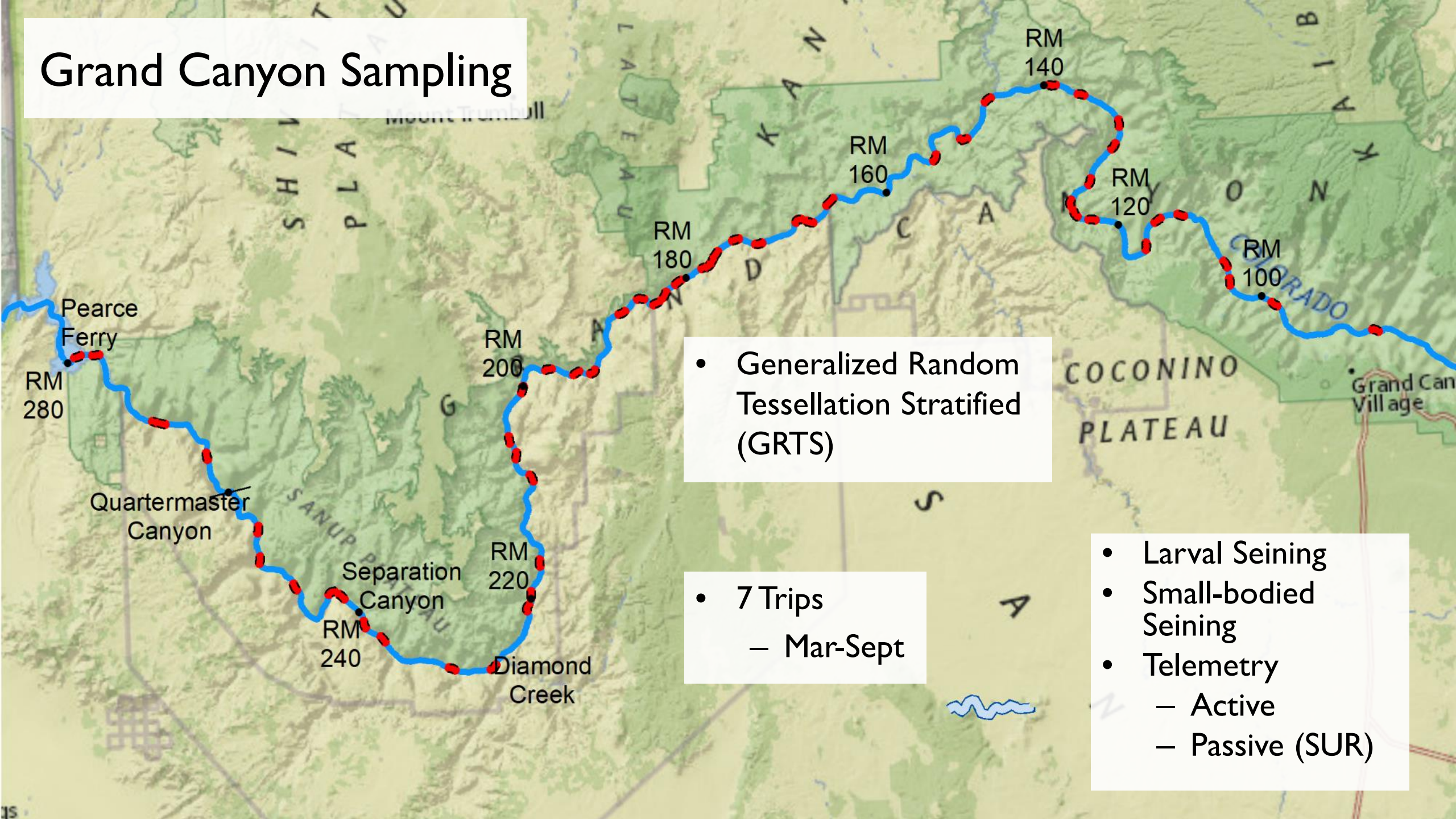


AGING AND RECRUITMENT



- 7 Razorback Suckers aged in 2019
- 46 CRI Razorback Sucker aged since 2010
- Year classes 1999–2014

Grand Canyon Sampling

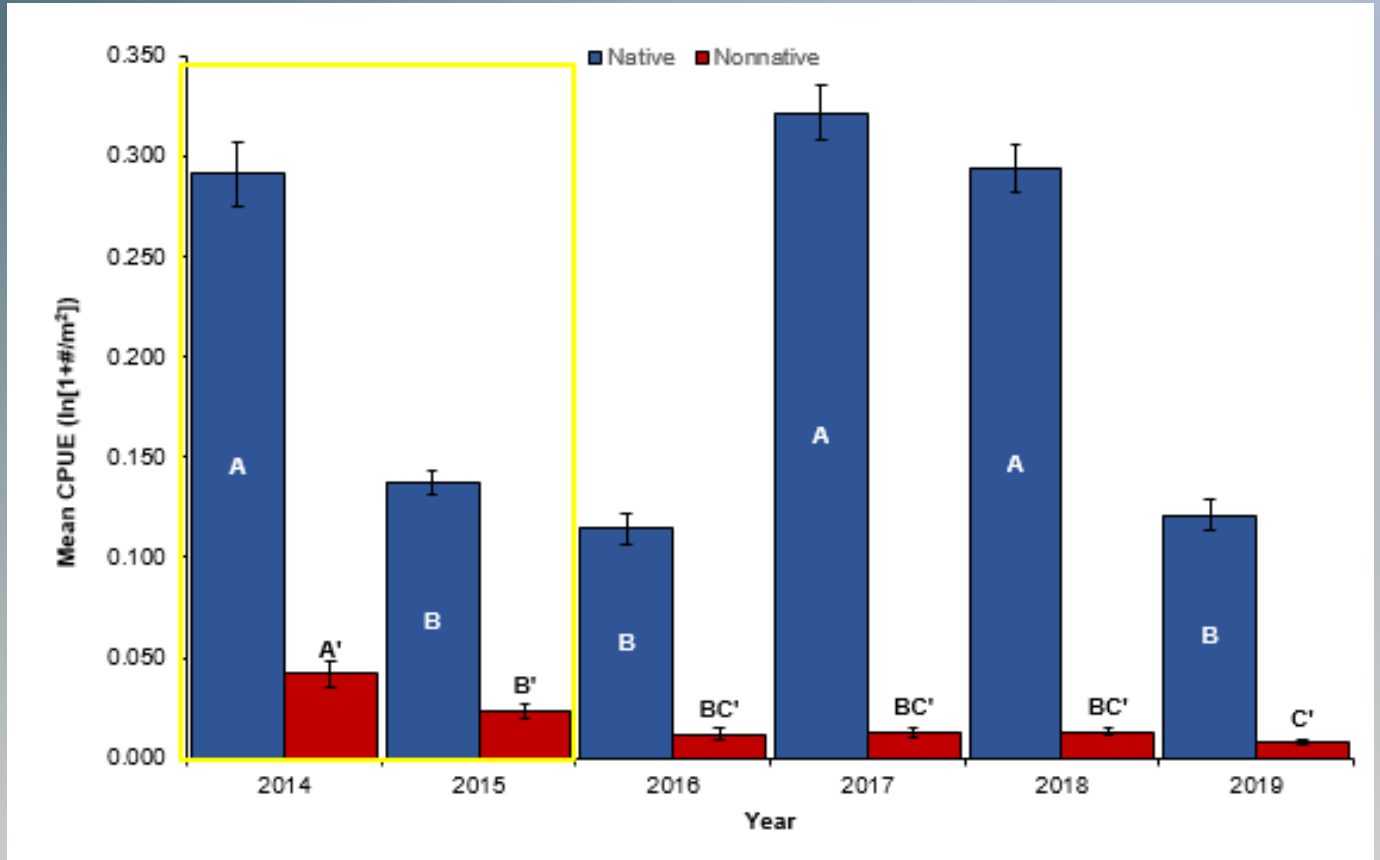


- Generalized Random Tessellation Stratified (GRTS)

- 7 Trips
  - Mar-Sept

- Larval Seining
- Small-bodied Seining
- Telemetry
  - Active
  - Passive (SUR)

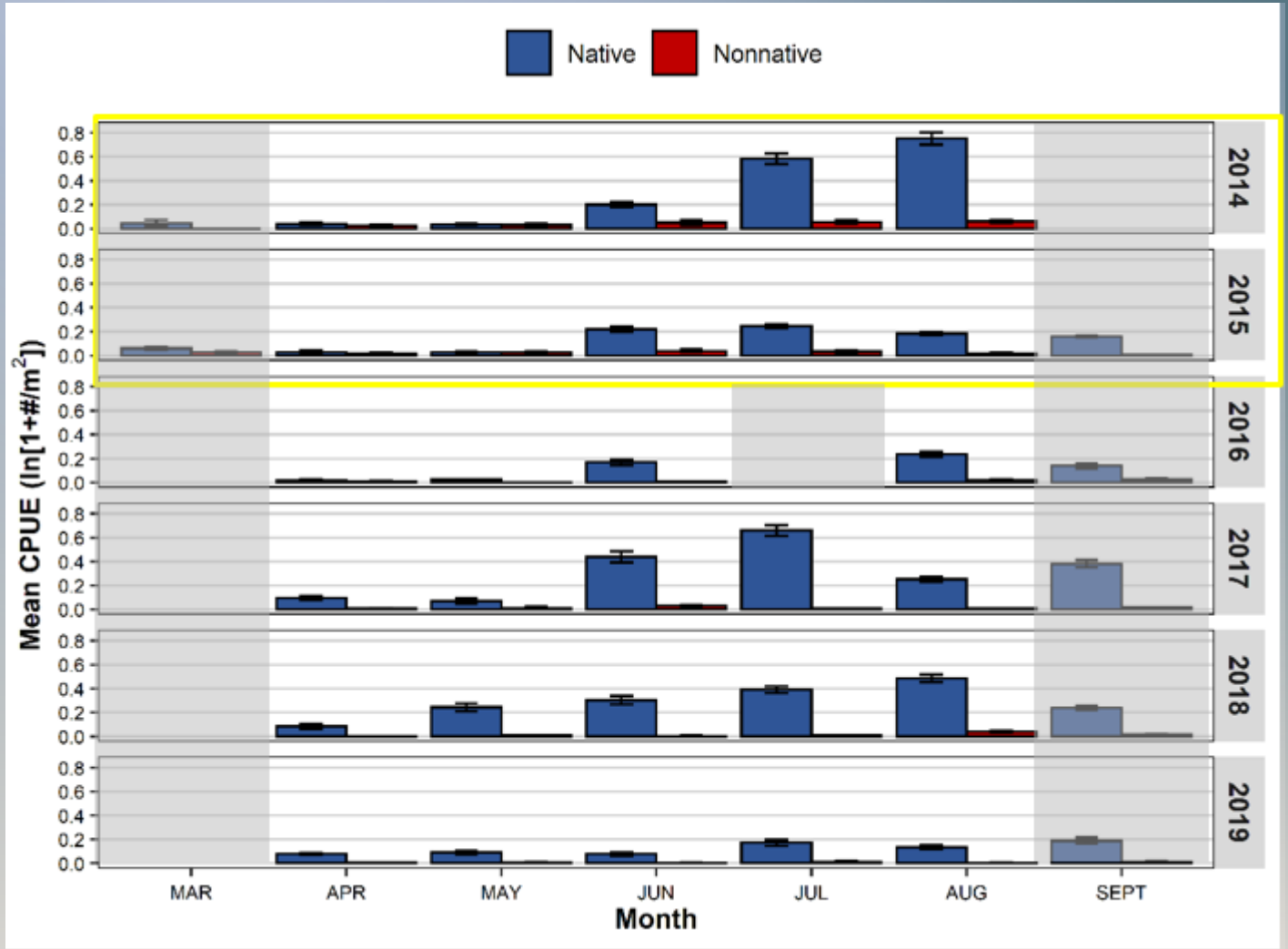
NATIVE VS. NONNATIVE CATCH RATES (YEAR)



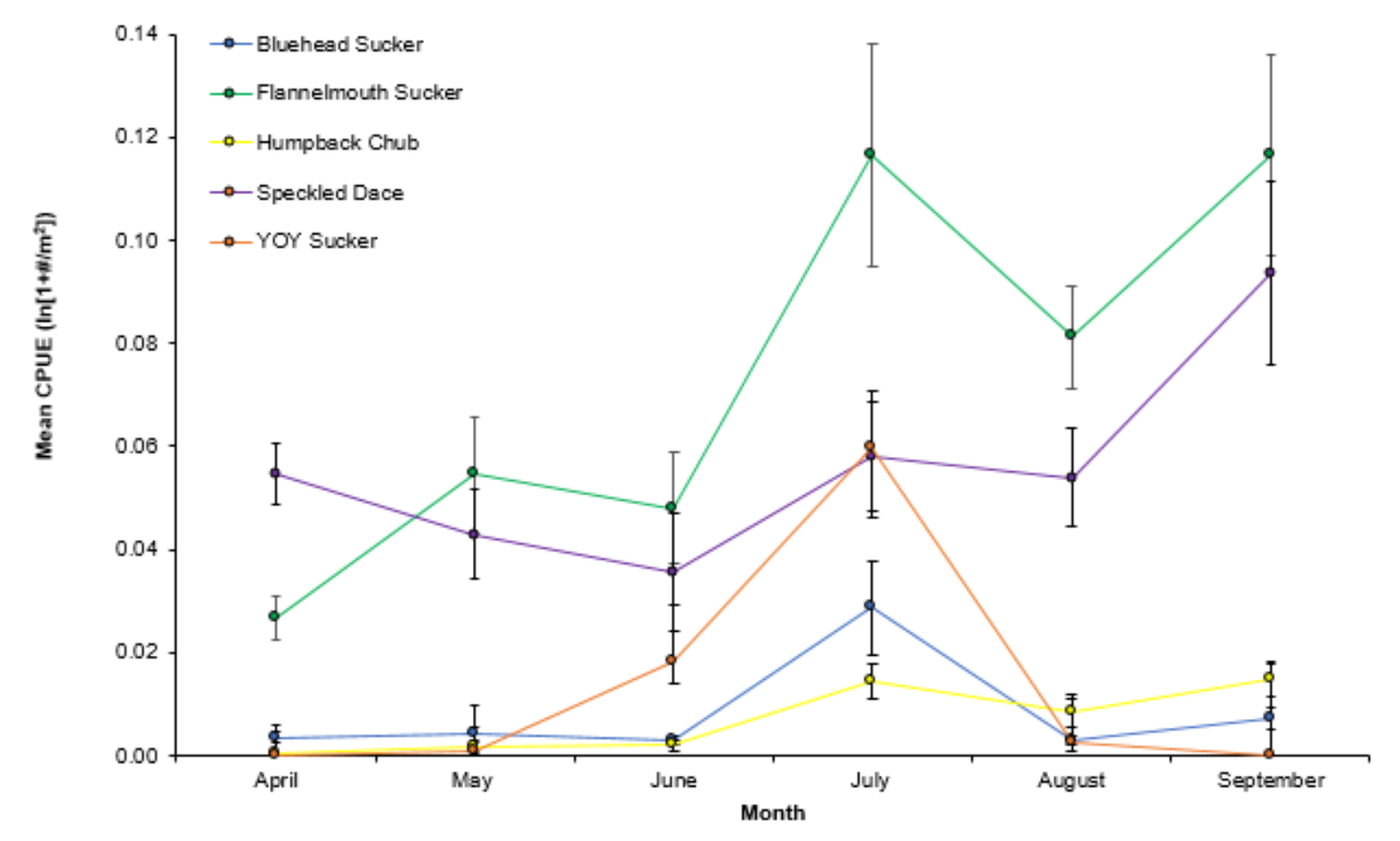
- Native fish dominate catch
  - Significant each year
- Variation among years
- Change in study area – 2016

NATIVE VS. NONNATIVE CATCH RATES (TRIP)

- Native fish dominate catch – all months/trips
- Typical increase in natives March through July or August
- Less variation among months/trips – 2015, 2016, and 2019
- Native catch typically higher in July followed by August, June, September



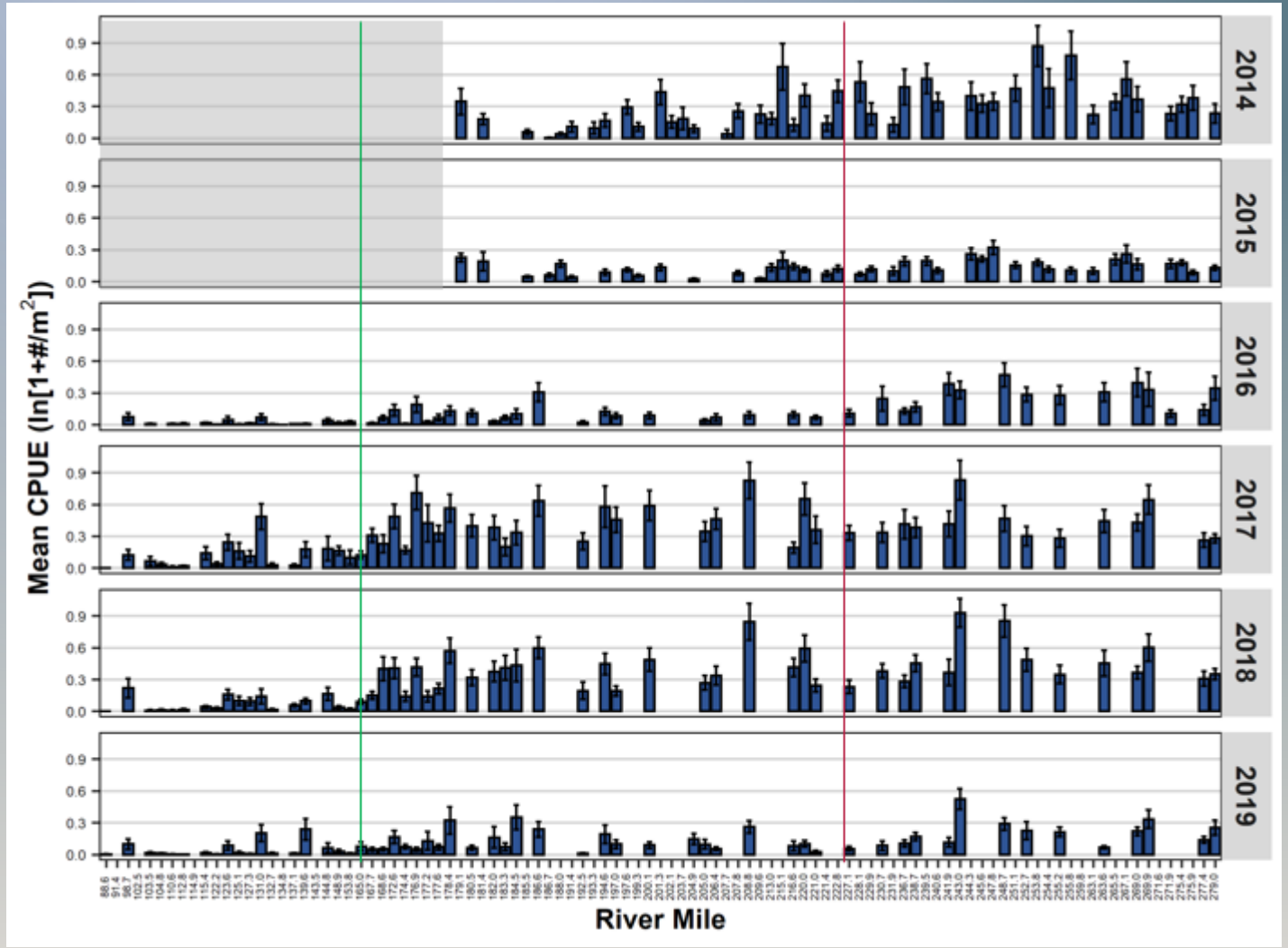
NATIVE CATCH RATES (SPECIES)



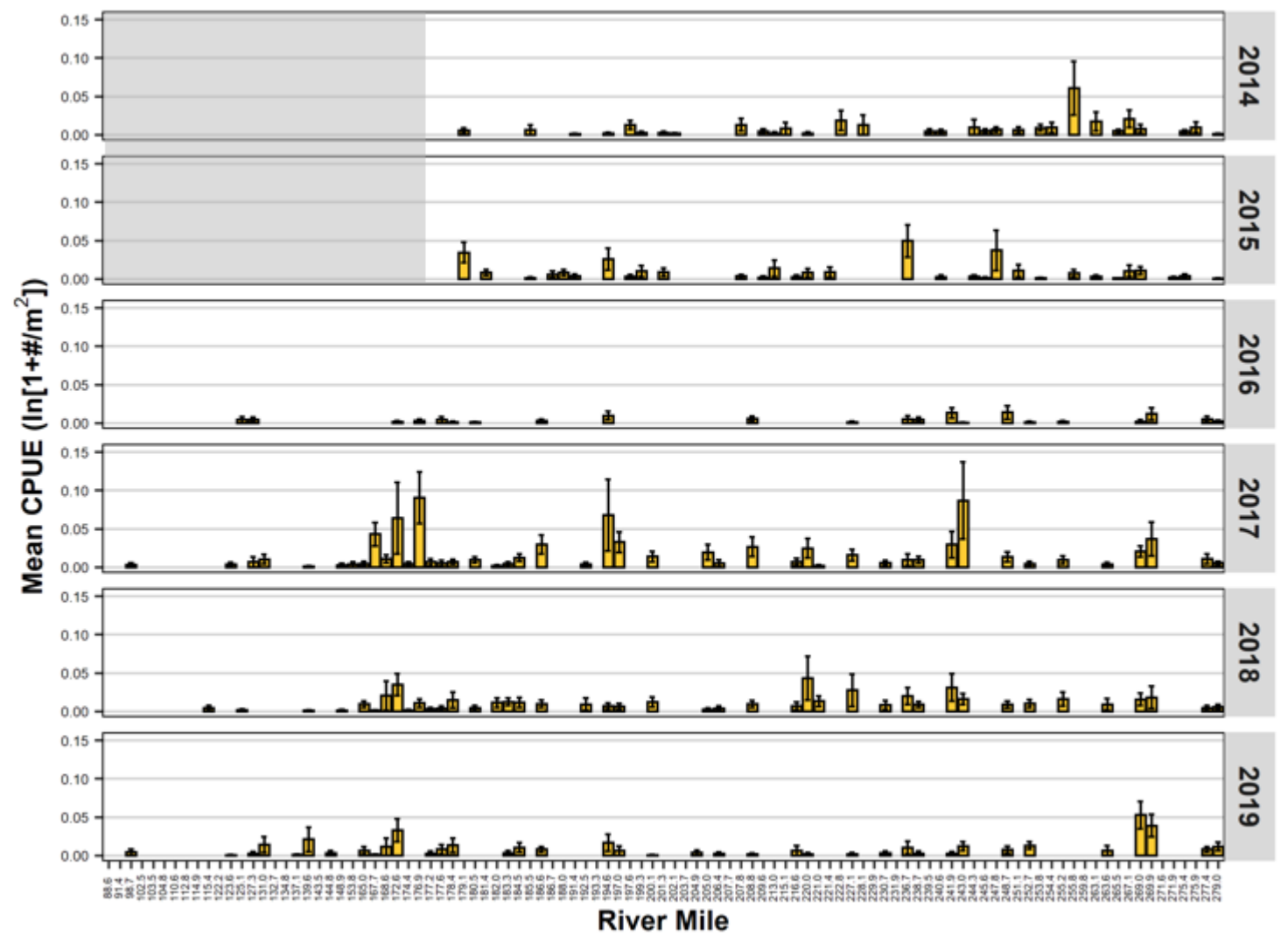
- 4 native species plus YOY suckers
- Flannelmouth Sucker and Speckled Dace dominant
- Humpback Chub present through all months but highest after May

NATIVE CATCH RATES BY RIVER MILE

- Study area increased in 2016
- Native fish found throughout the study area
- Variation among sampling segments with significant differences
- Significant differences in catch below Diamond Creek and Havasu Creek



HUMPBACK CHUB CATCH RATES BY RIVER MILE

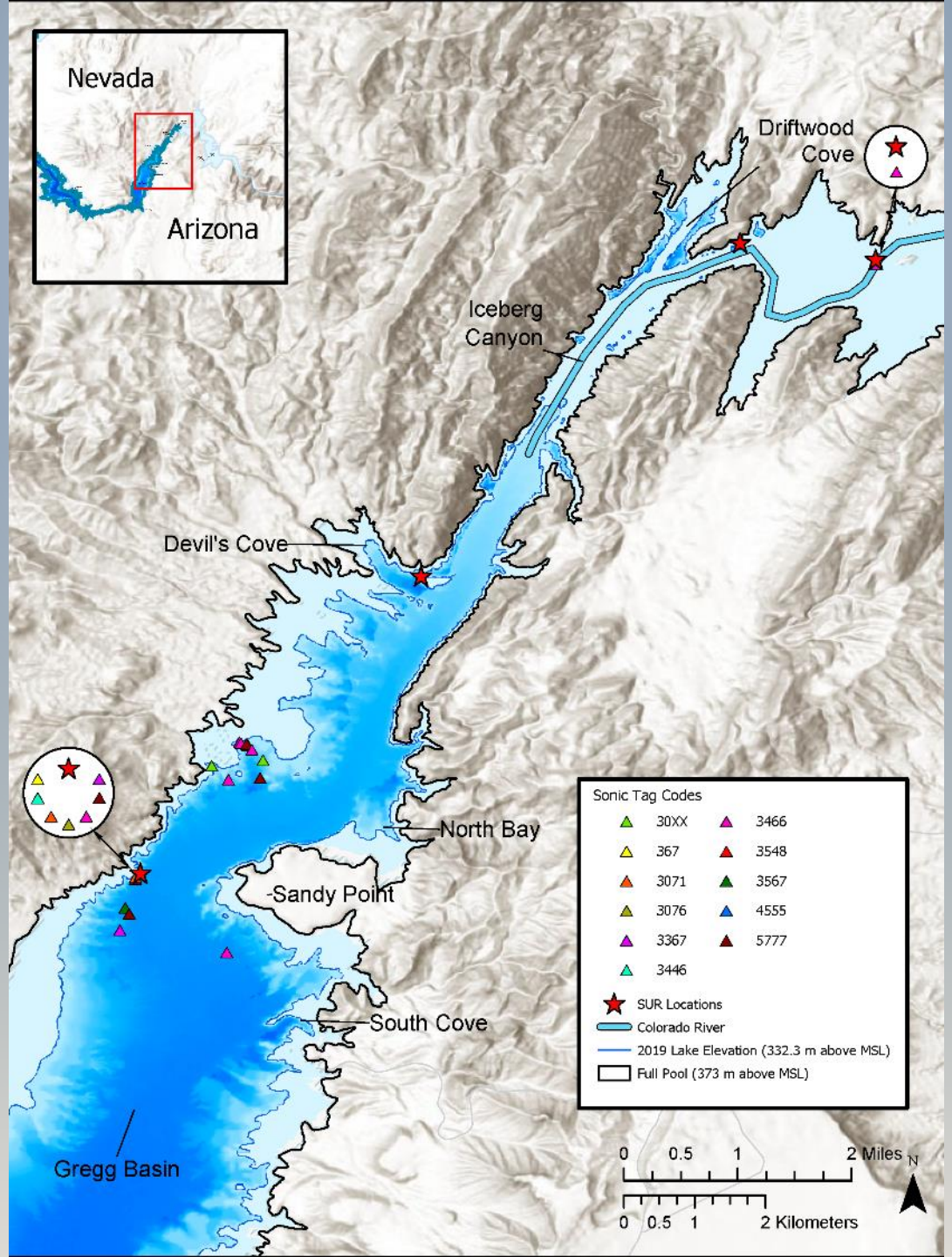


- Humpback Chub found throughout the study area
- Variation among sampling segments with significant differences
- 1,158 Humpback Chub captured
- Mean TL 50.5 mm (16–369 mm)
- Significantly higher catch in 2017

TELEMETRY

- 2019
  - 10 known unique Razorback Suckers, 182 contacts
  - 6 separate stocking cohorts
  - 3 fish from Grand Canyon at the CI
  - 1 fish located near RM 243
  - 1 fish moving between CRI and river below Pearce Ferry Rapid
- 2014-2019
  - Earlier movement of fish up and downstream of Pearce Ferry Rapid
  - One fish contacted as high as Pipe Creek (RM 89.5)
  - Utilizing habitats near RM 246 and 243
  - Locations, movements, and frequencies of contacts varying

Credit: Ben Goldfarb

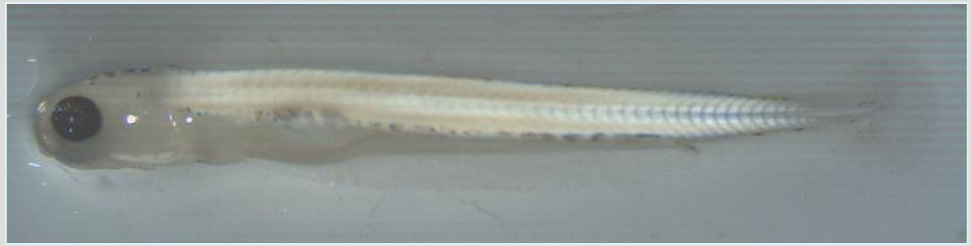


- One RBS located at RM 243 in June

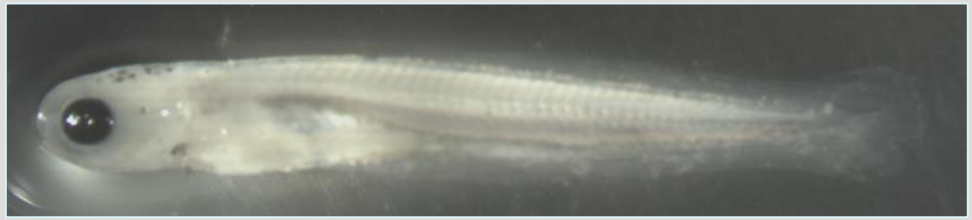
CONCLUSIONS

- Razorback Sucker present at the CRI (10th year)
- CRI specific spawning likely occurred
- Native fish continue to dominate the GC fish community
- Downstream increase in native fish catch rates
- Humpback Chub are found throughout the study area in multiple size classes
- Although Razorback Sucker and other sucker habitat likely overlaps within the CRI and GC, documented movement between the two has decreased
- Hypothesize that both habitats cumulatively allow for Razorback Sucker recruitment, but the role of each is still unclear

Distribution of larval Razorback Sucker *Xyrauchen texanus* and associated larval fish community in the Colorado River, Grand Canyon, AZ



Razorback Sucker *Xyrauchen texanus*



Humpback Chub *Gila cypha*

Adam L. Barkalow[1], Susan L. Wood, Martinique J. Chavez, Ron B. Kegerries[2], Brandon C. Albrecht[2], Ron J. Rogers[2], Mark C. McKinstry[3], Brian D. Healy[4], Emily C. Omana Smith [3,4], and James R. Stolberg[5]

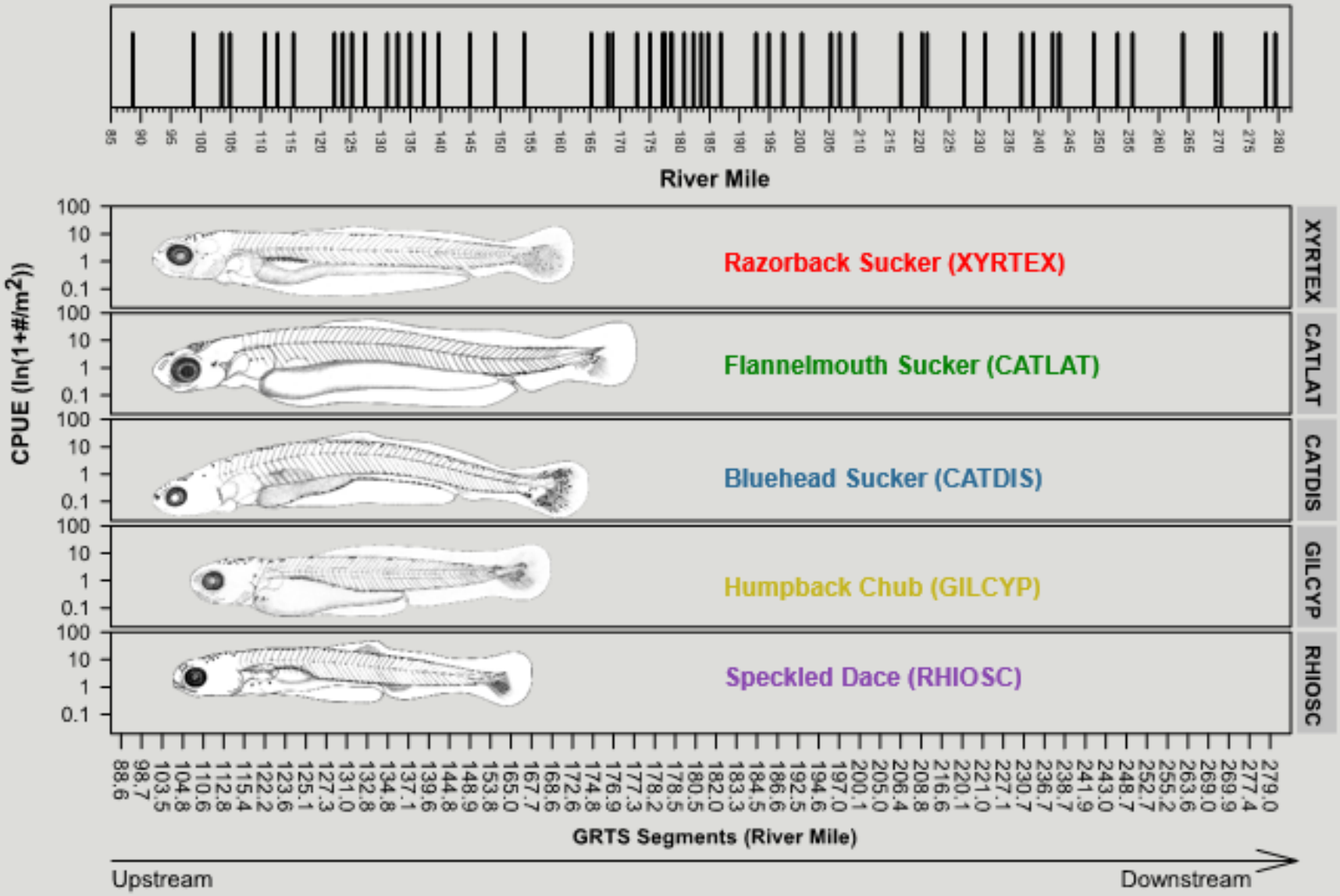
[1] American Southwest Ichthyological Researchers, LLC;
[2] BIO-WEST, Inc.;
[3] U.S. Bureau of Reclamation, Upper Colorado Region;
[4] U.S. National Park Service;
[5] Lower Colorado Multi-Species Conservation Program

Colorado River Aquatic Biologists: 7–8 January 2020

Larval Fish Survey Summary (2014–2019)

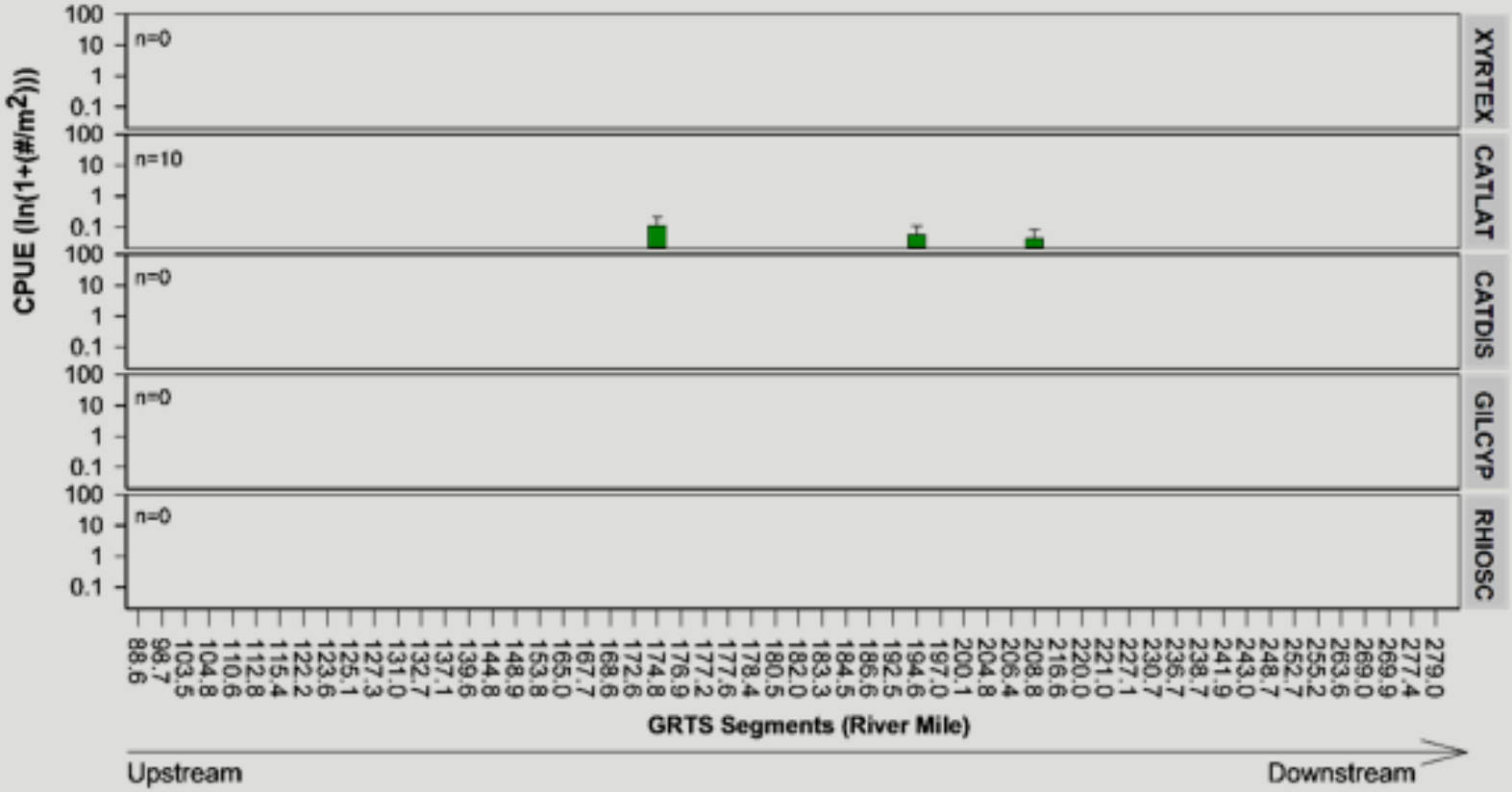
Year	Study area/study period	Native	Non-native	Razorback Sucker	Humpback Chub
2014	100 river miles/ Apr-Sep	98%	2%	n=459	n=200
2015	100 river miles/ Mar-Sep	99%	1%	n=81	n=67
2016	191 river miles/ Mar-Aug	99%	1%	n=46	n=41
2017	191 river miles/ Mar-Aug	99%	1%	n=27	n=129
2018	191 river miles/ Mar-Aug	99%	1%	n=10	n=110
2019	191 river miles/ Mar-Aug	99%	1%	n=8	n=129

Age-0 Monthly Captures



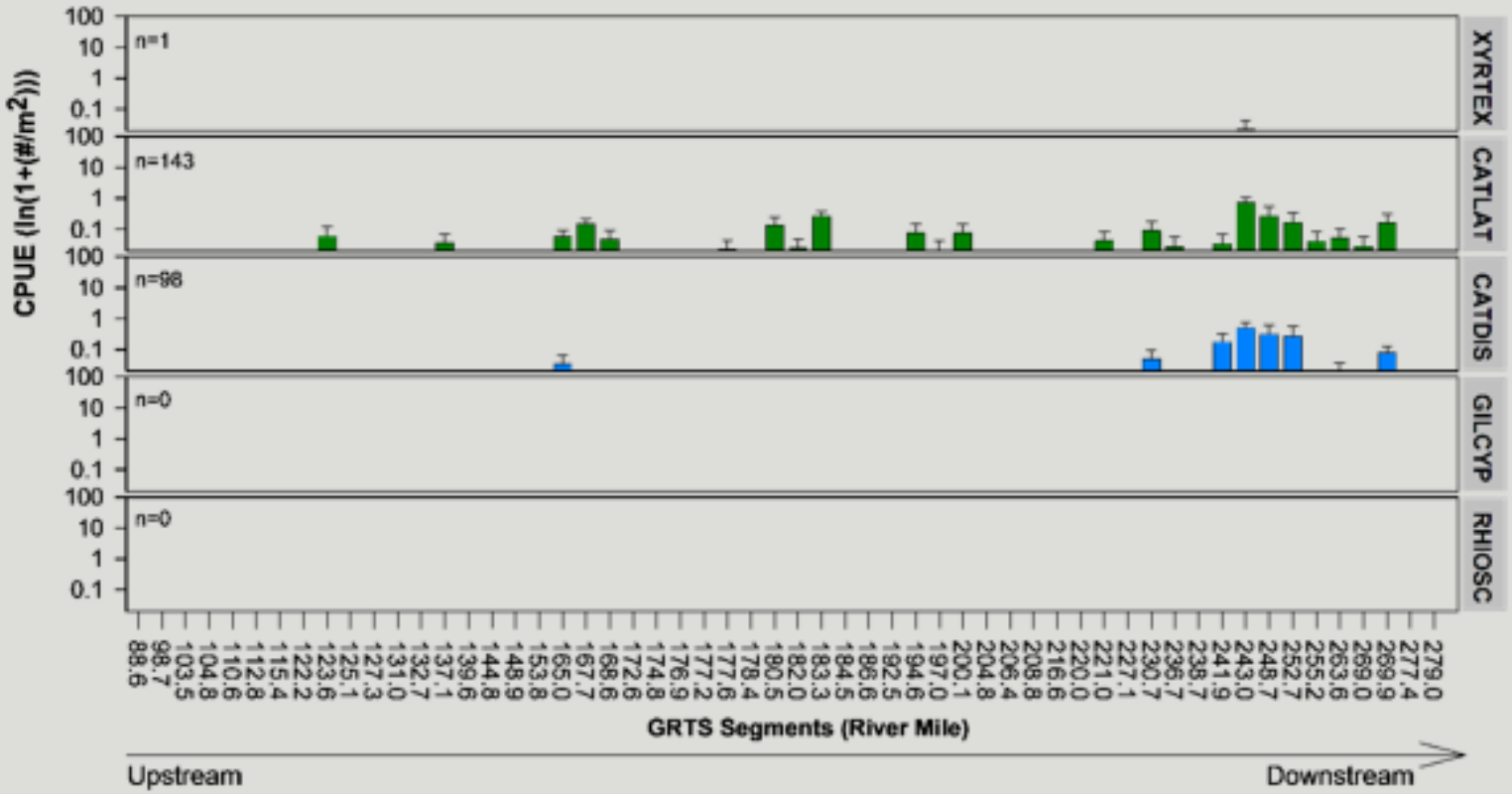
Razorback Sucker Xyrauchen texanus Research and Monitoring in the Colorado River Inflow Area of Lake Mead and the Lower Grand Canyon, Arizona and Nevada

2019 Age-0 Fish Captures – March



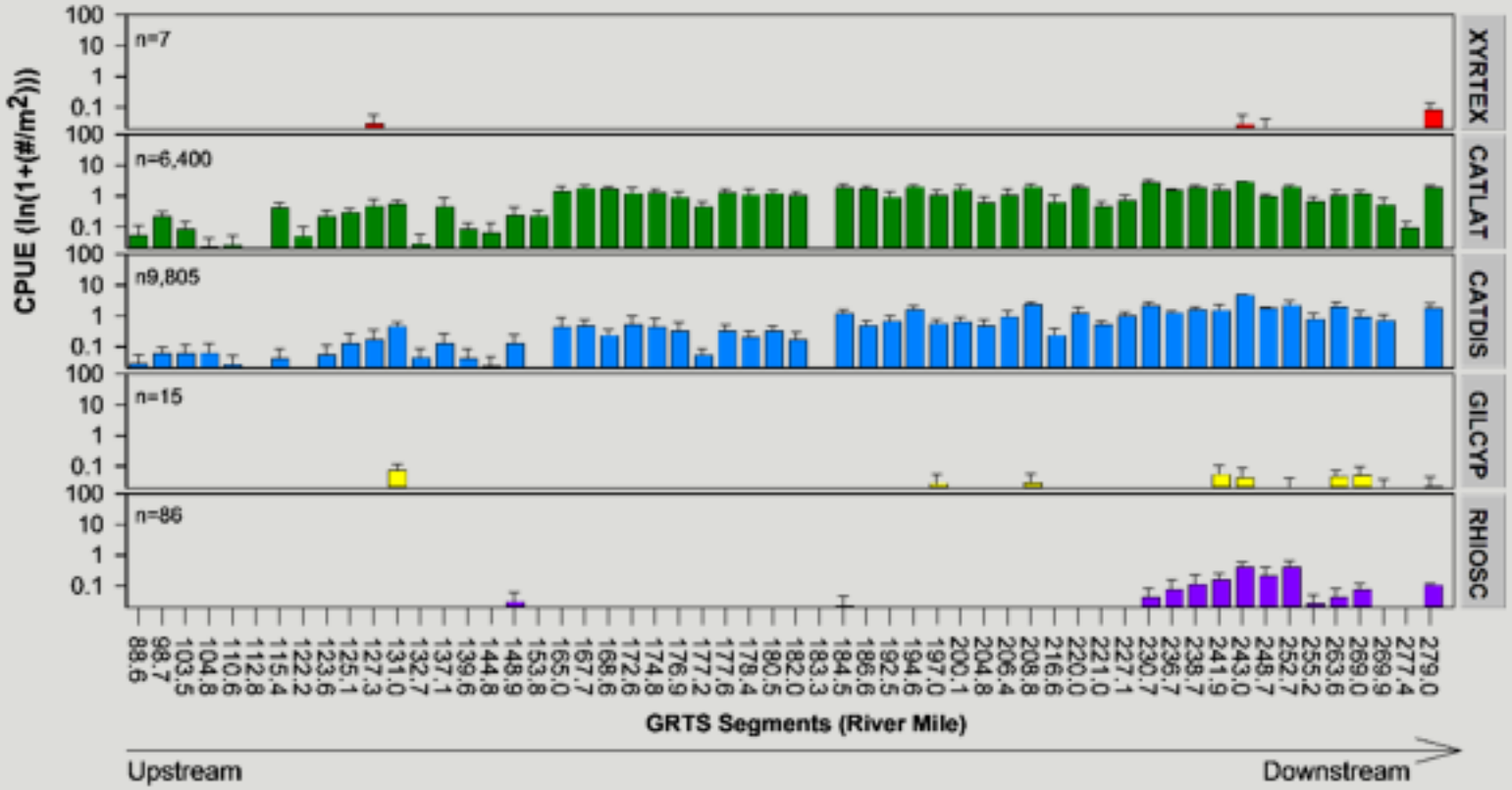
07–15 March 2019
GRTS segments: 56
Effort: 2,137 m^2

2019 Age-0 Fish Captures – April



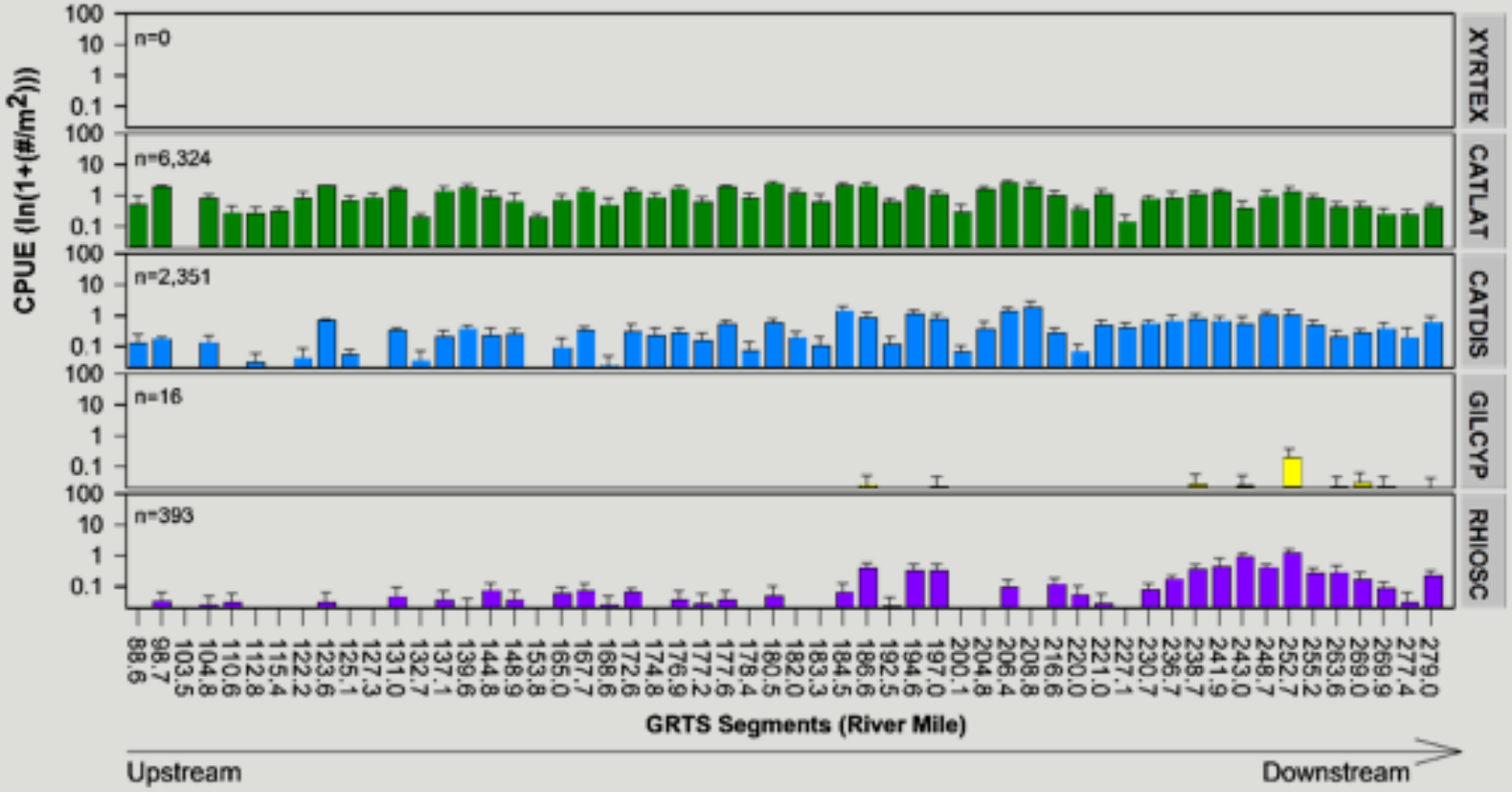
11–17 April 2019
GRTS segments: 56
Effort: 1,937 m^2

2019 Age-0 Fish Captures – May



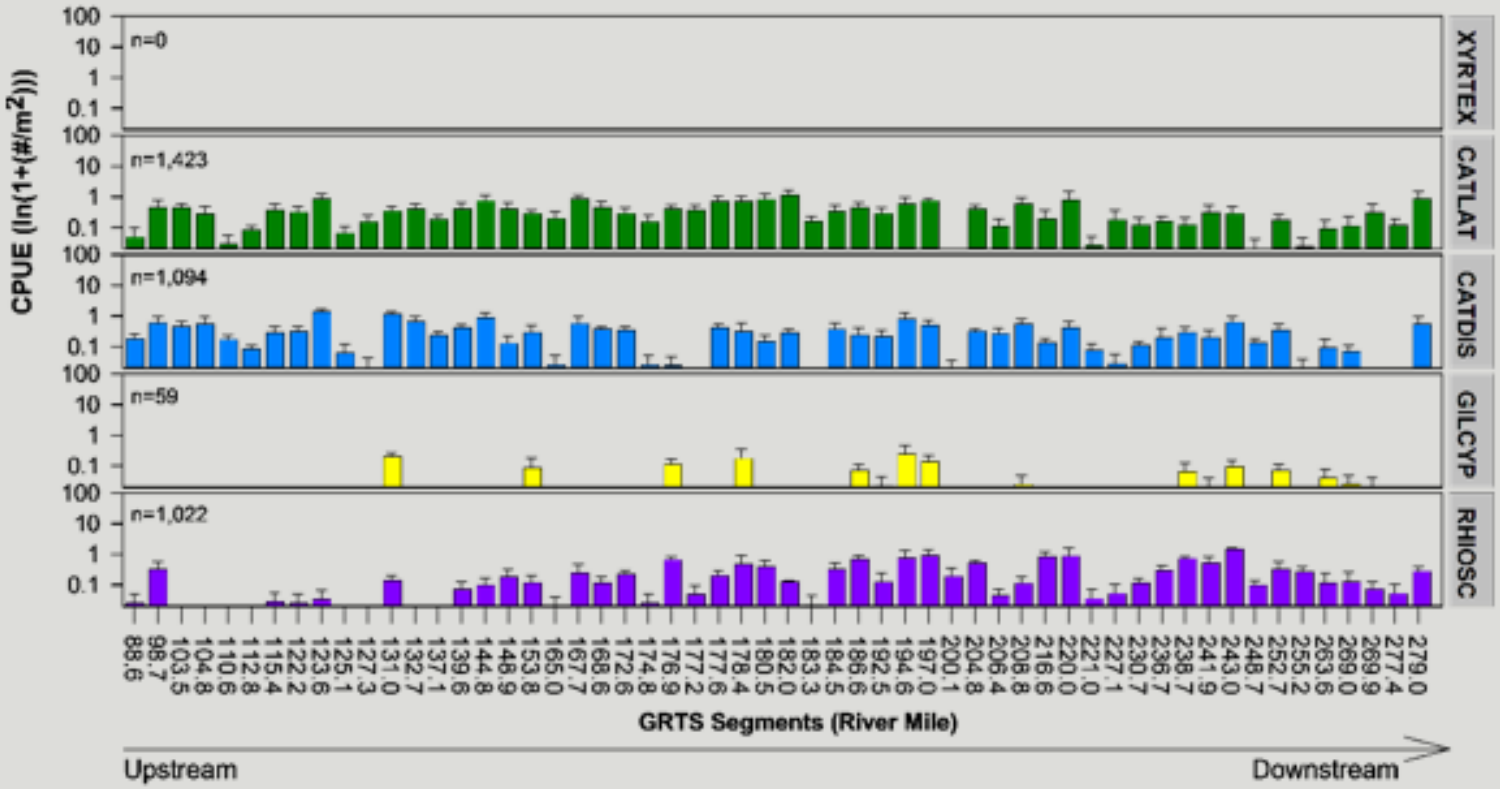
09–15 May 2019
GRTS segments: 55
Effort: 1,883 m^2

2019 Age-0 Fish Captures – June



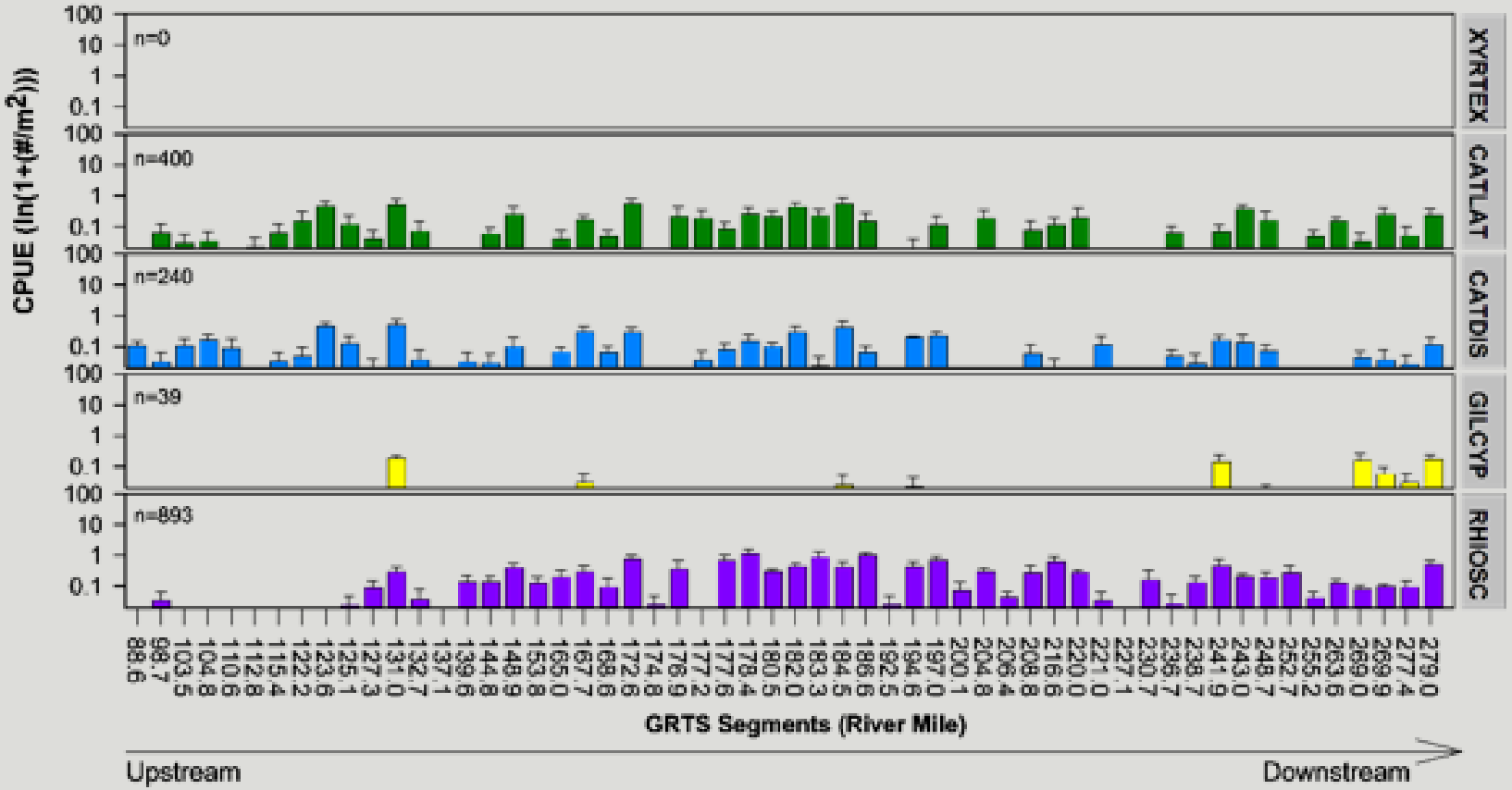
13–19 Jun 2019
GRTS segments: 55
Effort: 1,929 m^2

2019 Age-0 Fish Captures – July



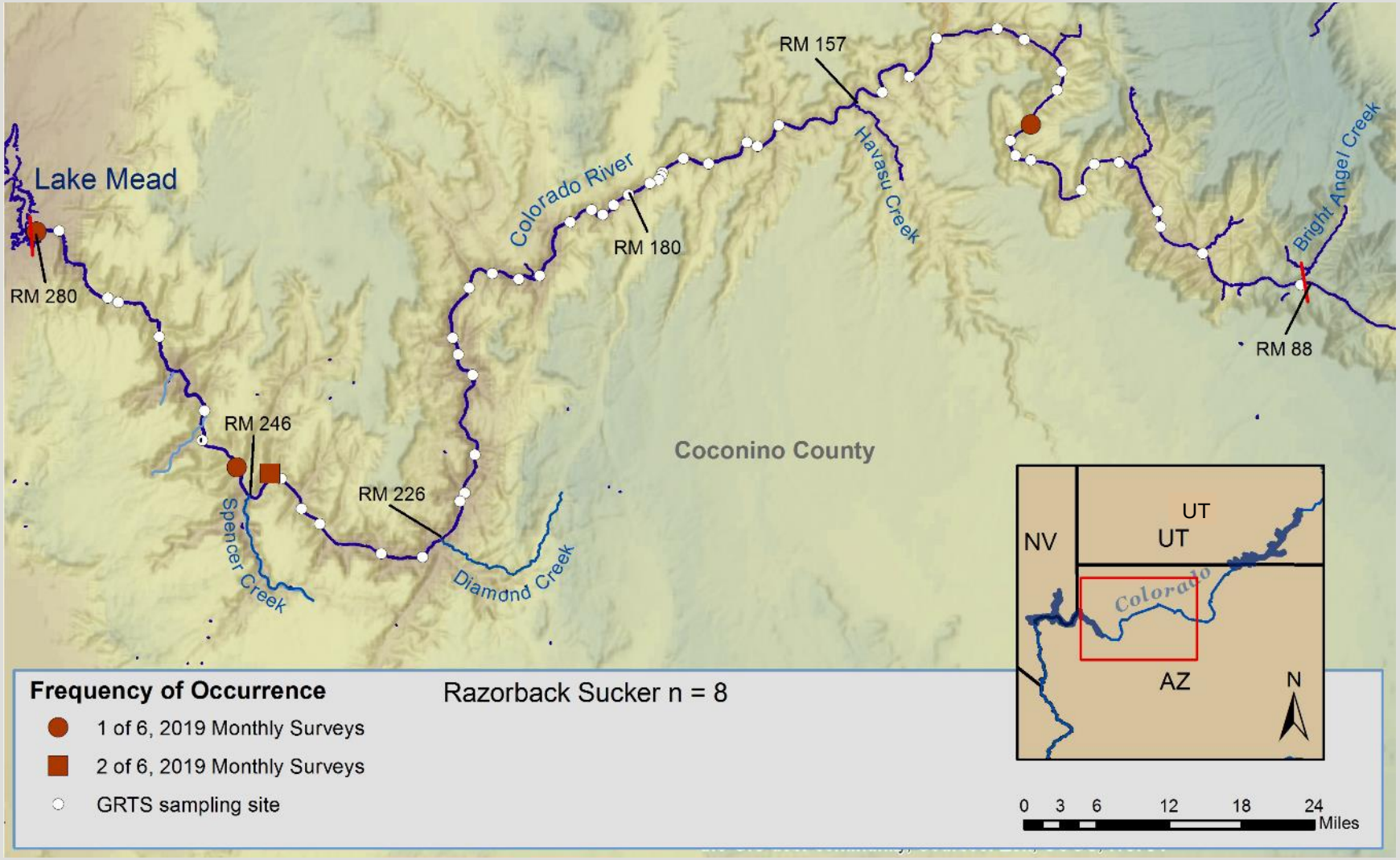
11–16 Jul 2019
GRTS segments: 56
Effort: 2,094 m^2

2019 Age-0 Fish Captures – August



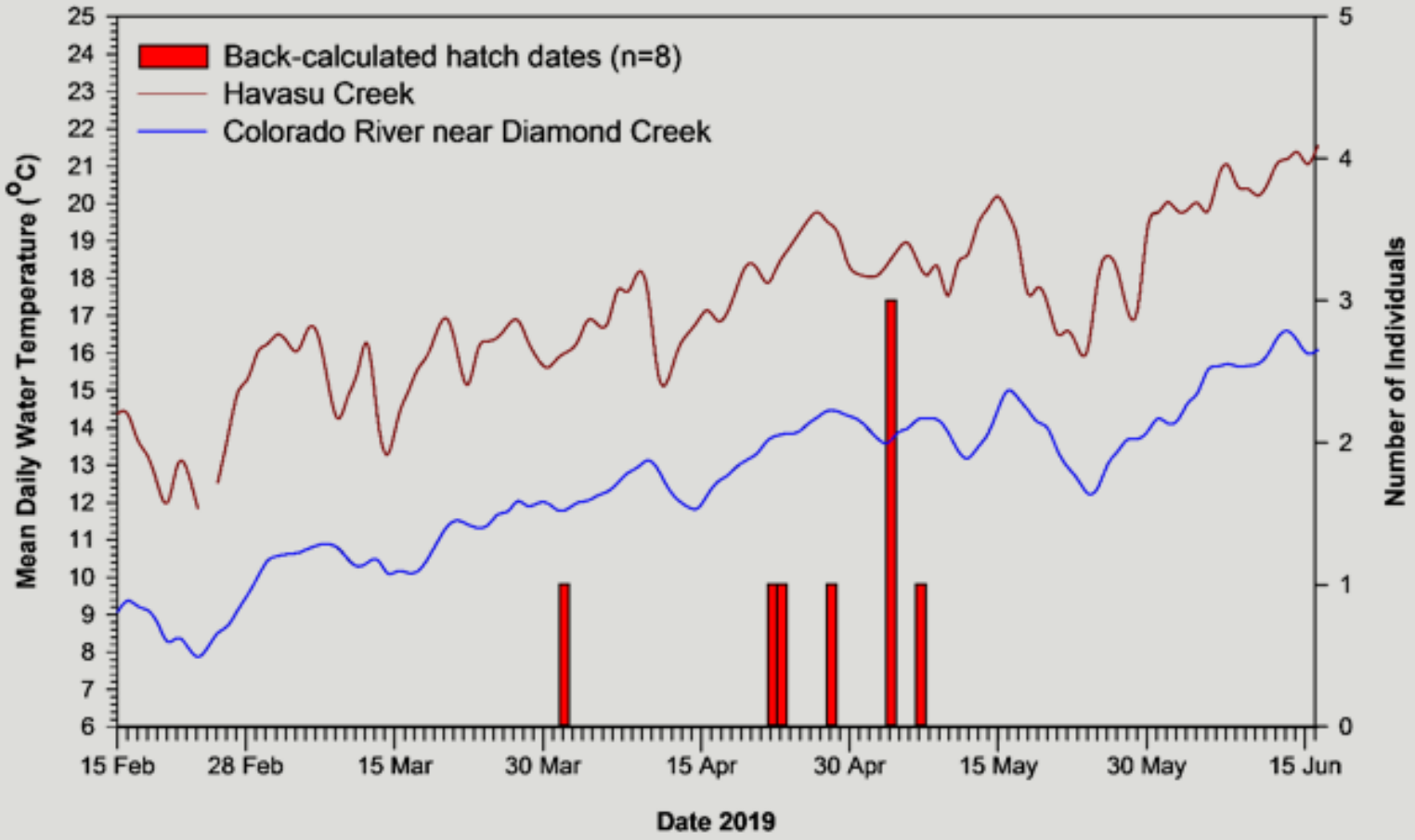
15–21 Aug 2019
GRTS segments: 56
Effort: 2,110 m^2

Larval Razorback Sucker GRTS locations

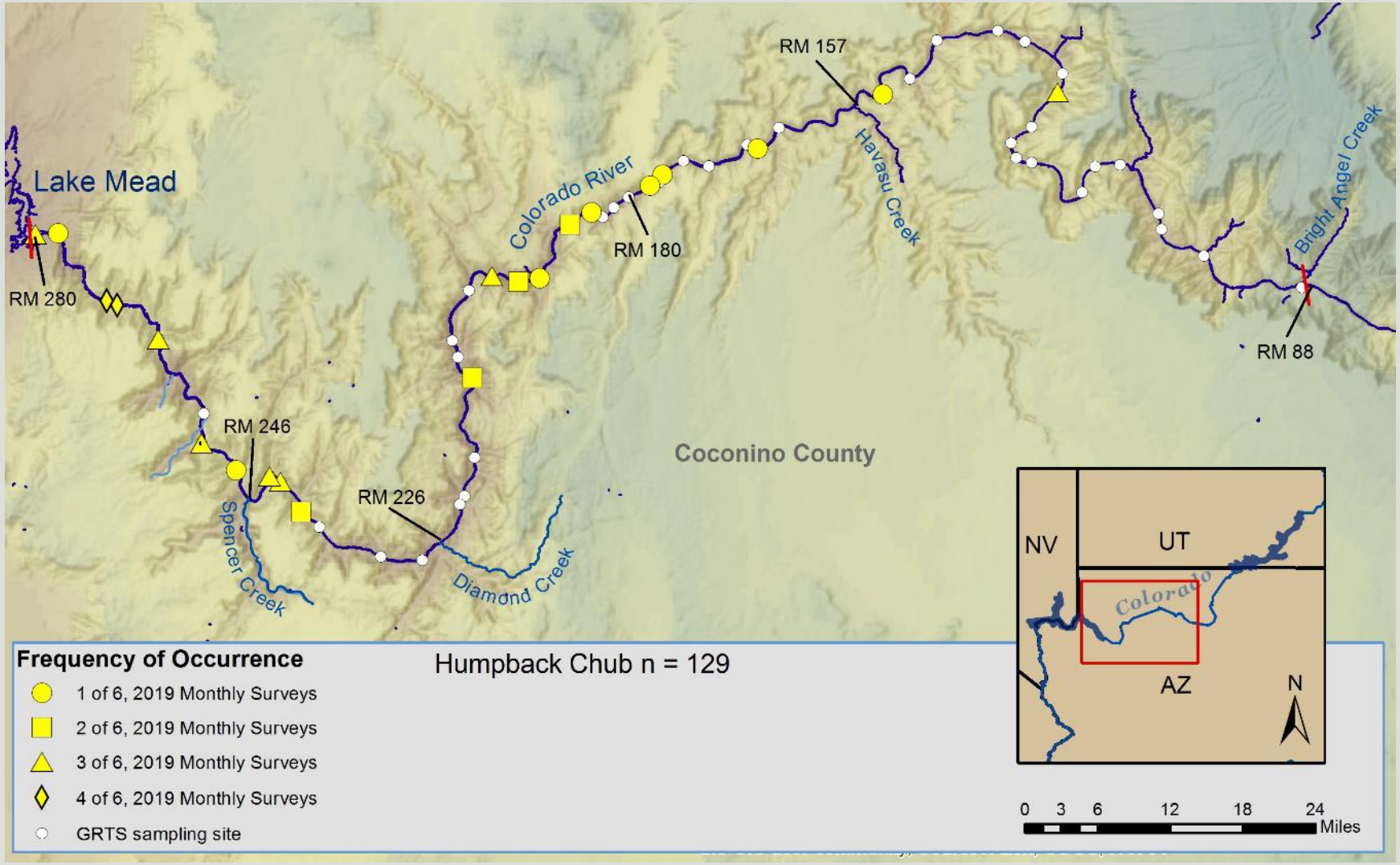


XYRTEX Back-calculated Hatch Dates

Hatch Dates: 1 April–8 May 2019

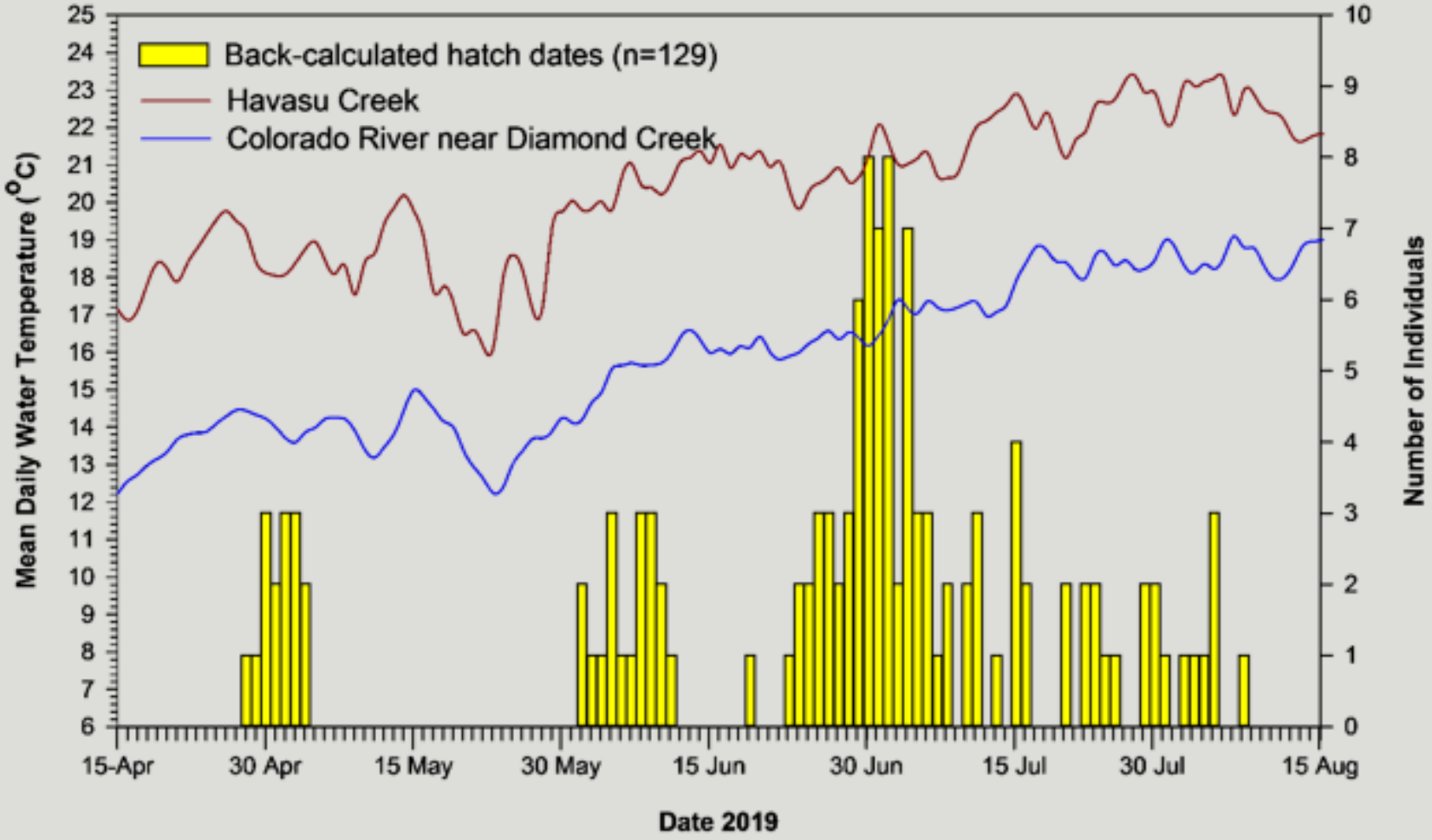


Larval Humpback Chub GRTS locations

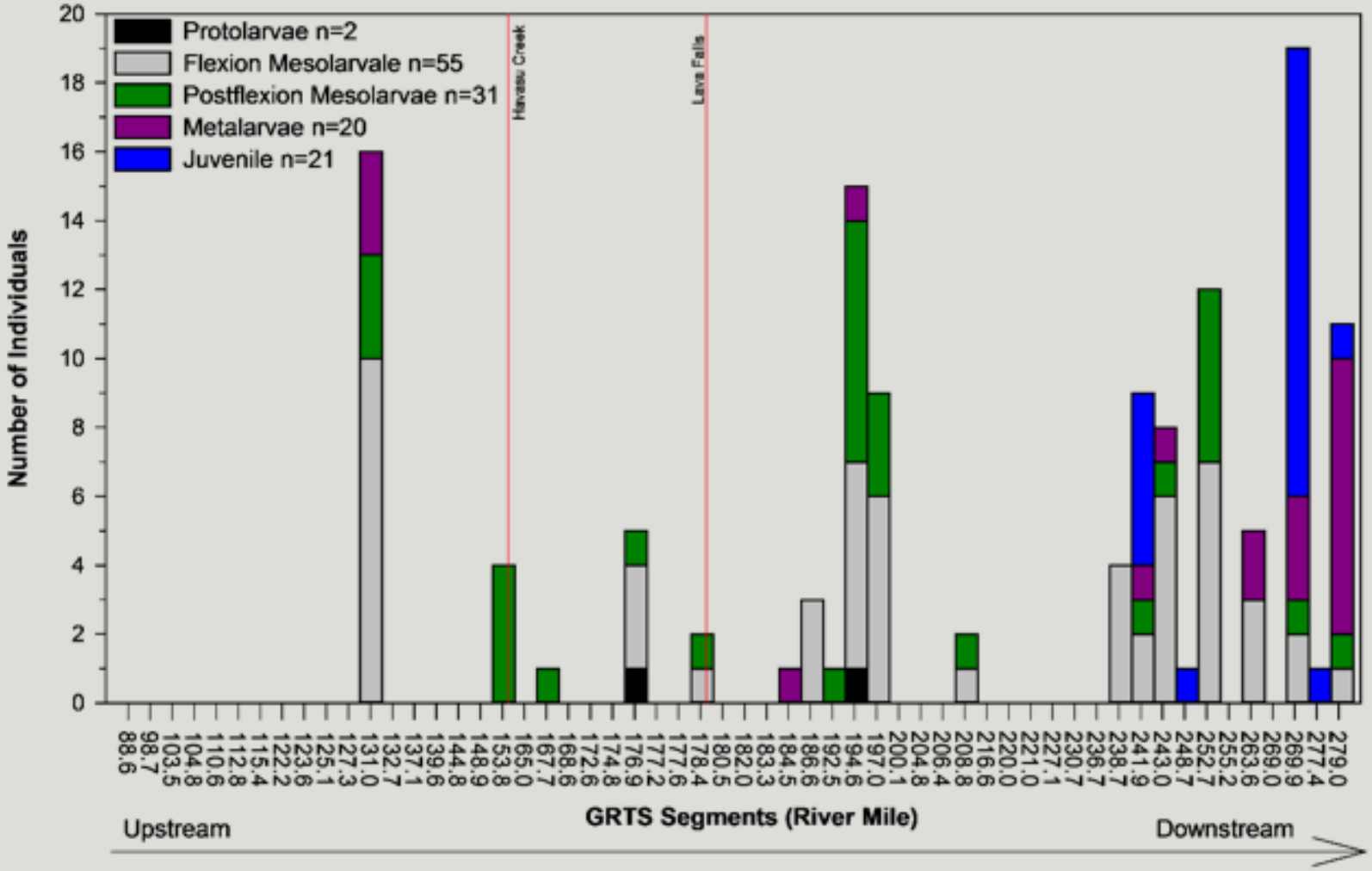


Chub Back-calculated Hatch Dates

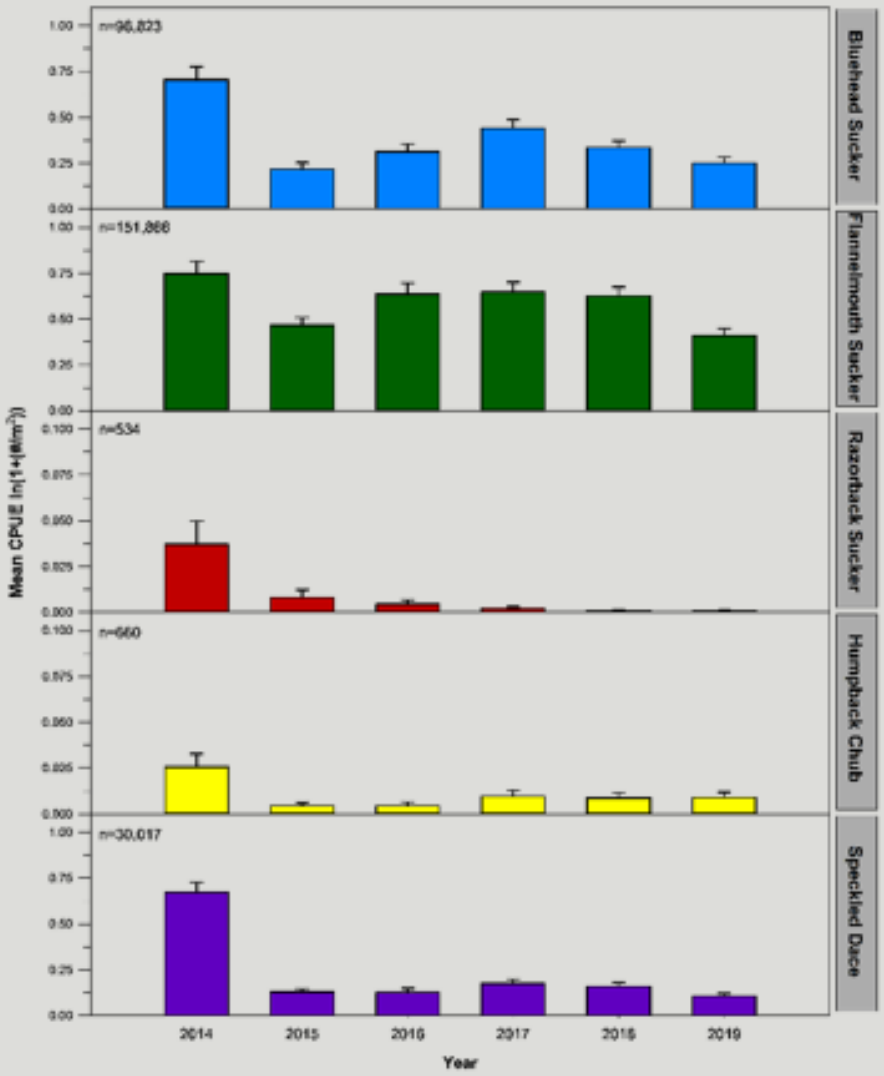
Hatch Dates: 28 April–8 August 2019



Humpback Chub Ontogenetic Distribution

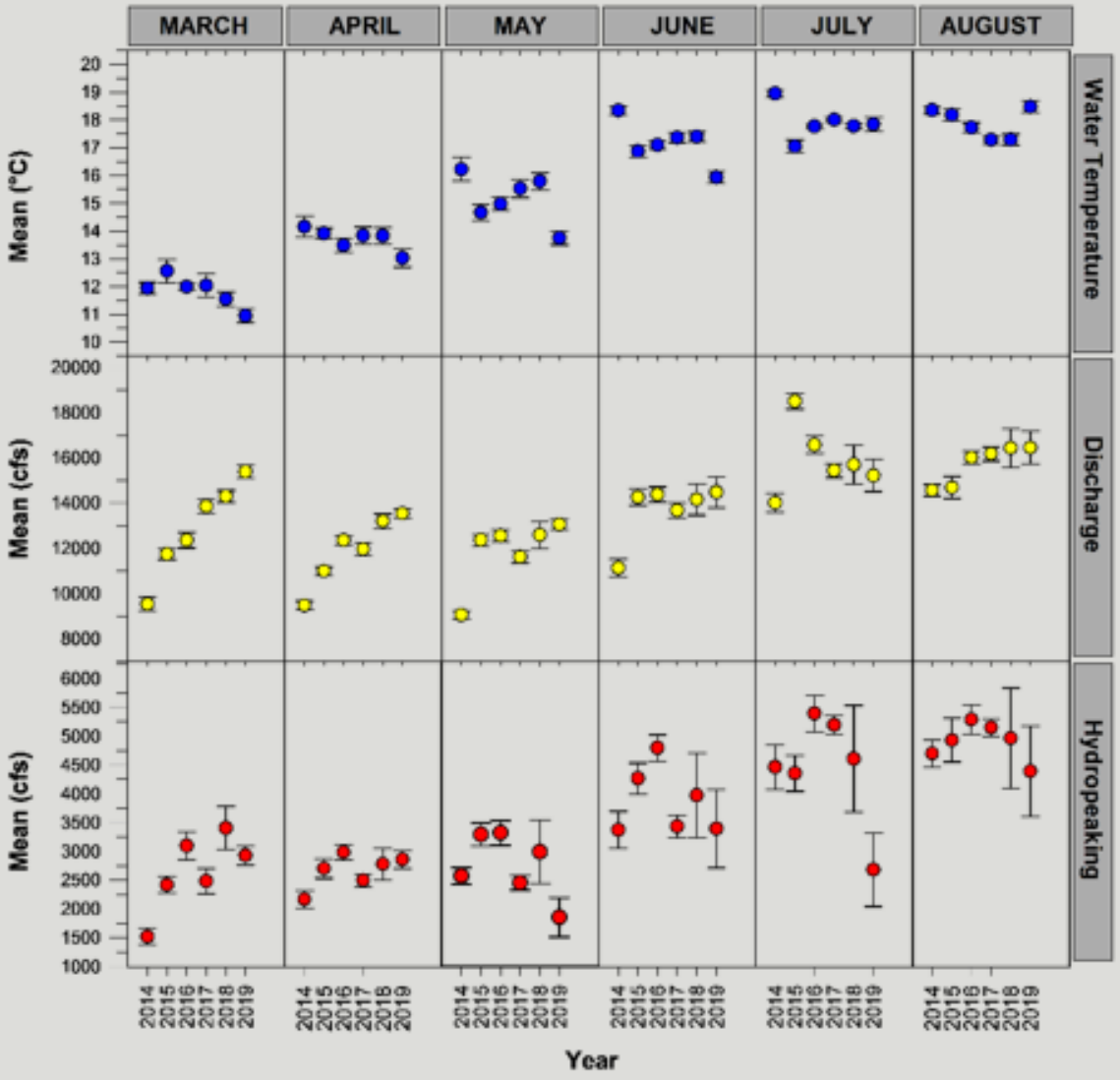


Annual Catch Rate of Native Larval Fishes



Razorback Sucker Xyrauchen texanus Research and Monitoring in the Colorado River Inflow Area of Lake Mead and the Lower Grand Canyon, Arizona and Nevada

Physical Parameters by Sampling Year



Razorback Sucker Conclusions

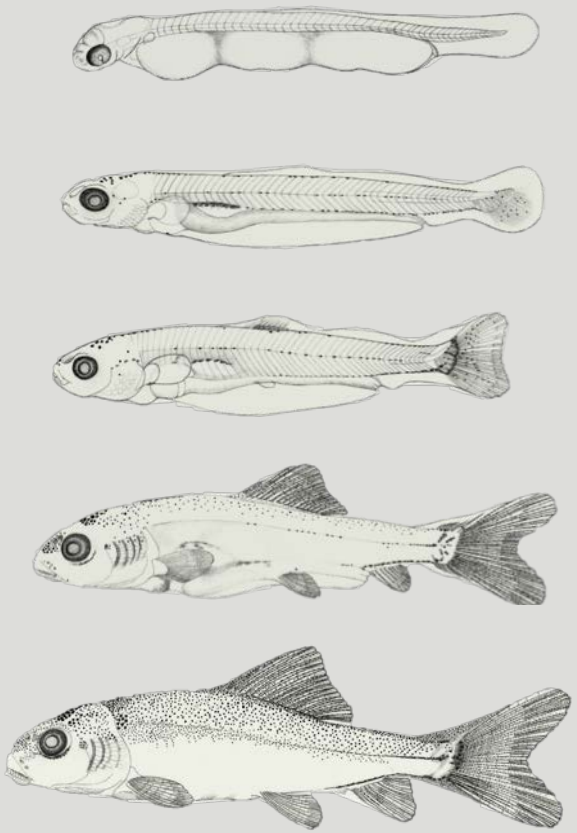
- Present in all sampling years (2014–2019).
- 2018 and 2019 had nearly the same distribution of larvae (RM 243.0–279.0).
- 2019 larvae captured in April and May.
- 2019 back-calculated hatch dates encompass a 5-week period (1 April–8 May).
- Only the three earliest ontogenetic larval phases were collected in 2019.
- Juveniles yet to be captured (2014–2019).

Humpback Chub Conclusions

- Present in all six sampling years (2014–2019).
- First larval captures occur in May.
- 2019 back-calculated hatch dates encompass a 14-week period (28 April–8 August).
- Broad distribution throughout the study area.
- Larval and juvenile specimens documented regularly.

Larval Fish Ontogenetic Phases

PHASE	SUB-PHASE
Protolarvae	
Mesolarvae	Flexion
	Postflexion
Metalarvae	
Early juvenile	



C.L.Bjork