Nevada Department of Wildlife

Lake Mead Razorback Sucker Augmentation

Brandon Senger
Outline

- Larval Collecting
- Fish on Station
- Water Quality
- Overton Wildlife Management Area
- Flow Conditioning Study
<table>
<thead>
<tr>
<th>Source</th>
<th>2010</th>
<th>2011</th>
</tr>
</thead>
<tbody>
<tr>
<td>Echo Bay</td>
<td>635</td>
<td>2,666</td>
</tr>
<tr>
<td>Las Vegas</td>
<td>210</td>
<td>404</td>
</tr>
<tr>
<td>Bay</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td><strong>845</strong></td>
<td><strong>3,070</strong></td>
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</tbody>
</table>
Fish On Station

2008 Fish
- 59 (380 stocked to Davis Cove in early summer)

2009 Fish
- 750 (600 stocked into Center Pond)

2010 Fish
- 2,000

2011 Flannelmouth Sucker
- 120
New Rearing Space

- Native Fish Room was previous rearing room
- Inside the hatchery is our current rearing space
Native Fish Room

- Previous rearing room
- 6 – 700 gallon fiberglass tanks
- 4 – 240 gallon fiberglass troughs
- 10 gallon aquaria
Native Fish Room
Indoor Fiberglass Capacity

- 10 – 20’x4’x2.3’ tanks (1,421 gallons)
- 10 – 30’x4’x2.3’ tanks (2,094 gallons)
- 10 – 40’x6’x2.7’ tanks (4,788 gallons)
Indoor and Outdoor Concrete Raceways
Lake Mead Elevation

*Data collected from USBR (http://www.usbr.gov/lc/region/g4000/hourly/mead-elv.html)
Hatchery Water Temperatures

Temperature (Celsius)

January  February  March  April  May  June  July  August  September  October  November  December

2009
2010
2011
Overton Wildlife Management Area

- Surveyed Center Pond in November
- 600 2009 razorback suckers stocked in December
- Working on renovation ideas
Center Pond Survey

- November 1 & 2

<table>
<thead>
<tr>
<th>Species</th>
<th>#</th>
<th>Avg. TL (mm)</th>
<th>Avg. Wt (kg)</th>
<th>% Biomass</th>
<th>% Species Composition</th>
<th>CPUE (fish/nn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Razorback</td>
<td>110</td>
<td>476</td>
<td>1.25</td>
<td>69.7</td>
<td>61.1</td>
<td>20.8</td>
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<tr>
<td>Carp</td>
<td>32</td>
<td>435.7</td>
<td>1.18</td>
<td>19.2</td>
<td>17.8</td>
<td>6</td>
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<tr>
<td>LMB</td>
<td>31</td>
<td>343.2</td>
<td>.587</td>
<td>9.3</td>
<td>17.2</td>
<td>5.8</td>
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<tr>
<td>Bullhead</td>
<td>6</td>
<td>332.8</td>
<td>.6</td>
<td>1.8</td>
<td>3.3</td>
<td>1.1</td>
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<tr>
<td>Bluegill</td>
<td>1</td>
<td>170</td>
<td>.17</td>
<td>0.1</td>
<td>0.6</td>
<td>0.2</td>
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</table>

- Two sub-adults captured (266 and 285 mm TL)
Center Pond Razorbacks

Sub-adult

Adult
Carp Die Off (July 31, 2011)
Gasping for Air
Carp Die Off
Evaluation of Flow Conditioning Razorback Suckers in Flow-Through Raceways at Lake Mead Fish Hatchery
Trials 2 & 3

Trial 2

• Winter 2011
• Control
• Two Treatments
  – 12 hour treatment
  – 18 hour treatment
• Only used 4 pump laid down design (TR 2 in Trial 1)
• 12-hour belt feeder
• 13° Celsius

Trial 3

• Summer 2011
• Control
• Two Treatments
  – 12 hour treatment
  – 18 hour treatment
• Only used 4 pump laid down design (TR 2 in Trial 1)
• 12-hour belt feeder
• 19° Celsius
Mean Failure Velocities

<table>
<thead>
<tr>
<th>Trial 2</th>
<th>Trial 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>TR 1</td>
</tr>
<tr>
<td>46.7</td>
<td>55.8</td>
</tr>
<tr>
<td>57.2</td>
<td>57.5</td>
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<tr>
<td>79.7</td>
<td>83.1</td>
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# Growth Results

<table>
<thead>
<tr>
<th></th>
<th>Fish/lb</th>
<th>Food Conversion Rate</th>
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<tbody>
<tr>
<td></td>
<td>Trial 2</td>
<td>Trial 3</td>
</tr>
<tr>
<td>Pre-Trial</td>
<td>3.7</td>
<td>2.5</td>
</tr>
<tr>
<td>Control</td>
<td>3.4</td>
<td>2.1</td>
</tr>
<tr>
<td>TR 1</td>
<td>3.1</td>
<td>1.7</td>
</tr>
<tr>
<td>TR 2</td>
<td>3.0</td>
<td>1.4</td>
</tr>
<tr>
<td>Control</td>
<td>6.3</td>
<td>2.4</td>
</tr>
<tr>
<td>TR 1</td>
<td>3.0</td>
<td>1.0</td>
</tr>
<tr>
<td>TR 2</td>
<td>2.5</td>
<td>0.7</td>
</tr>
</tbody>
</table>
Weight Increase

<table>
<thead>
<tr>
<th>Trial 2</th>
<th>Trial 3</th>
</tr>
</thead>
<tbody>
<tr>
<td>Control</td>
<td>TR 1</td>
</tr>
<tr>
<td>9.7</td>
<td>20.3</td>
</tr>
<tr>
<td>48.1</td>
<td>77.8</td>
</tr>
</tbody>
</table>

- Trial 2: Control 9.7%, TR 1 20.3%, TR 2 23.7%
- Trial 3: Control 48.1%, TR 1 77.8%
TL Growth

TL Weight Increase %

- Control
- TR 1
- TR 2

Trial 2: 2.5, 4.9, 5.2
Trial 3: 7.6, 10.4, 18
2011 Flow Conditioning Summary

• Completed winter (coldwater) and summer (warmwater) trials
• Flow conditioning effective in both trials
• Improved…
  – Failure velocities
  – Growth (weight & TL)
  – Feed conversion efficiencies
Future Ideas

• Continued Flow Conditioning
  – Stocking of flow conditioned fish

• Predator Avoidance Studies
  – Develop predator avoidance training
  – LMB/SMB vs Stripers
  – Turbidity and predation
  – Habitat use and predation

• Razorback/quagga research
  – UNLV

• Transporting fish from mussel positive water

• Space