Sturgeon of the Penobscot and the Gulf of Maine

Gayle Zydlewski

1865 THE UNIVERSITY OF MAINE
School of MARINE SCIENCES

All photos take pursuant to ESA permit #1595

Collaborative effort:

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Joe Zydlewski

Stephen Fernandes

Phillip Dionne

Kevin Lachapelle

Theresa McGovern

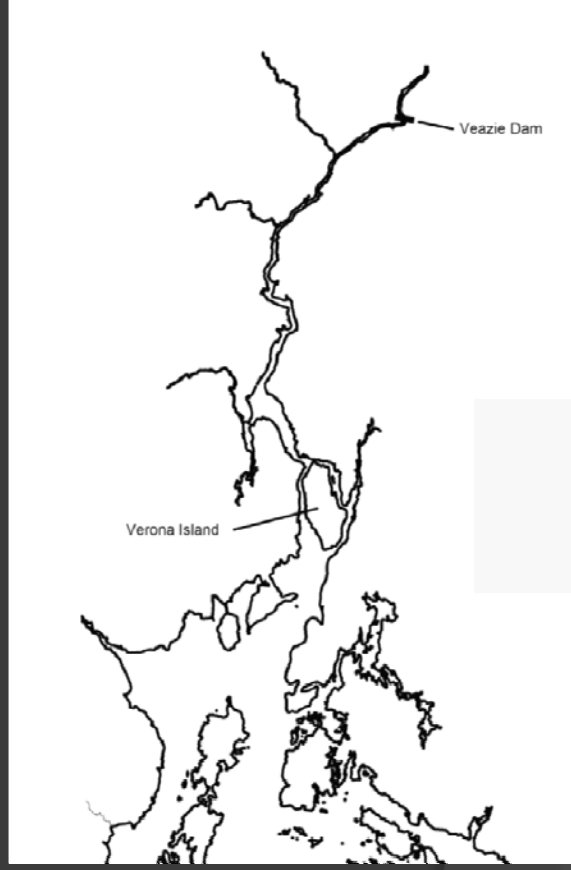
Christine Lipsky

James Hawkes

Gail Wippelhauser

Research started in 2006: Objectives focused on the Penobscot

- Confirm presence of shortnose sturgeon
- Identify critical habitat
- **Estimate abundance**



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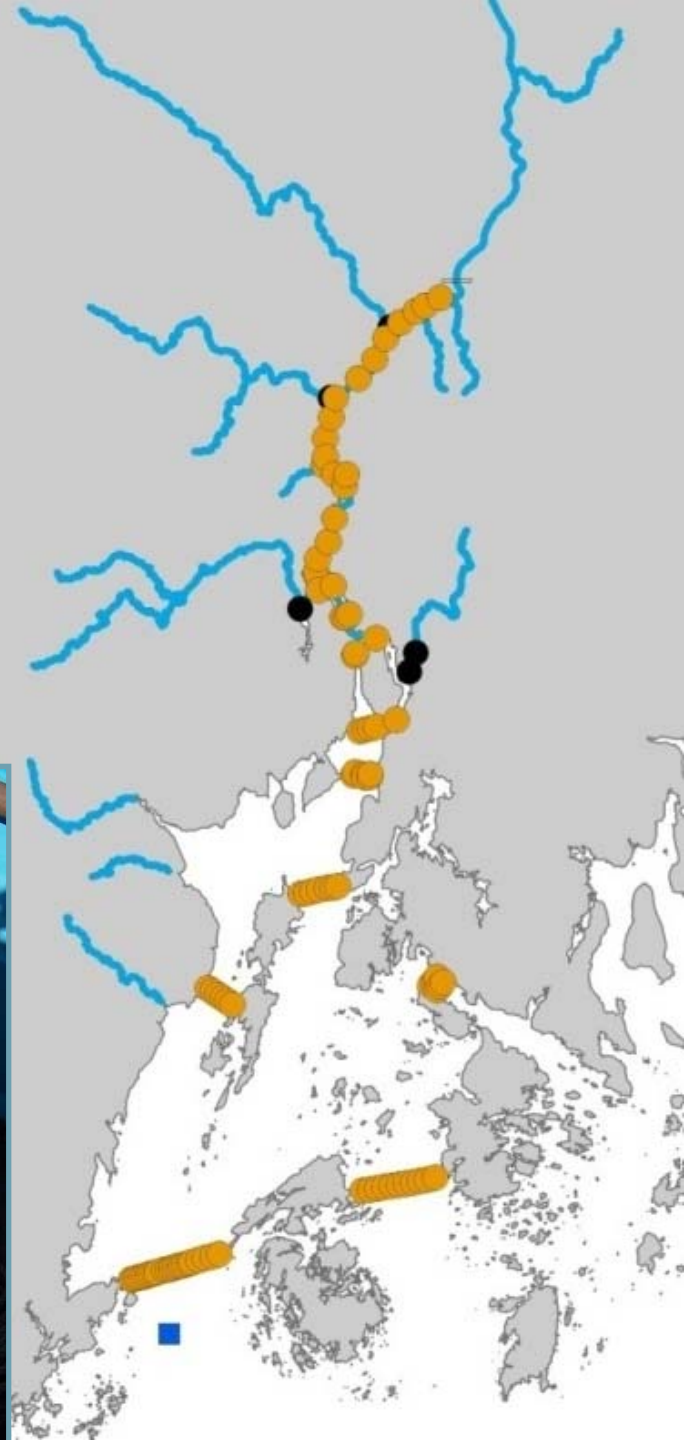
Current research objectives

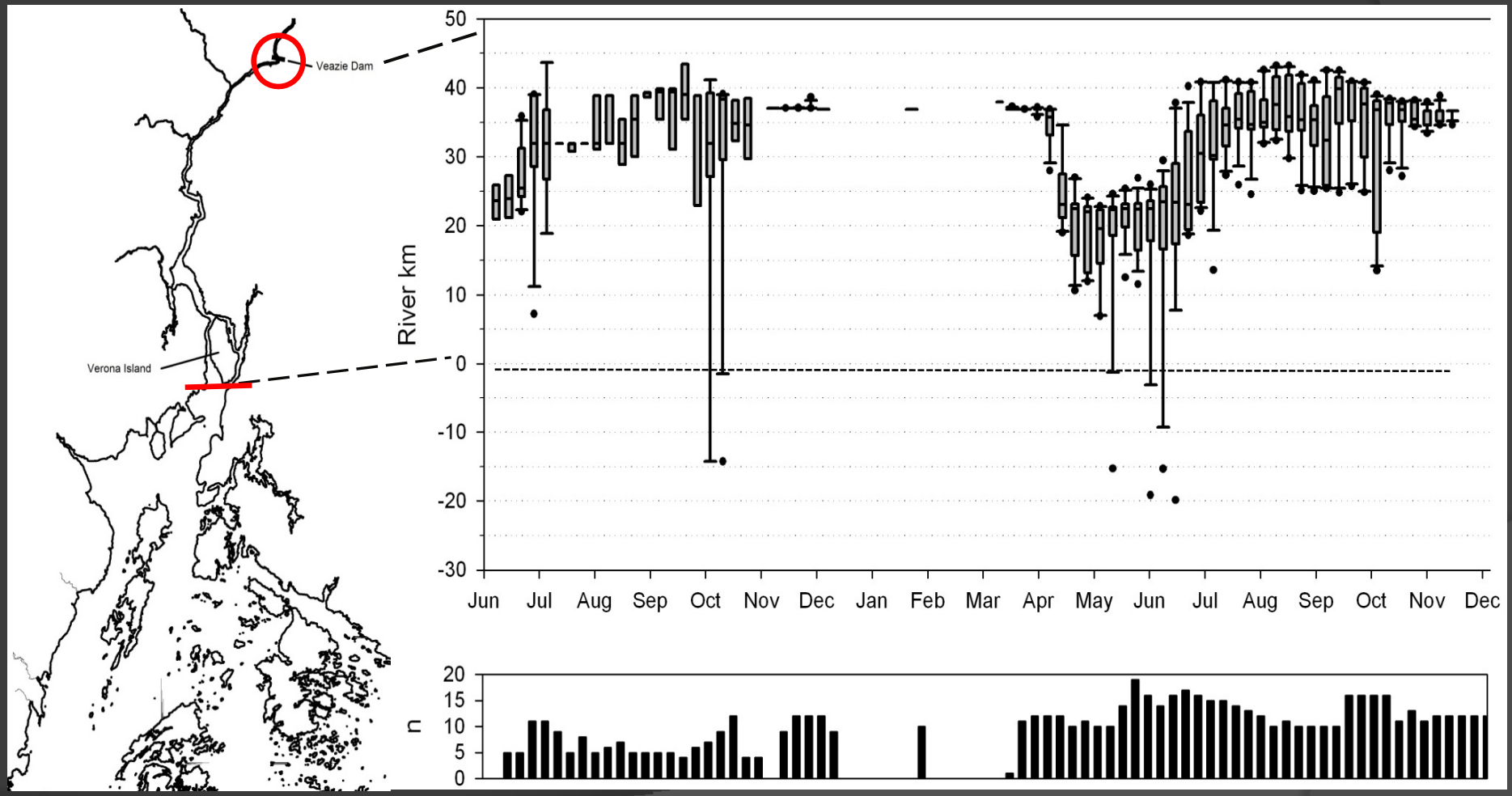
- Shortnose sturgeon
  1. Refine a population model and sampling design for Gulf of Maine shortnose sturgeon
  2. Use non-invasive techniques to estimate aggregations
  3. Document spawning in the Penobscot River

- Atlantic sturgeon
  - Document habitat use of the Penobscot River
  - Document wintering habitat (marine)

Methods

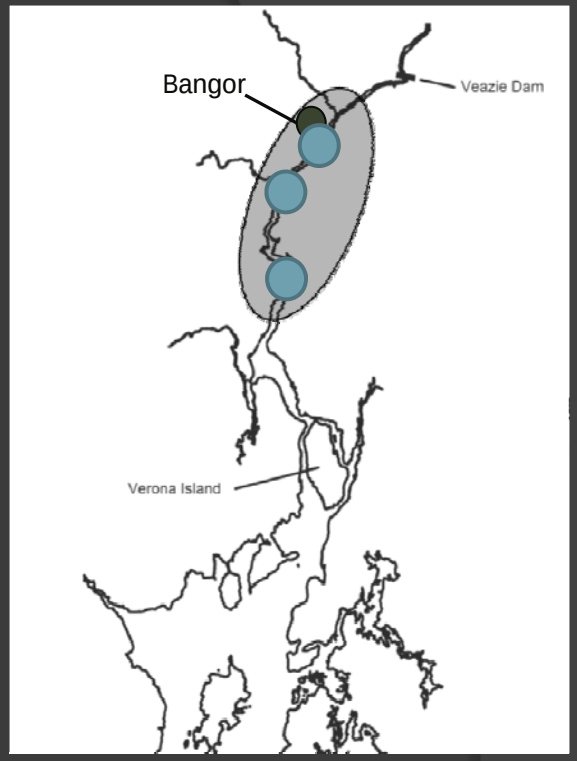


Movement: Shortnose sturgeon
2006-2007



Fernandes et al. 2008 *in press*

Annual Movement Pattern



Winter

upper estuary (aggregation)

downstream

lower estuary

Spring

upstream

middle estuary

Summer

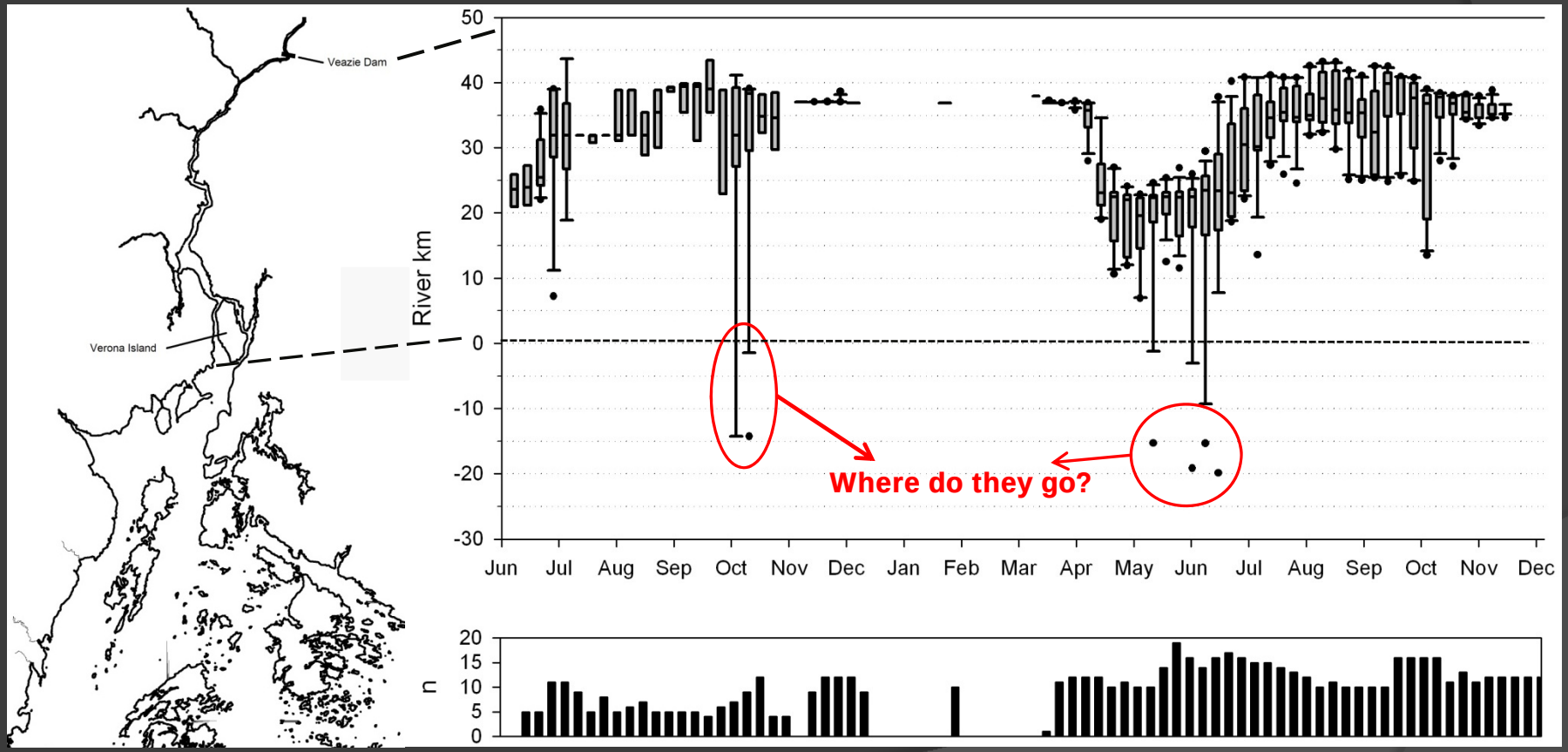
upstream

upper estuary

Fall

Movement–implications for population model

2006-2007…1. Refine a population model



Fernandes et al. 2008 *in press*

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DEPARTMENT OF Marine Resources STATE OF MAINE

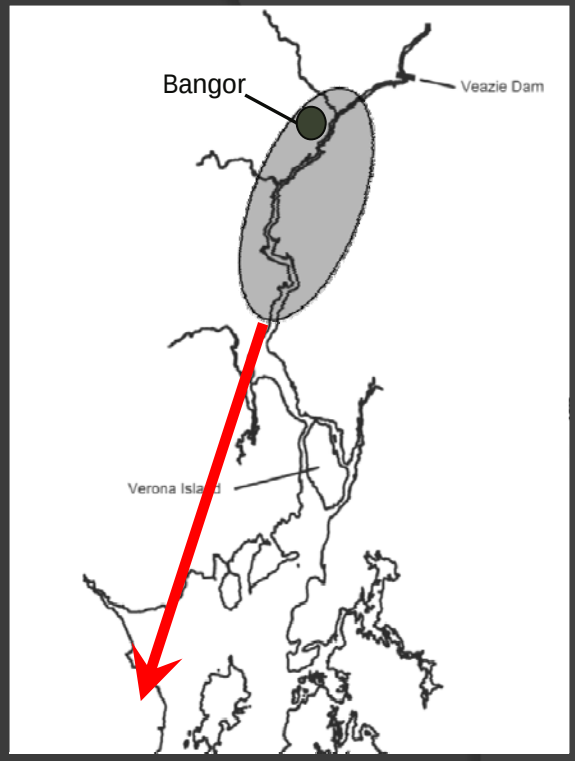
Penobscot River Array
Coastal River Array
Kennebec River Array
GoMOOS Array
New England Historic Salmon Rivers

N
W
E
S

0 5 10 20 30 40 Kilometers

Tara Trinko, NOAA

Annual Movement Pattern



Winter

upper estuary (aggregation)

downstream

Spring

lower estuary

upstream

Immigration / Emigration

middle estuary

upstream

Fall

upper estuary

Immigration / Emigration

Summer

Abundance Estimate:
Robust Design

- Seasonal estimates survival, capture probability, abundance, ***and*** *site fidelity*

- Allows for grouping of multiple sampling events under a primary sampling session

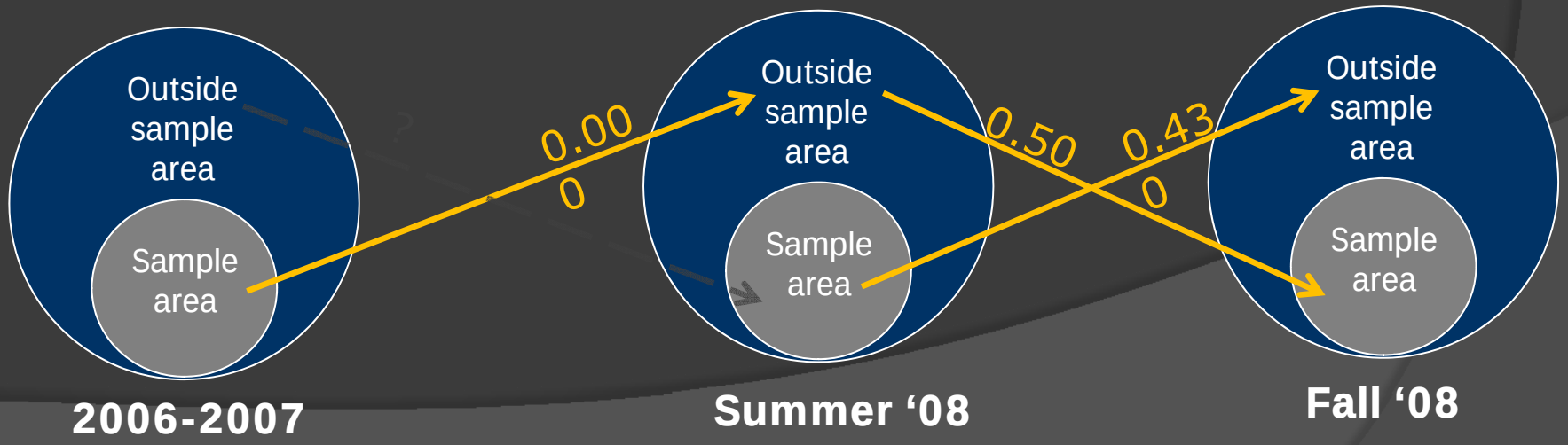
Preliminary Results

Sample Period	Survival (S)	SE	Capture/ Recapture (p)	SE
(1) 2006-2007	1.000	2.08E-05	0.0037241	9.77E-04
(2) Summer 2008	1.000	2.08E-05	0.0030632	0.0011553
(3) Fall 2008	1.000	2.08E-05	0.0128449	0.0025489

Sample Period	Emigration (γ'')	SE	Immigration (1-γ')	SE	Abundance (N)	SE
(1) 2006-2007	~	~	~	~	*906*	226
(2) Summer 2008	1.56E-09	1.11E-04	~	~	*1739*	676
(3) Fall 2008	2.84E-11	1.05E-05	0.4297026	4.53E-05	*1007*	214

Compared Estimates

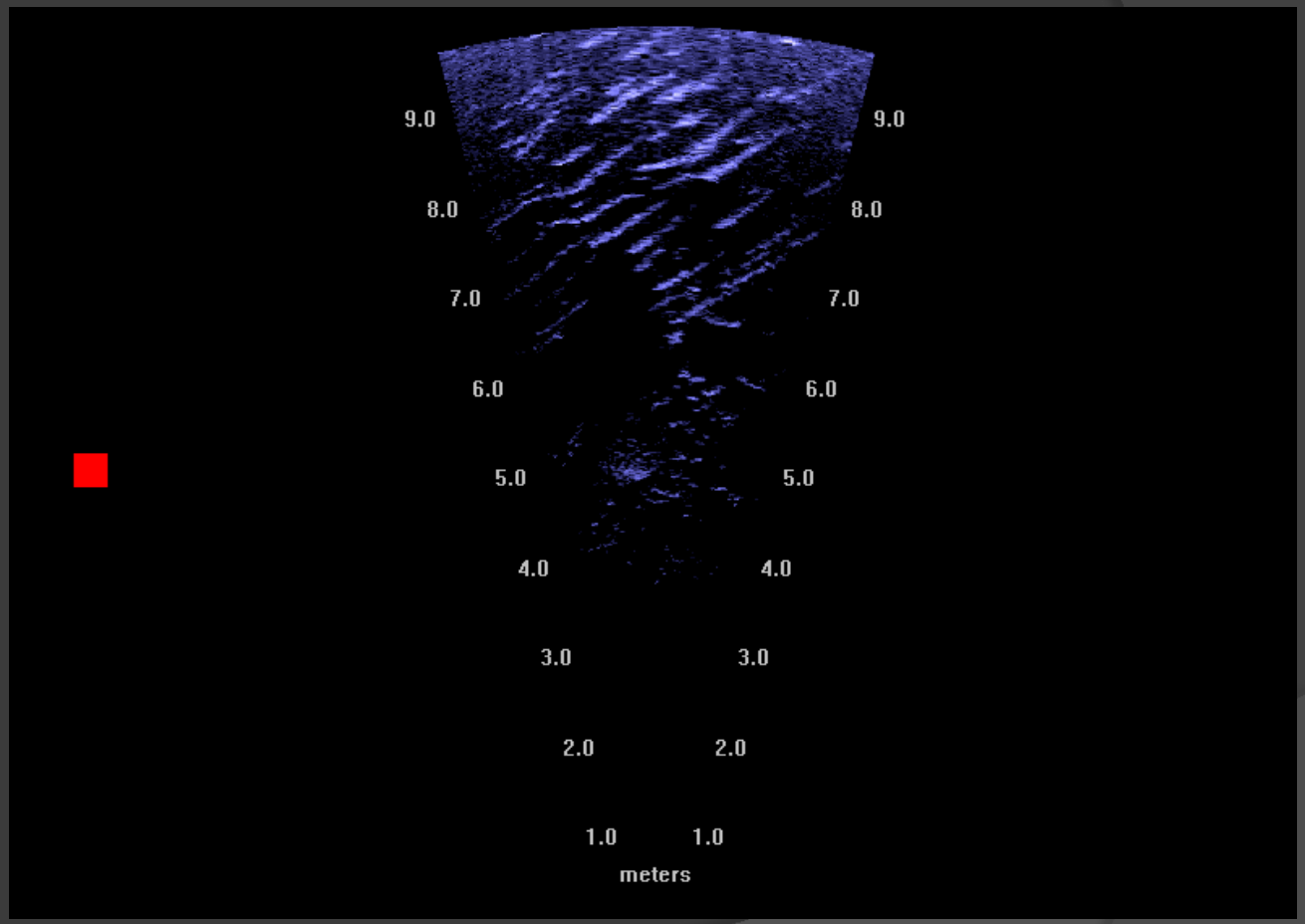
Sample Period	Emigration (γ'')	(Observed) Emigration (γ'')	Immigration (1-γ')	(Observed) Immigration (1-γ')	Abundance (N)	SE	Abundance (N)	SE
(2) Summer 2008	1.56E-09	0.000	~	~	1739	676	1739	676
(3) Fall 2008	2.84E-11	0.423	0.430	0.5	1007	214	667	140



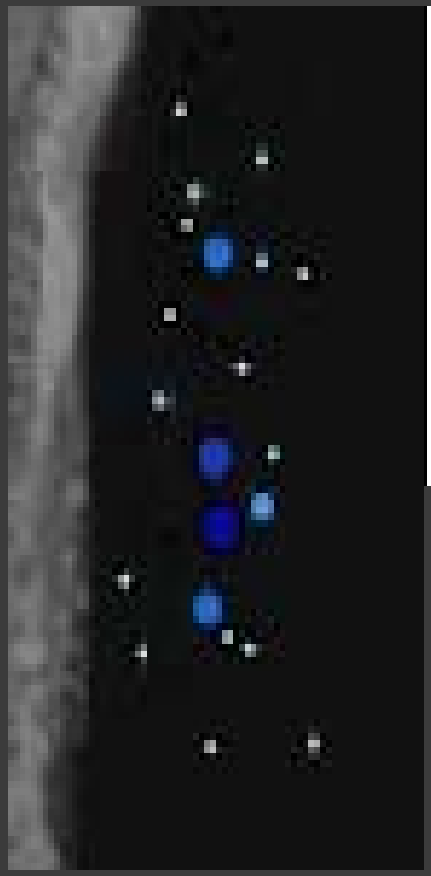
Another opportunity to estimate abundance…2. non-invasive technique

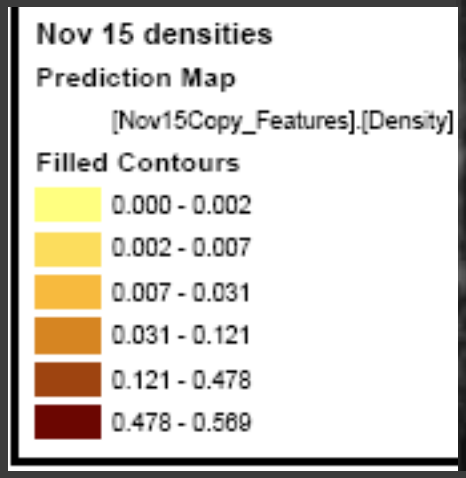

Québec
Montréal
Maine
Vermont
New Hampshire
Google

DIDSON



Analysis: Nov 15





Predicted 378 fish

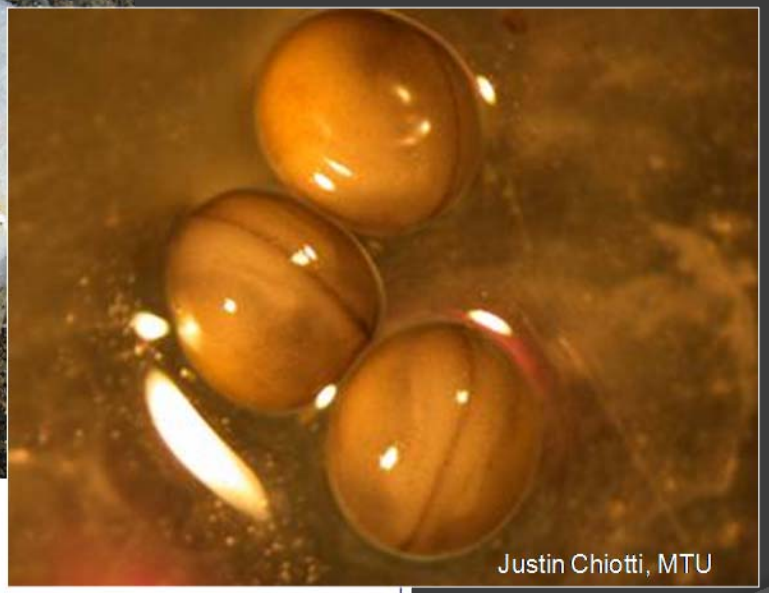
Water Temp 6.67 C

Abundance Estimate

- Nov 15: 378
- Nov 17: 372
- Nov 21: 758
- Average: 503 ± 242
- Previous Estimates:

667 fall residents

3. Documenting Spawning



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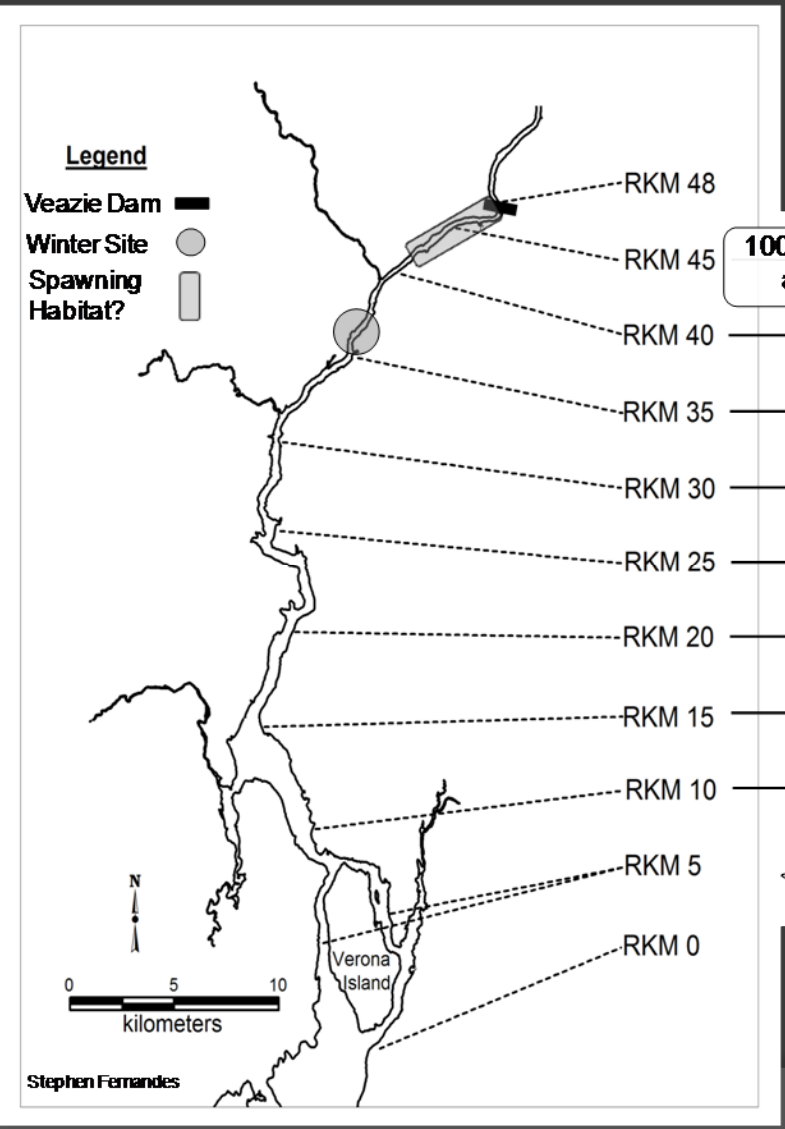
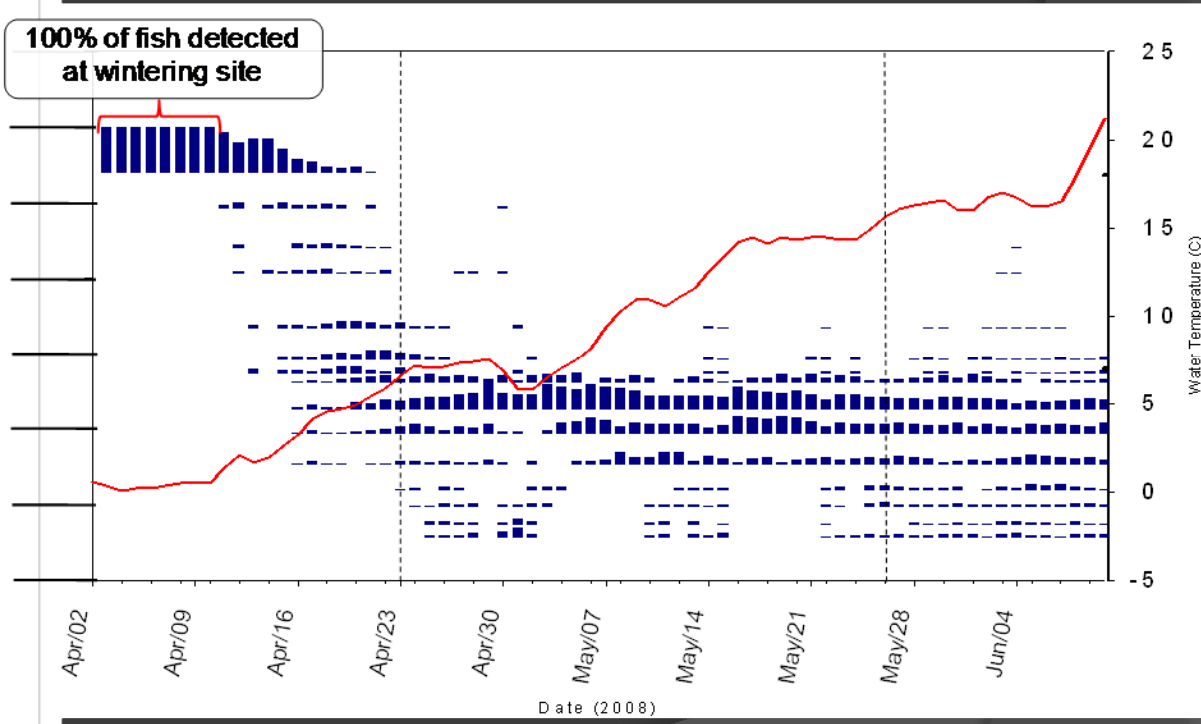
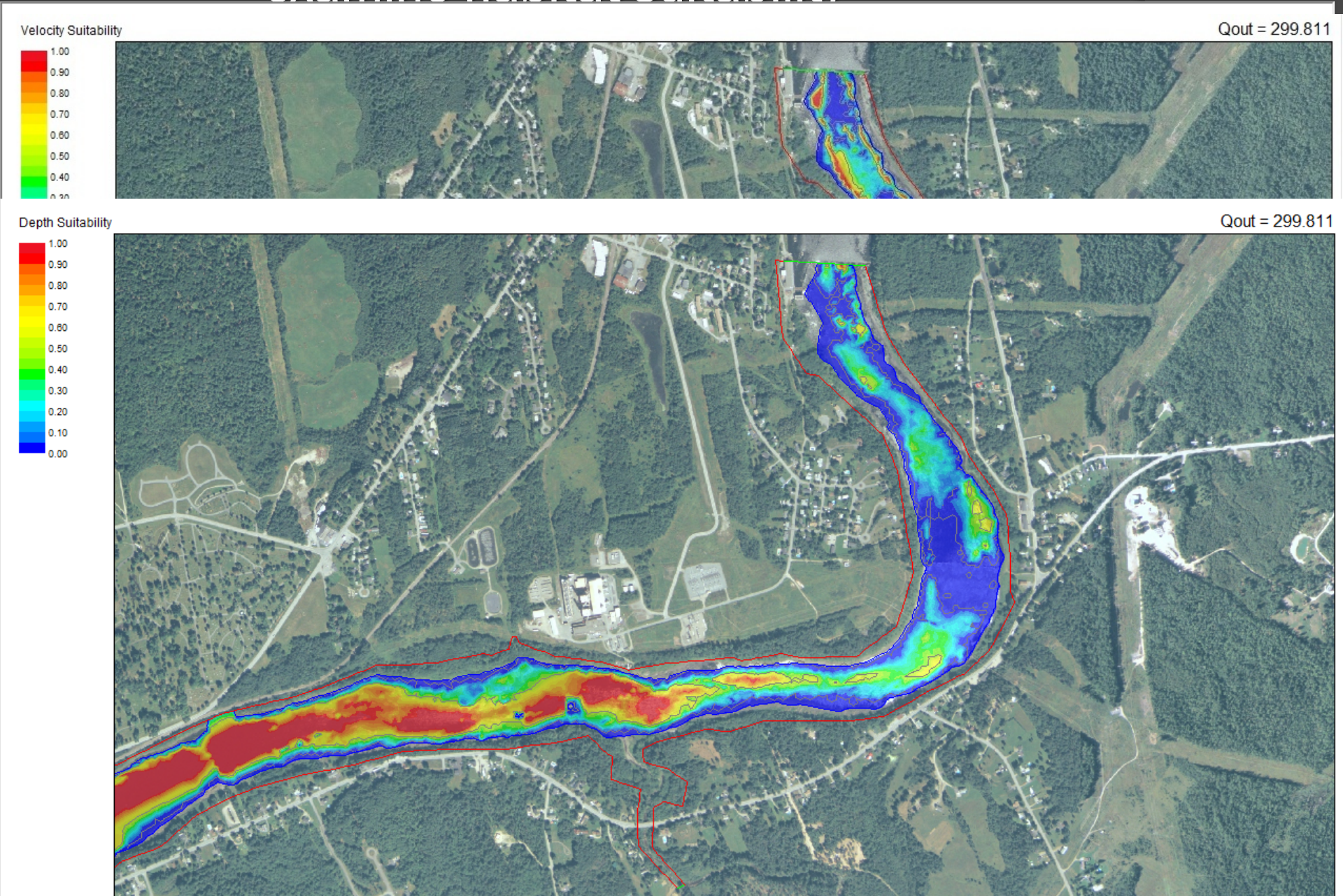
Movement out of the winter site





Using a 2D bathymetric-based model to examine habitat suitability



What about Atlantic sturgeon?

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Winter

(aggregation)

ream

Fall

downstream

Spring

upstream

upstream

Middle Estuary

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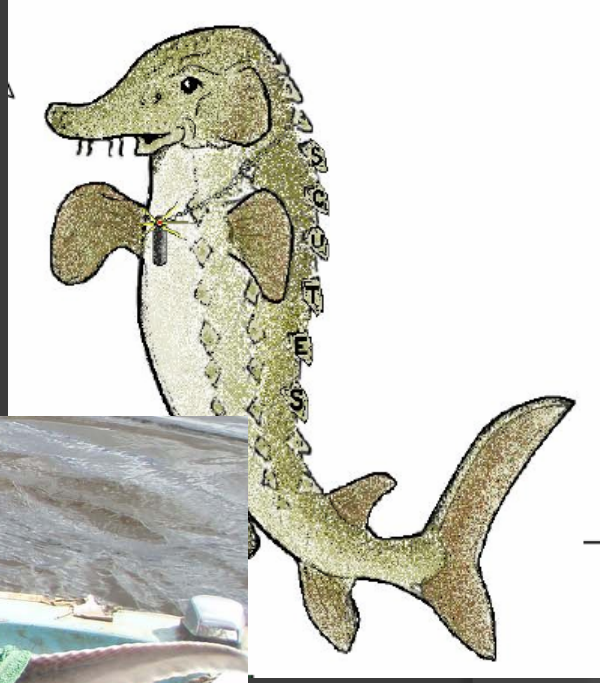
SCUTES program

Students Collaborating to Undertake Tracking Efforts for Sturgeon



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NOAA National Oceanic and Atmospheric Administration U.S. Department of Commerce

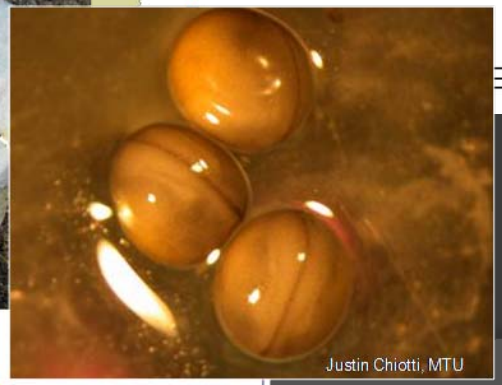
USGS

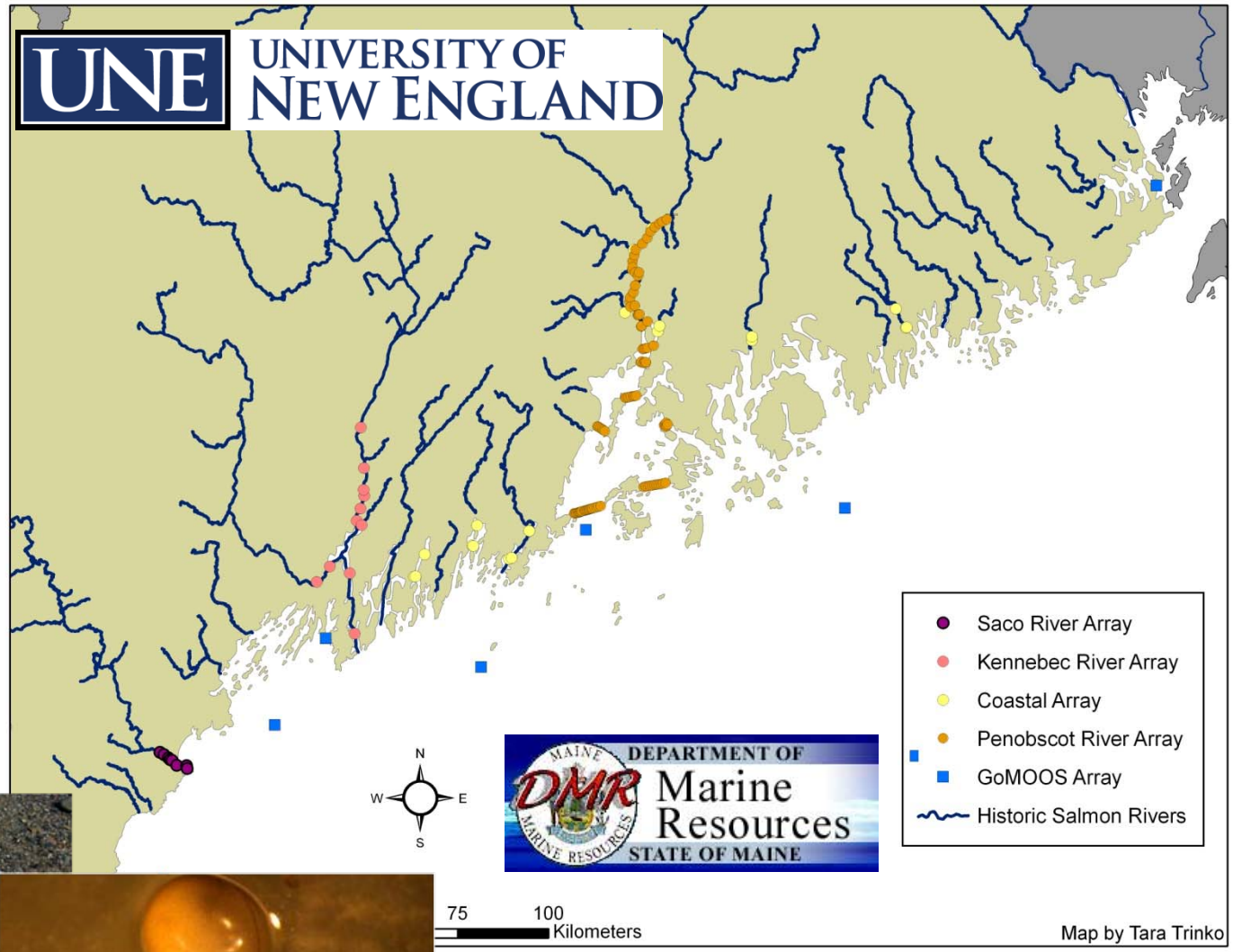
Delaware State University

1865 The University of Maine School of Marine Sciences

Connecticut Department of Environmental Protection

Future Work





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