

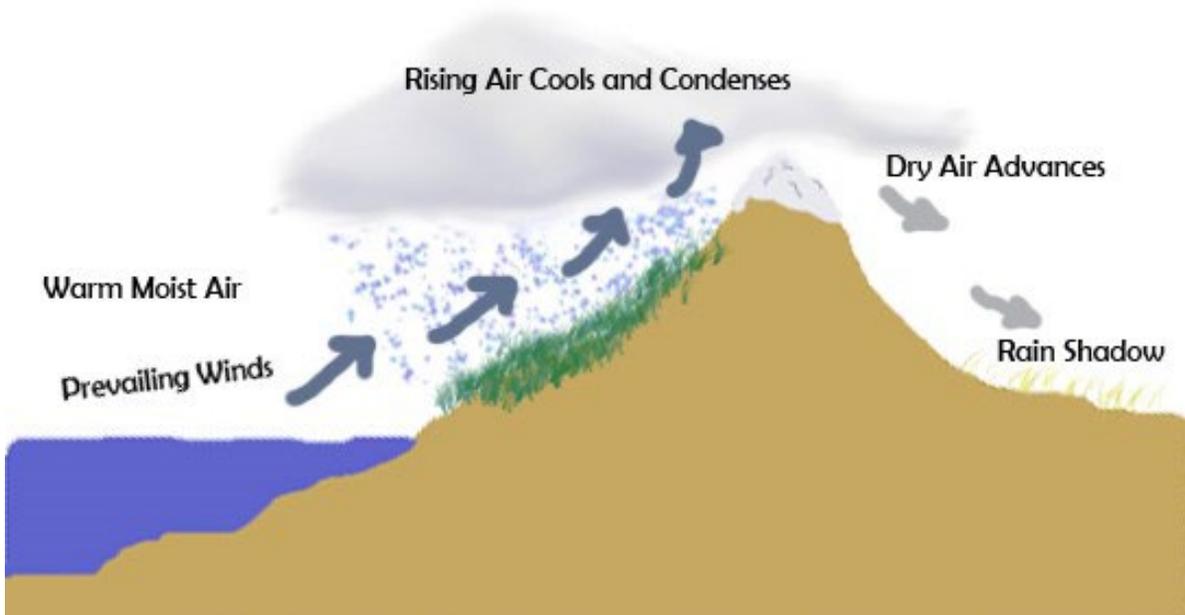
In the shadow of drought:
monitoring for lost connectivity
and population impacts

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Collaborators: Allison Roy – UMass, James Knighton and Eric Schultz – UConn

Supported by funding by the Long Island Sound Study Research Grant Program
and the Massachusetts Division of Marine Fisheries

Dryness is a feature resulting from climatic processes

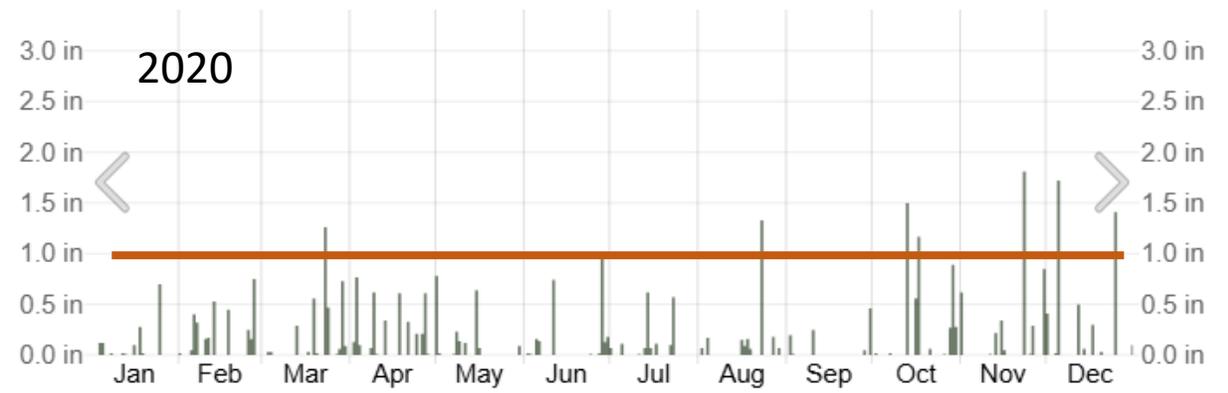
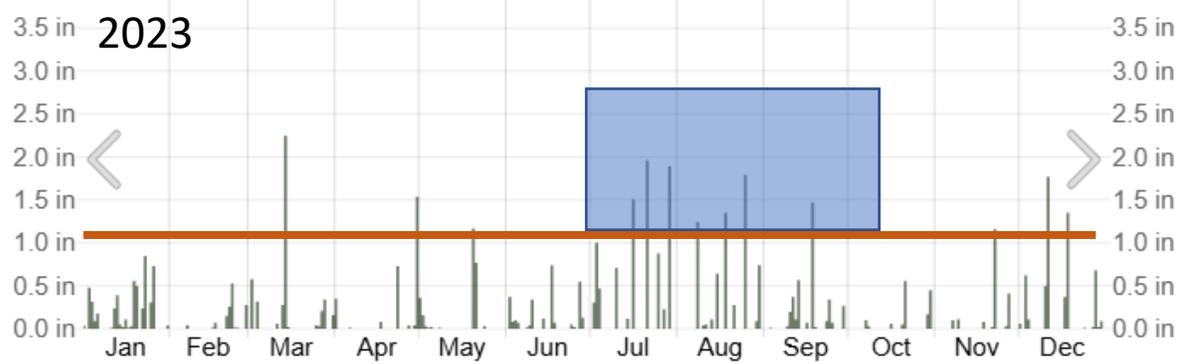
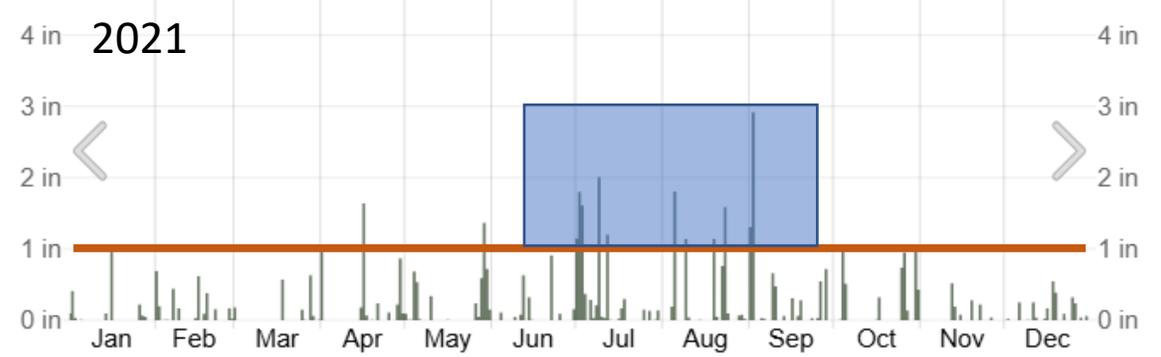
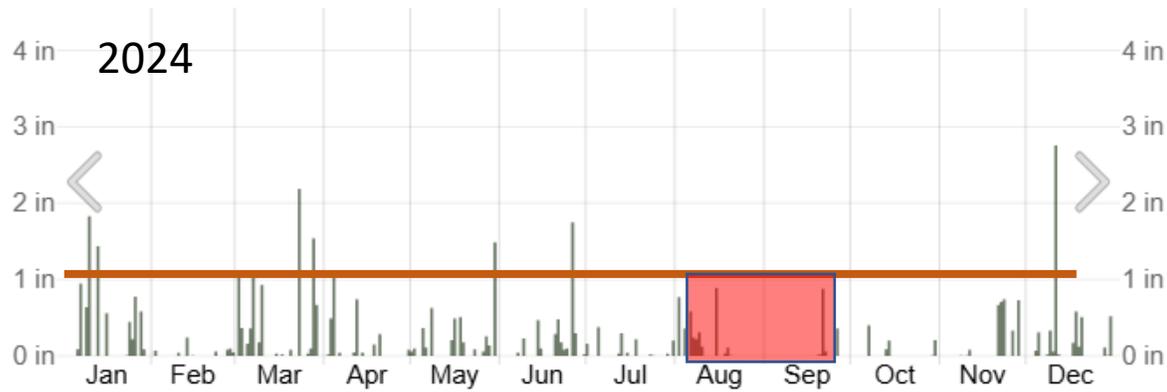
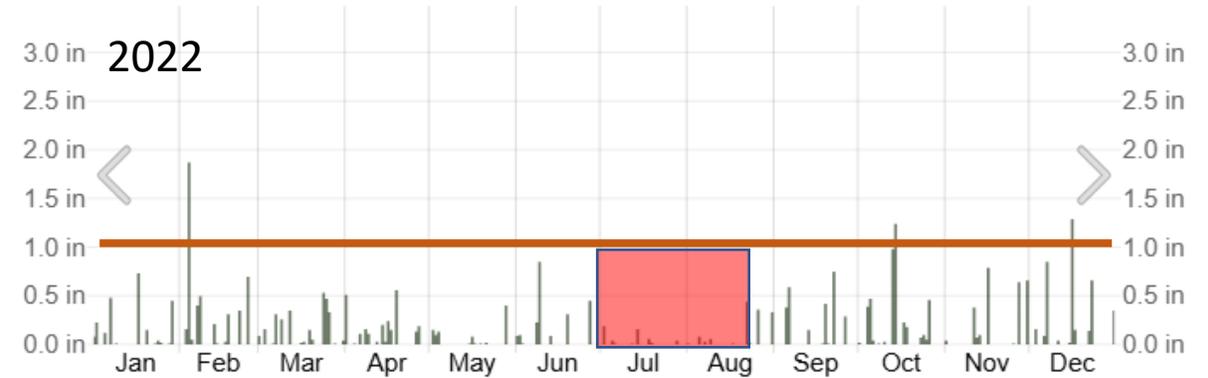
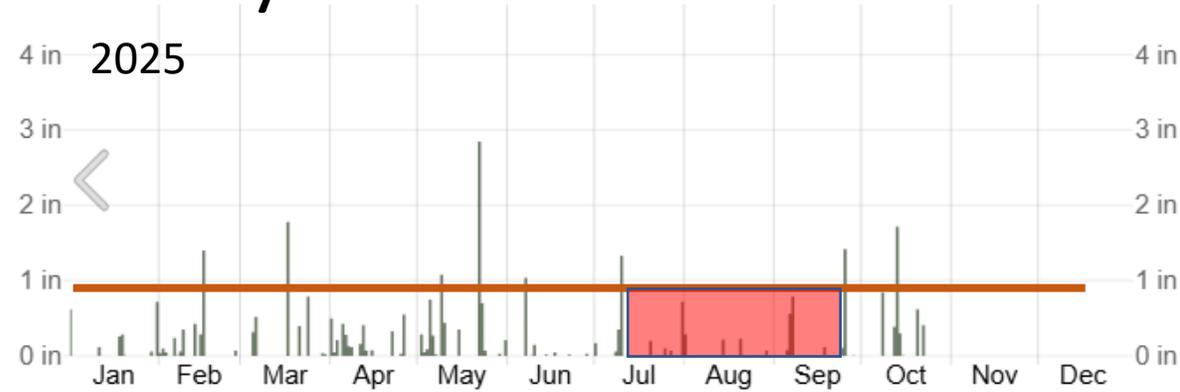


<https://www.nps.gov/jotr/learn/nature/deserts.htm>

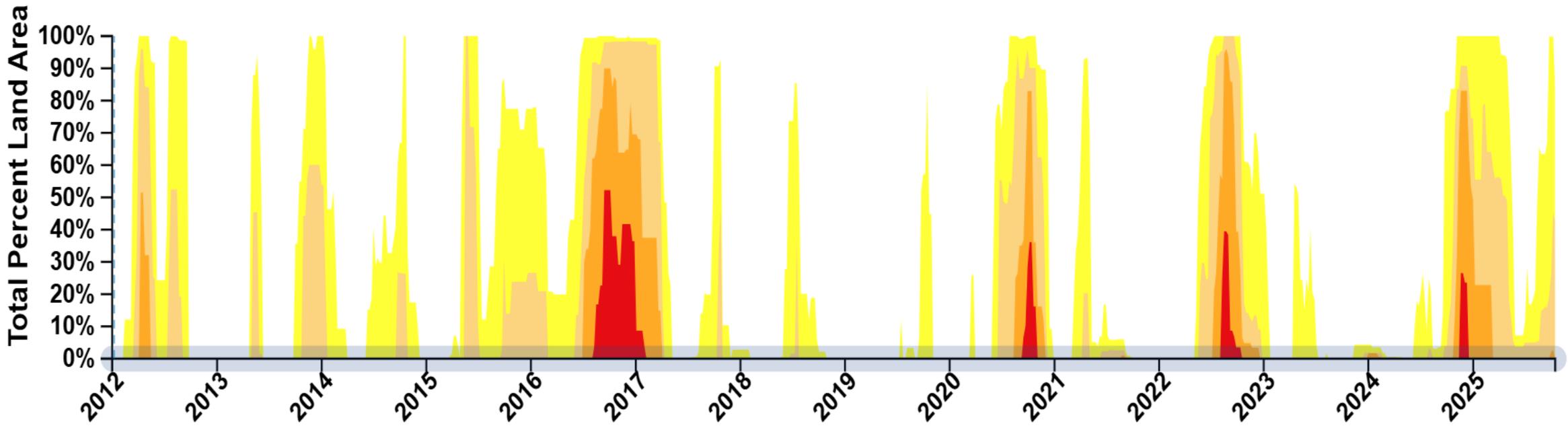


<https://education.nationalgeographic.org/resource/rain-shadow/>

Dryness in NE is not uncommon



Dryness transitions to drought

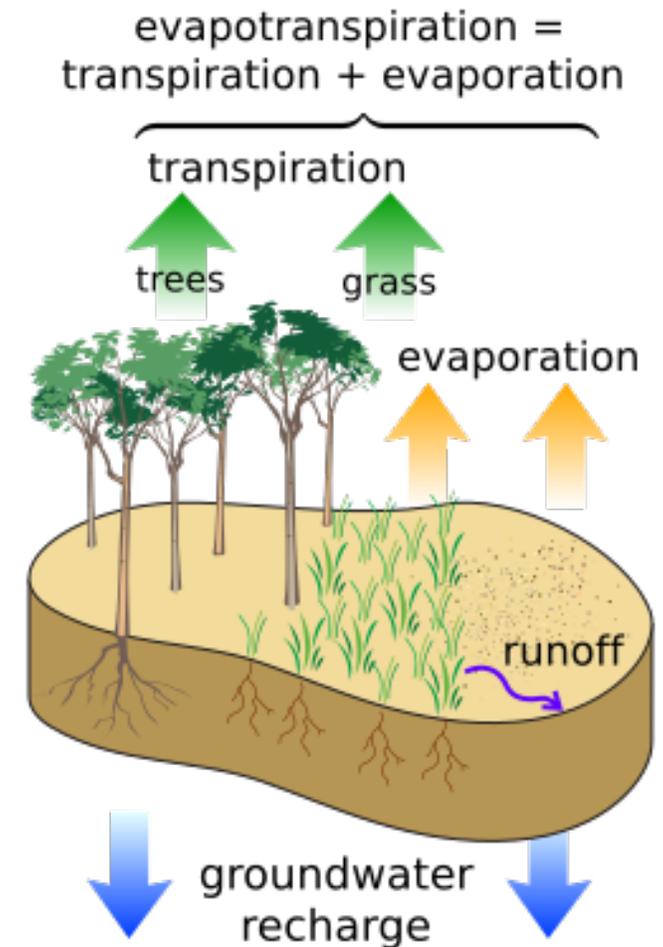


USDMS values for Massachusetts

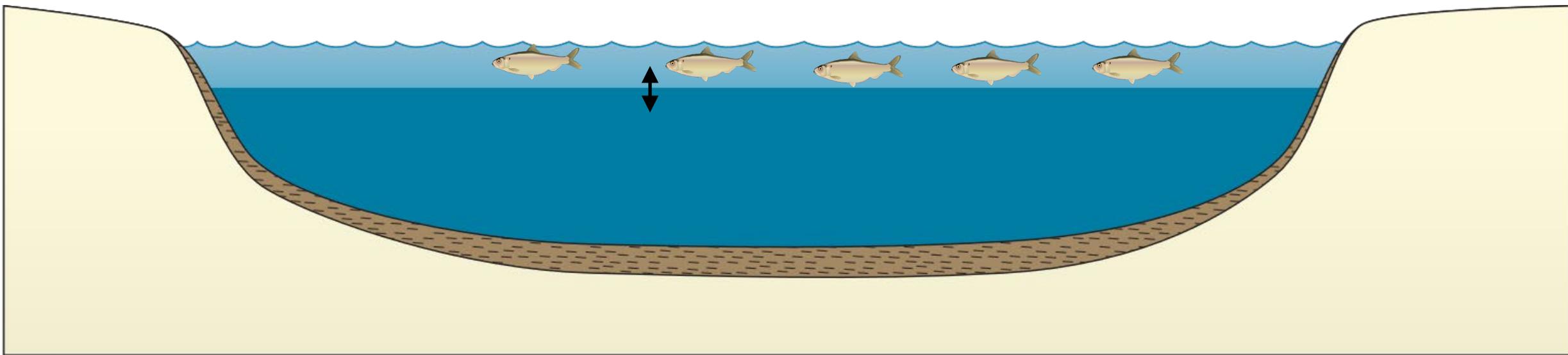
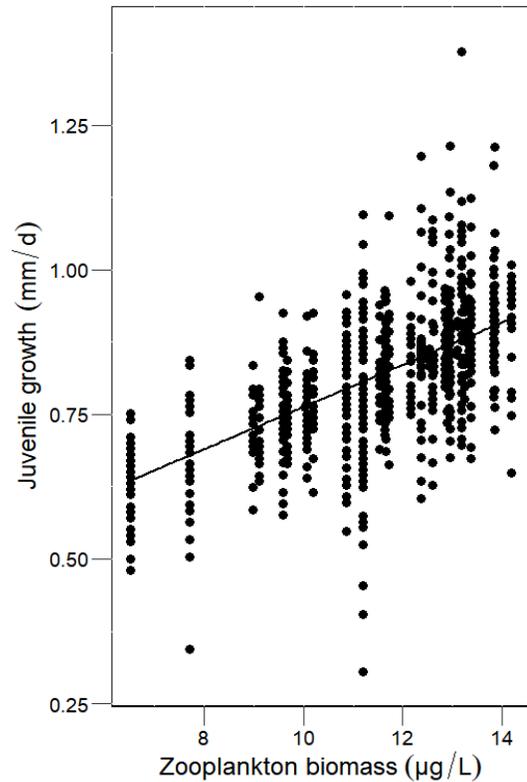
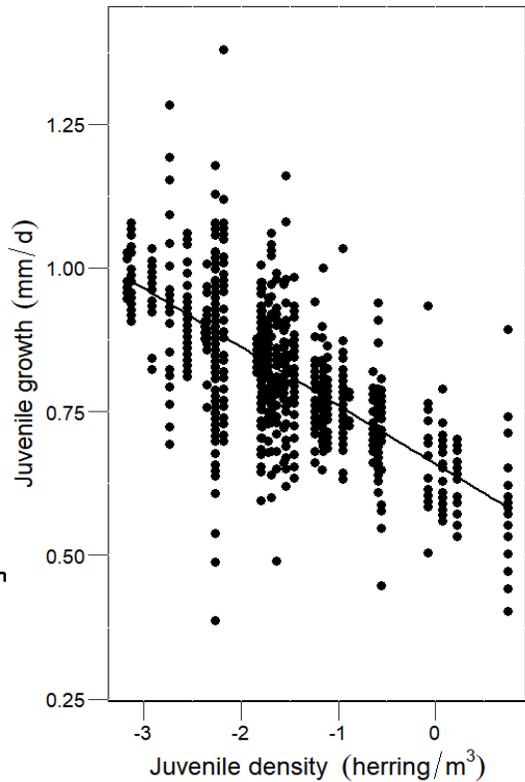
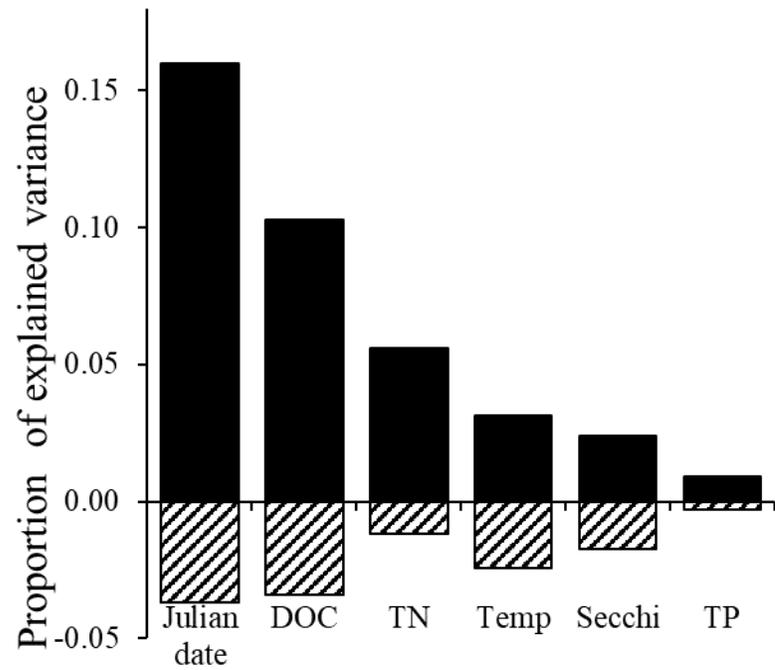
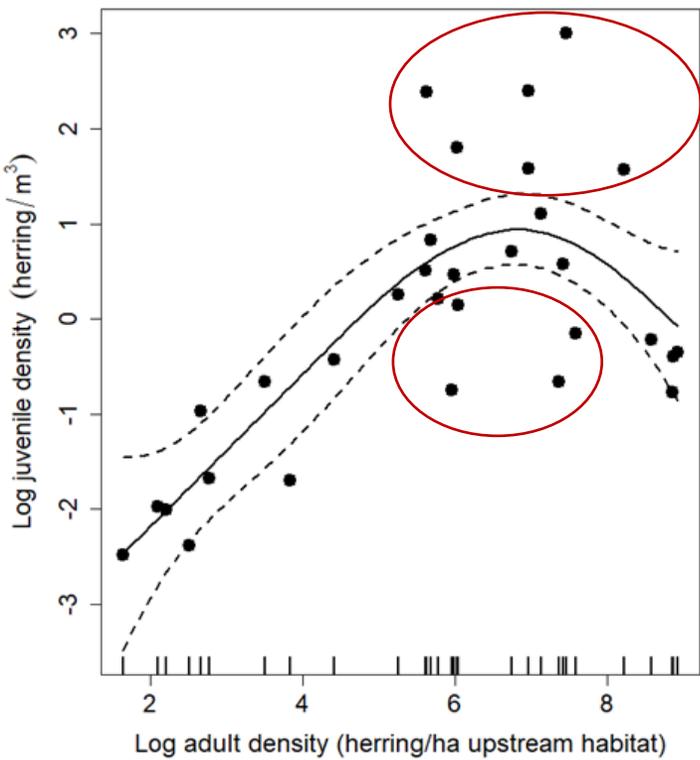
D0 Abnormally Dry	41.3%	D4 Exceptional Drought	0.00%
D1 Moderate Drought	42.3%	Total Area in Drought 42.30%	
D2 Severe Drought	0.0%		
D3 Extreme Drought	0.0%		

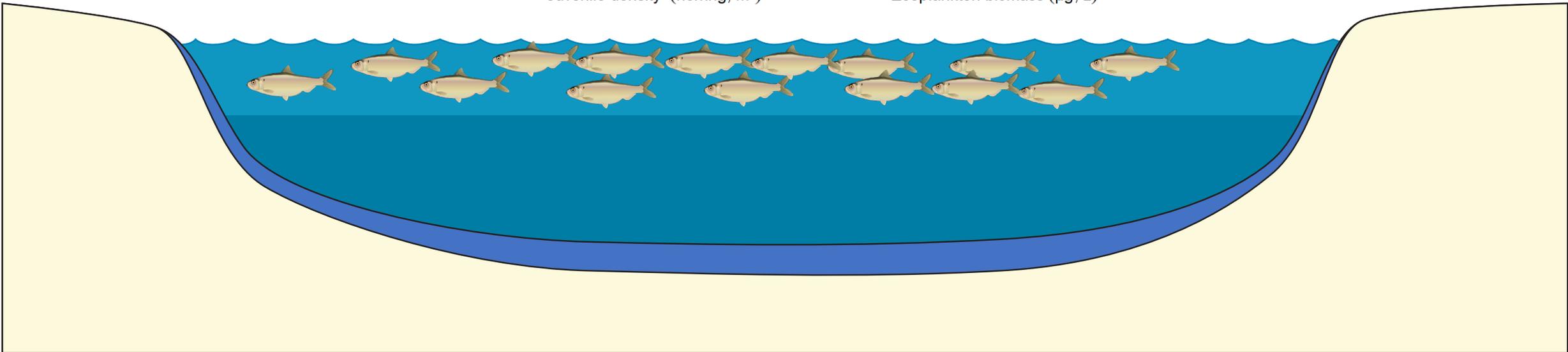
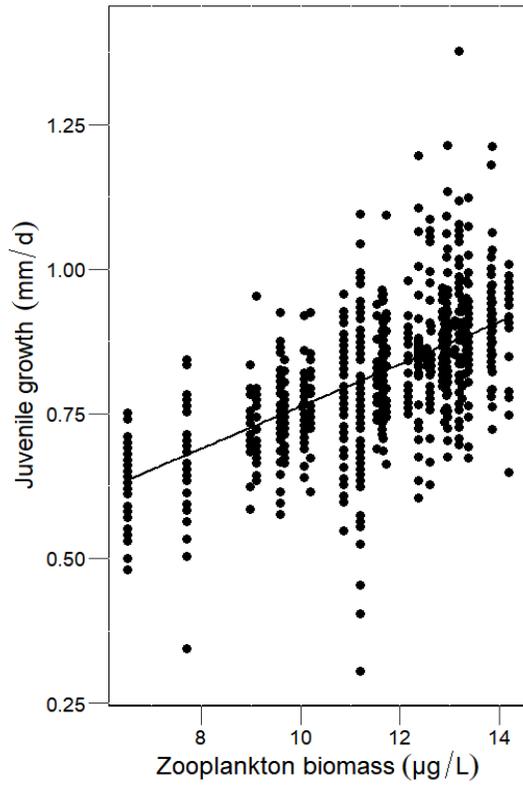
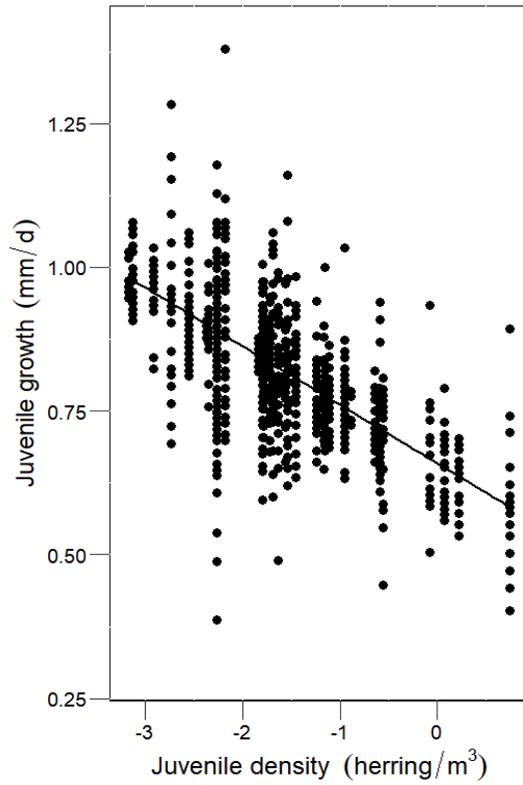


But there are additional water losses



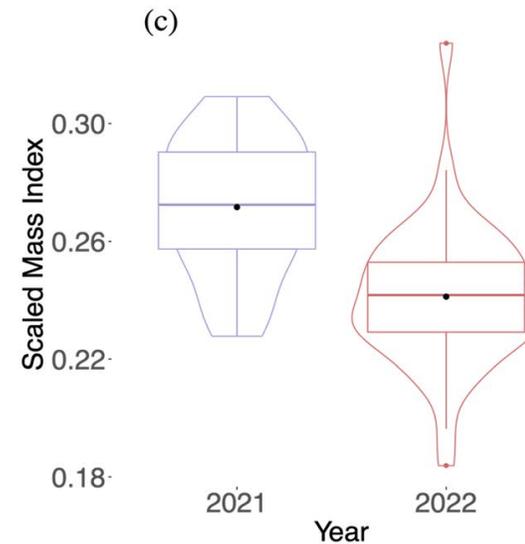
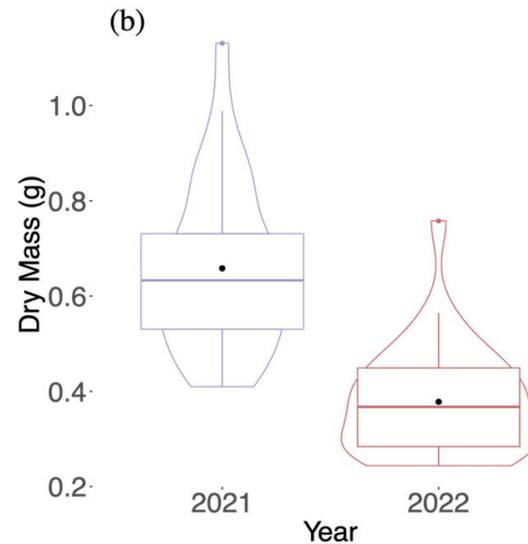
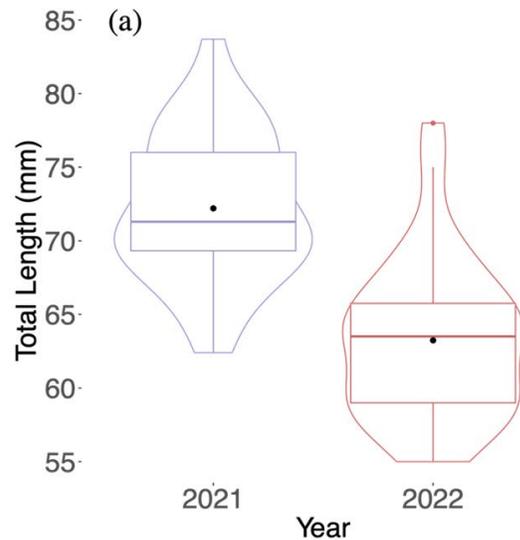
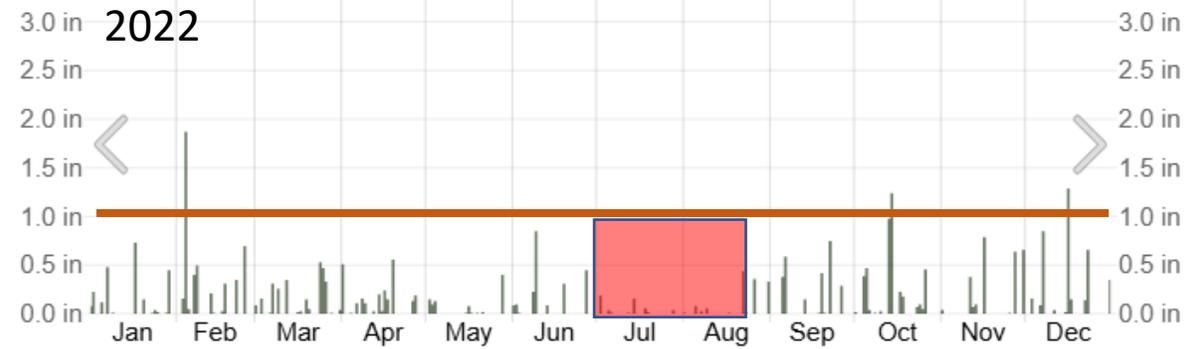
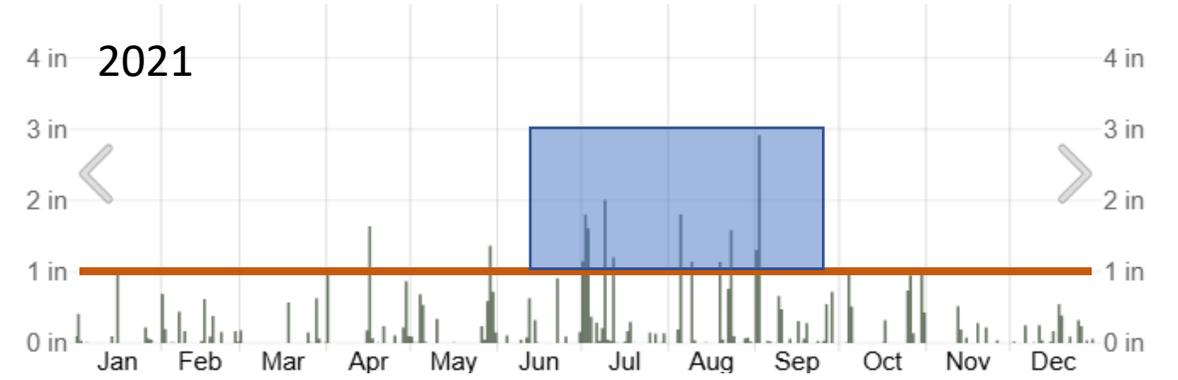




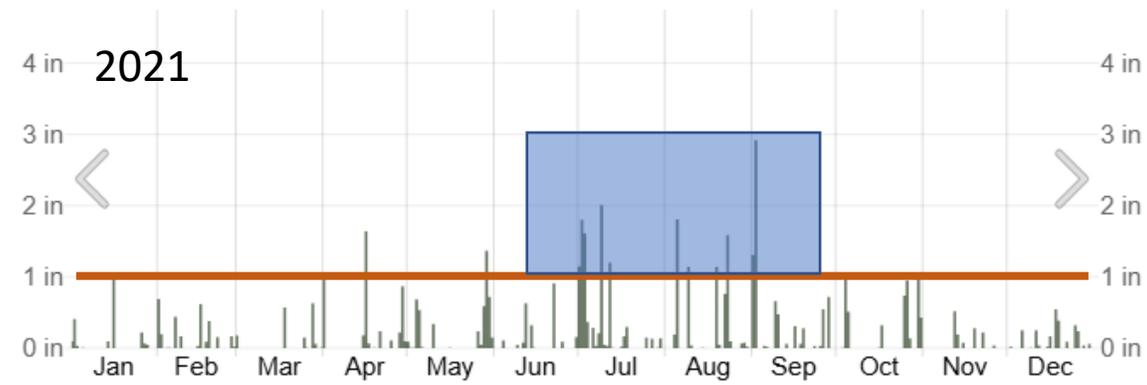
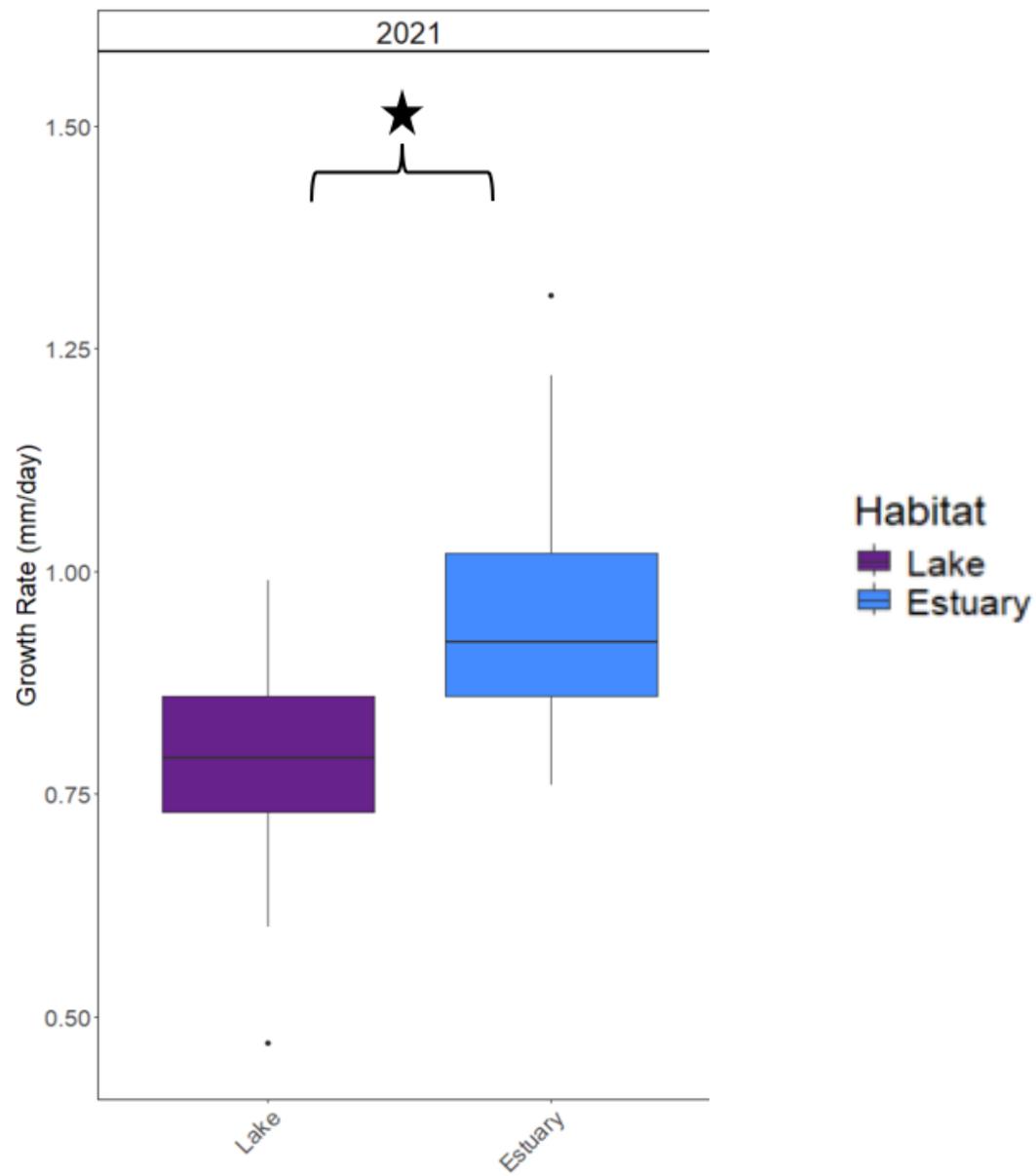


Can They Get Out 1

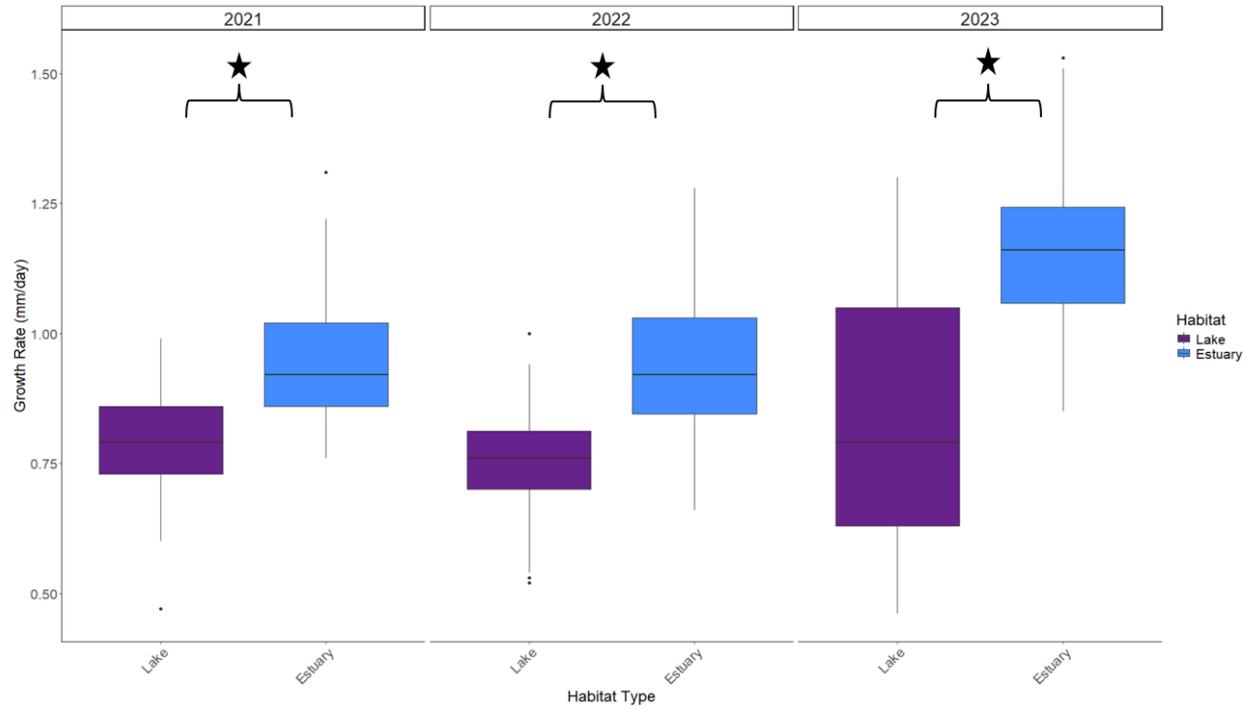
- Burgess – Bride Lake



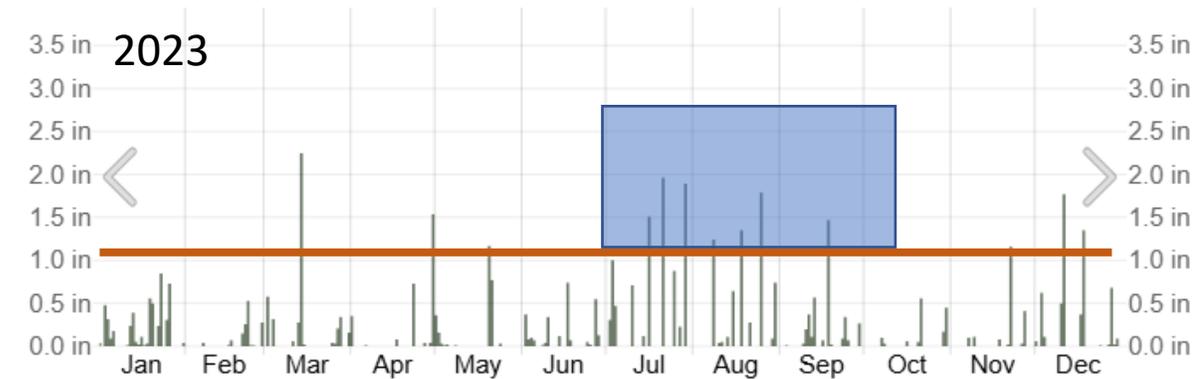
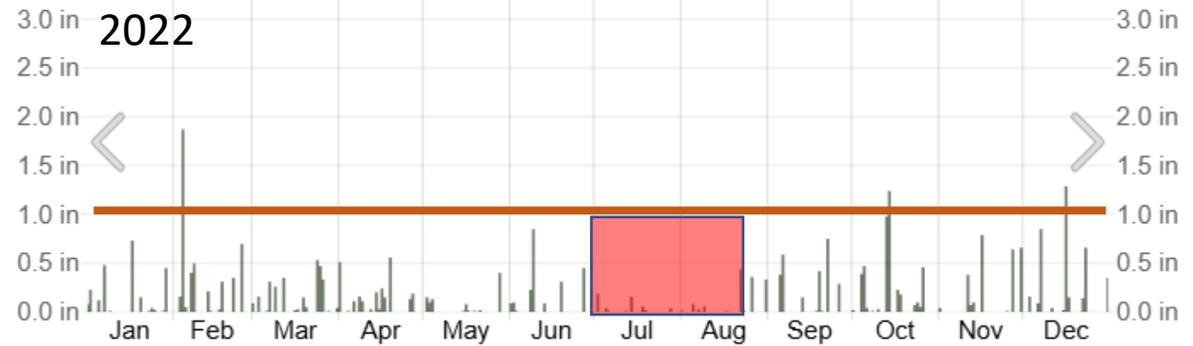
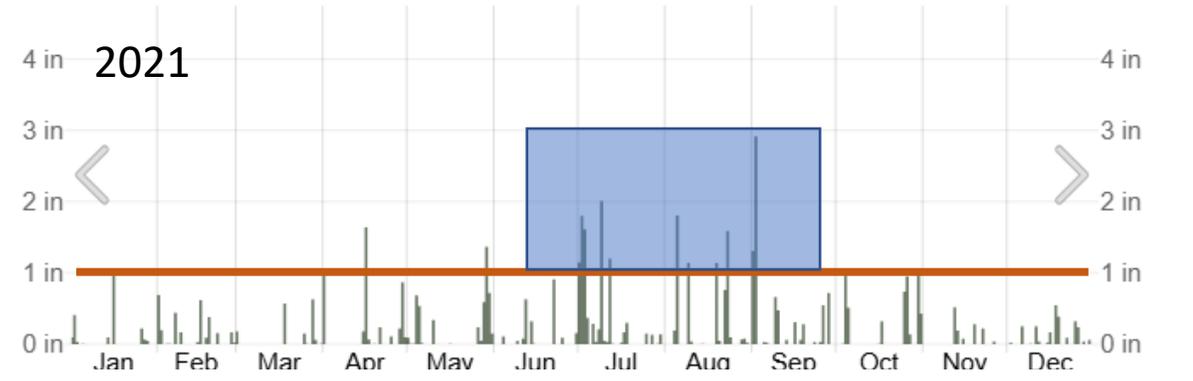
- Burgoff thesis at UMass



- Burgoff thesis at UMass



Weymouth Back River watershed



Winter

Spring

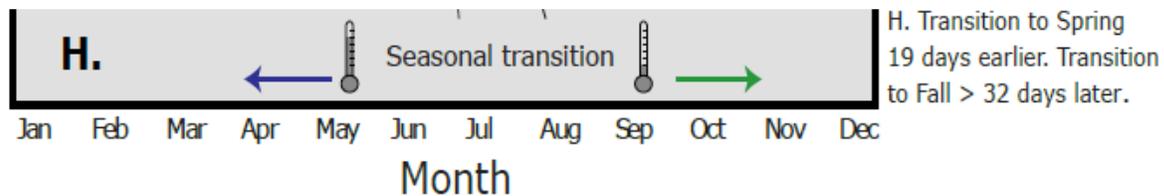
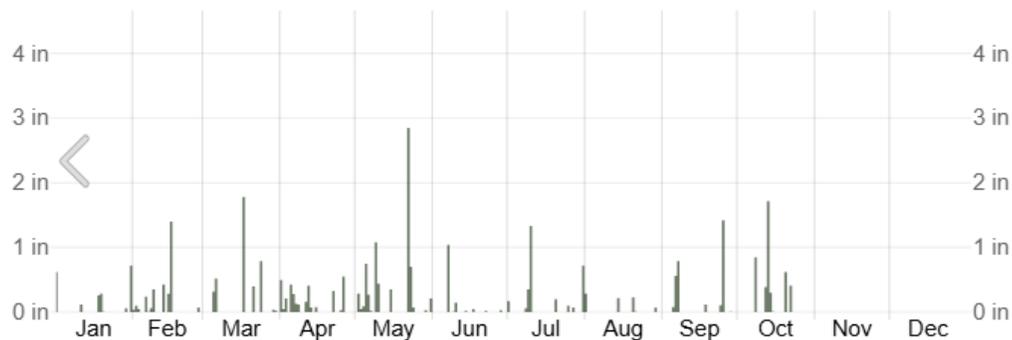
Summer

Autumn

Shifts in timing

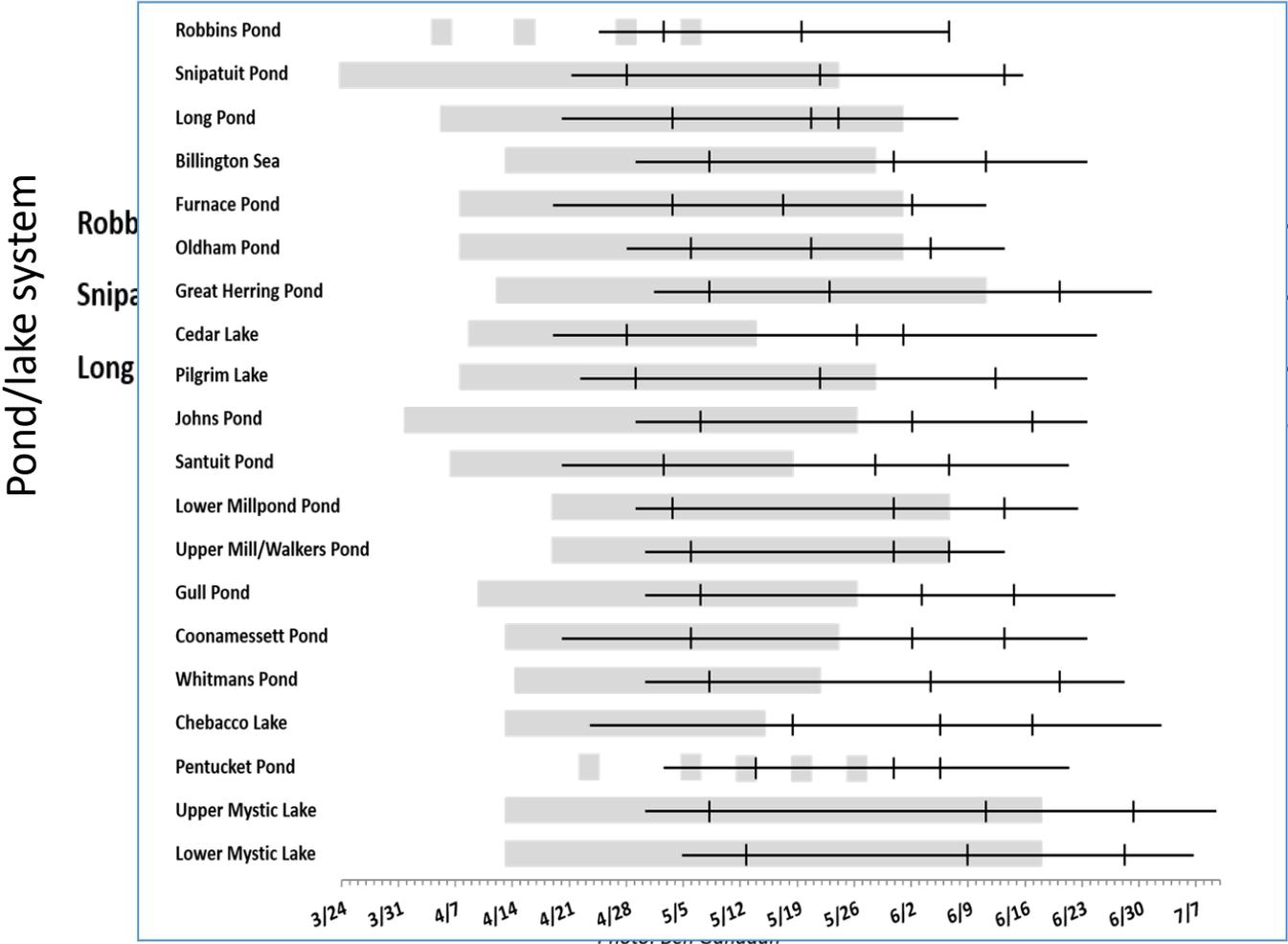


- Relatively few studies
- Earlier timing was most common
- Some shifts earlier, some later, some not at all



Phenology

- Spawning began after (7-28 days) first adult alewife
- Spawning continued after (7-48 days) adult run en



This all led to a hypothesis we can test

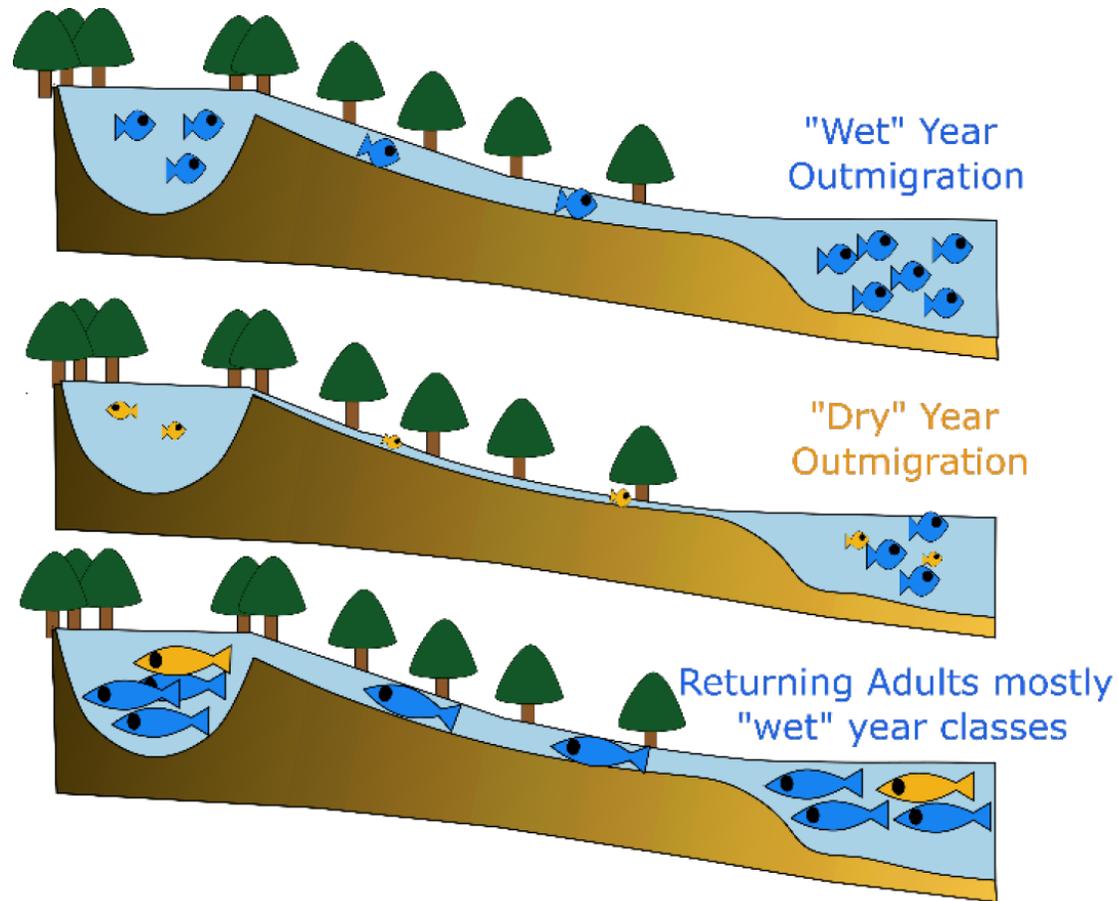
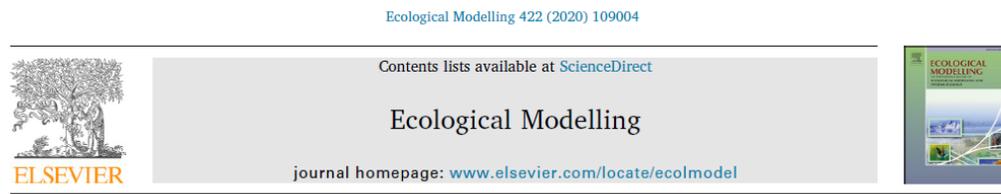


Fig. 1 – Hypothesized contribution of “wet” and “dry” year class to returning adults.

DMF collaboration

- Brad Chase, John Sheppard, Joe Holbeche, Michael Burgess
- Scott Elzey and the age and growth lab
- Gary Nelson, Ben Gahagan



A life cycle simulation model for exploring causes of population change in Alewife (*Alosa pseudoharengus*)

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^b Department of Environmental Conservation, University of Massachusetts, Amherst, MA 01003, United States

^c The Nature Conservancy, 99 Bedford Street, Suite 500, Boston, MA 02111, United States

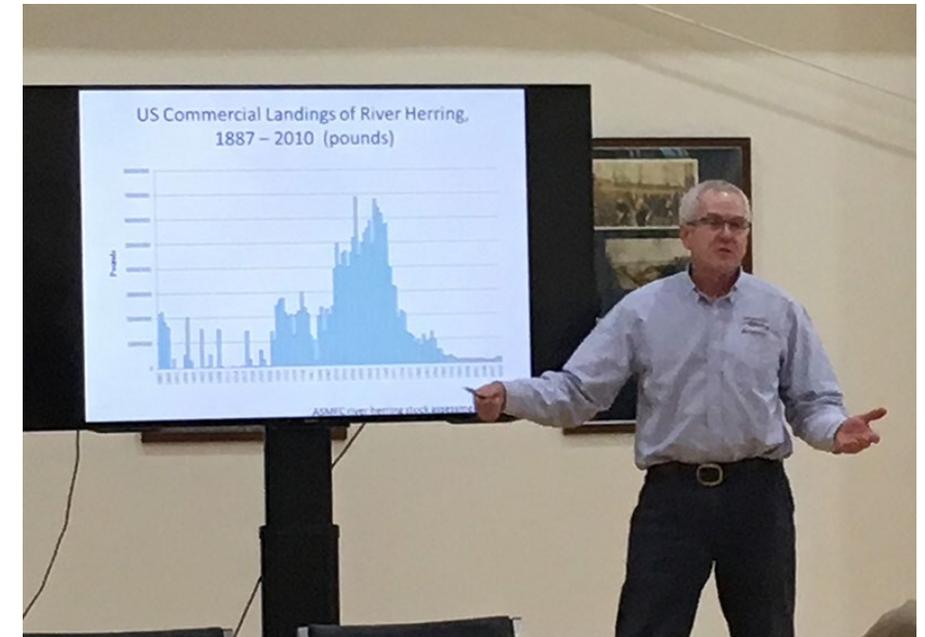


Photo by Barry Stringfellow

Over-arching questions

- Do drought year-classes represent a smaller fraction in runs
 - Analysis of long term age data to determine drought impact on year class strength
- Are fish smaller from drought years
 - Ongoing juvenile studies in CT, MA and ME
- Systems are unique so there is likelihood of differences in the outcomes based on timing of connectivity loss and other factors

What I would like to hear today...

1- Stories from this year that you all have?

2- How long were fished trapped this summer? Are there places that had flow all summer?

3- Do you have any records from past years?

4- Could you envision collecting this information in the future?

Other needs

- We are in need of advisory board members for CTGO II
- Emigration pictures from three cameras, maybe more
- Any data or anecdotal observations about your runs
- Please reach out!

UMass Amherst River Herring Research

PIs: Adrian Jordaan, (UMass Amherst), Allison Roy (USGS, MA Coop Unit), Michelle Staudinger (UMaine), Lisa Komoroske (UMass Amherst)

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MA Division of Marine Fisheries: Ben Gahagan, John Sheppard, Michael Armstrong, Brad Chase, Joe Holbeche

Connecticut Department of Energy and Environmental Protection: Kevin Job

US Fish and Wildlife Service: Michael Bailey, David Perkins, Ken Sprankle

The Nature Conservancy: Alison Bowden

Partners

Passamaquoddy Tribe Pleasant Point Reservation, Wampanoag Tribe of Gay Head (Aquinnah)
Mystic River Watershed Association, River herring wardens throughout Massachusetts, ME DMR, NH F&G, RI DNR,, River Herring Networks (Maine and Mass)

Funding Sources

