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Harmful Algal Blooms

Tundra Tough LLC and
University of Alaska Fairbanks

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HABs

What is a Harmful Algal Bloom?

“Harmful algal blooms, or HABs, occur when colonies of algae — simple plants that live in the sea and freshwater — grow out of control and produce toxic or harmful effects on people, fish, shellfish, marine mammals and birds” (NOAA, 2016).

HABs

What can cause Harmful Algal Blooms?

“Excess nitrogen and phosphorus cause an overgrowth of algae in a short period of time, also called algae blooms. The overgrowth of algae consumes oxygen and blocks sunlight from underwater plants. When the algae eventually dies, the oxygen in the water is consumed. The lack of oxygen makes it impossible for aquatic life to survive.” (EPA, 2025)

PSP

What is Paralytic Shellfish Poisoning?

“Paralytic shellfish poisoning (PSP) is a serious illness caused by eating shellfish contaminated with algae that contains Paralytic Shellfish Toxin (PST), a toxin harmful to humans. This toxin is extremely poisonous; as little as one milligram (0.000035 ounce) is enough to kill an adult.” (ADEC, n.d.)

PSP

What other types of poisonings are possible?

Amnesic Shellfish Poisoning
Diarrhetic Shellfish Poisoning
(SOADOH, n.d.)

What is our Research?

NSF Grant Application

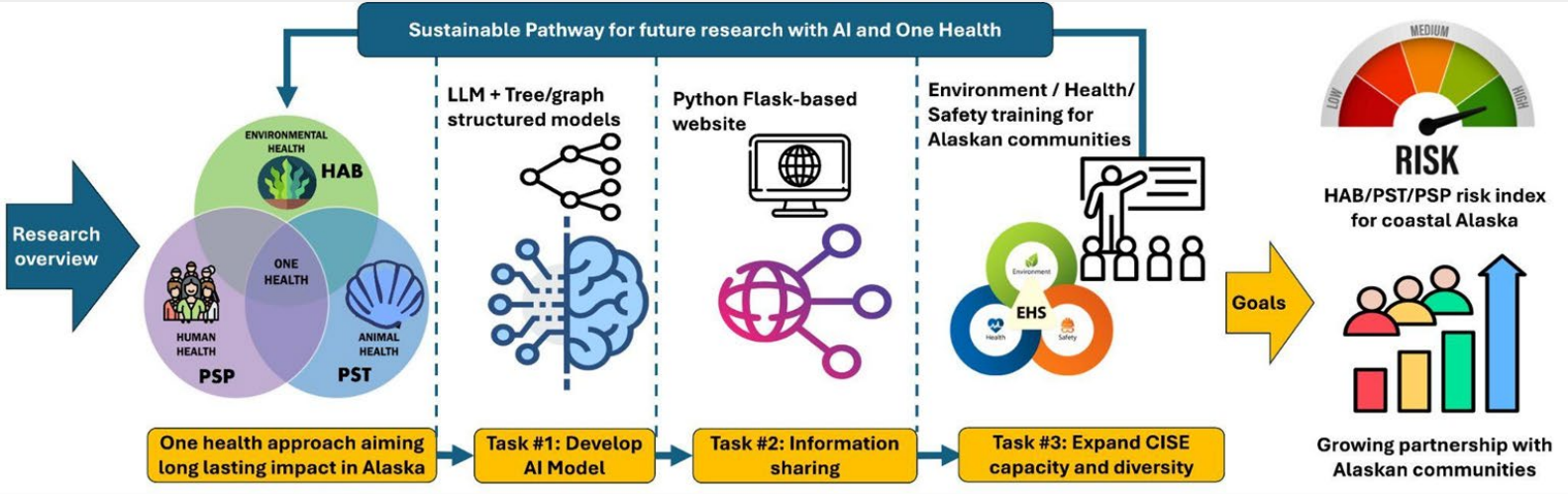
CISE MSI:RDP:SCH: AI Powered Prediction of Health Risks of Harmful Algal Blooms in Alaska: A Pilot to Predict Paralytic Shellfish Poisoning Disease by Integrating Multimodal Data

Mission

Using Data To Support

Subsistence Lifestyles

Program's Process



Preliminary Results

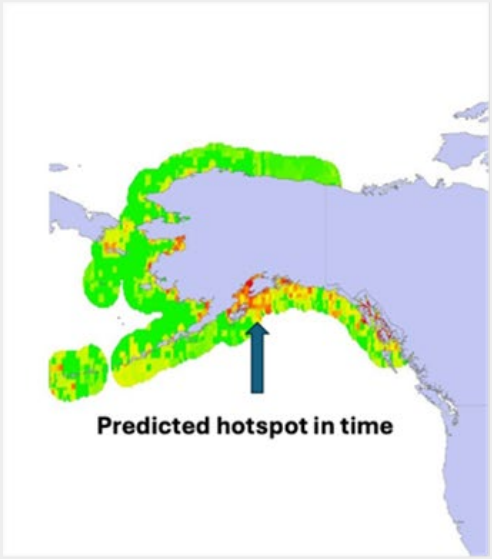


Figure 2a: heat map of RIOs for the study area

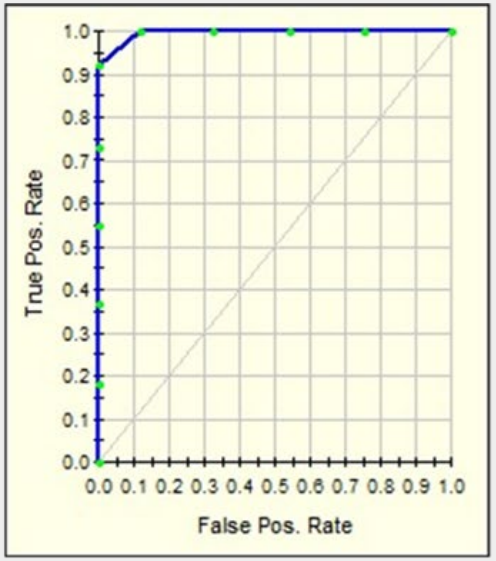


Figure 2b: Model accuracy (ROC/AUC = 96%)

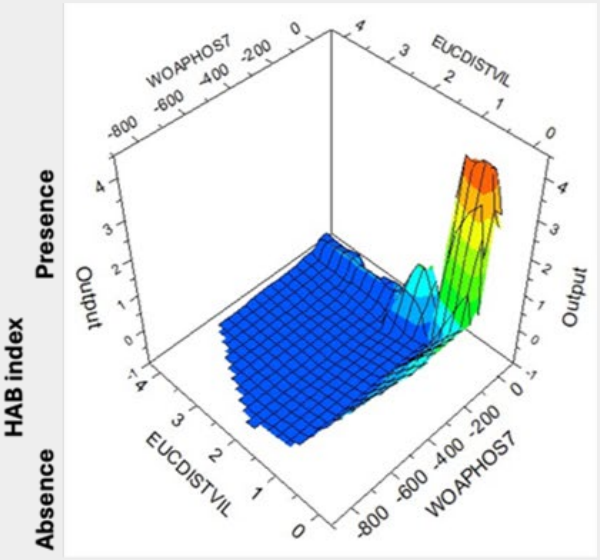


Figure 2c: Impact of Predictor EUCDISTVIL and WOAPHOS7

Figure (Left). Heat map of HAB risk index of occurrence.

Figure (Middle). High model accuracy. The ROC score is 96%.

Figure (Right). Distance to village and phosphate is of high importance to predict HAB

What's Next?

Traditional Knowledge

Protecting Resources

Community Health

Community Needs

UNIVERSITY OF ALASKA FAIRBANKS

Any Questions?

TUNDRA TOUGH LLC

Photos

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