

An aerial photograph of a frozen lake, showing a network of cracks and snow patches on the ice. A semi-transparent rectangular box is centered over the image, containing the project title in bold, dark blue, serif font.

# **WINTER LAKE KEEPERS**

## **2019 Pilot Project**





# LakeKeepers

- Smaller, more mobile alternative to LakeWatch
- Summer program running since 2018
- Kits are mailed out to volunteers, measure independently, ship data and samples back





# WINTER LAKEKEEPERS

- Teamed up with ice anglers
- Funded by Alberta Ecotrust
- Piloted early 2019 at 10 lakes
- Focus on nutrient and oxygen levels





# WHY STUDY LAKES IN WINTER?

- Important processes continue under ice
- Nutrients released and released and captured
- Algae blooms still a part of this system





# WHY STUDY LAKES IN WINTER?

- Oxygen produced and consumed, becomes a limited resource.
- It's kind of important



Winterkill at Crimson Lake, 2018  
(Edmonton Journal)



# OXYGEN TOLERANCE IN ALBERTA FISH

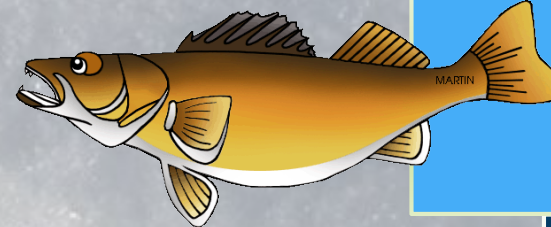
(Barton and Taylor 1995)

**Sensitive:** all salmonids, longnose sucker, burbot



>2 mg/L DO

**Intermediate:** all cyprinids except fathead minnow, walleye, white sucker, brook stickleback and goldeye)



1-2 mg/L DO

**Tolerant:** includes fathead minnow, northern pike and yellow perch)



< 1 mg/L DO



# WHAT INCREASES A LAKE'S RISK OF ANOXIA?

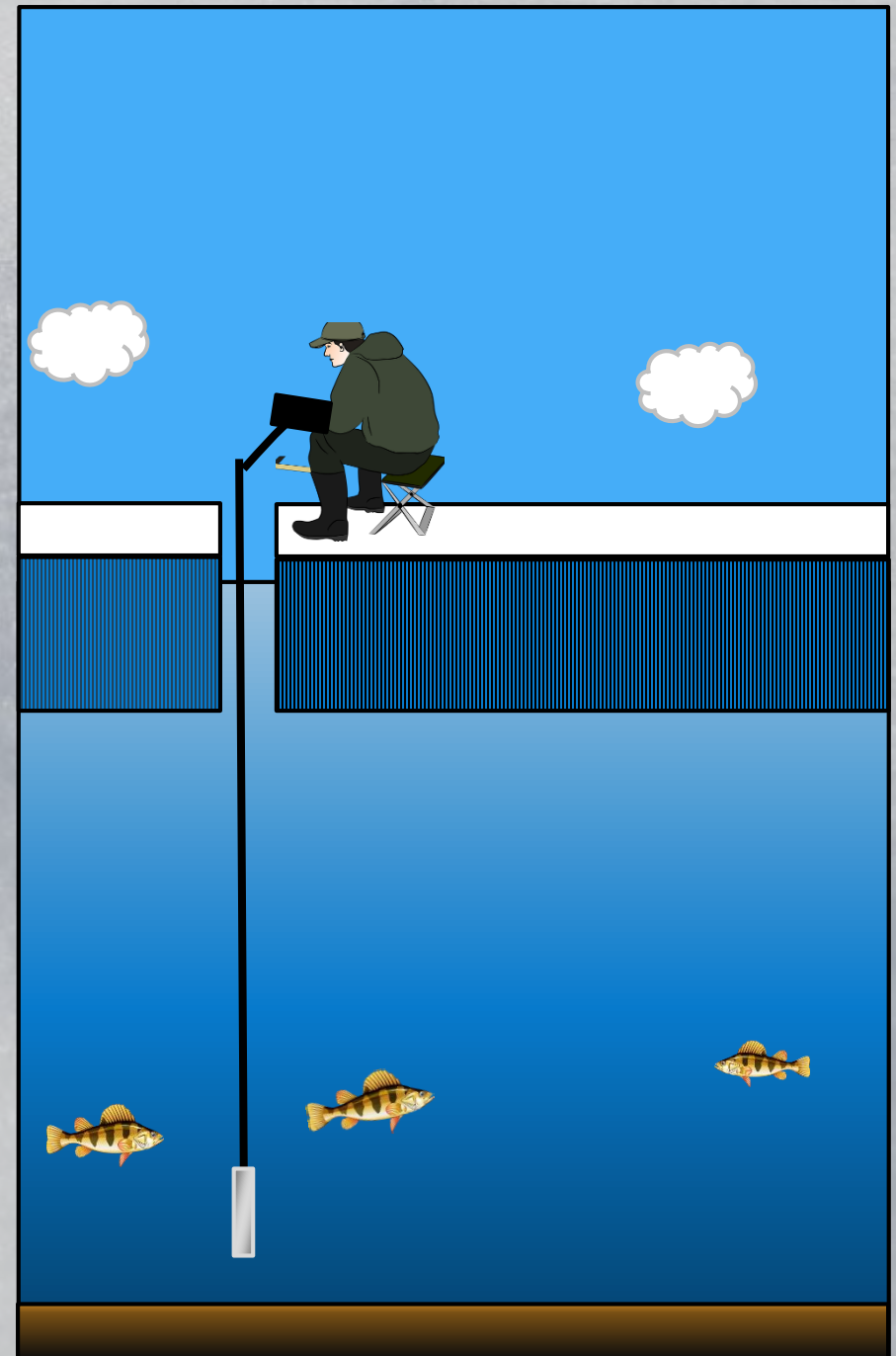
- Shallow depth
- Eutrophication
- Longer ice cover
- Snow cover



Caters News Agency 2014



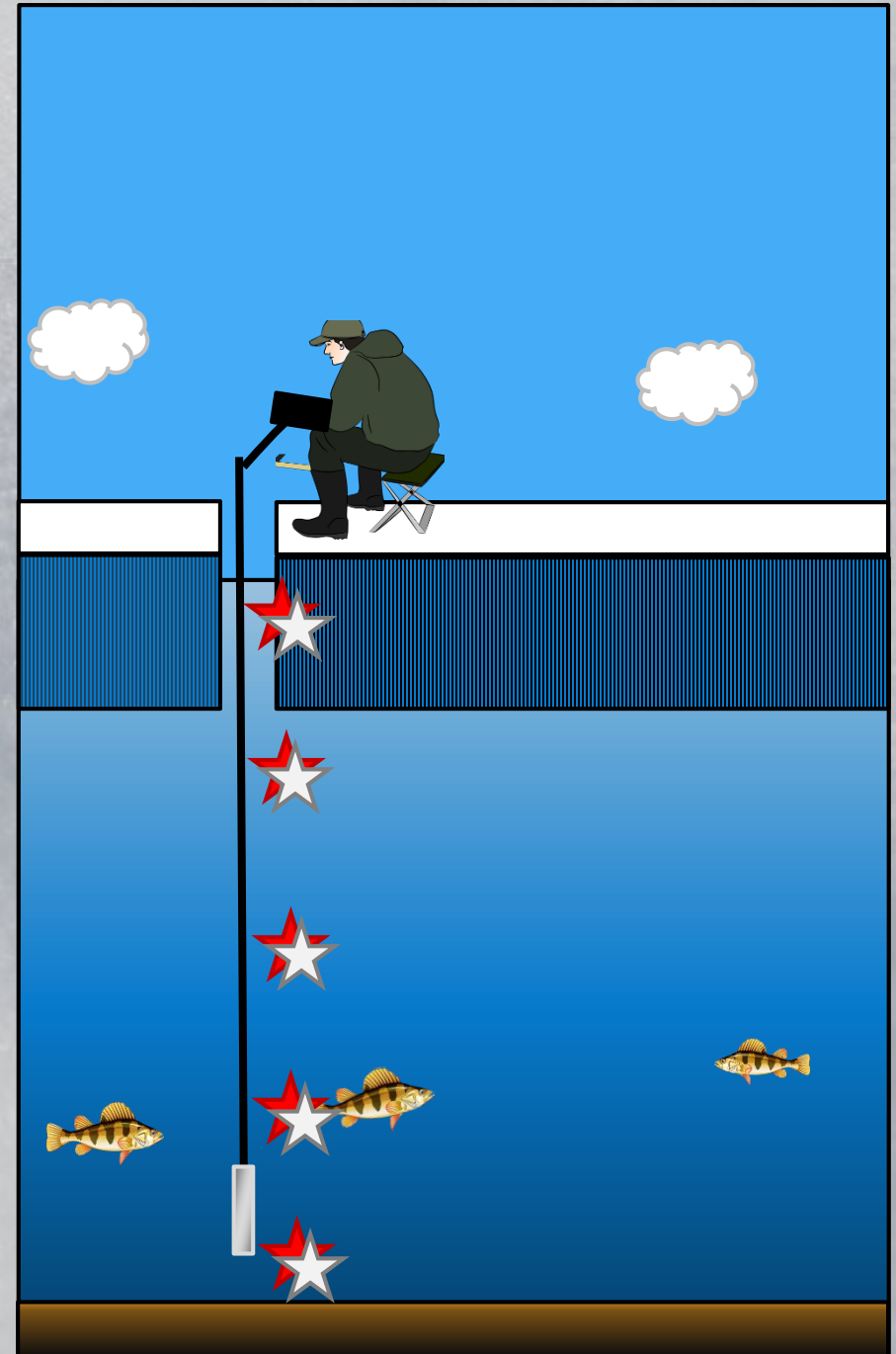
What they measured:





# What they measured:

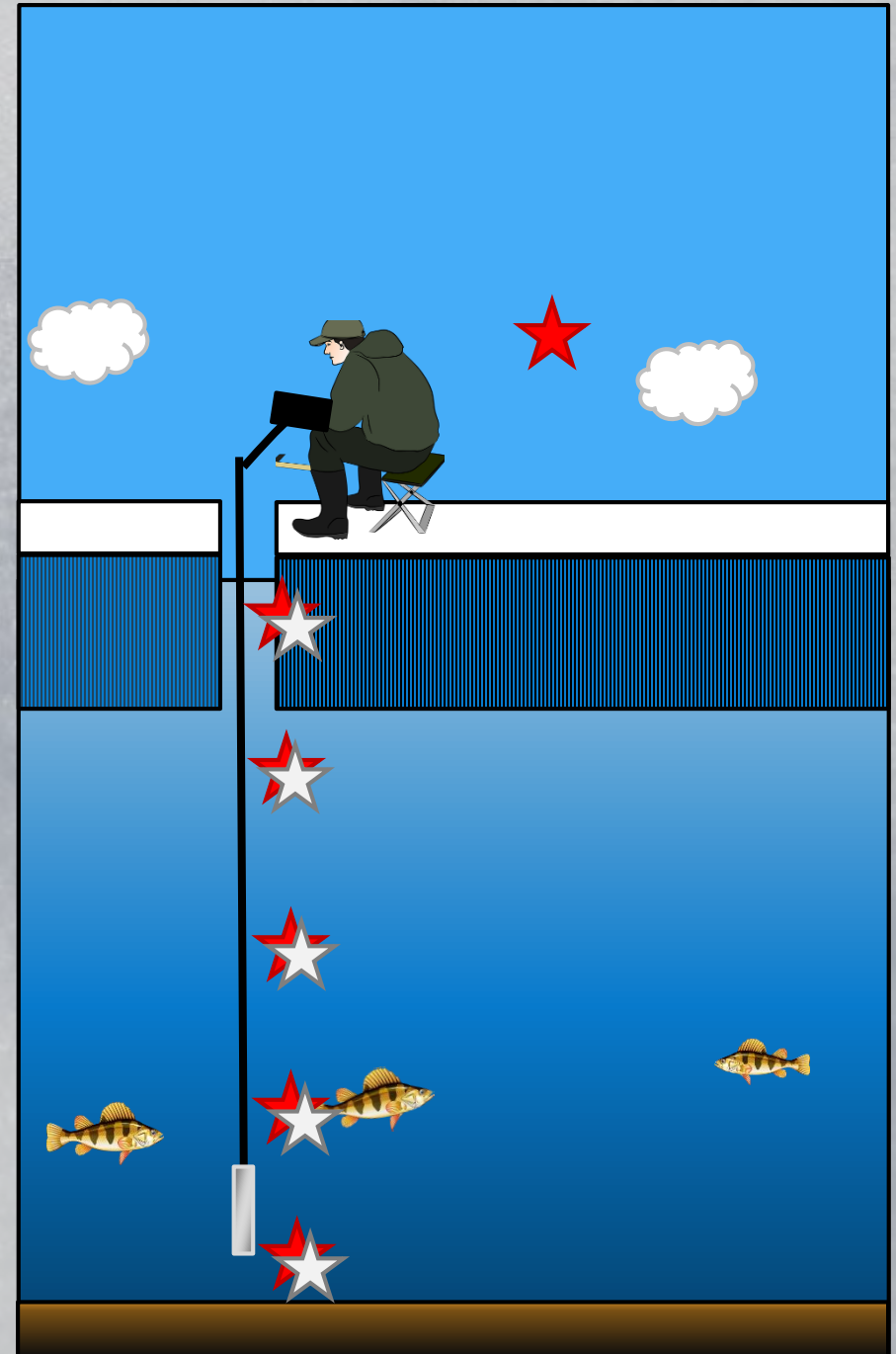
- Temperature and dissolved oxygen profiles





# What they measured:

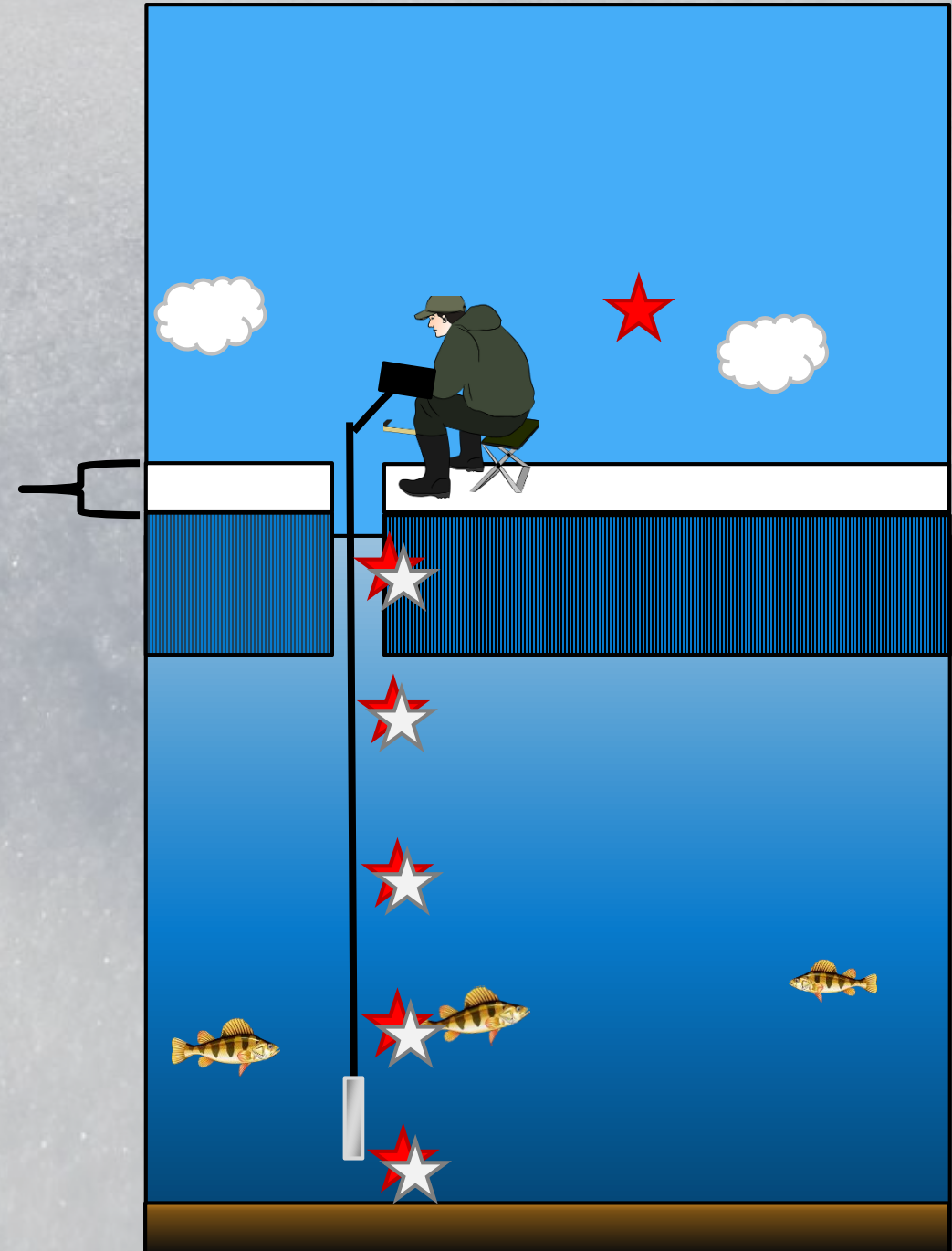
- Temperature and dissolved oxygen profiles
- **Air temperature**





# What they measured:

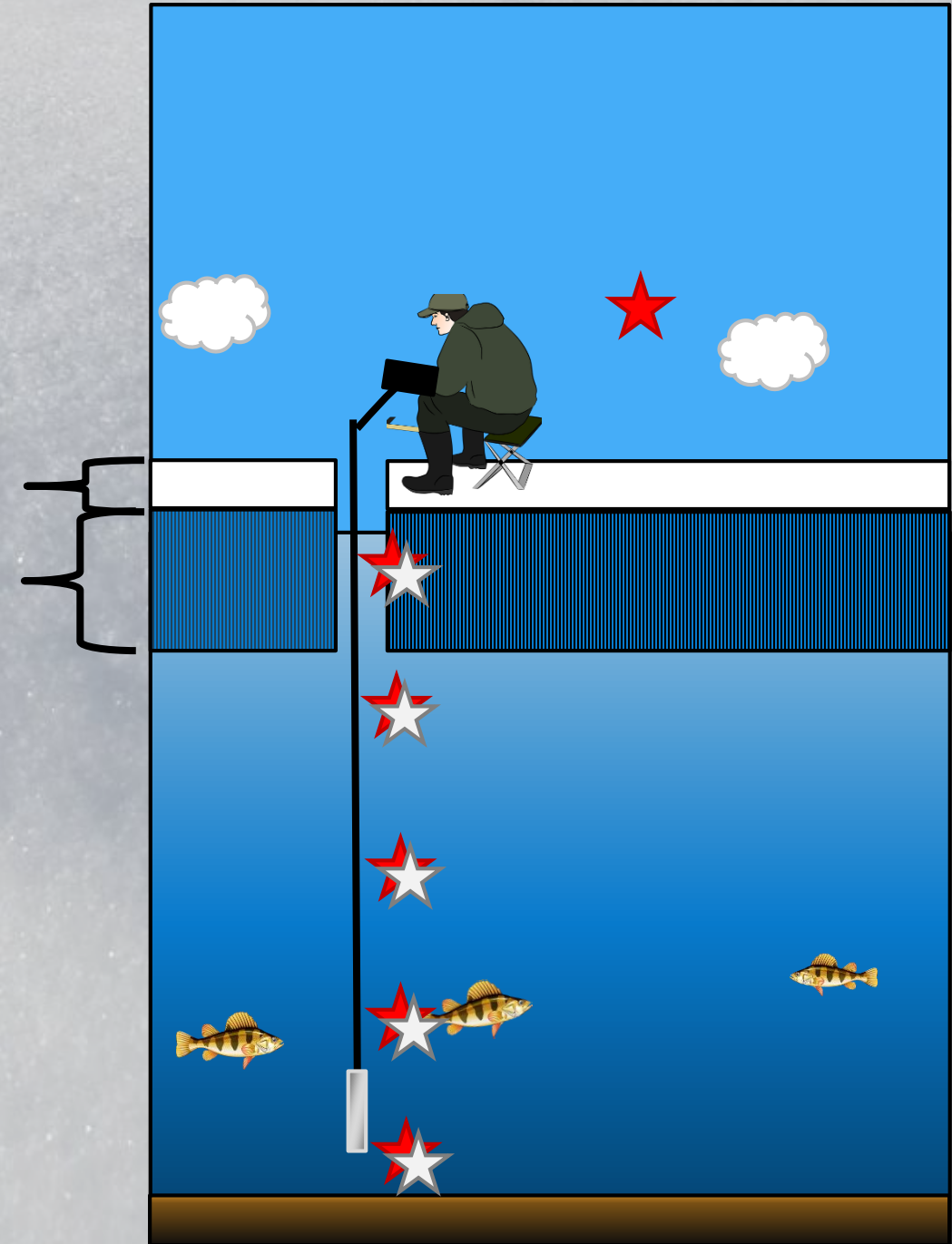
- Temperature and dissolved oxygen profiles
- Air temperature
- **Snow depth**





# What they measured:

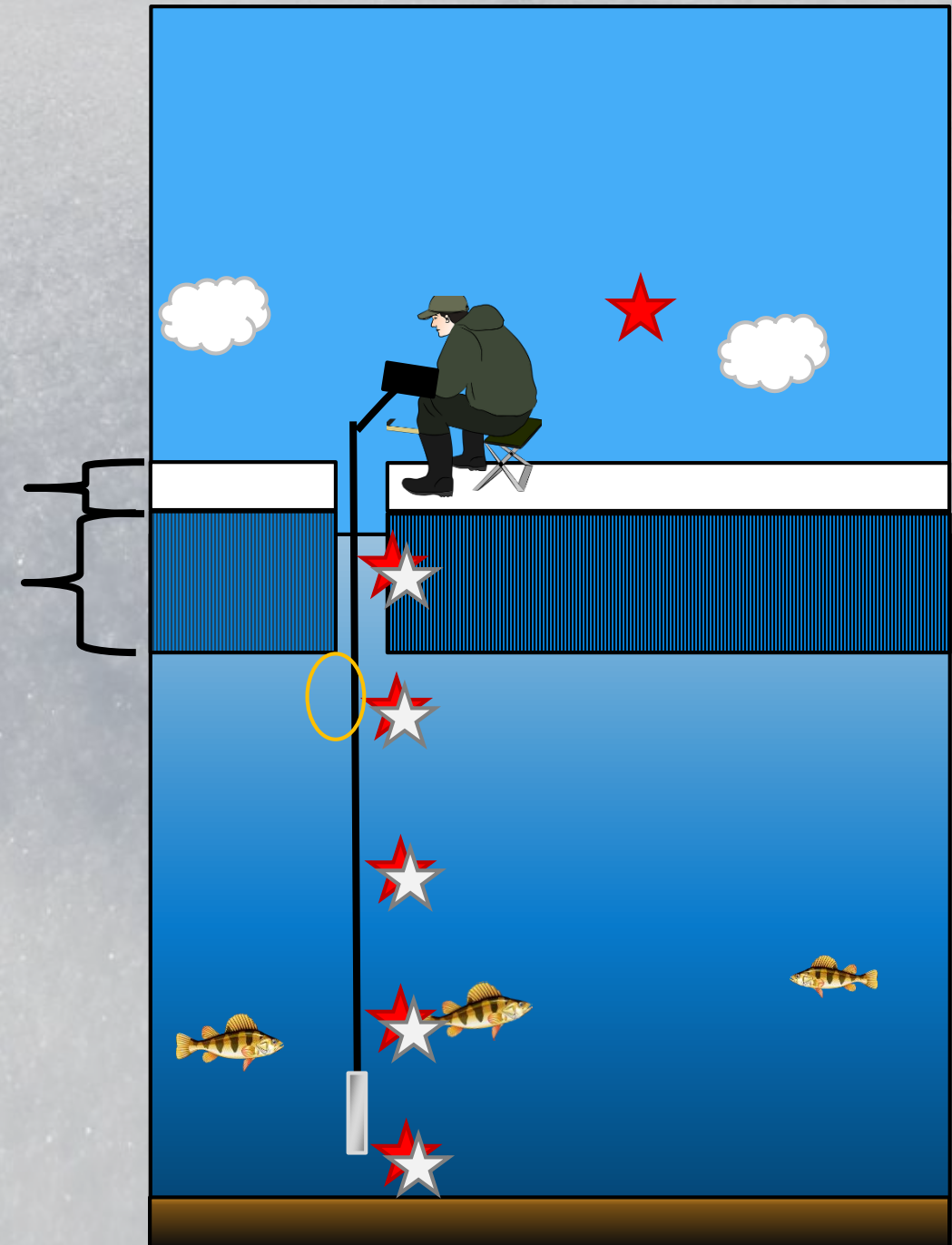
- Temperature and dissolved oxygen profiles
- Air temperature
- Snow depth
- **Ice depth**





# What they measured:

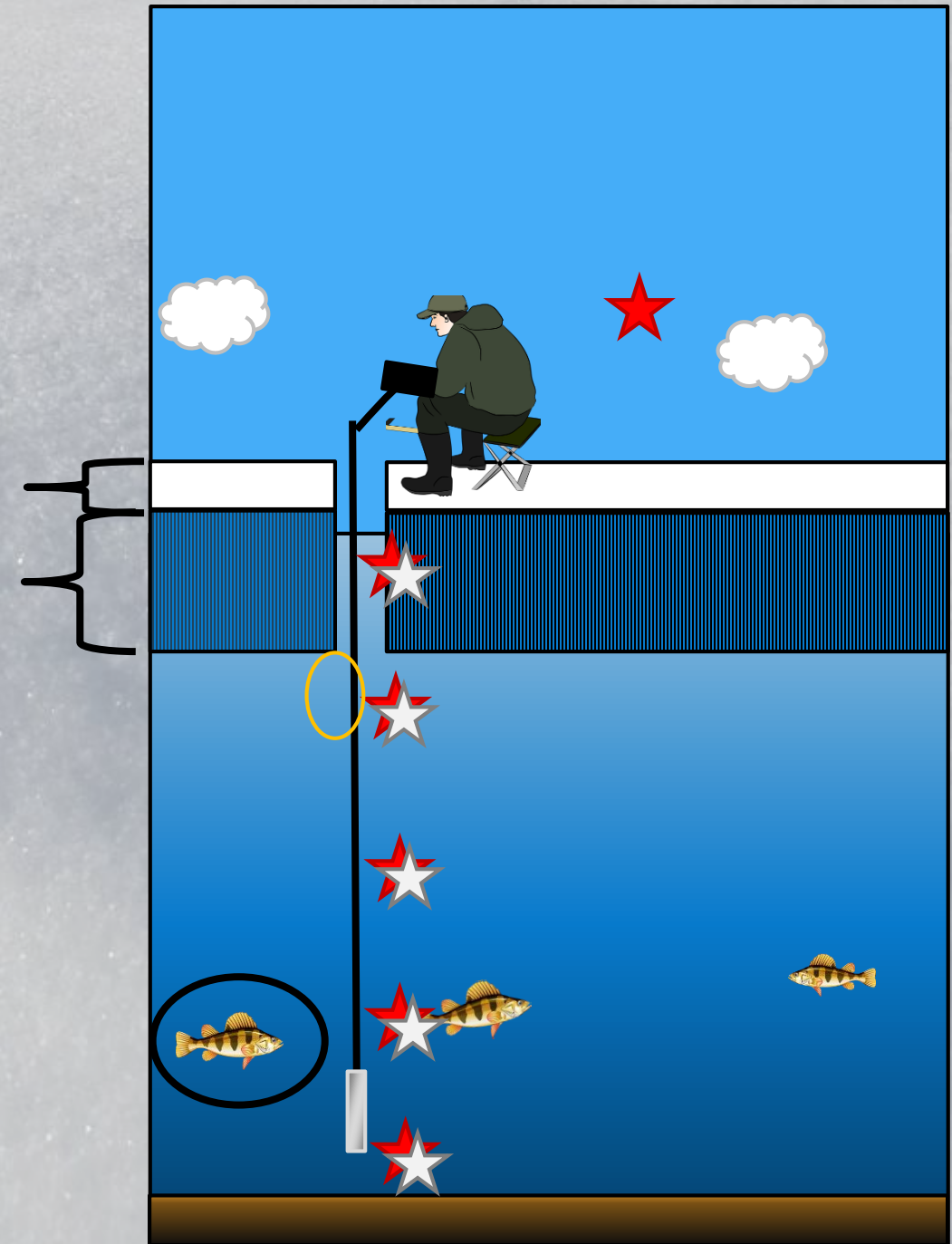
- Temperature and dissolved oxygen profiles
- Air temperature
- Snow depth
- Ice depth
- **Total phosphorus**





# What they measured:

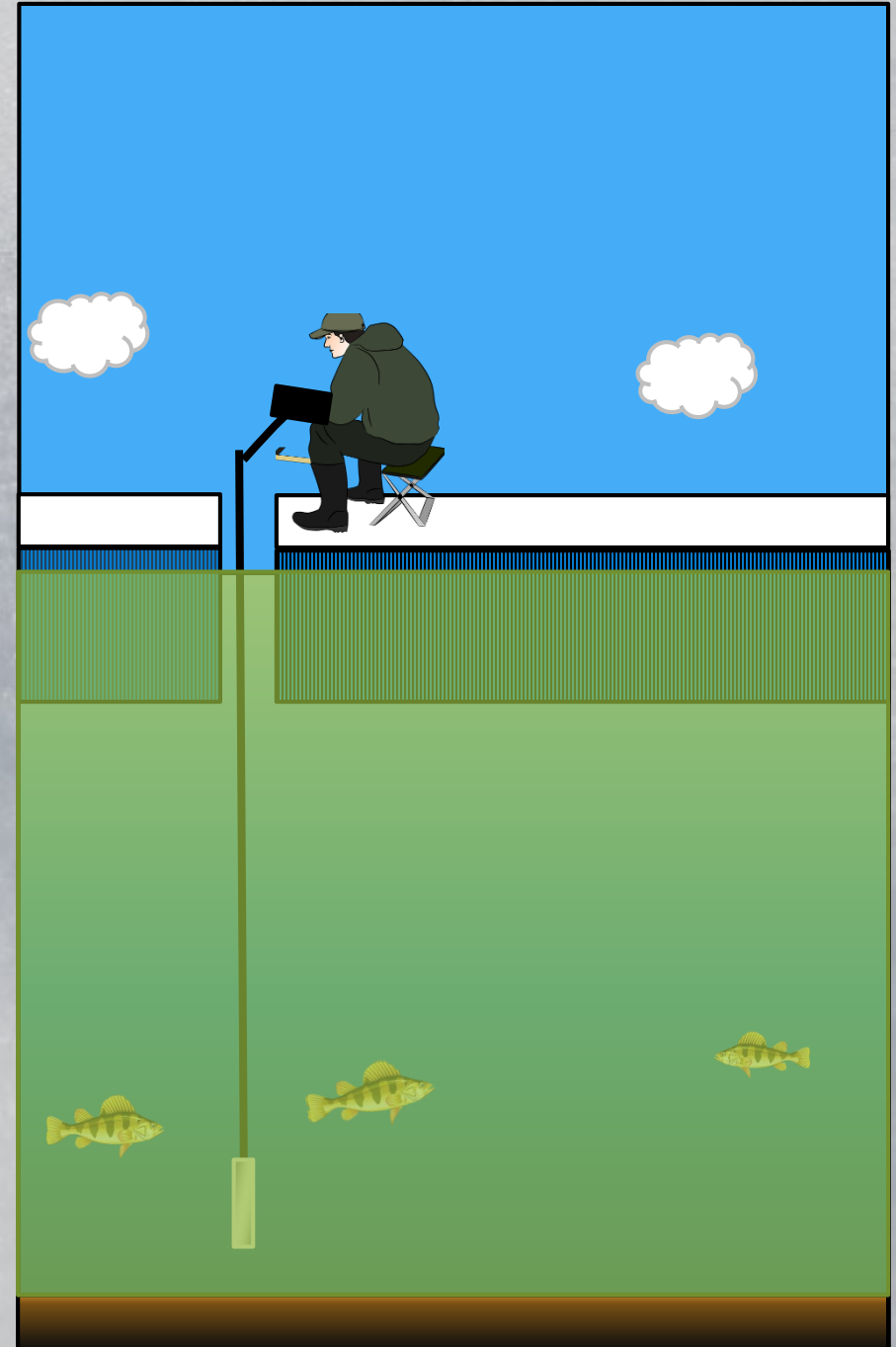
- Temperature and dissolved oxygen profiles
- Air temperature
- Snow depth
- Ice depth
- Total phosphorus
- **Type of fish**





# What they measured:

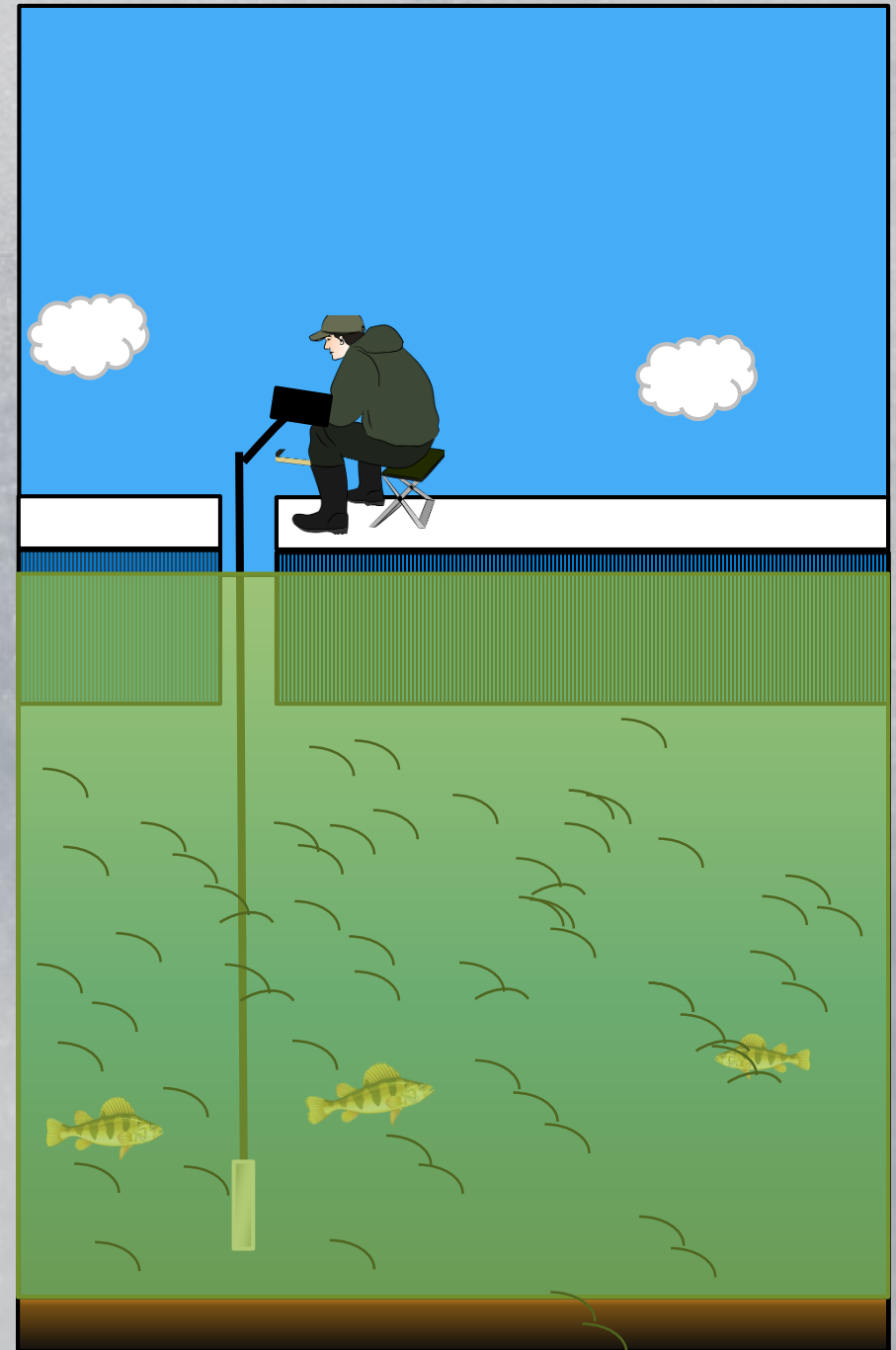
- Temperature and dissolved oxygen profiles
- Air temperature
- Snow depth
- Ice depth
- Total phosphorus
- Type of fish
- **Water colour and turbidity**





# What they measured:

- Temperature and dissolved oxygen profiles
- Air temperature
- Snow depth
- Ice depth
- Total phosphorus
- Type of fish
- Water colour and turbidity
- **Signs of cyanobacteria blooms**






# Where they measured:

## 10 Lakes in Central Alberta:

- Bangs Lake
- Nakamun Lake
- Minnie Lake
- Hope Lake
- North Wabasca Lake
- North Buck Lake
- Long Lake
- Manatokan Lake
- Moose Lake
- Lac Santé



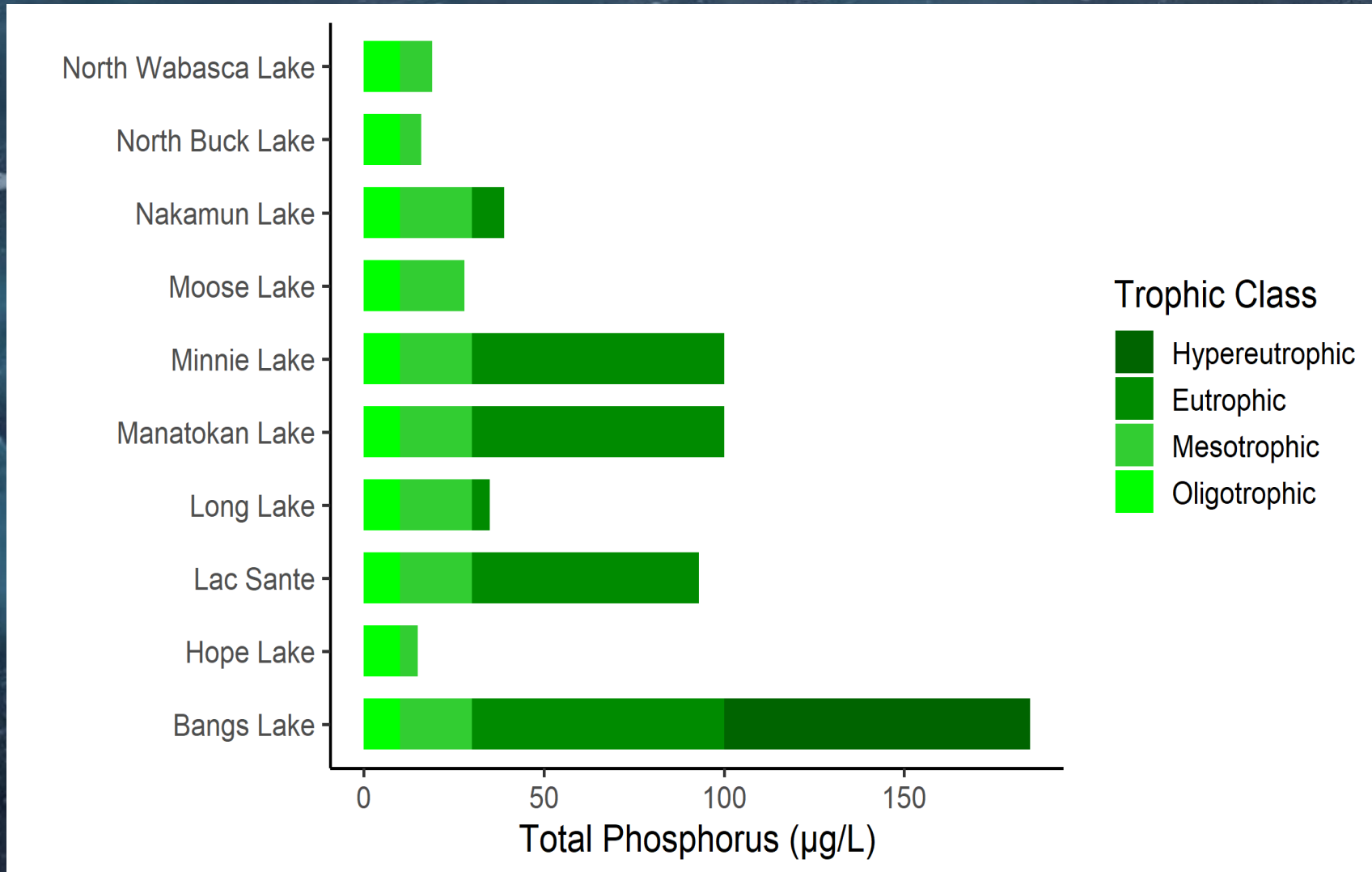


An aerial photograph of a frozen body of water, possibly a lake or river, showing a network of cracks and ice patterns. A semi-transparent blue horizontal band is overlaid across the center of the image.

# **RESULTS**

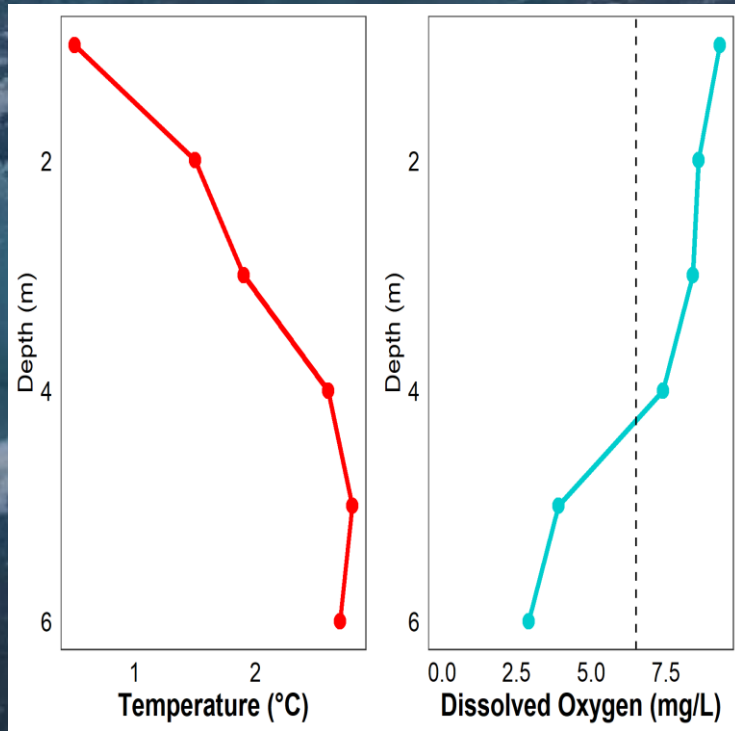


# TOTAL PHOSPHORUS

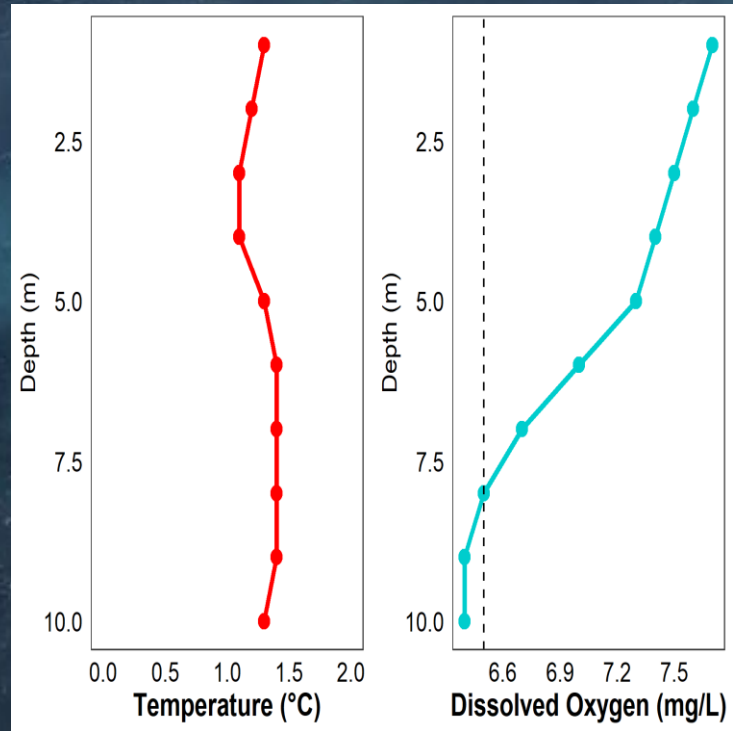




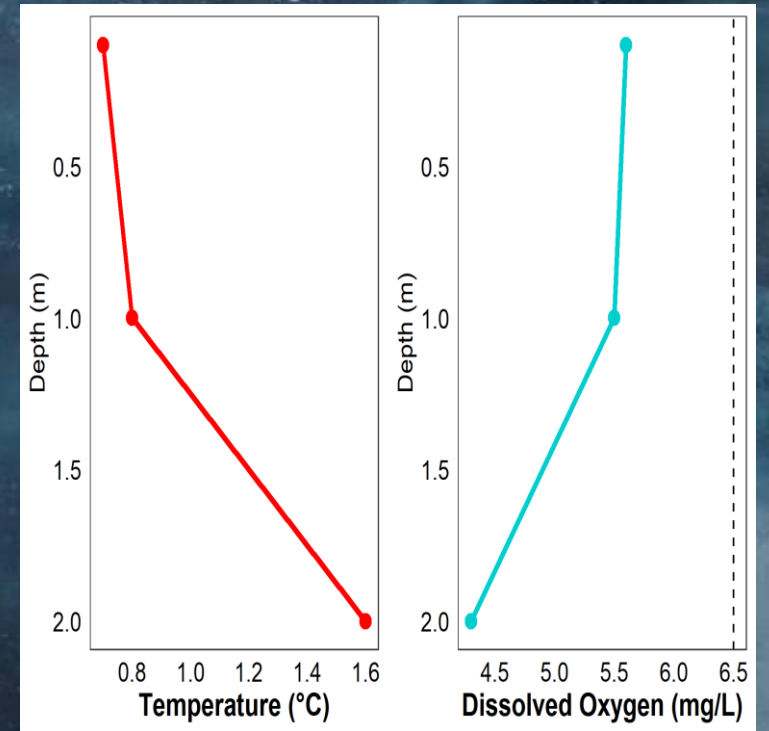
# OXYGEN PROFILES



Hope Lake



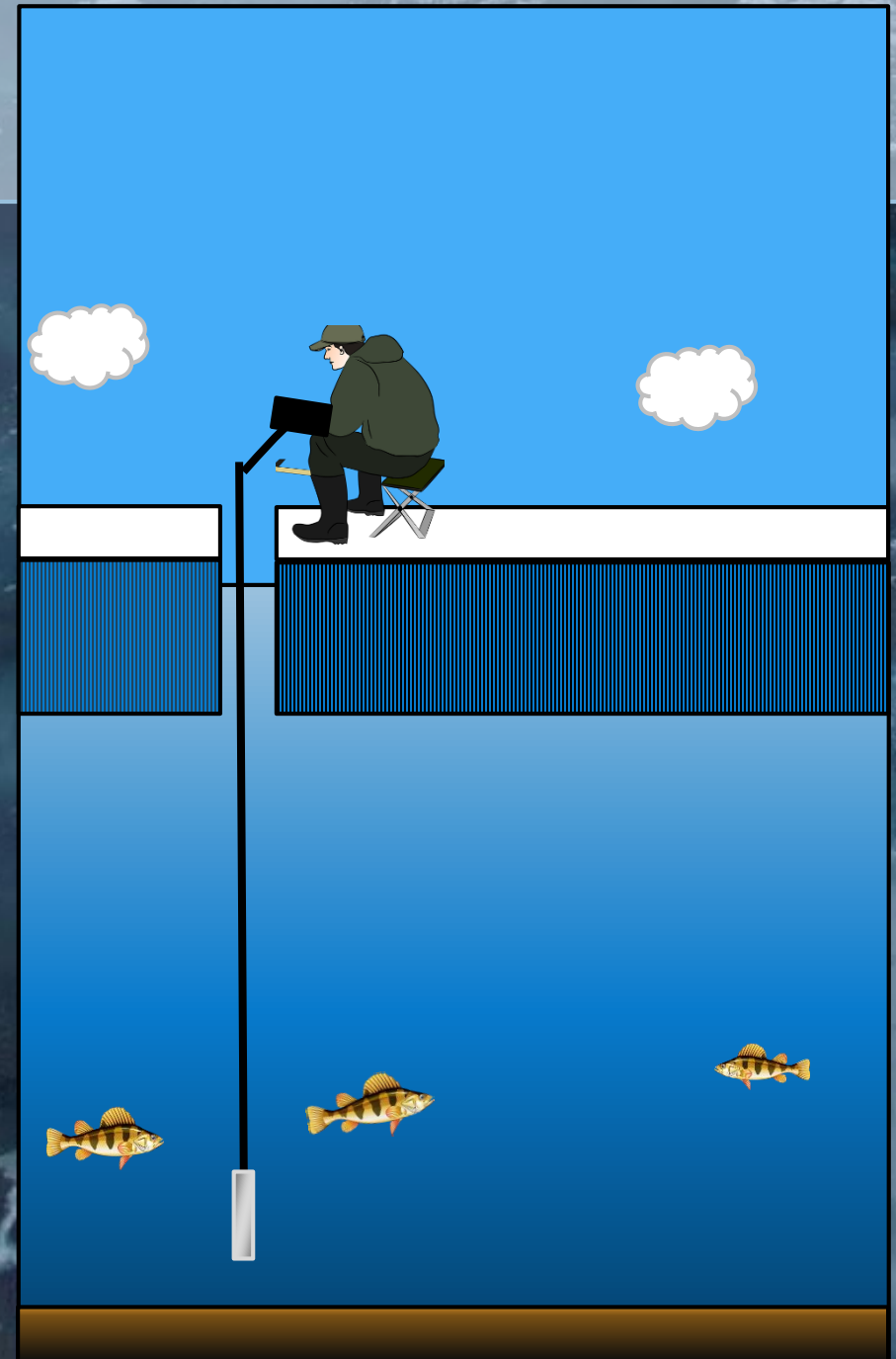
Lac Sante



Long Lake



# CYANOBACTERIA...

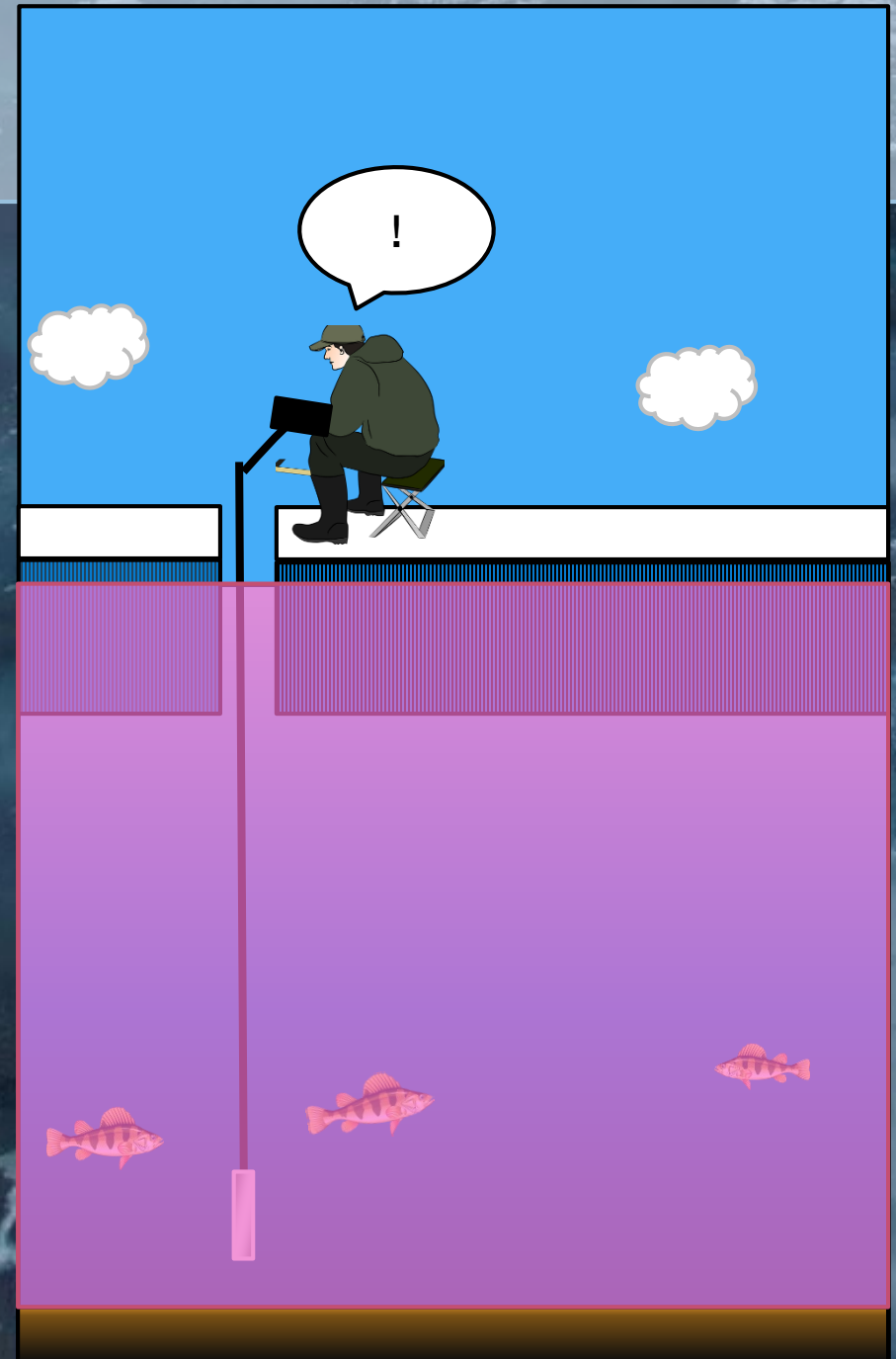




# CYANOBACTERIA...

“Didn’t fish today, water was pink.”

Cyanobacteria bloom, still present during LakeWatch sampling in June.





# OUTCOMES SO FAR

- Collection of valuable winter data
- Provide anglers with interesting information about their lakes
- Safety!



# WHAT'S NEXT?

- Full report with individual lake results on ALMS website
- Answering more questions about the conditions leading to winterkill
- Continuation in winter 2019/2020



# QUESTIONS

This project was made possible through the support of



More information at [www.alms.ca](http://www.alms.ca)