Smallmouth Bass Population Update for the South Branch of the Potomac River

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Update Coverage:

- Abundance
- Size Structure
- Condition
- Mortality Trends
- Angler Utility
- Environmental Investigations
Abundance - Young of Year:

Catch Rates of YOY SMB by Year, South Branch River

Year

CPUE


0  10  20  30  40  50  60
Abundance - Young of Year:

FLOW, and the role that it plays in recruitment success

\[ p = 0.095, \quad R^2 = 0.233 \]
Abundance - Young of Year:

FLOW, and the role that it plays in recruitment success.
Abundance Quality-sized (≥ 11”):

**Catch Rates of Quality-sized SMB by Year, South Branch River**

![Graph showing catch rates of Quality-sized SMB by year, South Branch River. The graph displays data points for the years 2005 to 2018, with a trend line indicating an increase in CPUE (Catch Per Unit Effort).](image-url)
Condition (weight compared to length):

![Wr Regressions 2005 - 2018](chart)

- 2005: mean = 88.6, slope = -0.061
- 2006: mean = 87.0, slope = -0.068
- 2008: mean = 89.8, slope = -0.060
- 2009: mean = 88.1, slope = -0.042
- 2010: mean = 87.9, slope = -0.014
- 2011: mean = 91.6, slope = -0.043
- 2012: mean = 87.8, slope = -0.012
- 2013: mean = 85.4, slope = -0.031
- 2014: mean = 86.5, slope = -0.048
- 2015: mean = 86.4, slope = -0.023
- 2016: mean = 86.8, slope = -0.028
- 2017: mean = 89.0, slope = -0.026
- 2018: mean = 91.6, slope = -0.027
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Mortality Trends ('05 – ’17)

Catch-Curve for SBR SMB 2005-2017

Annual Mortality from ages 2-3 = 85%
Mortality Trends (‘05 – ’17)

Catch-Curve for SBR SMB 2005-2017

Annual Mortality from ages 2-3 = 85%
Where do they go?

• They?
  • Fish aging from 2 – 3 years old are, on average, growing from 9” to 11”

• Harvest?
  • Extremely unlikely. Angler reward tag return indicates
  • Only 10% of anglers reported harvesting fish
  • Only 8.5% (of 2,765 tagged fish) were returned!
    • Likely because another factor is removing fish from the population
  • Lack of visual evidence of any harvest at this magnitude
Where do they go?

• Emigration? Moving out of the system to the Potomac?
  • Conversations with Maryland DNR seem to suggest that mortality curves look similar to what we see
  • It is unlikely that movement of fish out of the SBR is enhancing quantities of age 3 fish in the Potomac

• Post-release mortality?
  • Although angler harvest isn’t high, efforts and catch rates often ARE!
  • Very high usage from small watercraft anglers
  • Any given fish throughout the South Branch has a comparatively high likelihood of being caught in a season
Fish Health? Most depressed in our adult fish.

- Smallmouth mature at about age 2, or 8” in length

<table>
<thead>
<tr>
<th>Indicator of Health</th>
<th>P-value for tests</th>
<th>Life stage with Greatest severity</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Golden Redhorse</strong></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Body erosions</td>
<td>&lt; 0.001</td>
<td>Adult</td>
</tr>
<tr>
<td>Body raised lesions</td>
<td>0.764</td>
<td>-</td>
</tr>
<tr>
<td>Body parasites</td>
<td>&lt; 0.001</td>
<td>Adult</td>
</tr>
<tr>
<td>Dermal healing</td>
<td>&lt; 0.001</td>
<td>Adult</td>
</tr>
</tbody>
</table>

| **Smallmouth Bass** |                   |                                  |
| Gill lamellae margination | < 0.001 | Adult                           |
| Gill lamellae fraying    | < 0.001 | Adult                           |
| Gill lamellae erosion    | < 0.001 | Adult                           |
| Pale gill lamellae      | 0.255   | -                                |
| Gill Parasites          | 0.013   | Adult                           |
Fish Health?

- Spawning effort is a very stressful natural process that likely compounds effects from other stressors
  - Historic fish kills during or directly after spawning time frames
  - Landscape runoff and inputs of nutrients, pesticides, and wastewater during spring flows?
  - Effects of nutrient and degrading streamside habitats on Bluegreen Algae growth, water quality and habitat?

- Peak dermal erosions in the summer months, many colonized by pathogens (bacteria) considered to be harmless to healthy fish
  - Smallmouth Bass largely considered immune system compromised at this time

- Very low prevalence of LMBv
  - None of our “sick” fish that we have necropsied have come back positive
WV DNR Bluegreen Algae Toxin Study

- Electrofished and sacrificed Smallmouth from 2014 – 2017 during all seasons
- Analyzed DIETS and LIVERS for liver toxin (Microcystins and Nodularin)
- About a 71% chance of having low levels of liver toxin in diets
- About a 31% chance of having low levels of liver toxin in liver
- Interested in what other BGA compounds they could be frequently contacting
  - Known and unknown compounds that could compromise the immune system
BGA Liver Toxins in Tissues Positively Correlated with Flow

- Mean Diet Conc. $R^2 = 0.423; p < 0.01$
- Mean Liver Conc. $R^2 = 0.213; p < 0.05$
BGA Liver Toxins in Tissues Positively Correlated with Turbidity
Conclusions?

• Angler perception has been VARIED!
  • Very difficult fishing conditions, a lot of available food, and more flow filling out habitats

• Cautiously observant, but not alarmed

• Reasonable numbers of quality-sized fish

• Poor numbers of smaller fish, but high rate of mortality prior to quality-size either way

• Very good individual bass condition right now. Should positively influence:
  • Growth
  • Survival
  • Length + Weight

• We are seeing really good numbers of 2019 spawned fish in all WV waters to the Potomac this summer