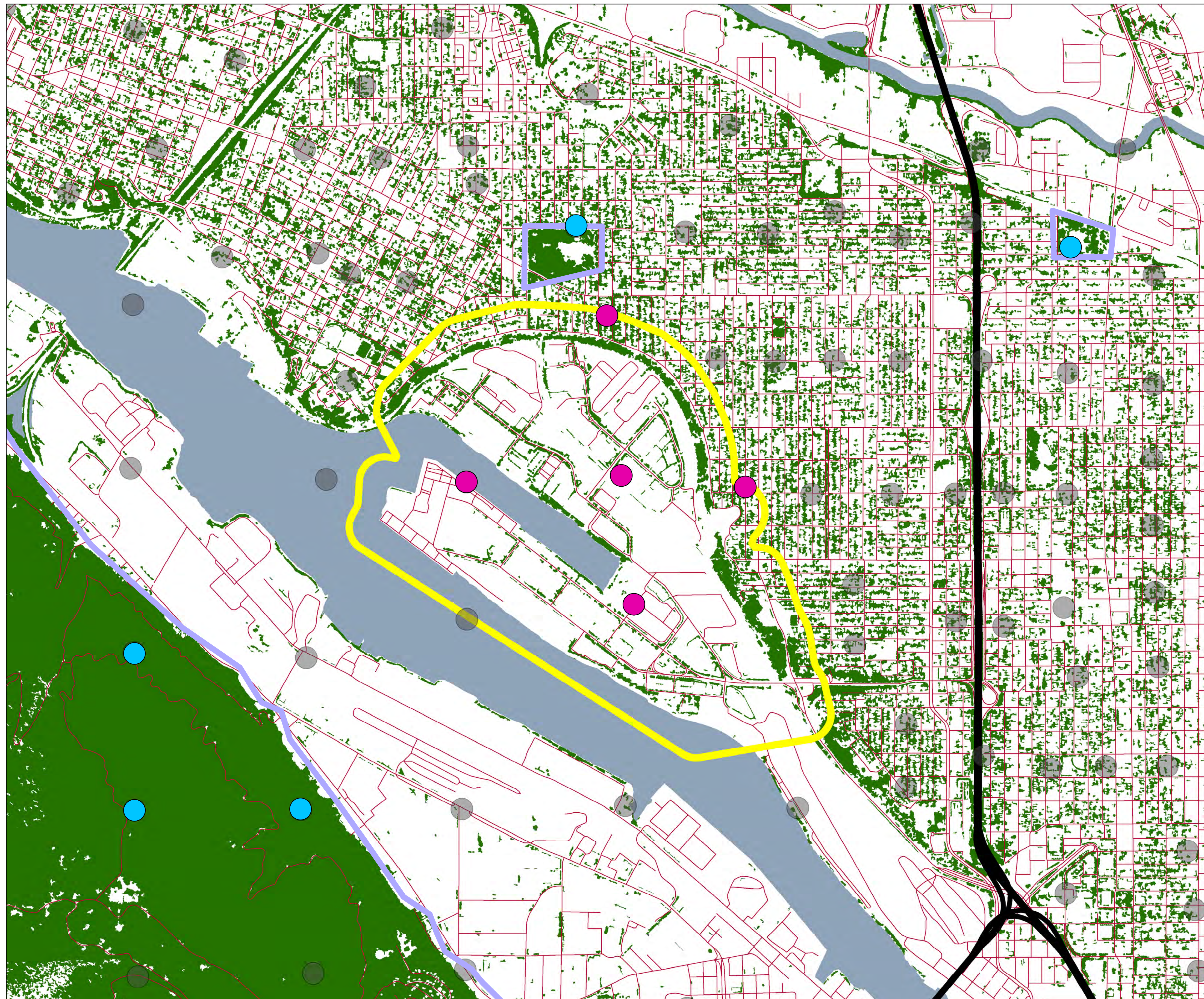
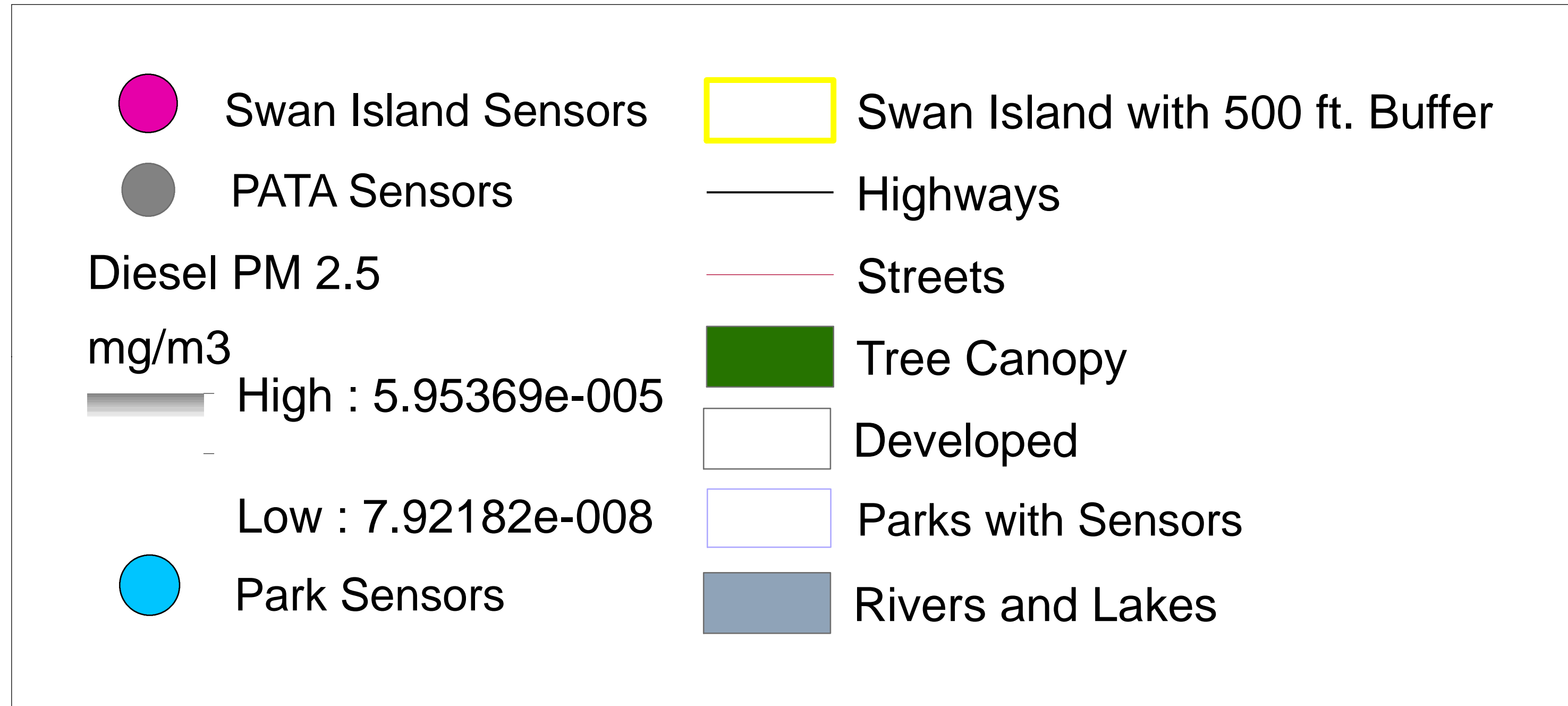


Urban Canopy as a Diesel PM 2.5 Mitigator in Portland, Ore.

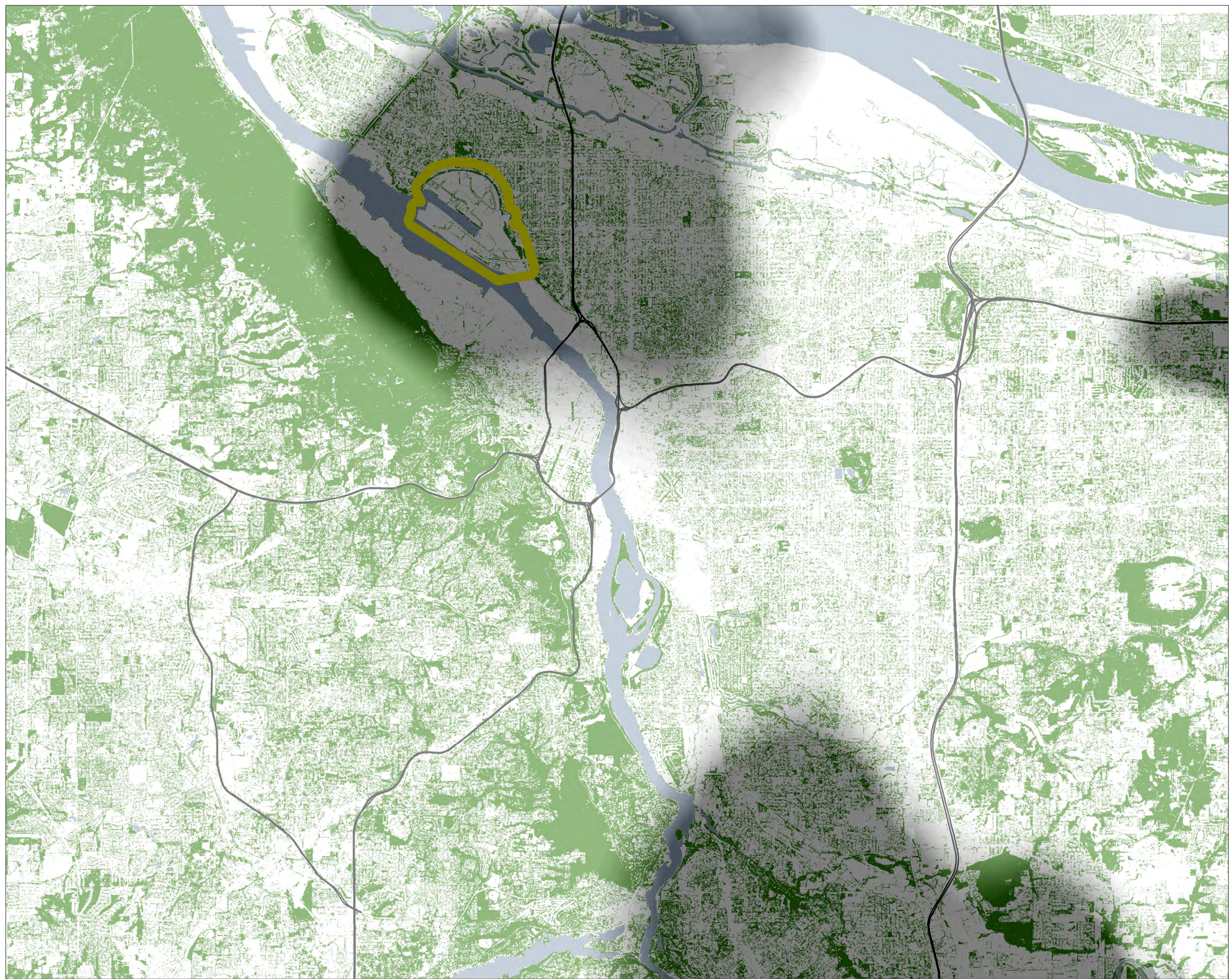


0 0.5 1 2 Miles



A

B



0 2.5 5 10 Miles

FOUNDATION

The EPA is concerned with ambient Diesel particulate matter 2.5, which is emitted from industries and automobiles. It can pass easily through the mouth and nose, enter into the lungs, and cause chronic respiratory issues, as well as cancer. This fact focused the present project on Swan Island, a major Diesel PM 2.5 source, as visualized by Map B.

Meanwhile, recent studies (Maher et al 20013, Nowak et al. 2012, Becket et al. 2000) have shown the mitigating impact trees can have on PM 2.5. This project set out to prove this impact in Portland.

METHODOLOGY - RESULTS - CONCLUSIONS

MAP A - Layers: Streets, Highways, and Landcover data via Regional Land Information System (RLIS) at Metro, as well as Portland Air Toxics Assessment (PATA) monitors/sensors from the Department of Environmental Quality. Based on the particulate matter monitoring results from Worley et al 2000, a 500 ft. buffer was created from RLIS Census Block group data (later removed), which was then clipped to the PATA points for analysis. An average Diesel PM 2.5 of 0.0189 $\mu\text{g}/\text{m}^3$ within the Swan Island buffer was used as the expected value in a Chi-Square Goodness of Fit (GOF) test. Observed values were taken from PATA sensors in dense canopy covered parks. With alpha set to 5%, a p-value of .9998 revealed a failure to reject the null hypothesis that trees play a critical role in particulate matter mitigation (Chi-Square = .3755, Critical Value: 9.488)

MAP B - Layers: Highways, Landcover, and PATA. Krigging allowed the Diesel PM 2.5 data points to be transformed into a continuous raster for a birds-eye view of higher levels throughout the Portland area.

Note: The U.S. National Ambient Air Quality Standards limit for Diesel PM 2.5 is set at 12 $\mu\text{g}/\text{m}^3$. This data found a maximum value of .02 $\mu\text{g}/\text{m}^3$.

DATA SOURCES

5 June 2015
Created by Matthew Downs

PATA from Portland's DEQ (2006) via Vivek Shandas and Jackson Voelkel at PSU, Landcover (2007) from RLIS at Metro. Methods and procedures informed by DEQ and EPA websites, Worley et al. 2000, Maher et al. 2013, Nowak et al. 2012, Becket et al. 2000.