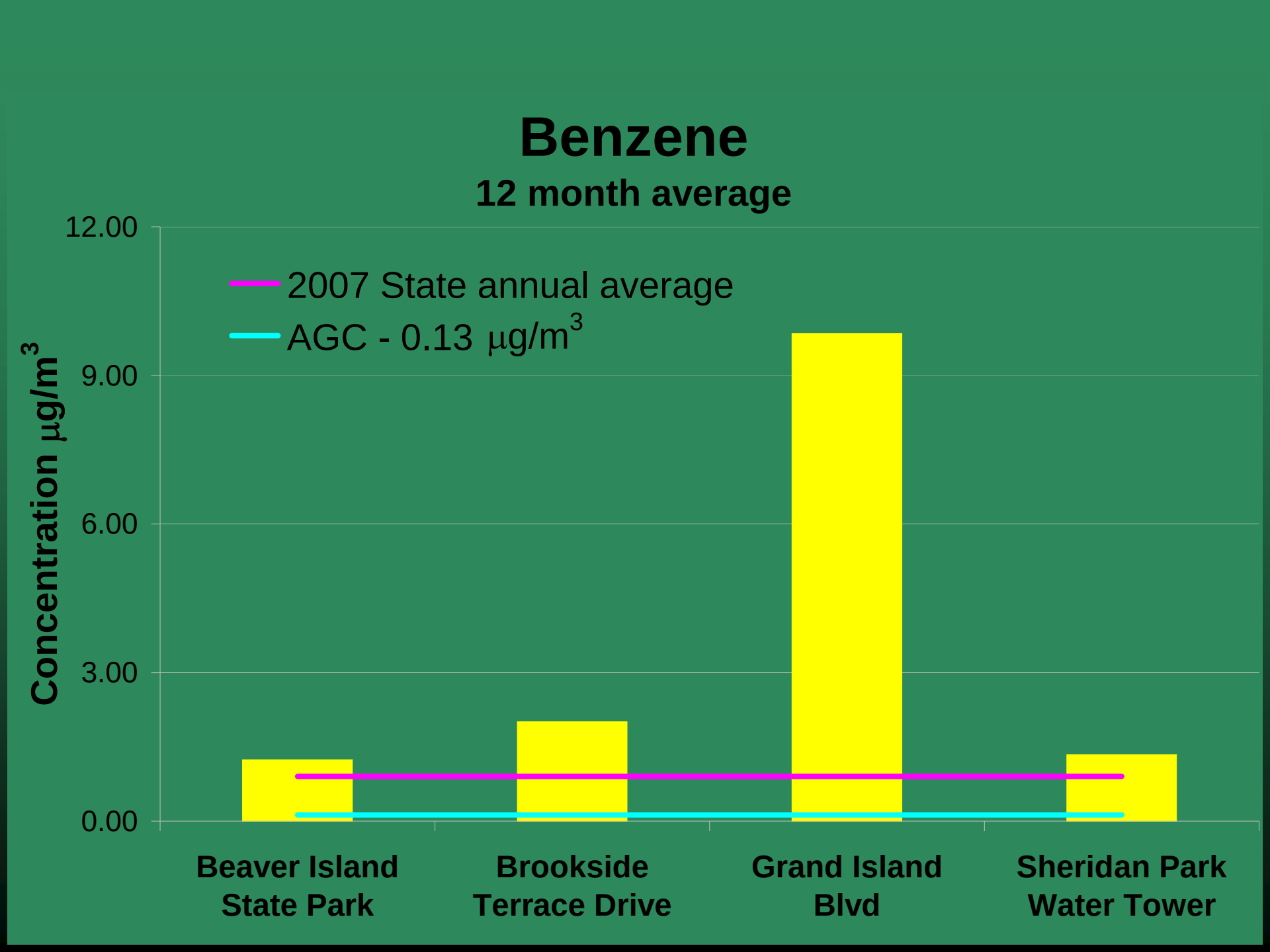
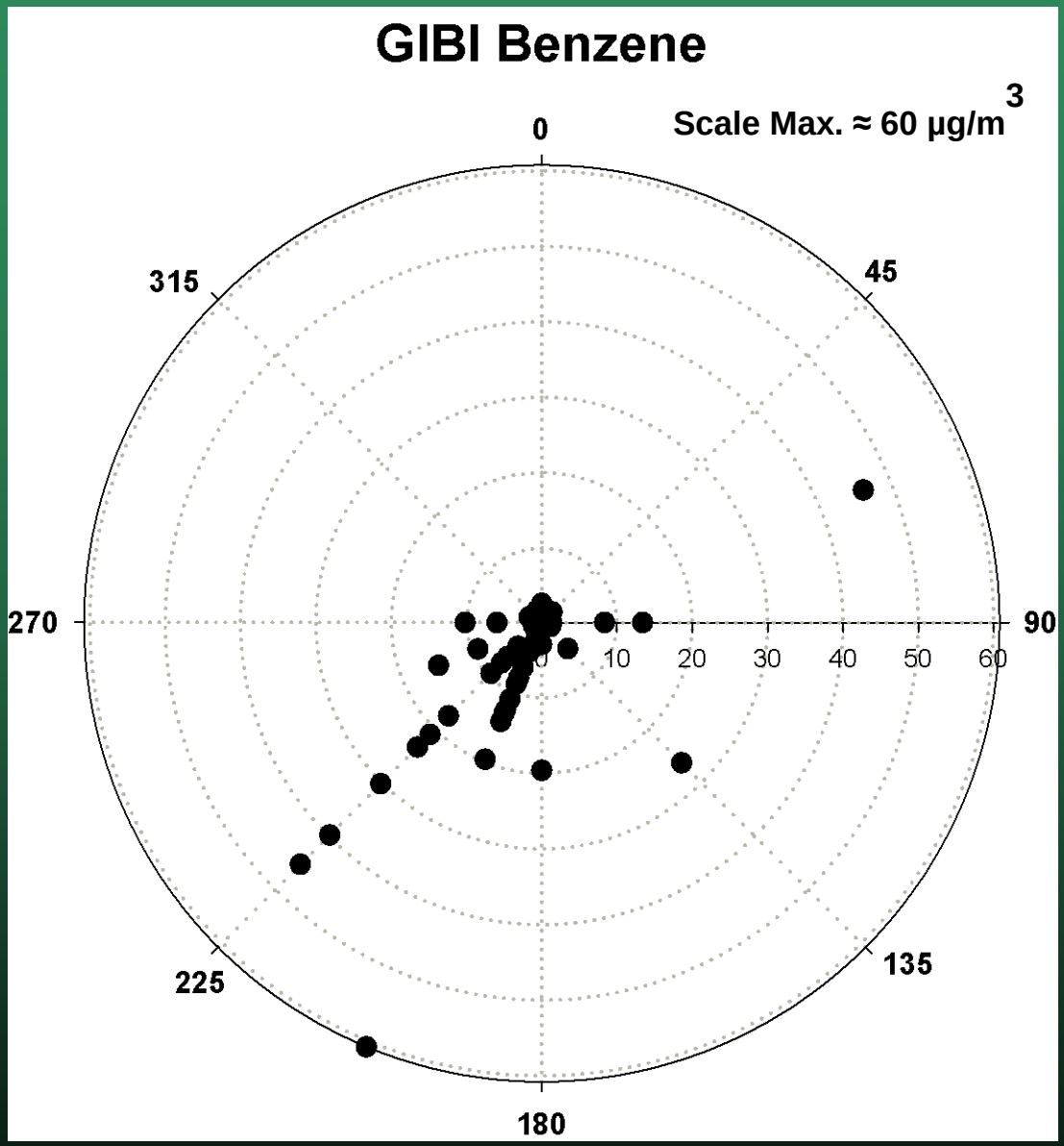
Benzene

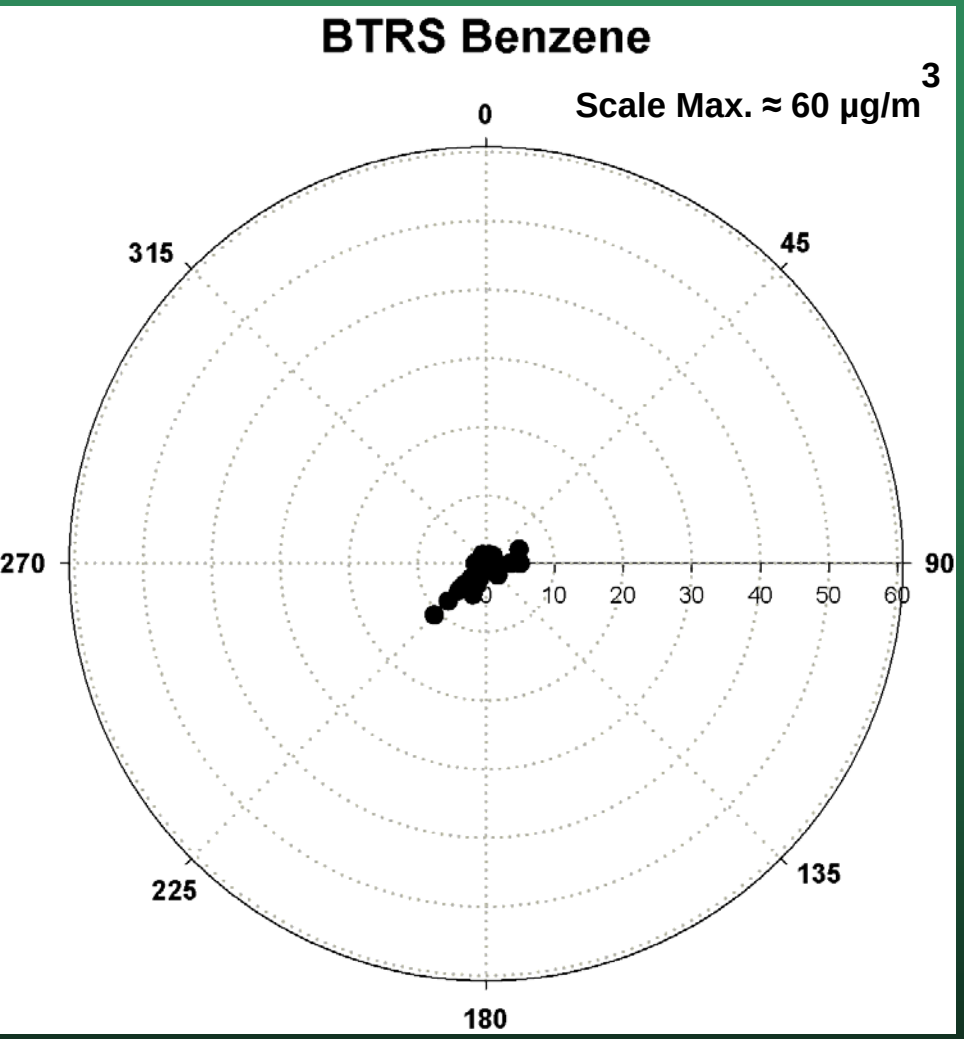
12 month average

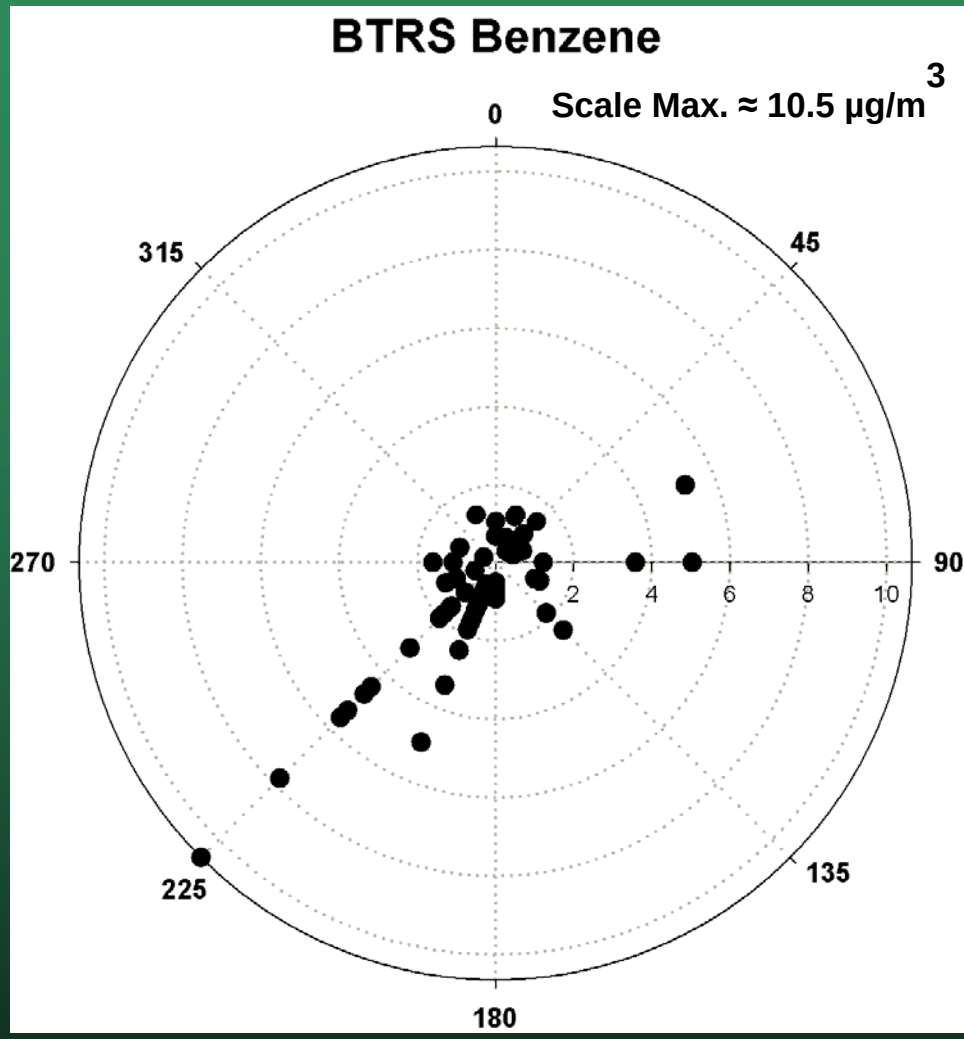


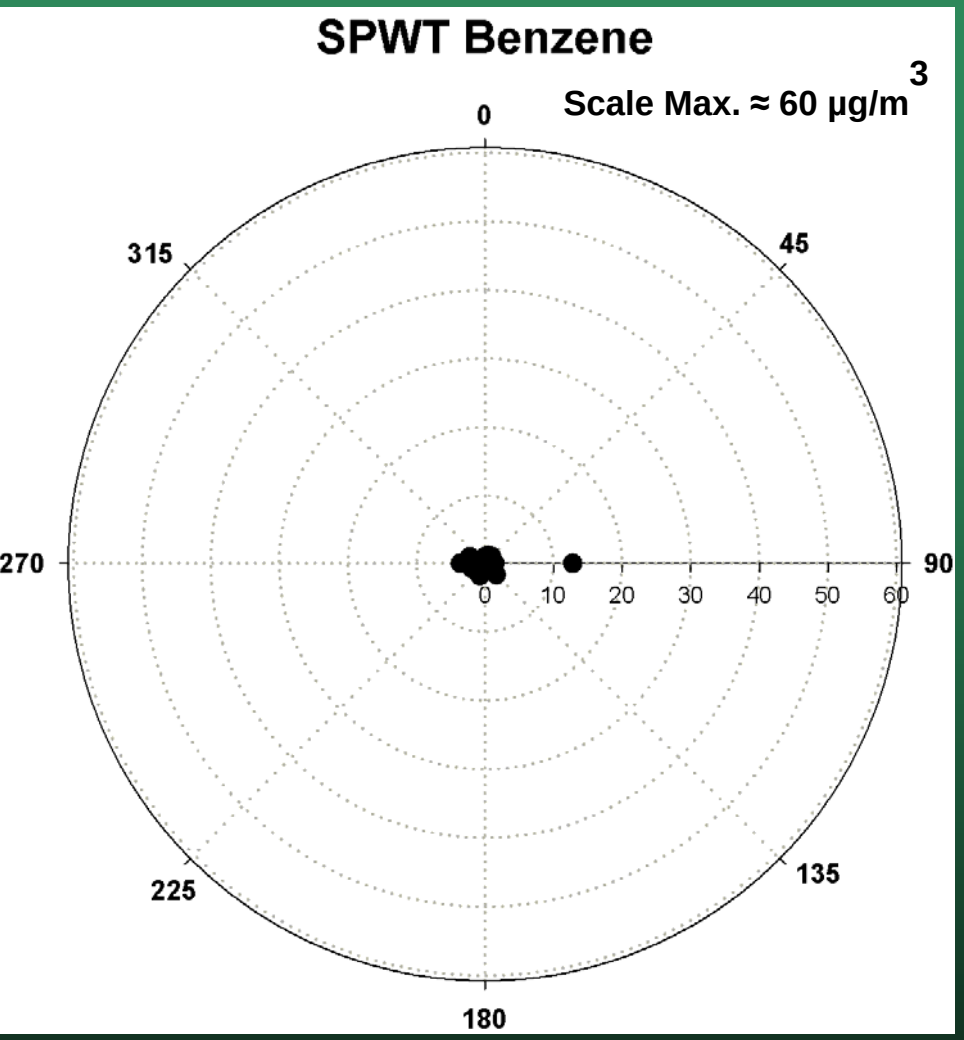
Benzene Sources

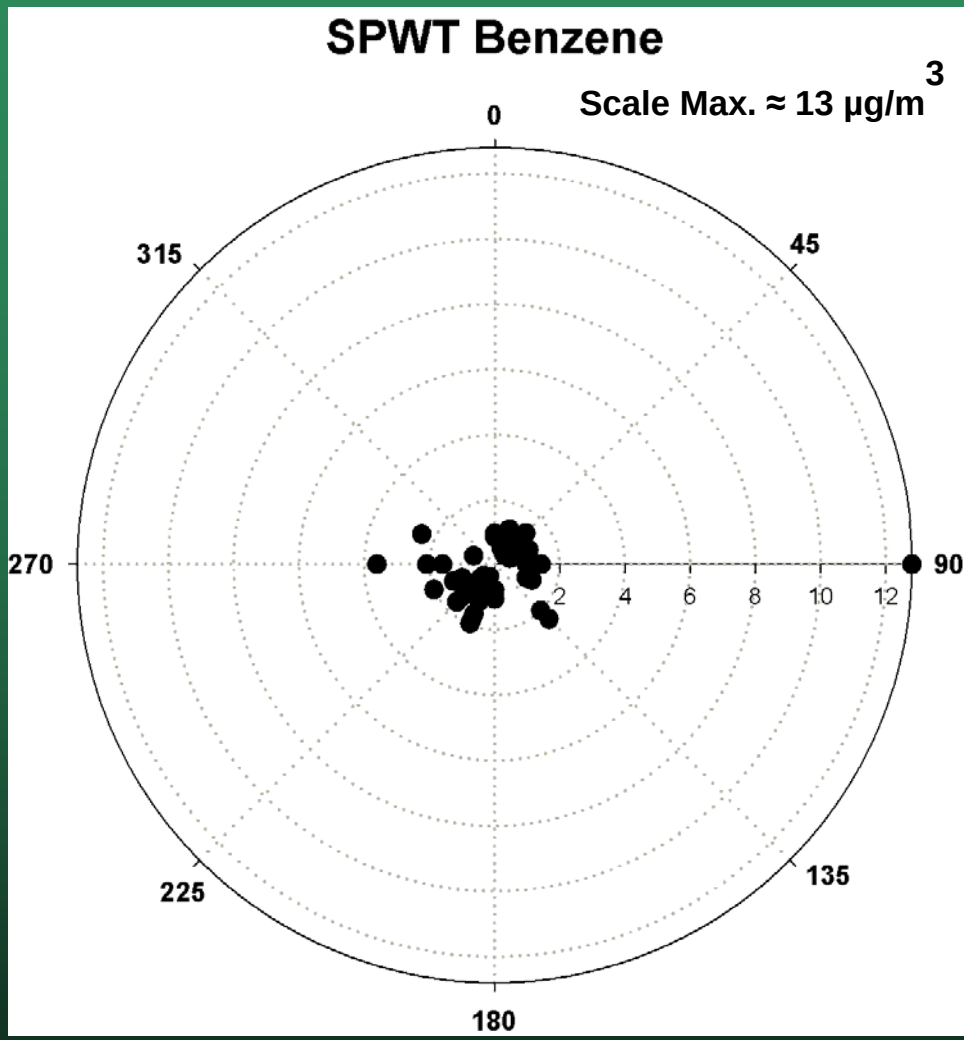
- Manmade sources include:
  - Tobacco smoke
  - Motor vehicle
  - Oil and natural gas production
  - Petroleum refining & distribution
  - Burning coal, oil and gas
  - Gasoline service stations
  - Coke ovens and coal chemical manufacturing
  - Rubber tire manufacturing
  - Storage or transport of benzene
- Natural sources
  - Emissions from wildfires

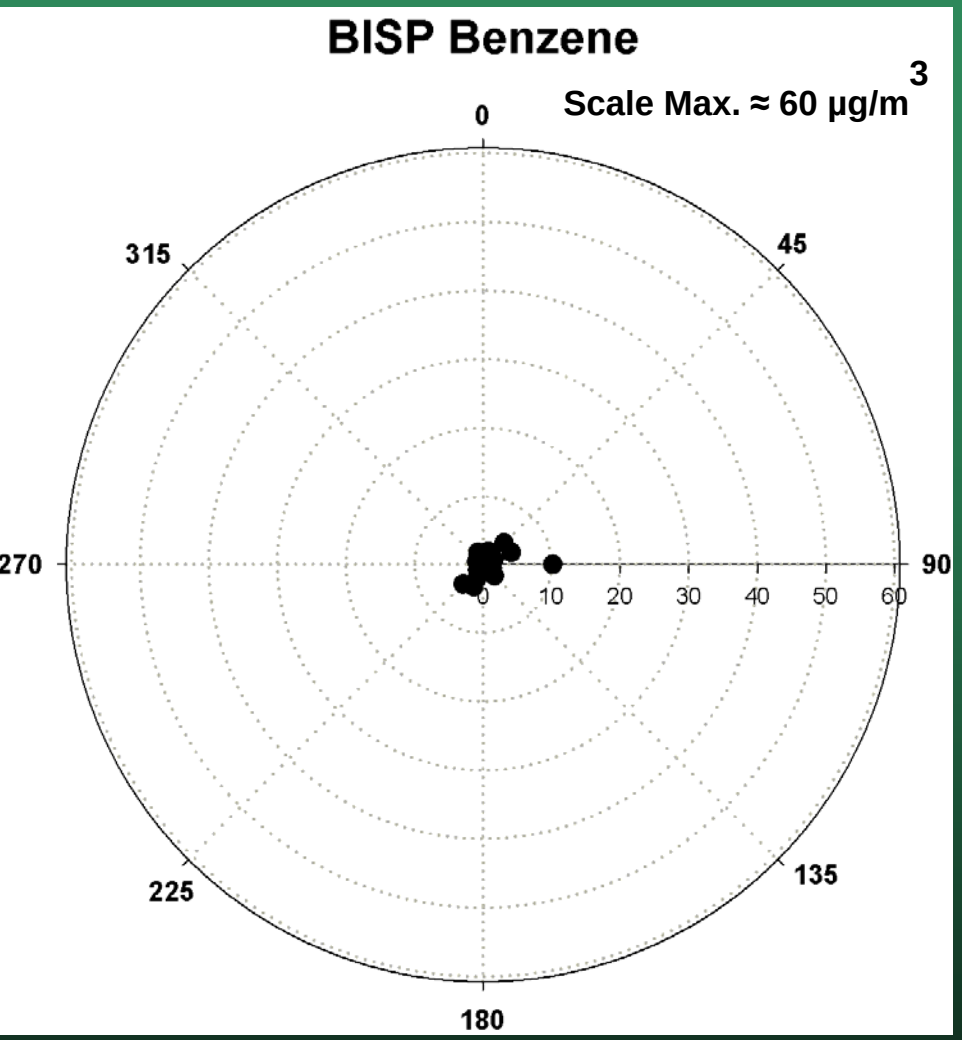

GIBI Benzene
Scale Max. ≈ 60 µg/m3
0
45
90
135
180
225
270
315
10
20
30
40
50
60

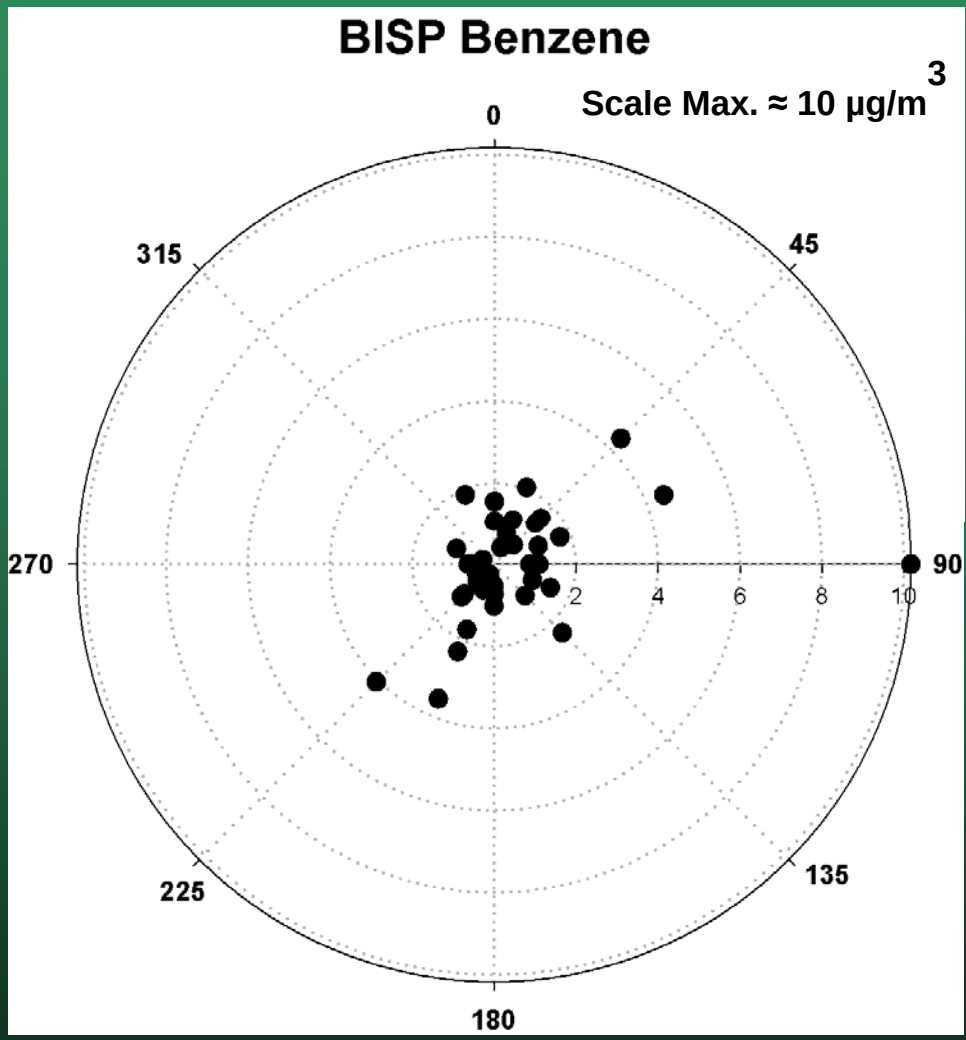

BTRS Benzene
Scale Max. ≈ 60 µg/m3
0
45
90
135
180
225
270
315
0
10
20
30
40
50
60


BTRS Benzene
Scale Max. ≈ 10.5 µg/m3
0
45
90
135
180
225
270
315
2
4
6
8
10


SPWT Benzene
Scale Max. ≈ 60 µg/m3
0
45
90
135
180
225
270
315
0
10
20
30
40
50
60


SPWT Benzene
Scale Max. ≈ 13 µg/m3
0
45
90
135
180
225
270
315
2
4
6
8
10
12


BISP Benzene
Scale Max. ≈ 60 µg/m3
0
45
90
135
180
225
270
315
0
10
20
30
40
50
60


BISP Benzene
Scale Max. ≈ 10 µg/m3
0
45
90
135
180
225
270
315
0
2
4
6
8
10

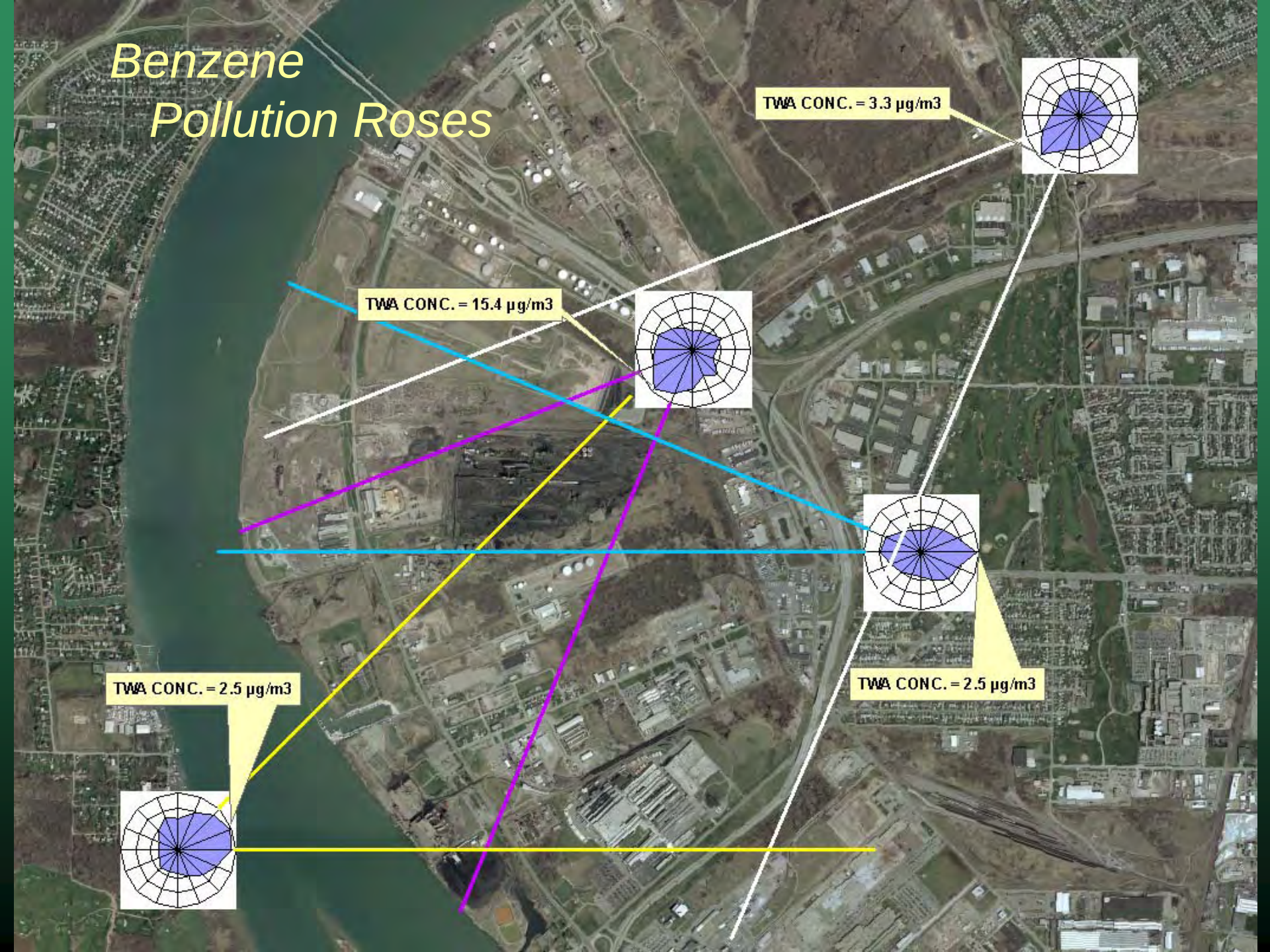
Benzene Pollution Roses

Benzene Pollution Roses

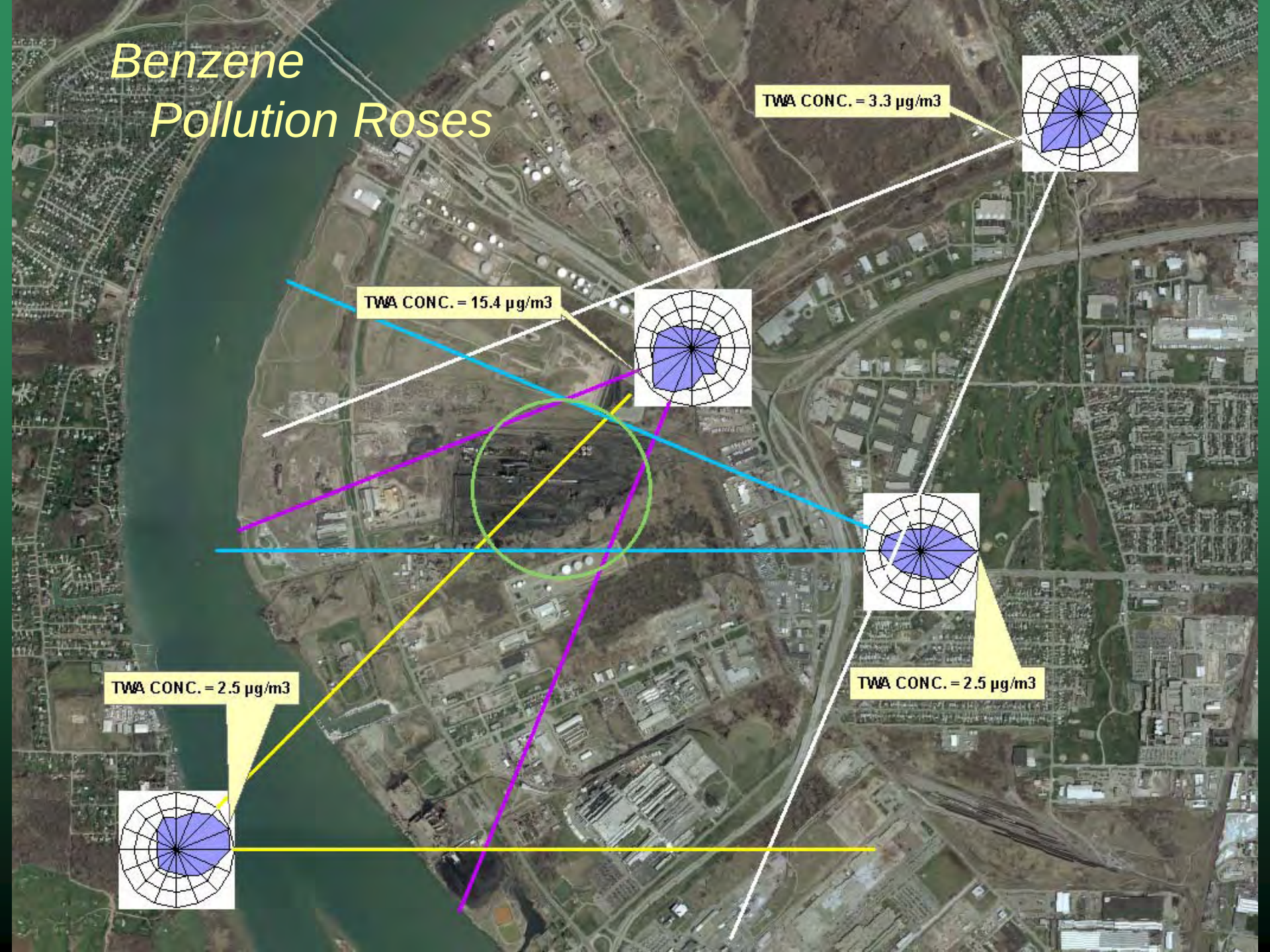
Benzene Pollution Roses

Benzene Pollution Roses

Benzene Pollution Roses



Benzene Pollution Roses



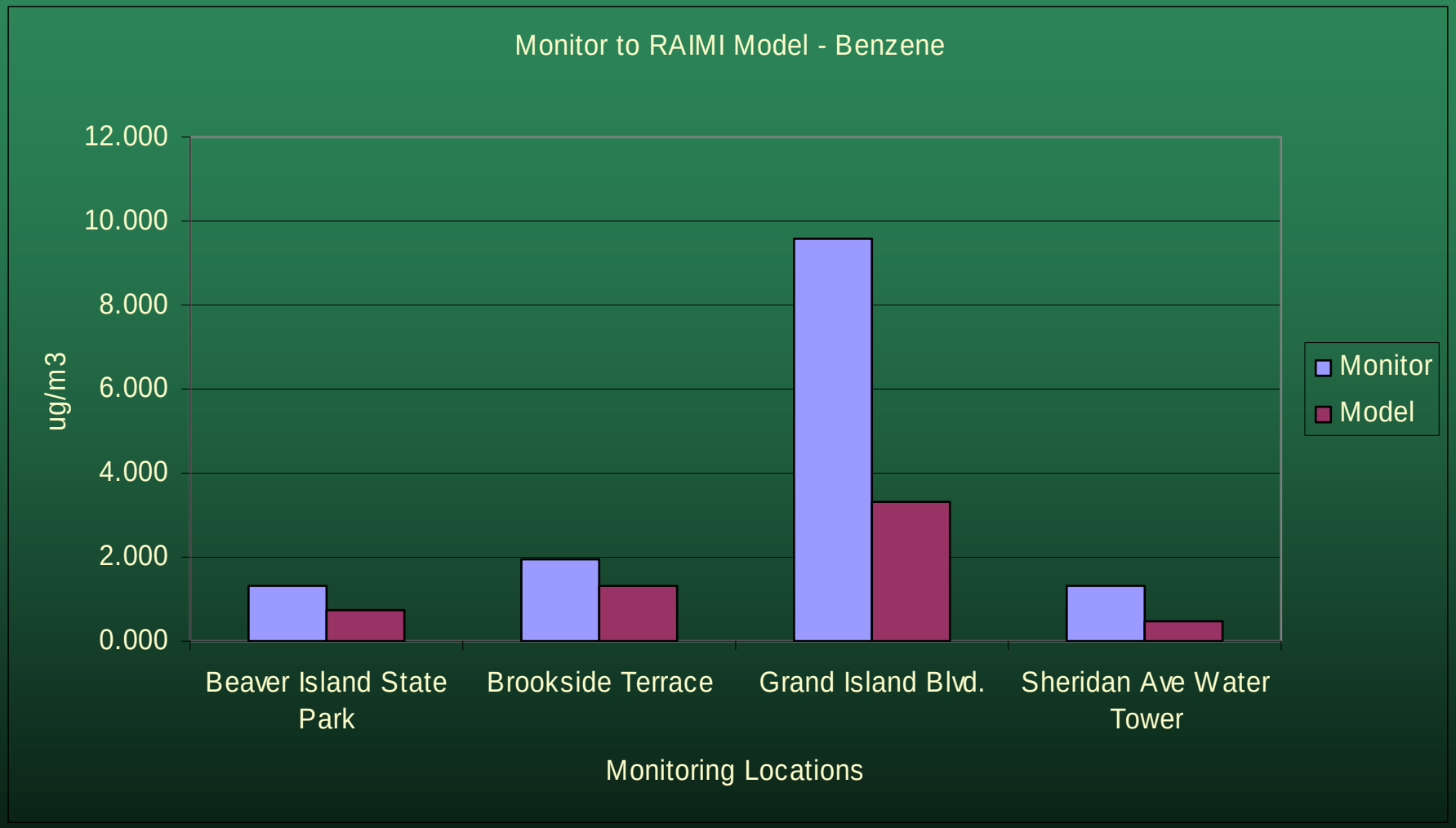
Air Dispersion Models

- A tool for predicting ambient air concentrations from facilities;
- Cost effective – can't measure everything everywhere;
- Two levels of models
  - Screening
  - Refined

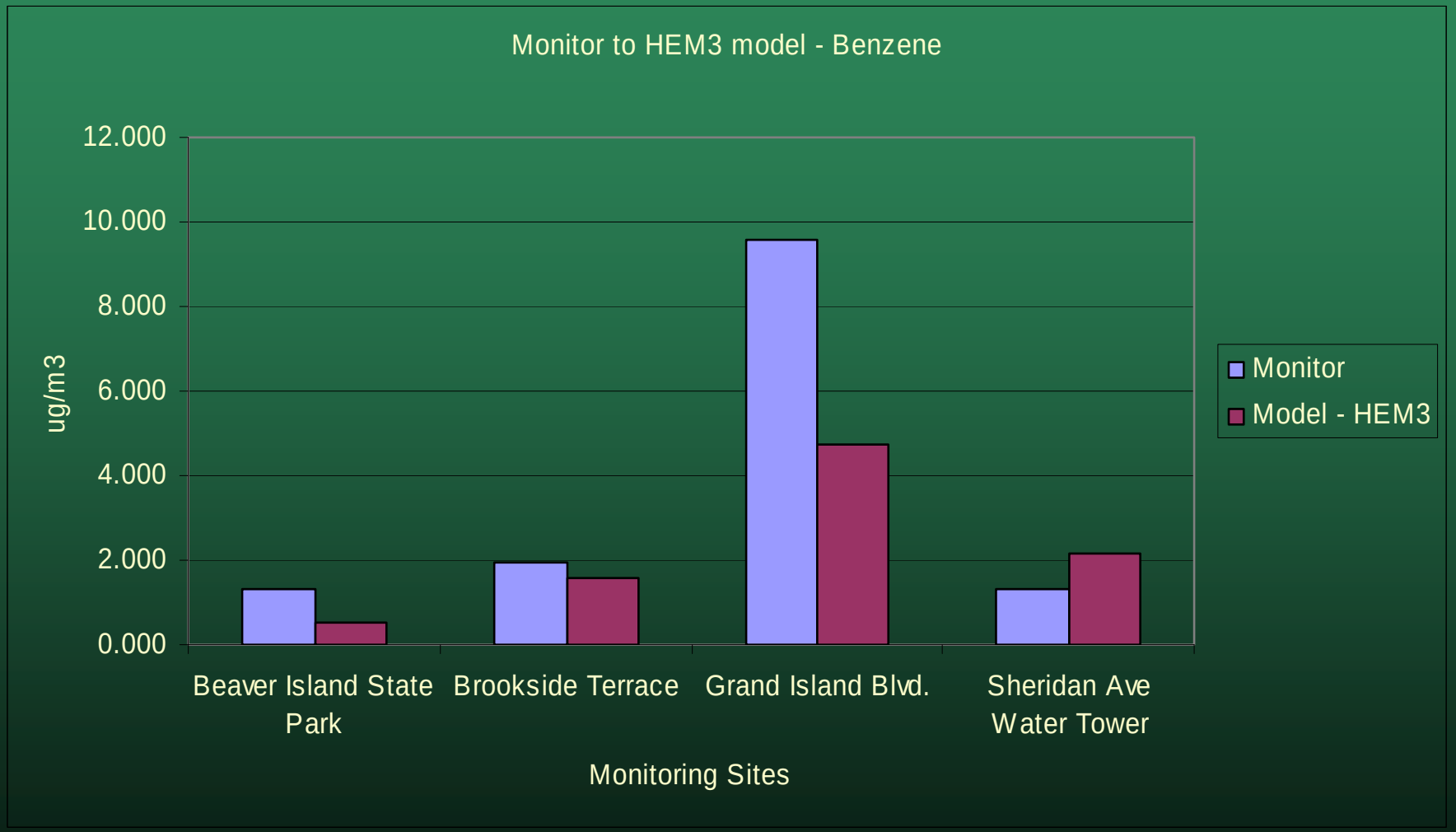
Measured to Model Comparisons

- Human Exposure Model 3 (HEM3) – AERMOD
- Regional Air Impact Modeling Initiative – ISCST3

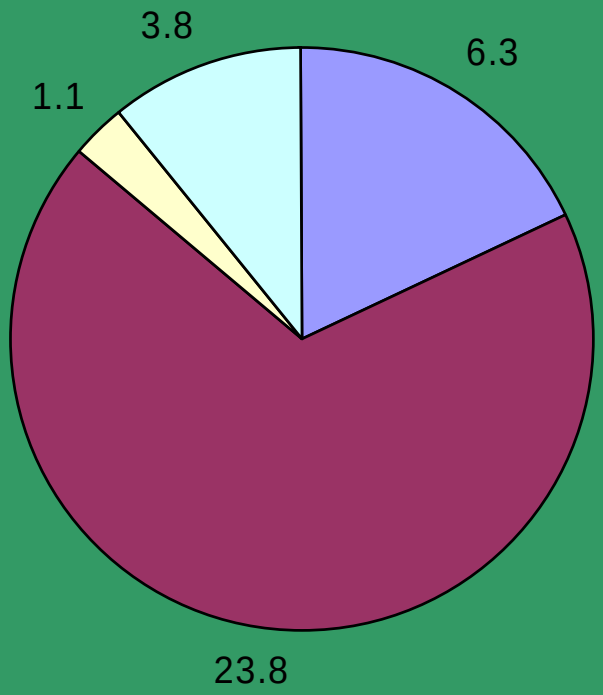
Measured to Modeled - RAIMI



Measured to Modeled – HEM3

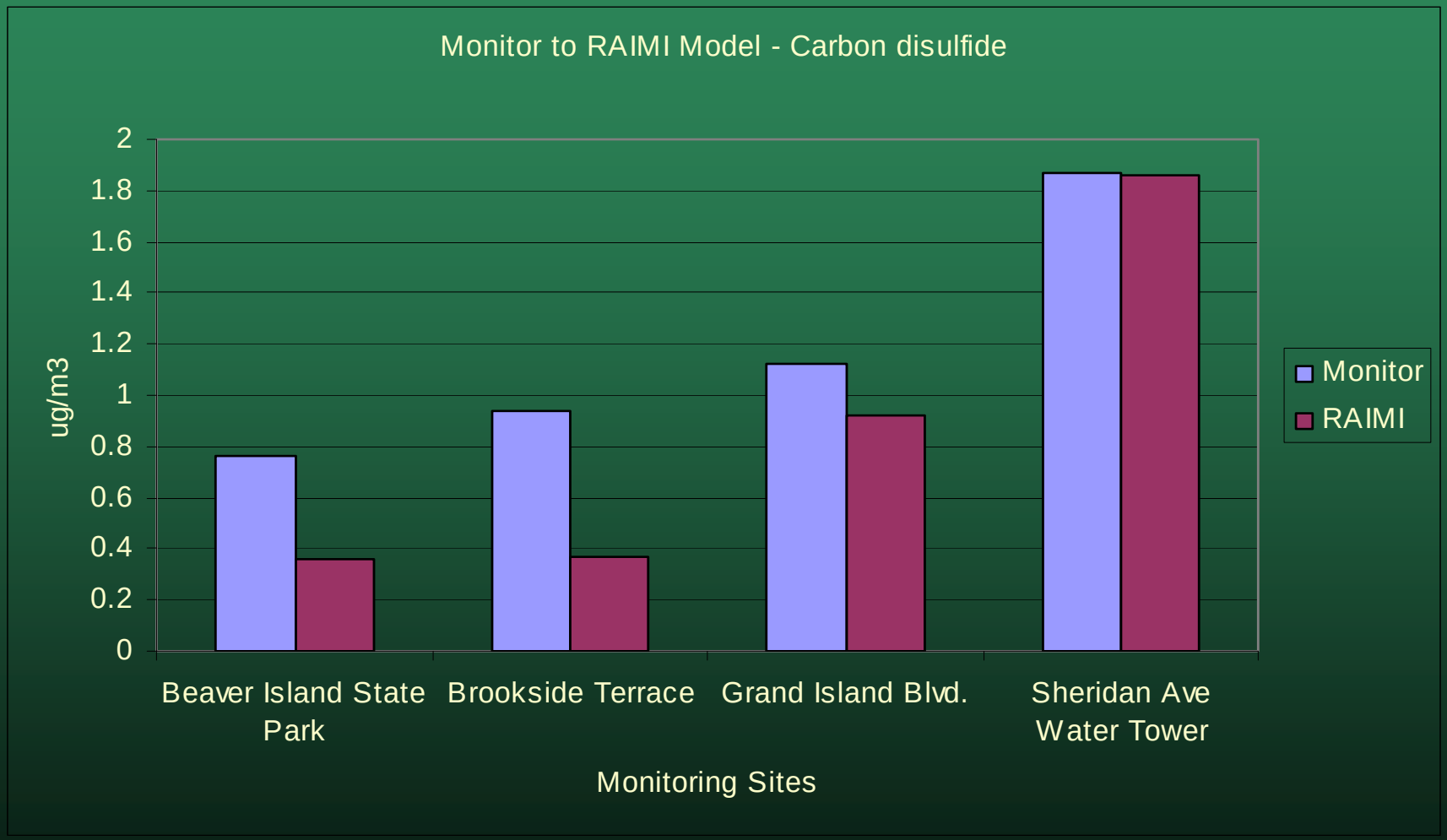


Benzene Emissions - Tons per year
Tonawanda Community Area



Mobile emissions calculated from air pollution model, Mobile6
Major includes Title V permitted point sources
Minor includes State Facility and Registered point sources
Area includes landfills, sewage treatment plants and gas stations

Measured to Modeled – RAIMI



EPA Coke Oven Residual Risk Assessment (2005)

- Assessed non-cancer and cancer risk of emissions from all operations (battery emissions, by-product plant, pushing fugitives and quenching) at Tonawanda Coke Corporation;
- Part 63 NESHAP Subpart L for Coke Oven Batteries (1993) addressed emissions from charging, and leaks from doors, lids and off-takes.

EPA Coke Oven Residual Risk Assessment (2005)

- Part 63 NESHAP Subpart CCCCC for Coke Ovens: Pushing, Quenching and Battery Stacks (2003);
- Part 61 NESHAP Subpart L for Benzene from Coke Oven By-Product Recovery Plants (1989).

EPA Coke Oven Residual Risk Assessment (2005)

- No non-cancer risk identified in community;
- Identified maximum cancer risk of 100 x 10^{-6} in community around Tonawanda Coke;
- Cancer risk drivers were benzene and benzene soluble organics (BSO) – coke oven emissions;
- Modeled Emissions - 15.3 tons of benzene, 4.98 tons of BSO;
- Identified limitation about the lack of monitoring data around any of the 4 facilities.
- End Result – adoption of lowest achievable emission rate for coke oven batteries.

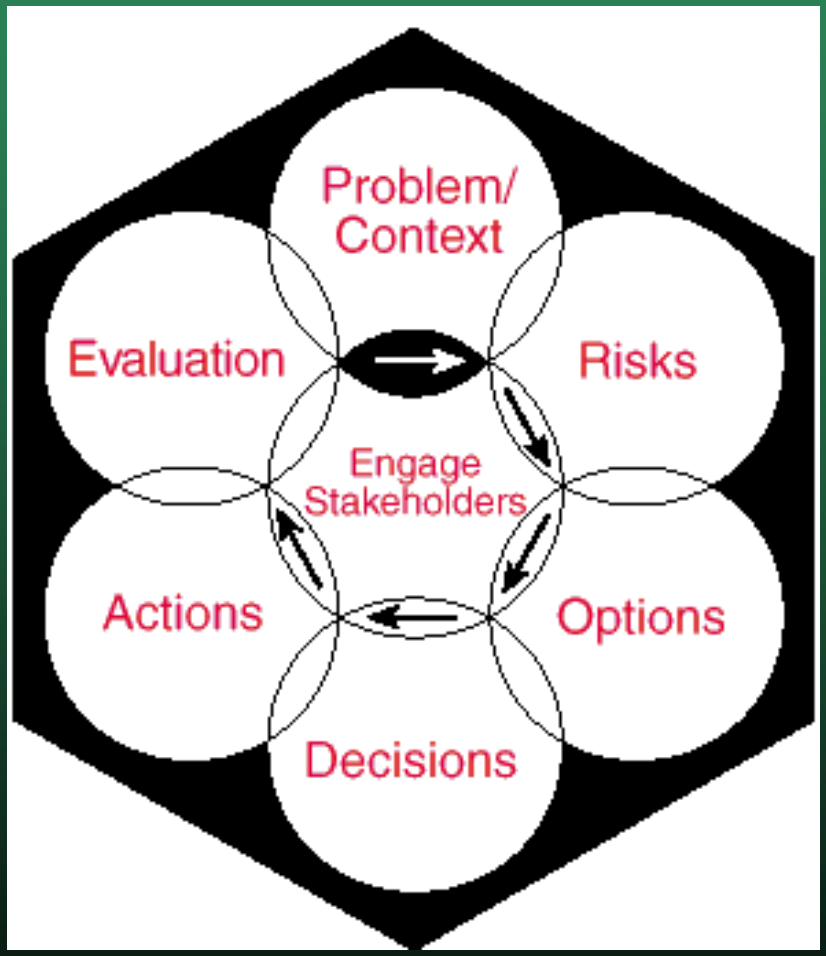
EPA Coke Oven Residual Risk Assessment (2005) Check

- **Non-cancer** inhalation risk screen for benzene (hazard quotient (HQ) = 0.2)
- GIBI monitor (HQ = 0.3)
- Other monitoring sites (HQ < 0.1)

EPA Coke Oven Residual Risk Assessment (2005) Check

- Maximum benzene cancer risk predicted from Tonawanda Coke was 50×10^{-6}
- GIBI benzene cancer risk measured 75×10^{-6}
- BTRS benzene cancer risk measured 16×10^{-6}

Framework of Risk Management for Community Air Quality Decisions



Contact

- Questions about facilities and emissions
  - Larry Sitzman (716) 851-7130
- Questions about Tonawanda Study Report
  - Tom Gentile (518) 402-8402
  - Paul Sierzenga (518) 402-8508