

# Rollin' on the River:

two years of tracking  
river herring in the  
Coonamessett River



# Community effort

## The many fish sponsors:

>100 individuals and organizations adopted ~1000 herring

~175 students from Falmouth public schools

About 85% of the program costs in 2015 and a similar percentage in 2016

## Other support:

Falmouth Rod & Gun Club

Sporting Safety Conservation and Education Fund of Falmouth (SSCEFF)

Falmouth DNR

Falmouth Water Stewards

## Volunteers:

Andy Nabreski  
Anne-Marie Runfola  
Betsy Gladfelter  
Bruce Bertschmann  
Camile Romano  
Carl Peterson  
Charlie Cooper  
Chris Neill  
Emily Ferguson  
Erica Szuplat  
Frank Okrasinski  
Greg Pinto  
Izja Lederhendler  
Ken Beckenhaupt  
Ken Kostel  
Linda Chambers  
Linda Deegan  
Linda Lutz

Lou Turner  
Martin Monk  
Mary Kay Fox  
Mitch Buck  
Mike Scherer  
Pamela Kokmeyer  
Pat Keoughan  
Peter Hargraves  
R. Charles Martinsen  
Robert Delano  
Roger Kligler  
Sally Collinson  
Steve Jones  
Steven Treistman  
Terry Hughes  
Thomas Carignan  
Wade Crews  
Wendi Buesseler

*And many many others!*



# Scientific support from many sources

## Assistance and advice:

Heidi Golden, UConn

Cameron MacKenzie, MBL

Derrick J. Alcott, UMass

Joel Llopiz, WHOI

Ben Gahagan, MA DMF

Brad Chase, MA DMF

John Sheppard, MA DMF

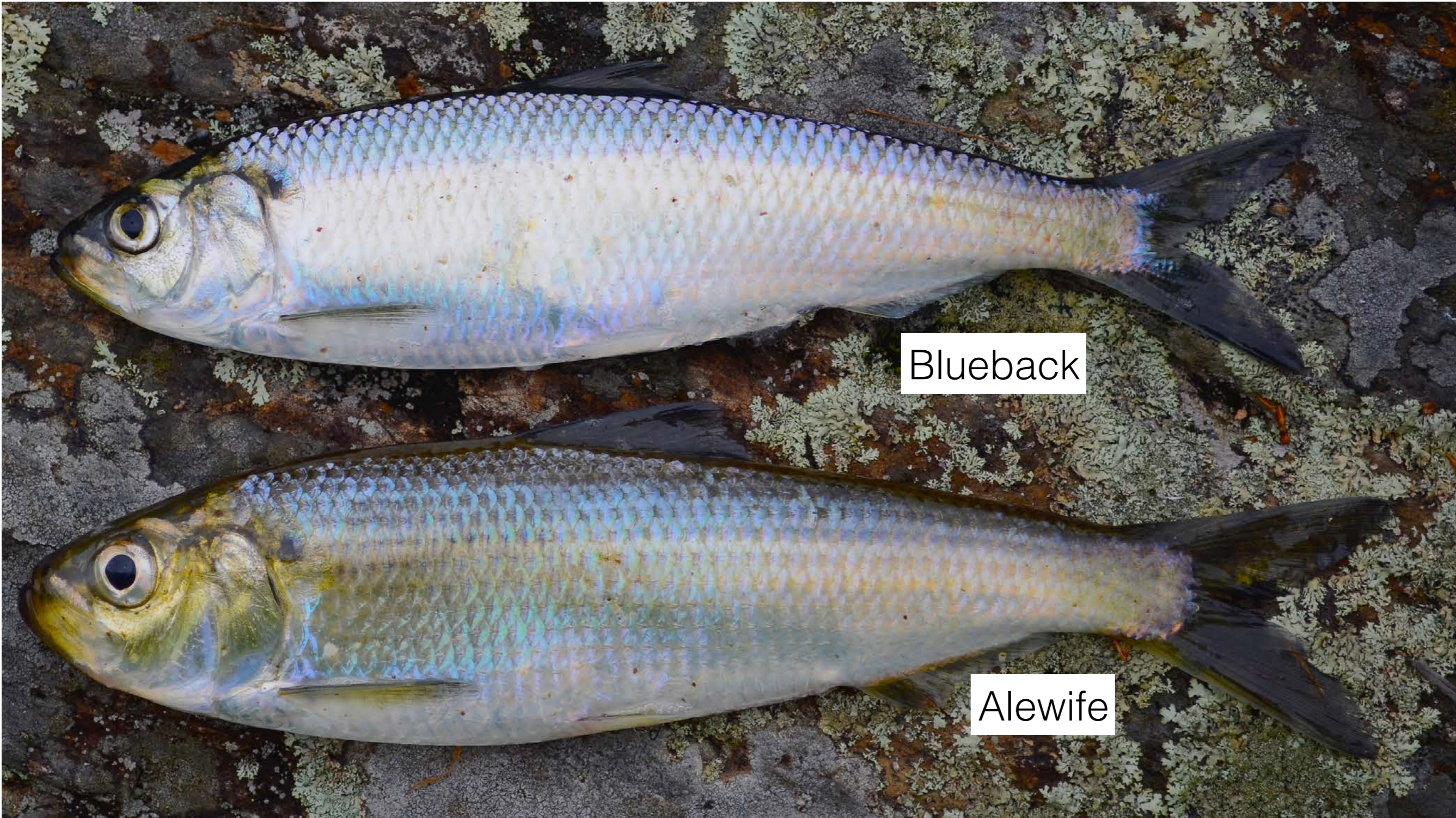
Warren Winders, SRBT

Steve Hurley, MA DFW

*And many many others!*



# River herring



Blueback

Alewife

LAKES AND STREAMS

ESTUARIES

Juveniles

Juveniles

Larvae

Eggs

SUMMER/FALL

SPRING

FALL/WINTER

SPAWNING

ALOSINE  
LIFE  
CYCLE

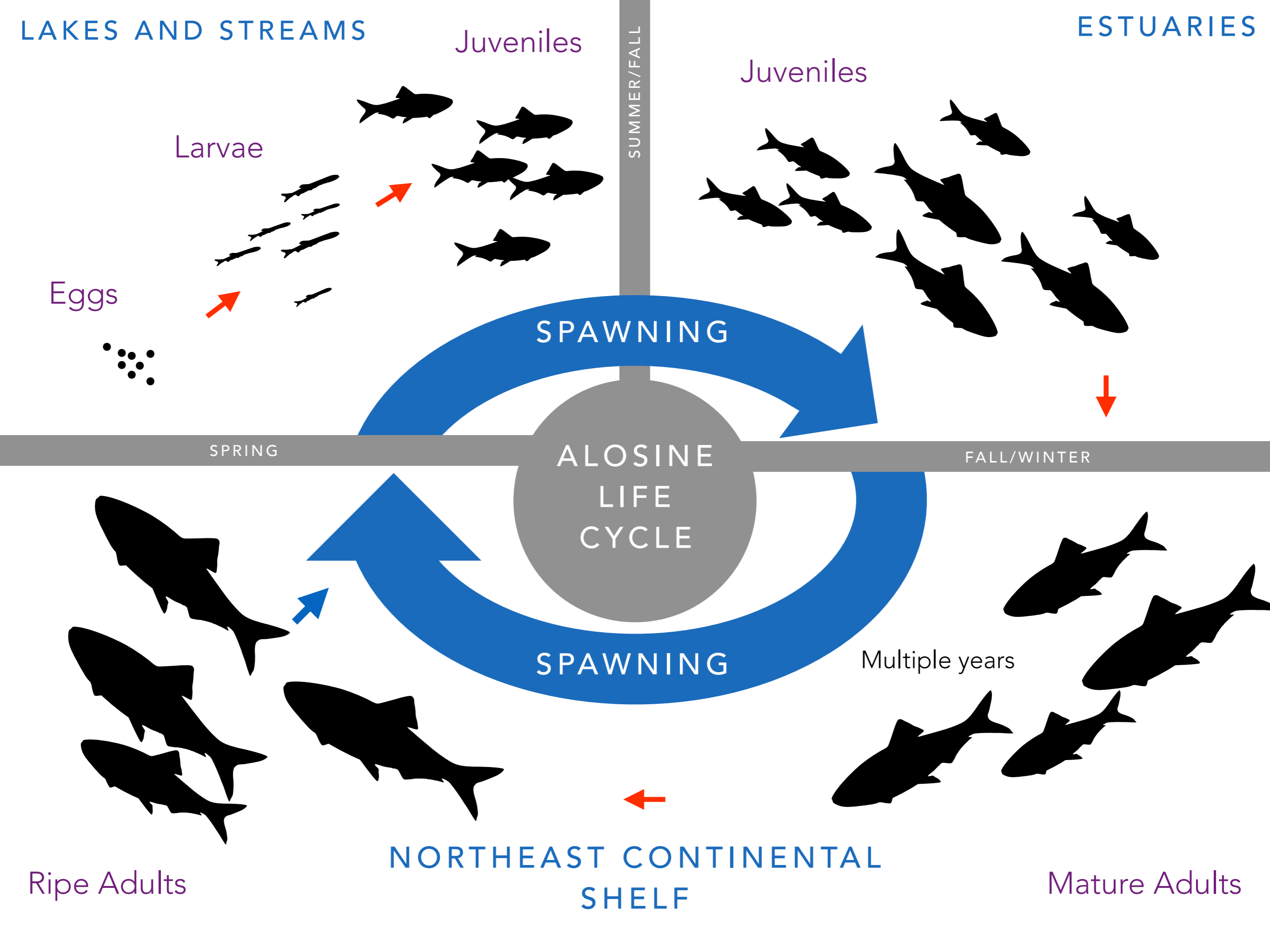
SPAWNING

Multiple years

NORTHEAST CONTINENTAL  
SHELF

Ripe Adults

Mature Adults

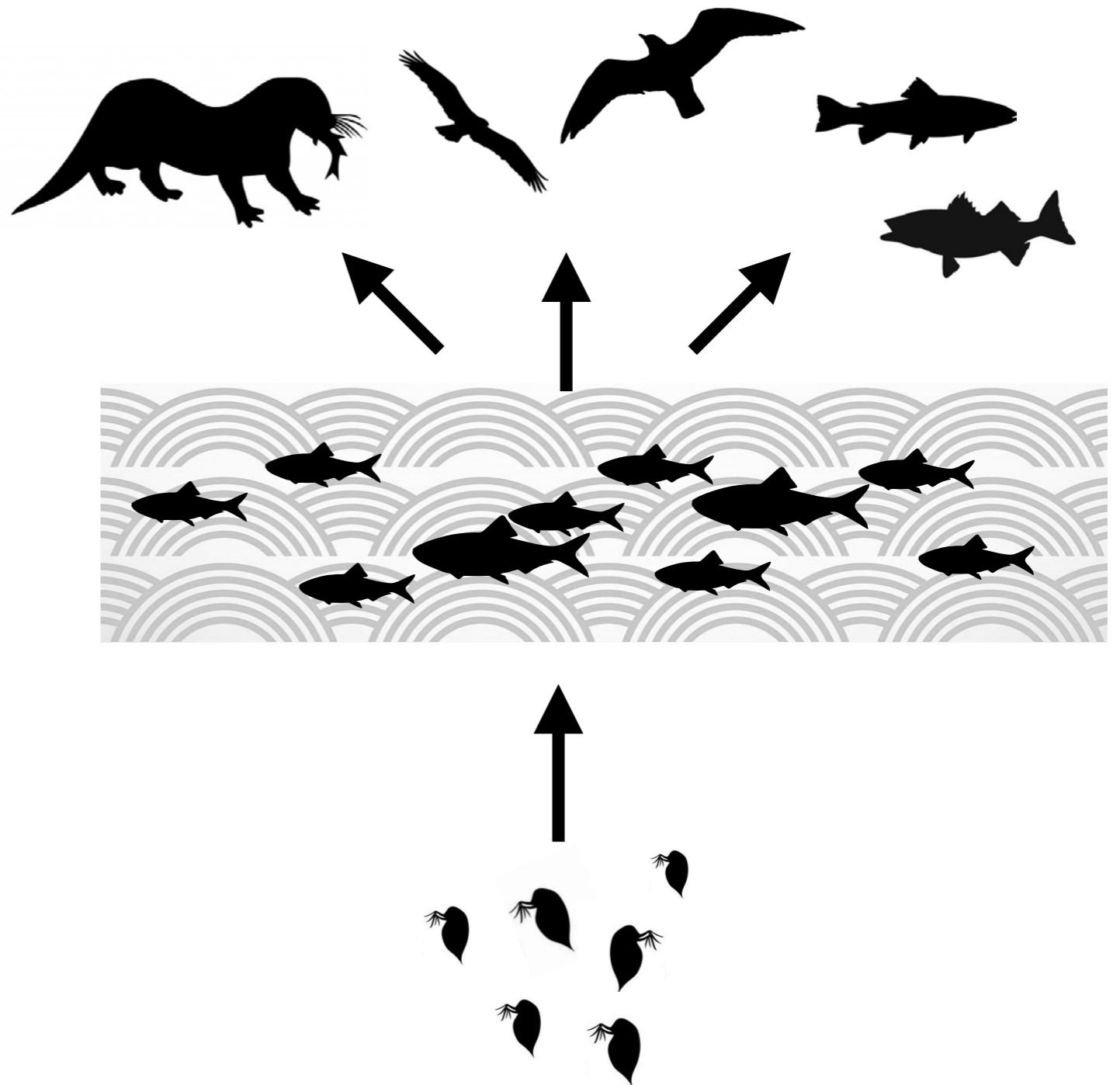






# Ecological importance

- Link freshwater and marine ecosystems
- Important prey species for predators in both environments
- Canonical keystone predator in freshwater (shape zooplankton community)
- Important to people as well





# The Coonamessett River

Moderate length run (~5 km in length)

Currently at least two ponds used for spawning (likely other areas as well)

Historically the largest river herring run in Falmouth

CRT has conducted visual counts since 2005



# Little is known about movement use of freshwater

We know relatively little about fine scale movement patterns

- The time it takes fish to ascend streams
- Length of residency in freshwater
- Diel patterns of movement

Having this information could be quite useful



# PIT (RFID) tags can tell us about nuanced movement patterns



Photo: Andy Nabreski - On the Water Magazine

# Herring tagging

Tagged ~970 fish over 2 years (2015 & 2016)

~ 820 alewives & ~ 150 blueback

Migration and outmigration studied

**Tagging Site**

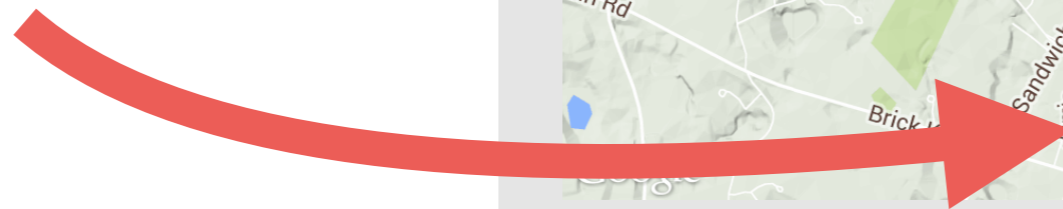








Photo: Andrea Carter Falmouth Enterprise

A close-up photograph showing two fish being held by hands. The top fish is held by a hand wearing a white and blue fishing glove. The bottom fish is held by a bare hand. Both fish are silver with a dark stripe along their sides and a dark spot on their heads. The background shows a body of water and some green vegetation.

Alewife

Blueback





Photo: Wendi Buesseler















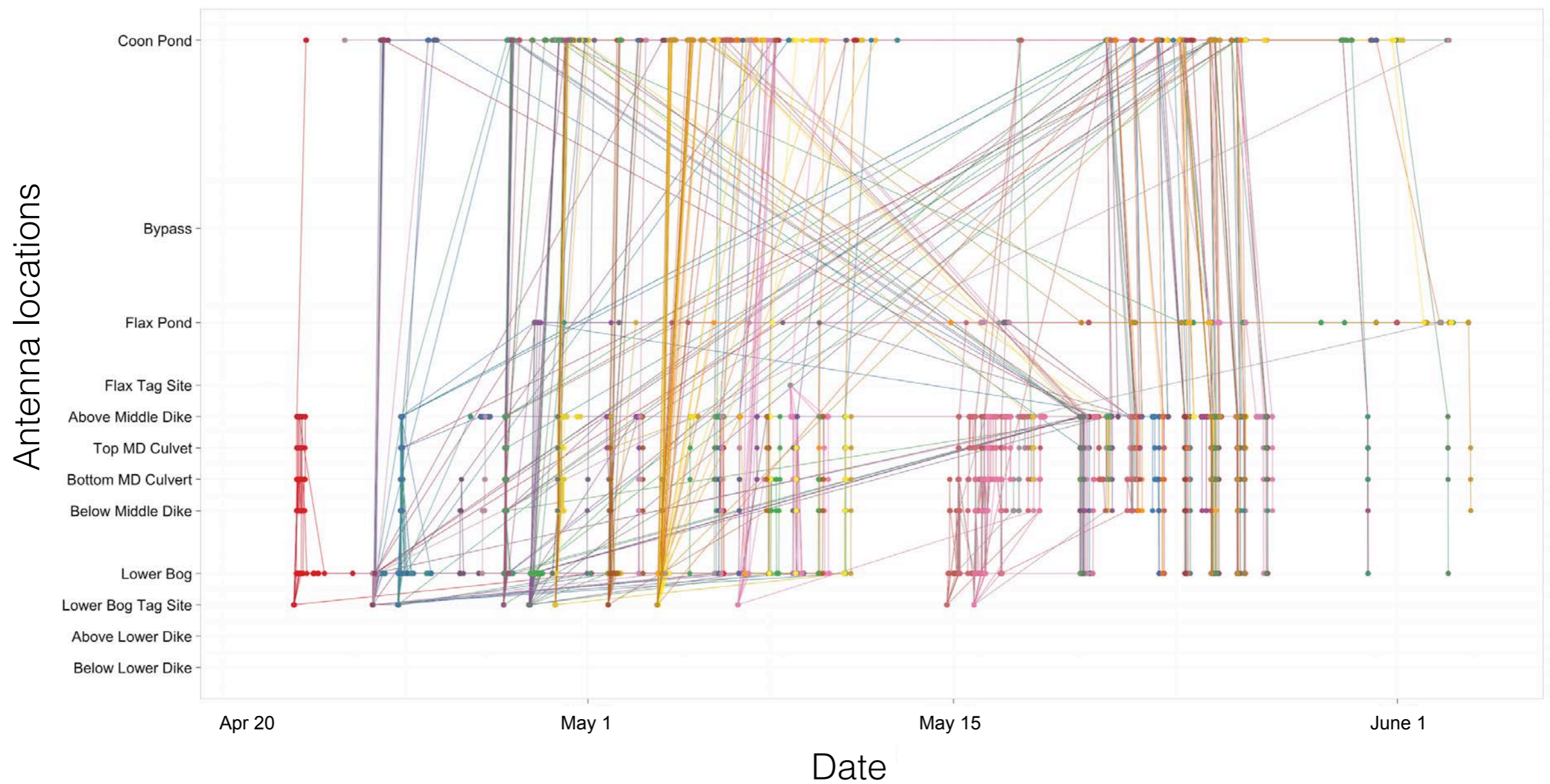
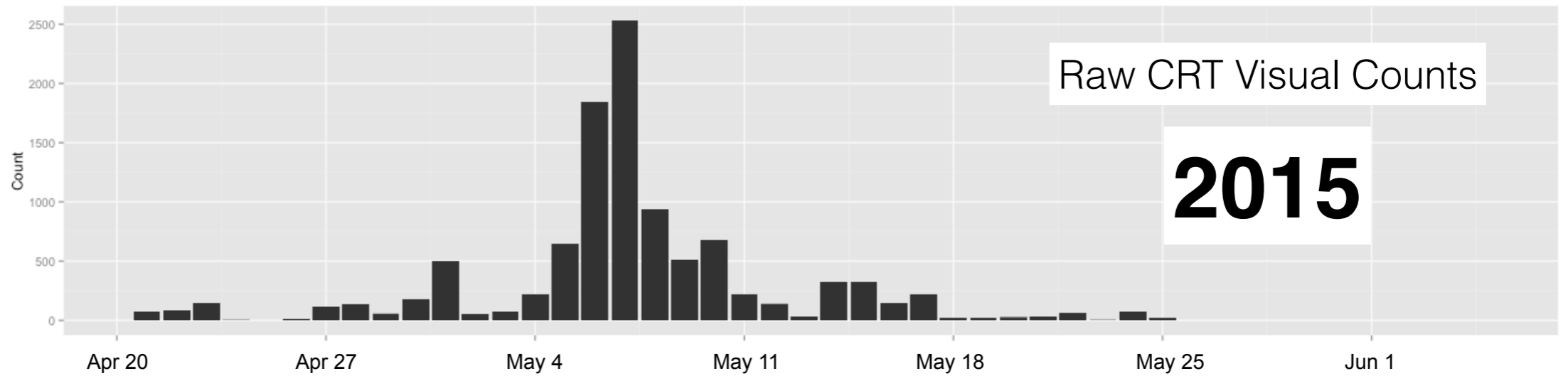






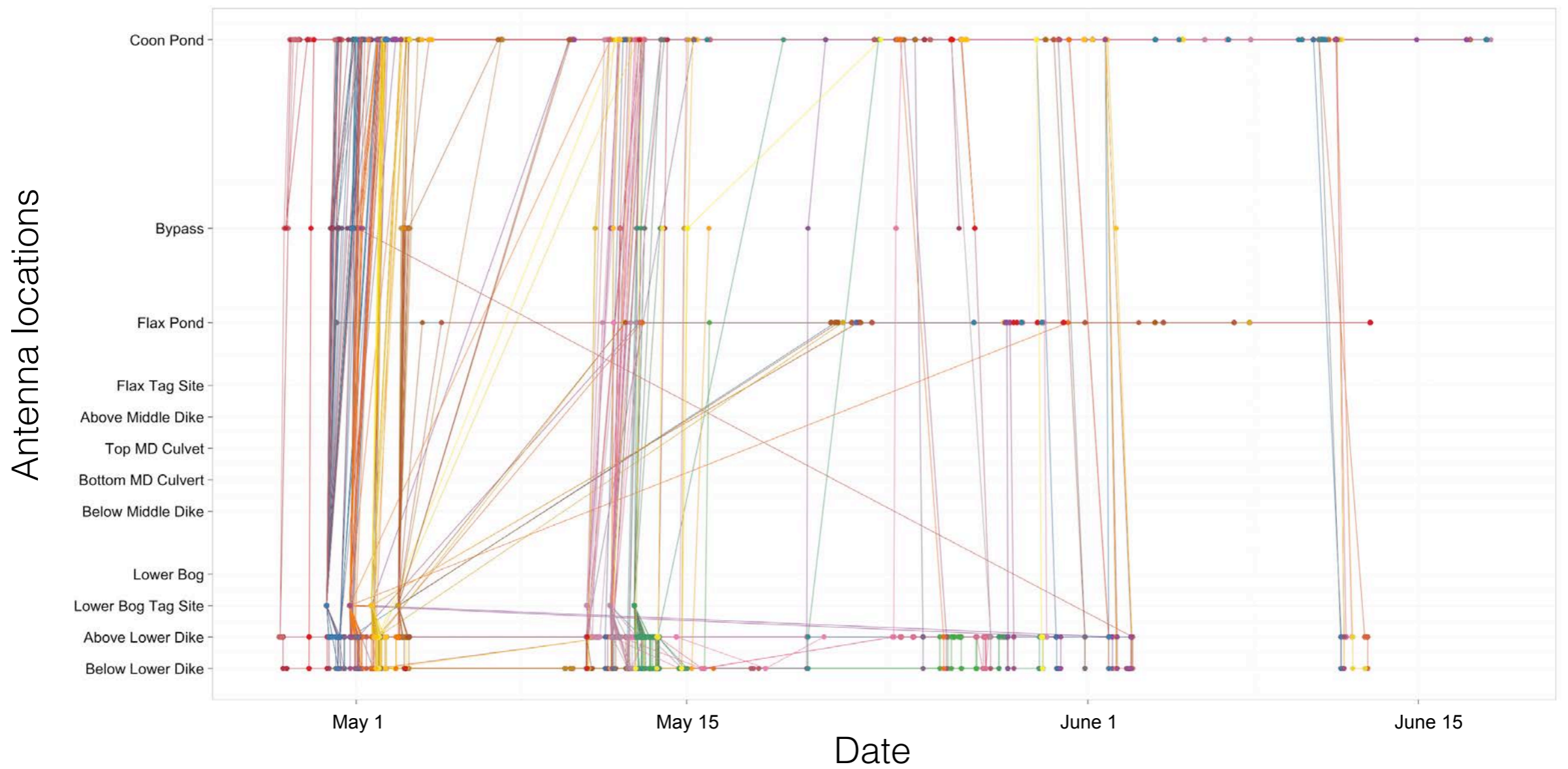
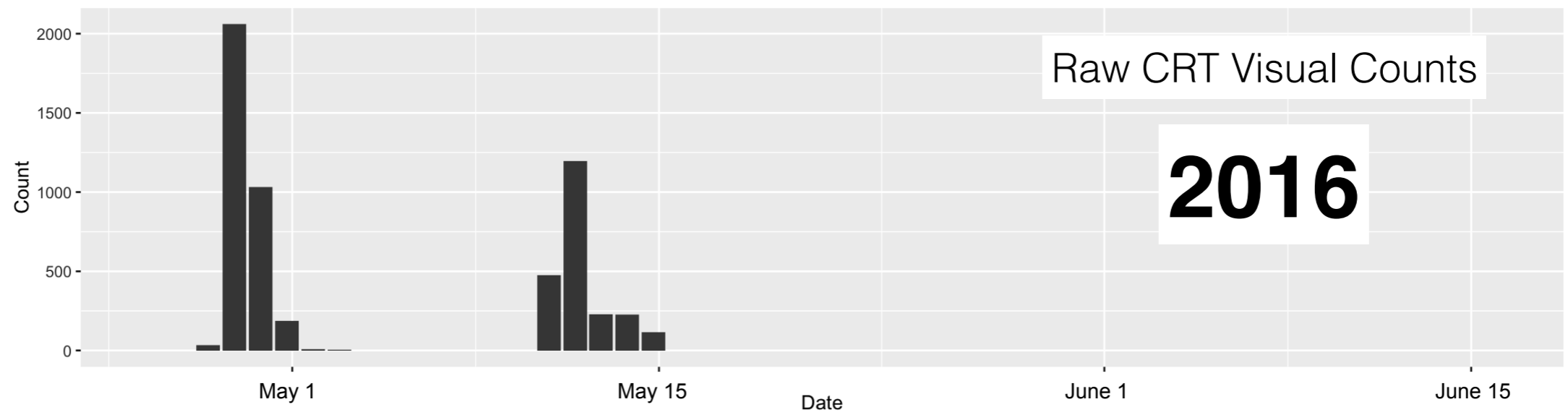






~3,000 movements

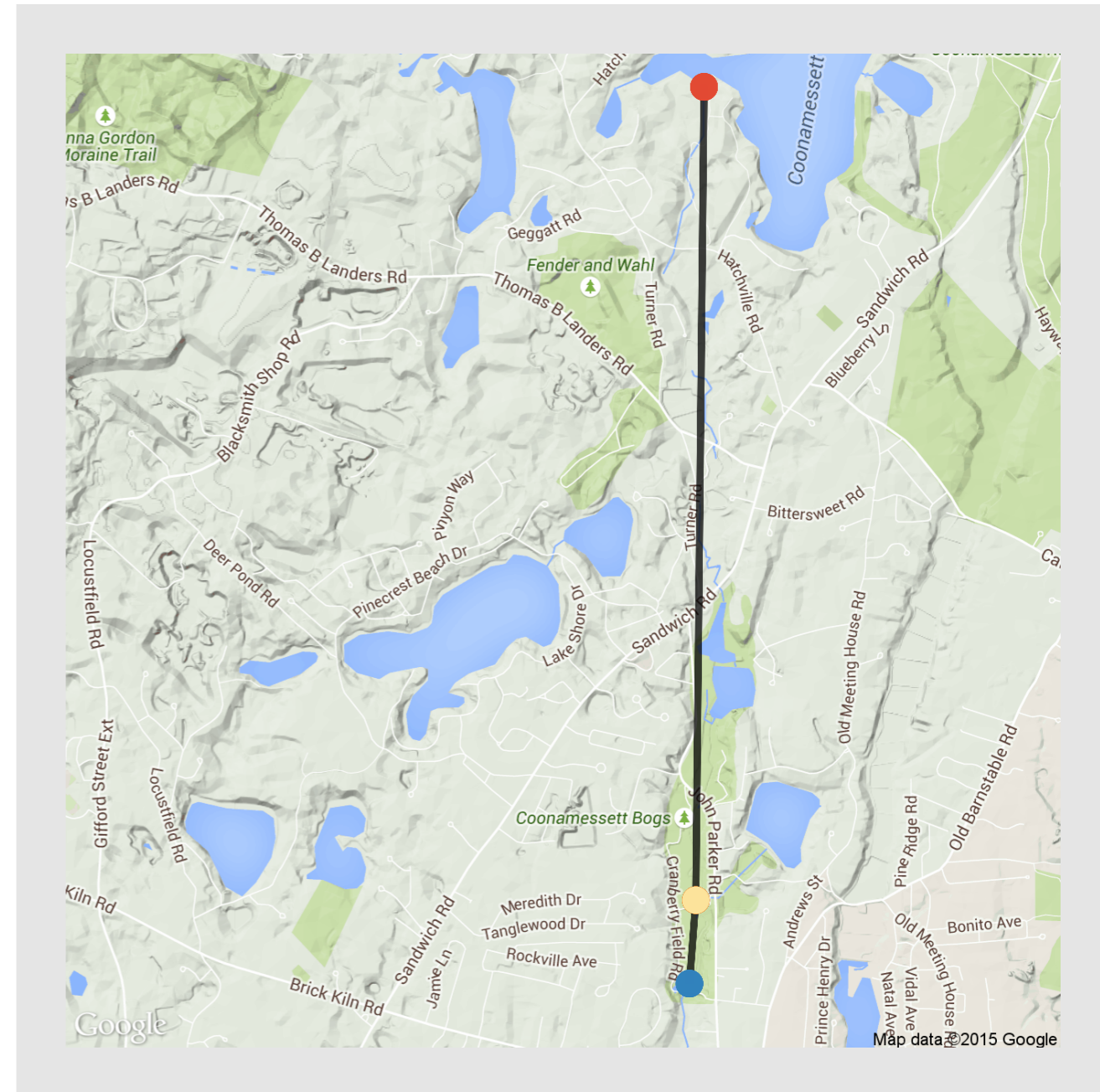
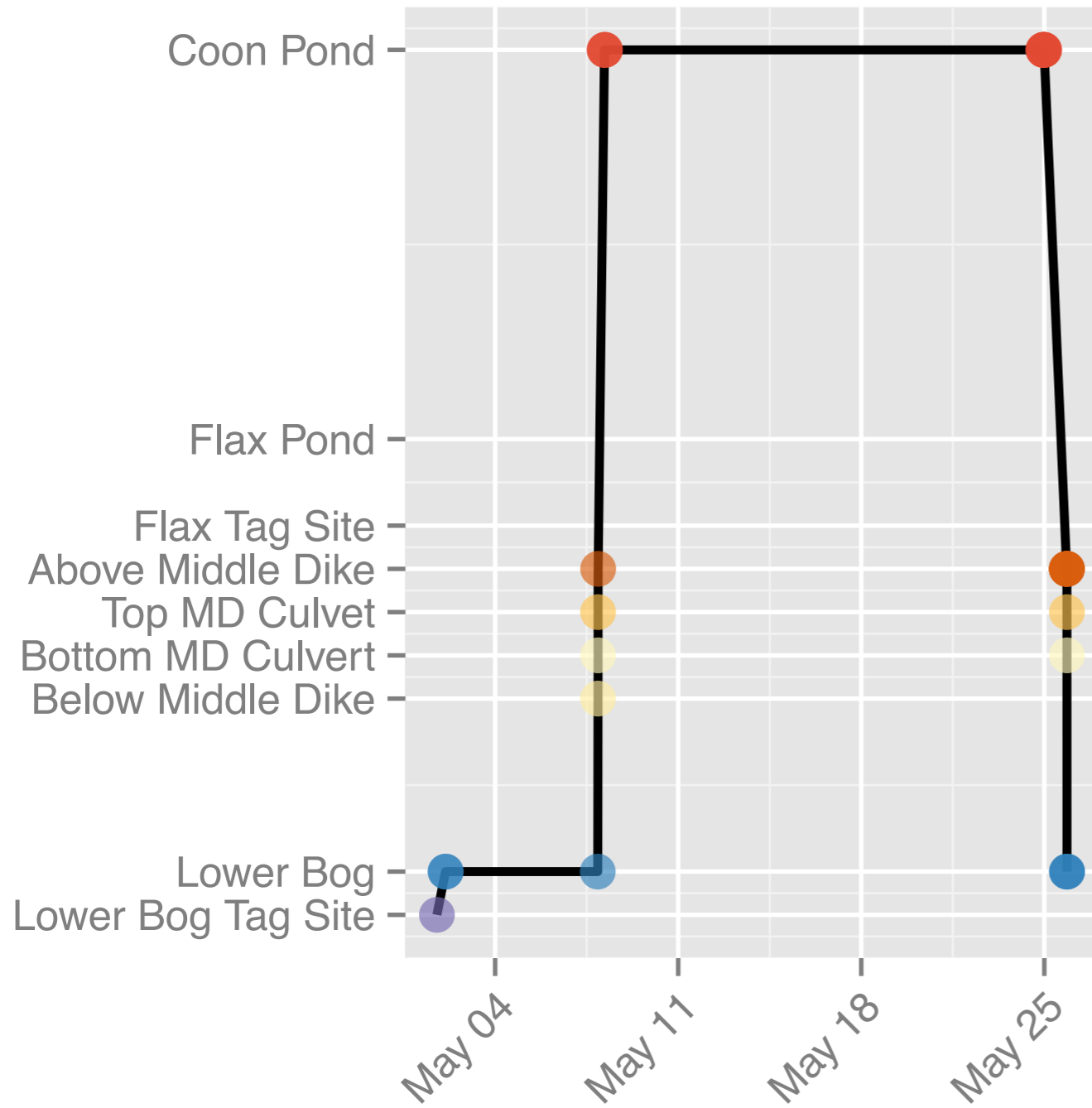
2015 CRT PIT Tagged Fish



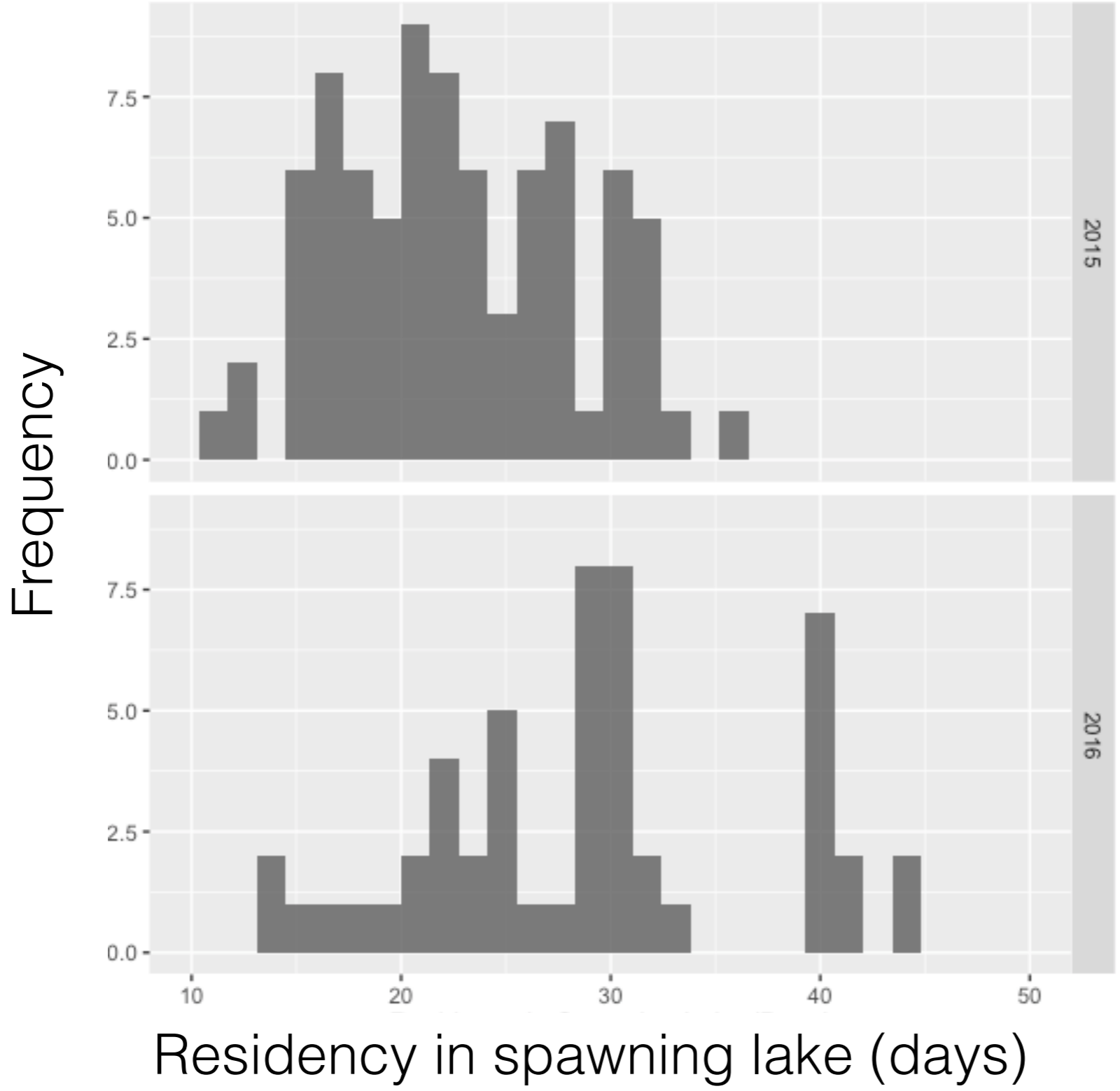
~5,000 movements

2016 CRT PIT Tagged Fish

# If we drill down to specific fish



# Significant period spent in lakes



**2015:** On average ~22 days

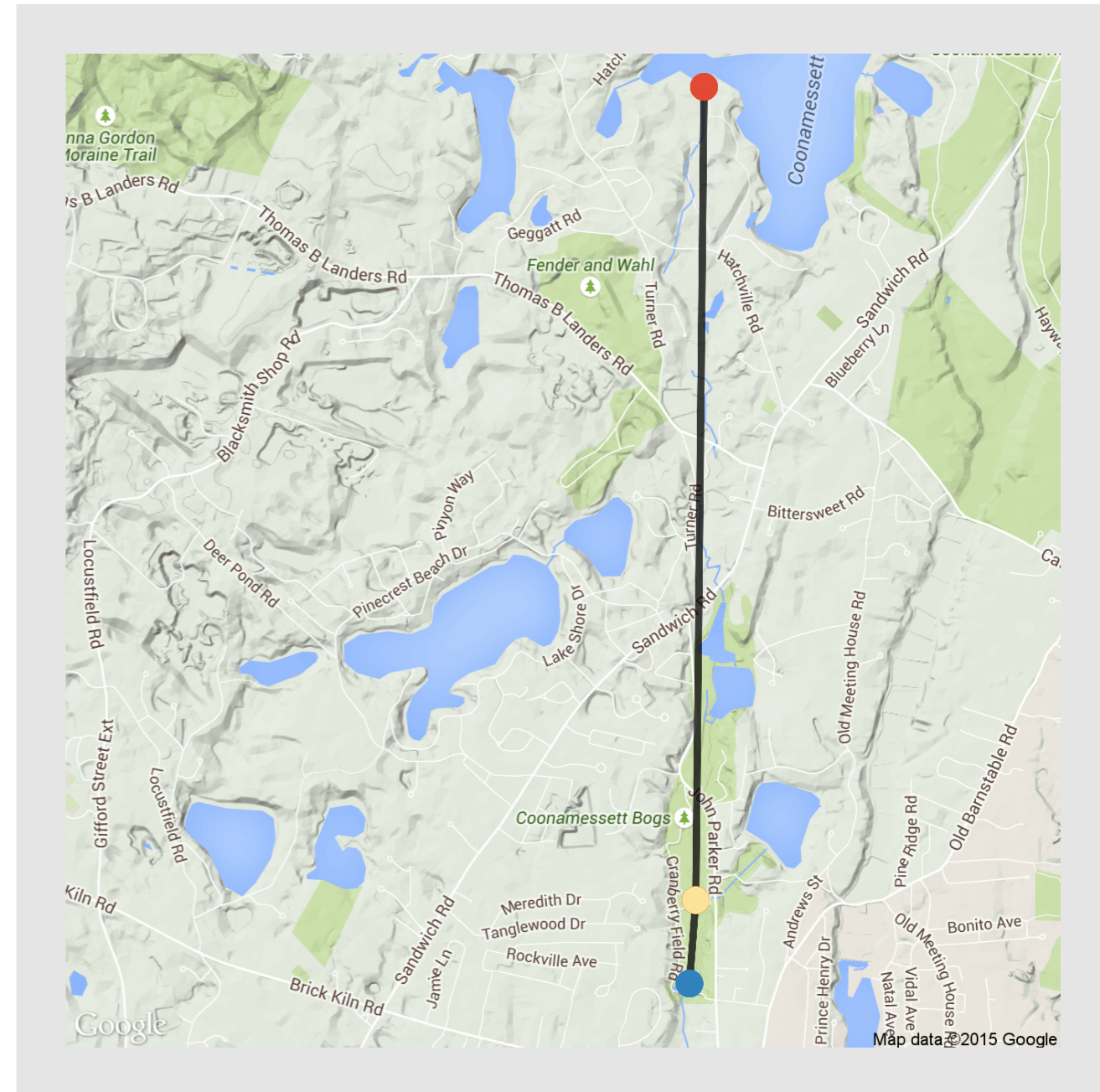
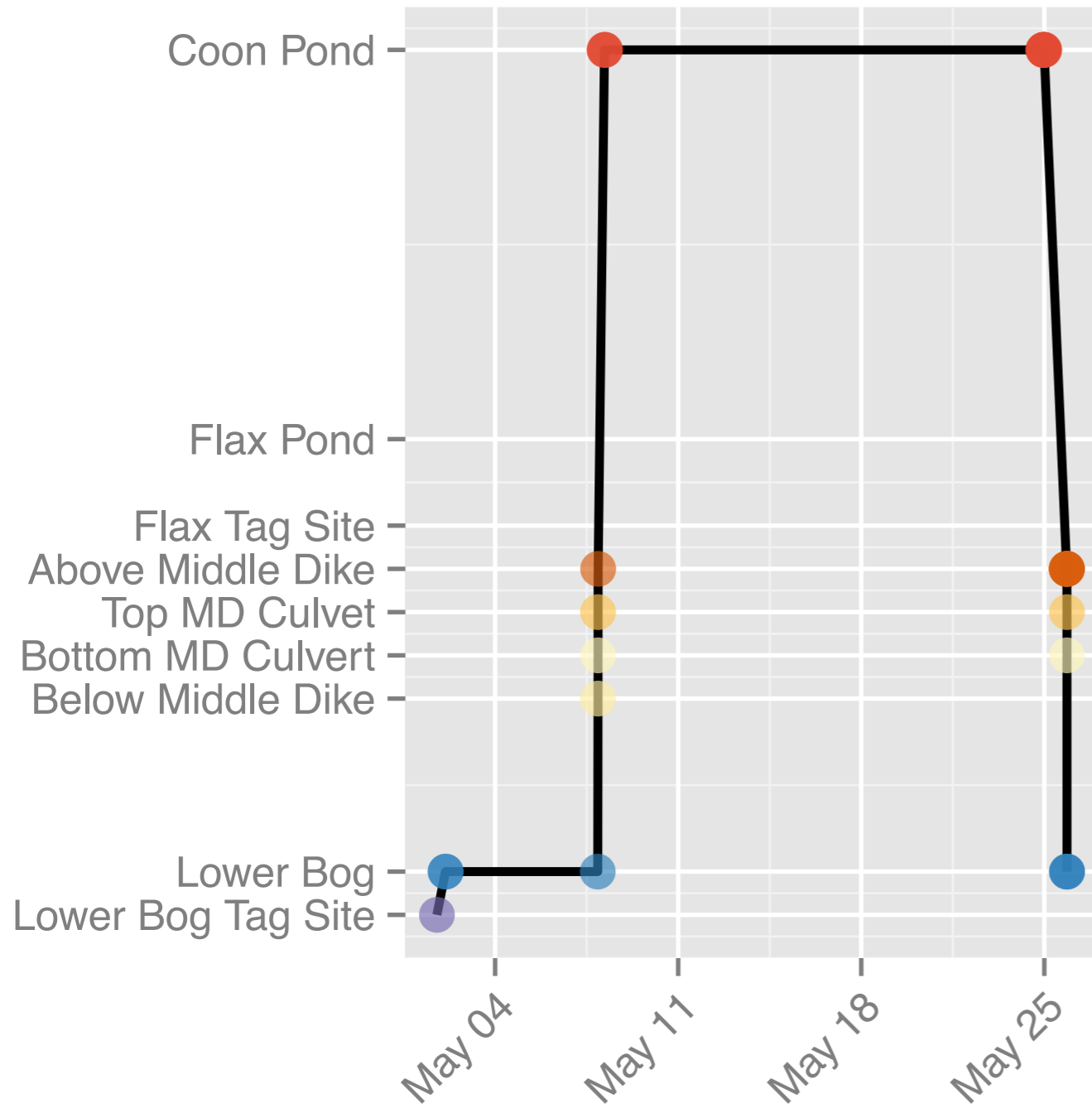
**2016:** On average ~30 days

50% - 100% > than previously thought

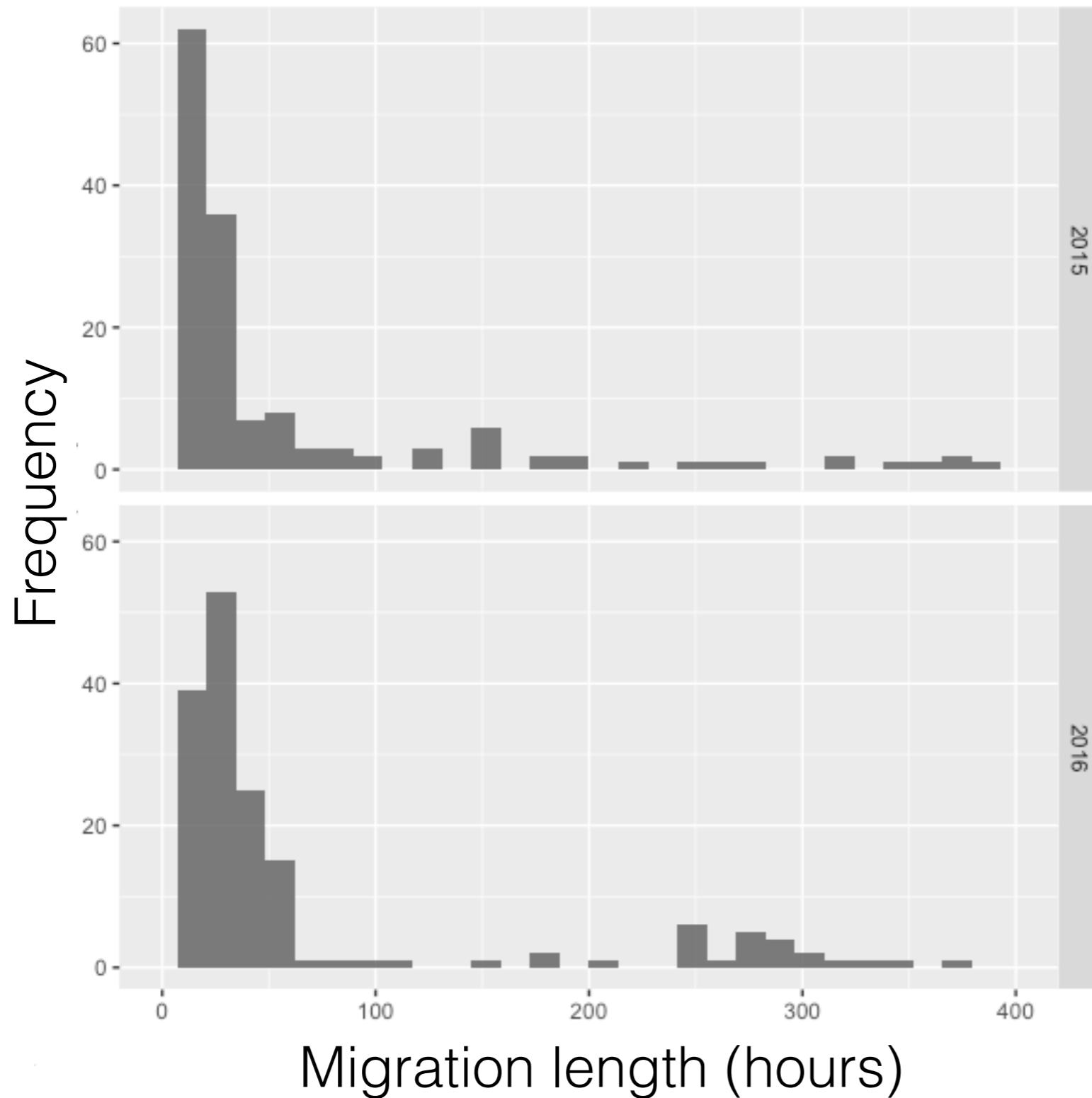
Potentially important for nutrient loading and life history



# Another feature of individual tracks

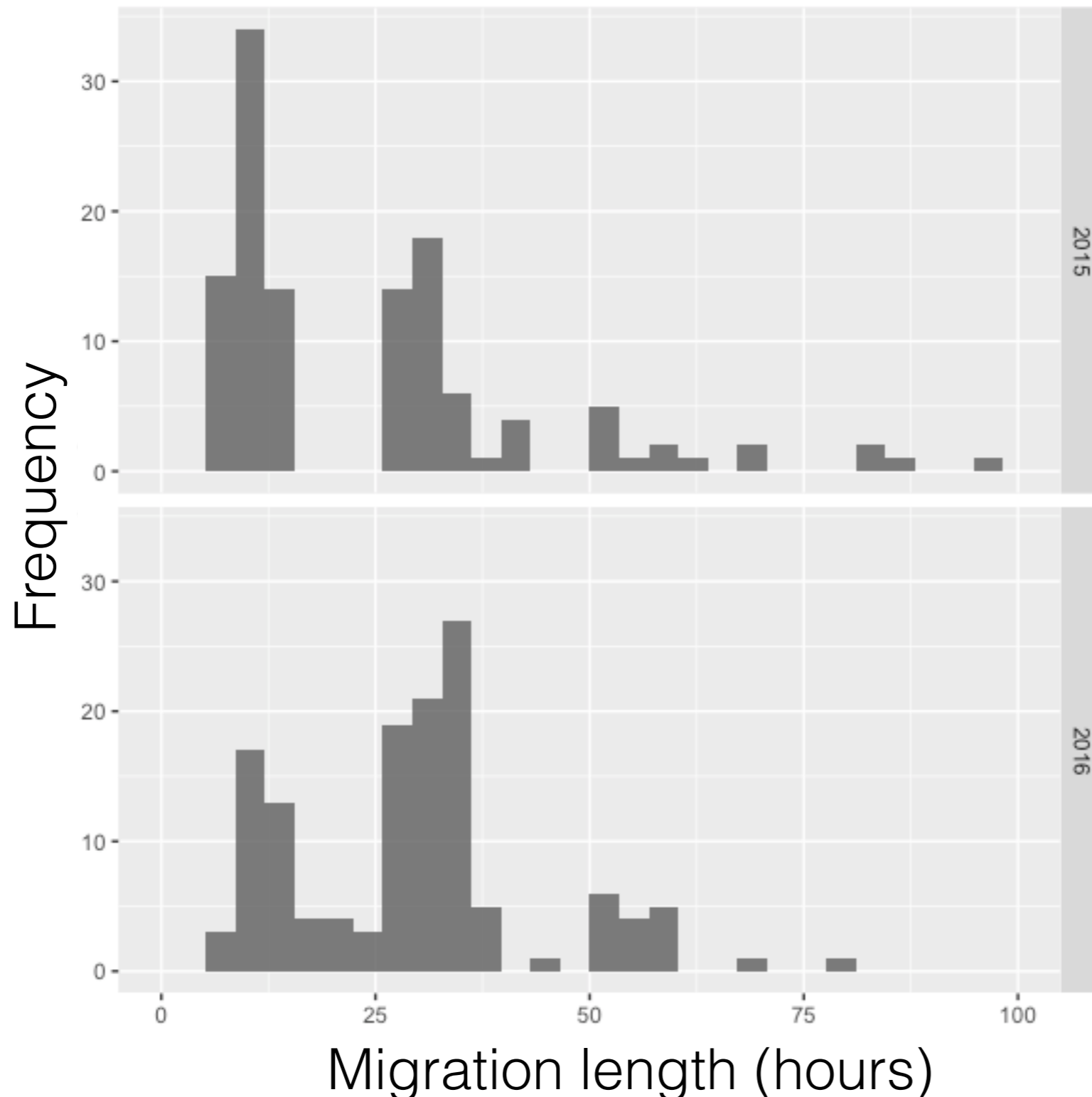


# Some fish took more time



Longer tail esp. in  
2016

# But generally, migrations were quick



Longer tail esp. in 2016

~50% in <10 hours

A second peak at ~ 24 hours

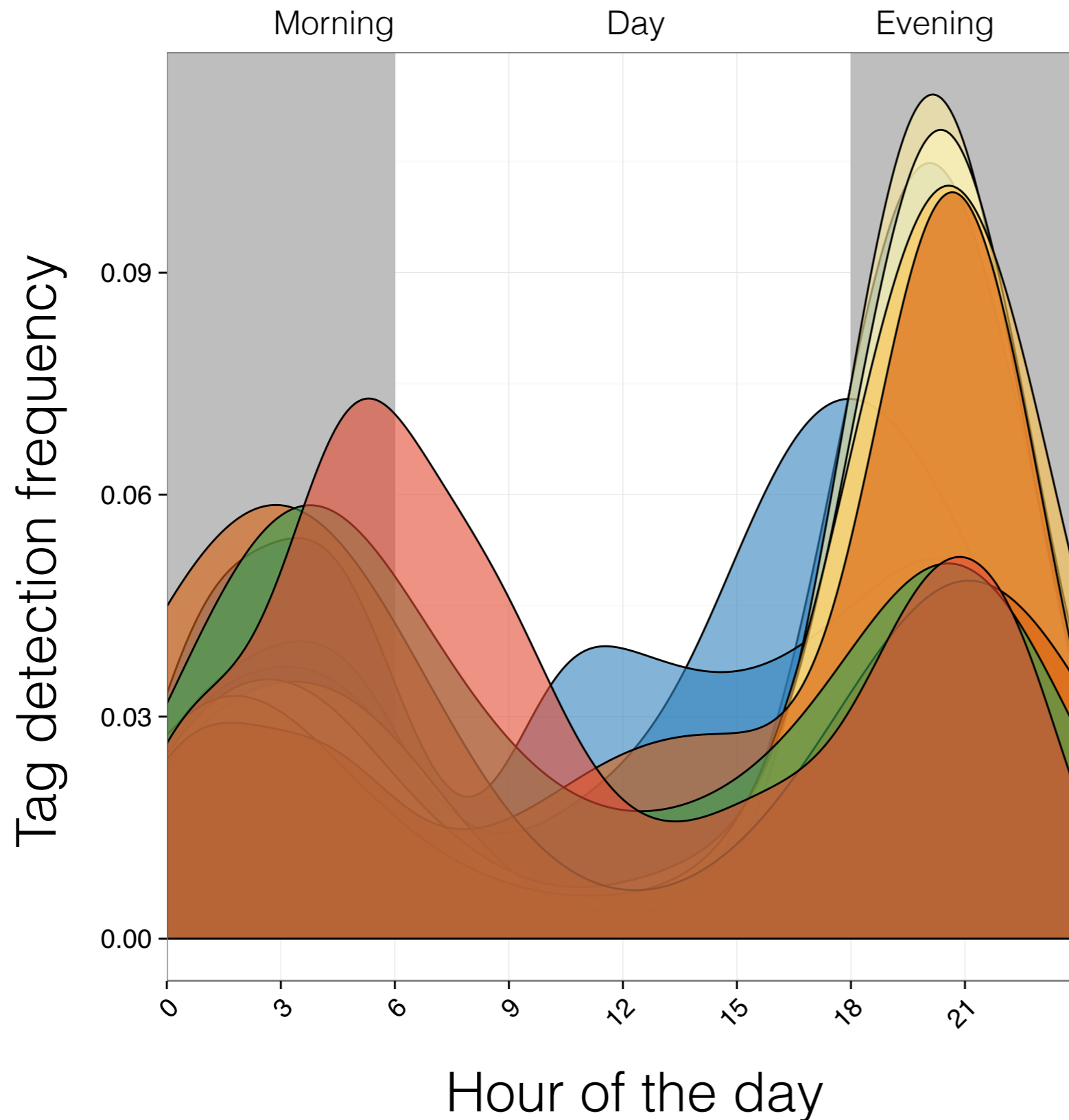
Interesting patterns suggest migration may not be continuous

Fastest fish made it in ~ 5 hrs

# Pattern of crepuscular movement



# Pattern of crepuscular movement



Bimodal pattern

Similar pattern for all antennas (colors)

Similar pattern through the season

Pattern observed for both species & years



# Ponds use was similar in both years



**2015:** 90% Coon & 10% Flax

**2016:** 88% Coon & 12% Flax

Percents were similar among species

But many more alewives reached ponds

85-90% of bluebacks remained in Lower Bog in both years

# Few fish made it to spawning ponds



Pattern initially thought to be result of low detection rate

But observed for both years

~ 45 - 50% of alewives

~ 10 - 15% of blueback

Many potential drivers...



# Summary CRT study

- Movement primarily occurred under the cover of darkness, with peak periods of movement occurring immediately following sunset and just prior to sunrise
- Movement through the river was typically rapid, with many fish covering the 5 km stream length in a single night (and as little as 5 hours)
- Surprisingly few fish that entered the watershed made it to a spawning pond

# Summary CRT study

- Movement primarily occurred under the cover of darkness, with peak periods of movement occurring immediately following sunset and just prior to sunrise
- Movement through the river was typically rapid, with many fish covering the 5 km stream length in a single night (and as little as 5 hours)
- Surprisingly few fish that entered the watershed made it to a spawning pond
- Some repeat spawning, but limited between 2015 and 2016 for the Coonamessett
- Evidence that existing culverts do delay migration, may impact survival or success
- Most fish avoided the steep pass ladder on the way up, but utilized it on the way down

# The future of CRT tagging

Generated valuable (novel) scientific data for relatively little \$


This information is helping to guide restoration planning and collaboration interested parties

Plan to continue this work for the foreseeable future

Hope to tag to assess the how the changes associated with restoration affect fish behavior

Many unanswered questions about blueback herring (e.g., where are they spawning & role of Pond 14?)



A background image of water with reflections of trees and a sky, overlaid with a white text box. The water is dark blue and green, with golden reflections of trees and a bright sky. The text box is white and contains the word "Questions?".

Questions?