Increased upstream detection of Catostomids, Colorado River in Grand Canyon, 2016:

2014-2016 Spatial and Temporal Distribution of Larval Fishes

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Razorback Sucker in the Colorado River, Grand Canyon

**History**

Believed to be extirpated since 1990s

Collection of one likely larval Razorback Sucker at Havasu in 1998

From 2010 onwards, adults tagged in Lake Mead detected in the lower Colorado River, Grand Canyon

Two collections of adults in 2012 and 2013 in the lower Colorado River, Grand Canyon

**Current**

Larval Razorback Sucker collected in 2014, 2015, and 2016
Larval Fish Survey Methods

Study area
2014: river mile 179-280
2015: river mile 179-280

Sample Locality
2014: 40
2015: 40

Monthly Sampling
2014: April–September*
2015: March–September*

Study area
2016: river mile 88-280

Sample Locality
2016: 56

Monthly Sampling
2016: March–August

*Data will not be reported
Larval Fish Survey Methods

Collection of samples

Small seine (1 m x 1 m x 0.8 mm mesh)

Low-velocity shallow habitats

Four hauls/site

Specimens <20 mm retained
## March Catostomid Spatial Distribution

### March 2014

No Survey

### March 2015

- **n=130**
- **n=11**
- **n=14**

### March 2016

- **n=95**
- **n=10**
- **n=7**

**Legend:**
- Green: Flannelmouth Sucker
- Blue: Bluehead Sucker
- Red: Razorback Sucker

<table>
<thead>
<tr>
<th>Location</th>
<th>RM 88</th>
<th>RM 180</th>
<th>RM 280</th>
</tr>
</thead>
<tbody>
<tr>
<td>Phantom</td>
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<tr>
<td>Shinumo</td>
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<td>Kanab</td>
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<td>Havasu</td>
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<td>Lava</td>
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<td>Spring</td>
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<td>Diamond</td>
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<td>Pearce</td>
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**Mean CPUE (#/m²):**

- 14 rm

**Note:**

- Upstream vs. Downstream
April Catostomid Spatial Distribution

### April 2014
- n=1,936
- n=1,050
- n=400

### April 2015
- n=1,050
- n=599
- n=57

### April 2016
- n=1,462
- n=257
- n=29

- Flannelmouth Sucker
- Bluehead Sucker
- Razorback Sucker

<table>
<thead>
<tr>
<th>Location</th>
<th>April 2014</th>
<th>April 2015</th>
<th>April 2016</th>
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<tbody>
<tr>
<td>Phantom</td>
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<tr>
<td>Shinumo</td>
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<td>Kanab</td>
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<td>Havasu</td>
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<td>Pearce</td>
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</tbody>
</table>

Mean CPUE (#/m²)

14 rm

RM 88  RM 180  RM 280
April Catostomid Spatial Distribution

April 2014
- n=1,936
- n=1,050
- n=400

April 2015
- n=1,050
- n=599
- n=57

April 2016
- n=1,462
- n=257
- n=29

Flannelmouth Sucker
- RM 88

Bluehead Sucker
- RM 180

Razorback Sucker
- RM 280
<table>
<thead>
<tr>
<th>May 2014</th>
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<tbody>
<tr>
<td></td>
<td>n=14,510</td>
<td>n=18,445</td>
<td>n=39</td>
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<tr>
<td>May 2015</td>
<td></td>
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<tr>
<td></td>
<td>n=6,041</td>
<td>n=6,104</td>
<td>n=6</td>
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<td>May 2016</td>
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<tr>
<td></td>
<td>n=11,317</td>
<td>n=5,016</td>
<td>n=6</td>
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<tr>
<td>Flannelmouth Sucker</td>
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<tr>
<td>Bluehead Sucker</td>
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<tr>
<td>Razorback Sucker</td>
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</tbody>
</table>

Mean CPUE (#/m²)

RM 88
RM 180
RM 280
### June Catostomid Spatial Distribution

<table>
<thead>
<tr>
<th>Year</th>
<th>Total</th>
<th>Flannelmouth Sucker</th>
<th>Bluehead Sucker</th>
<th>Razorback Sucker</th>
</tr>
</thead>
<tbody>
<tr>
<td>June 2014</td>
<td>5,115</td>
<td>4,755</td>
<td>17</td>
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<tr>
<td>June 2015</td>
<td>5,036</td>
<td>1,232</td>
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<tr>
<td>June 2016</td>
<td>14,338</td>
<td>5,701</td>
<td>4</td>
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</tbody>
</table>

**Mean CPUE (#/m²)**

- **Phantom**: RM 88
- **Shinumo**: RM 180
- **Kanab**: RM 280
- **Harasu**: RM 180
- **Lava**: RM 88
- **Spring**: RM 180
- **Diamond**: RM 280
- **Separation**: RM 88
- **Surprise**: RM 180
- **Pearce**: RM 280

**Diagrams**:

- June 2014: Data points for Flannelmouth Sucker, Bluehead Sucker, and Razorback Sucker are shown with bar charts indicating their respective counts and mean CPUE.
- June 2015: Similar bar charts for the same species, with adjusted counts and CPUE values.
- June 2016: Bar charts with updated counts and CPUE values for each species.
July Catostomid Spatial Distribution

July 2014
- Green: n=1,985
- Blue: n=1,737
- Red: n=3

July 2015
- Green: n=1,611
- Blue: n=135
- Red: n=0

July 2016
- No Survey

Flannelmouth Sucker
- Bluehead Sucker
- Razorback Sucker

RM 88  RM 180  RM 280
August Catostomid Spatial Distribution

August 2014
- n=1,386
- n=523
- n=0

August 2015
- n=655
- n=42
- n=2

August 2016
- n=1,251
- n=263
- n=0

Flannelmouth Sucker
Bluehead Sucker
Razorback Sucker

RM 88  RM 180  RM 280
Conclusions and Discussion

Razorback Sucker adults are present in the Colorado River in the lower Grand Canyon and are successfully reproducing.

Razorback Sucker adults present as far up as Havasu Creek, 123 river miles upstream from Lake Mead.

All three Catostomids appear to initiate spawning at the same time.

Upstream increase in spawning of Catostomids as identified in 2016 samples.

Larval fish sampling is a method which can detect and provide ecological data on rare species.