

# Lakes, Climate Change and Maine Summer Camps



Colin Holme, Lakes Environmental Association



Year-Round Lake Monitoring



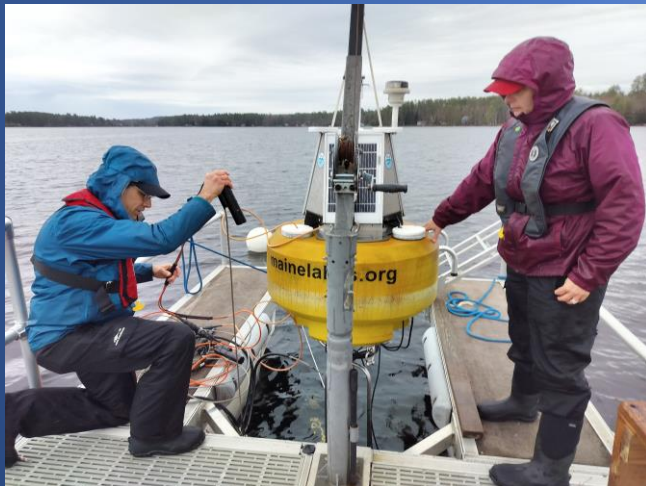
Watershed-Based Education



Aquatic Invasives Control



Advanced Lake Testing



Aquatic Invasives Prevention



Maine Lake Science Center



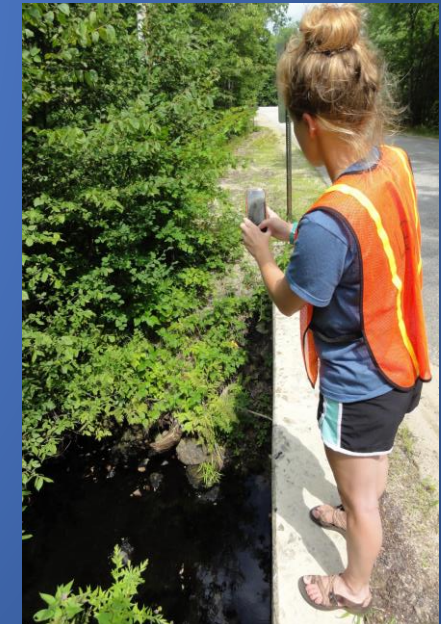
Land Preserves



Stream Restoration



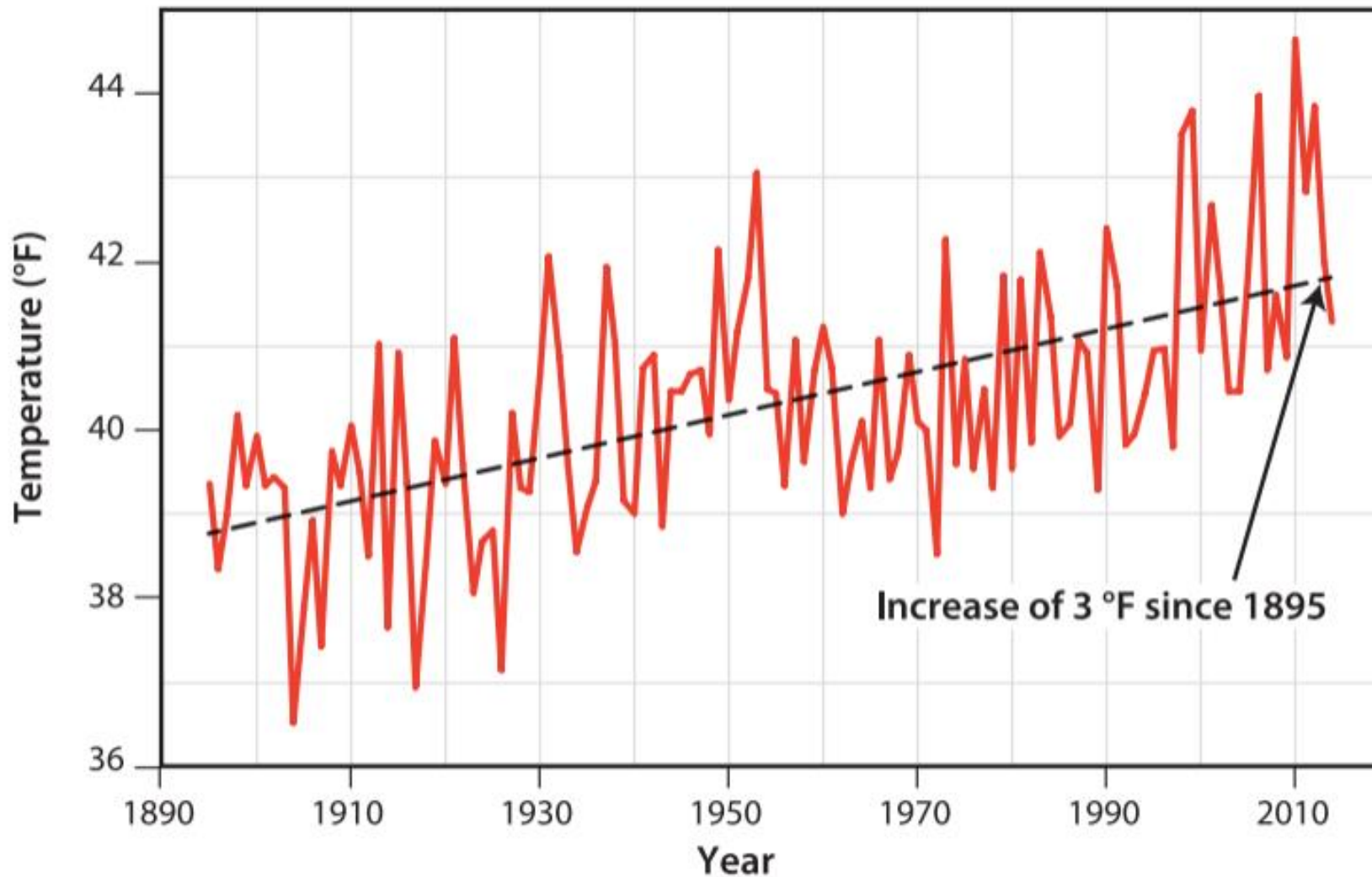
Stormwater Control



Lakes Environmental  
Association -  
**Funded by Members**  
[www.mainelakes.org](http://www.mainelakes.org)

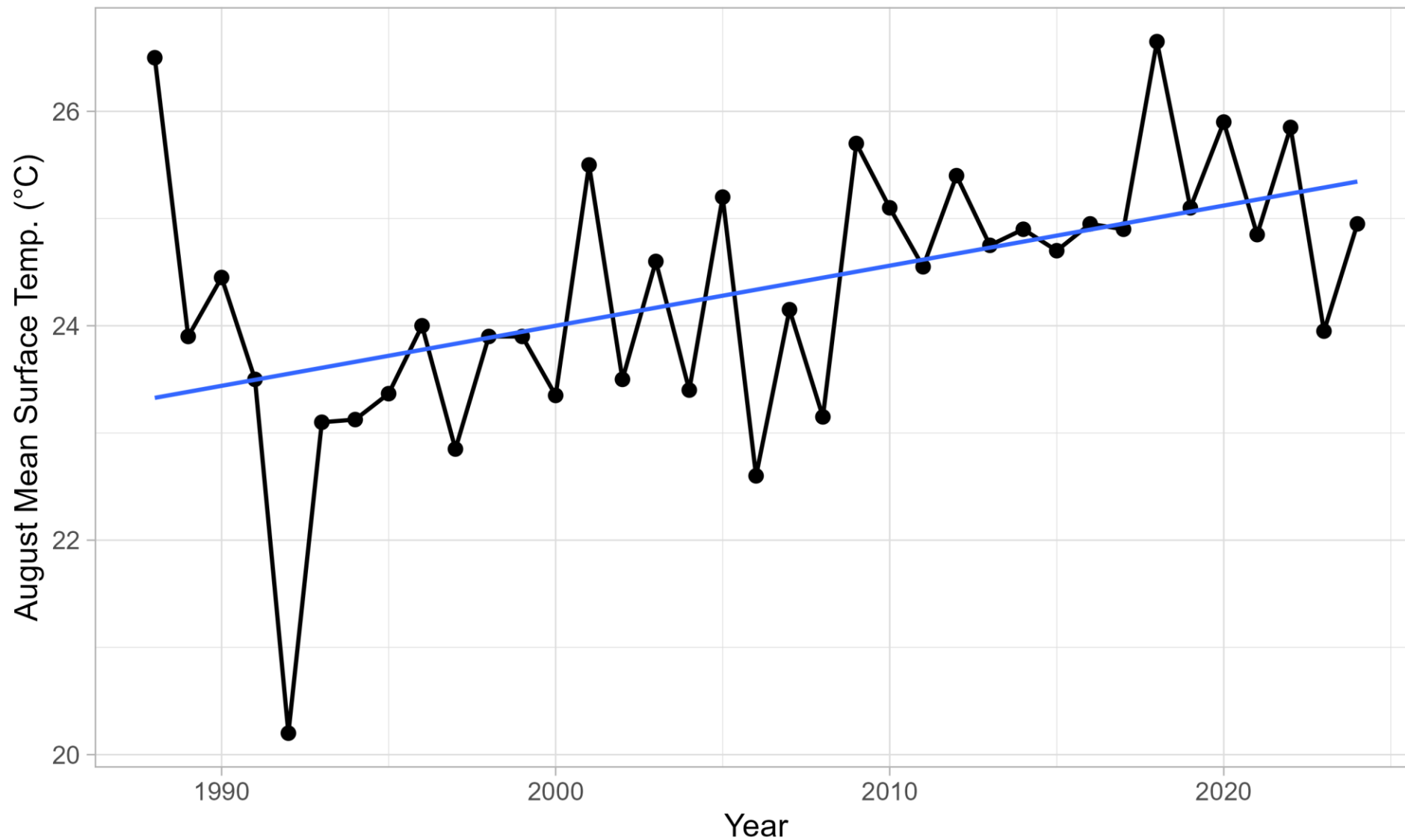


## Maine's Average Annual Temperature



**Figure 1.** Mean annual temperature, 1895–2014, averaged across Maine from gridded monthly station records from the U.S. Climate Divisional Dataset ([ncdc.noaa.gov/monitoring-references/maps/us-climate-divisions.php](http://ncdc.noaa.gov/monitoring-references/maps/us-climate-divisions.php)). A simplified linear trend (black line) indicates that temperature increased 3 °F over the record period.

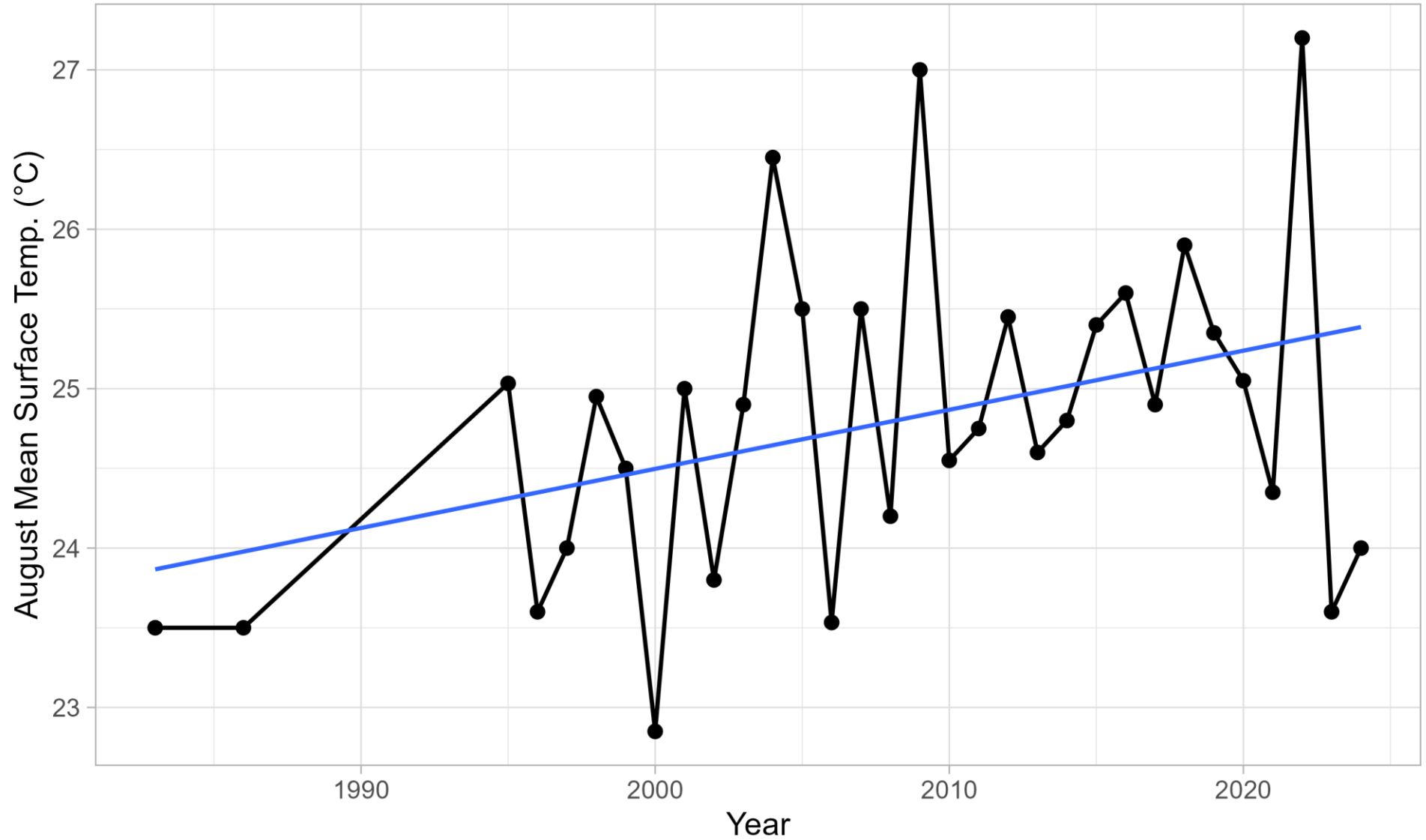
# Long Lake-South (1988–2024)



Trend: 0.6°C per decade ( $p = 0.0012$ )



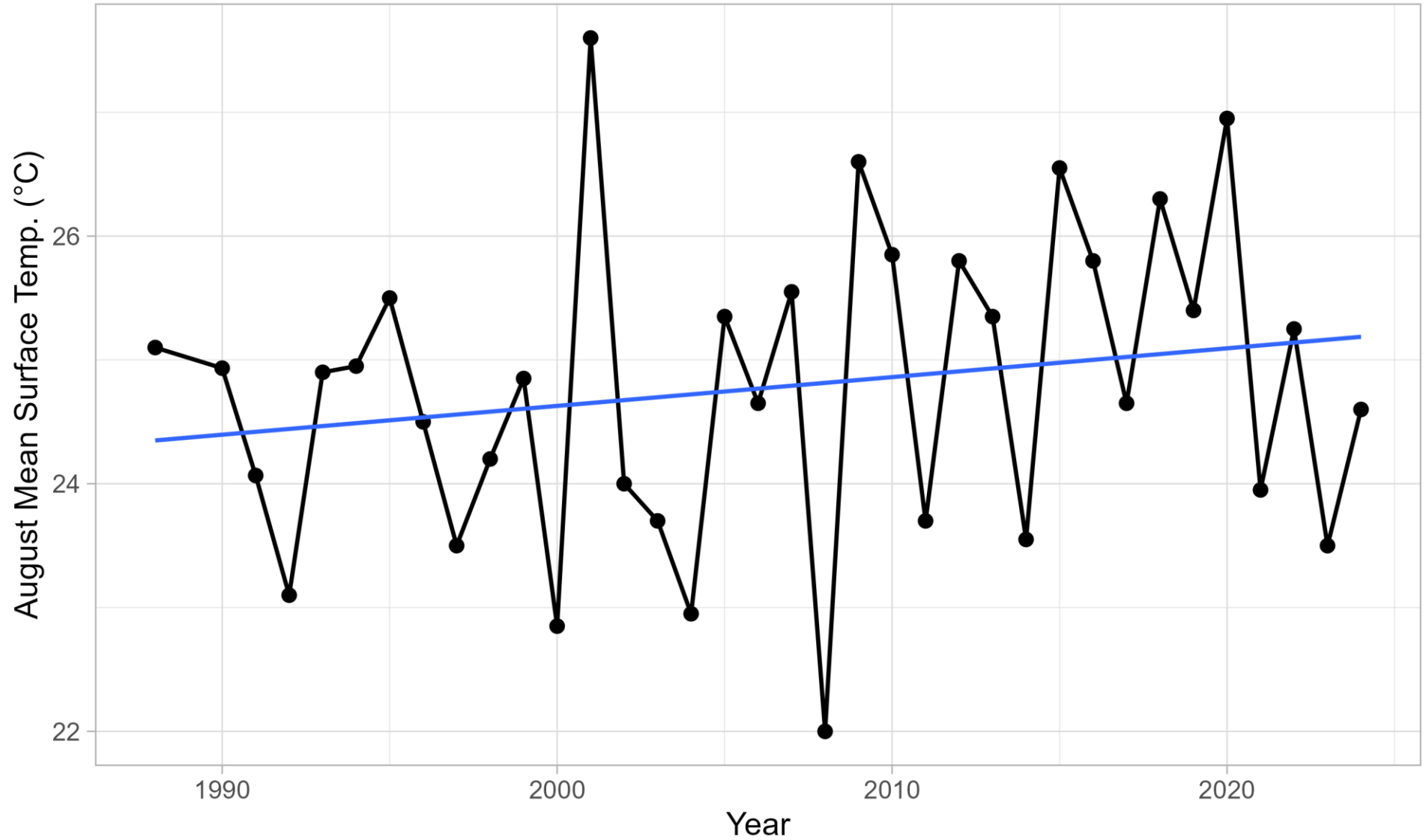
# Sand Pond (1983–2024)



Trend: 0.4°C per decade ( $p = 0.048$ )



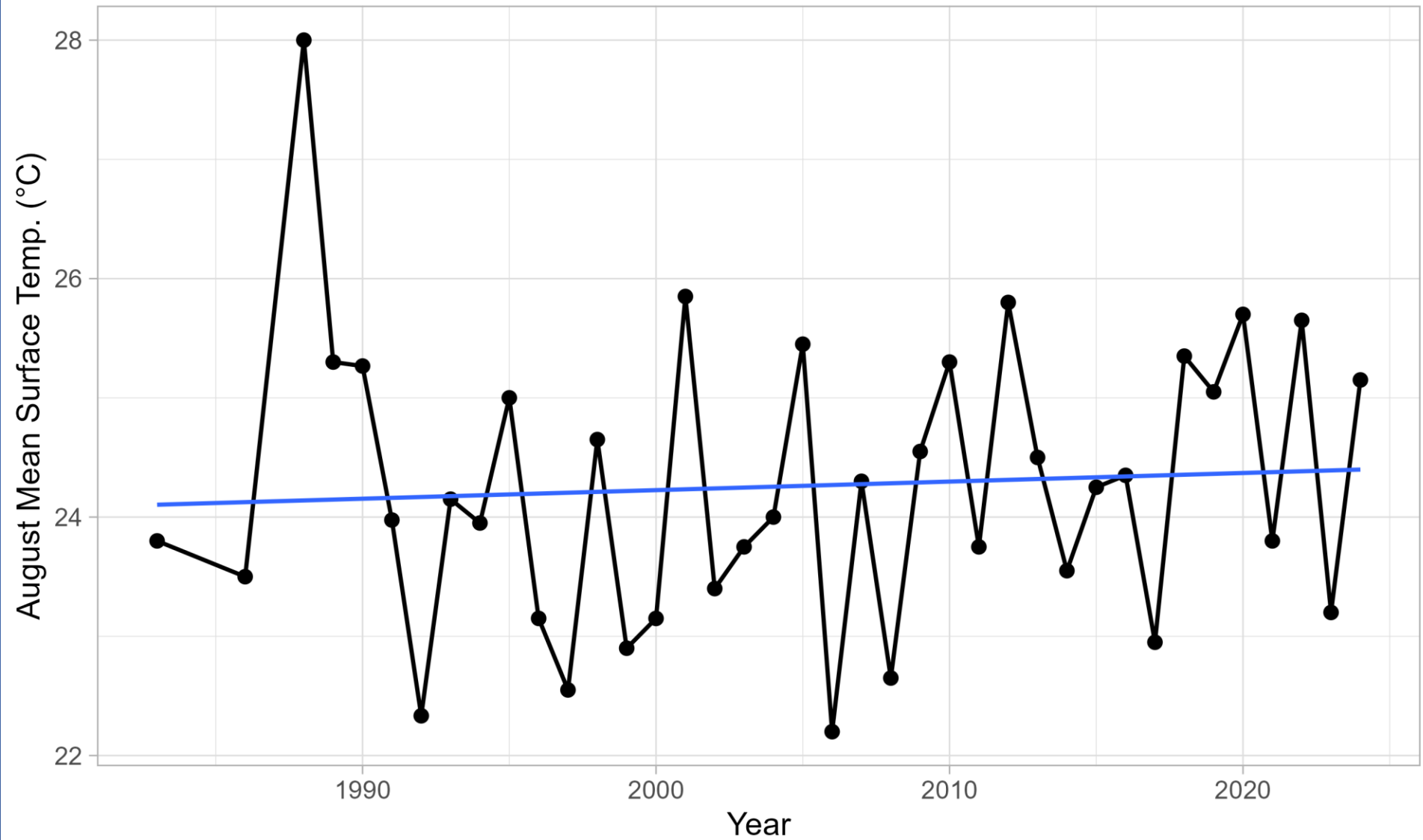
# Woods Pond (1988–2024)



Trend: not significant



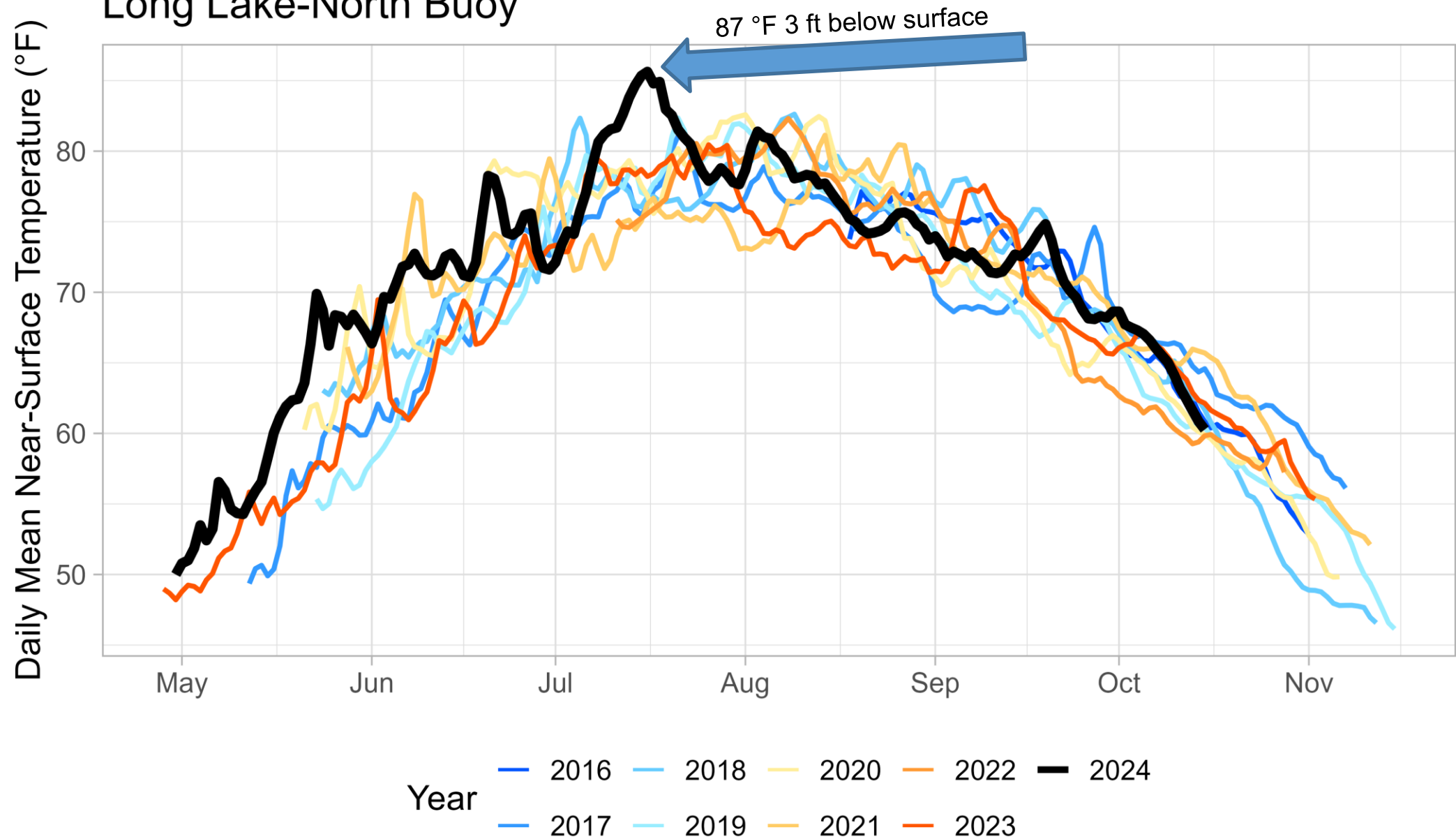
# Moose Pond-Main (1983–2024)



Trend: not significant

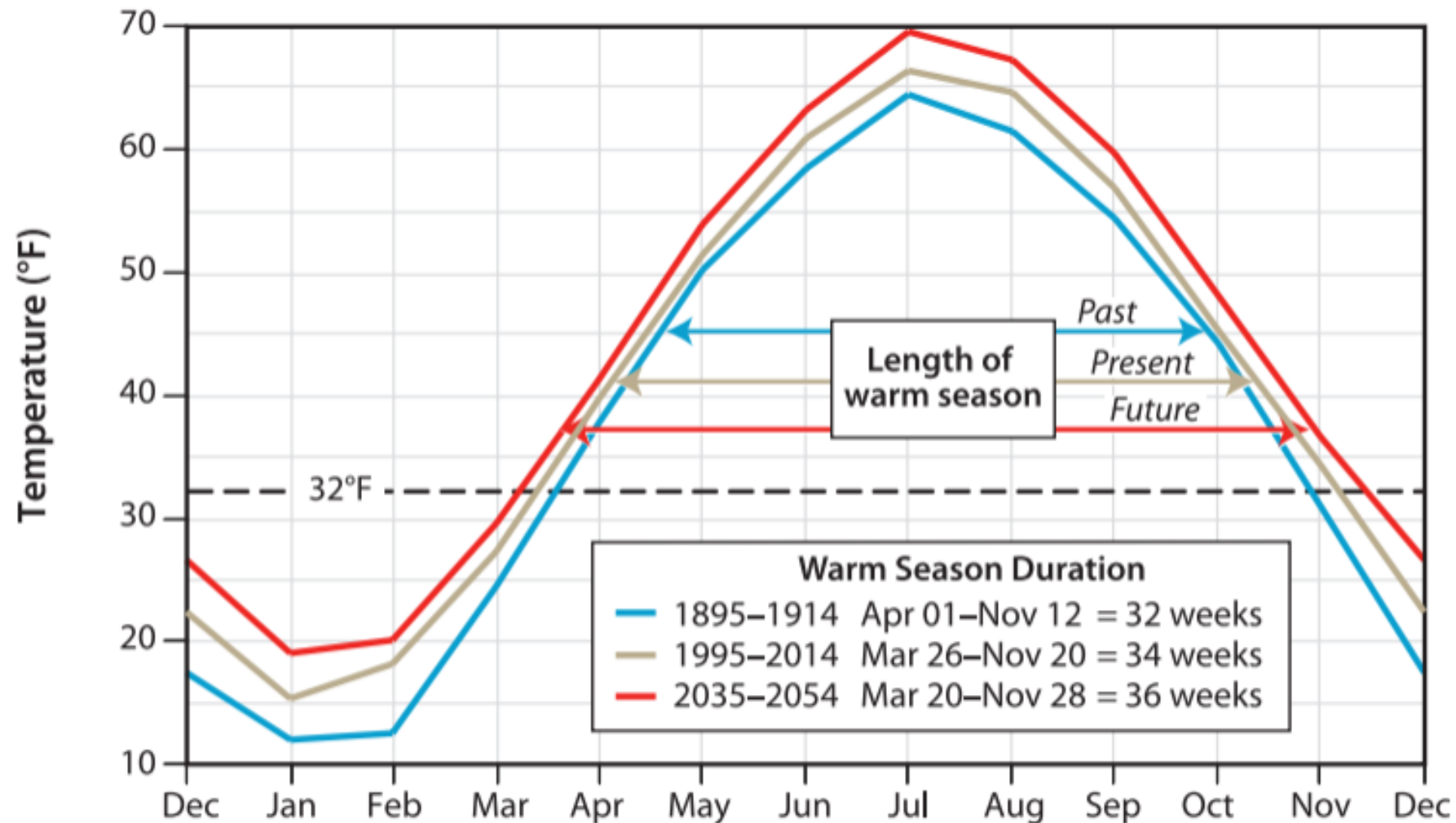


# Long Lake-North Buoy





## Maine's Changing Seasons



**Figure 3.** Mean monthly temperature averaged across Maine for historical (1895–1914), recent (1995–2014), and future (2035–2054) time periods. Historical and recent data from the U.S. Climate Divisional Dataset ([ncdc.noaa.gov/monitoring-references/maps/us-climate-divisions.php](https://ncdc.noaa.gov/monitoring-references/maps/us-climate-divisions.php)), and future prediction from an ensemble simulation of the IPCC emissions scenario A2.

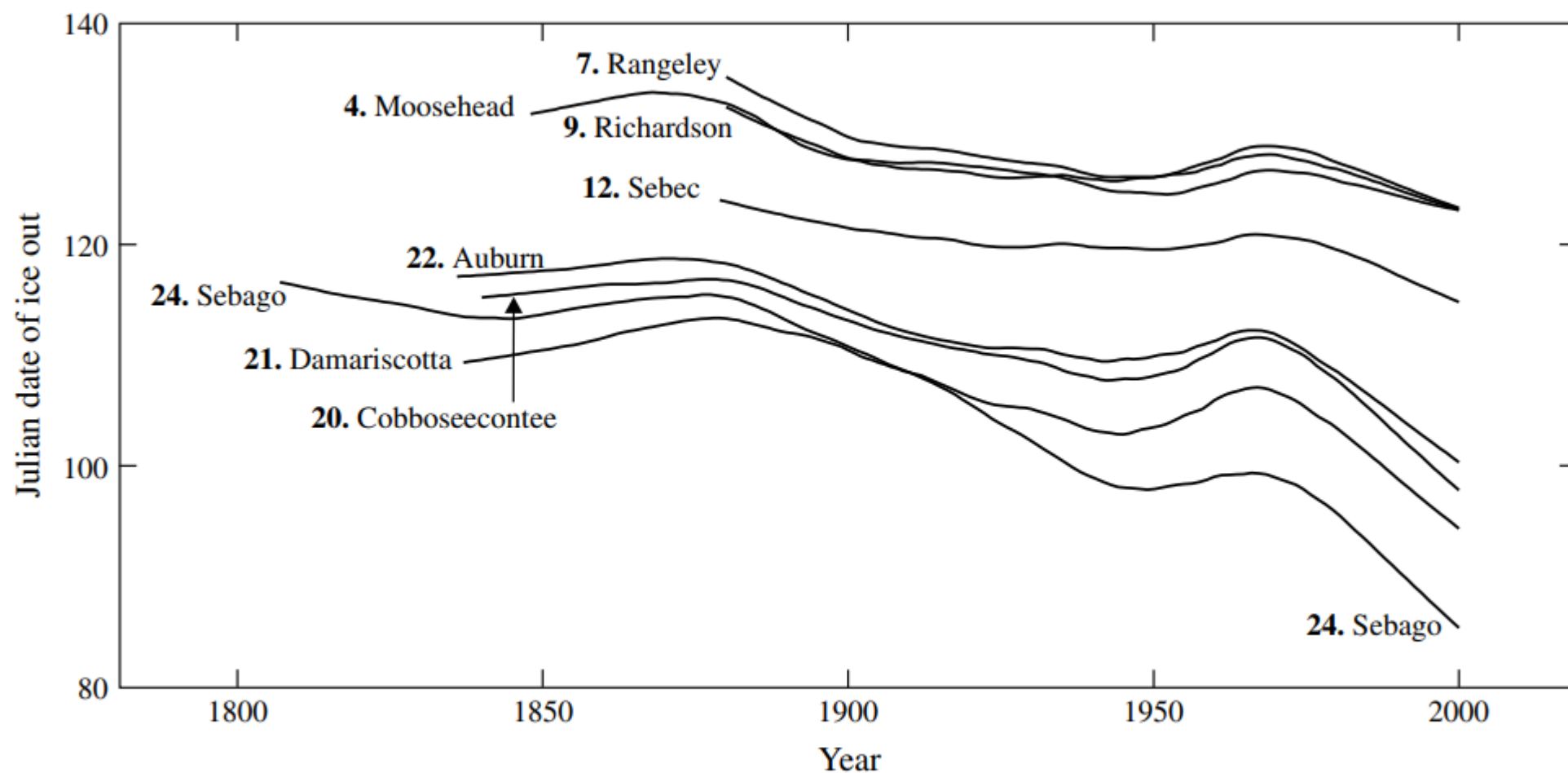
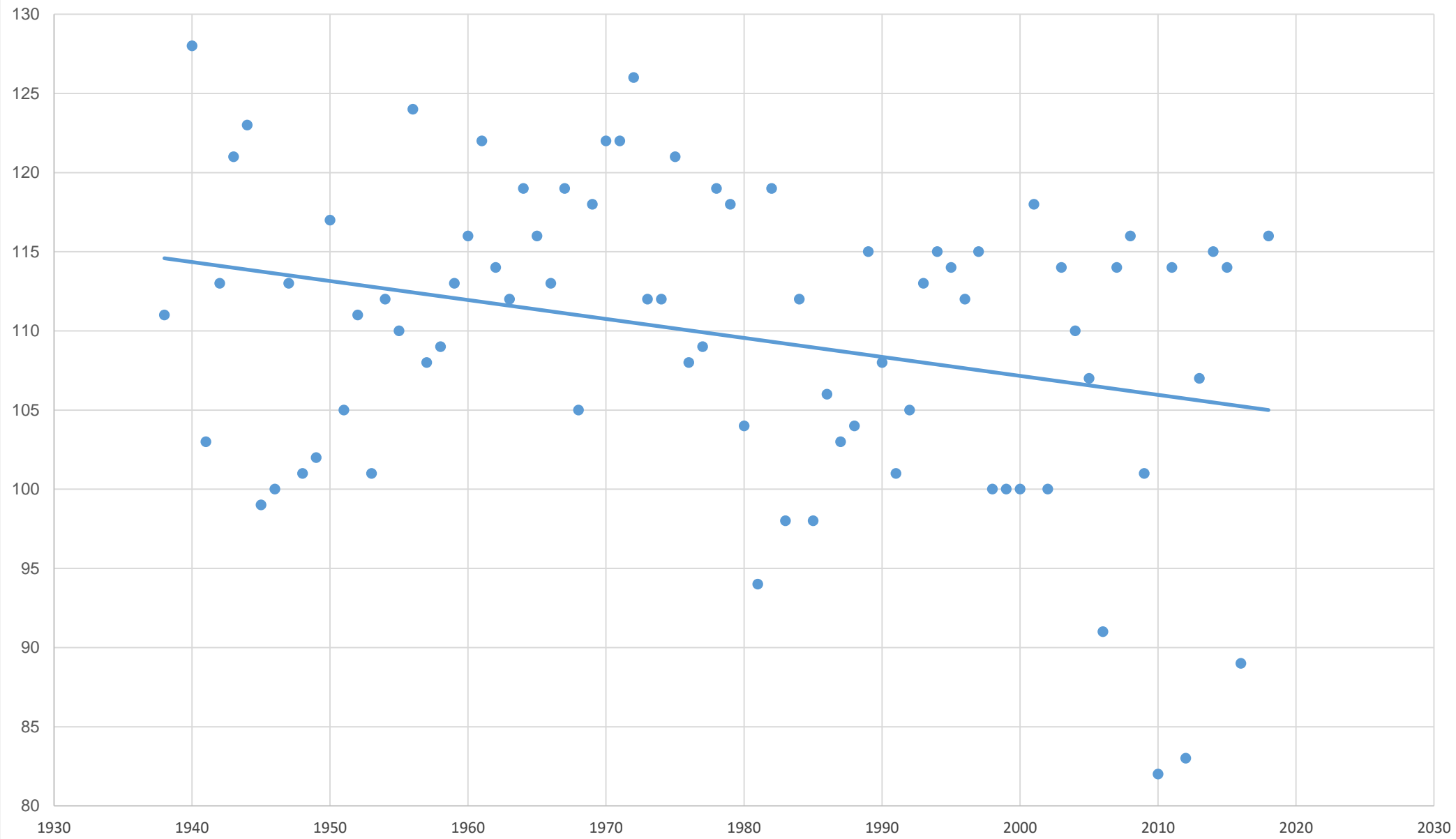


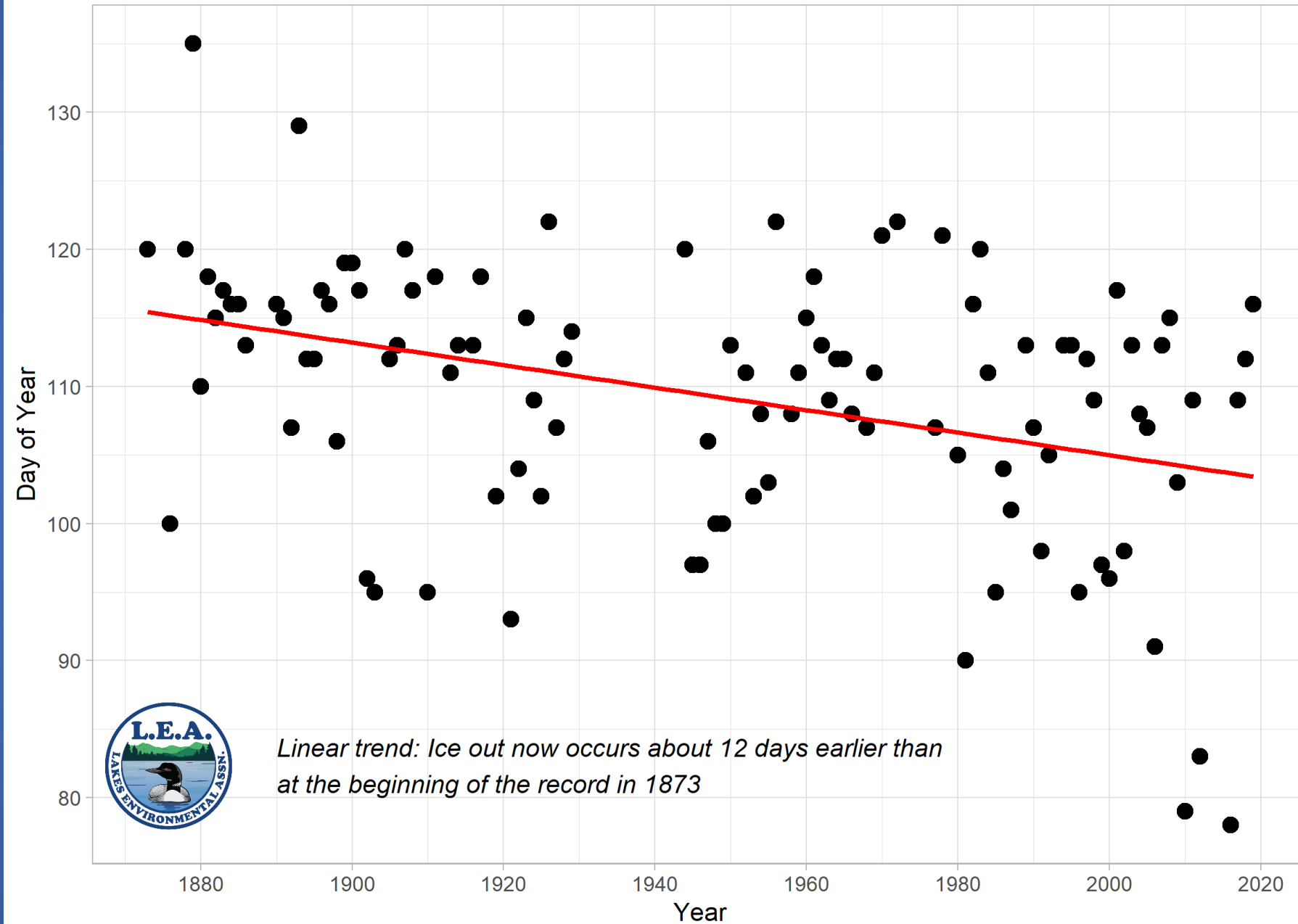
Figure 3. Ice-out dates over time for eight selected lakes in New England. Data smoothed by locally weighted regression. Locations are shown in Figure 1



Keoka Ice Out Dates



## Ice Out - Long Lake (North Basin)













**KEEP OUT**  
**EXTREMELY**  
**HOT WATER AND ROCKS**  
SOME TEMPERATURES NEAR BOILING (200°)  
WATER TEMPERATURES INCREASE  
SUDDENLY AND WITHOUT WARNING





# How will warmer lakes and ponds effect the camp experience?

## Pros:

People and kids like warm water!







Pros:  
Longer  
boating  
season



Pros: More warm weather for camp setup, breakdown, and maintenance





Cons:  
Warmer water is  
more conducive  
to algal blooms











Cons::  
Warmer water is  
better for  
bacteria growth  
and survival





Cons:  
Many invasive  
aquatic species  
thrive in warmer  
water and longer  
growing seasons



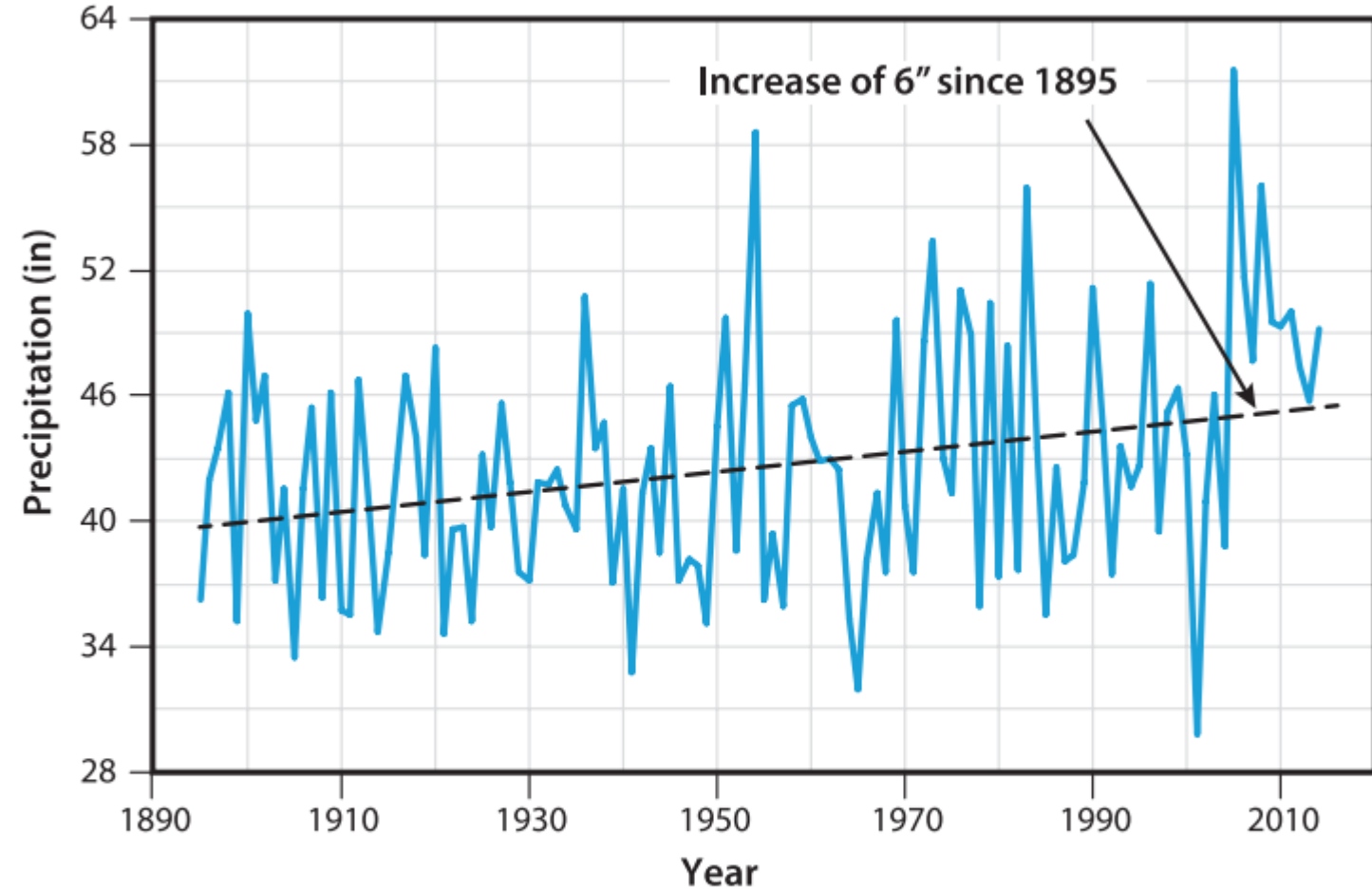
Cons:  
Longer  
boating  
season





Cons:  
More  
precipitation  
and more  
storm events

### Maine's Total Annual Precipitation



**Figure 6.** Total annual precipitation, 1895–2014, averaged across Maine from gridded monthly station records from the U.S. Climate Divisional Dataset ([ncdc.noaa.gov/monitoring-references/maps/us-climate-divisions.php](http://ncdc.noaa.gov/monitoring-references/maps/us-climate-divisions.php)). A simplified linear trend (black line) indicates that precipitation increased six inches, or about 13%, during the recording interval.





Building and  
grounds runoff  
matters...





Infrastructure  
too close to  
streams





# Improper road drainage





Clean up costs  
and possible  
fines







Undersized culverts



Clogged culverts and  
ditches



# Mitigation and adaptation strategies for Summer Camps





# Global Issue







Maine's Lakes



New England  
Lakes



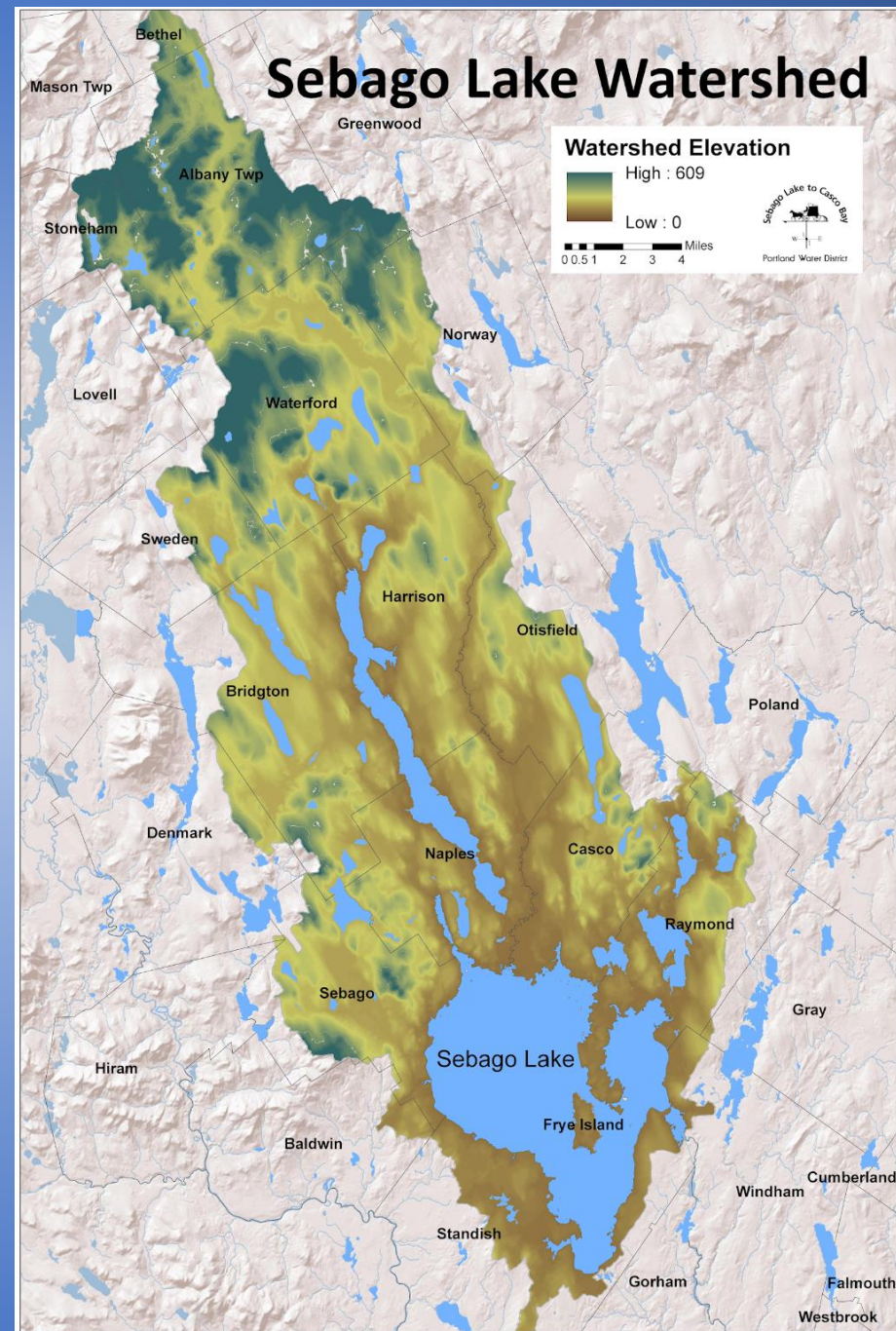




Phosphorus controls the  
amount of algae in lakes



Upstream green  
= downstream  
blue





# Summer Camps have a long history of helping with conservation







Plan for more rainy  
day activities!

Anticipate flooding  
in low areas





Regular road maintenance, grading, raking, ditch and culvert cleaning



# Find and correct perennial erosion sources





Understand and use proper erosion control for all construction





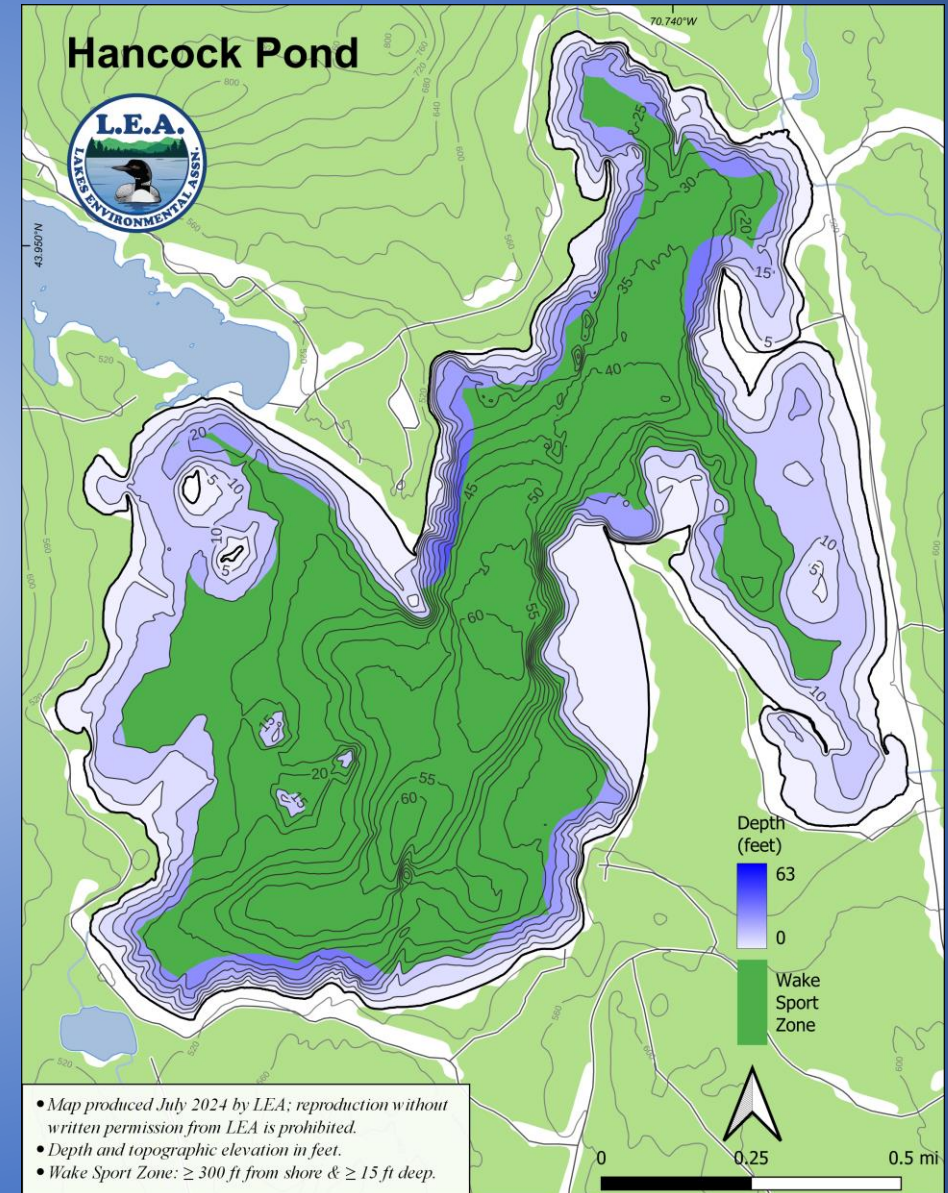
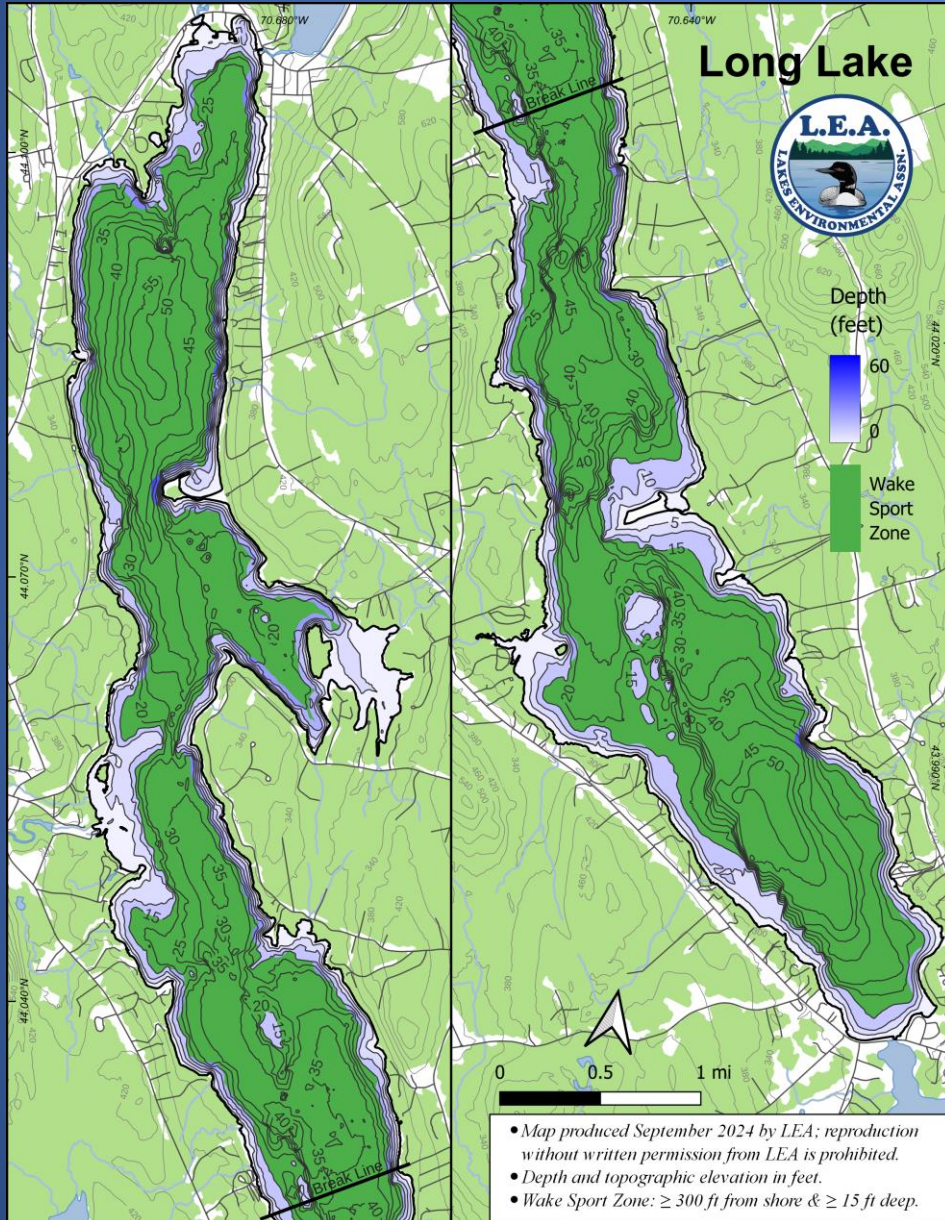


Use traditional  
and LID  
stormwater  
control  
techniques



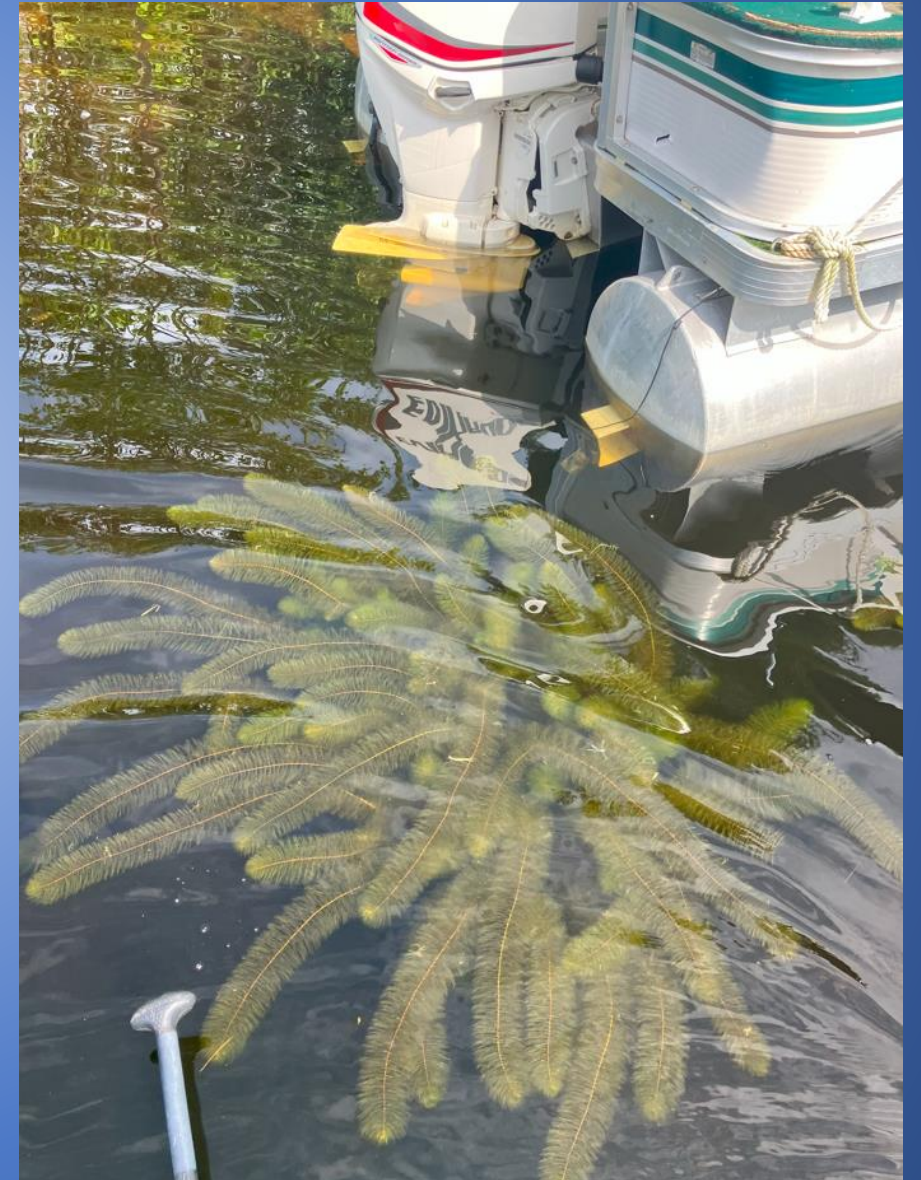


# Mitigate the negative effects of power boating





Don't boat through the weeds and regularly check your docks





Inspect camp boats, and support CBI programs on your lake





Support the control of invasive species  
on your lake and in the region





# Properly size stream-road crossings







• SOIL TEST REPORT FOR:

BRIDGTON ME 04008

MAINE SOIL TESTING SERVICE  
UNIVERSITY OF MAINE  
5722 DEERING HALL  
ORONO, MAINE 04469-5722

• SOIL TEST SUMMARY & INTERPRETATION  
(see Numerical Results section for more information)

	Level Found	LOW	MEDIUM	OPTIMUM	ABOVE OPTIMUM
Soil pH	6.4				
Organic Matter(%)	7.6				
Phosphorus (lb/100)	27.9				
Potassium (lb/100)	2.4				
Calcium (lb/100)	85.4				
Magnesium (lb/100)	13.1				
Sulfur (ppm)	9				
Boron (ppm)	0.2				
Copper (ppm)	0.12				
Iron (ppm)	11				
Manganese (ppm)	5.9				
Zinc (ppm)	2.8				

• RECOMMENDED ADDITIONS FOR EXISTING LAWN - Crop Code # 201

No line recommended. Soil pH is at or above the optimum level for this crop.



Intelligent grounds maintenance involves understanding existing conditions



# Questions and Discussion

