Specific, Measurable, Achievable, Relevant, and Time-Bound

Proposal 1

What are the chances that NYC’s AQI will reach over 200 (unsafe for all populations) due to Canadian wildfires next summer 2024? How long can we expect air quality to be unsafe?

● Context

https://advocate.nyc.gov/reports/orange-sky-red-alert-review-air-quality-emergencies-nyc/

In the days leading up to the first week of June, winds from a storm in Nova Scotia pushed smoke from these wildfires south along jet streams to parts of the northeastern and central U.S. The smoke that blanketed NYC was the result of a stalled weather pattern known by meteorologists as an "Omega Block”. While shifting wind patterns pushed the orange haze out of the city in just a few days, the ongoing fires and changing weather patterns mean that hazardous air quality will persist at least throughout the summer. Furthermore, climate change guarantees that we will see more frequent and intense wildfires, making a comprehensive plan to respond to fires and protect people from their smoke an urgent task for municipal, state, and federal leaders.

● Criteria for success

We will only predict AQI due to wildfires for the summer of 2024.

● Scope of solution space

Data from the last 5 years will be used as the rise of wildfires is felt more presently in the Northeast (as compared to California wildfires).Compare to the singular incident in July 2023.

● Constraints

AQI takes into account more than just particulate matter from wildfires, including chemical exhaust and ozone. This project will need to take into account a restricted look at AQI. Wind patterns would be restricted from north to south.

● Stakeholders

EPA, NYC health departments, NYC environmental agencies, general public

● Data sources

Wildfires in Canada: <https://cwfis.cfs.nrcan.gc.ca/datamart>

NYC Air quality: <https://data.cityofnewyork.us/Environment/Air-Quality/c3uy-2p5r>

(Will need another AQI source as this one does not seem to have July 2023)

Wind Direction Data: <https://www.climate.gov/maps-data/dataset/wind-roses-airports-around-world-graphics-or-raw-data-tables>

Proposal 2

Can we predict where sightings of spotted lanternfly will increase in the Northeastern US in the seasons of 2024?

● Context

<https://agriculture.ny.gov/spottedlanternfly>

*Lycorma delicatula,* or Spotted Lanternfly (SLF), is an invasive plant hopper from Asia. In the United States, it was first found in Pennsylvania in 2014. Spotted Lanternfly has been found in New York State on Staten Island, all New York City boroughs, Long Island, Port Jervis, Sloatsburg, Orangeburg, Ithaca, Binghamton, Middletown, Newburgh, Highland, and the Buffalo area. SLF threatens the agriculture and forestry industries, and is also a nuisance pest. The nymphs and adults feed on over 70 different plants with piercing sucking mouthparts.

I will be using iMapInvasives as my geolocation data on SLF. iMapInvasives is a collaborative GIS-based invasive species database for presence, not-detected, and treatment records entered by professionals and citizen scientists. Taxonomic experts across the state review and confirm the species identity of presence records.

● Criteria for success

We can predict in time for the growing seasons in agriculture of the Northeast.

● Scope of solution space & Constraints

Due to the recent conception of the iMapInvasives map, we can expect more sightings in the future in general as more people contribute. Seasons will play a role in how many SLF will be detected. We can compare the borders of observation that have been previously set to the predictions.

● Stakeholders

US and state level departments of agriculture, grape vineyard and apple orchard owners, ecological research groups

● Data sources

Invasive species map data

<https://www.nyimapinvasives.org/data-and-maps>

General species map, which will need to be merged

<https://www.gbif.org/occurrence/search?dataset_key=50c9509d-22c7-4a22-a47d-8c48425ef4a7>

<https://www.inaturalist.org/observations/export>