Little Colorado River Fish Monitoring in the Lower 1,200 Meters, Grand Canyon, AZ. 1987-2011

Arizona Game and Fish Department Research Branch
Introduction

- Annual standardized AGFD Little Colorado River (LCR) Lower 1,200 meter spring (April/May) hoop net monitoring began in 1987.

- The LCR is the primary spawning site for the endangered humpback chub in Grand Canyon. Other native species spawn in the LCR such as flannelmouth sucker, bluehead sucker and speckled dace. Nonnative species such as black bullhead, channel catfish, common carp and fathead minnow also spawn in the LCR.

- This project is one of the most consistent, standardized long-term monitoring projects in Grand Canyon, with the exception of 2000-2001.
Methods

- 13 standardized hoop nets are fished for 20-30 days each spring (~24hr sets).
- Data collected is utilized to assess relative abundance trends and status of native and select nonnative species.
- Data analysis consists of CPUE as fish per 24 hours, species composition and length frequency distributions. CPUE indices are useful as independent validation for age structured mark-recapture (ASMR) population models of humpback chub.
<table>
<thead>
<tr>
<th>2011 Species Composition</th>
<th>Count</th>
<th>% of Total Catch</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bluehead sucker (BHS)</td>
<td>322</td>
<td>16.30</td>
</tr>
<tr>
<td>Flannelmouth sucker (FMS)</td>
<td>602</td>
<td>29.97</td>
</tr>
<tr>
<td>Humpback chub (HBC)</td>
<td>383</td>
<td>19.06</td>
</tr>
<tr>
<td>Speckled dace (SPD)</td>
<td>367</td>
<td>18.27</td>
</tr>
<tr>
<td><strong>Total Native</strong></td>
<td>1,675</td>
<td>83.4</td>
</tr>
<tr>
<td>Black bullhead (BBH)</td>
<td>2</td>
<td>0.10</td>
</tr>
<tr>
<td>Channel catfish (CCF)</td>
<td>6</td>
<td>0.30</td>
</tr>
<tr>
<td>Common carp (CRP)</td>
<td>3</td>
<td>0.15</td>
</tr>
<tr>
<td>Fathead minnow (FHM)</td>
<td>306</td>
<td>15.23</td>
</tr>
<tr>
<td>Plains killifish (PKF)</td>
<td>2</td>
<td>0.10</td>
</tr>
<tr>
<td>Rainbow trout (RBT)</td>
<td>13</td>
<td>0.65</td>
</tr>
<tr>
<td>Red shiner (RSH)</td>
<td>2</td>
<td>0.10</td>
</tr>
<tr>
<td><strong>Total Non-native</strong></td>
<td>334</td>
<td>16.6</td>
</tr>
<tr>
<td><strong>Total:</strong></td>
<td>2,009</td>
<td>100.0</td>
</tr>
</tbody>
</table>

*Total Effort 6,129.8 hours of soak time*
HBC

Total Length (mm)

Percent of Catch

2011
N=383
Humpback chub

CPUE (fish/24 hrs)

Year

< 150 mm

CPUE (fish/24 hrs)

Year
Humpback chub

![Graph showing CPUE (Fish/24 hrs) vs. Year for Humpback chub with data points for years 1985 to 2010, with a peak CPUE in 1990. The graph indicates a decline in CPUE after 1990.]
Flannelmouth sucker

![Graph showing CPUE (fish/24 hrs) vs. Year for Flannelmouth sucker, with data points for years 1985 to 2010. The graph indicates a decline in CPUE from 1985 to 2010, with a sharp increase after 2005. The x-axis represents the year, and the y-axis represents CPUE (fish/24 hrs).]
BHS

2011
N=322

Percent of Catch

Total Length (mm)

Total Length (mm)

Percent of Catch
Bluehead sucker

CPUE (fish/24 hrs) vs Year

Year


<= 150 mm
Why the increase in nonnatives in 2011?

1) Possibly due to increases in mainstem Colorado River (equalization) flows from approximately 15,500 - 24,500 cfs over a three day period.

2) Increased flows allowed greater access to lower LCR for cold-water species (i.e., Rainbow trout).
Why the increase in nonnatives in 2011?

3) Dispersed small-bodied fish downstream in mainstem Colorado River (2011) and LCR in fall of 2010?

4) The increased relative abundance of fathead minnow is not unprecedented (i.e., 2006).
Conclusions

• CPUE of HBC ≥ 200 mm was similar to early 1990’s catch rates.

• Relative abundance of flannelmouth sucker continues to remain above historic observations.

• Relative abundance of commonly captured nonnative species tends to vary annually.

• Trends in LCR lower 1,200 m adult HBC (≥ 200 mm) are similar to trends in Age Structured Mark Recapture (ASMR) abundance estimates for adult HBC.
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