Atlantic Salmon Restoration

An Ecological and Bioenergetics Approach

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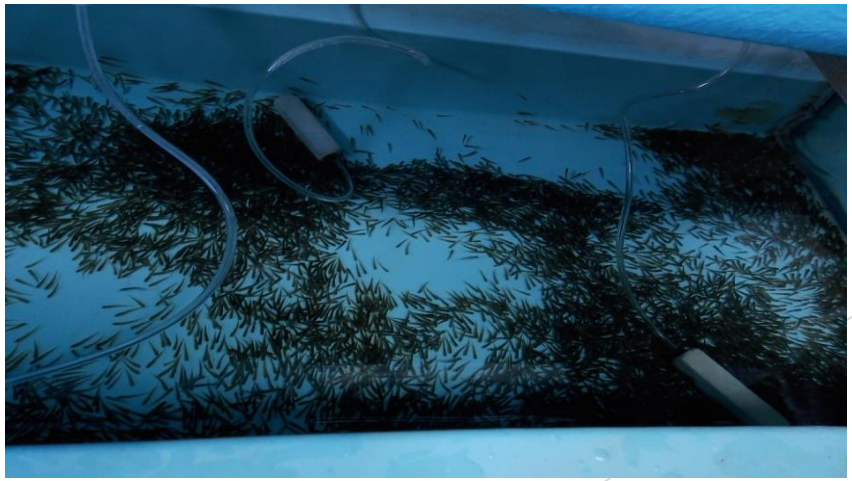
Fish Creek
Atlantic Salmon Club

Objective:

Restore Atlantic Salmon to Fish Creek Region

Presentation Outline

- Field study (Justin)
  - Objectives
  - Methods
  - Results
- Laboratory study (Chris)
  - Objectives
  - Methods
  - Desired outcomes

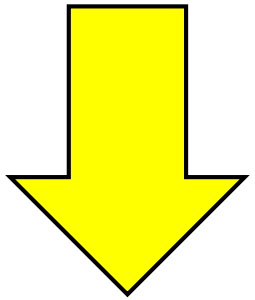


Field Objectives

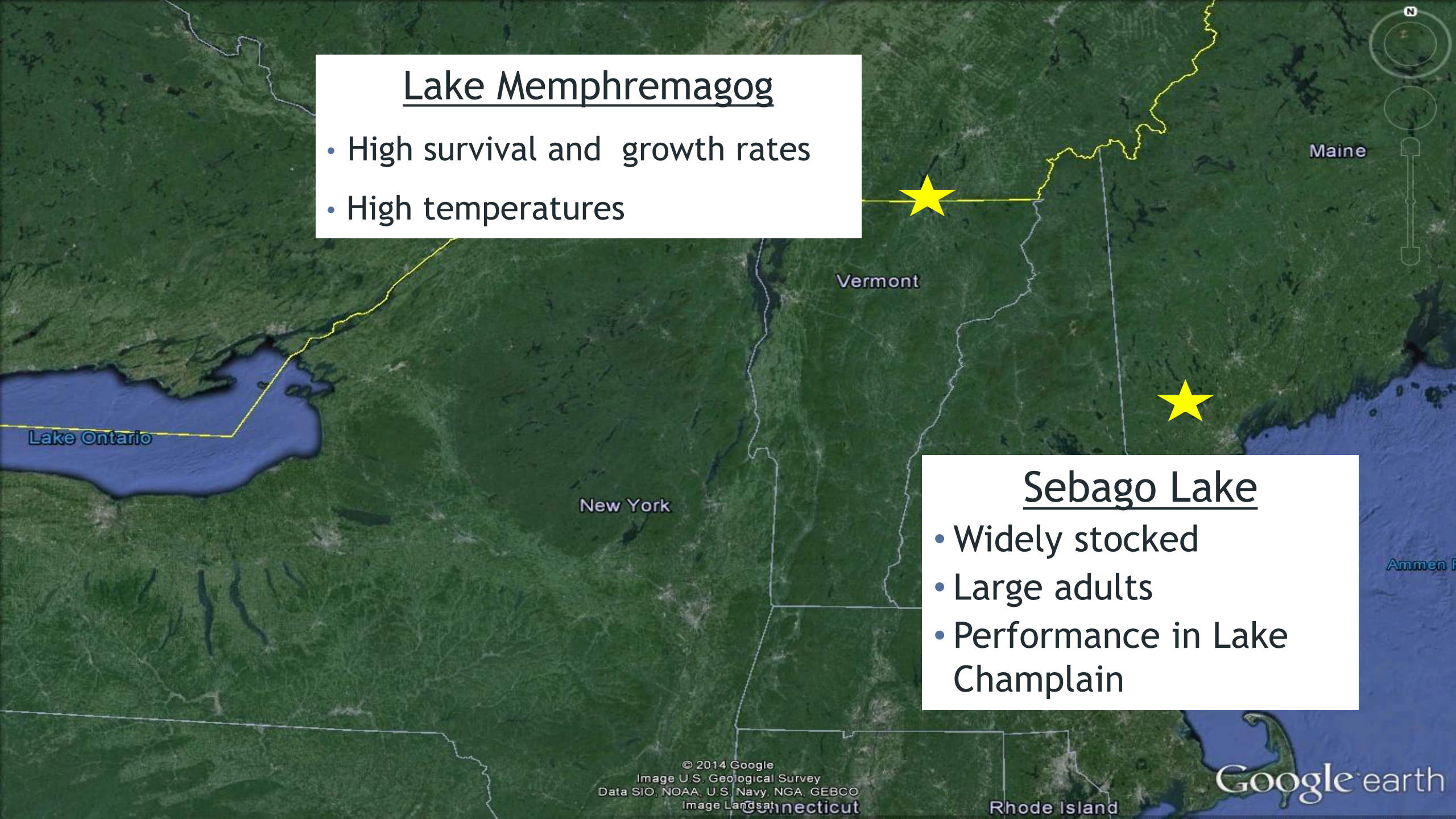
Assess fry/parr growth and survival

Evaluate stream habitat

Identify regions of interest for restoration



Identify candidate strain

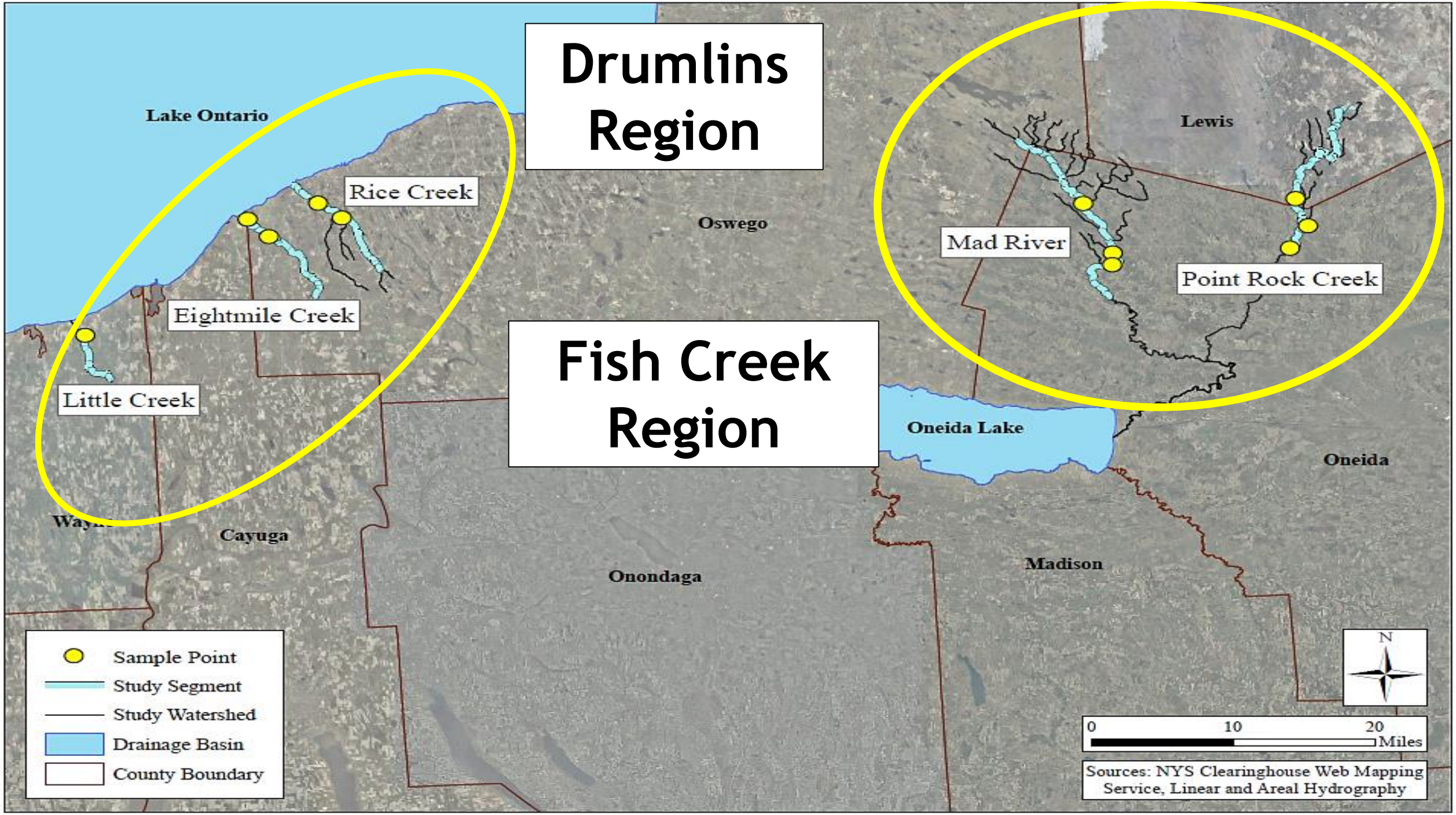


Lake Memphremagog

- High survival and growth rates
- High temperatures

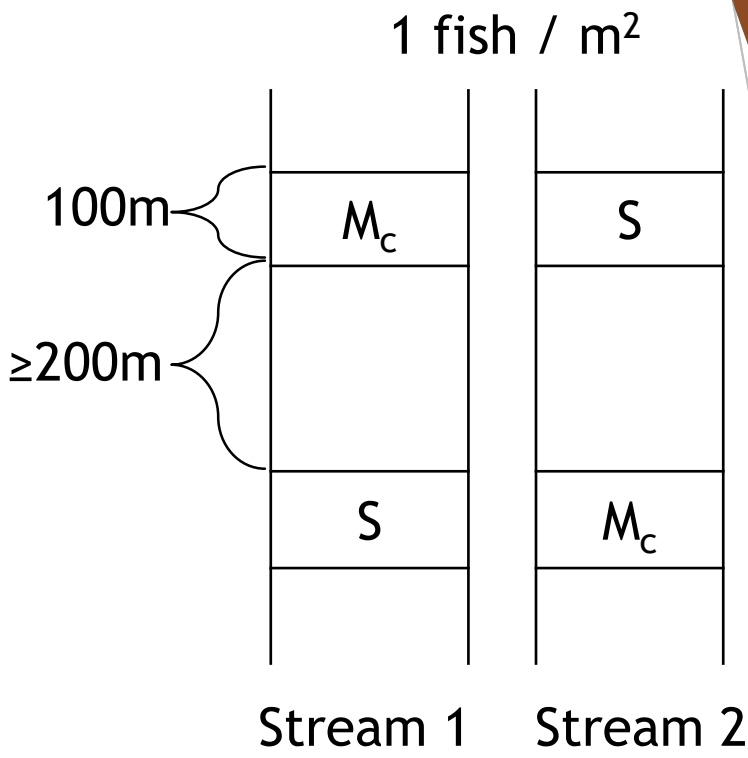
Sebago Lake

- Widely stocked
- Large adults
- Performance in Lake Champlain


Drumlins Region
Fish Creek Region
Lake Ontario
Rice Creek
Eightmile Creek
Little Creek
Oswego
Lewis
Mad River
Point Rock Creek
Oneida Lake
Oneida
Cayuga
Onondaga
Madison
Sample Point
Study Segment
Study Watershed
Drainage Basin
County Boundary
N
0
10
20
Miles
Sources: NYS Clearinghouse Web Mapping Service, Linear and Areal Hydrography

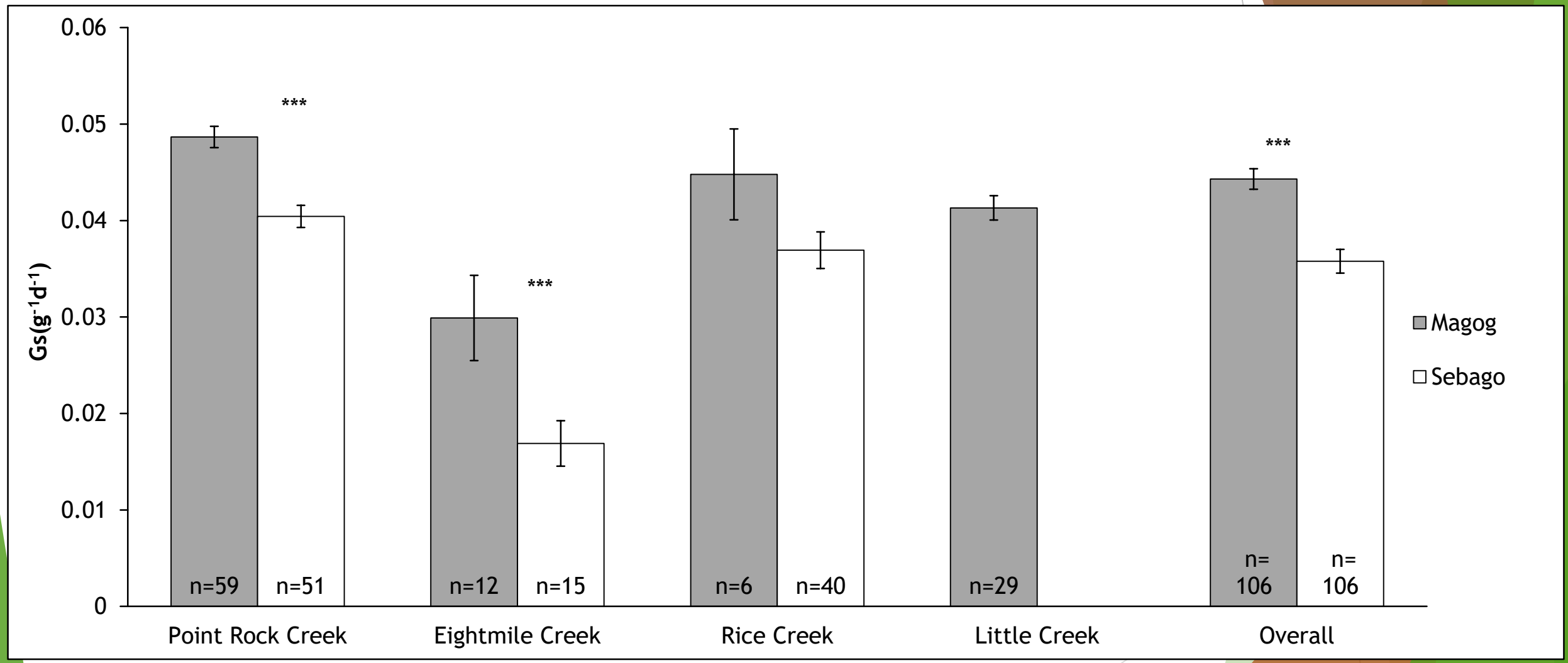
Field Study Design

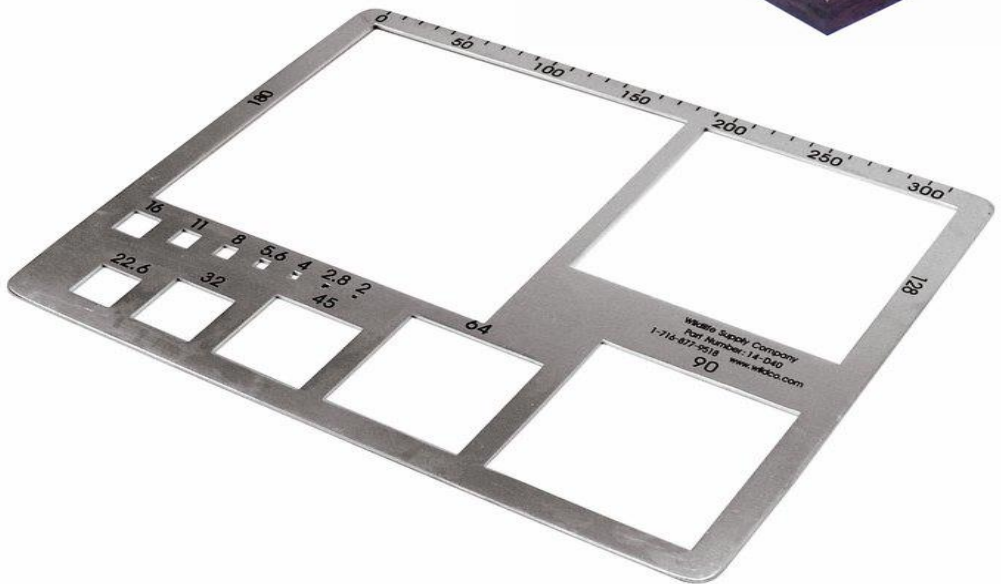
- Stock fish early-summer
  - Magogs clipped, Sebagos not
- Sample habitat
  - Substrate
  - Water temperature
  - Depth
  - Velocity
  - Water chemistry
- Sample fish late-summer

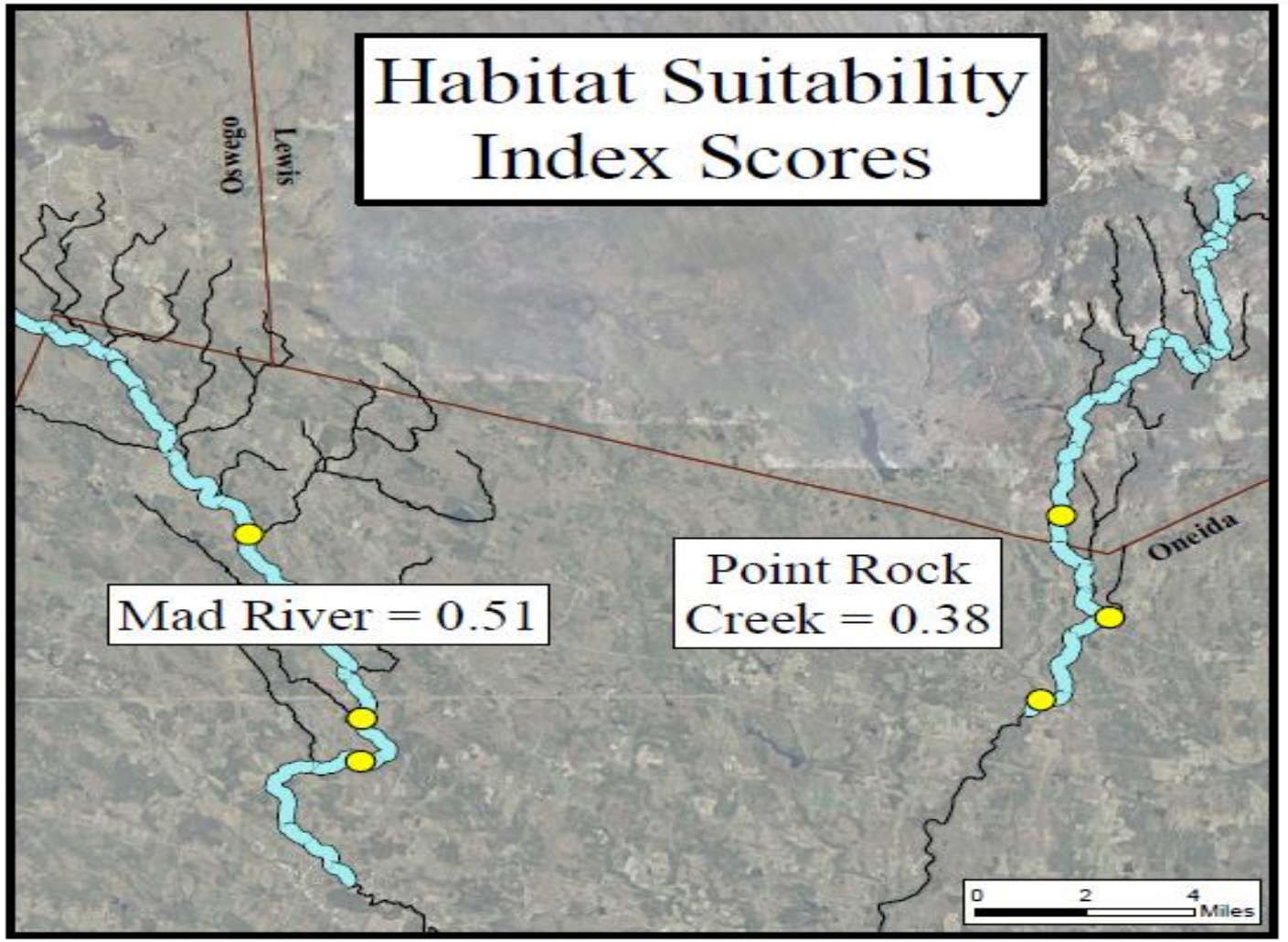


Electroshocking

Growth Rate (G_s)







Sample Point
Study Segment
Study Watershed
County Boundary

N

Sources: NYS Clearinghouse Web Mapping Service, Linear and Areal Hydrography, GPS Survey Points

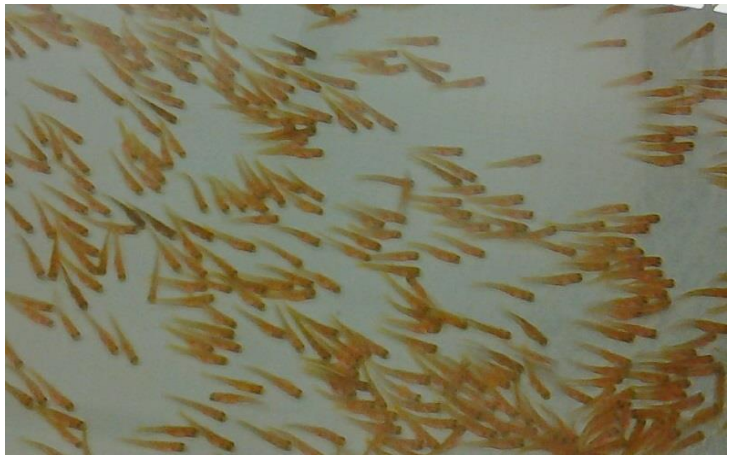
Score 0 - 1

Water Quality
Fry
Parr
Reproduction

HSI

Field Results

- Magog strain has higher growth rate potential
- Survival was similar between strains
  - High in Point Rock Creek, virtually zero in Mad River
- Fish Creek tributaries offer relatively suitable habitat
- Expand streams / study sites for 2015

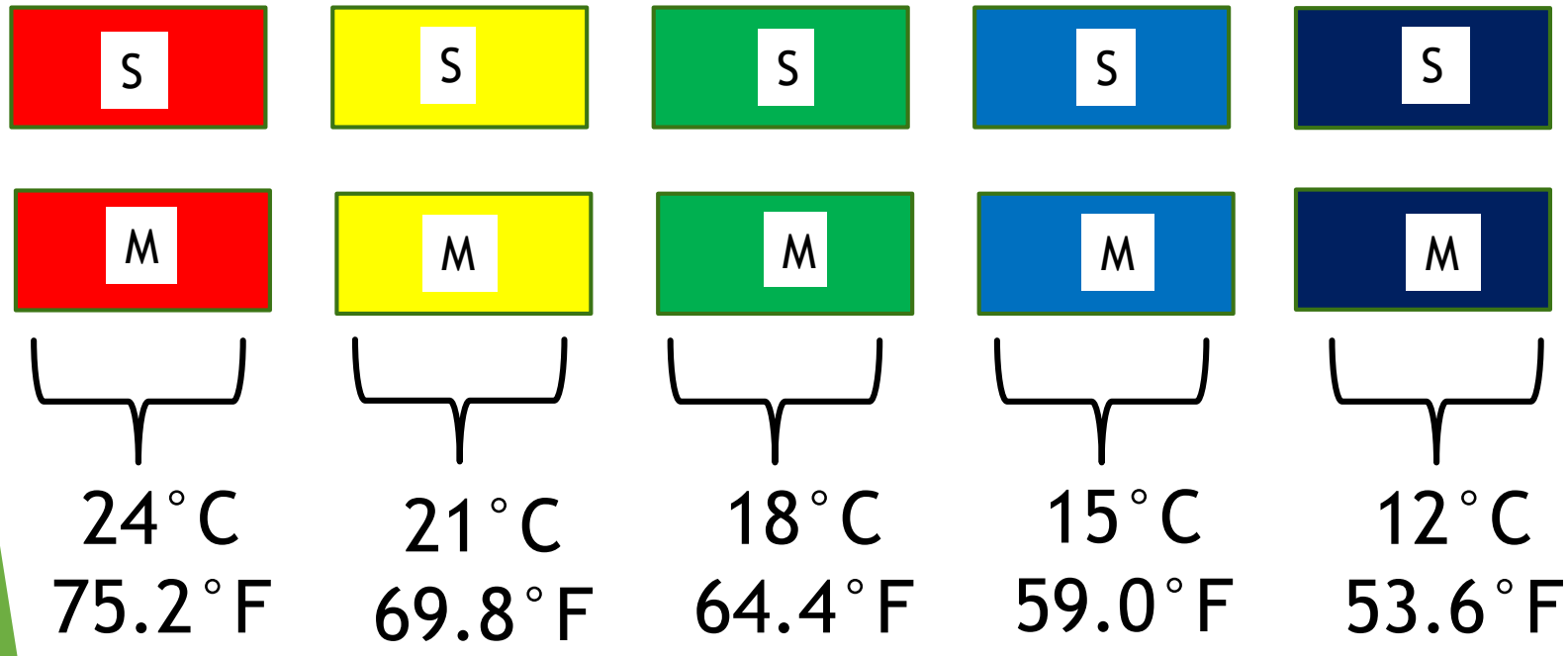


Laboratory & Modeling Objectives

- 1)Evaluate Physiological Differences between two Strains
- 2) Model Climate Change Impacts on Habitat Suitability

1) Evaluate Physiological Differences

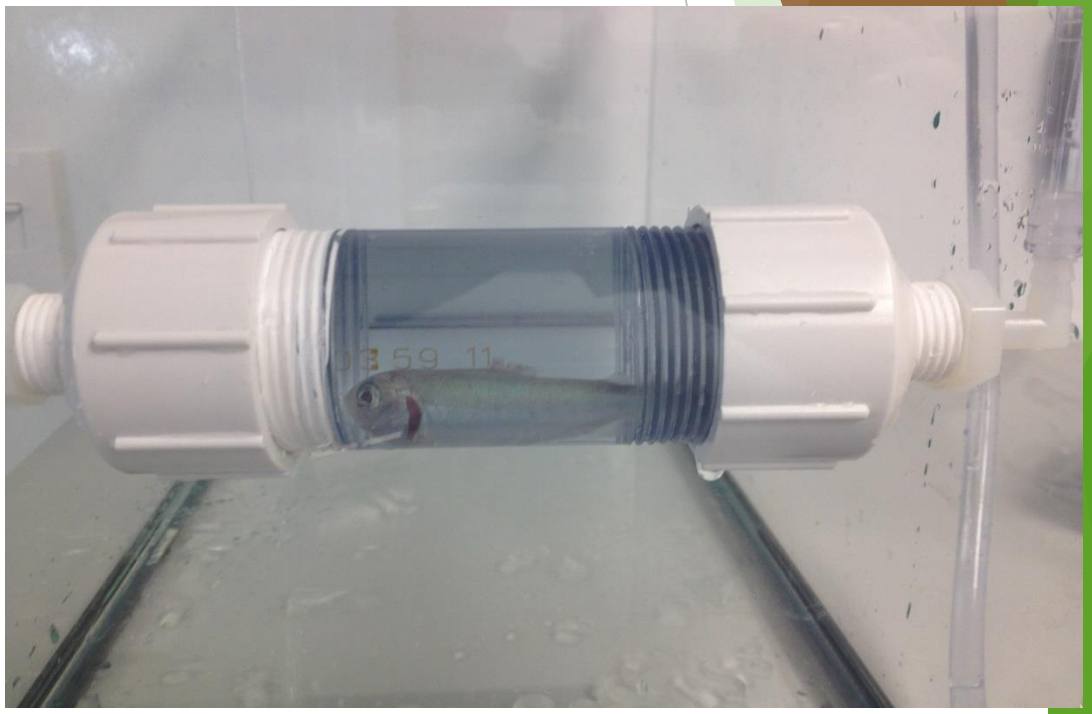
- Experimental Design:
  - 10 Glass Tanks = 2 Strains of Fish x 5 Temperatures



1) Evaluate Physiological Differences

- Growth, Food Consumption, Metabolism(Oxygen Consumption)
- Does one strain “outperform” the other at elevated temperatures?

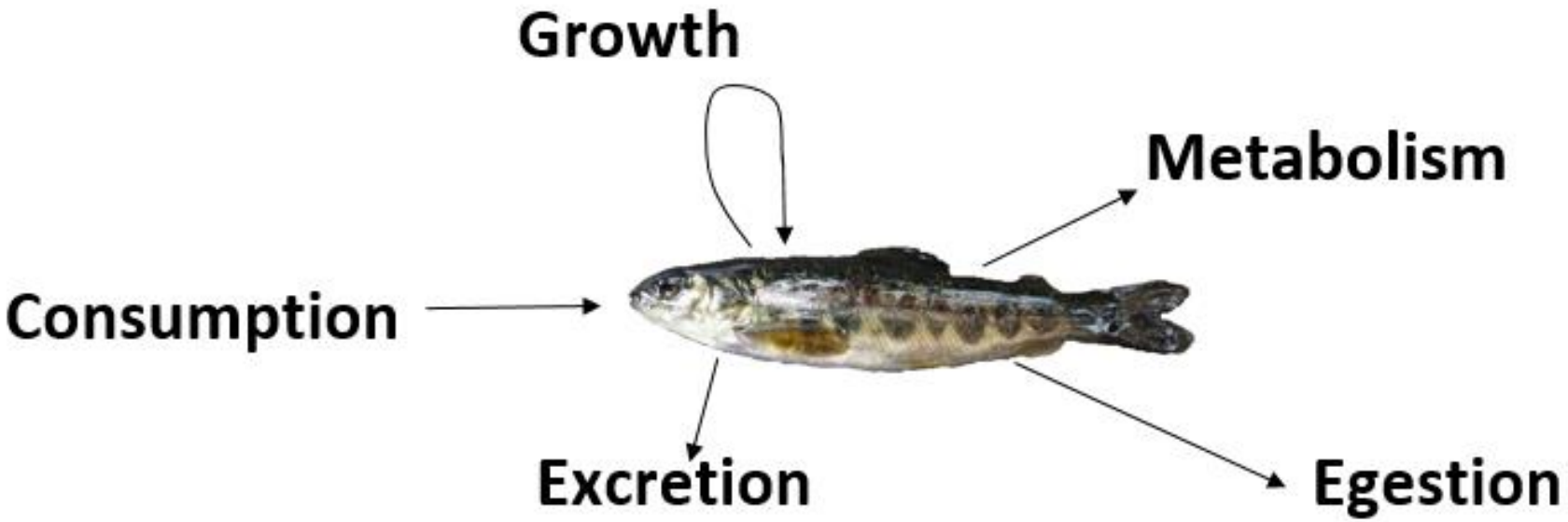
Calibrating the Oxygen Probes



Salmon in Respirometry Chamber

2) Model Climate Change Impacts

- How will climate change effect Habitat Suitability and Salmon?
- Bioenergetics Model



Field Study:
Foraging Model, Site Habitat Variables

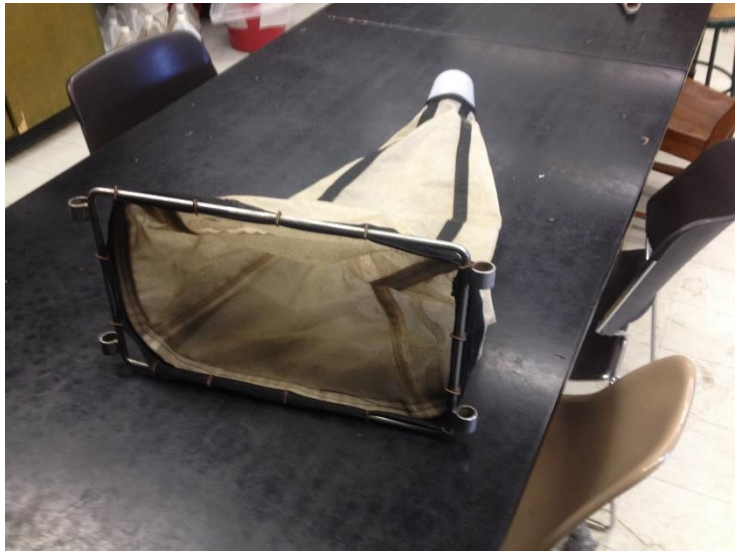
Growth = Consumption – (Metabolism + Waste Products)

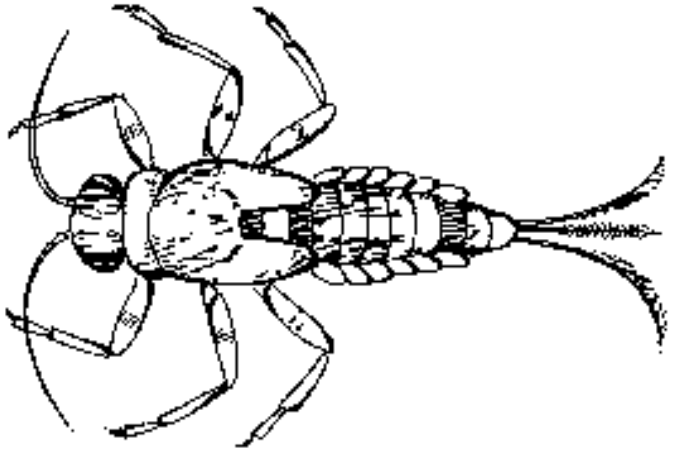
Laboratory Study:
Strain Specific Metabolism

Previous Studies:
Equations from earlier Researchers

2) Model Climate Change Impacts

- Calculate Consumption using observed Flow Rates, Insect Drift





- Use observed field data to calculate predicted Growth, a metric for Habitat Quality

-Climate Change Predictions:
Alter: 1) Temperatures
2) Flow Rates
3) Insect Drift

-Stream/Regional Differences?

Summary

- Laboratory experiments = Strain Suitability
- Bioenergetics/Foraging Model = Climate Change Impacts
- Combined Outcomes =
  - Identify sites most suitable for continued stocking and potential habitat restoration efforts.
  - Determine whether stocking additional strains should be pursued.

Any Salmon Encounters?

- Statewide Regulation = 15 inch minimum size
- Send us your Oneida Lake salmon and trout photos
- Contact: **cdpowers@syr.edu** or **jadirado@syr.edu**

Adult Atlantic Salmon Caught & Released by an angler on the W. Branch of Fish Creek

Acknowledgements

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