Effects of climate change on winter flounder and its impacts on fisheries in Narragansett Bay

Fall 2017 RIMFI Update
Project Goals

I. Collect larval winter flounder to evaluate spawning habitat and productivity
   ➢ 2016 & 2017 surveys

II. Identify mortality bottleneck(s) in the life cycle and their potential causes
2016 & 2017 Ichthyoplankton Survey

• Weekly sampling
  • 2016: March 1\textsuperscript{st} – April 20\textsuperscript{th}
  • 2017: February 22\textsuperscript{nd}-April 5\textsuperscript{th}

• Identified all larval fish
  • Winter flounder measured
2016 Species Collected

1. Sand lance- 31,778 (92.26%)
2. **Winter flounder**- 1,845 (5.36%)
3. Grubby- 581 (1.69%)
4. Atlantic herring- 118 (0.34%)
5. **Atlantic cod**- 74 (0.21%)
6. Menhaden- 20 (0.06%)
7. Rock gunnel- 18 (0.05%)
8. **Summer flounder**- 7 (0.02%)
9. Fourspot flounder- 2 (0.01%)

*Bold* = recreational importance
Spawning appears to occur in the Providence River, Greenwich Bay, and the Sakonnet River.
2016 Summary

• Spawning occurred from late-January to early-March
  • Coldest portion of the year

• Larval density decreased 20x from the 2001-2008 average

• Spawning contracted toward the Northwest portion of the Bay
  • Greenwich Bay and the Providence River
Progress on 2017 Analysis

- Picking samples is almost completed, identification and counting will begin soon

- Far more winter flounder were captured

- Spawning appears to have lasted longer into the spring
  - In line with persistent cold water temperatures
Life Cycle Modeling Objective

Which transition best explains the pattern of population decline?

1979-2016

Spawners

Eggs

Larvae

Age-2 Spring

Age-1 Fall

June YOY

October YOY

Age-1 Spring

Spawners

Eggs

Larvae

Age-2 Spring

Age-1 Fall

June YOY

October YOY

Age-1 Spring

1979-2016

Spawners

Eggs

Larvae

Age-2 Spring

Age-1 Fall

June YOY

October YOY

Age-1 Spring

Which transition best explains the pattern of population decline?
Stage-specific Winter Flounder Abundance

- Larvae
- YOY June
- YOY October
- Age-1 Spring
- Age-1 Fall
- Age-2 Spring

Log(abundance) vs. Year class

Progress on life cycle modeling

• Modeling has begun, but results are not yet available

• Preliminary indications suggest larval survival may be highly important
  • Too soon to be sure
  • Stay tuned!
Questions?