

# Fall 2010 Research Update

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**Technician: Silas Ratten**

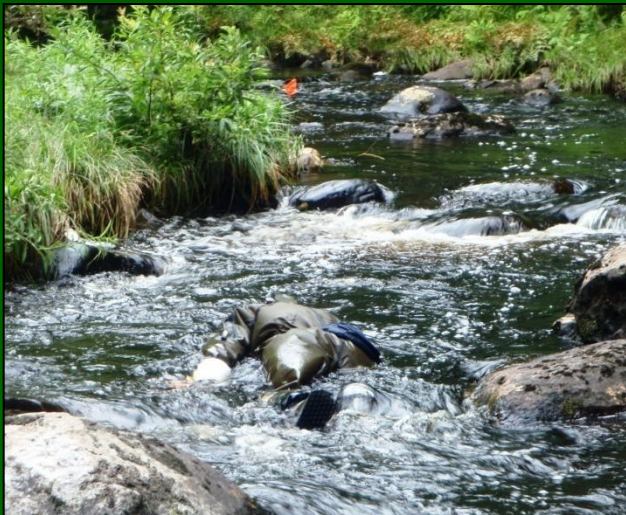
# Projects

- Interactive ecology of Atlantic salmon and smallmouth bass juveniles in nursery streams: competition for habitat?
- Distribution and abundance of stream fishes in relation to barriers: implications for monitoring stream restoration
- Barrier removal and range expansion of sea lamprey: quantifying habitat conditioning in Atlantic salmon nursery streams

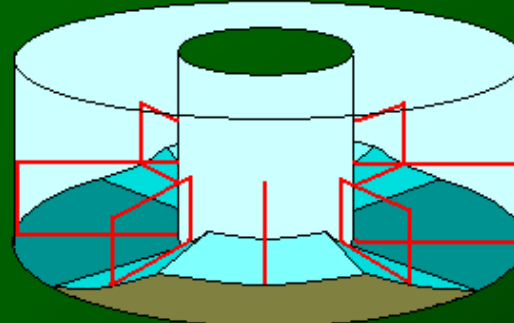
# Habitat use and overlap of Atlantic salmon and smallmouth bass

## Three-pronged approach:

Open Observations

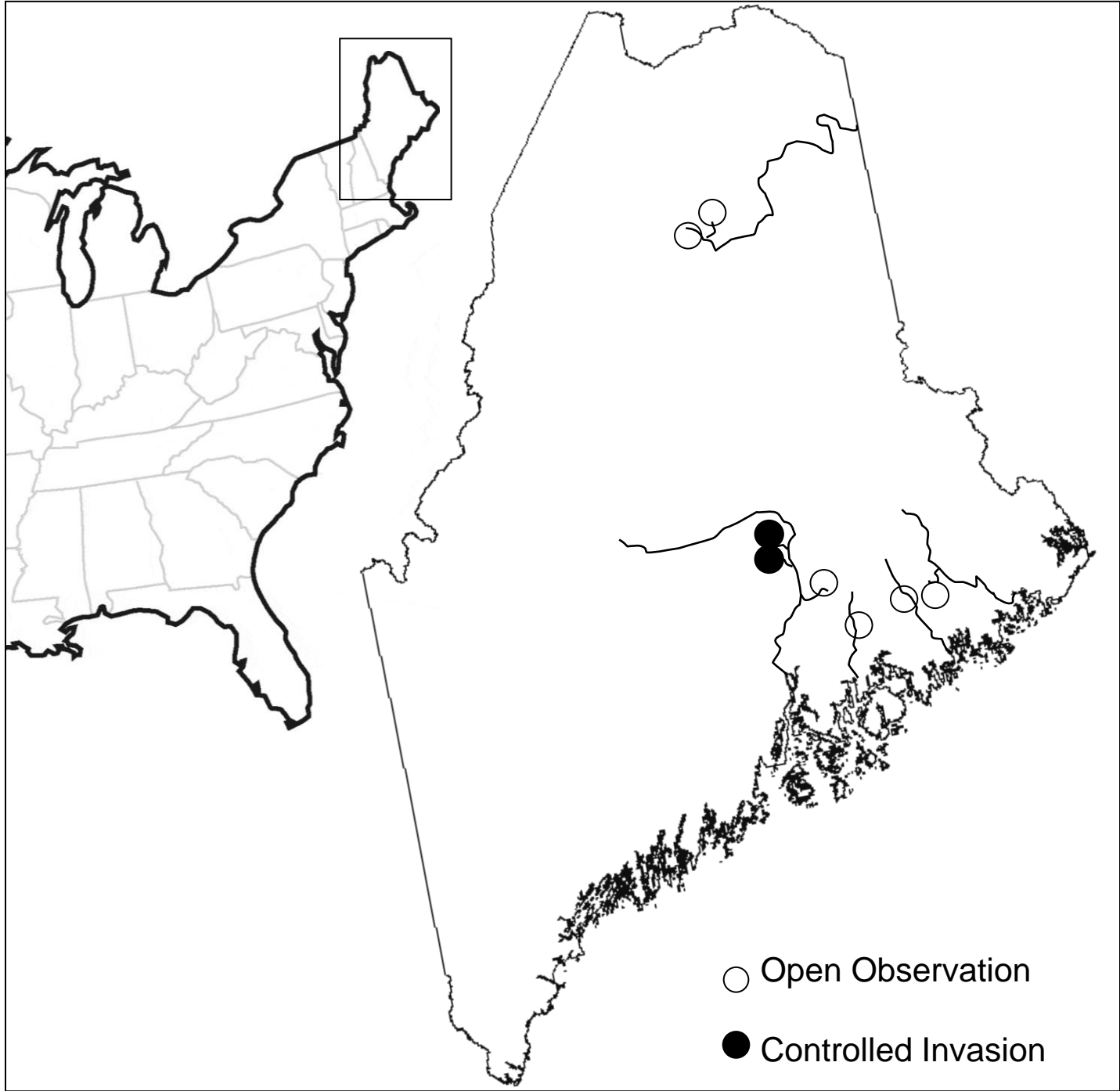


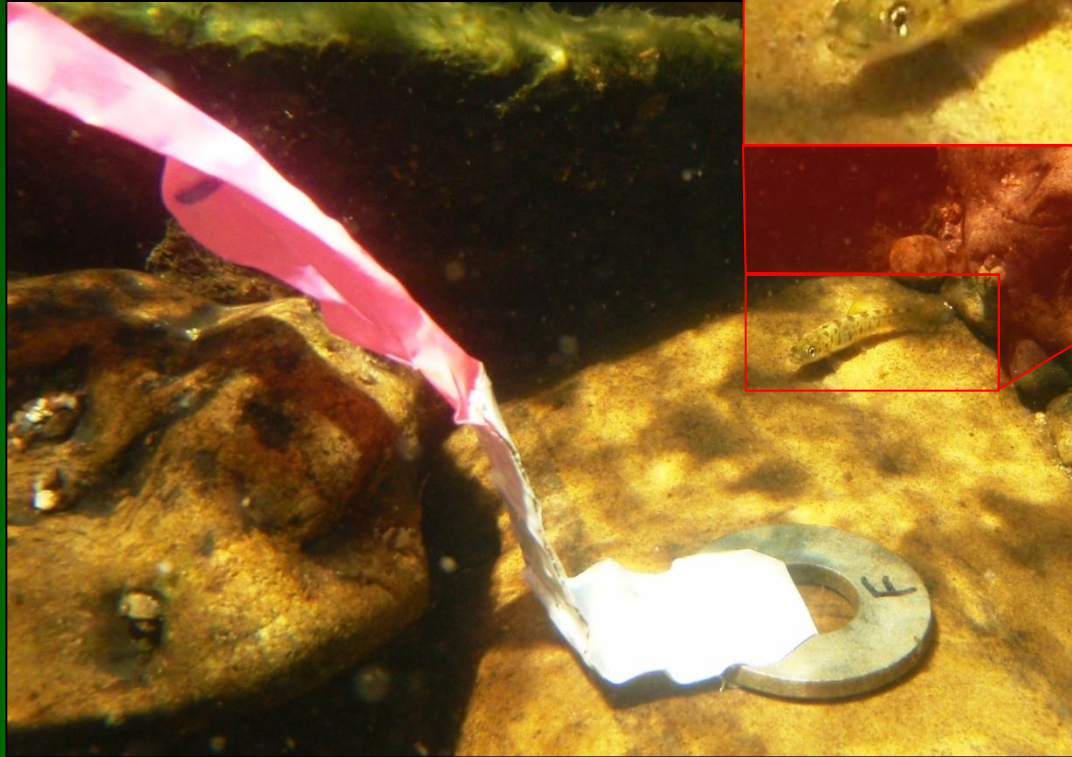
Simulated Stream



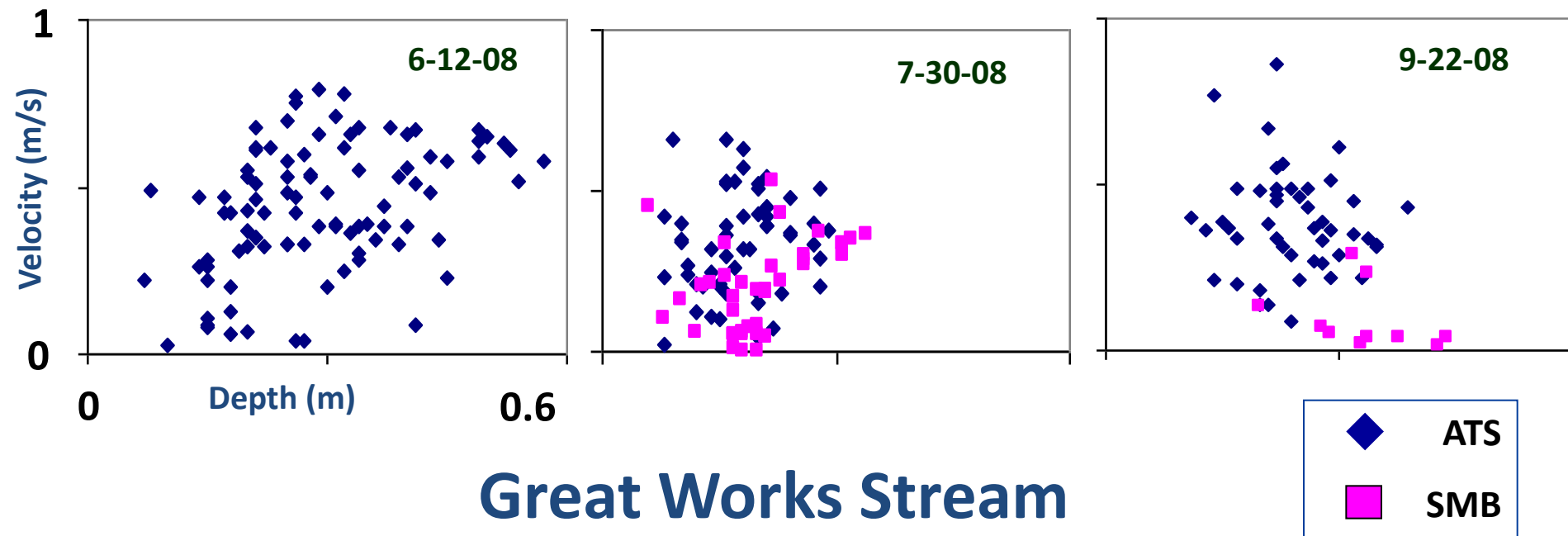
Controlled Invasion Experiment



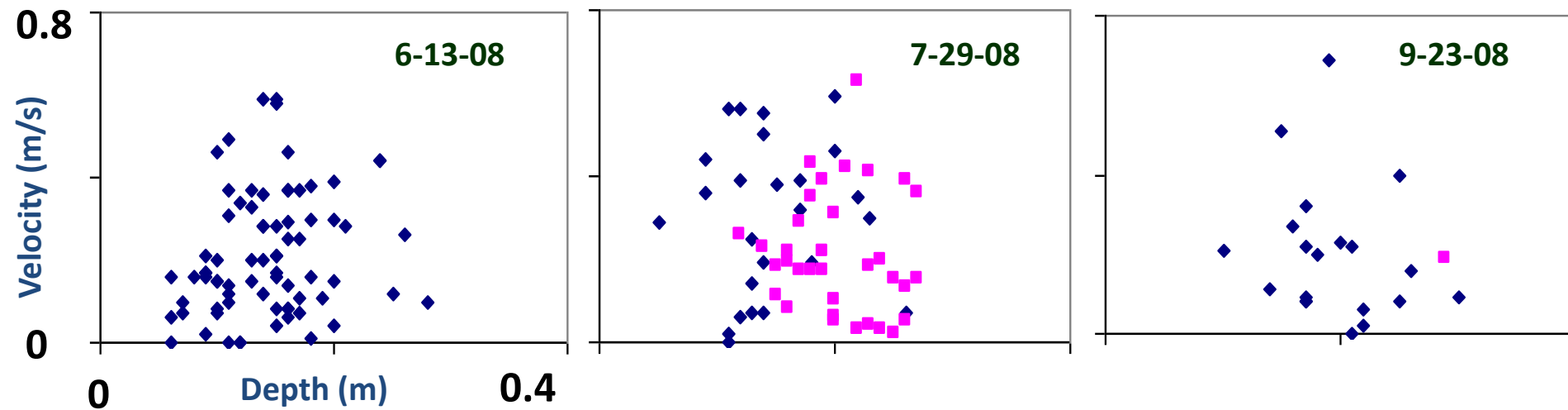




# Union River



# Great Works Stream



# Results / Conclusions

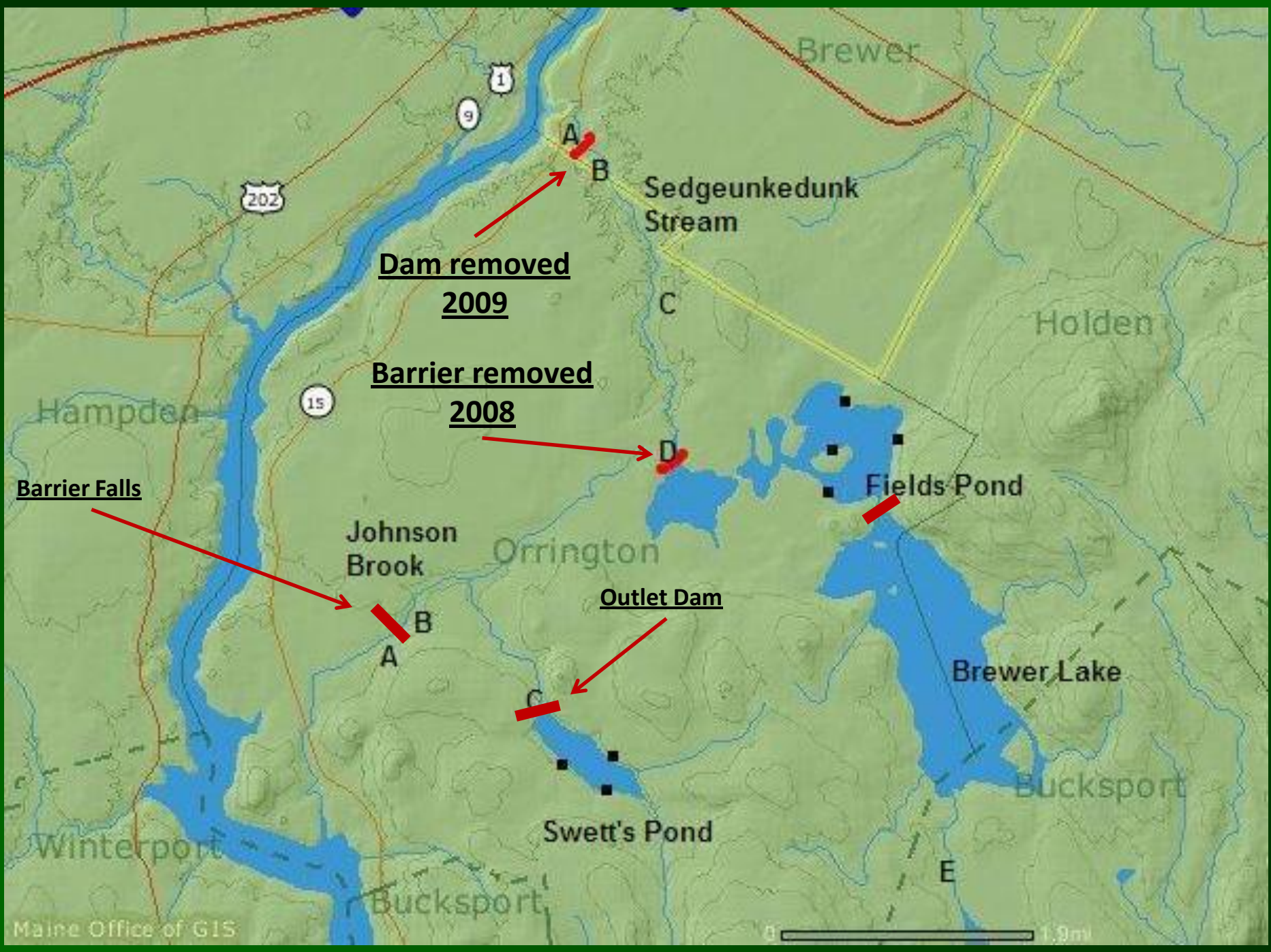
- 2008 field: 0+ ATS shifted to shallower habitats during mid-summer when 0+ SMB present, and hid in interstitial spaces when 1+ SMB present (contrary to what we observed in ATS-only sites)
- 2009 field: Virtual year-class failure of SMB; no effect on ATS
- Suggests that competitive effects important in warm, dry years but not in cool, wet years
- Lab: differences in diel activity - ATS stationary in day, moved at night; SMB vice-versa
- Gus Wathen: MS thesis, 2 papers in review in TAFS
- Paul Damkot: PhD student in spring 2011 – temperature- and flow-dependent competition and 3-way interactions w/ BKT

A photograph of a stream with clear water flowing over rocks and fallen leaves. A person's hand is visible in the top left corner, holding a long, thin object, possibly a fishing rod or a stick. The stream is surrounded by green foliage and branches.

## Sedgeunkedunk Stream

- Fishway construction and dam removal
- Response of resident fish community
- Response of anadromous fishes, especially sea lamprey
- Effect of sea lamprey on physical habitat and in-stream productivity





Barrier Falls

Dam removed  
2009

Barrier removed  
2008

Outlet Dam

# Research Questions

- 1) Does dam removal result in significant changes to Sedgeunkedunk Stream's resident fish community?
- 2) Will sea lamprey recolonize newly accessible habitat?
- 3) Do sea lamprey "condition" physical habitat to the benefit of Atlantic salmon via alteration of substrate during spawning activities?
- 4) Do sea lamprey spawning activities increase drift of aquatic insects, thereby releasing prey to resident fish community?
- 5) Are sea lamprey a significant source of MDN, and if so, does their input translate towards increased primary production?

## Objective 1:

Characterize fish community changes  
(species, size, abundance, distribution, etc.)  
in response to barrier removals

### Methods:

Electro-fish established  
sites via 3-pass  
depletion methods

Identify species,  
measure length and  
mass

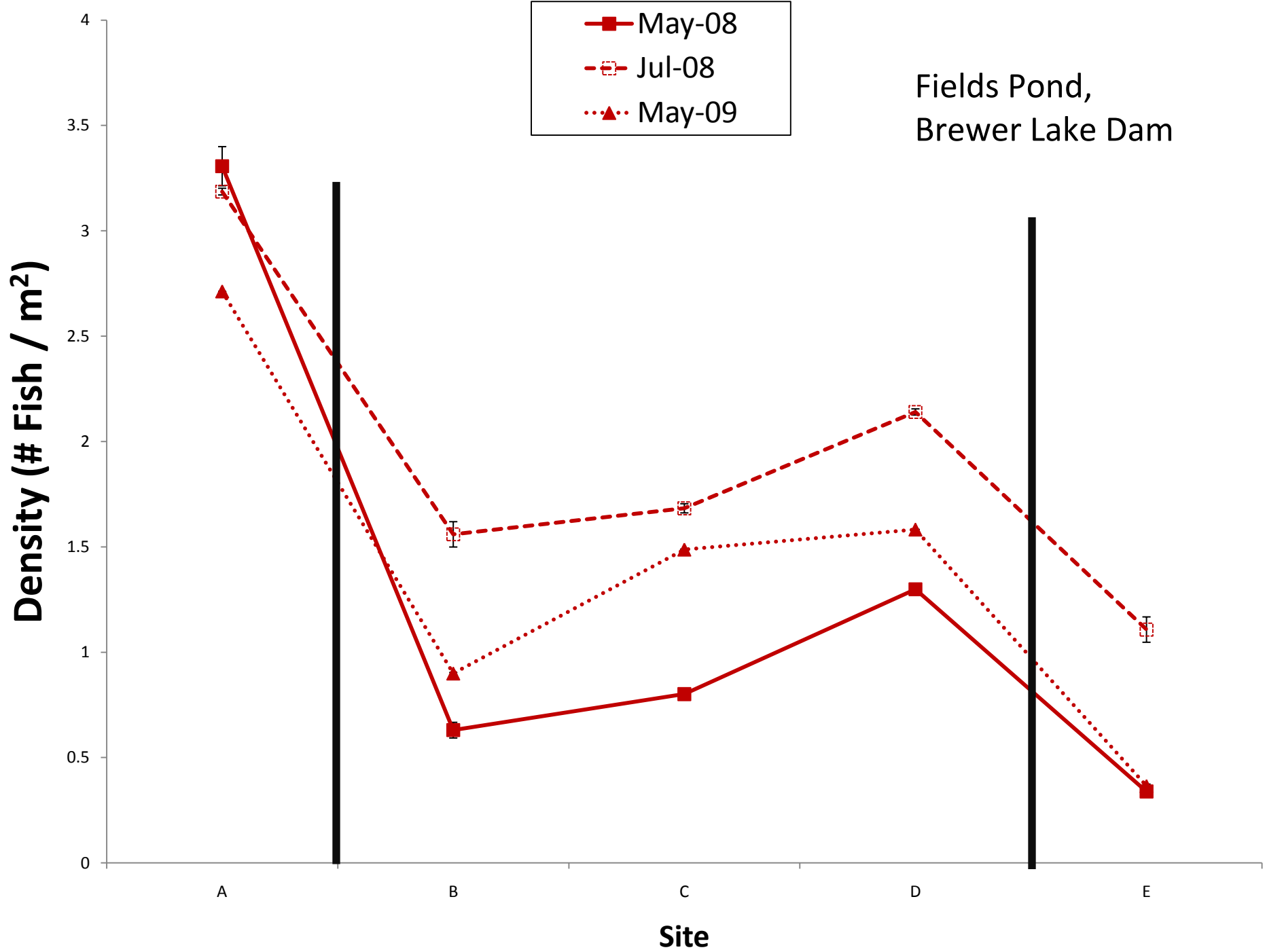
Each site sampled  
twice yearly  
(spring and summer)



# Sedgeunkedunk - Mill Dam

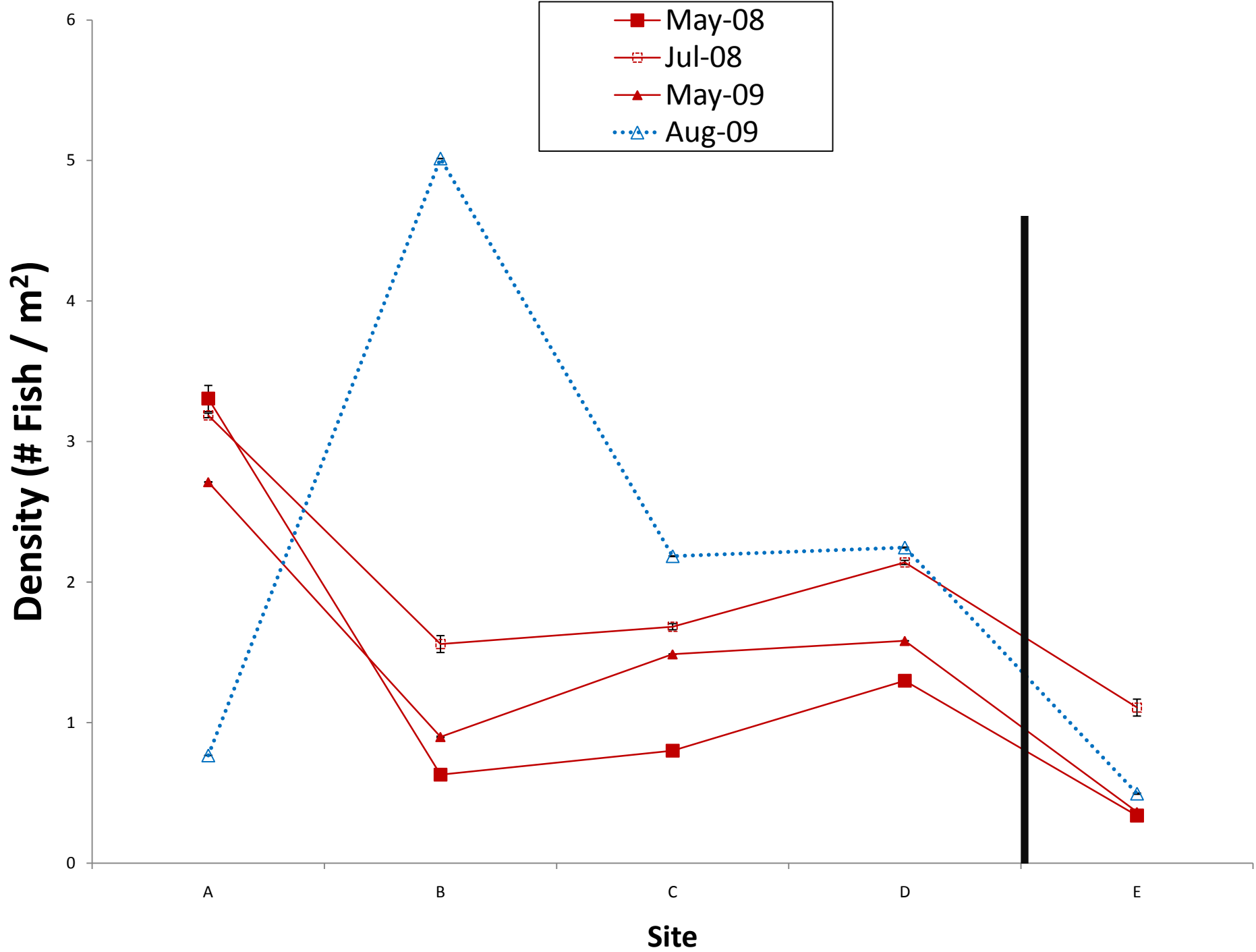


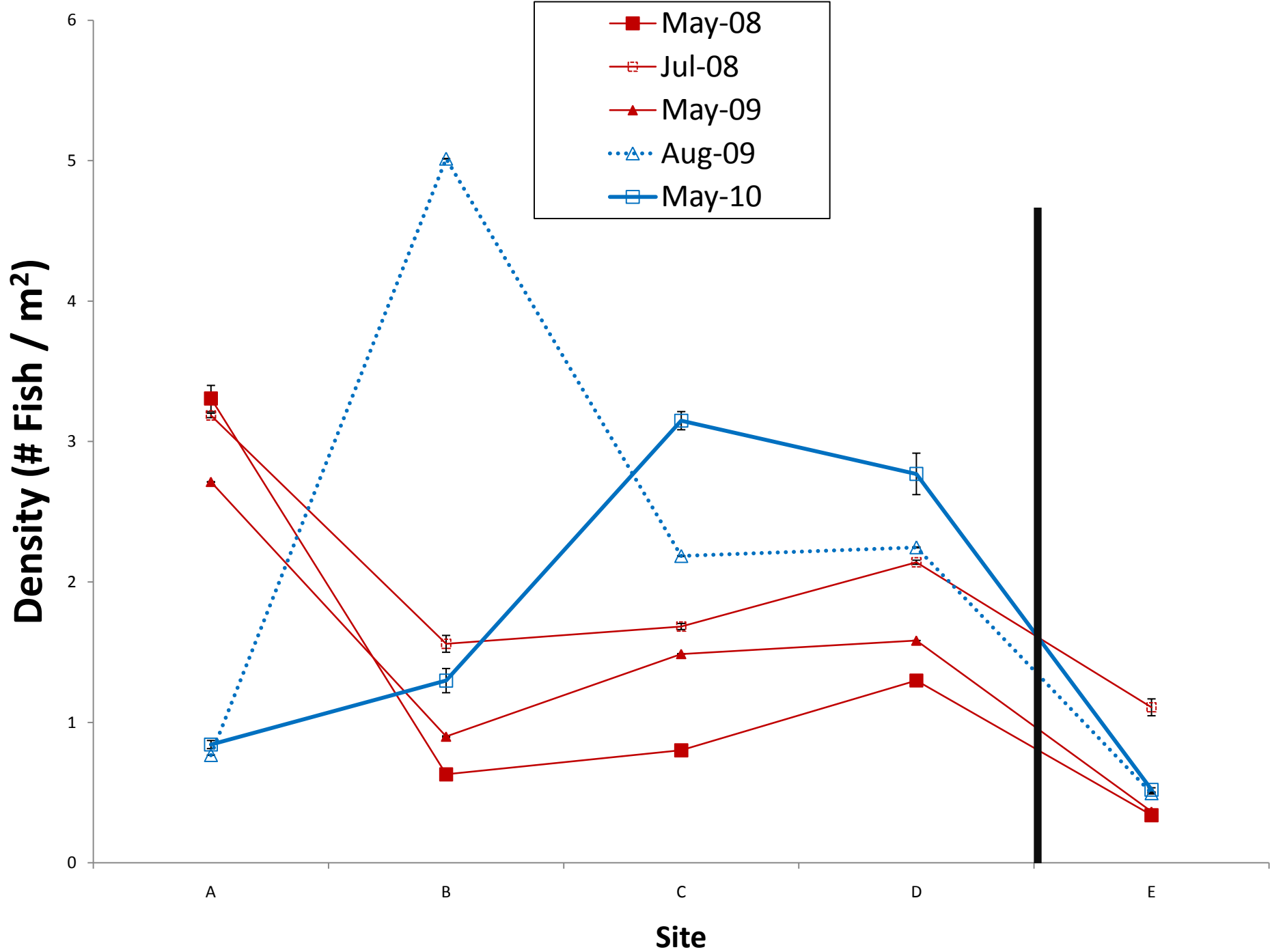
Fields Pond,  
Brewer Lake Dam



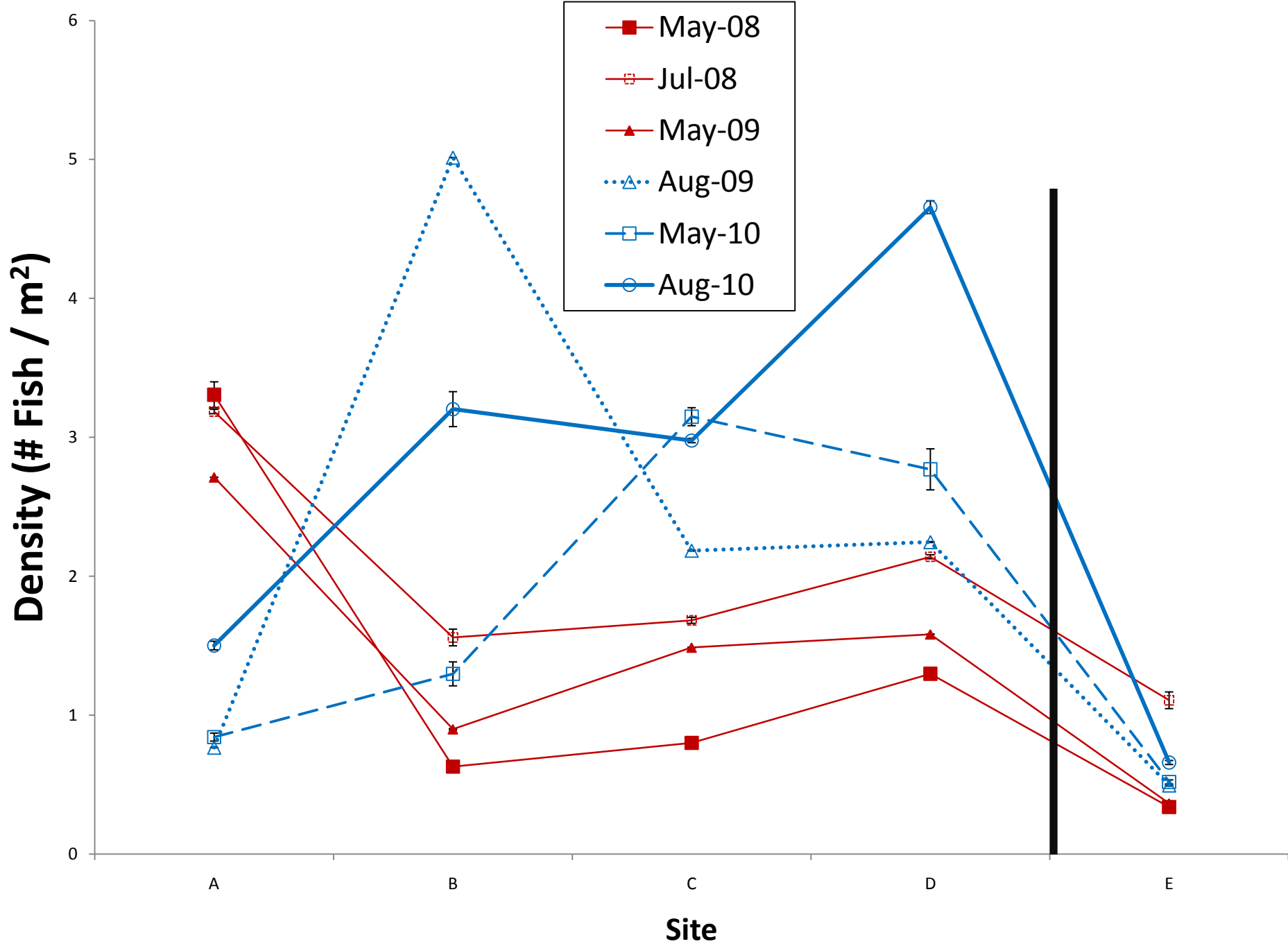


Mill Dam, 1 day post-removal









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## Objective 2:

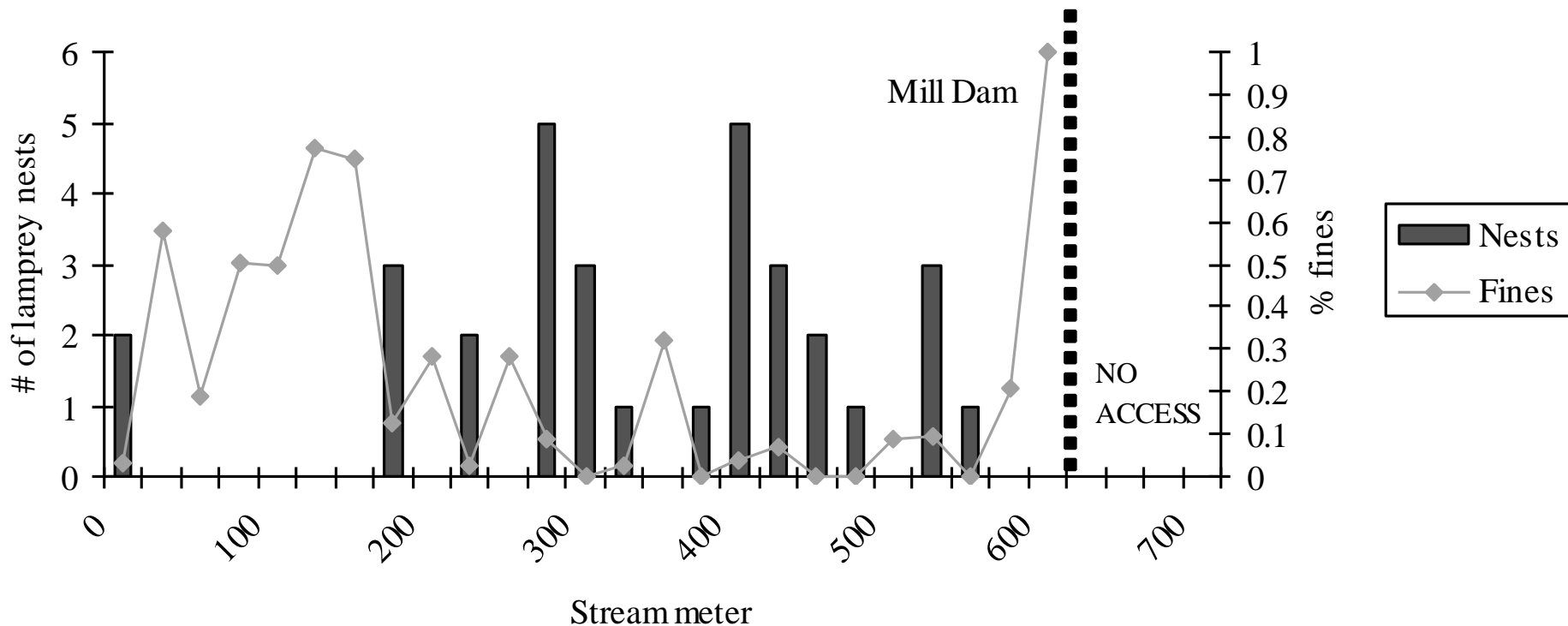
Evaluate abundance, size-structure, habitat use, and nest fidelity of spawning lamprey.

Methods:

Capture lamprey with fixed trap nets, mark with PIT tags, and track activity with daily surveys



- Spawning run from June 14 – June 27, 2008
- $47 \pm 0$  adults and  $31 \pm 0$  nests, all below Mill Dam
- Spawned in every reach where fines < 20%



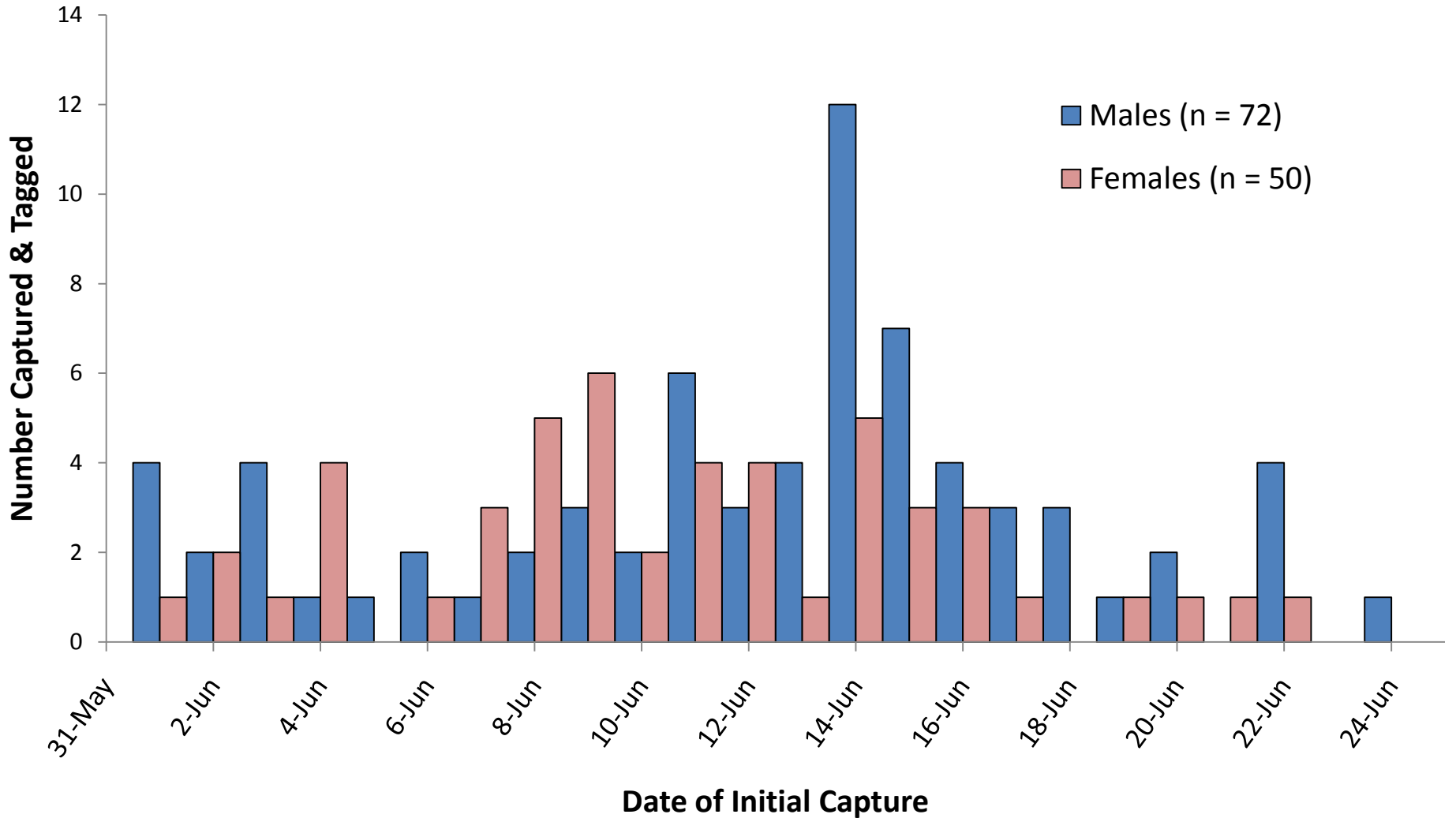
# No spawning in flood of 2009



2008



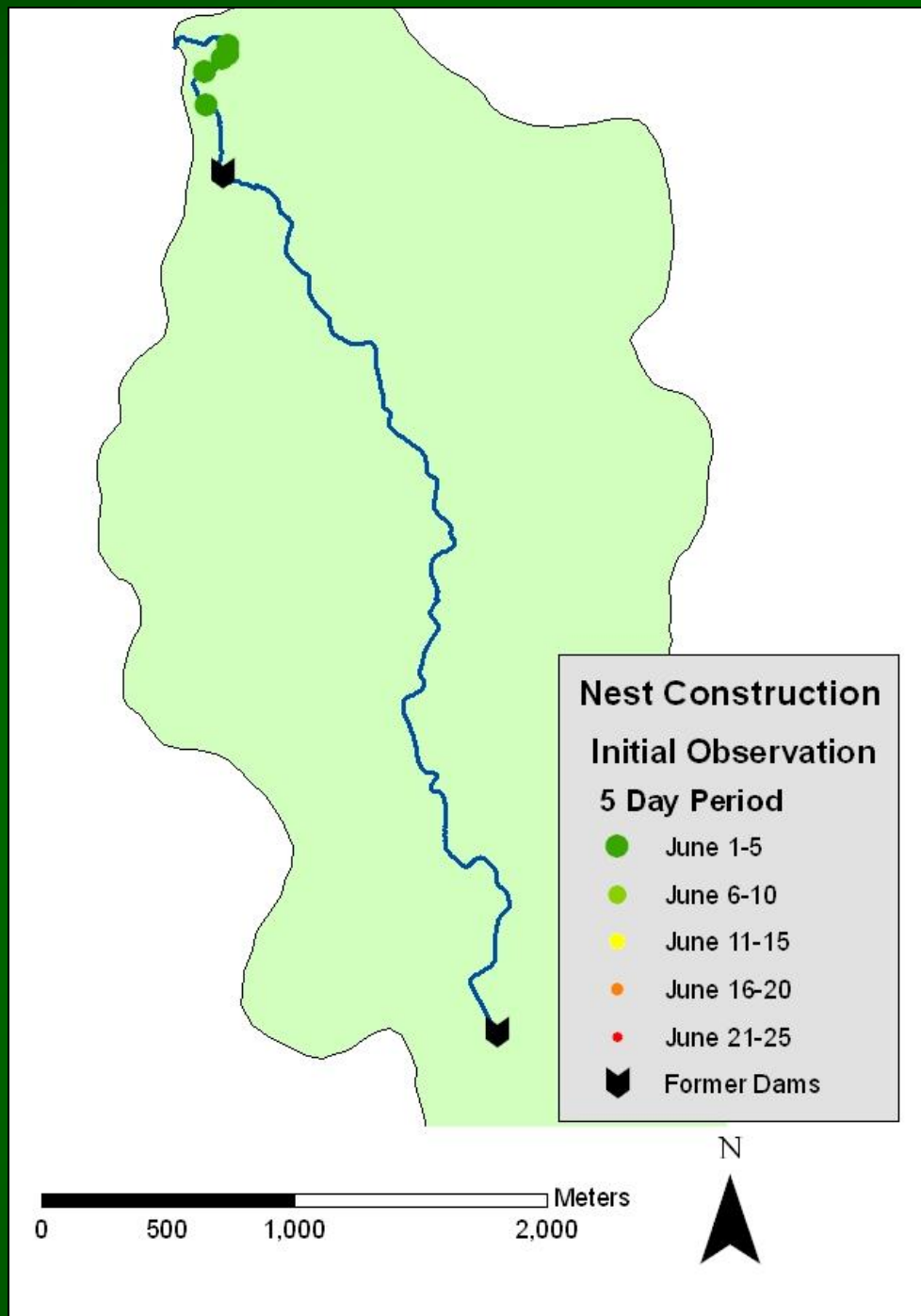
2009



**2010 Spawning Run: June 1 – June 24**  
**122 tagged adults + 7 novel carcasses**

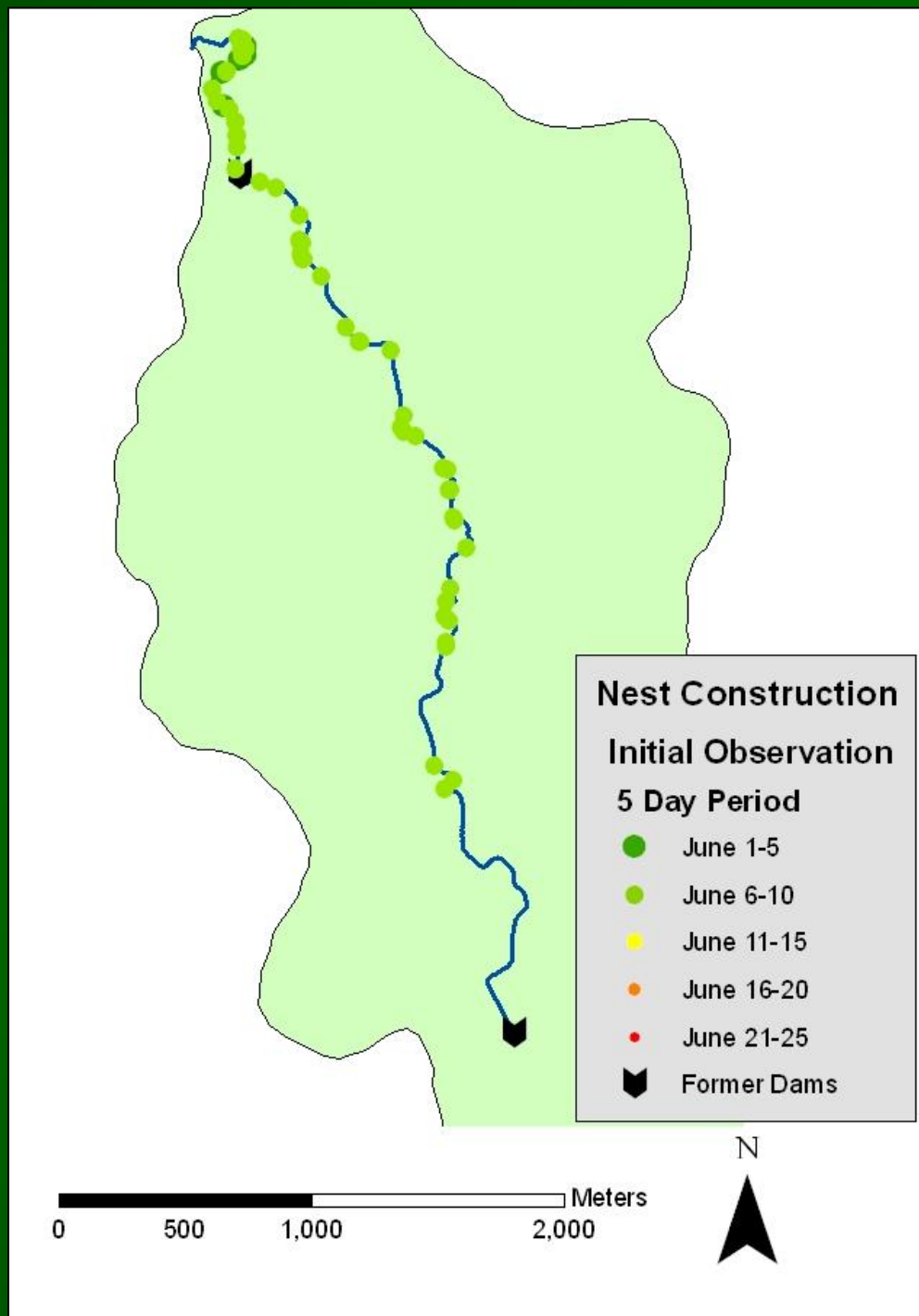
# Spawning Run 2010

Sea lamprey nests  
observed during  
first five days of  
spawning activity



# Spawning Run 2010

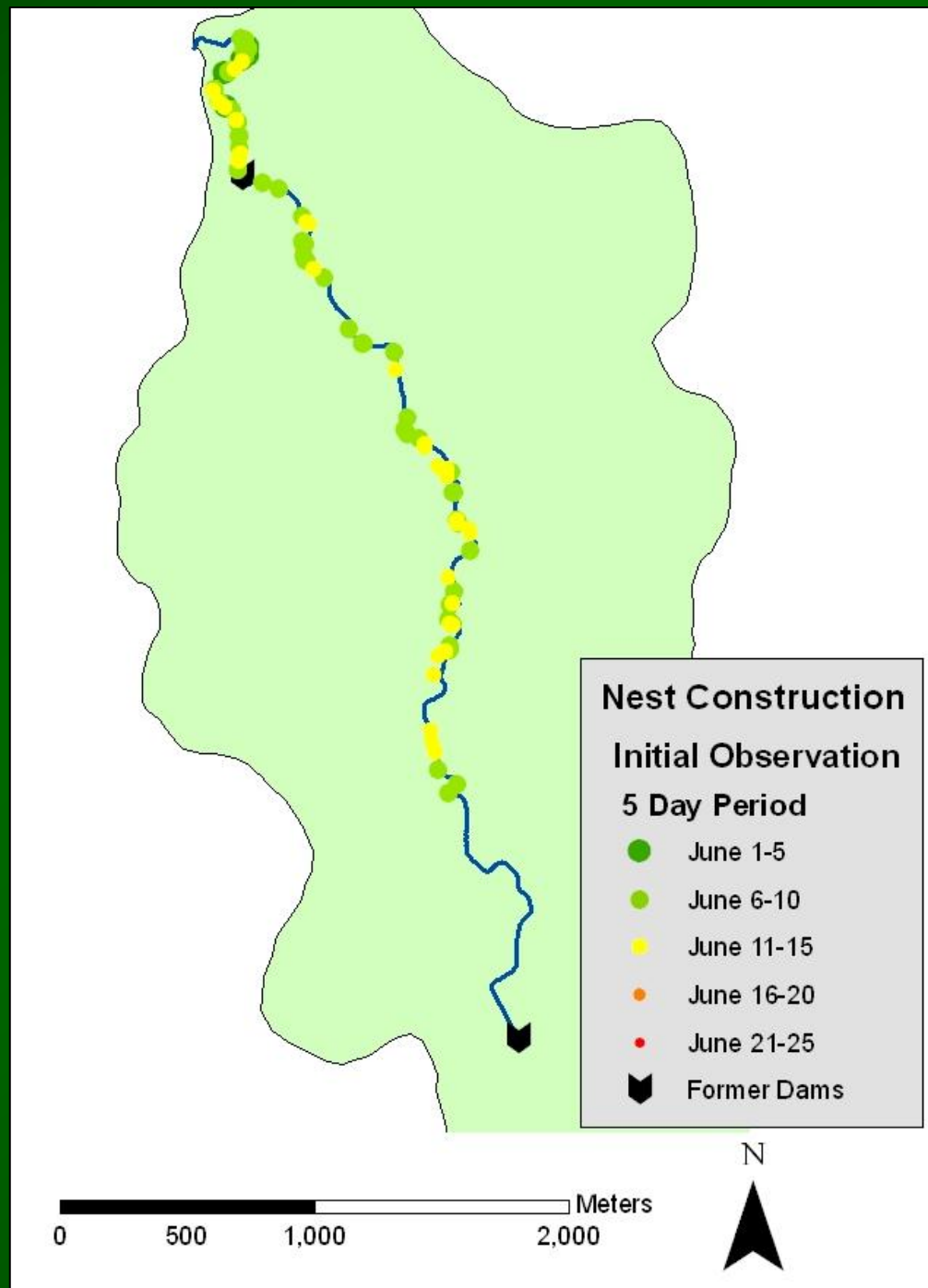
Sea lamprey nests  
observed during  
first ten days of  
spawning activity





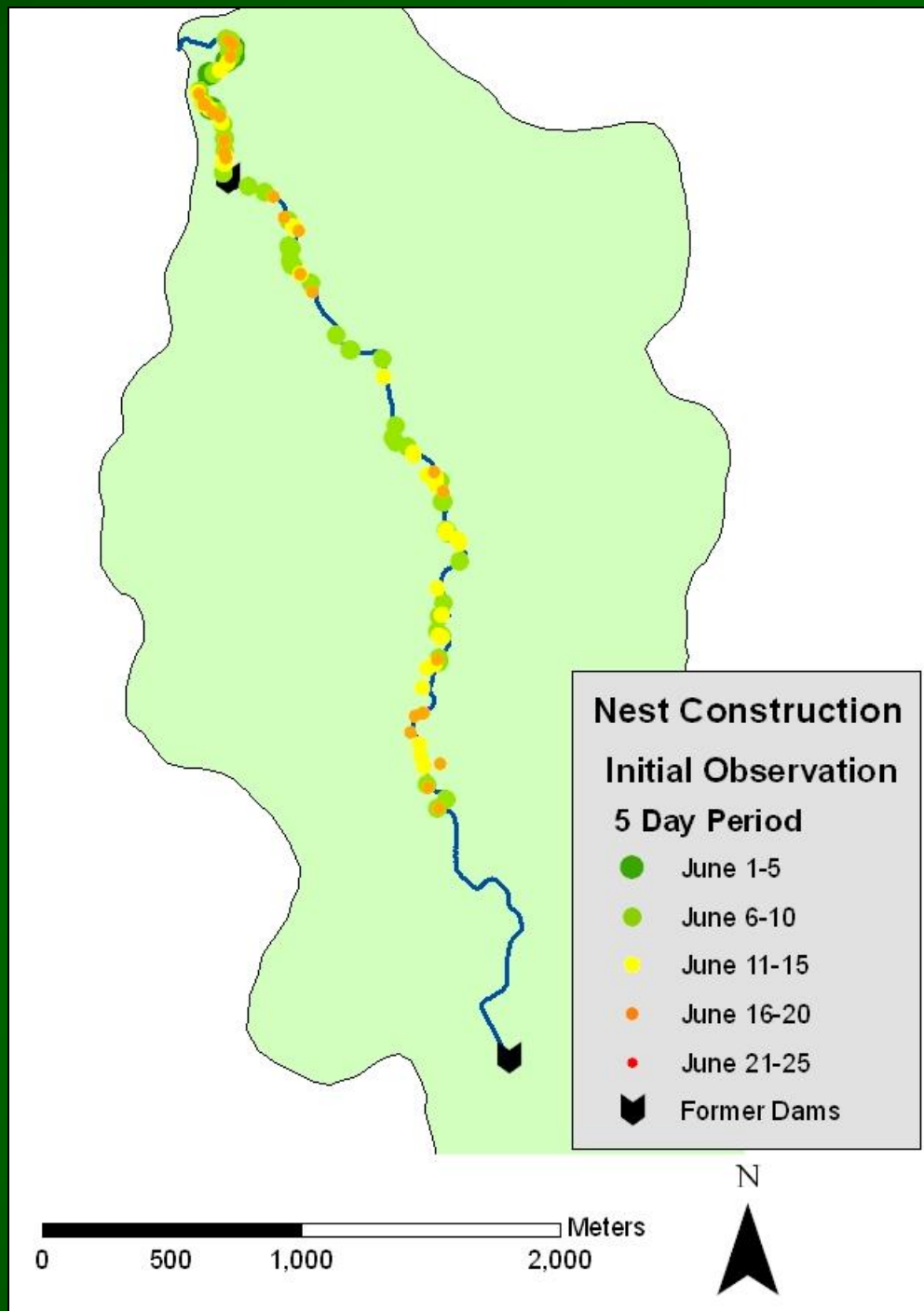
# Spawning Run 2010

Sea lamprey nests  
observed during  
first fifteen days of  
spawning activity



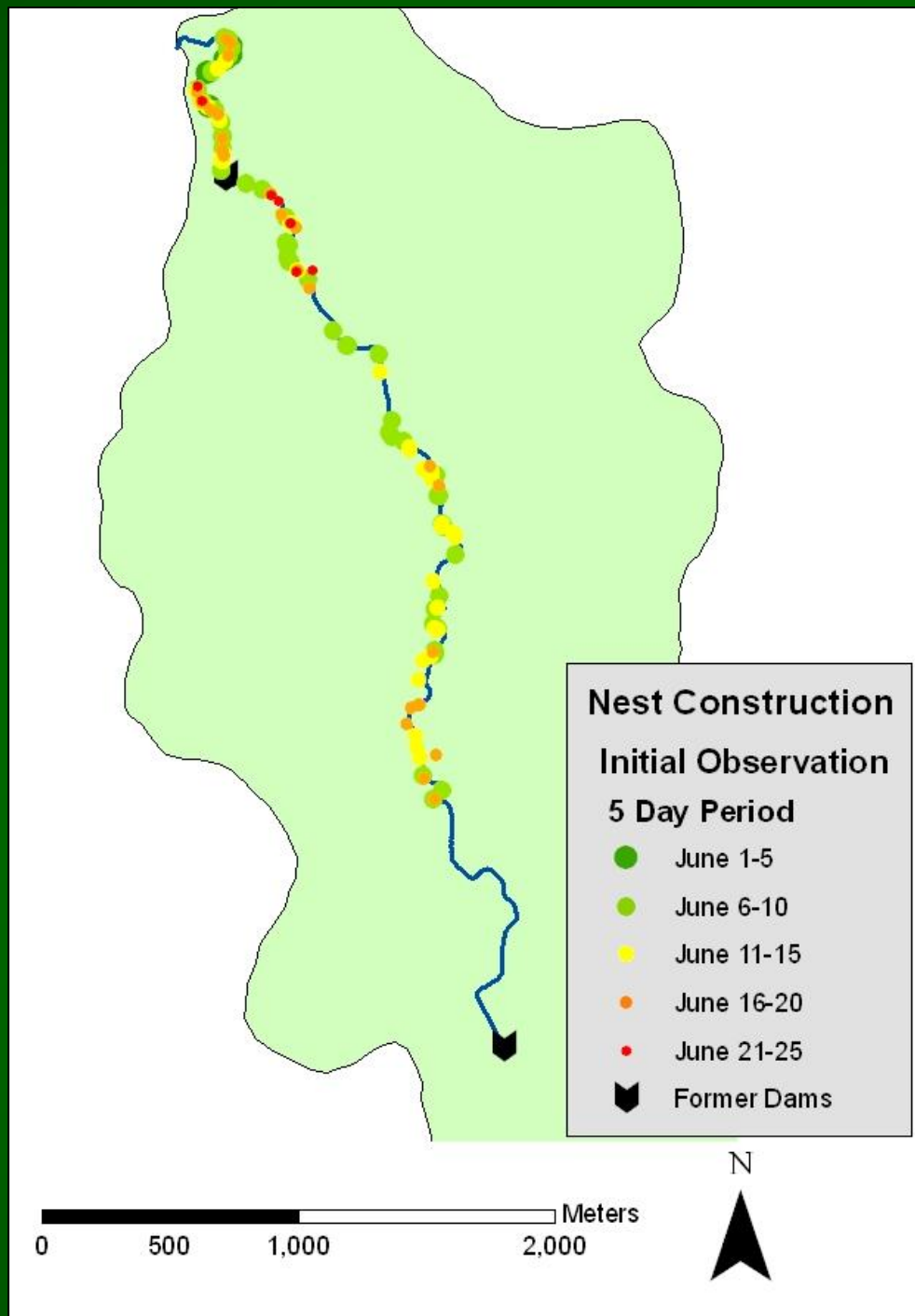
# Spawning Run 2010

Sea lamprey nests  
observed during  
first twenty days of  
spawning activity



# Spawning Run 2010

Sea lamprey nests  
observed over duration  
of twenty-five day  
spawning period



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# Project Status

- Cory Gardner
  - MS Thesis Oct 2010
  - Papers submitted to Environmental Biology of Fishes, Northeastern Naturalist
- Rob Hogg – current MS student
- Basis for long-term monitoring study

Any questions?

