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

• Monitoring the Colorado River Inflow (CRI)
  – Same methods since 2010

• Determine Razorback Sucker presence and habitat use in Grand Canyon (GC)
  – Larval and small-bodied fish community sampling within the GC
    • Assess reproduction and distribution
    – GC telemetry

• Explore linkages between Lake Mead and GC
Colorado River Inflow (CRI)
2017 Adult Catch (CRI)

- **12 Razorback Suckers**
  - 5 new, wild (1 was juvenile)
  - 2 recaps from Overton Arm
  - 1 sonic-tagged LGC recap

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**Mean Razorback Sucker Captures (Ln[#fish/hour+1])**

- Green: Virgin River/Muddy River Inflow Area
- Purple: Echo Bay
- Blue: Las Vegas Bay
- Red: Colorado River Inflow

**Years:** 2005 to 2017

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**Razorback Sucker Xyrauchen texanus Research and Monitoring in the Colorado River Inflow Area of Lake Mead and the Lower Grand Canyon, Arizona and Nevada**
2017 Larval Catch (CRI)

- Active and passive sampling:
  - 6 RBS larvae
  - 3 FMS larvae
Movement of RBS in Lake Mead

Mohn et al. (2016)

Virgin River/Muddy River inflow

Echo Bay

9.05 (5.76-13.9)

0.44 (0.05-3.95)

8.1 (3.78-16.54)

0.95 (0.12-7.04)

2.3 (0.58-8.83)

1.1 (0.16-7.71)

Overton Arm

Colorado Inflow

Las Vegas Bay

Mohn et al. (2016)

Razorback Sucker Xyrauchen texanus Research and Monitoring in the Colorado River Inflow Area of Lake Mead and the Lower Grand Canyon, Arizona and Nevada
<table>
<thead>
<tr>
<th>Year</th>
<th>Study area</th>
<th>Study Period</th>
<th>GRTS Sites</th>
<th>Implanted Razorback Sucker</th>
<th>Larval Razorback Sucker</th>
</tr>
</thead>
<tbody>
<tr>
<td>2014</td>
<td>100 river miles Lava Falls–Pearce Ferry</td>
<td>Apr–Sep</td>
<td>n=40</td>
<td>n=9 above Lava Falls Rapid</td>
<td>n=459</td>
</tr>
<tr>
<td>2015</td>
<td>100 river miles Lava Falls–Pearce Ferry</td>
<td>Mar–Sep</td>
<td>n=40</td>
<td></td>
<td>n=81</td>
</tr>
<tr>
<td>2016</td>
<td>191 river miles Bright Angel Creek–Pearce Ferry</td>
<td>Mar–Sep</td>
<td>n=56</td>
<td>n=10 Diamond Creek</td>
<td>n=46</td>
</tr>
<tr>
<td>2017</td>
<td>191 river miles Bright Angel Creek–Pearce Ferry</td>
<td>Mar–Sep</td>
<td>n=56</td>
<td></td>
<td>n=27</td>
</tr>
</tbody>
</table>
Sampling Localities in Grand Canyon

GRTS site

River Mile

UT

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

Larval Fish Sampling
- Small fine mesh seine
- Low velocity habitats
- Four hauls per site

Small-bodied Fish Sampling
- 10’ and 15’ seine
- Diverse habitats
- ~10 hauls per site

Telemetry
- Active
- Passive (n=20 SURs, every 10 miles)
Age-0 Monthly Captures

Razorback Sucker (XYRTEX)

Flannelmouth Sucker (CATLAT)

Bluehead Sucker (CATDIS)

Humpback Chub (GILCYP)

Speckled Dace (RHIOSC)

Razorback Sucker Xyrauchen texanus Research and Monitoring in the Colorado River Inflow Area of Lake Mead and the Lower Grand Canyon, Arizona and Nevada
2017 Age-0 Fish Captures – March

9–17 March 2017
GRTS segments: 54
Effort: 1,993.4 m²
2017 Age-0 Fish Captures – April

8–13 April 2017
GRTS segments: 56
Effort: 2,011.6 m²
2017 Age-0 Fish Captures – May

19–24 May 2017
GRTS segments: 56
Effort: 2,017.7 m²
2017 Age-0 Fish Captures – June

14–19 Jun 2017
GRTS segments: 56
Effort: 1,976.5 m²
2017 Age-0 Fish Captures – July

11–17 Jul 2017
GRTS segments: 56
Effort: 1,978.3 m²
2017 Age-0 Fish Captures – August

16–23 Aug 2017
GRTS segments: 56
Effort: 1,990.6 m²
Back-calculated Hatching Dates

Hatch Dates: 23 February–18 May 2017

Date 2017

Number of Individuals

n=27
Back-calculated Hatching Dates

Hatch Dates: 23 February–18 May 2017

- Colorado River near Diamond Creek
- Havasu Creek
- Back-calculated hatch dates (n=27)

Razorback Sucker Xyrauchen texanus Research and Monitoring in the Colorado River Inflow Area of Lake Mead and the Lower Grand Canyon, Arizona and Nevada
2017 Small-bodied Sampling (GC)

Mean CPUE (Ln[#/m2+1])

Trip Month

Native
Humpback Chub
Bluehead Sucker
Flannelmouth Sucker
Speckled Dace
YOY Sucker

March April May June July August September

Razorback Sucker Xyrauchen texanus Research and Monitoring in the Colorado River Inflow Area of Lake Mead and the Lower Grand Canyon, Arizona and Nevada
Small-Bodied HBC Captures 2017
(all trips combined)

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

Mean CPUE (Ln[#/m2+1])

River Mile

n=930
19–282 mm TL
Small-bodied Sampling (GC)

- Valdez et al. (1995), Ackerman et al. (2005), Kegerries et al. (2014–2017)
Telemetry-Tagged Fish

- Critical to monitor movement and improve sampling efficiency
- Since 2013 n=46 sonic tagged fish released
2010–2016 Movement Patterns

- Four types of movement
- 70% remain within stocking habitat

- Most movement occurs during the spring and summer

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

Pearce Ferry Rapid
South Cove
Lake Mead
Spencer Creek
Lava Falls
Diamond Creek
Bright Angel Creek

2014-2017
2017 Science Panel Report

- Do not force augmentation (i.e., stocking) of Razorback Sucker.

- Continue ongoing work with Razorback Sucker at the Colorado River Inflow Area and western Grand Canyon.

- Expand fish surveys for Razorback Sucker, in the lower Grand Canyon and investigate larval fish to get evidence of spawning and use of river.

- Integrate all habitat, fish, and food base studies in the Grand Canyon and the Colorado River Inflow Area of Lake Mead.

Three-Year Review of Razorback Sucker Xyrauchen texanus Research in Grand Canyon and Colorado River Inflow to Lake Mead

A Science Panel Report

U.S. Bureau of Reclamation
Upper Colorado Region
Salt Lake City, Utah
Razorback Sucker Conclusions

- All life stages present at the CRI (8th year).
- Larvae documented in Grand Canyon downstream of Havasu Creek.
- Native fishes dominate the fish community of the GC.
- Movement of Razorback Sucker occurs between Grand Canyon, CRI, and Lake Mead.
- Hypothesize that lentic and lotic habitats cumulatively facilitate Razorback Sucker recruitment.