

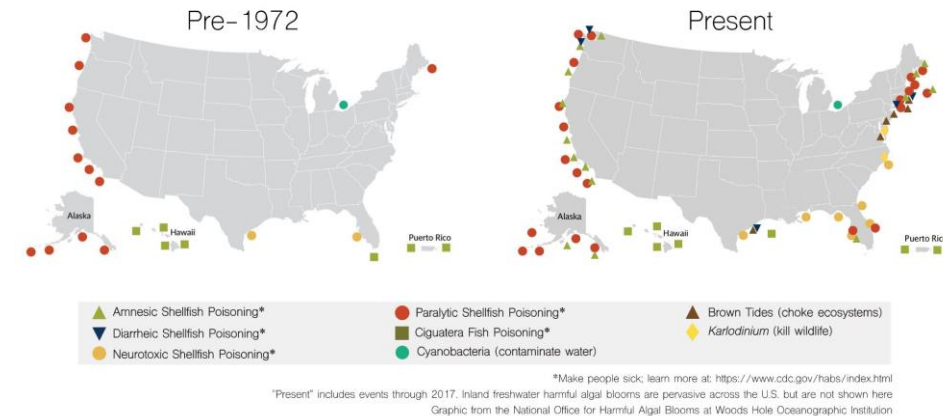


# Bloom Early Detection (BED) Model

A platform for forecasting and visualizing harmful algae blooms.

# Motivation

- Detrimental to economies: \$900 million each year on health and illness costs
- Over last three decades
  - More severe
  - More frequent



# The Problem

01

Harmful algal bloom (HAB) portals are hard to use for the general public.

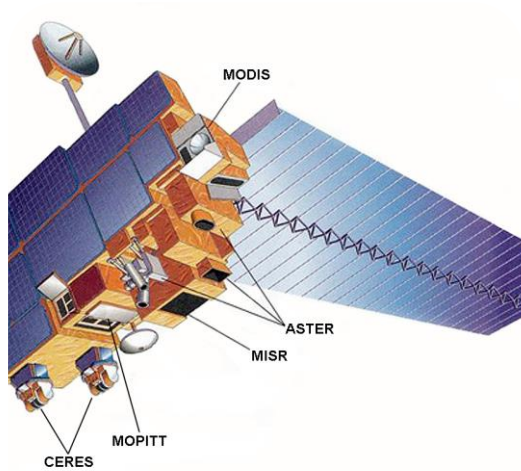
02

Forecasting algal blooms is difficult and time consuming.

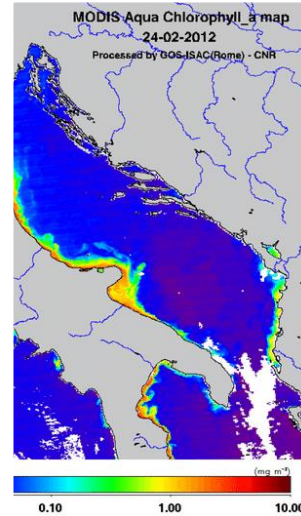
03

Wanted to develop a dashboard for identifying HAB growth with a focus on ease of use and accessibility.

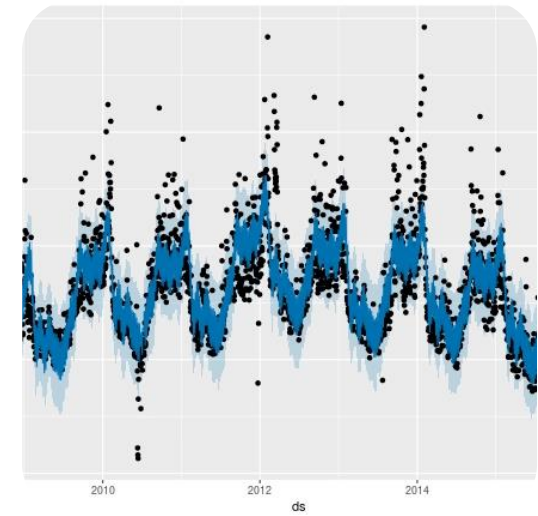
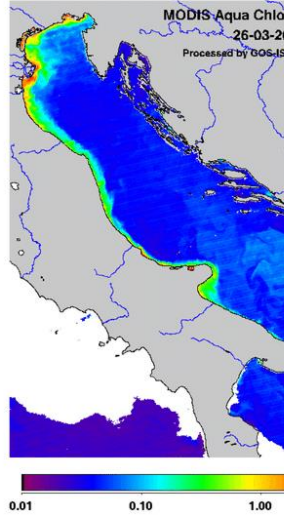
# Our Model



Data collected from  
Aqua MODIS



Data processed to extract  
Chlorophyll-A and Sea Surface  
Temperature data over time



Machine learning model used  
to learn multivariate trends in  
location-specific waterbodies

# Our Solution



Easy to use interactive dashboard with bloom forecasting



Monthly predictions provided with machine learning algorithm



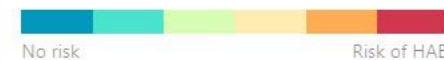
Multivariate study: uses Sea Surface Temperature and Chlorophyll-A data to determine risk



☒ Pins ☐ Chlorophyll-a Heatmap

## Bloom Early Detection

An investigation in bloom early prediction.



### Lake Huron

2020-07-17 to 2020-08-16

1 month Chloro-a  
Change:

↓ -8.38 %

Current Chlorophyll  
Concentration

2.19 mg/ml

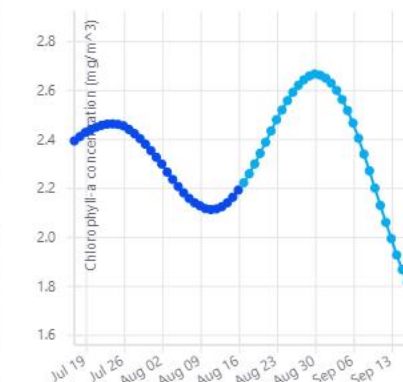
2020-08-17 to 2020-09-16

Chloro-a forecast (1  
month)

1.81 mg/ml

Prediction interval (95%  
confidence)

1.43 /2.21 mg/ml



View Code: [GitHub](#)

Interactive  
waterbody points

Forecasted information  
for waterbody

Relevant statistic for  
current and future bloom  
conditions

Bloom Early Detection (BED) Model

Find our app at: <https://forensx.github.io/bloom-early-detection/>



☐ Pins ☒ Chlorophyll-a Heatmap

Multiple visualizations available: surface pins and Chlorophyll-a concentration heatmap

## Bloom Early Detection

An investigation in bloom early prediction.



### United States

Percent of states with harmful algae blooms annually

> 50 %

Annual health costs

\$ 900,000,000

Percent of waterbodies with excessive nutrient input

> 65 %

Dead Zone surface area

245,000 (sq. km.)

View Code: [GitHub](#)

Visualization can readily handle millions of points with ease in real time

Bloom Early Detection (BED) Model

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