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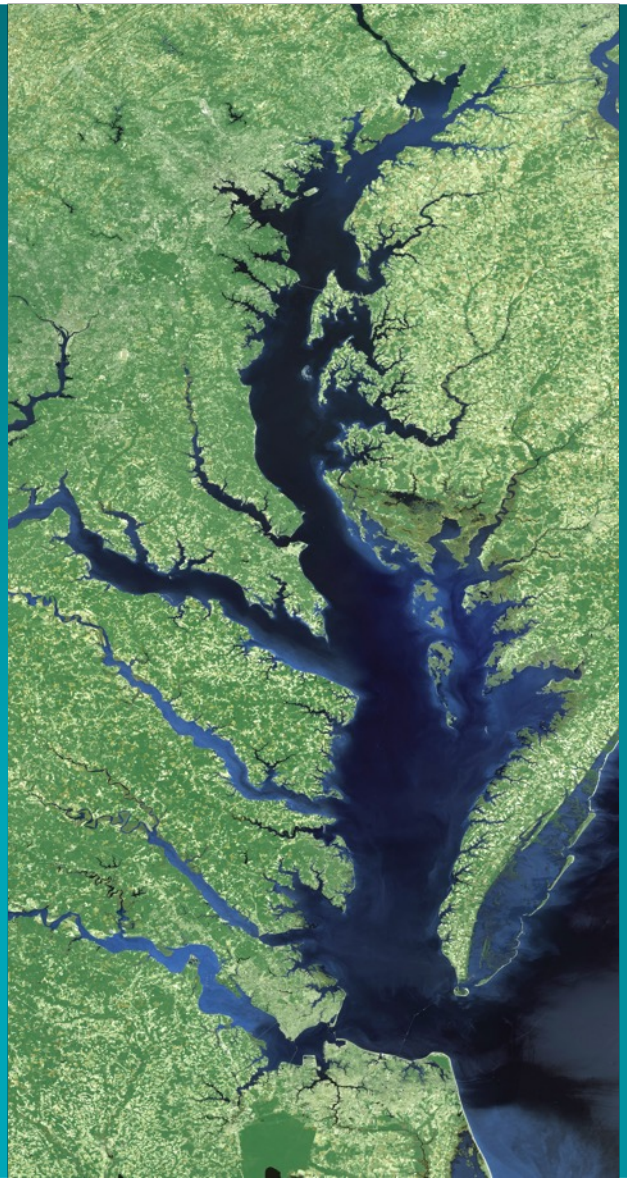
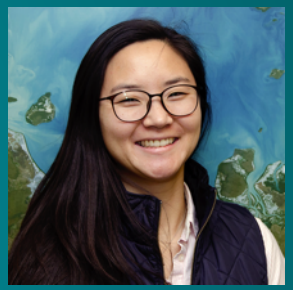


CLIMATE RESILIENCY FOR THE CHESAPEAKE BAY

Submission to Spark+AI Summit 2020/Databricks' Hackathon for Social Good: Reduce the Impact of Climate Change

Moe Steller
Data Scientist
Lead Associate

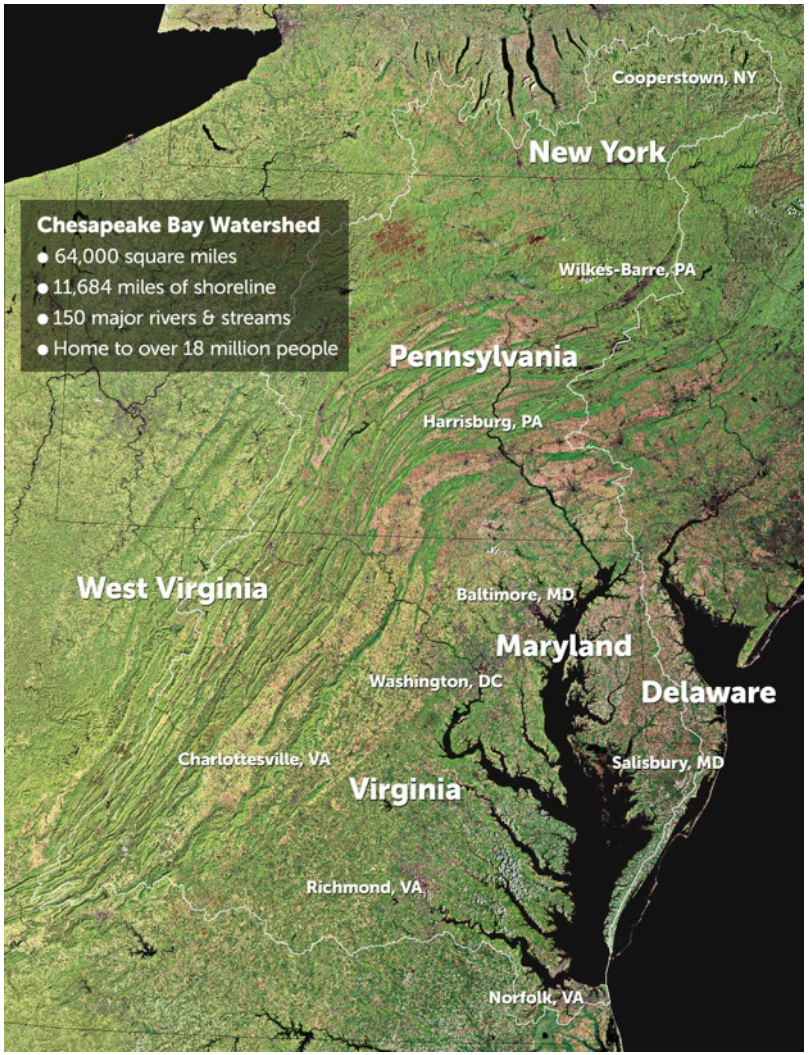


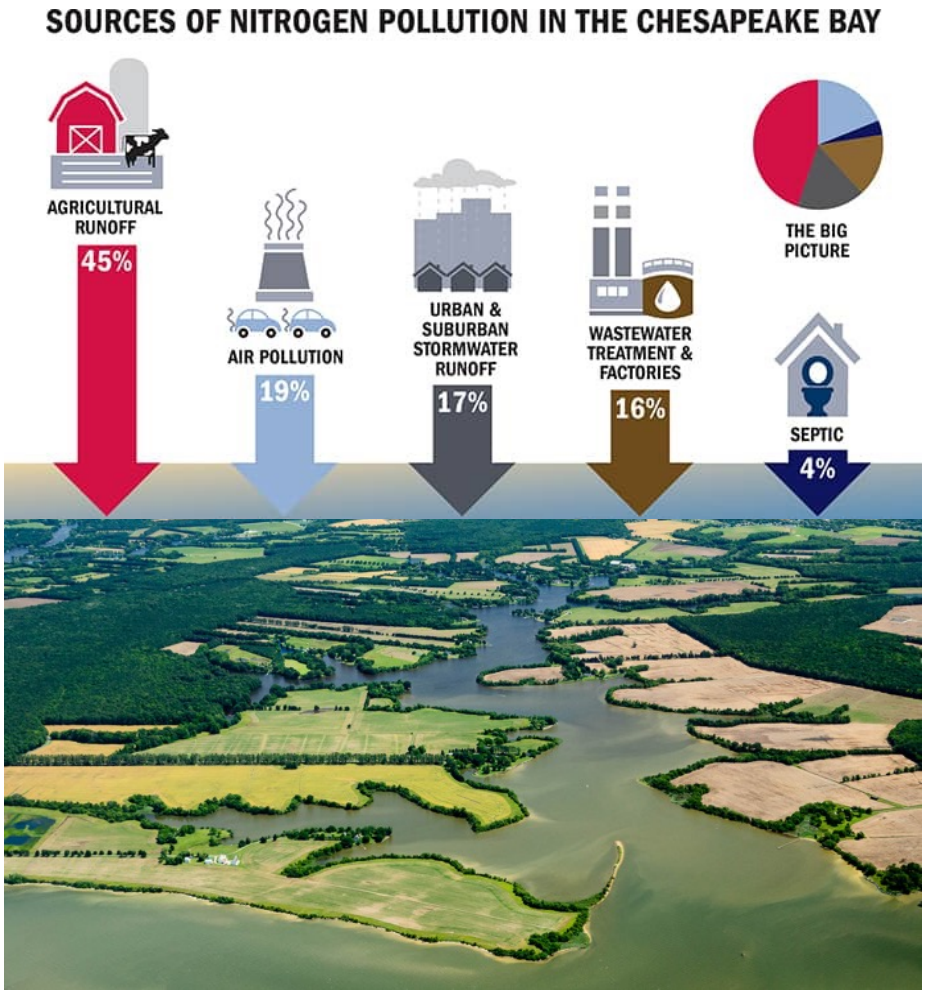
Grace Kim
Data Scientist
Senior Consultant

Sarah Olson
Data Scientist
Senior Consultant

Lucy Han
Data Analyst
Associate

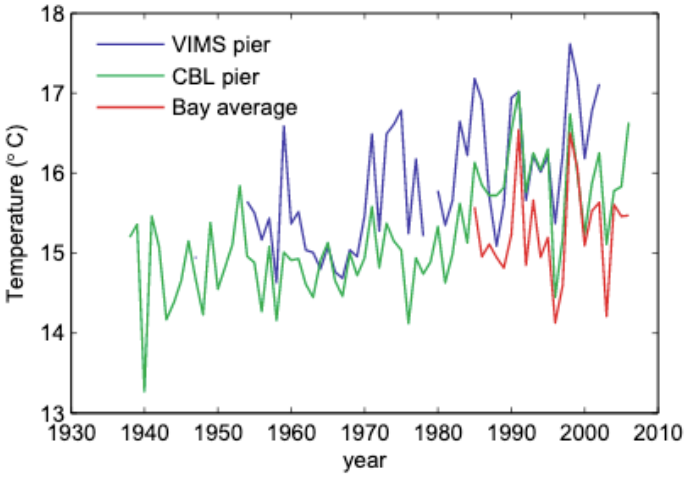
THE CHESAPEAKE BAY WATERSHED IS LARGE AND COMPLEX, WITH MANY SOURCES OF NUTRIENT POLLUTION



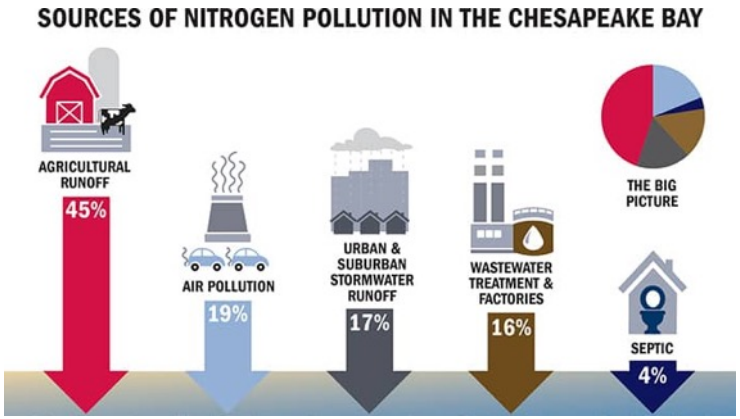


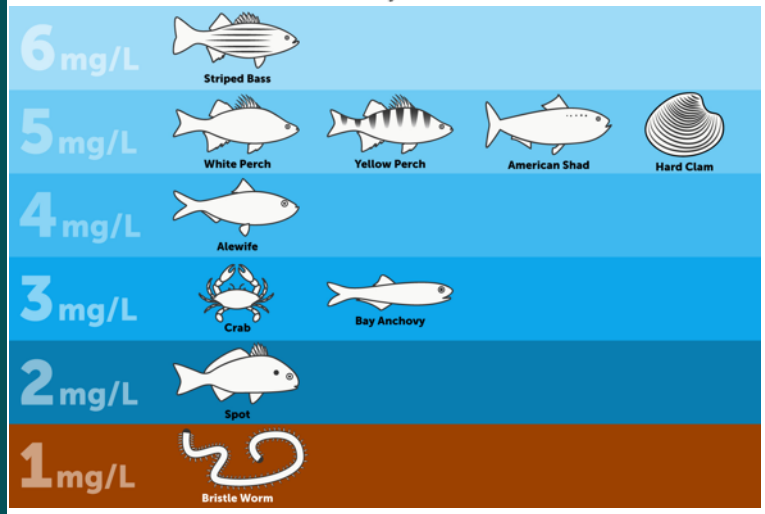
chesapeakebay.net & cbf.org

NUTRIENT POLLUTION AND RISING TEMPERATURES ARE DANGEROUS TO THE AQUATIC ECOSYSTEM



Rising temperatures & nutrient pollution





contribute to

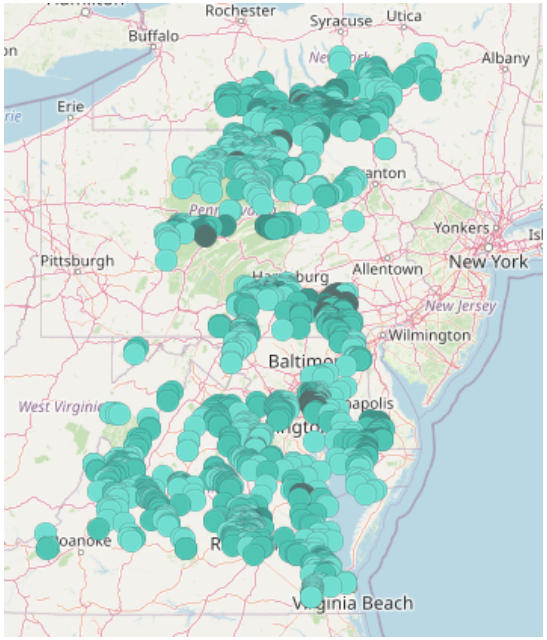
low oxygen & harmful algae

cbf.org & chesapeakebay.net & Najjar et al 2010 doi:10.1016/j.ecss.2009.09.026

HARNESSING CITIZEN SCIENCE TO TACKLE CLIMATE CHANGE IMPACTS ON WATER QUALITY

Citizen Science
Water Quality

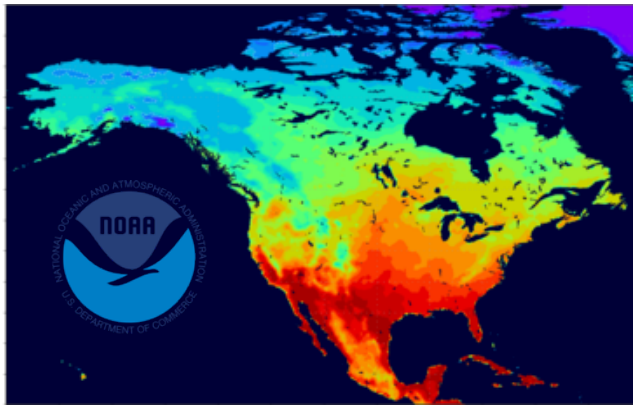
CMC Chesapeake Monitoring Cooperative



Local Gov't Agencies
Water Quality

Chesapeake Bay Program
Science. Restoration. Partnership.

N. American Regional Reanalysis
Climate



Chesapeake Bay Phase 6
Land Use

NOTEBOOKS:
DATA LOAD, ANALYSIS, MODEL

@moezilla-ml

repo: DatabricksHackathon

NITROGEN CONCENTRATIONS ARE HIGHLY DEPENDENT ON LOCATION

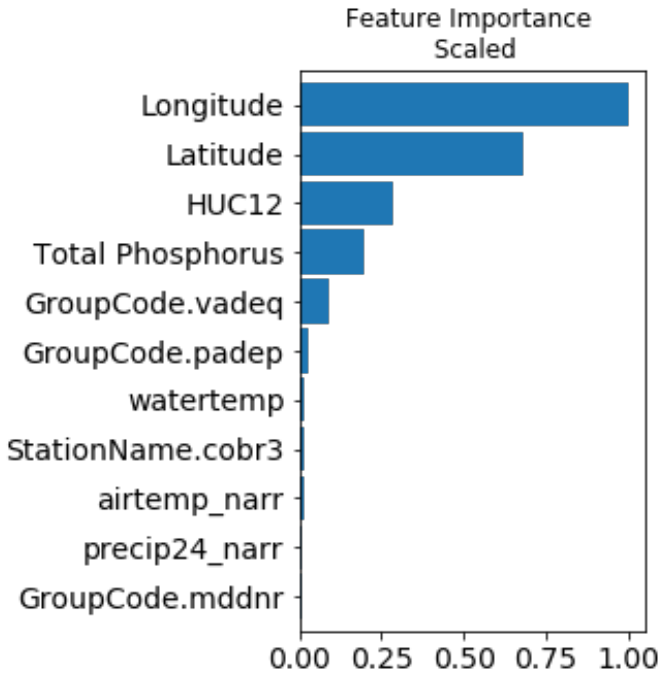
Features:

- Latitude
- Longitude
- Group
- HUC12
- Time
- Month
- Year
- Dissolved Oxygen
- Total Phosphorus
- Water Temperature
- Air Temperature
- Precipitation
- Wind Speed

Target: Total Nitrogen

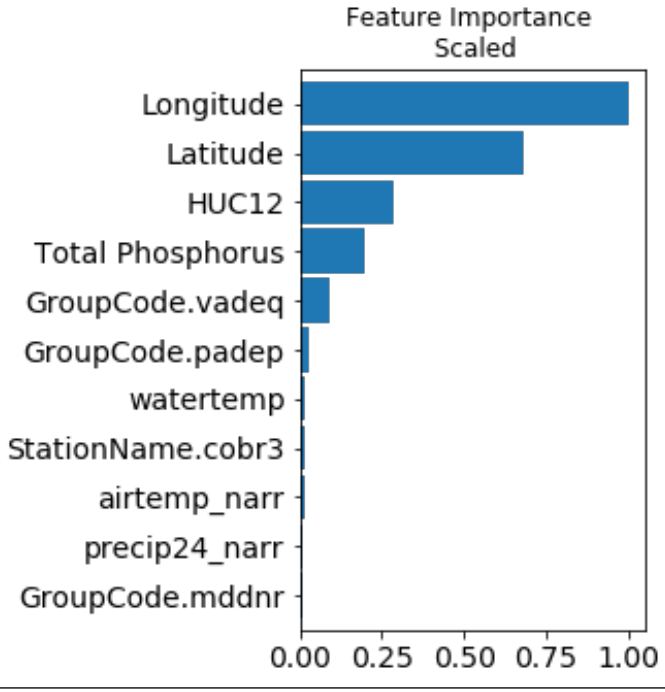
databricks

Model	RMSE	R^2
Linear Regression (baseline)	1.34	0.33
GBT	0.96	0.66
Random Forest	0.77	0.78
XGBoost	0.78	0.80
H2O Auto ML XGBoost	0.69	0.84
H2O Auto ML Regression GLM Stacked Ensemble (train; cv)	0.50; 0.69	0.93; 0.84
H2O Auto ML Regression GLM Stacked Ensemble (test)	0.48	0.91



Watershed communities can mitigate negative climate change impacts on Chesapeake Bay water quality by reducing location and land-use specific nutrient pollution sources

Photo credit: cbf.org



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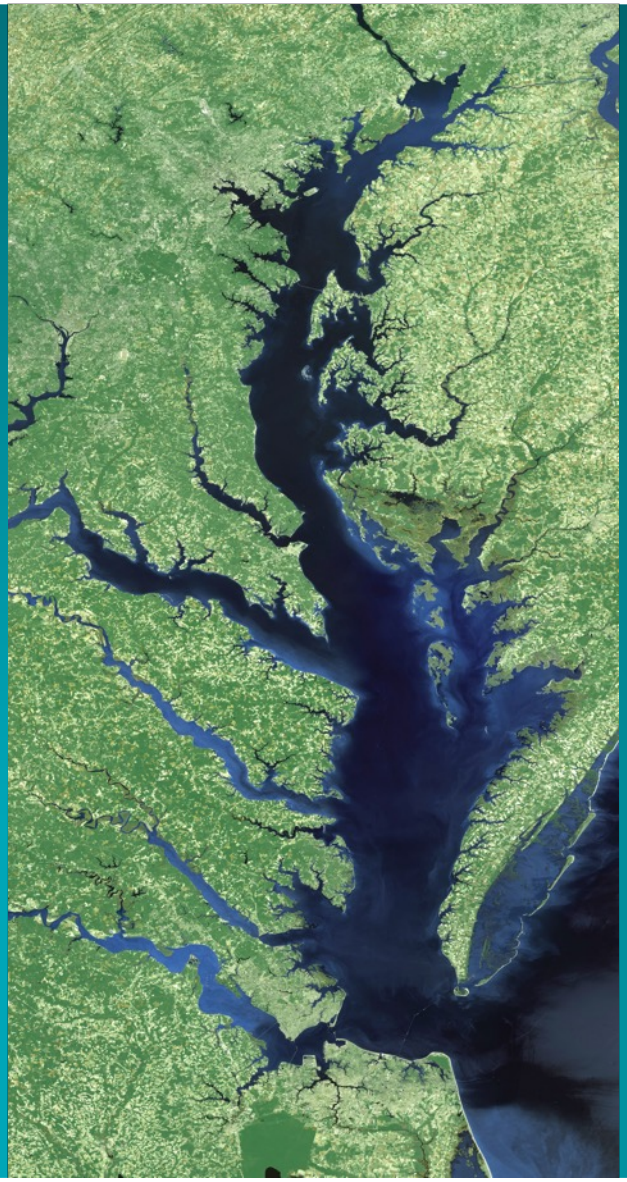

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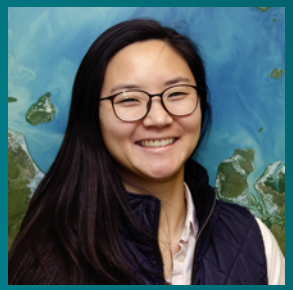

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