Tonawanda Community Air Quality Study

Division of Air Resources

Bureau of Air Quality Analysis & Research

Bureau of Air Quality Surveillance

EPA Air Toxics Webinar Series

June 25, 2009

Purpose of Study

- Evaluate the effectiveness of the 1990 Clean Air Act Air Toxics Program;
- Participate in the National Ambient Air Toxics Monitoring Strategy;
- Characterize the degree and extent of local-scale air toxics problems;

Purpose of Study

- Provides information for the community and State/Federal government to identify the need for implementing risk reduction strategies.
- Community education - understanding air toxics regulation to foster community involvement.

Why Was Tonawanda Selected ?

- Community concerns about ambient concentrations of benzene and odors;
- EPA's 1999 National-scale Air Toxics Assessment (NATA) results for Erie County;
- Coke Oven Residual Risk Assessment prepared by EPA

Community Outreach

- Small meetings with community prior to study;
- Three major public meetings held in affected community to discuss study.

- Presentation of study design and six months of monitoring results;
- Presentation of one year of monitoring results and individual risk;
- Presentation of study conclusions, current actions, future actions and our data analysis.

Commitment to the Public

- Keep public informed by holding public meetings to discuss project and results
- Continue to work on air pollution reduction strategies
- Collaborate with the Clean Air Coalition of Western N.Y. (CACWNY)

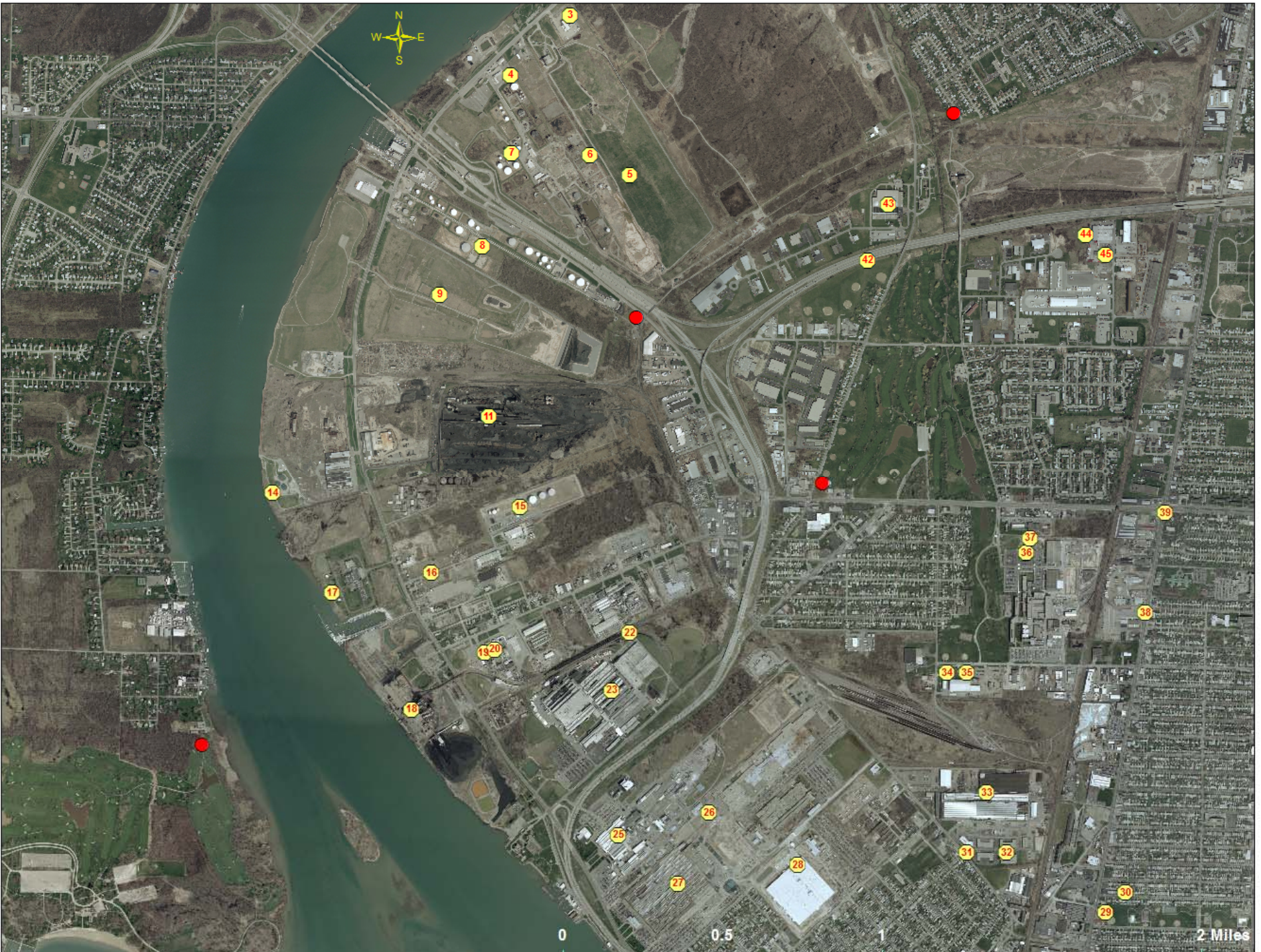
Tonawanda Study Plan

- Collected monitoring data from four sites for one year
- Analyze pollutant specific data
  - Evaluate influence of wind direction on monitored concentrations
  - Compare annual average concentrations to health-based guidelines and characterize risk
  - Assess emissions and potential contribution to monitored concentrations
    - Mobile sources, large (major) and small (area) industrial and manufacturing sources

Tonawanda Study Plan

- Enhance emission inventory for large and small sources
- Model these emissions to:
  - Allow for comparison to monitored values
  - Allow for analysis of previously modeled air toxics (EPA's NATA)
  - Evaluate a new multi-facility modeling tool developed by EPA
  - Evaluate previous Coke Oven modeling results, conducted for Residual Risk Assessment


0
0.5
1
2 Miles
I190
I290
BTRS
GIBI
River Road
SPWT
Sheridan Parkside Community Center
BISP
N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32
28
27
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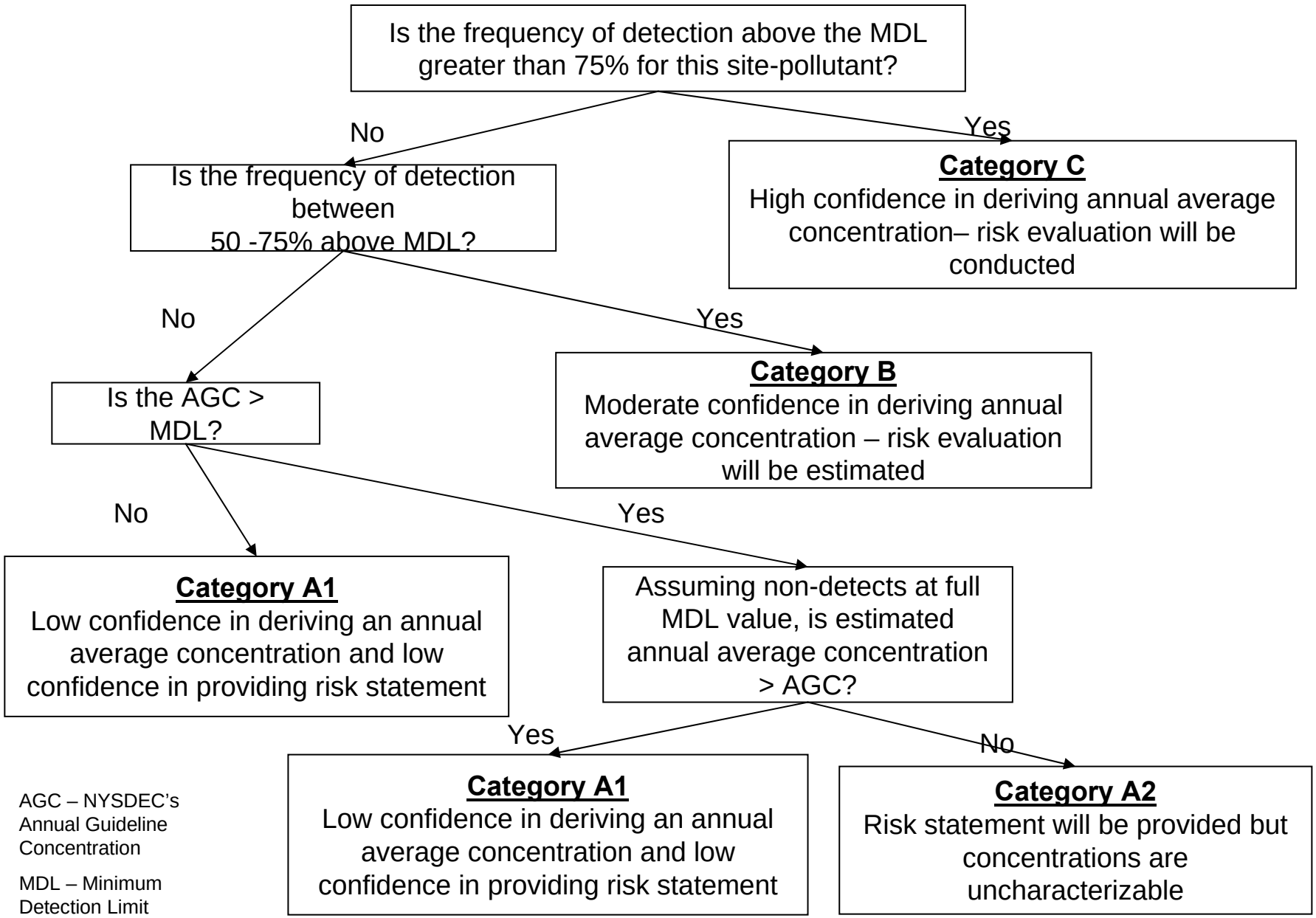
29
0
0.5
1
2 Miles

Air Toxics Measured July 2007 – July 2008

- 44 Volatile Organic Compounds (VOCs) and 12 Carbonyls;
- 1 in 6 day sampling schedule (24 hour sample);
- 15 of the chemicals are high priority urban air toxics targeted for reductions by the 1990 Clean Air Act.

Decision Matrix - To assess suitability of characterizing annual averages for health risk evaluation



AGC – NYSDEC's Annual Guideline Concentration

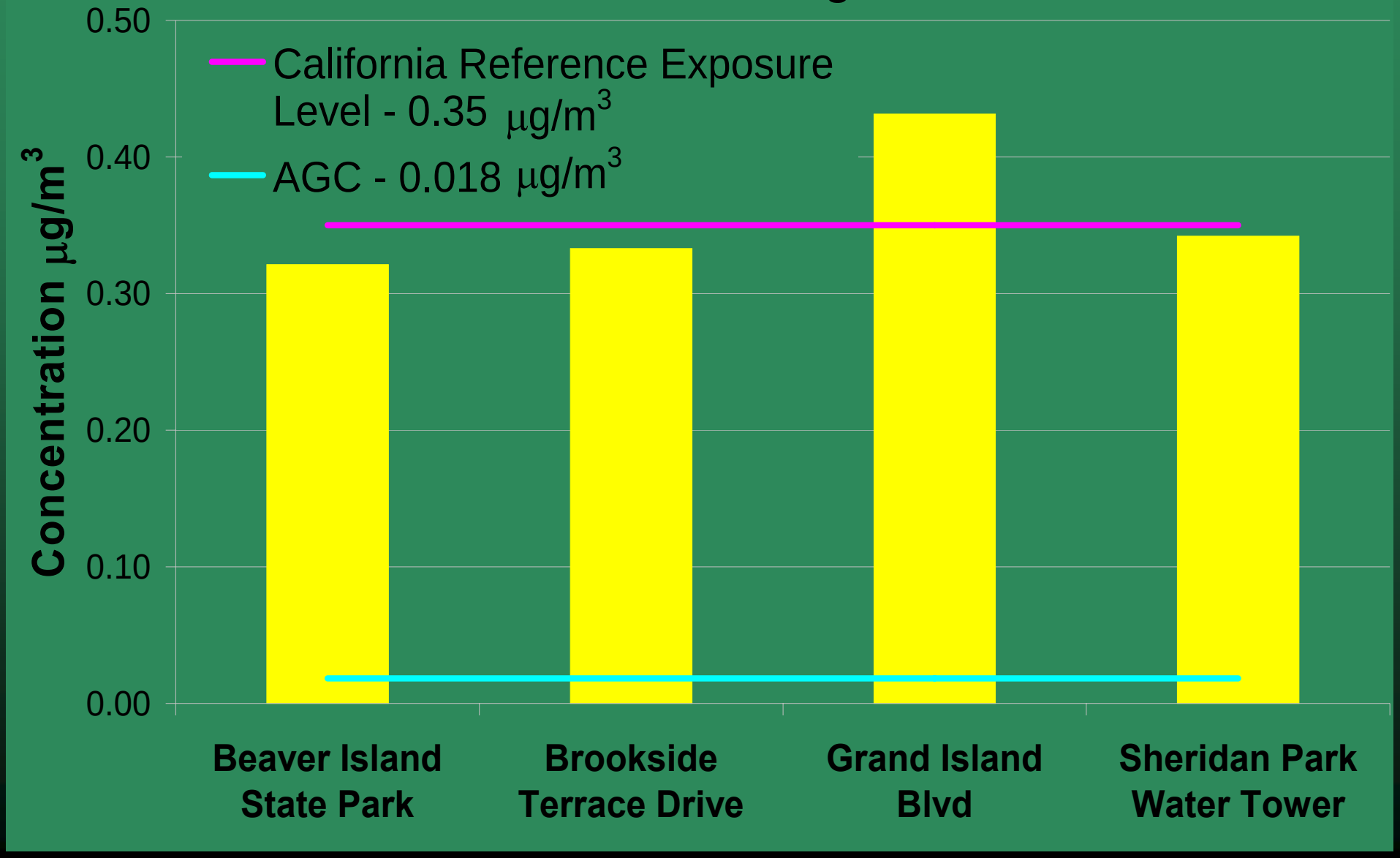
MDL – Minimum Detection Limit

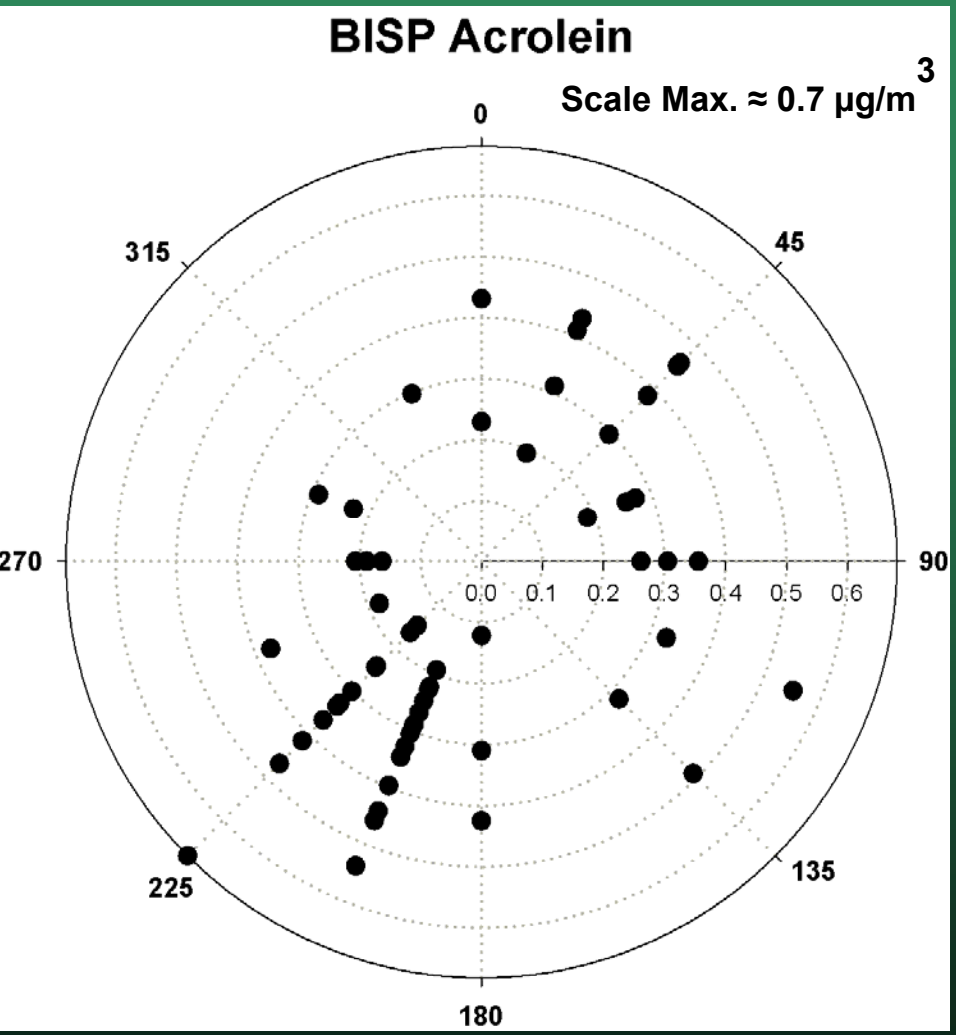
Compounds greater than the AGC

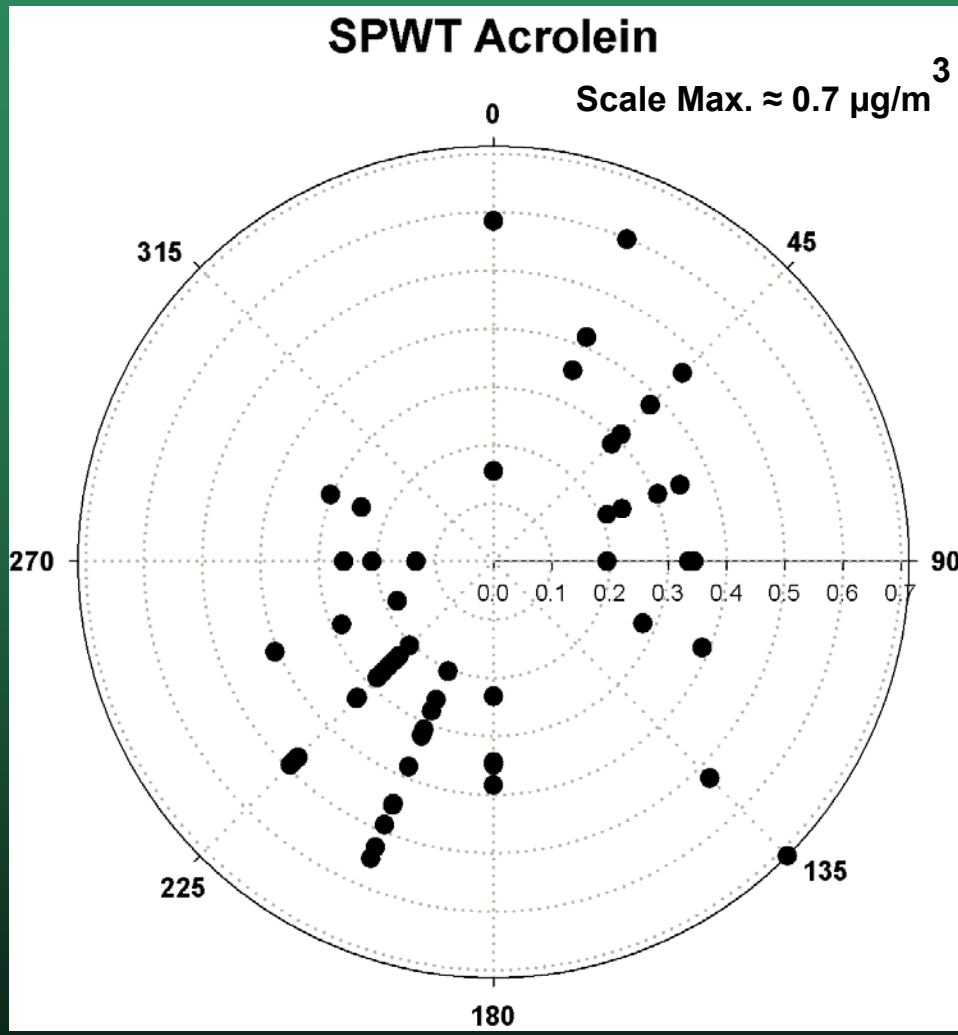
- Volatile Organic Compounds
  - Benzene
  - Acrolein
  - Carbon tetrachloride
- Carbonyls
  - Formaldehyde
  - Acetaldehyde

Acrolein

12 month average




BISP Acrolein
Scale Max. ≈ 0.7 µg/m3
0
45
90
135
180
225
270
315
0.0
0.1
0.2
0.3
0.4
0.5
0.6


SPWT Acrolein
Scale Max. ≈ 0.7 µg/m3
0
45
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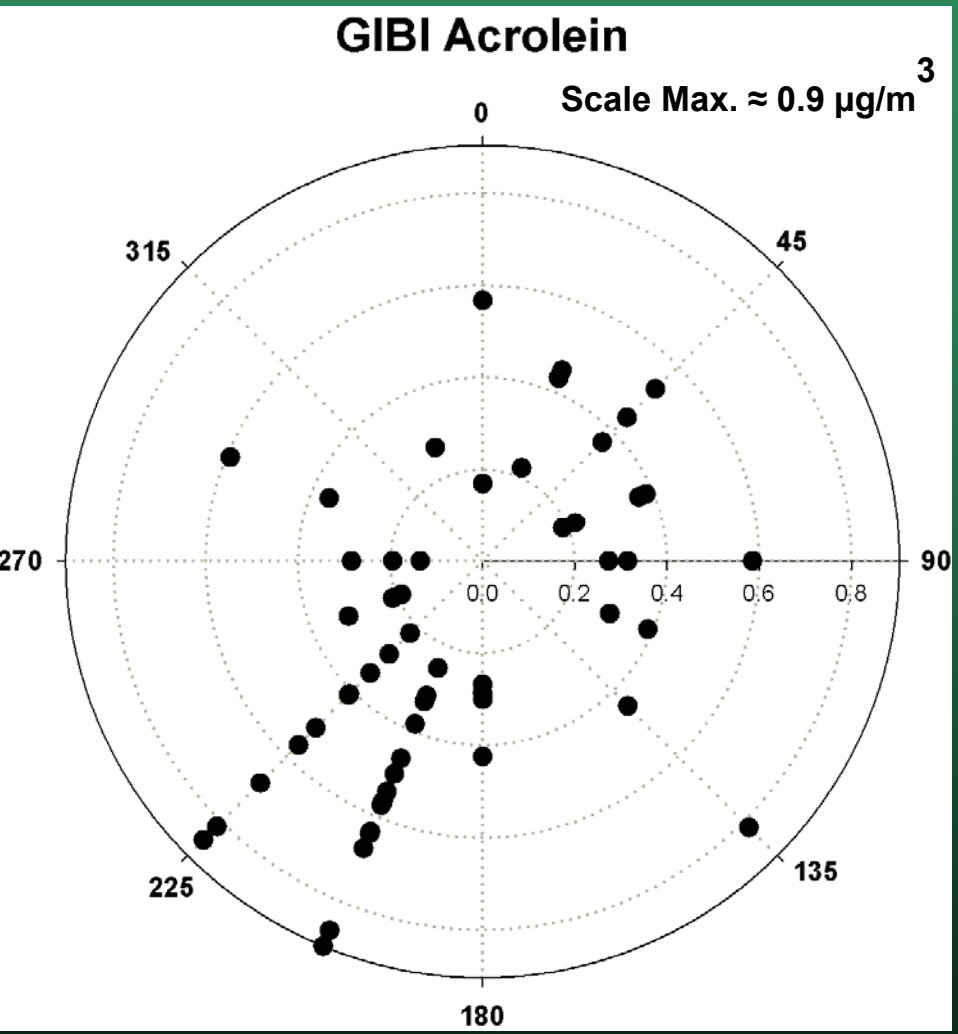
0.4
0.5
0.6
0.7


GIBI Acrolein
Scale Max. ≈ 0.9 µg/m3
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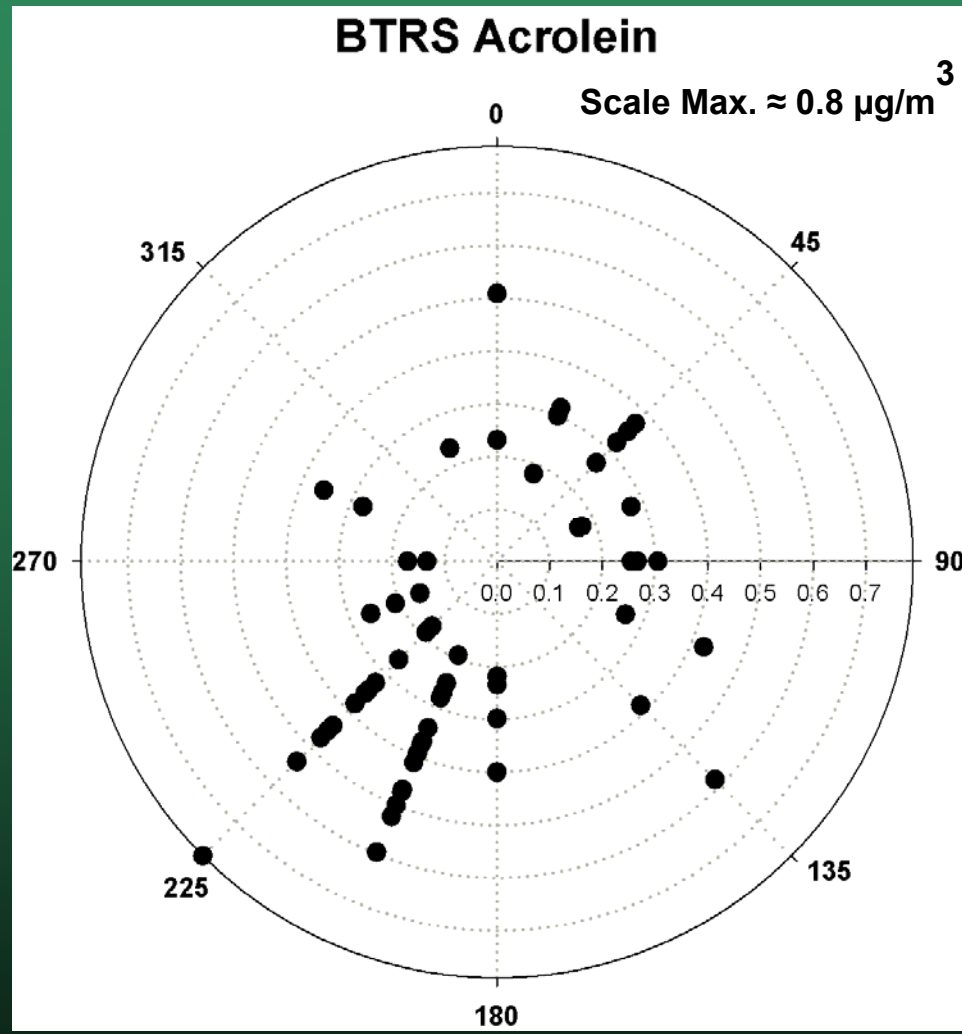
45
90
135
180
225
270
315
0.0
0.2
0.4
0.6
0.8


BTRS Acrolein
Scale Max. ≈ 0.8 µg/m3
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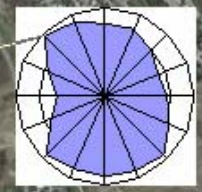
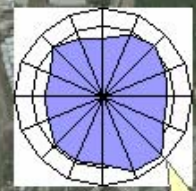
45
90
135
180
225
270
315
0.0
0.1
0.2
0.3
0.4
0.5
0.6
0.7

Acrolein Pollution Roses

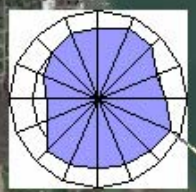


TWA CONC. = 0.4 µg/m3

TWA CONC. = 0.5 µg/m3



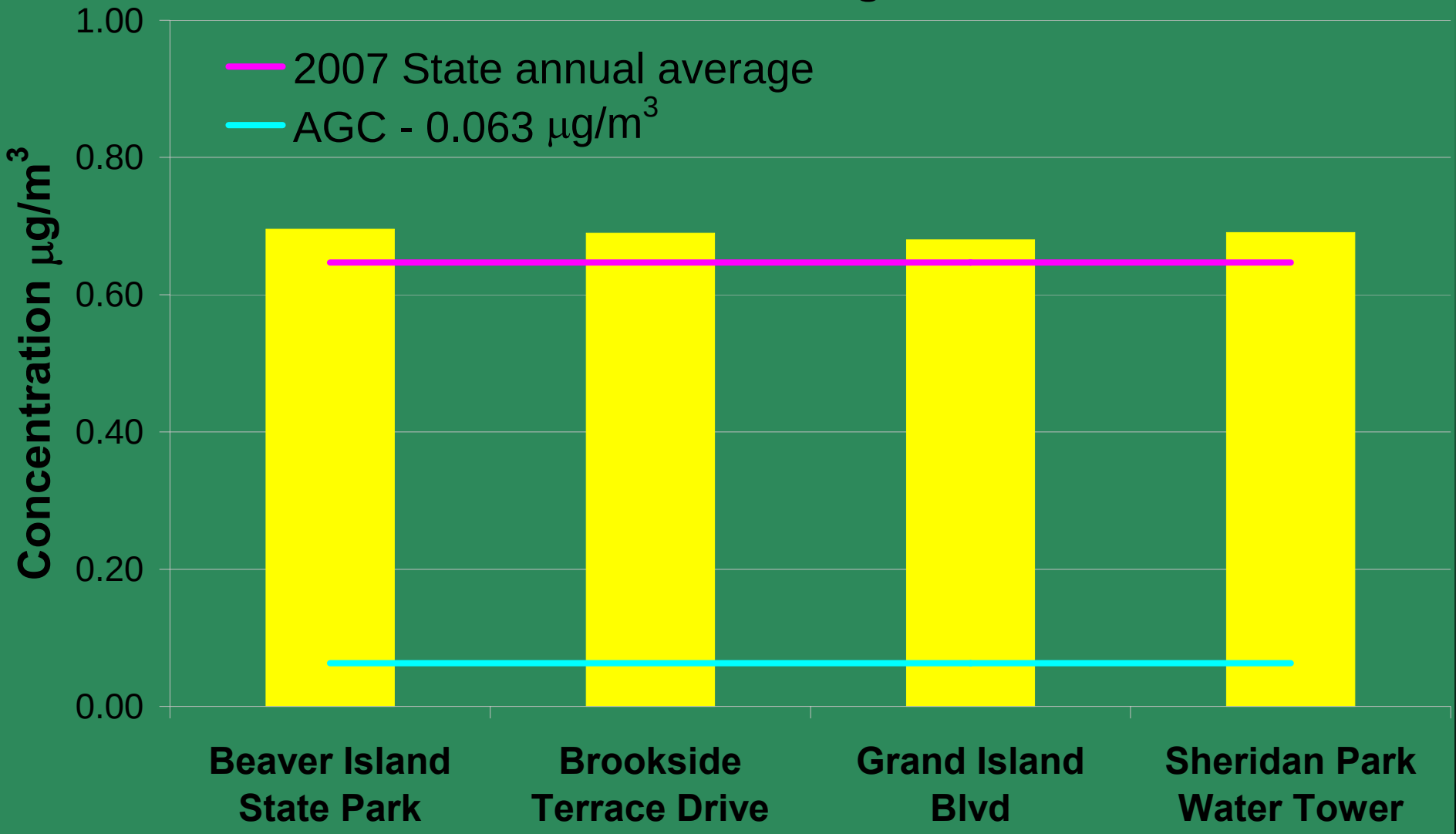
TWA CONC. = 0.4 µg/m3



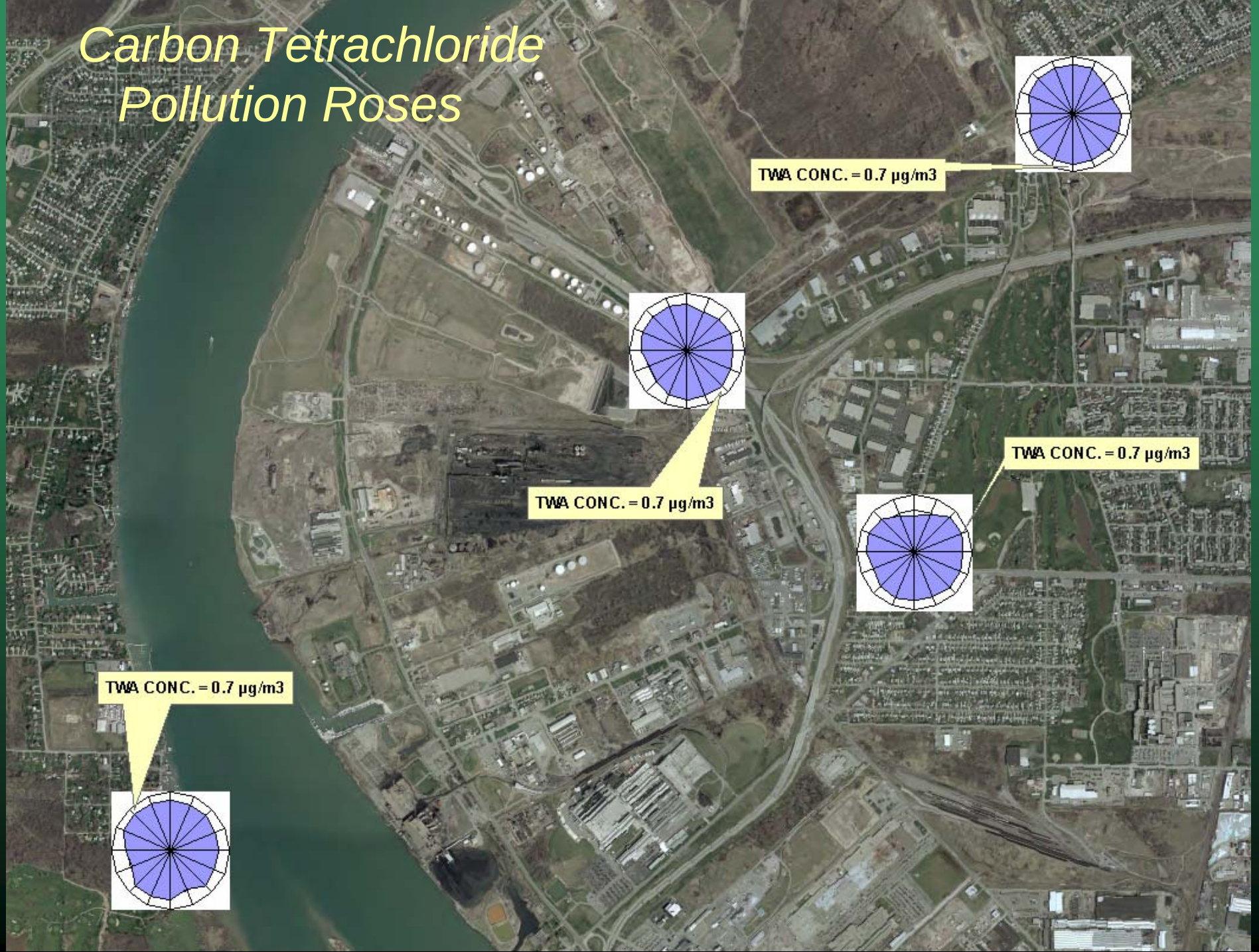
TWA CONC. = 0.4 µg/m3

Carbon tetrachloride

12 month average

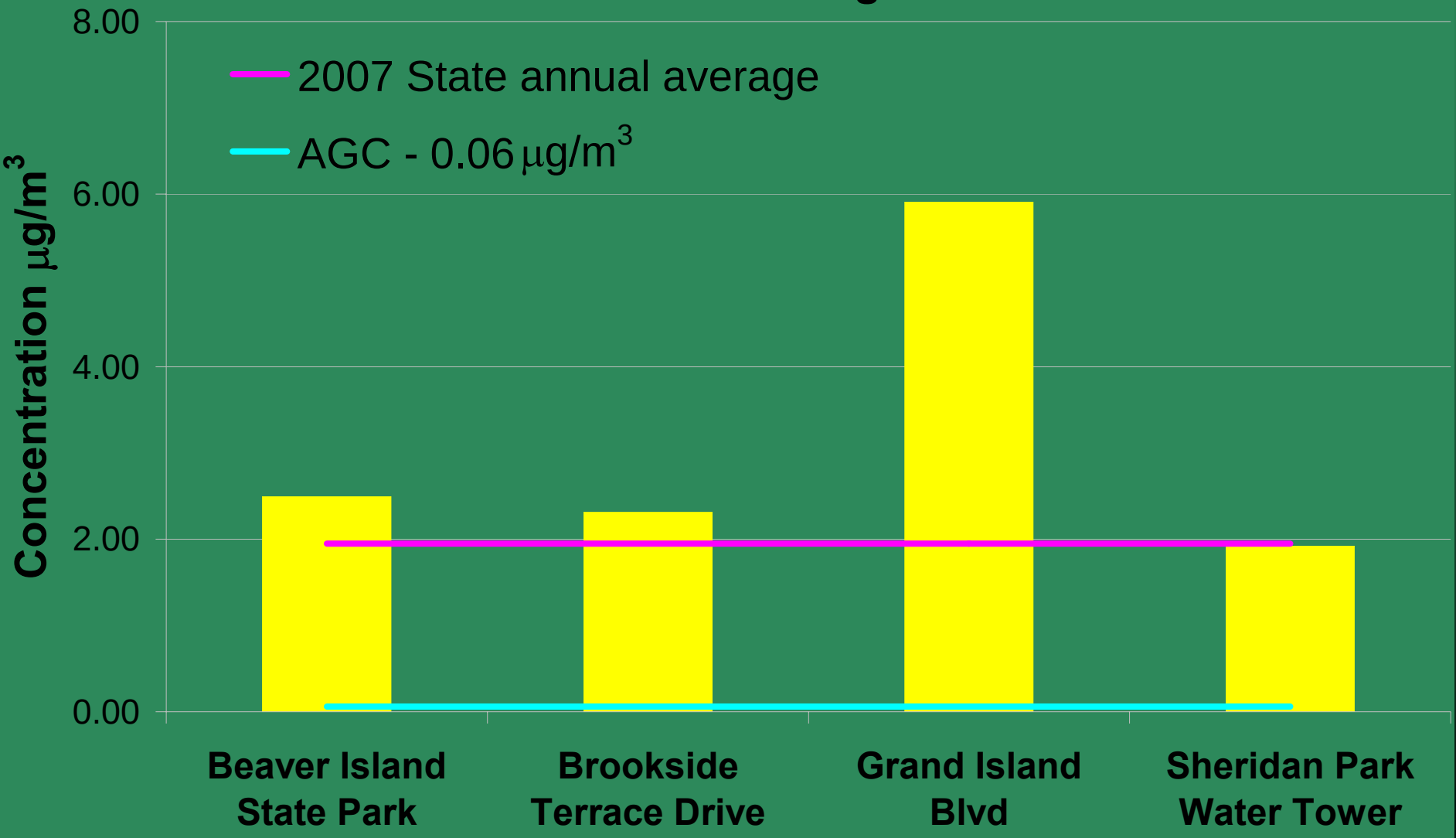


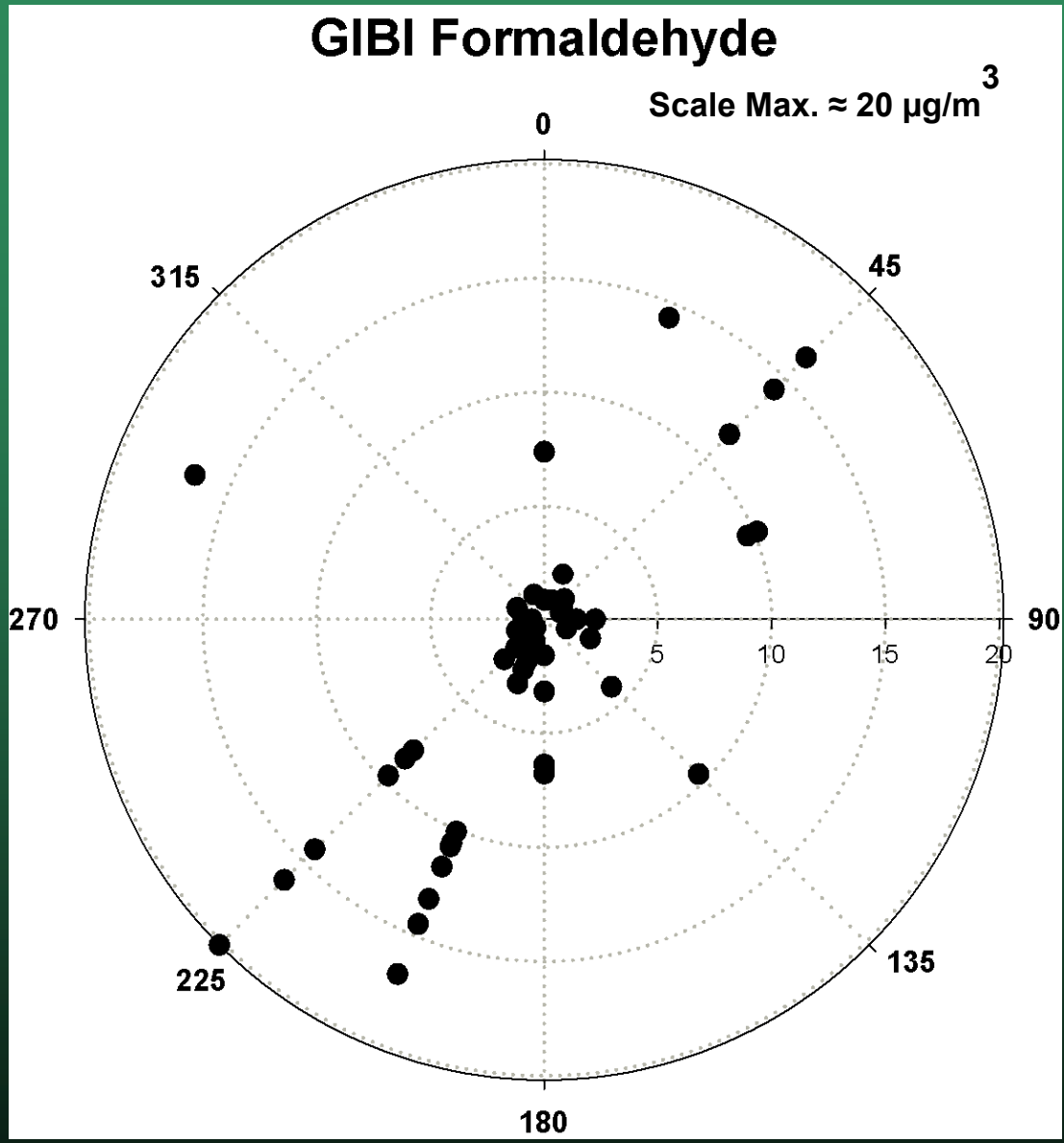
Carbon Tetrachloride Pollution Roses

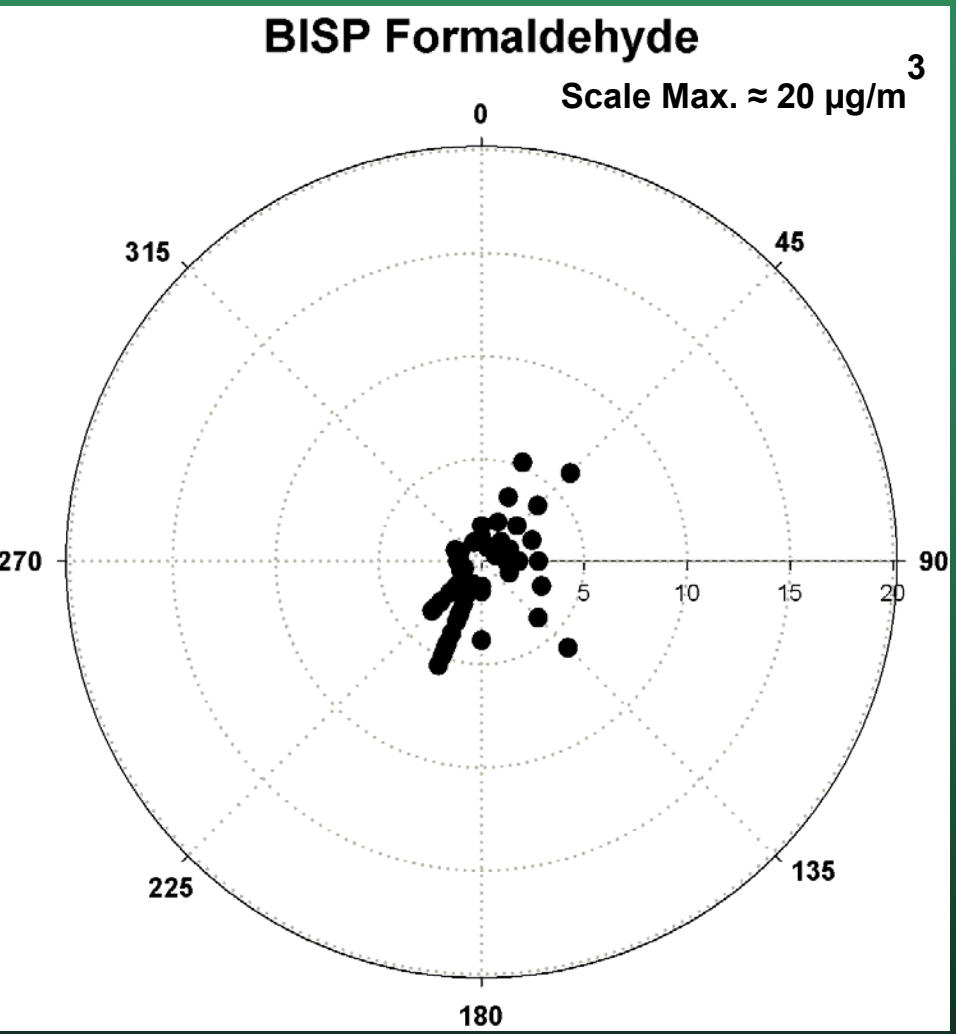


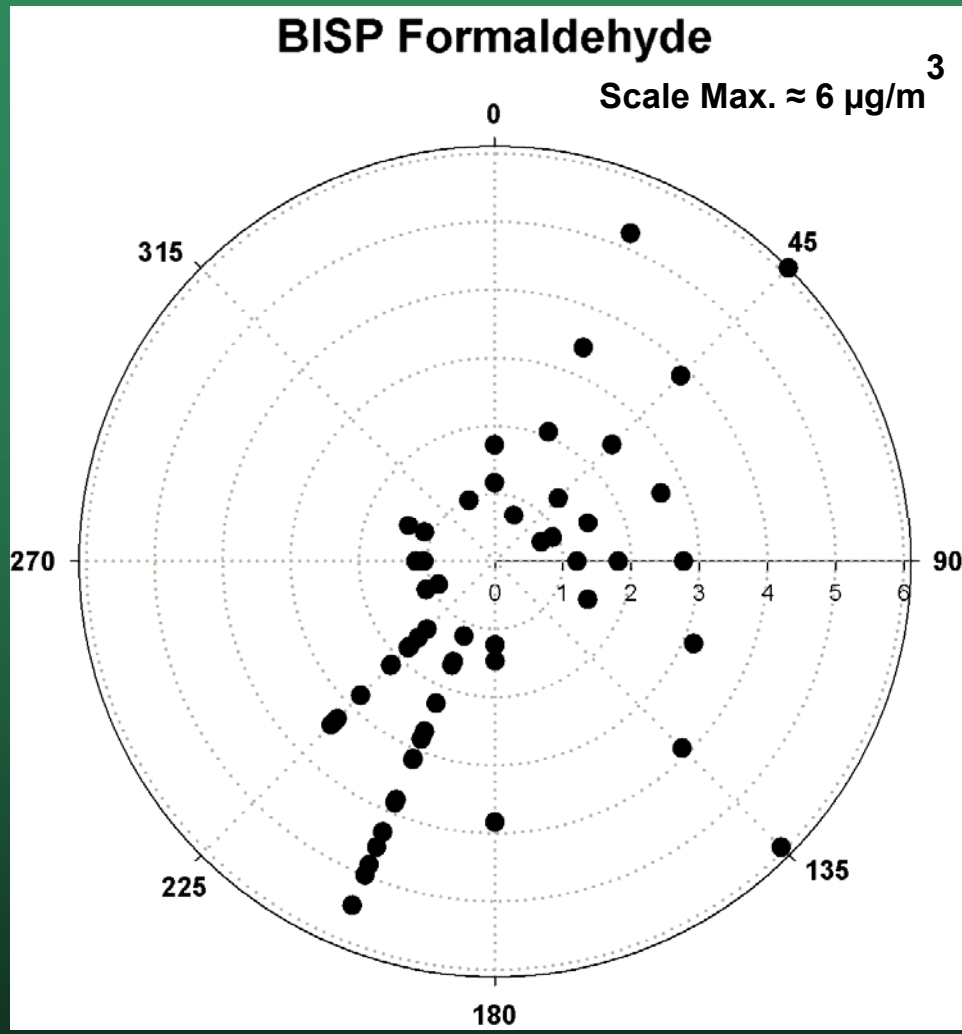
Formaldehyde

12 month average




GIBI Formaldehyde
Scale Max. ≈ 20 µg/m3
0
45
90
135
180
225
270
315
5
10
15
20


BISP Formaldehyde
Scale Max. ≈ 20 µg/m3
0
45
90
135
180
225
270
315
5
10
15
20


BISP Formaldehyde
Scale Max. ≈ 6 µg/m3
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45
90
135
180
225
270
315
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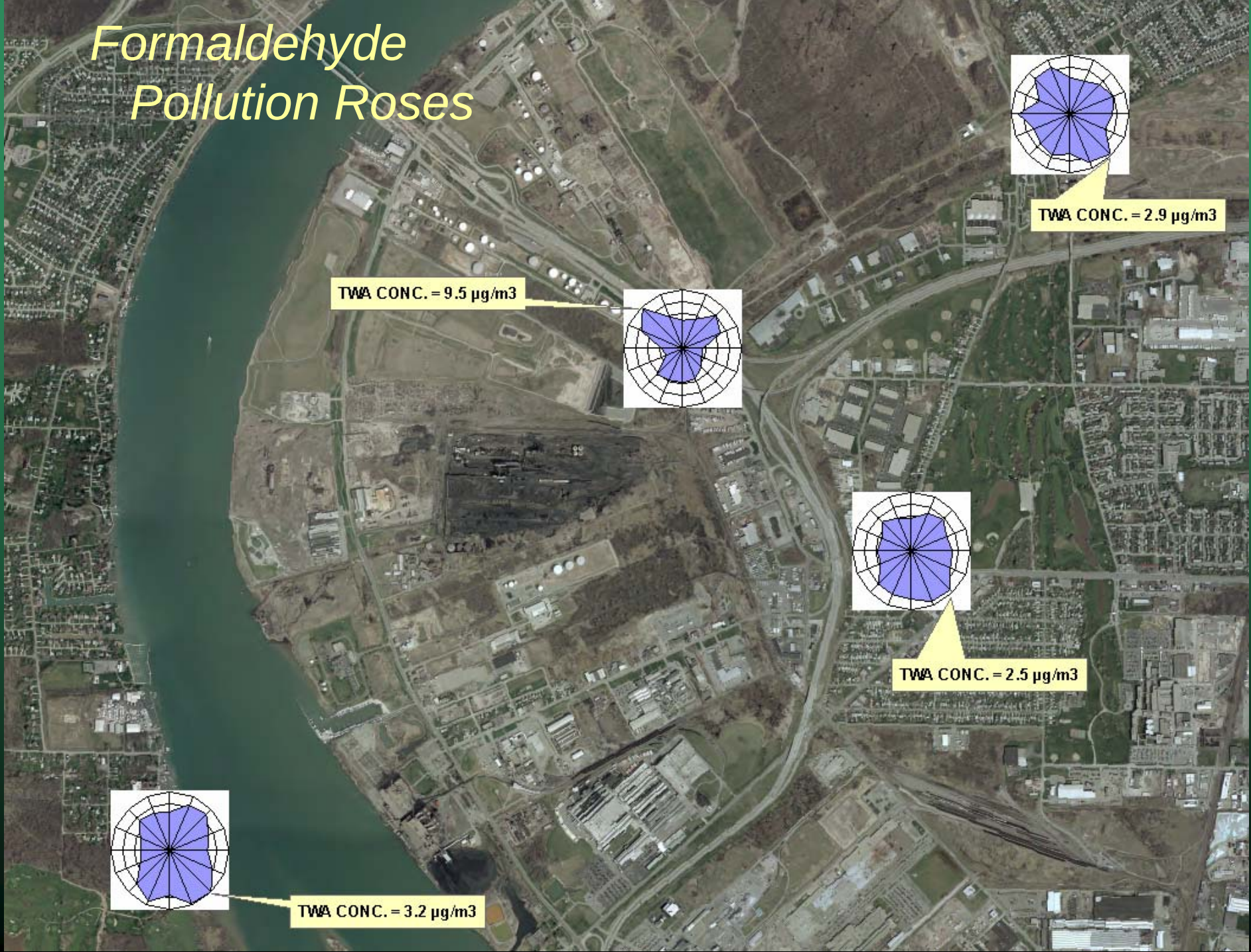
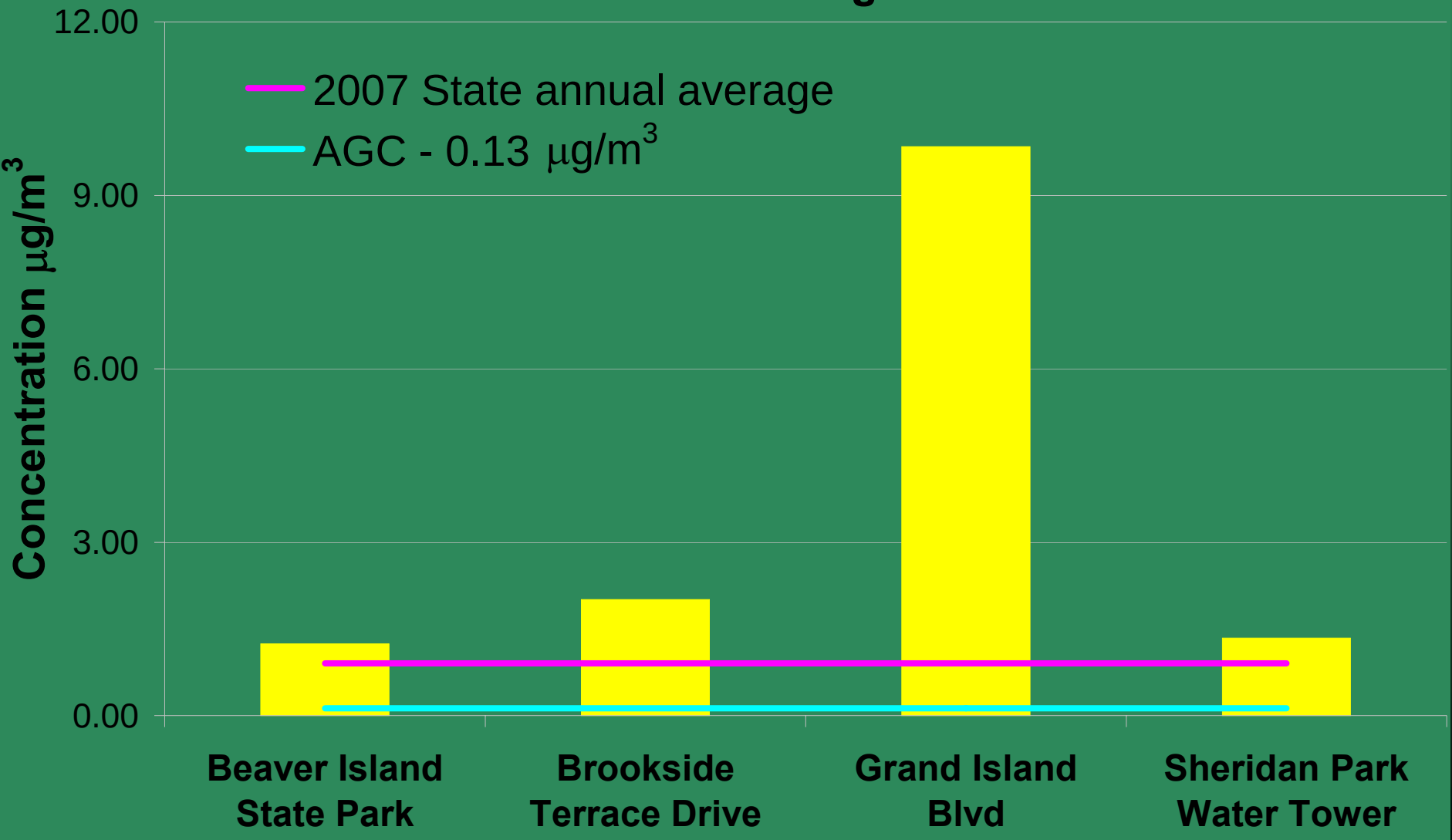
1
2
3
4
5
6

Formaldehyde Pollution Roses

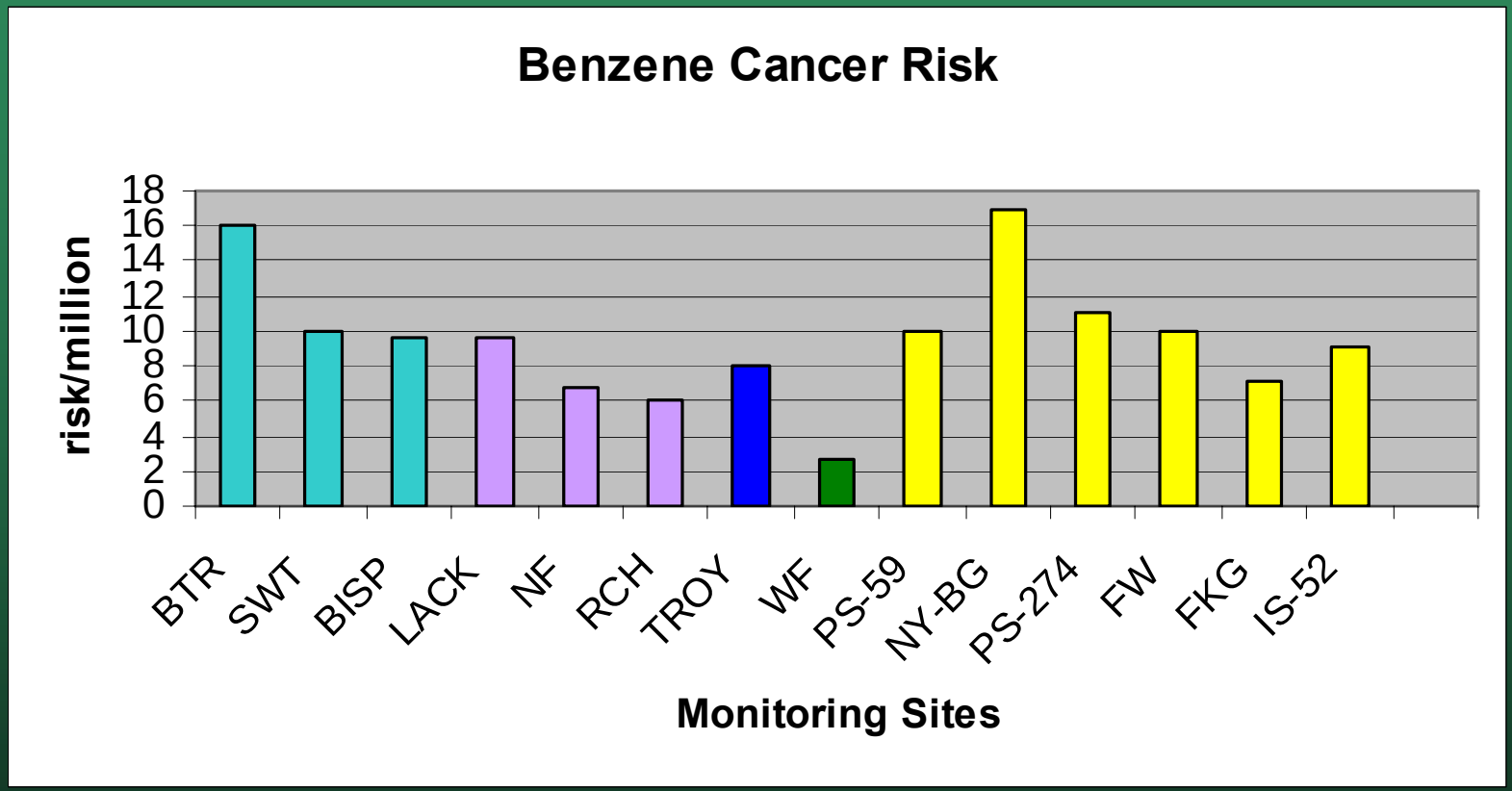


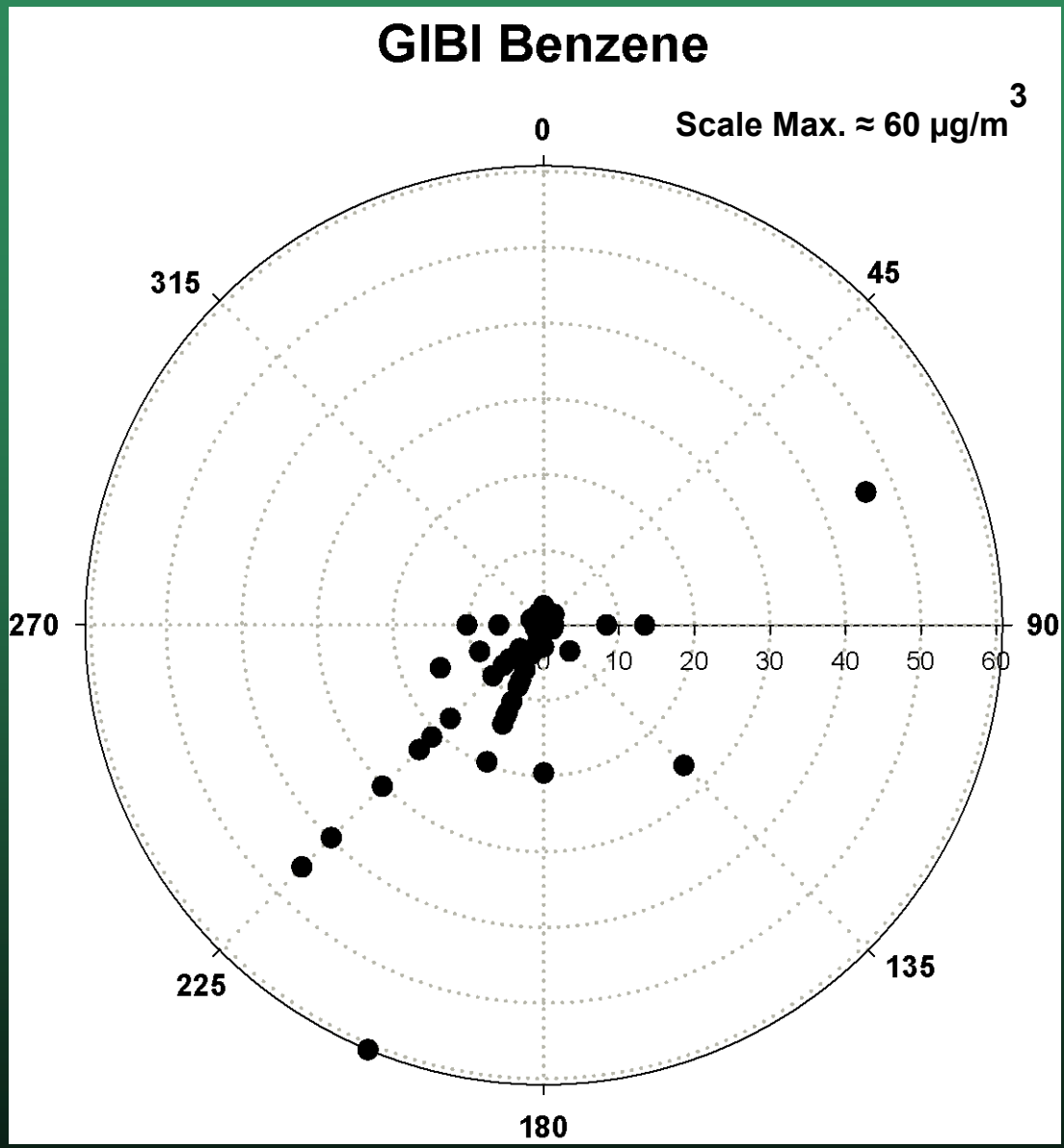
Benzene

12 month average



NYS Benzene Monitoring Data 2005-2007




GIBI Benzene
Scale Max. ≈ 60 µg/m3
0
45
90
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180
225
270
315
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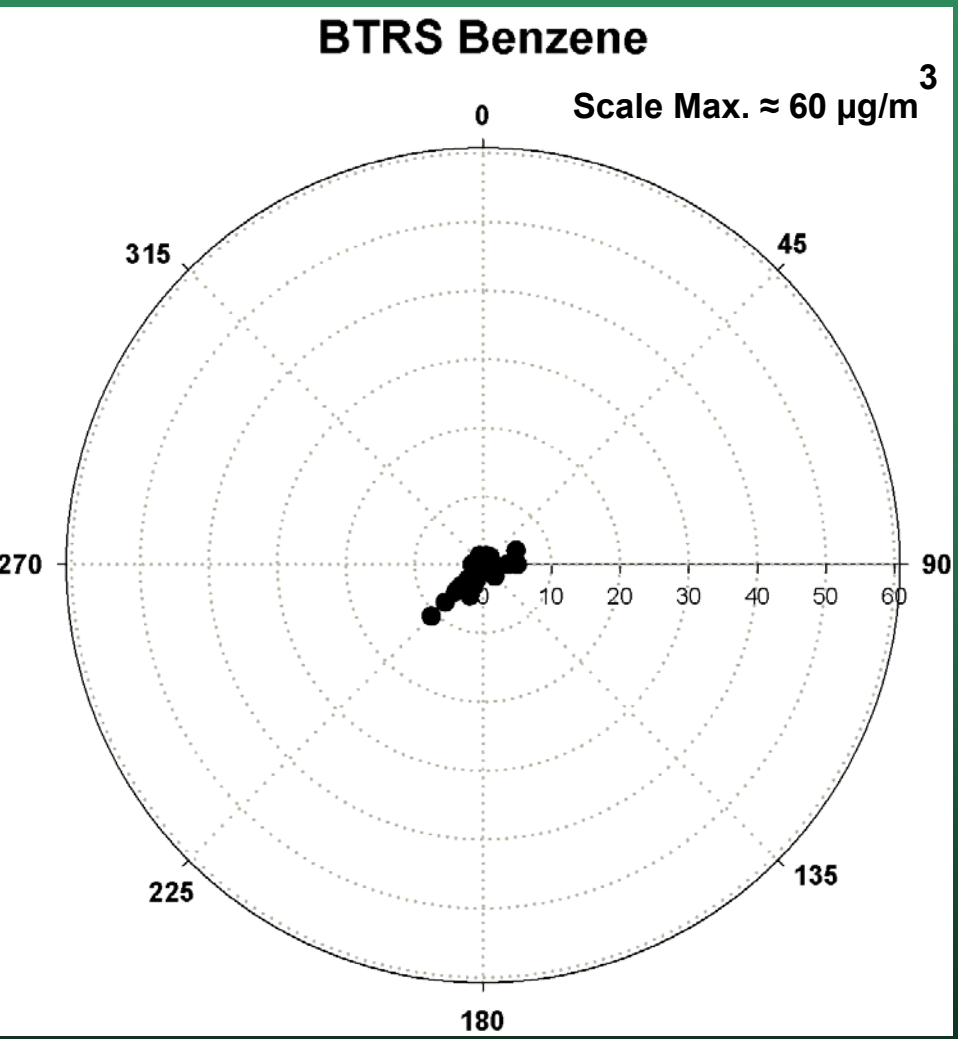
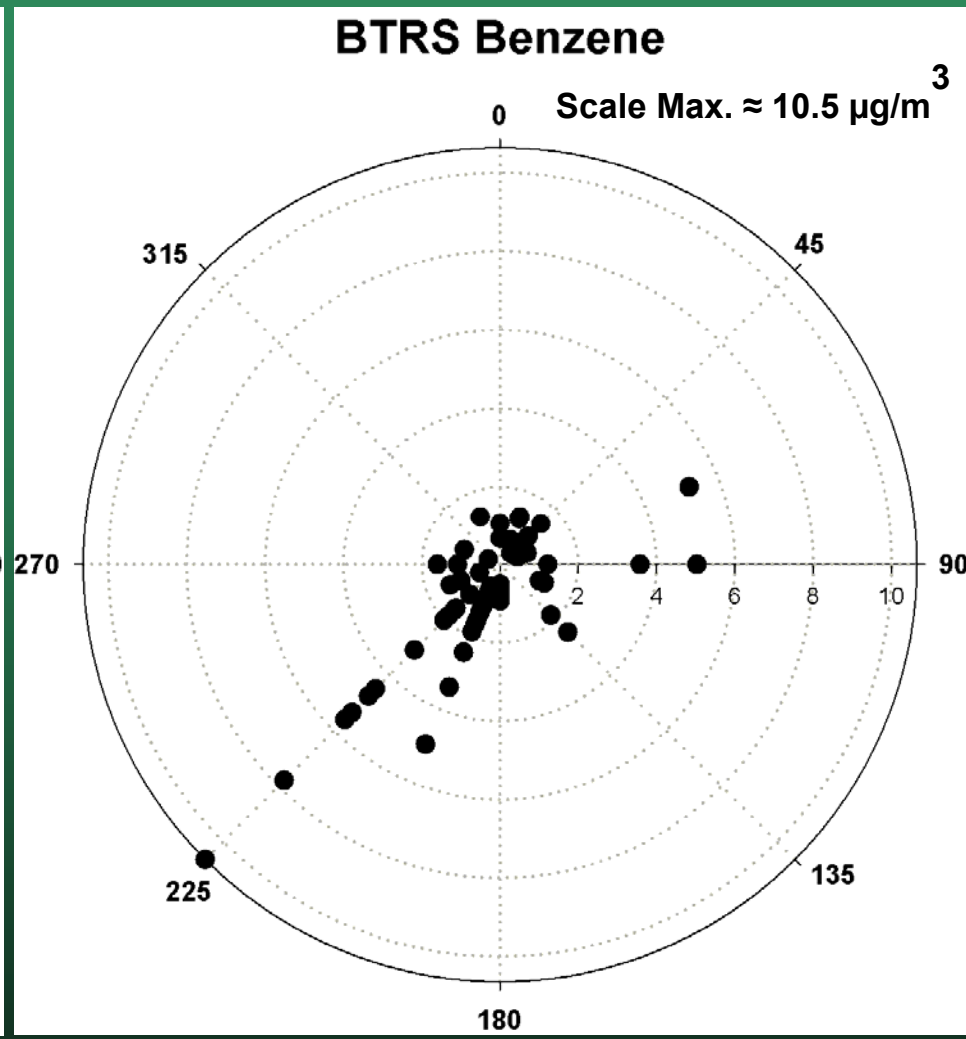
60


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


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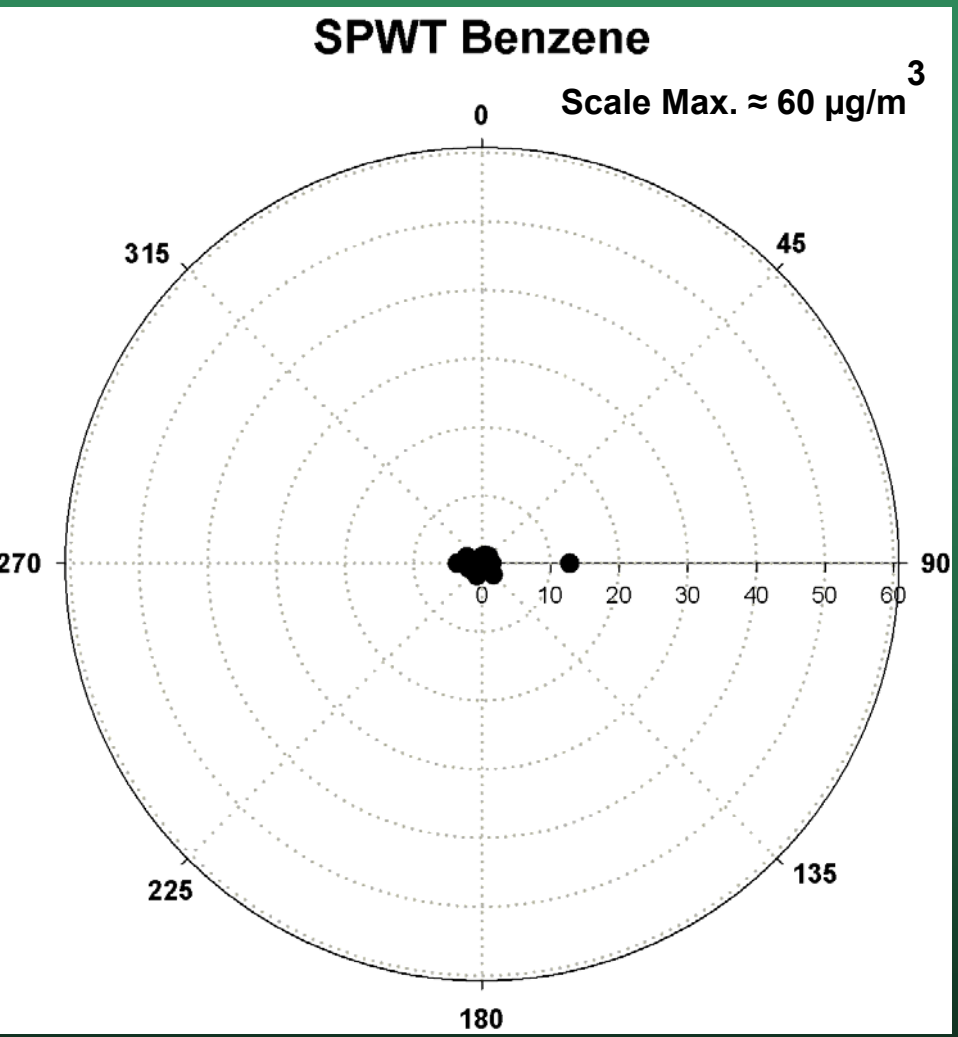
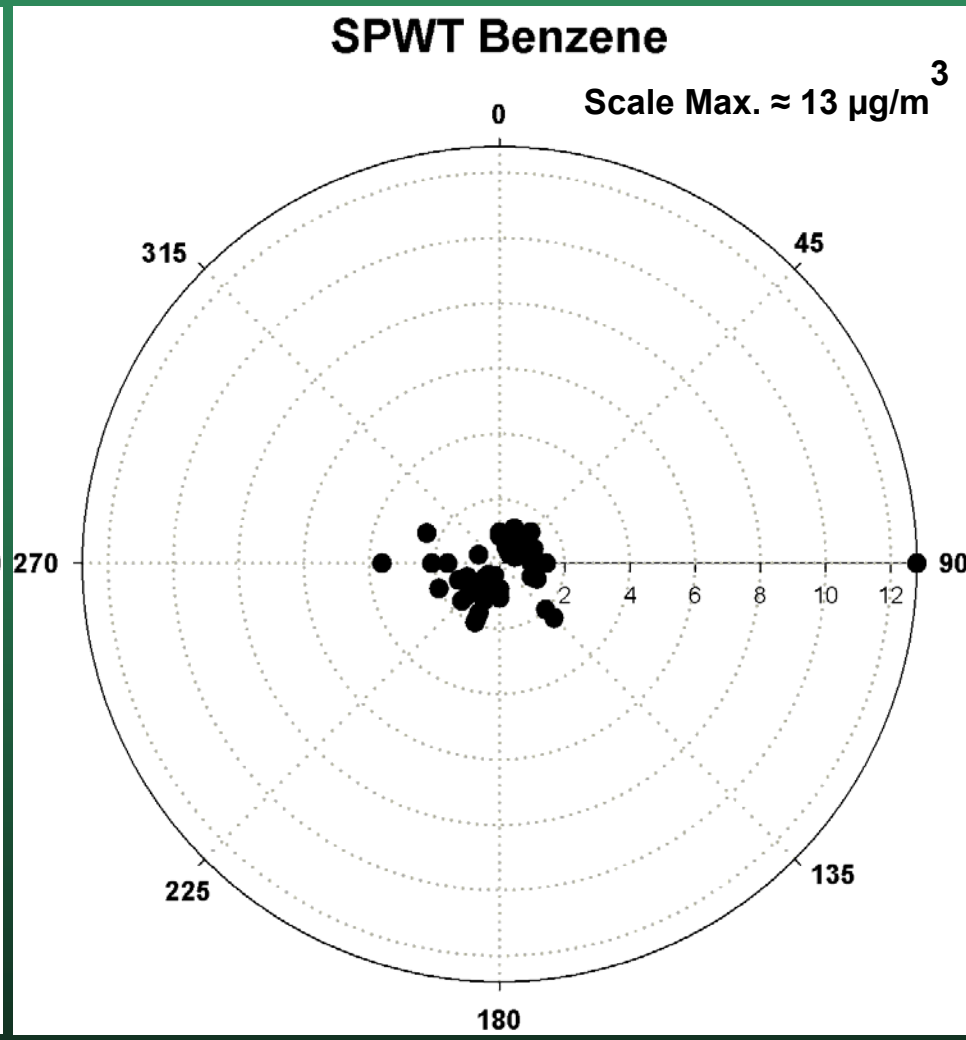
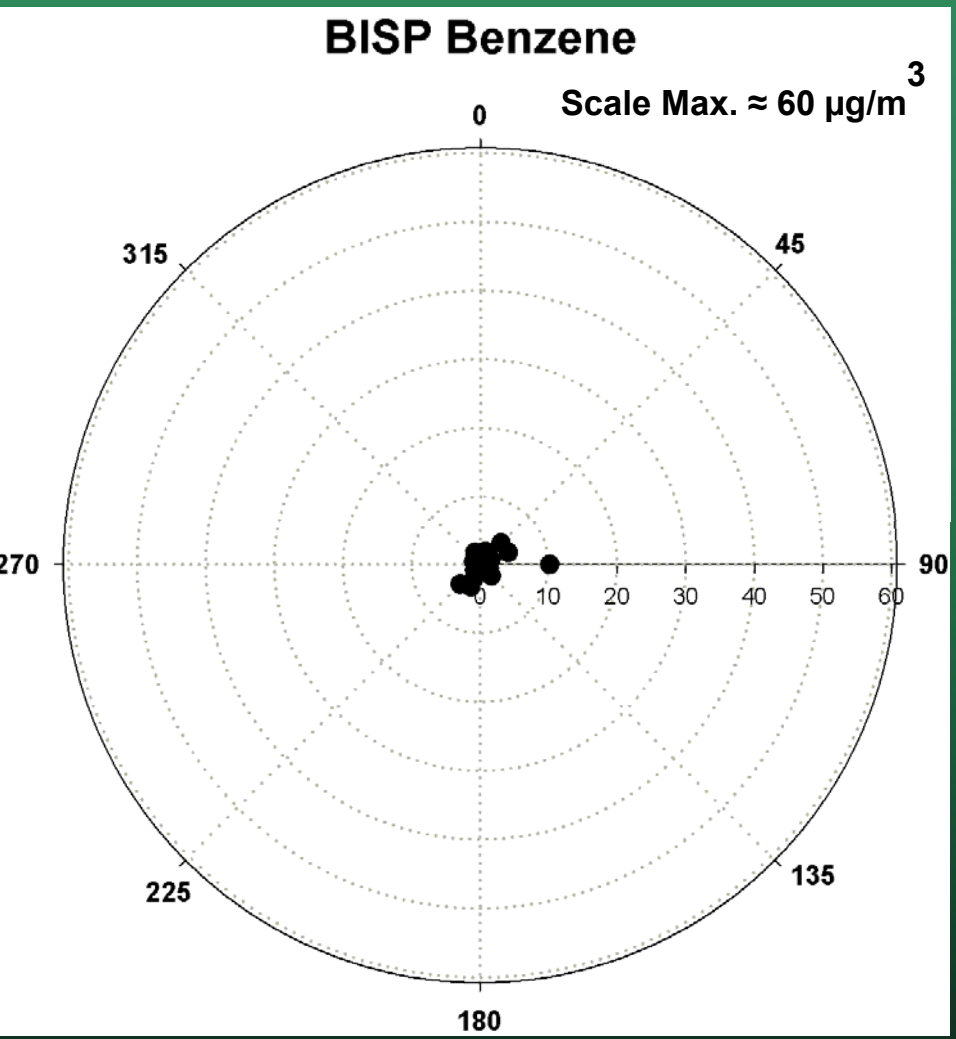
45
90
135
180
225
270
315
2
4
6
8
10


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
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180
225
270
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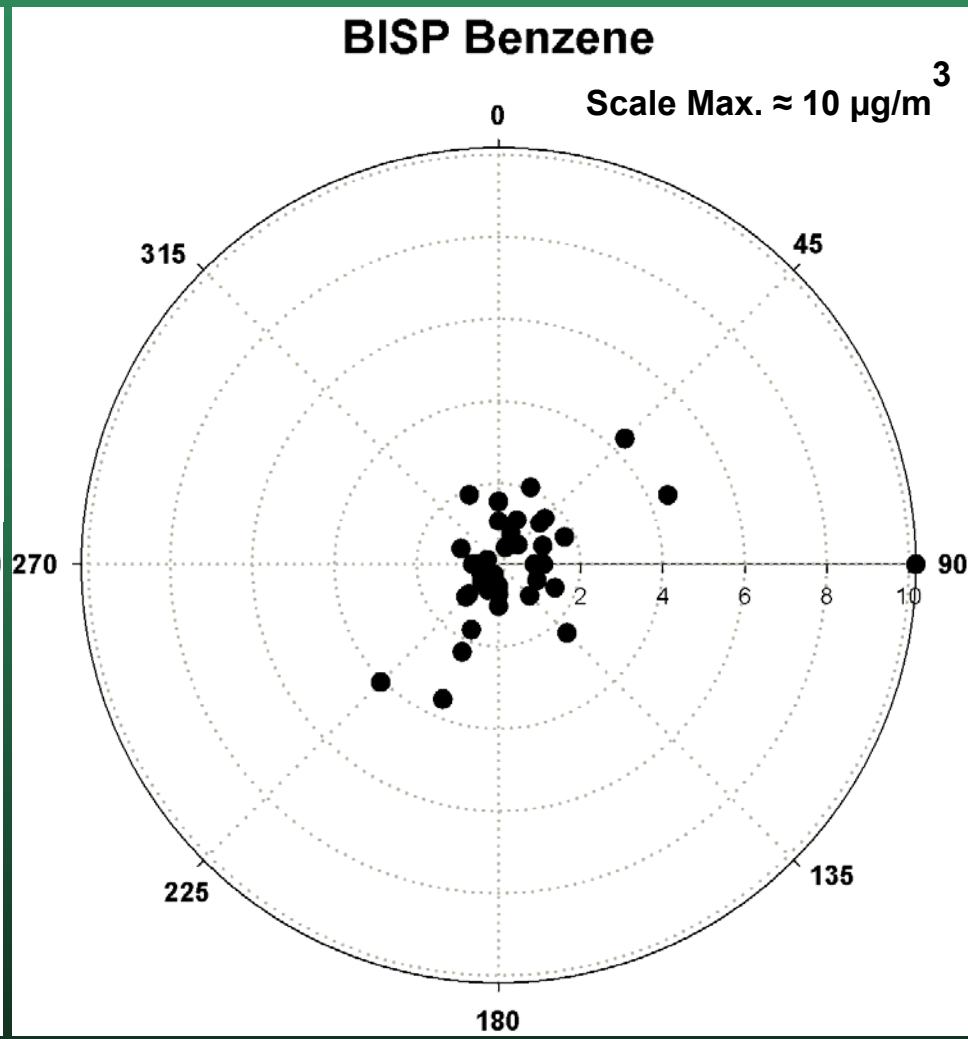
60

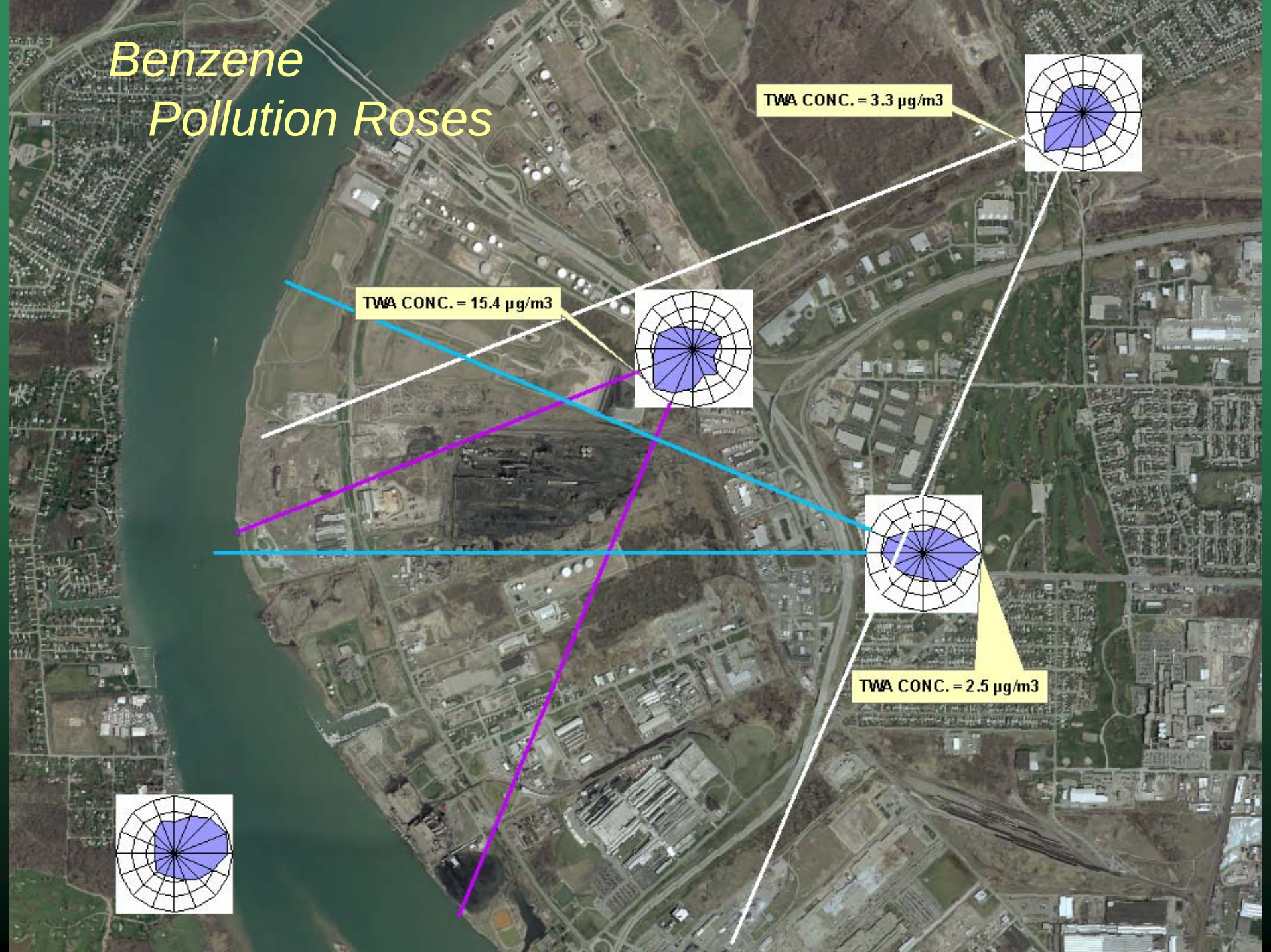

BISP Benzene
Scale Max. ≈ 10 µg/m3
0
45
90
135
180
225
270
315
2
4
6
8
10

Benzene Pollution Roses

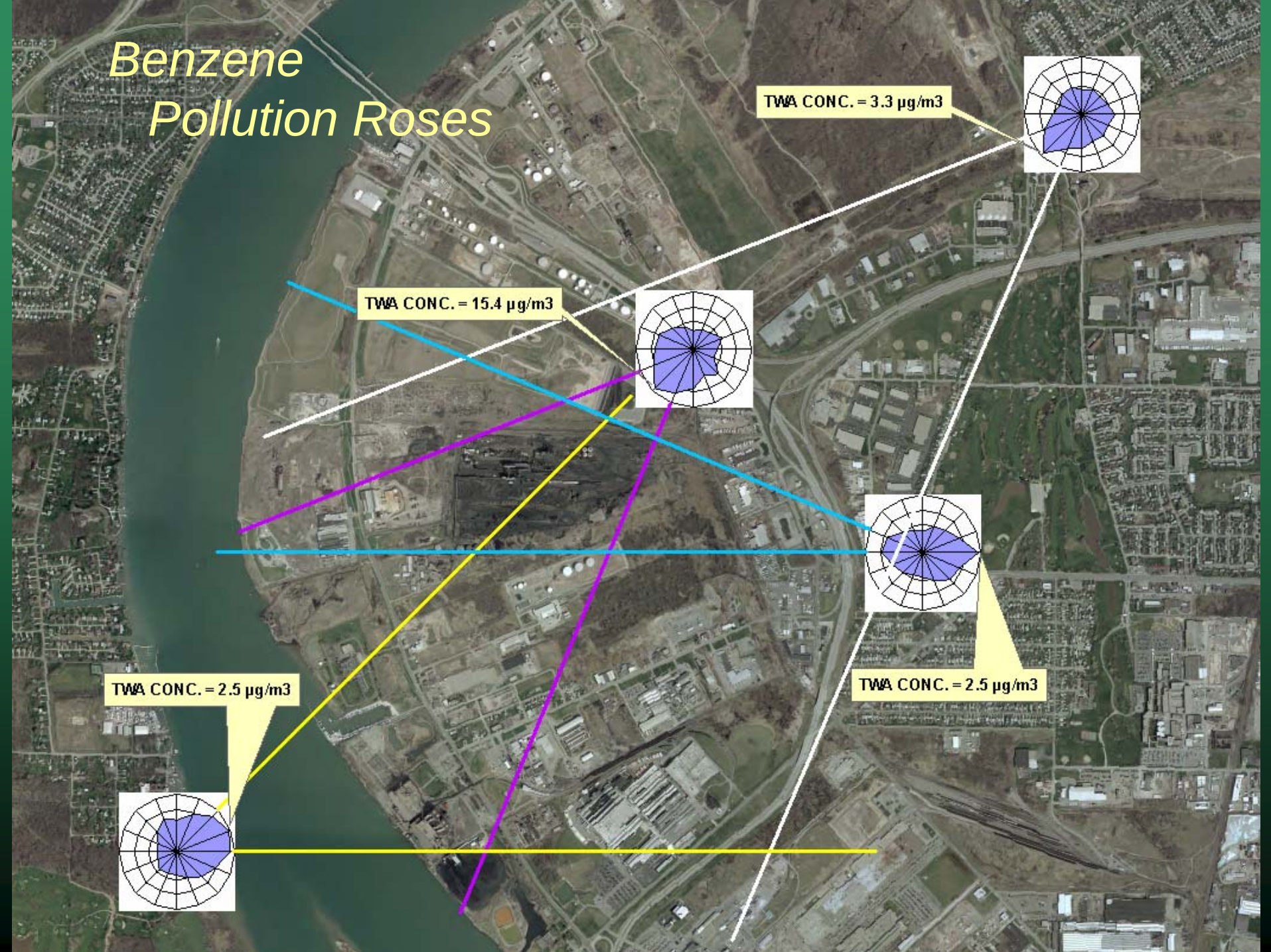
Benzene Pollution Roses

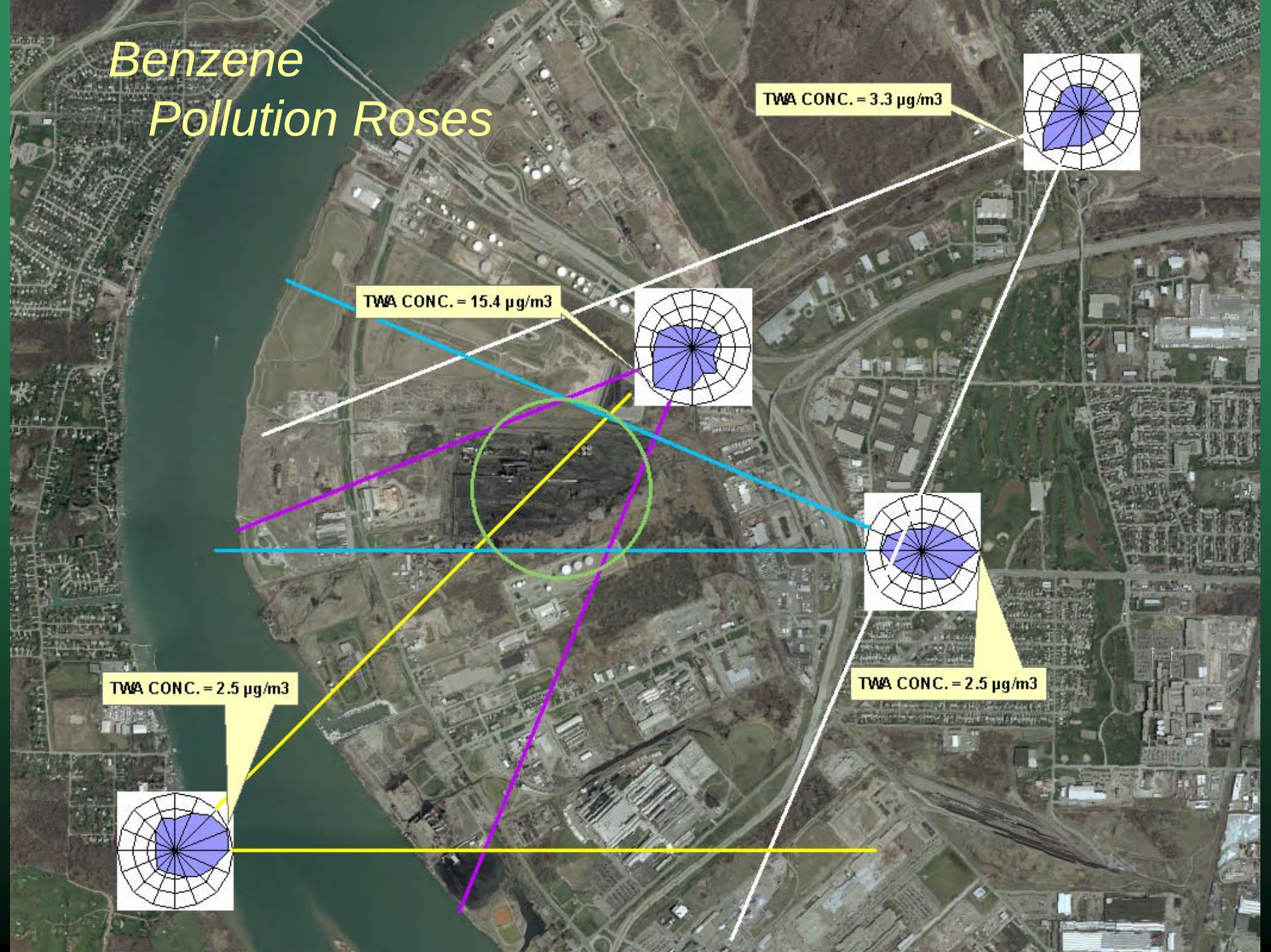
Benzene Pollution Roses

Benzene Pollution Roses



Benzene Pollution Roses




Benzene
Pollution Roses
TWA CONC. = 3.3 µg/m3
TWA CONC. = 15.4 µg/m3
TWA CONC. = 2.5 µg/m3
TWA CONC. = 2.5 µg/m3

Tonawanda Community Air Quality Study

Division of Air Resources
Community Presentation

June 12, 2009

Sheridan Parkside Community Center

Tonawanda, NY

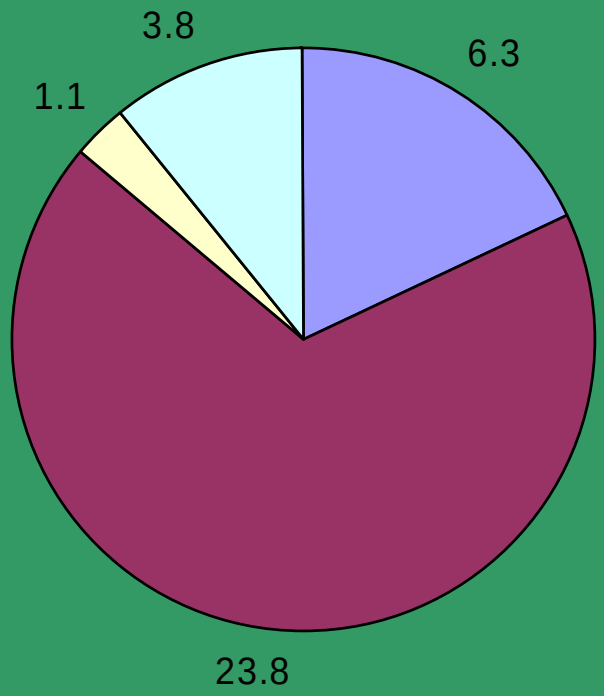
Conclusion

The results of the community air quality monitoring study and data analysis indicates there is a need for a focused effort to reduce the burden of air toxics in the Tonawanda area.

Future Air Pollution Reduction Project Goals

- Reduce odor complaints in community;
- Reduce the emissions of chemicals associated with acute irritation effects;
- Reduce cancer risk in the community.

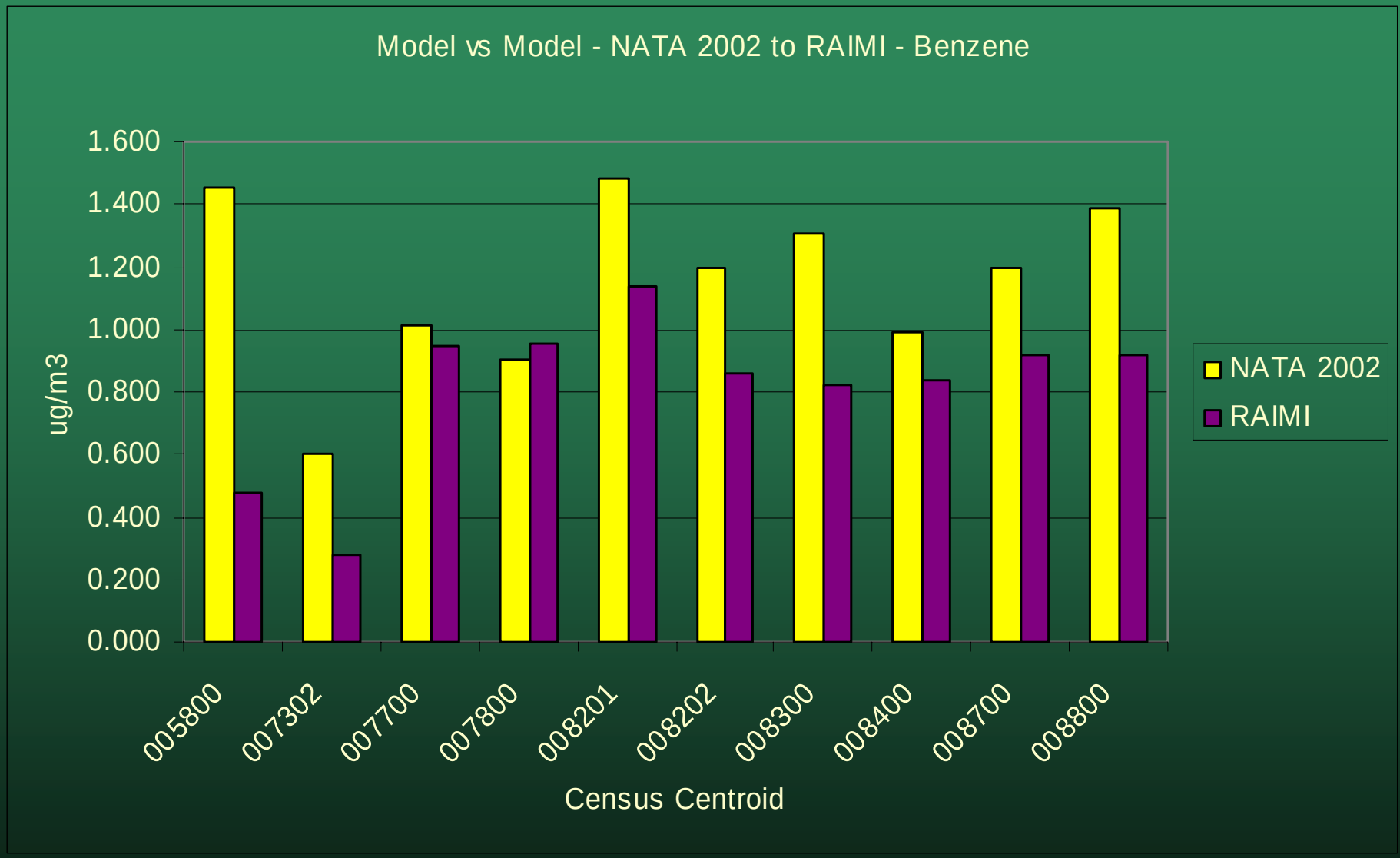
Benzene Emissions - Tons per year
Tonawanda Community Area



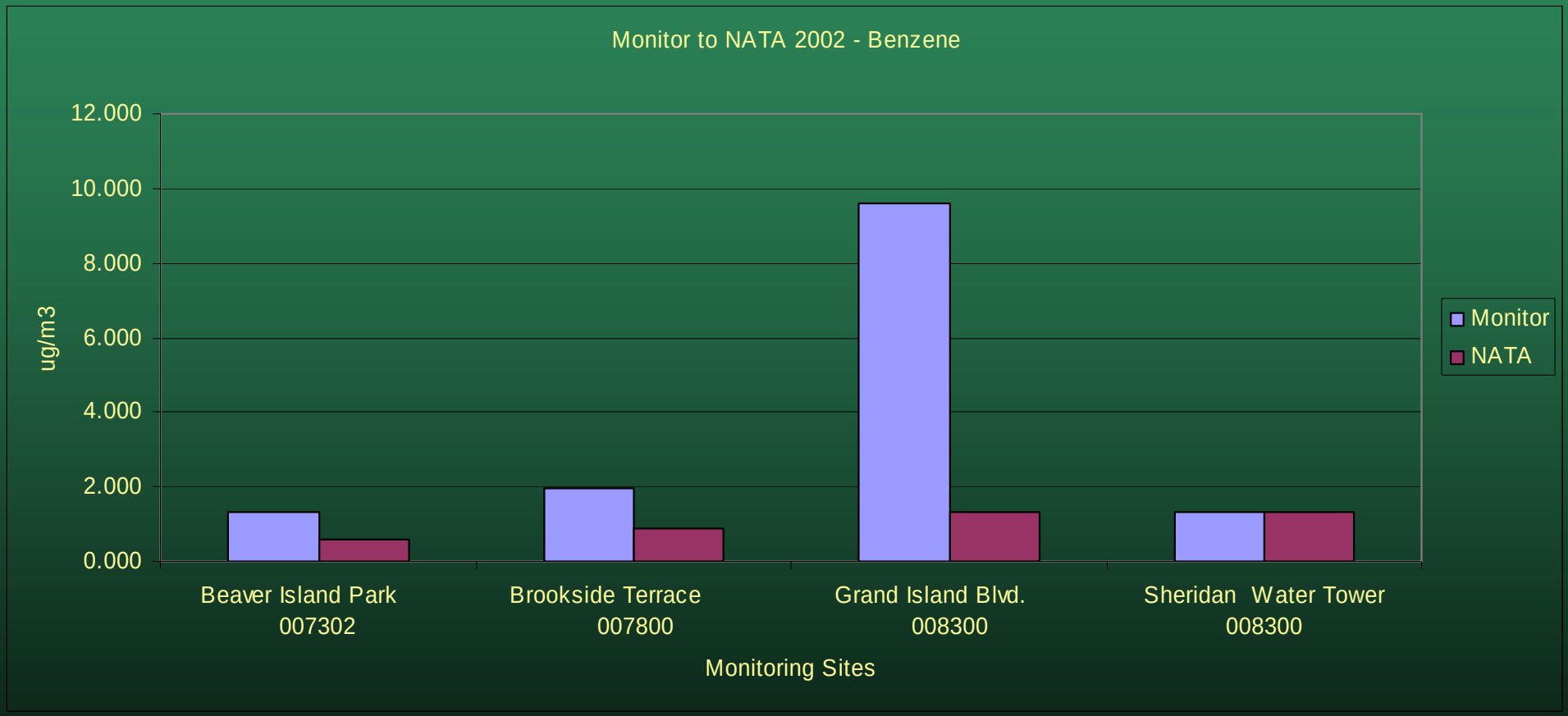
Mobile emissions calculated from air pollution model, Mobile6
Major includes Title V permitted point sources
Minor includes State Facility and Registered point sources
Area includes landfills, sewage treatment plants and gas stations

Model to Measured Comparisons

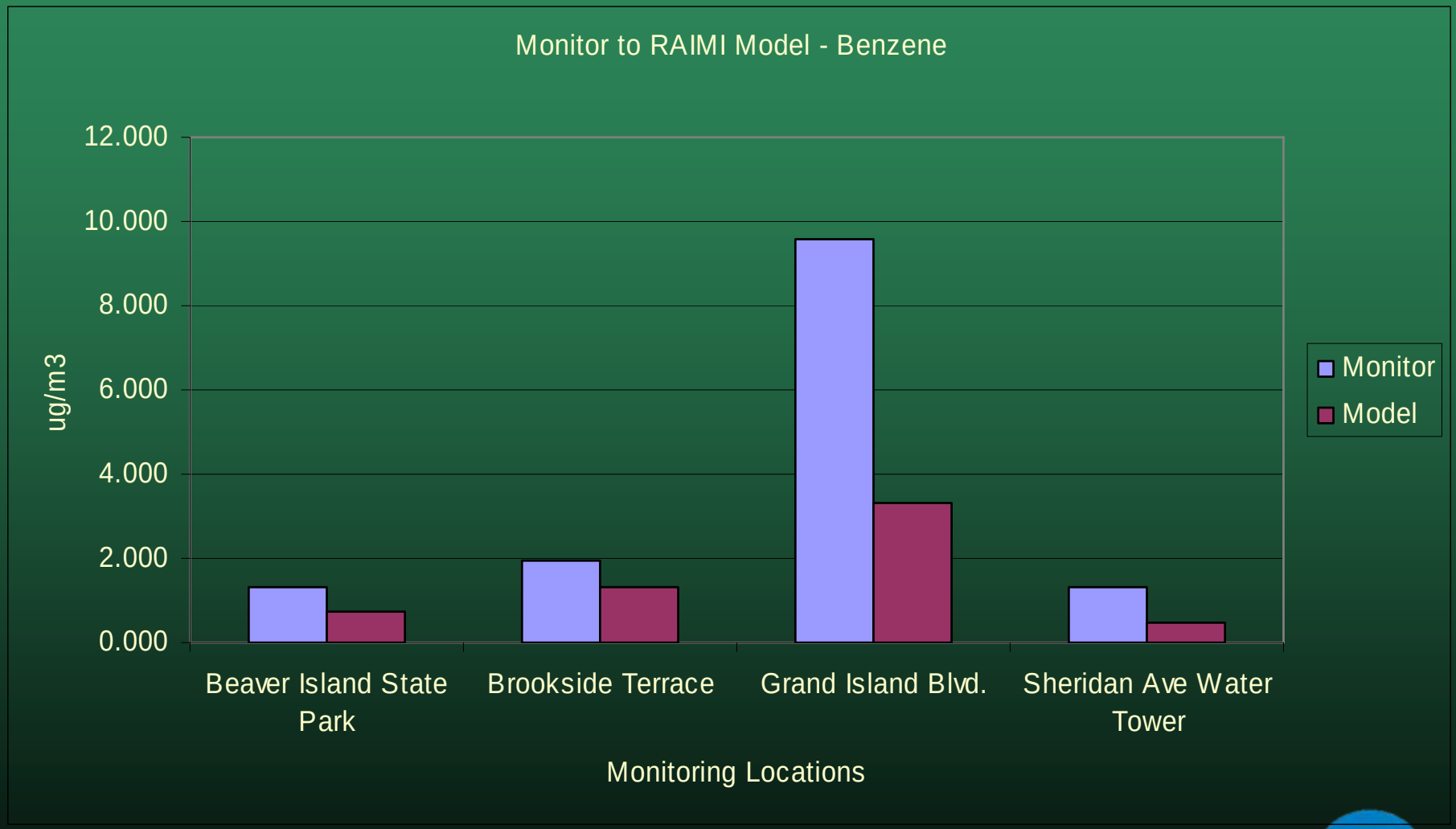
- NATA 2002 – ASPEN
- Human Exposure Model 3 (HEM3) – AERMOD
- Regional Air Impact Modeling Initiative – ISCST3


Model vs Model - NATA 2002 to RAIMI - Benzene
1.600
1.400
1.200
1.000
0.800
0.600
0.400
0.200
0.000
ug/m3
NATA 2002
RAIMI
005800
007302
007700
007800
008201
008202
008300
008400
008700
008800
Census Centroid

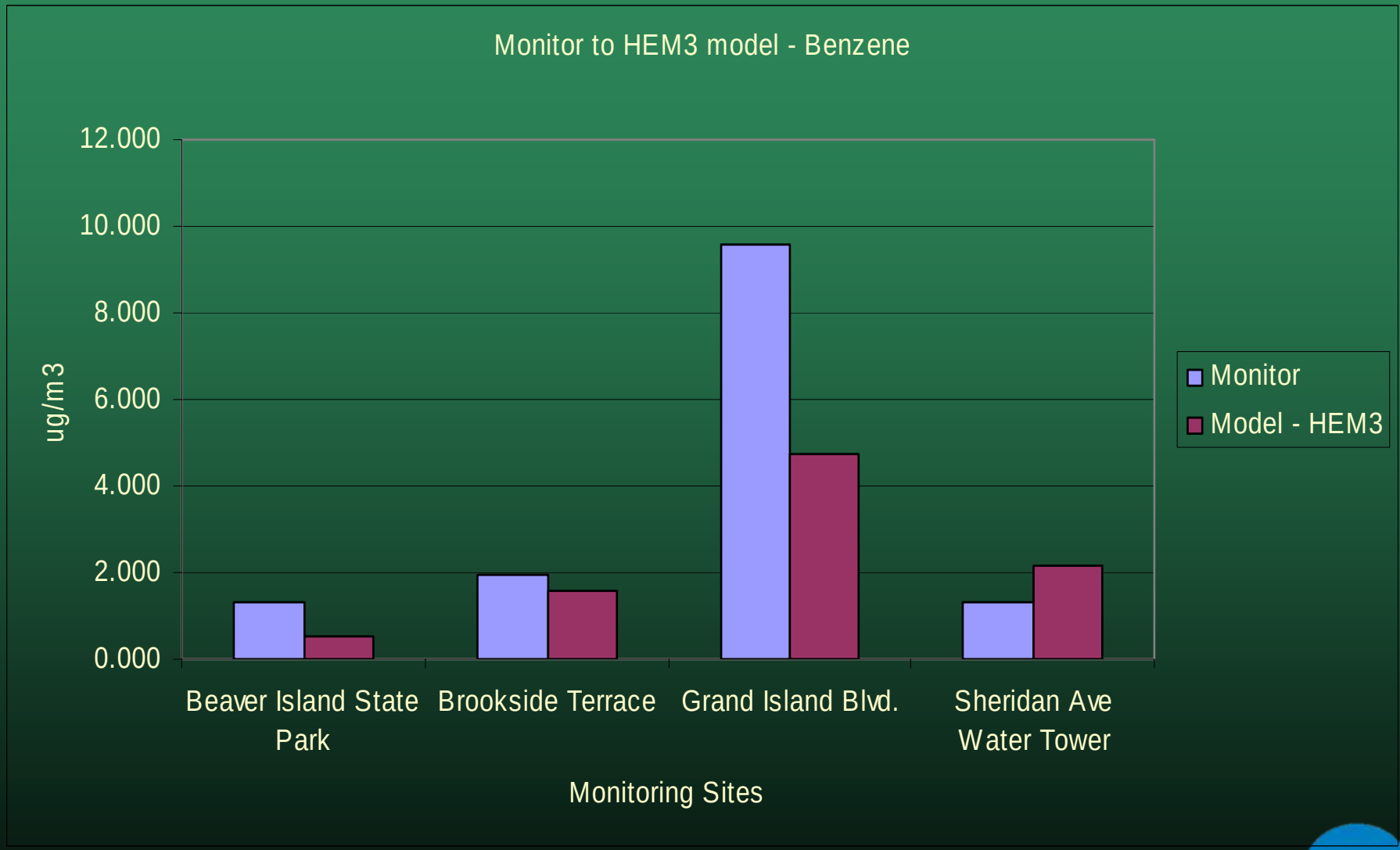
Measured to Modeled NATA



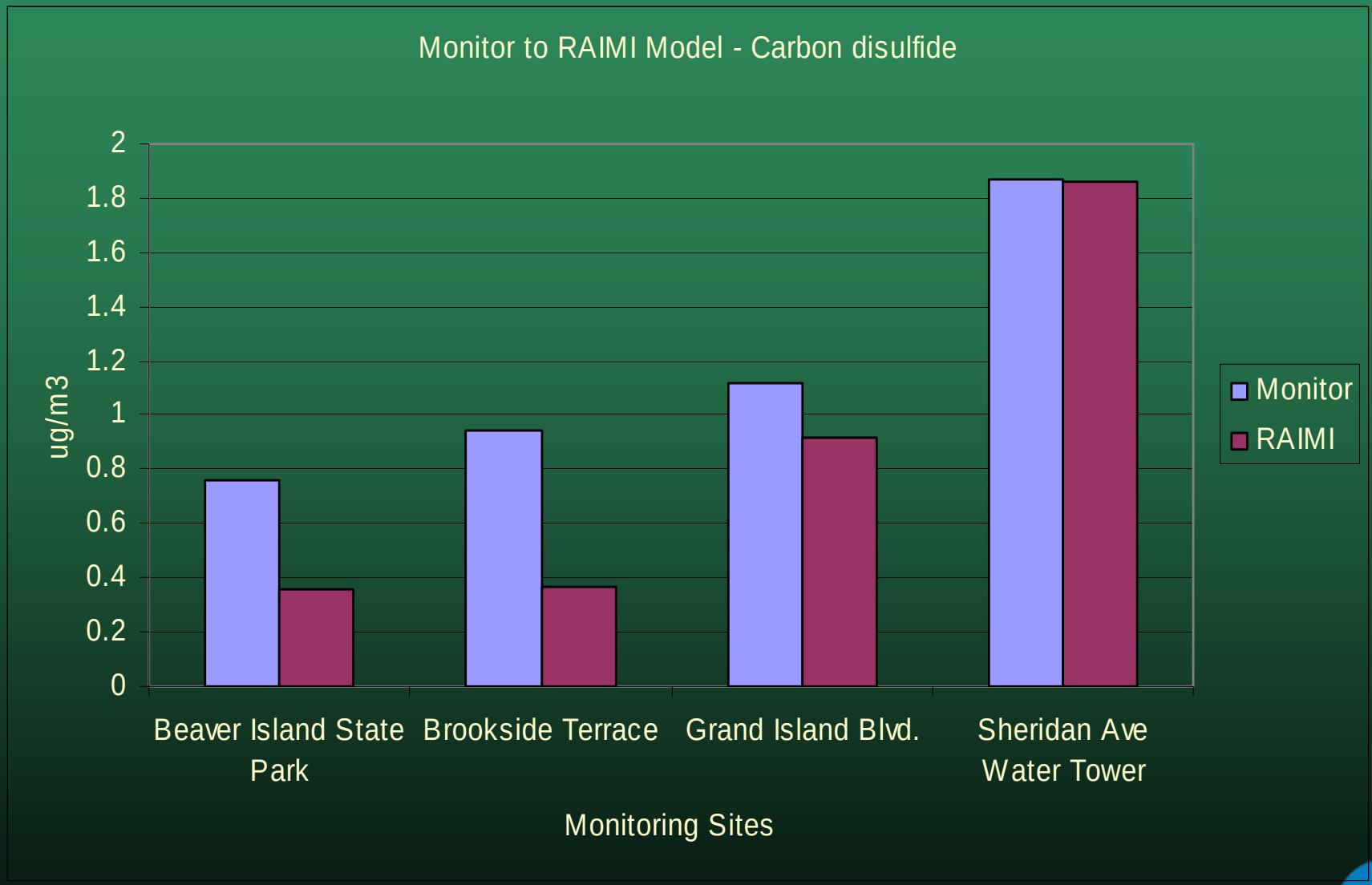
Measured to Modeled - RAIMI



Measured to Modeled – HEM3



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}

Thank You

- Questions about facilities and emissions
  - Larry Sitzman (716) 851-7130
    lbsitzma@gw.dec.state.ny.us
- Questions about Tonawanda Study Report
  - Tom Gentile (518) 402-8402
    tjgentil@gw.dec.state.ny.us
  - Paul Sierzenga (518) 402-8508
    pmsierze@gw.dec.state.ny.us