Sexual differentiation and growth of reintroduced American eels in the Susquehanna River watershed

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Background

- Major dam construction in lower Susquehanna watershed in early 20th century
- Largely precluded eels from the watershed until large scale stocking efforts in 2008
Conserving the Nature of the Northeast
Buffalo Creek Elver Stocking

- Experimental stocking on known Eastern elliptio mussel beds to see if eels would increase recruitment of mussels
- Buffalo Creek stocked 2010-2013 with 118,642 elvers
Buffalo Creek Study

- PIT tagged eels >200 mm to monitor growth over time
- Sampled two sites within creek with backpack electrofishers from 2012-present
- In 2017, sampled 12 upper Buffalo Creek sites for eel presence and PIT tagged eels >200 mm
  - Electrofished for 20 min per site for upper watershed
22 eels captured at 9 of 12 sites
Lengths ranged from 232-621 mm
No eels captured in 1st order stream
10 of 22 eels were female (based on external maturity stage and length; TL of females was 436-621)
Stocking Site Monitoring

2,245 eels captured since 2012 (1,613 PIT tagged)
Length-frequency of all eels

- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
Conserving the Nature of the Northeast

Length-frequency of all eels

- 2012
- 2013
- 2014
- 2015
- 2016
- 2017

Total Length (mm) vs. # of eels
Length-frequency of all eels
Length-frequency of all eels

Largest eel so far, 805 mm in 2017

- Conserving the Nature of the Northeast

Length-frequency of all eels

- Total Length (mm)

- # of eels

- 2012
- 2013
- 2014
- 2015
- 2016
- 2017
Sexual Differentiation - Females

Ovaries
Male/Female or Silver & Yellow Male
Tagging and Growth

• 1,613 eels tagged since 2012
  – 150 individuals recaptured
  – 11 of those 3x, 2 of them 4x, and 1 5x
### Male vs female growth rates

<table>
<thead>
<tr>
<th>Sex</th>
<th>N</th>
<th>GR Avg (mm/yr; ±SD)</th>
<th>GR Min</th>
<th>GR Max</th>
</tr>
</thead>
<tbody>
<tr>
<td>M</td>
<td>24</td>
<td>28.1 (±7.8)</td>
<td>11.3</td>
<td>41.8</td>
</tr>
<tr>
<td>F</td>
<td>25</td>
<td>77.0 (±20.7)</td>
<td>47.7</td>
<td>116.7</td>
</tr>
<tr>
<td>Unidentified</td>
<td>112</td>
<td>40.6 (±19.2)</td>
<td>2.1</td>
<td>102.7</td>
</tr>
</tbody>
</table>
Male vs Female lengths over time
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Growth Rate (mm/yr)

TL at tagging

Unknown Sex

Male

Female
Conclusions/Discussion

• Stocked eels are surviving, growing well, and slowly distributing throughout the Buffalo Creek watershed

• Female growth much higher than males
  – Larger prey base?
  – “New” environment leading to reduced competition?
  – Still relatively early, trend may change in coming years

• Males are entering silver phase earlier
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Questions?