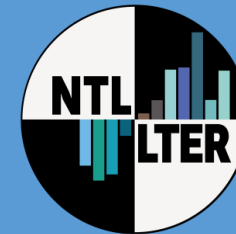
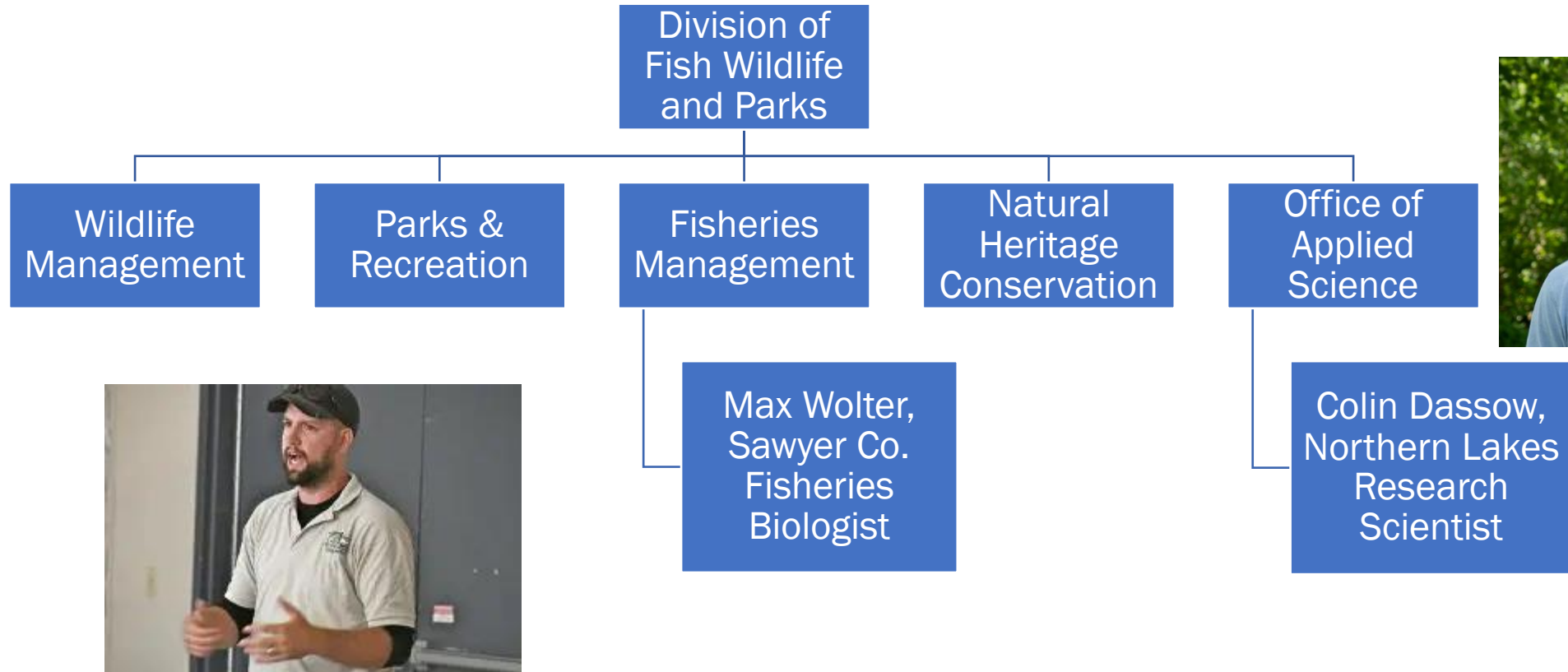


Wisconsin's Changing Fisheries



Dr. Colin Dassow

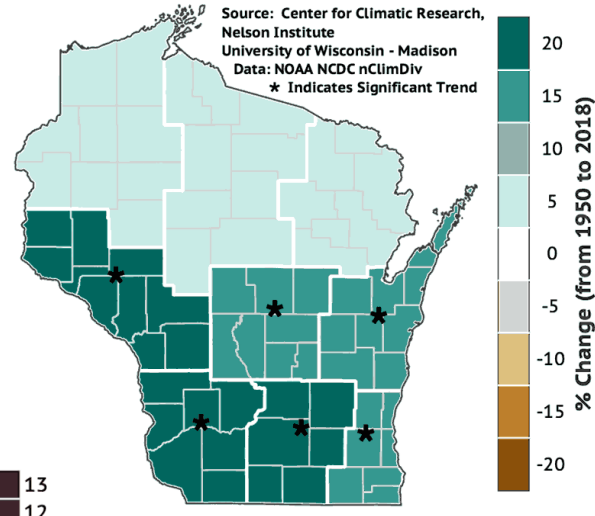
WDNR – Office of Applied Science



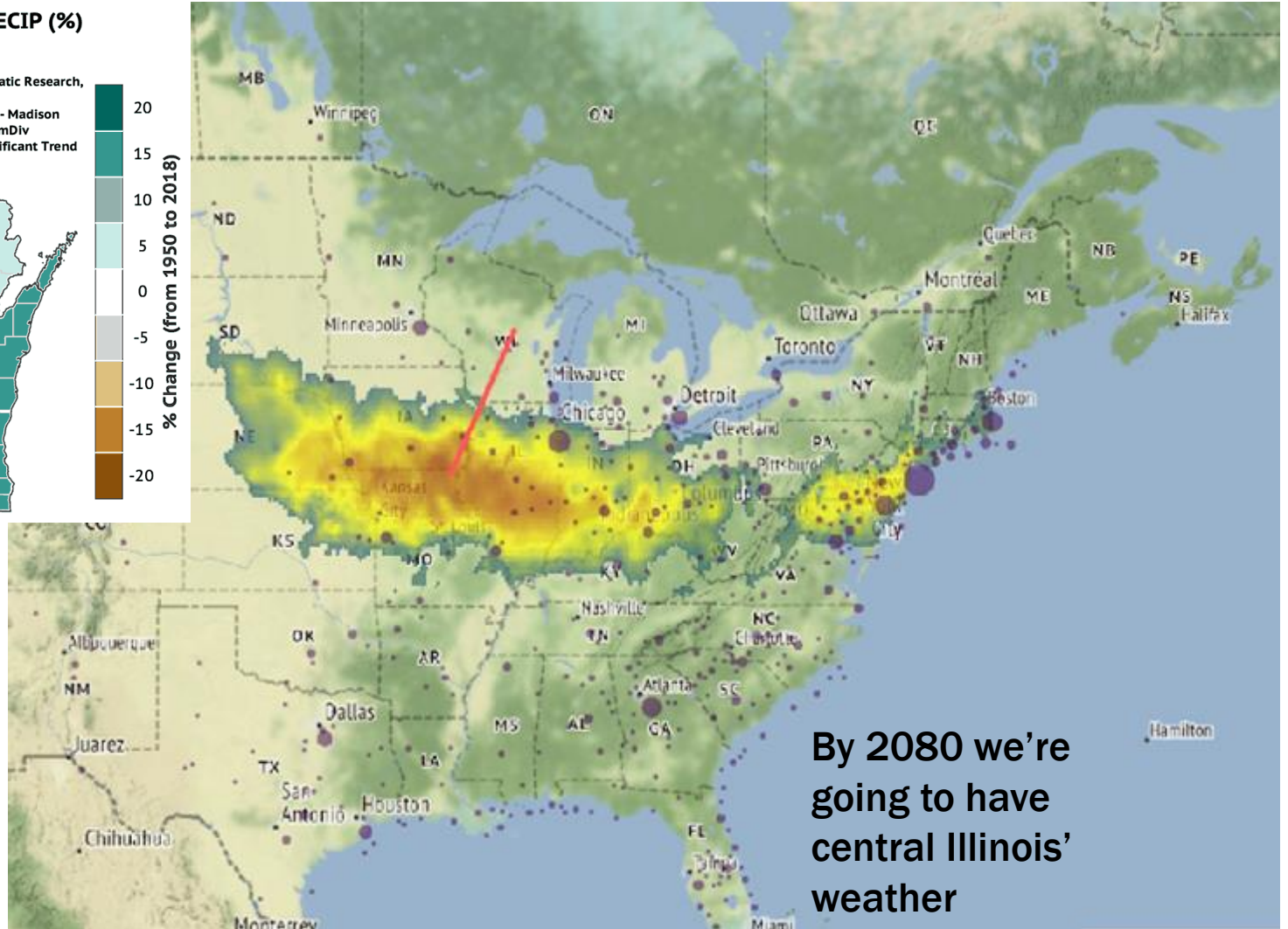
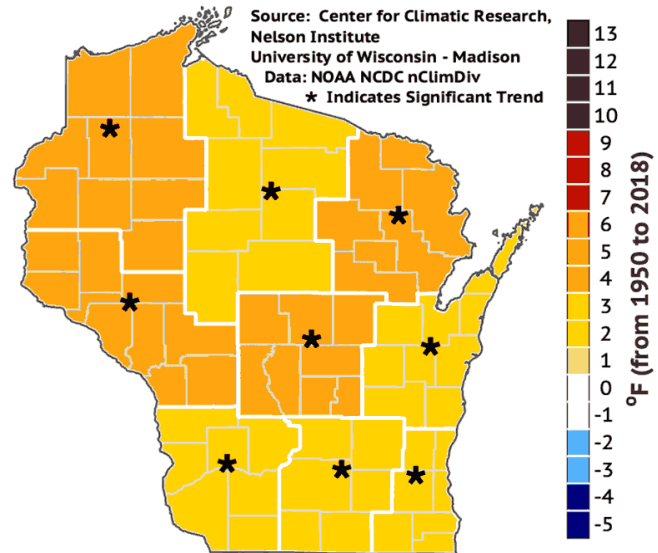
Office of Applied Science – Staff provide best available science to inform conservation and management decision making. We focus on high priority needs of our partners within the Division of Fish, Wildlife, and Parks ensuring research products are transparent and accessible to maximize their use in agency decision making.

Wisconsin's climate is changing

Historical Change in Annual PRECIP (%)
from 1950 to 2018



Historical Change in Annual TMIN
from 1950 to 2018



Warming



Extreme events



Novel conditions



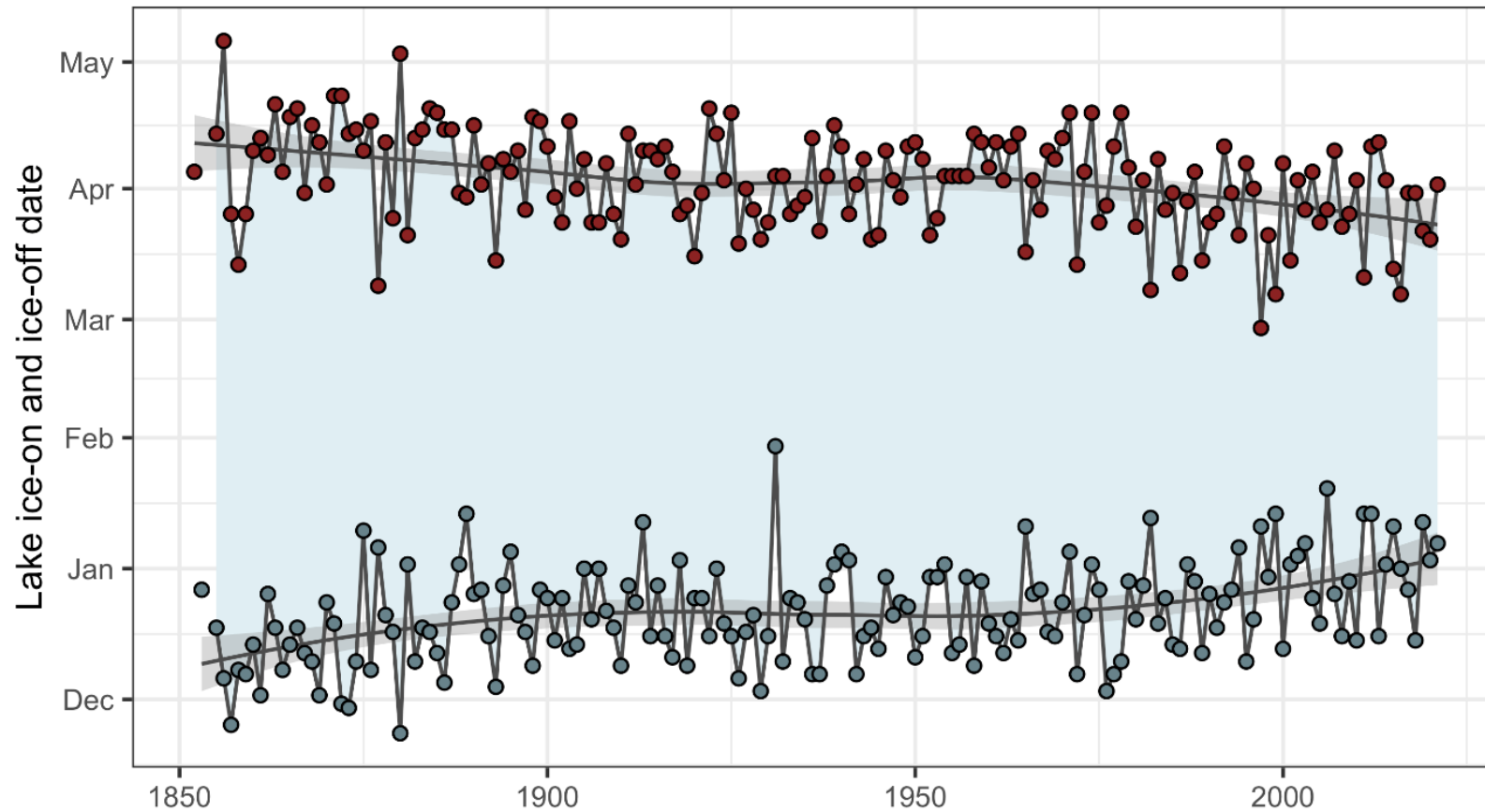
Seasonal disruption



A new, less predictable environment

Winter is getting shorter

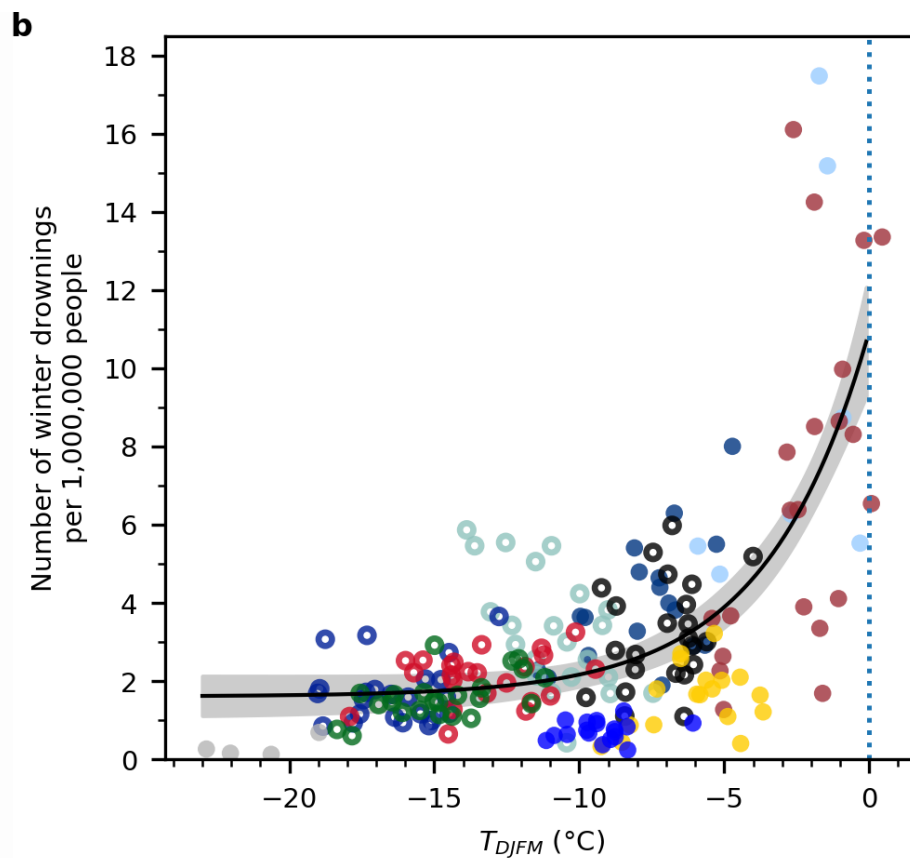
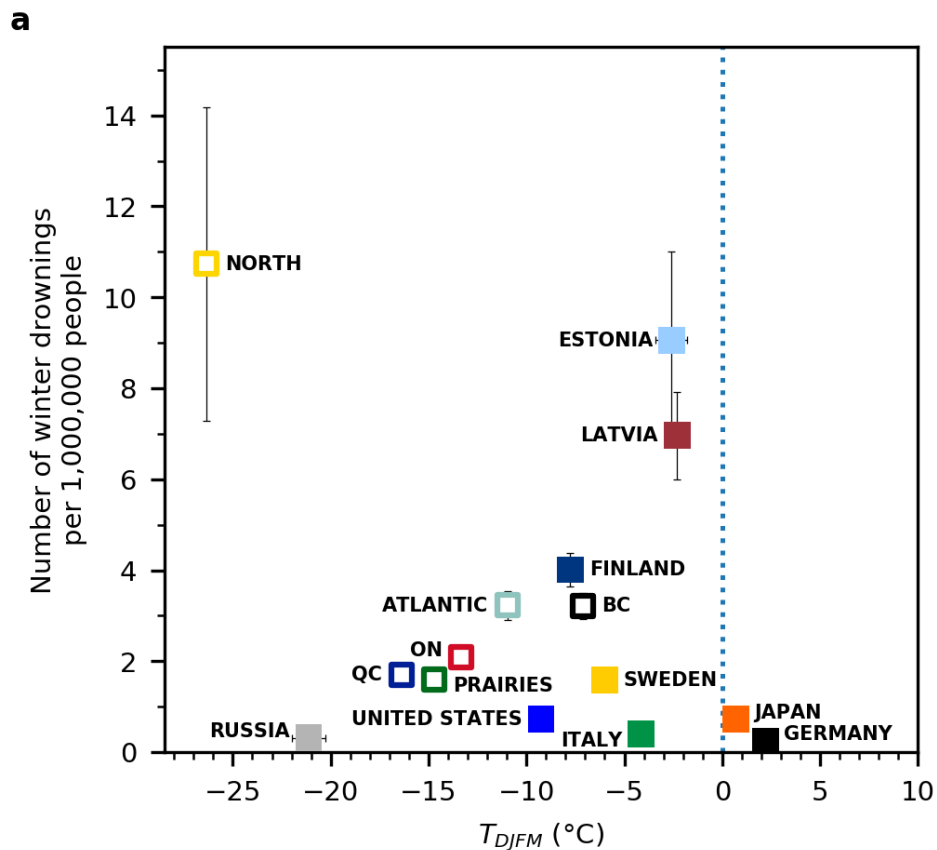
Ice Cover on Lake Mendota



Data from Wisconsin State Climatology Office

Ice-off is becoming increasingly unpredictable

Increased winter drownings with warmer winters.



- Late Winter is highest risk
- 23F to 32F, highest risk temperature

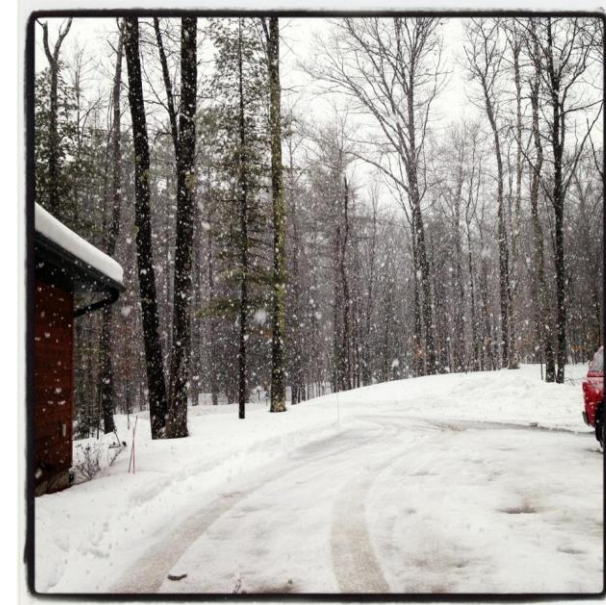


Sharma et al. 2020, *PLOS One*

Ice-off is becoming increasingly unpredictable



Abruptly ending
winter sampling
in February
**Ice-off on March
20, 2012**



Spring (still winter) in
the Northwoods
**Ice-off on
May 10, 2013**

H. Dugan, G. Gerrish, N. Lottig



Phenology

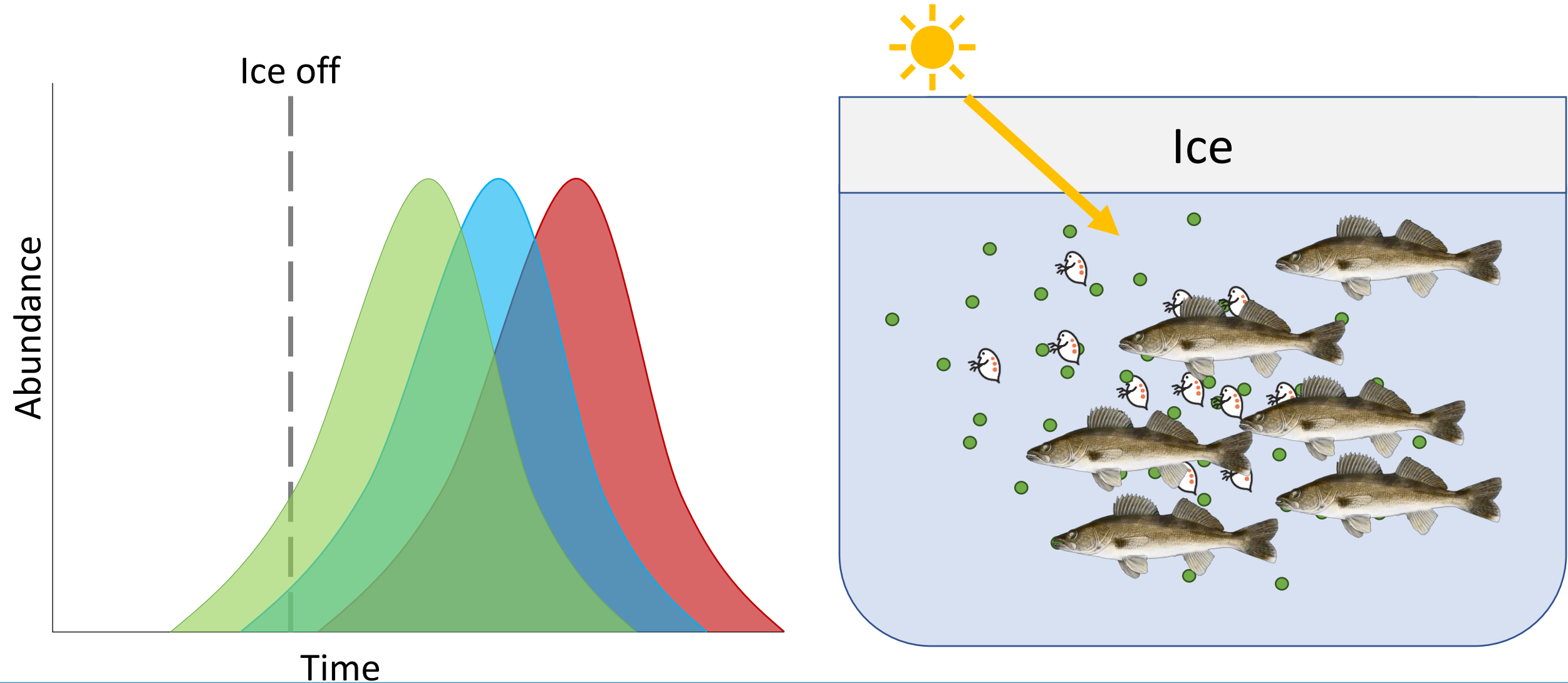
The study of cyclic and seasonal natural phenomena, especially in relation to climate and plant and animal life



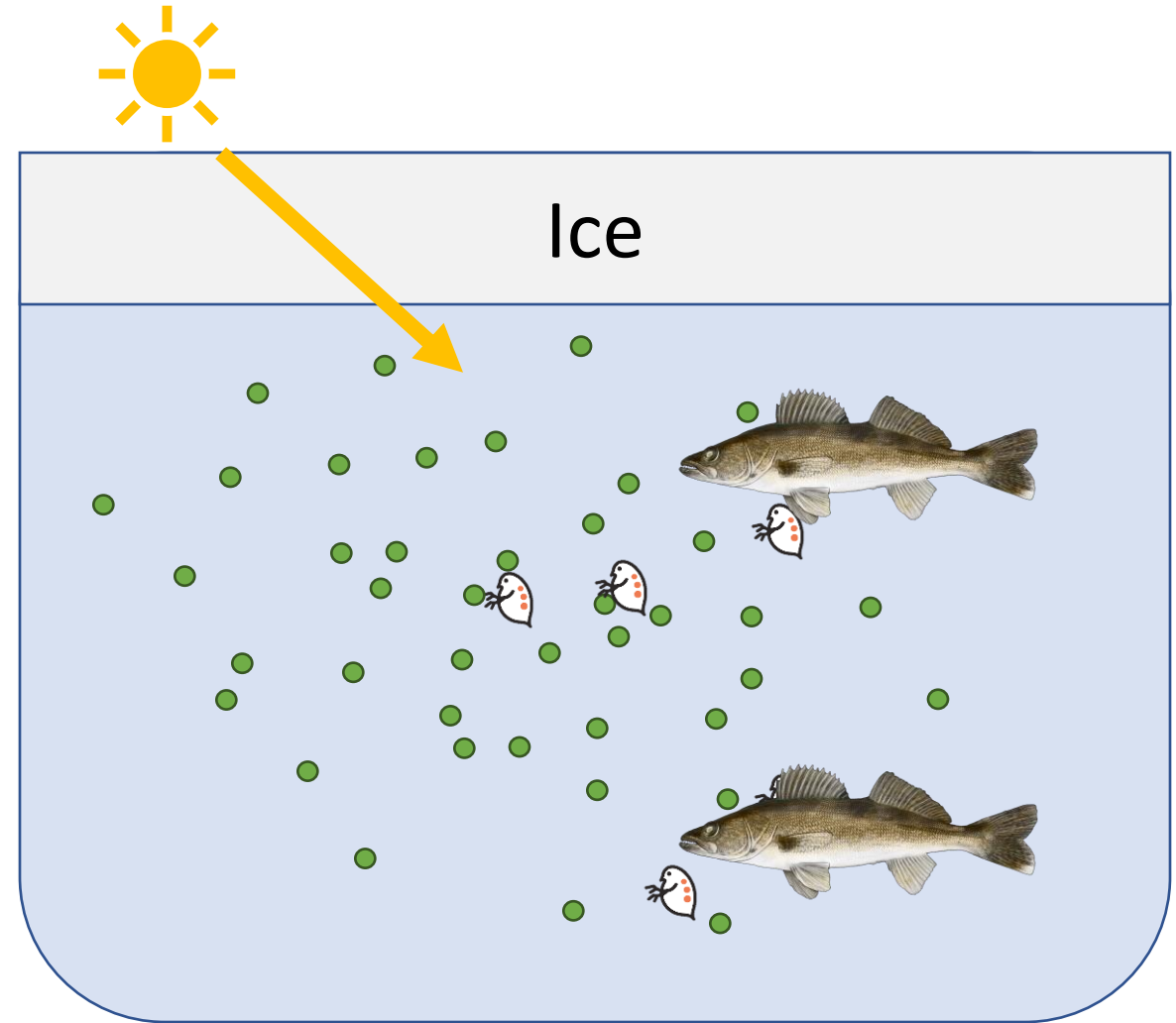
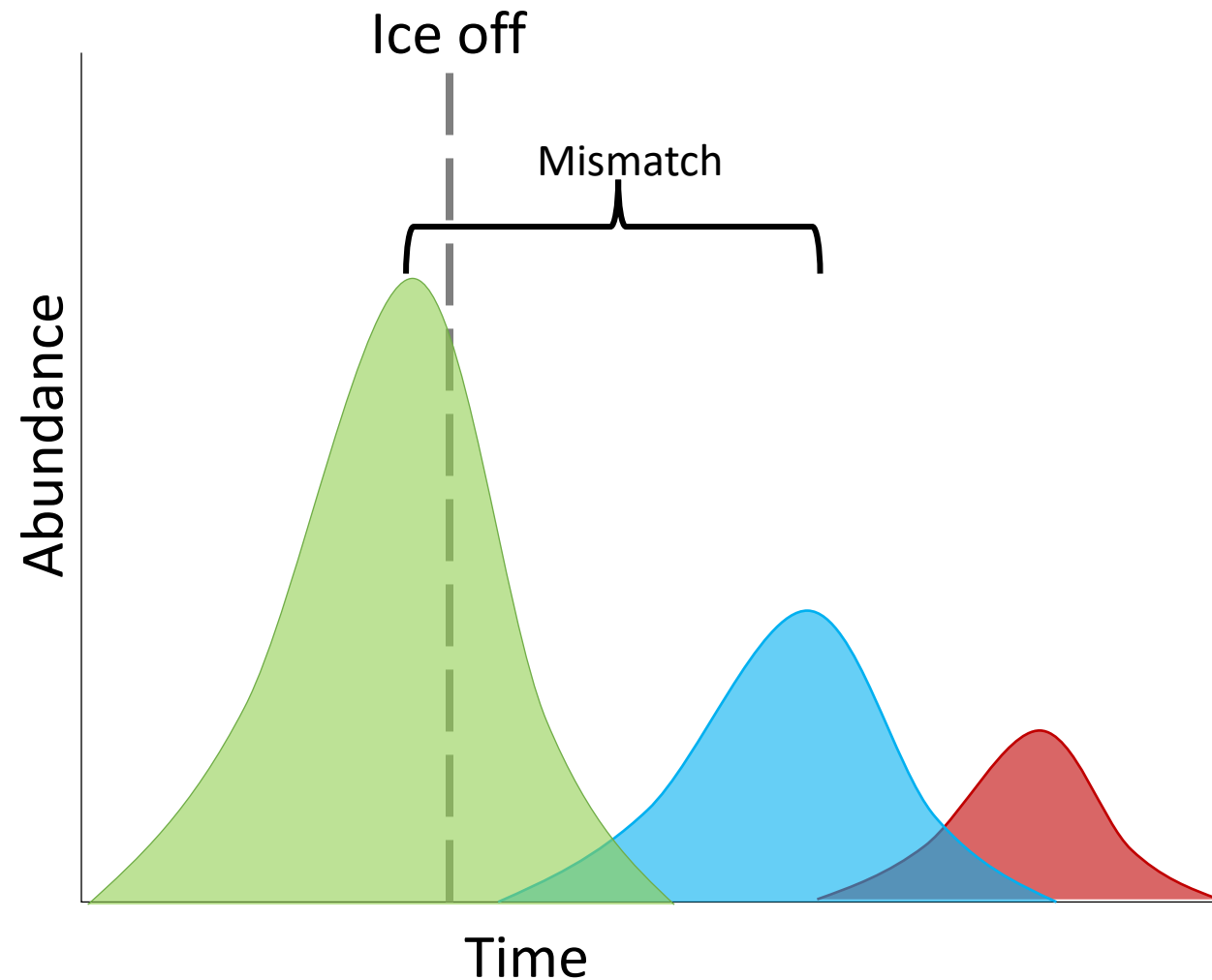
Phenology informs how humans interact with the world



Unpredictable ice-off can lead to mismatches

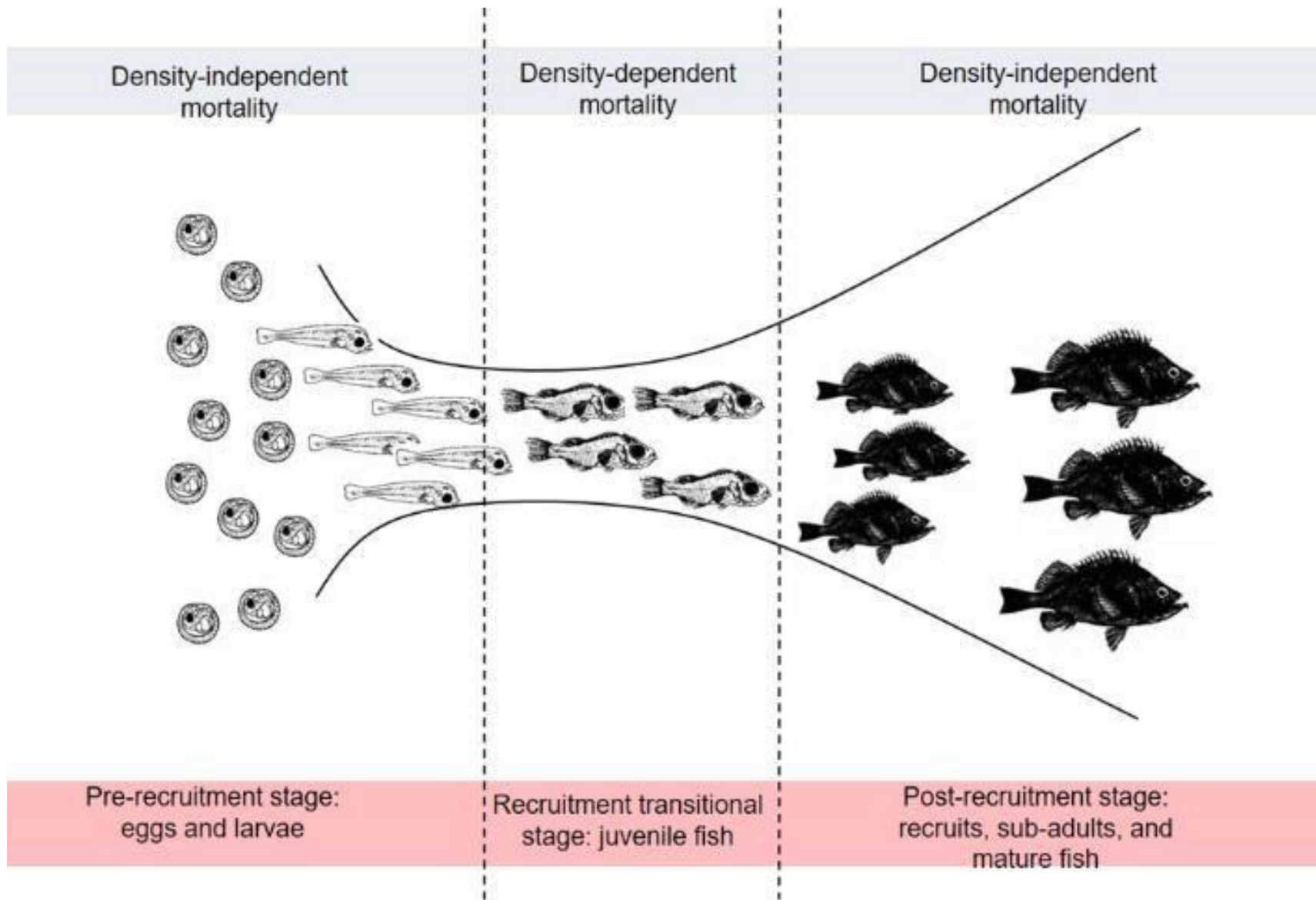


Unpredictable ice-off can lead to mismatches



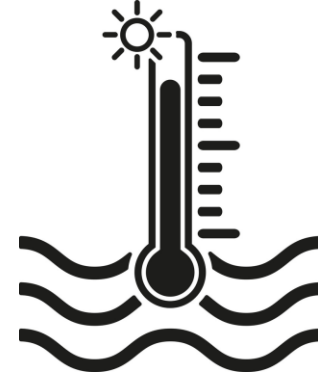
Unpredictable ice-off can lead to mismatches





Camp et al. 2020

Walleye spawning ecology



Temperature, Oxygen,
Predators

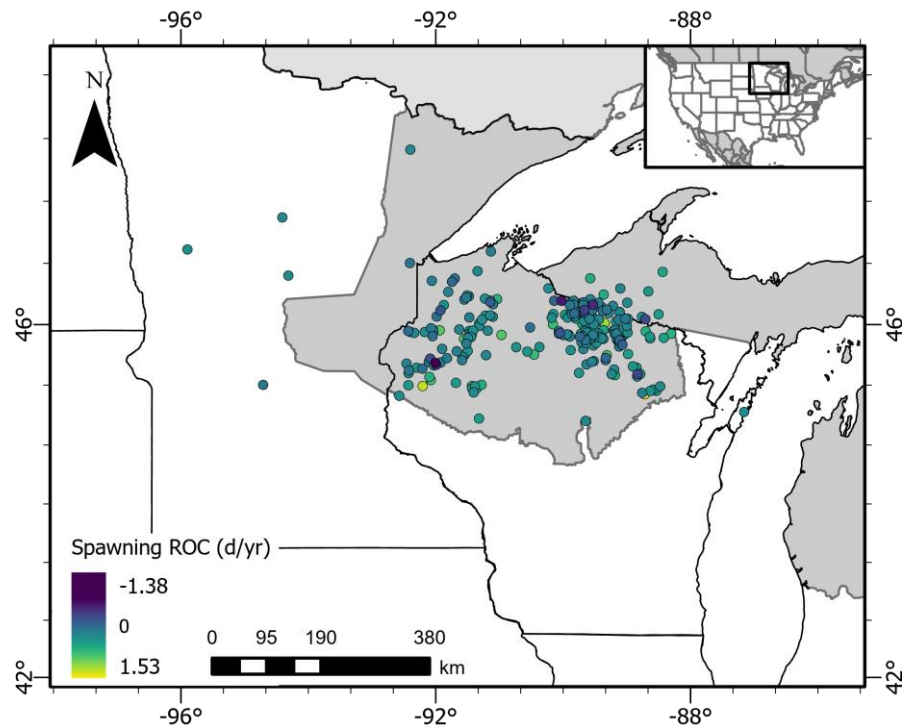


Temperature, Food, Predators

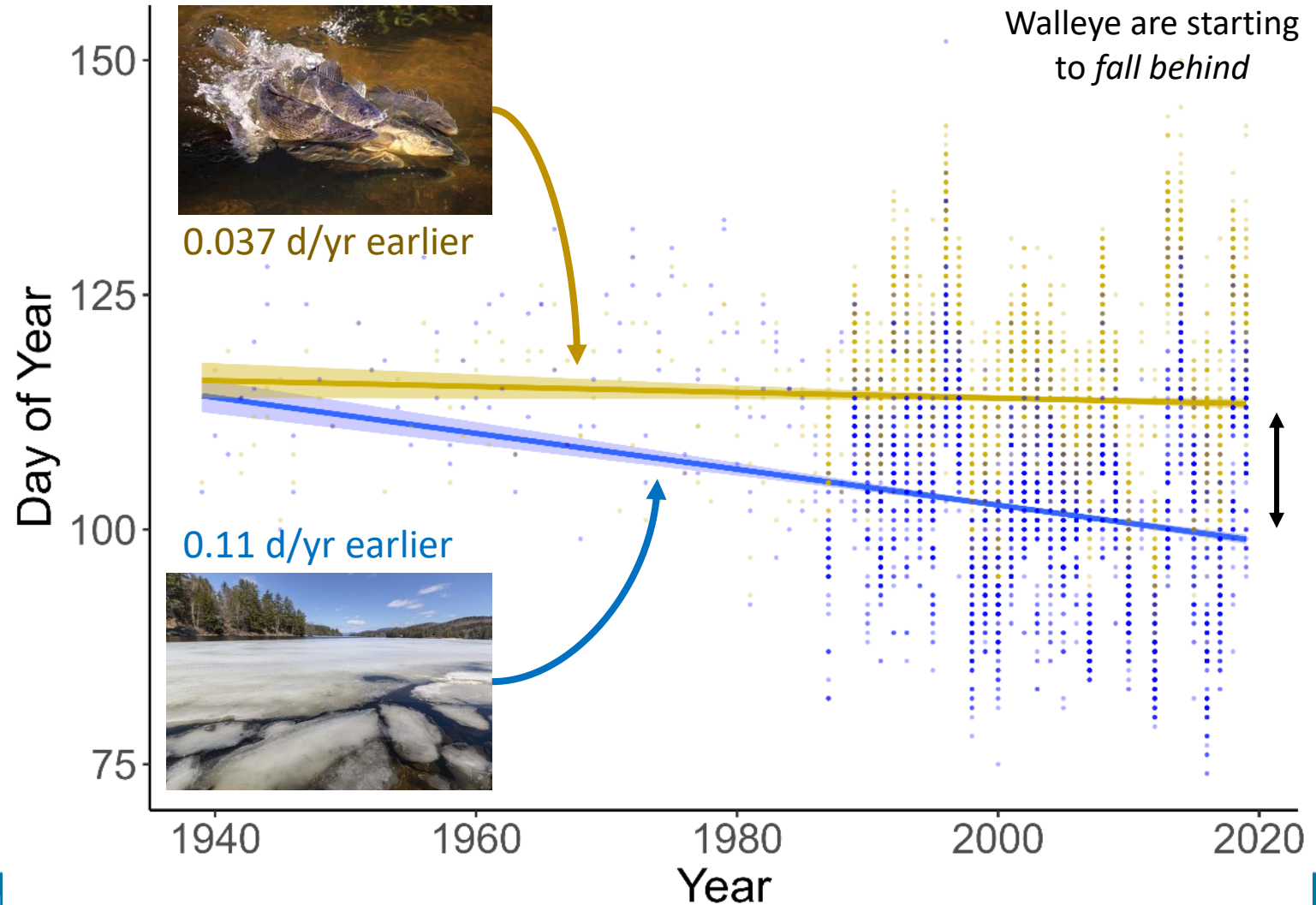


Temperature, Food, Predators

Ice off and walleye spawning are changing at different rates

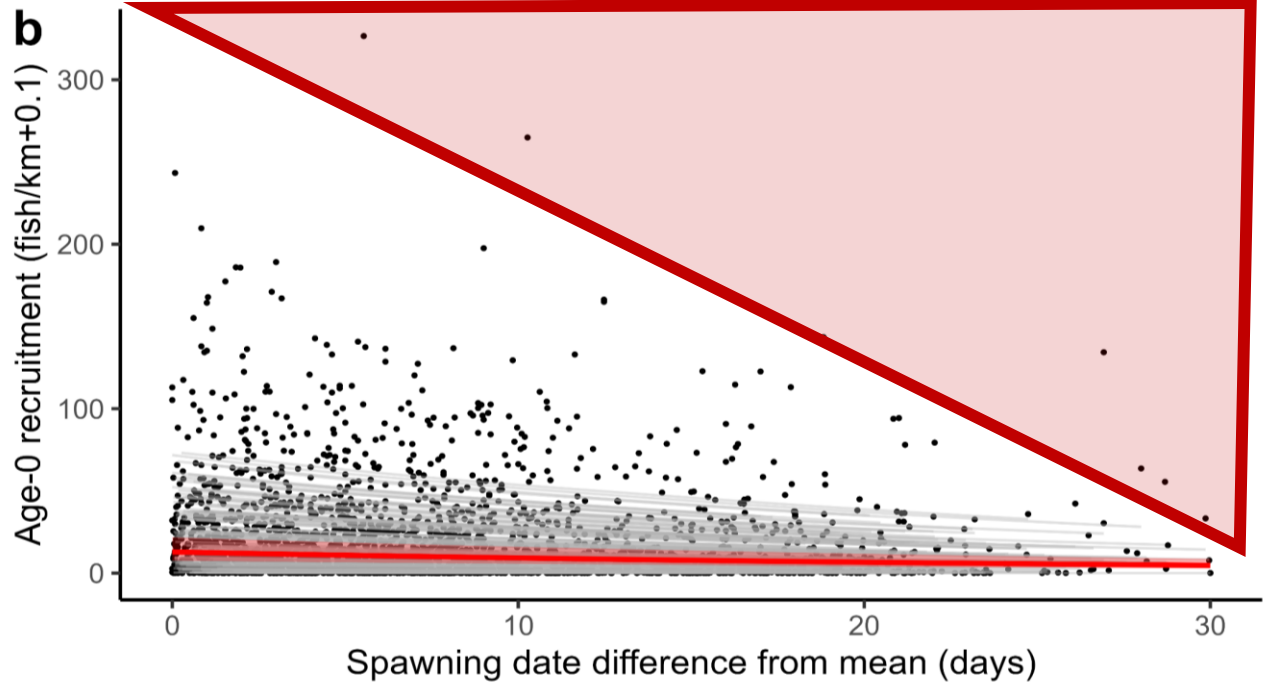
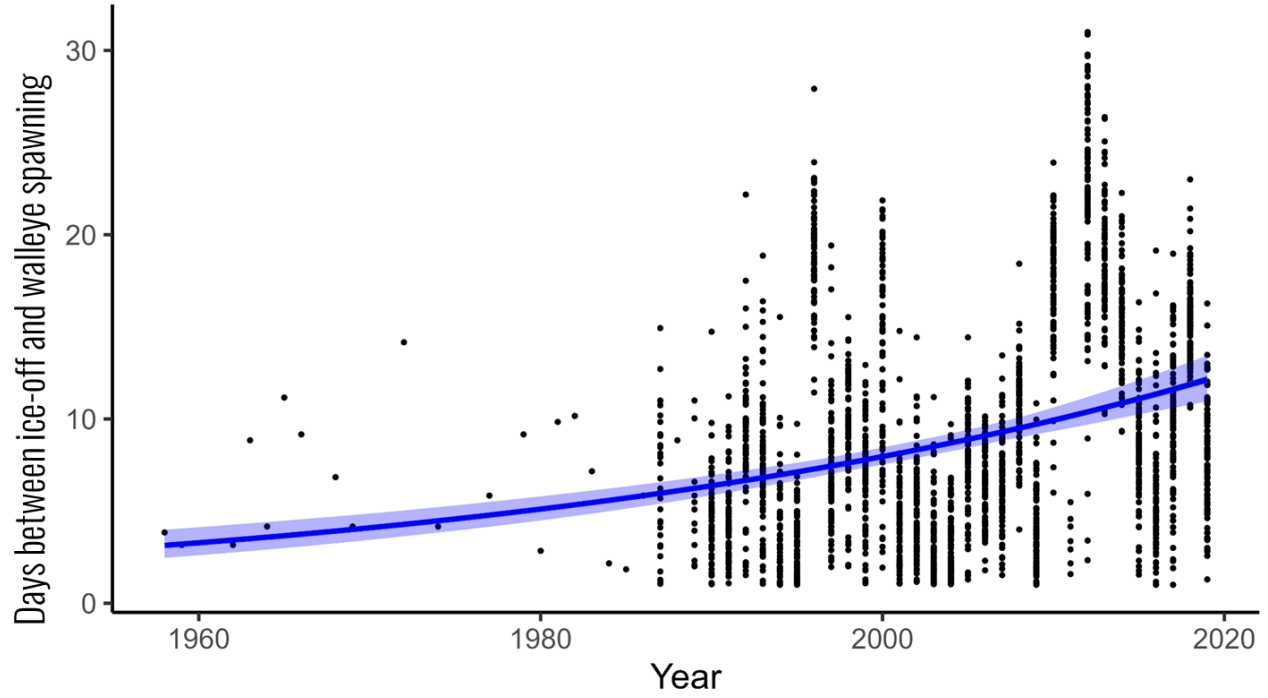


N = 194 lakes
>10 yr per lake



Mismatches between ice and walleye are becoming larger over time

Mismatches are bad for walleye recruitment

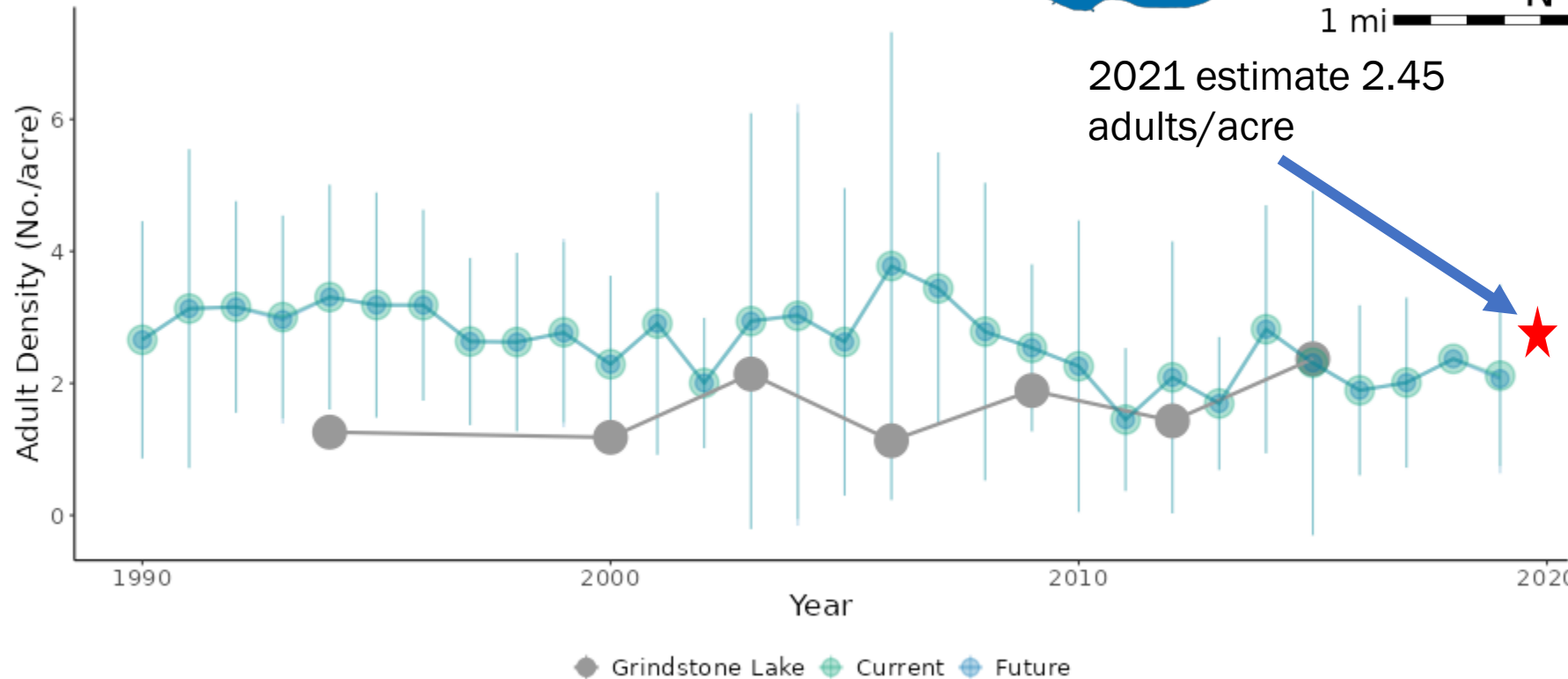
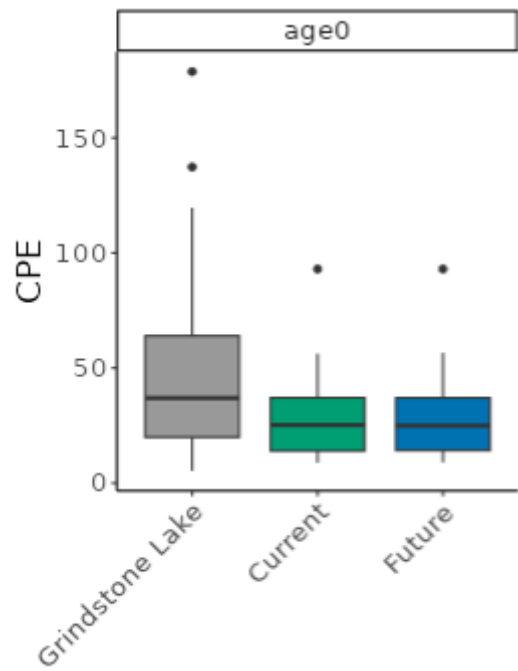


Current

- High performer now, **99th percentile** (Complex Two-Story Lakes)

Future

- 2050 model predictions show a decline, but not as bad as other lakes, **50th percentile**



Wisconsin Initiative on Climate Change Impacts

www.wicci.wisc.edu

2021 Assessment Report: Wisconsin's Changing Climate



Photo credit: Finn Ryan

Wisconsin's climate continues to change. In the 10 years since the 2011 WICCI Assessment Report, new data show continued warming, increases in rain and snow, and more frequent extreme rainfall events. Our 2021 report explains the issues and impacts of our warming climate on Wisconsin residents and describes the scientific progress made toward solutions.

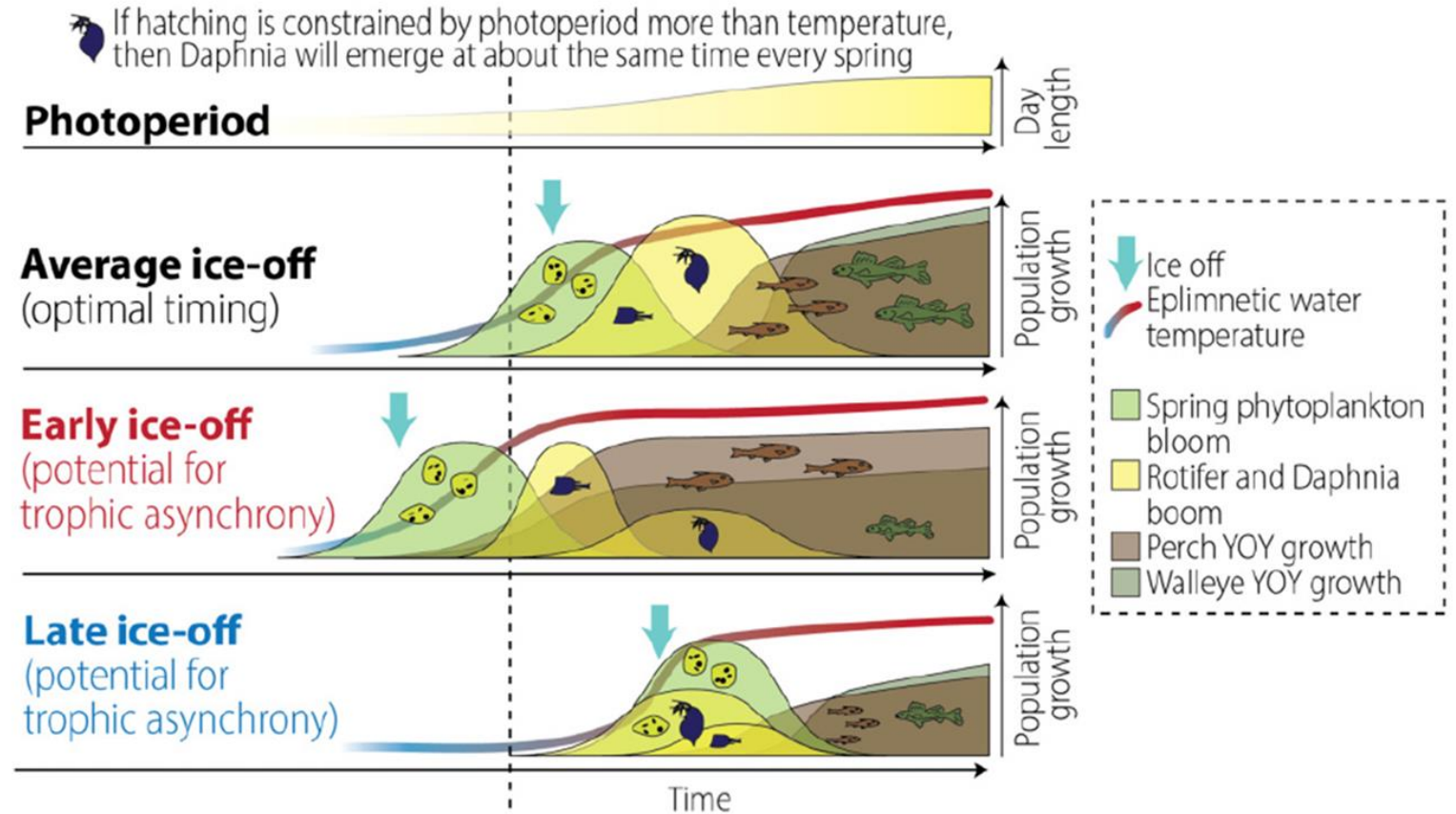
[Read the report](#)

Seasonal disruption



Mismatches between ice and walleye are becoming larger over time

Mismatches are bad for walleye recruitment





Looking Forward

Fisheries
Management usually
looks to the past for
goals

What if the past no longer
reflects the future?

Resist

- Stocking
- Harvest management
- Walleye rehab plans
- Fish removals
- Riparian land management

Resist



Accept



Accept

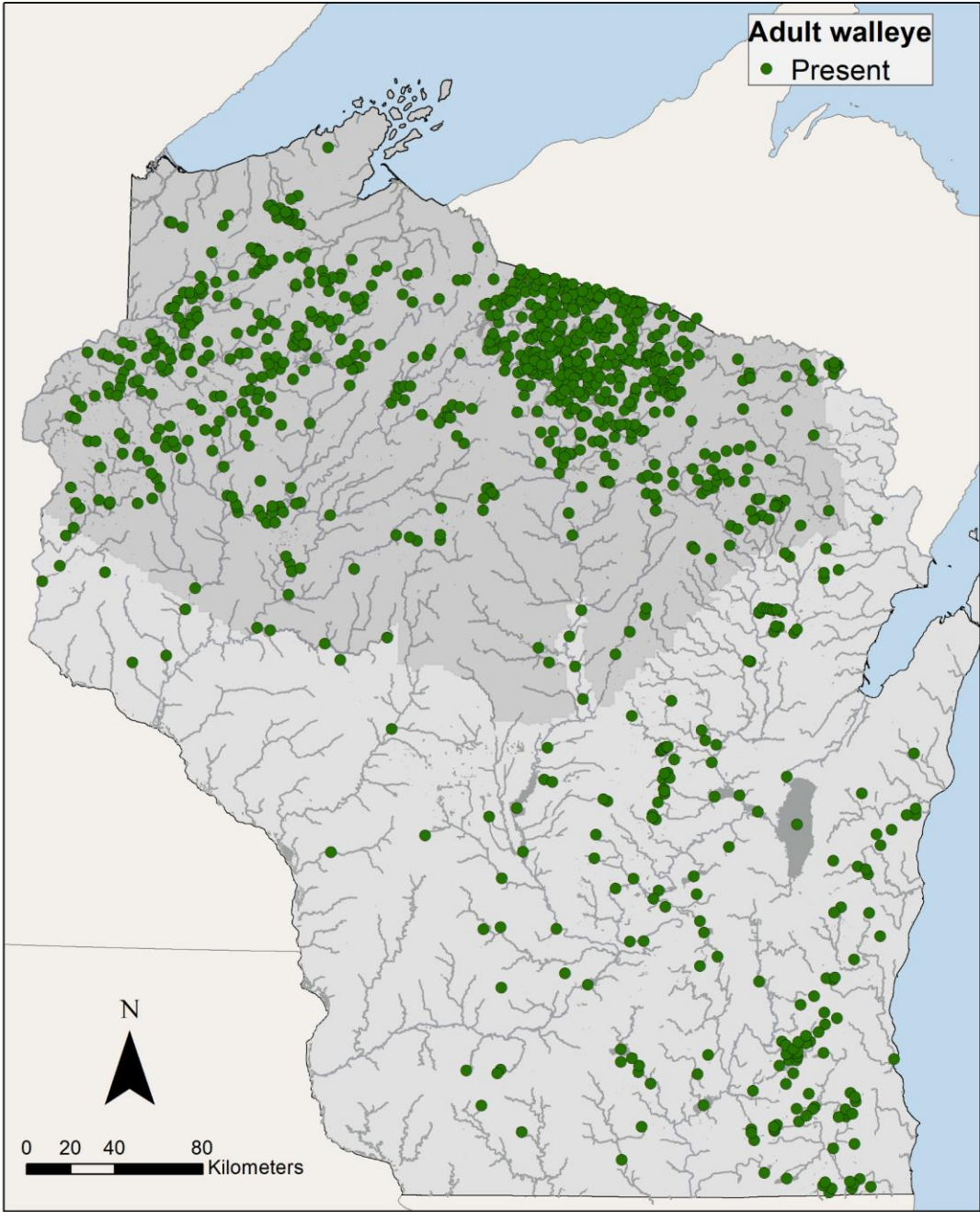
- Coldwater fish declines
- Warmwater species expansions

Direct



Direct

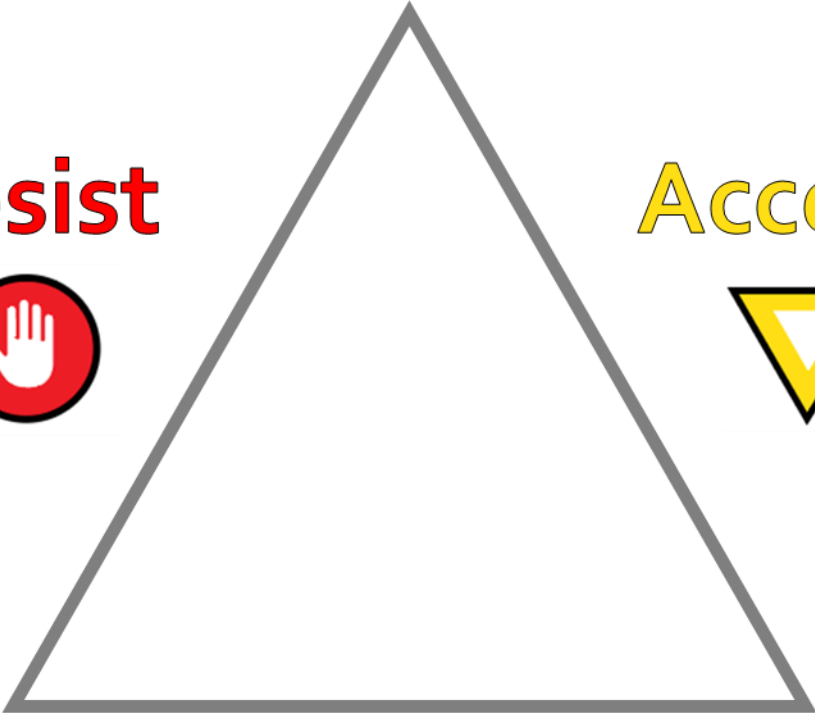
- Panfish management



Resist



Accept



Direct



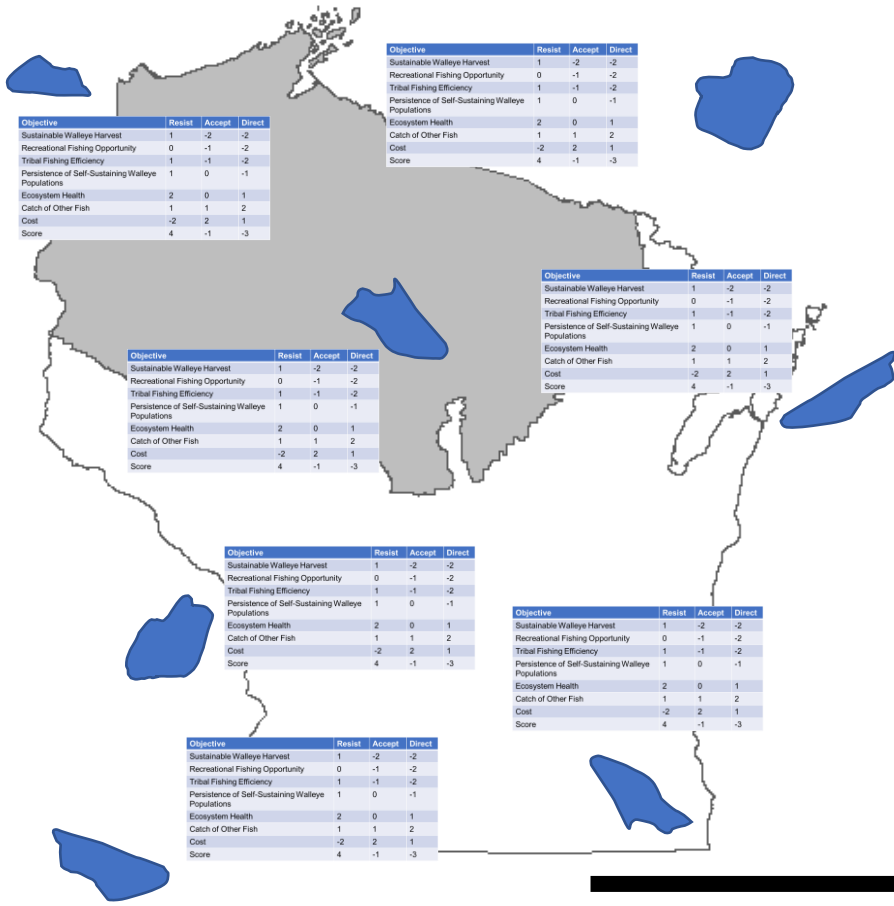
Dassow et al. *in prep*



Individual Lake Decision to Resist, Accept, Direct



Statewide Distribution of Resources

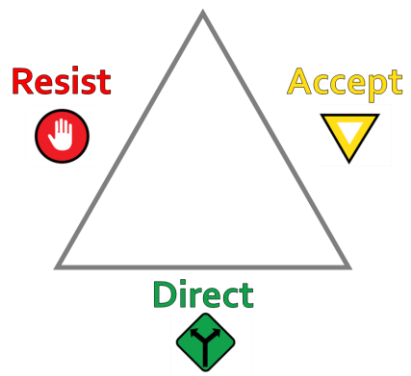
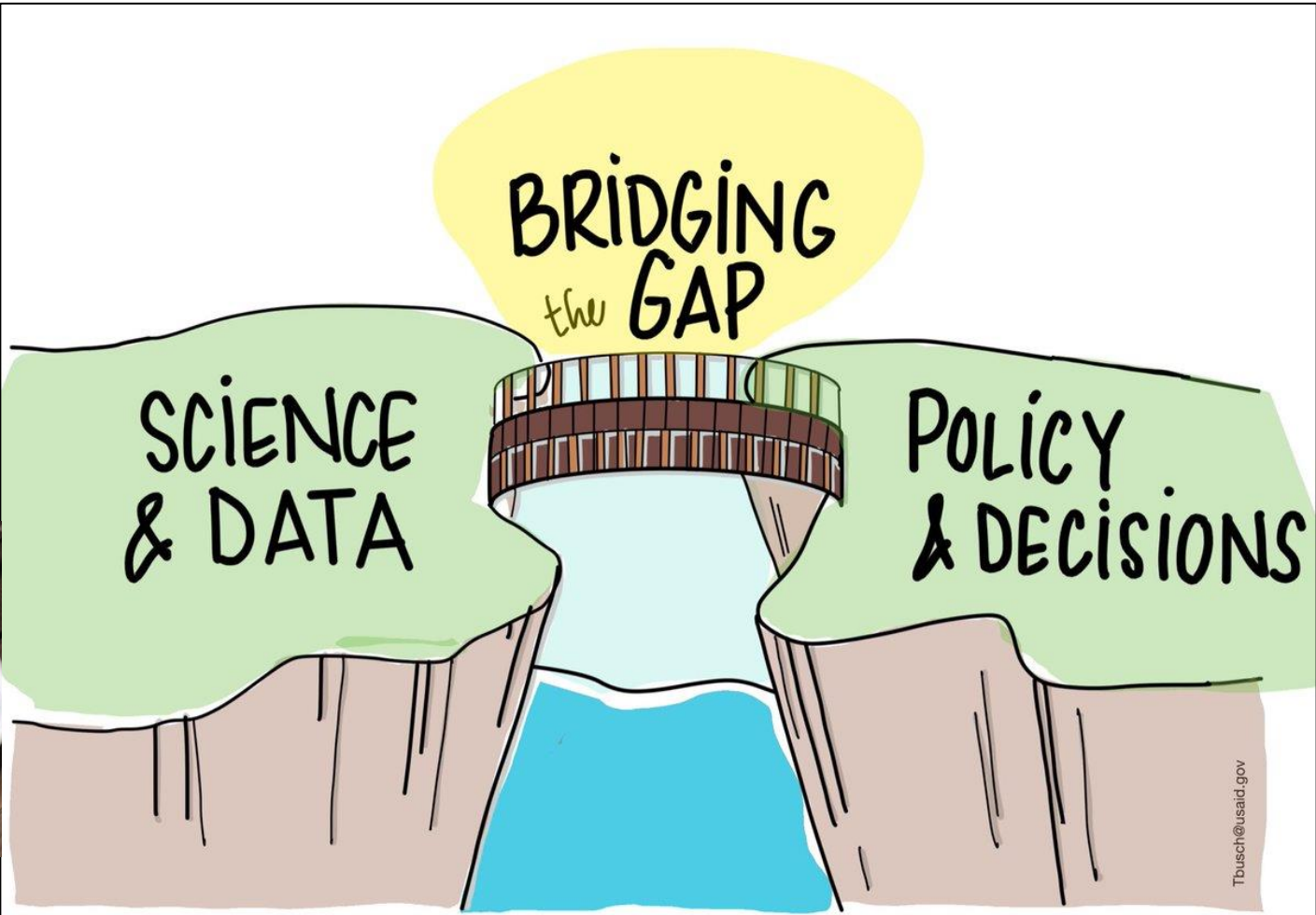
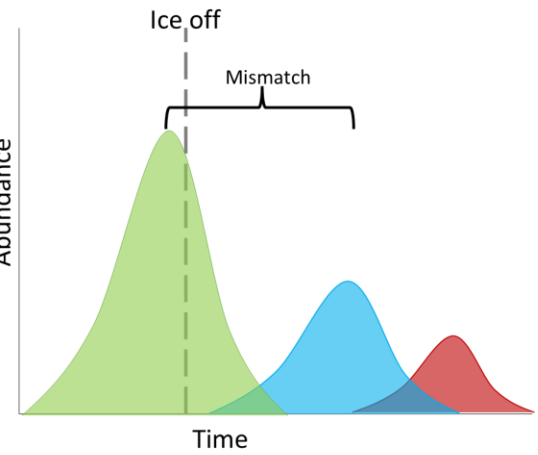


- Most Efficient use of
- Resources (i.e. stocked fish)
 - Staff time

Access and Opportunity for as many anglers and tribal harvesters as we're able

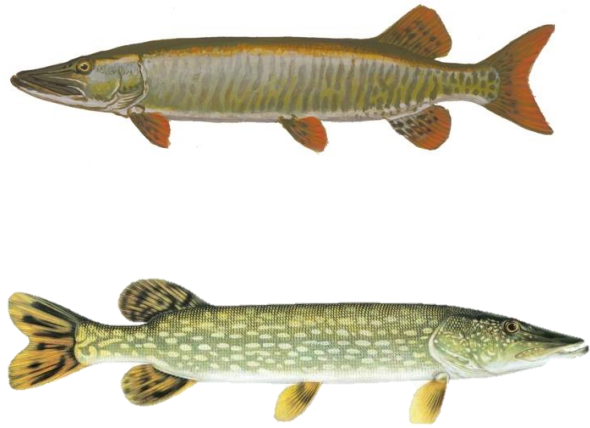
Time

Stewarding Ecosystems into the Future

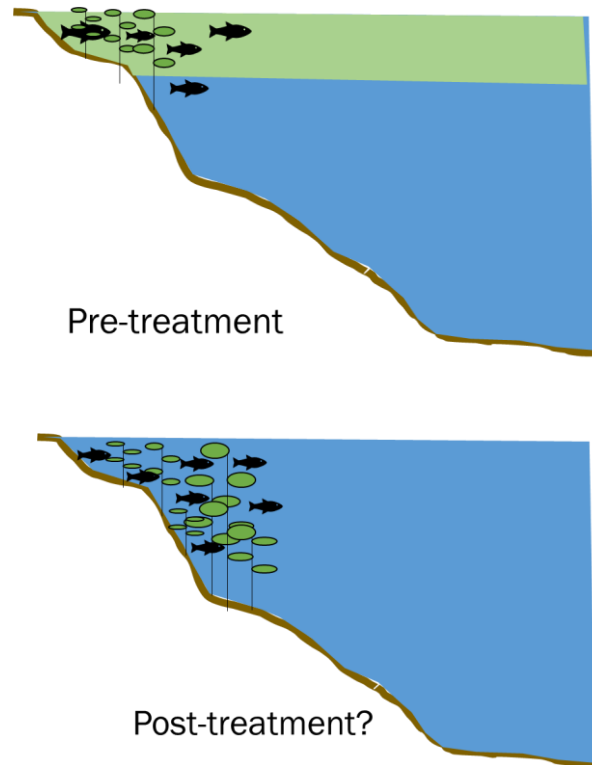


Other ongoing research

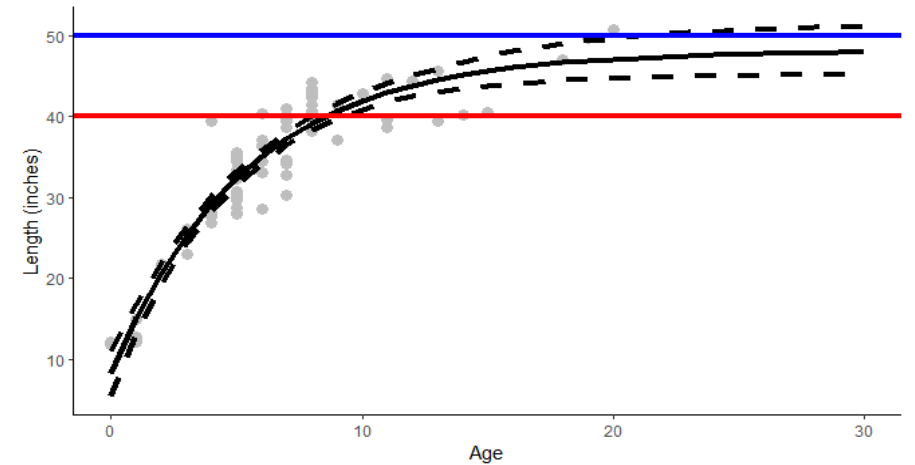
Musky – Pike interactions on Spider Lake, Sawyer Co.



Effects of Aluminum Sulfate Treatments on Panfish in Big Round Lake, Polk Co.



Muskellunge Age and Growth tracking in Northwest WI



Acknowledgements

Zach Feiner, WDNR Office of Applied Science

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Holly Embke, USGS Midwest Climate Adaptation Science Center

Max Wolter, WDNR Bureau of Fisheries Management



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"WILD WISCONSIN:
OFF THE RECORD"



Coldwater

Coolwater

Warmwater