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Air Quality Overview

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Tacoma City Council
Study Session
June 20, 2017

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Overview

- Which air pollutants do we focus on, and why?
- How is overall air quality and air pollutant trends in the Tacoma area?
- Where do priority air pollutants come from?
- How does air quality in the tide flats compare with other areas?
- What type of information is available?

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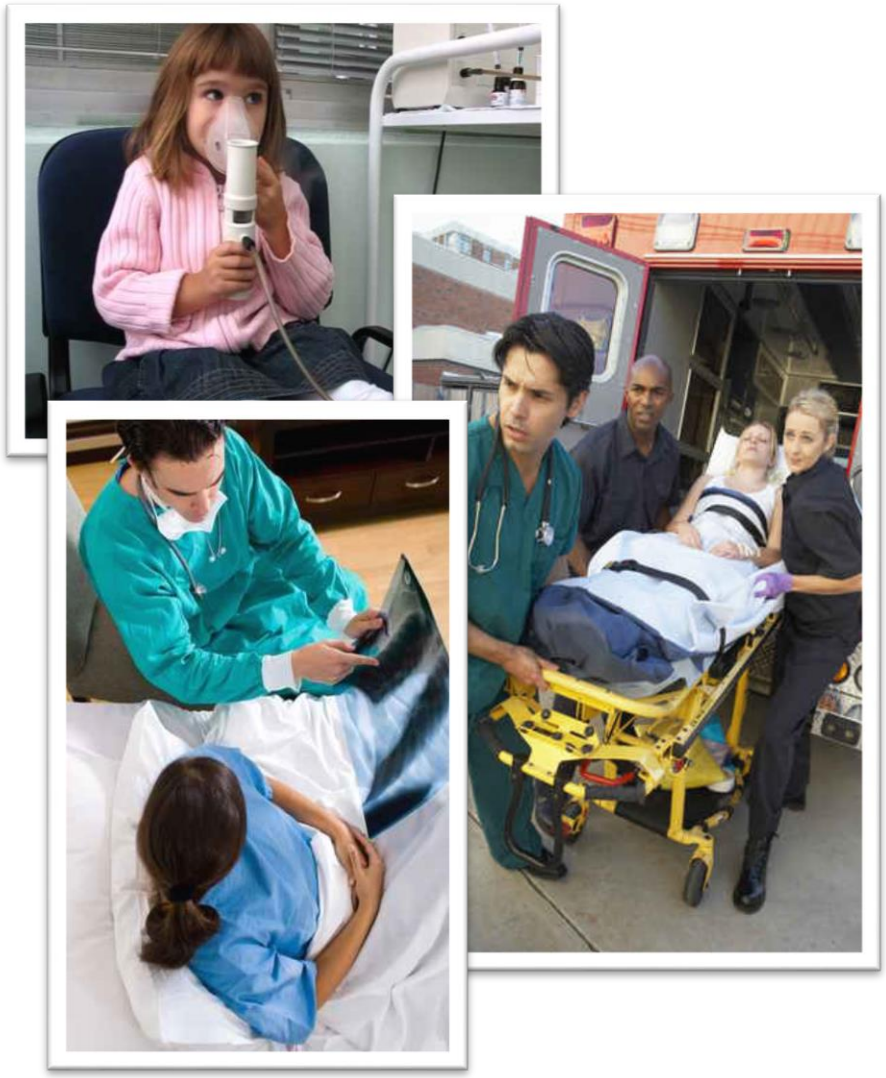
Why focus on fine particle pollution ($PM_{2.5}$) ?



Most established health effects include:

- Asthma aggravation
- Reduced lung function
- Heart attacks
- Strokes
- Premature death

Host of health effects based on emerging research.

Levels in Tacoma area previously violated federal health-based national ambient air quality standards.

Puget Sound Clean Air Agency and others have identified more stringent health goal.

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$PM_{2.5}$ pollution has improved

A result of targeted wood smoke programs

3-year average of the 98th percentile of daily concentrations
$PM_{2.5}$ Reference and Continuous Methods

Note: All South L data are FRM from 2000- 2016. Alexander Avenue data are FRM from 1999-2002 and nephelometer from 2003-2016.
South Hill data are FRM from 1999-2002 and nephelemeter from 2003-2004 and 2006-2016 incomplete nephelometer data was collected from South Hill in

Source: PSCAA draft 2016 Data Summary

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How we/how to measure different pollutants

- Particles vs. gaseous
- Difference in instruments and what they can and cannot tell us

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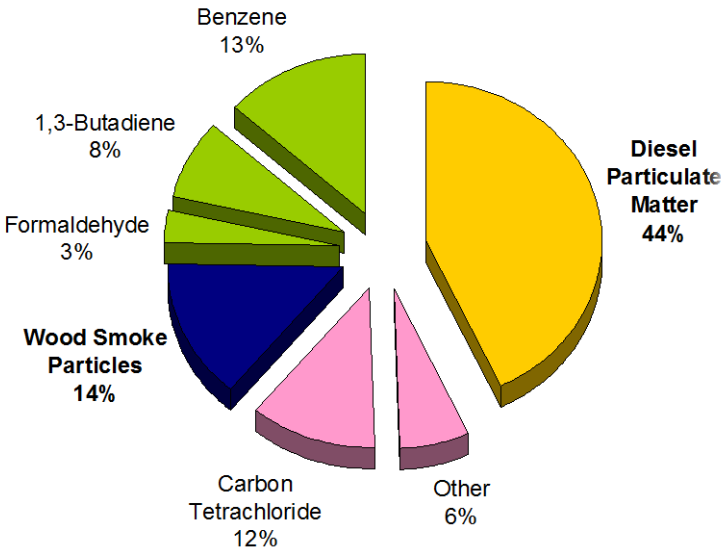
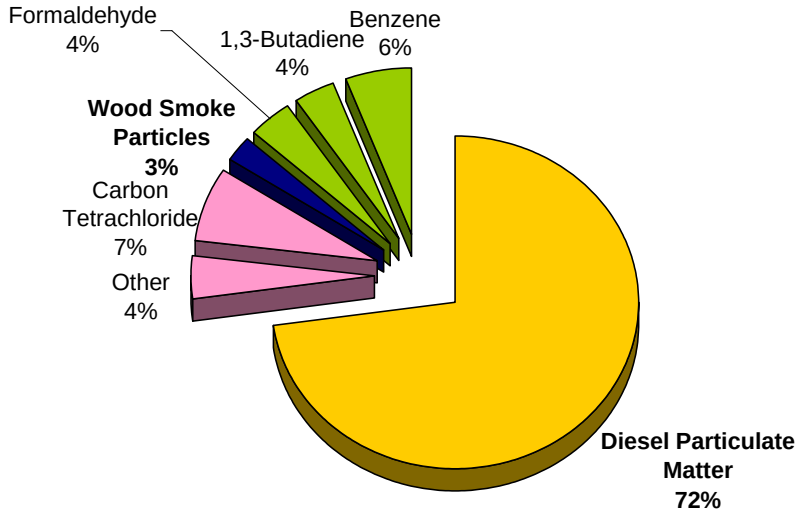
We also focus specifically on diesel $PM_{2.5}$

Main potential cancer risk driver from air pollution

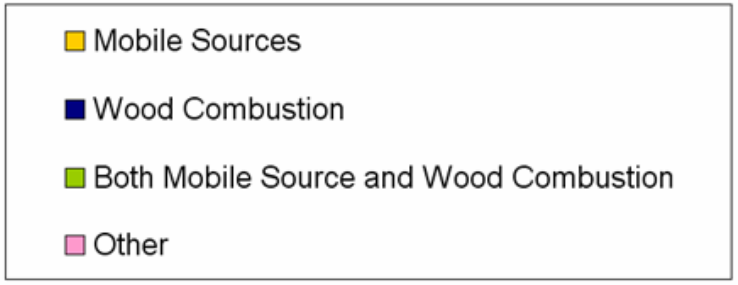
Potential Cancer Risk Contribution



Tacoma South L Street Site



Seattle Duwamish Site

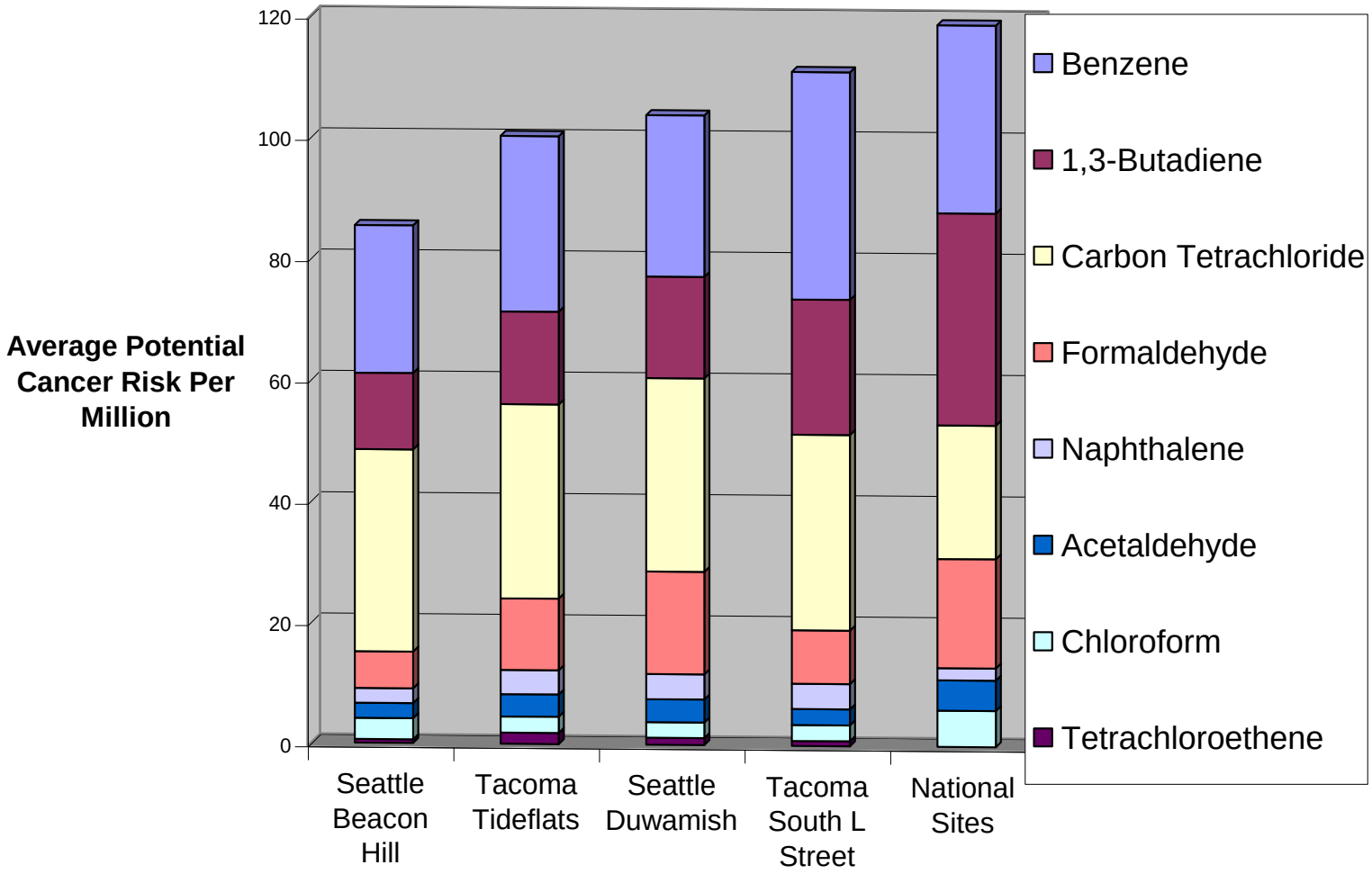


Source: PSCAA 2009 Air Toxics Evaluation

How does air pollution in the Tideflats compare?

Consistent with other urban sites, areas

Potential cancer risk from air toxics across Tacoma and Seattle sites
DOES NOT INCLUDE RISK FROM DIESEL



Source: PSCAA 2009 Air Toxics Evaluation

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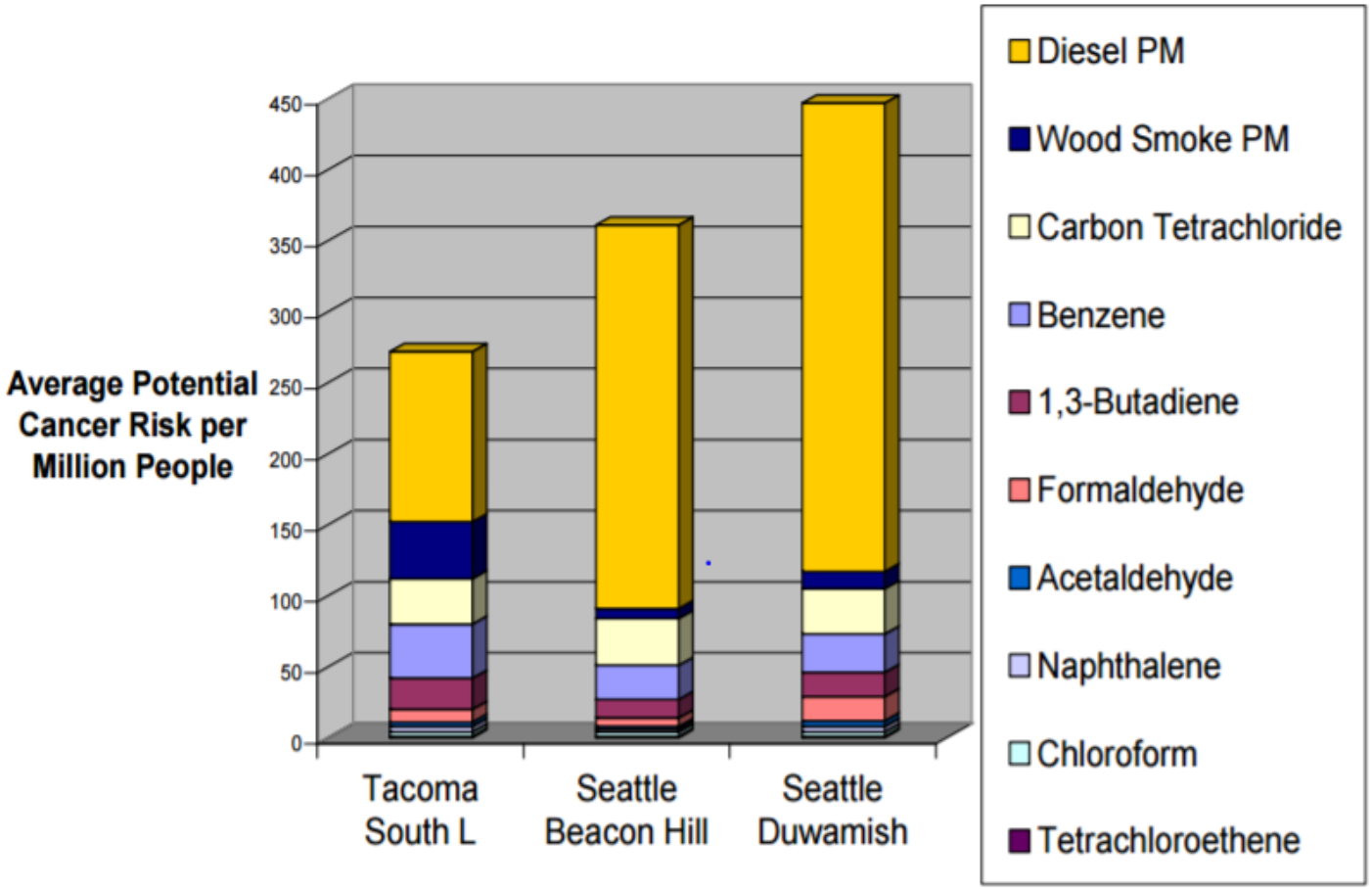
Same as previous slide, with Diesel Risk Included

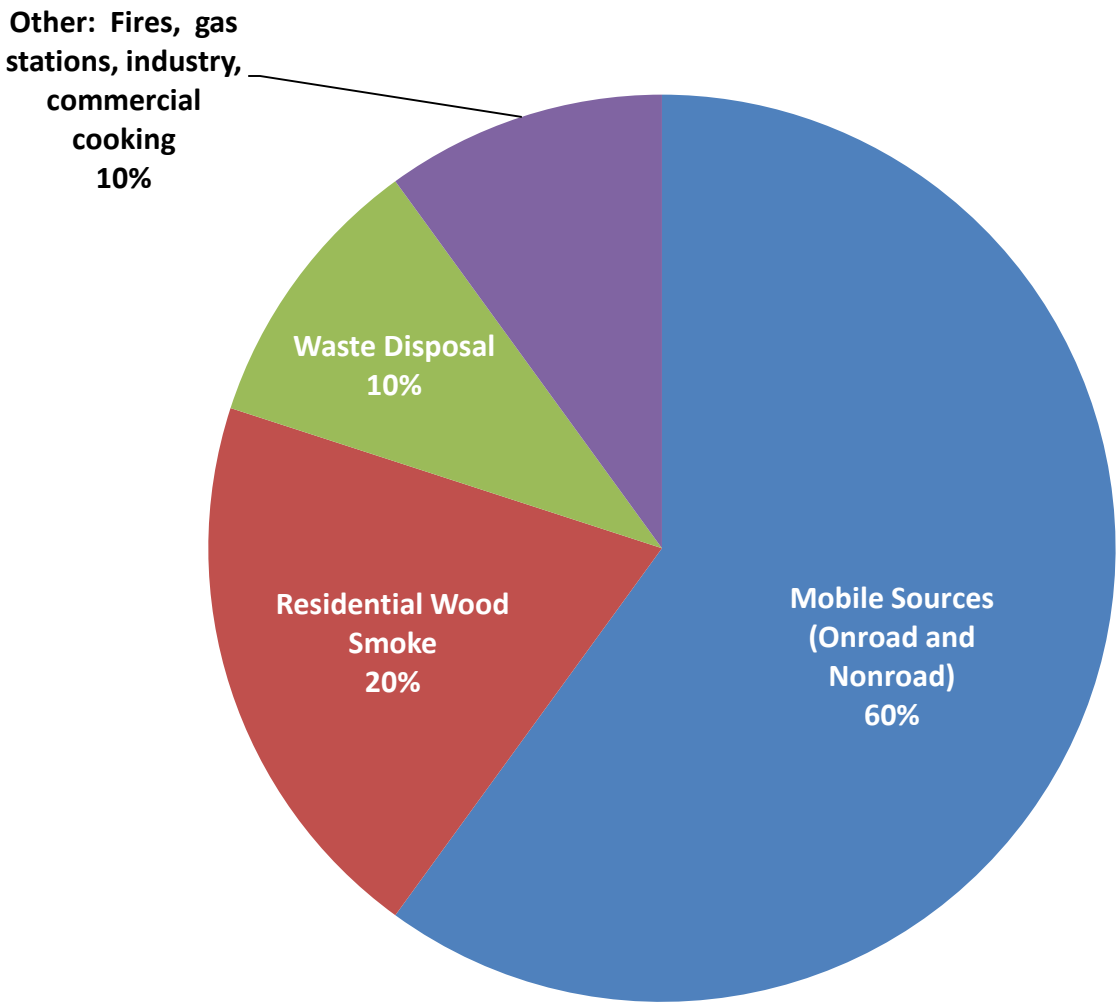
Figure B: Potential Cancer Risks with Diesel and Wood Smoke



Diesel and wood smoke particulate matter results are based on recent estimates from other studies.[2,3]

Sources of Benzene in Pierce County

Mobile sources, residential wood burning largest contributors



Source: EPA 2014 National Emissions Inventory

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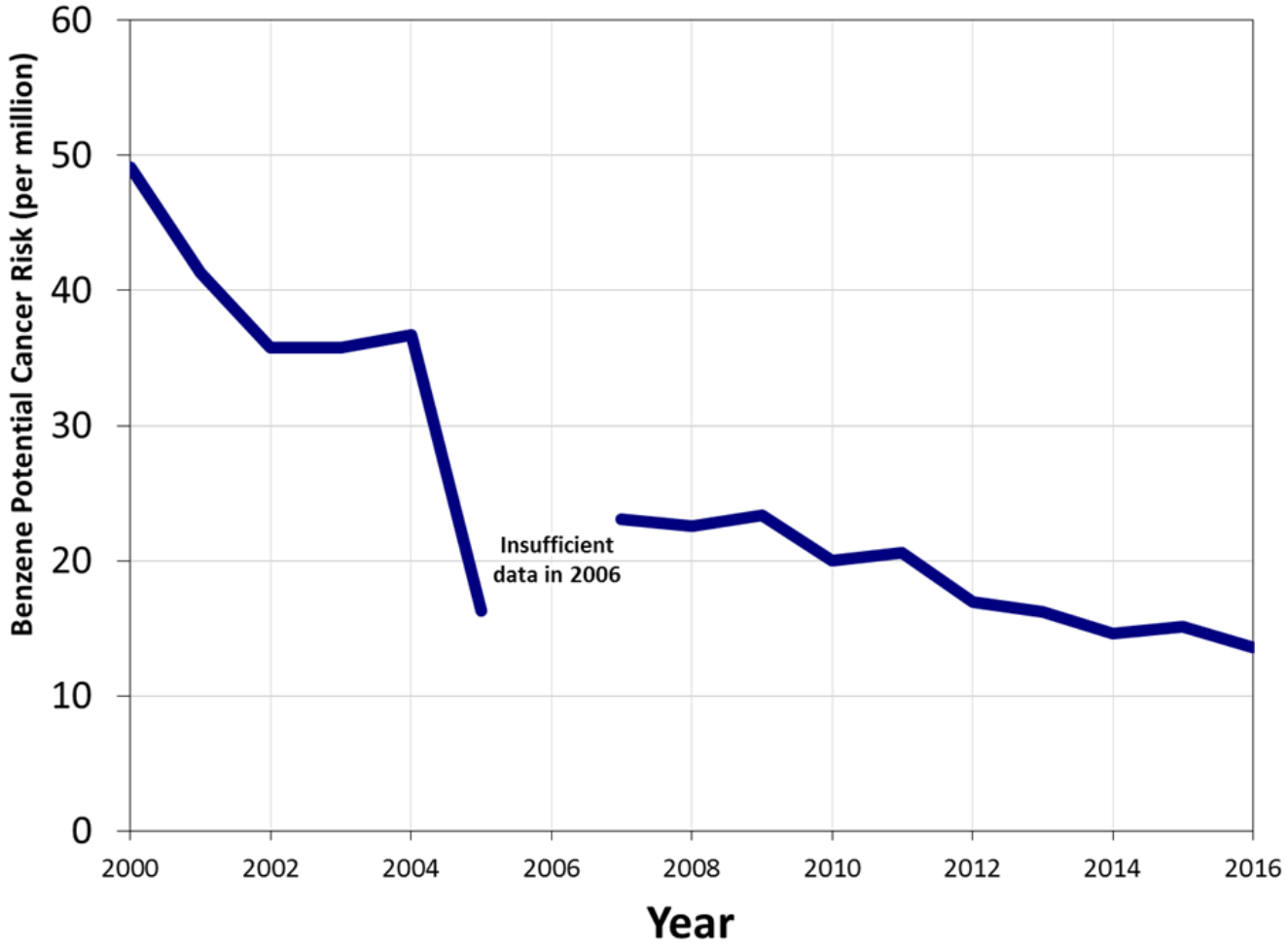
Benzene trend over time

Mobile sources toxics continue to decline

Benzene trend at Seattle Beacon Hill National Air Toxics Trend Site



Source: PSCAA draft 2016 Data Summary

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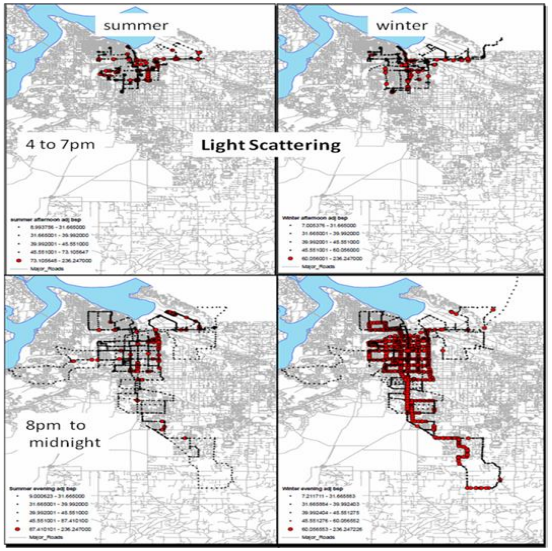
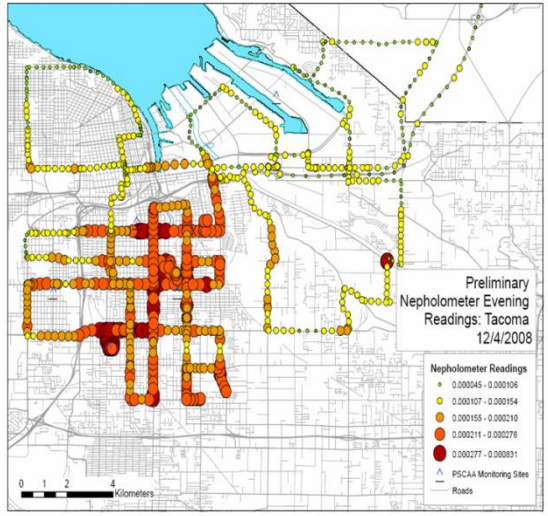
Multiple studies over multiple years

Consistent story

Figure 7: Location of Four Temporary and Three Regular Network $PM_{2.5}$ Monitors



Sources: PSCAA 2009 Air Toxics Evaluation, PSCAA 2007 $PM_{2.5}$ Nonattainment Area Recommendation



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A quick note about odors

- Science
- Risks?
- Organics versus inorganics

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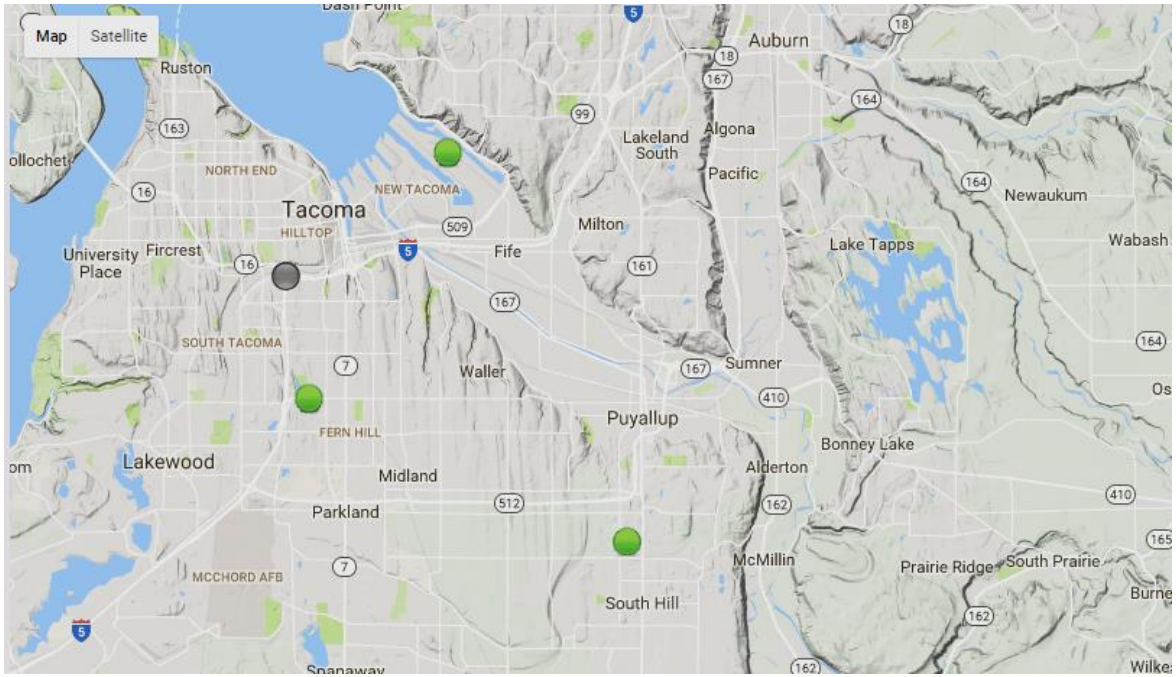
Where can I find more info?

- Historic reports in “Library”
- Near real-time data for four Tacoma-area monitors “Our Air Quality/Network Map”



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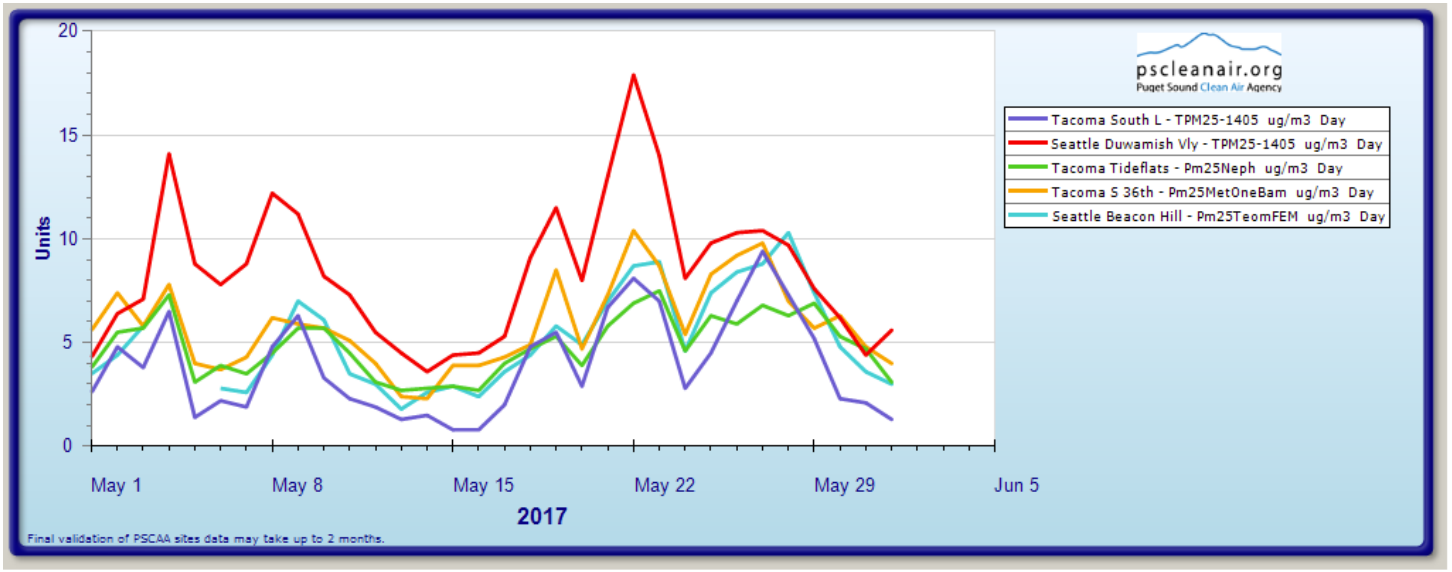
Graphing Tool Example

Daily Values



Change start 1 day -1 Day +1 Day

Start Date 5/1/2017

End Date 6/1/2017

Select Station ---> then Parameter
Select Parameter ---> then Station

Select Group: All Parameters

List 1 - Parameters:
Pm10 Teom 1400
Pm2.5 Black Carbon
Pm2.5 Black Carbon_633
Pm2.5 MetOne Bam
Pm2.5 Nephelometer
Pm2.5 Partisol (daily)
Pm2.5 Partisol (daily) colloc
Pm2.5 Teom 1400
Pm2.5 Teom 1405
Pm2.5 Teom FEM

List 2 - Stations:
Bremerton Spruce
Darrington
Kent
Lynnwood
Seattle Beacon Hill

Change y-axis scale: Up, Down, Autoscale

Add selection >
Add all items >>
Clear grid <<

Instructions for making graphs

Display AQI category: None, Pm25 24Hr

Create Plotted Data File (csv, xml)
Download File
View Grid of Plotted Data

Select Hour - Day Avgs | Select Month - Year Avgs | Update | Daily Stats

Location	Parameter	Av1Hr	Av8Hr	Av24Hr	Aqi	Day	DayAqi	AvgBase	Avg	Max	Min	
Tacoma South L	Pm2.5 Teom 1405					✓		Day	3.9	9.4	0.8	Delete
Seattle Duwamish Vly	Pm2.5 Teom 1405					✓		Day	8.4	17.9	3.6	Delete
Tacoma Tideflats	Pm2.5 Nephelometer					✓		Day	4.9	7.5	2.7	Delete
Tacoma S 36th	Pm2.5 MetOne Bam					✓		Day	5.9	10.4	2.3	Delete
Seattle Beacon Hill	Pm2.5 Teom FEM					✓		Day	5.1	10.3	1.8	Delete

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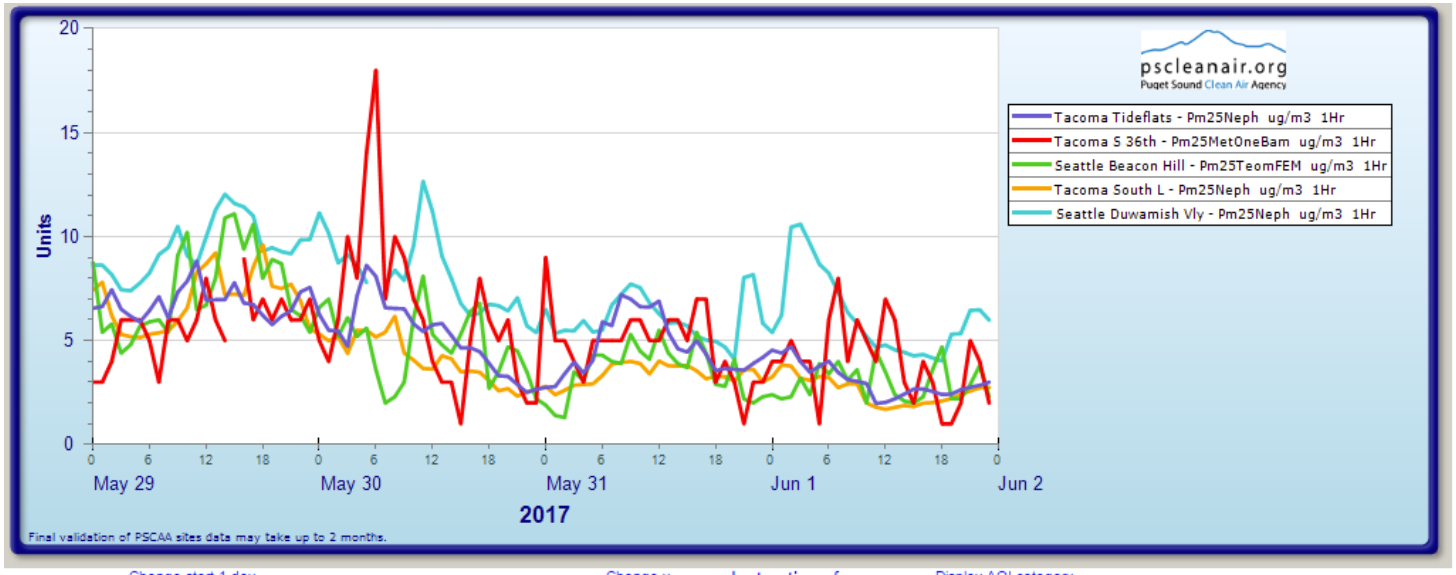
Graphing Tool Example

Hourly Values



Change start 1 day
-1 Day | +1 Day

Start Date
5/29/2017

End Date
6/1/2017

Select Station ---> then Parameter
Select Parameter ---> then Station

Select Group
All Parameters

List 1 - Parameters
Nitrogen Oxides (NOx)
Reactive Nitrogen minus NC
Total Reactive Nitrogen (NO
Ozone (uv abs)
Pm10 Beta Atten
Pm10 Teom 1400
Pm2.5 Black Carbon
Pm2.5 Black Carbon_633
Pm2.5 MetOne Bam
Pm2.5 Nephelometer

List 2 - Stations
Aberdeen
Anacortes
Bellevue SE 12th
Bremerton Spruce
Chehalis
Chelan Woodin Av
Clarkston
Colville E 1st St
Darrington
Dayton

Change y-axis scale
Up
Down
Autoscale

Add selection >
Add all items >>
Clear grid <<

Instructions for making graphs

Display AQI category
None | Pm25 24Hr

Create Plotted Data File
Download File
View Grid of Plotted Data
csv
xml

Select Hour - Day Avgs | Select Month - Year Avgs | Update | Daily Stats

Location	Parameter	Av1Hr	Av8Hr	Av24Hr	Aqi	Day	DayAqi	AvgBase	Avg	Max	Min	
Tacoma Tideflats	Pm2.5 Nephelometer	✓						1Hr	5.0	8.8	2.0	Delete
Tacoma S 36th	Pm2.5 MetOne Bam	✓						1Hr	5.2	18.0	1.0	Delete
Seattle Beacon Hill	Pm2.5 Teom FEM	✓						1Hr	4.7	11.1	1.3	Delete
Tacoma South L	Pm2.5 Nephelometer	✓						1Hr	4.3	9.6	1.7	Delete
Seattle Duwamish Vly	Pm2.5 Nephelometer	✓						1Hr	7.5	12.7	4.0	Delete

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In summary

- We focus on $PM_{2.5}$ pollution, and specifically diesel $PM_{2.5}$ because of its associated health impacts.
- Air quality in Tacoma is roughly on par with other urban areas, and continues to improve.
- Our priority pollutants come mainly from combustion of fuels: wood smoke dominates general $PM_{2.5}$, and diesel dominates diesel $PM_{2.5}$.
- Air quality in the Tideflats area is similar to other areas in Tacoma, with lower risk from some pollution ($PM_{2.5}$, benzene) and higher risk from diesel $PM_{2.5}$ than South End residential areas.
- Please visit our website for more info.

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Thank you and Questions

Links to data and reports referenced:

http://www.pscleanair.org/library/Documents/2015AQDS.pdf

http://www.pscleanair.org/library/Documents/TacomaExSummary2010air_toxics_study.pdf

http://www.pscleanair.org/library/Documents/2010_Tacoma-Seattle_Air_Toxics_Report.pdf

http://www.pscleanair.org/library/Documents/Tacoma_PM2_5_recFullreport.pdf

http://www.pscleanair.org/airquality/ourairquality/Pages/networkmap.aspx

http://airgraphing.pscleanair.org

EXTRA SLIDES

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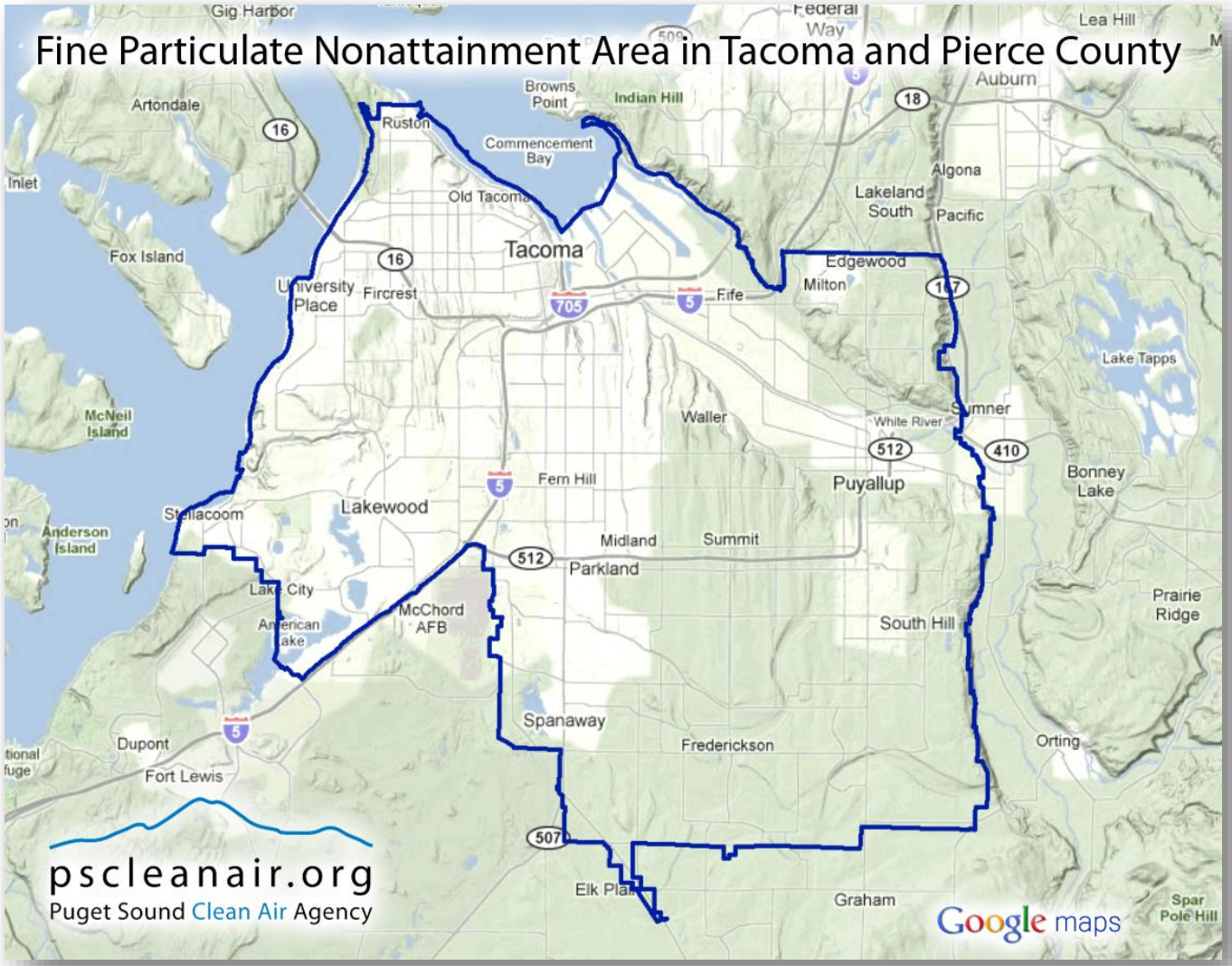
Fine particle nonattainment area



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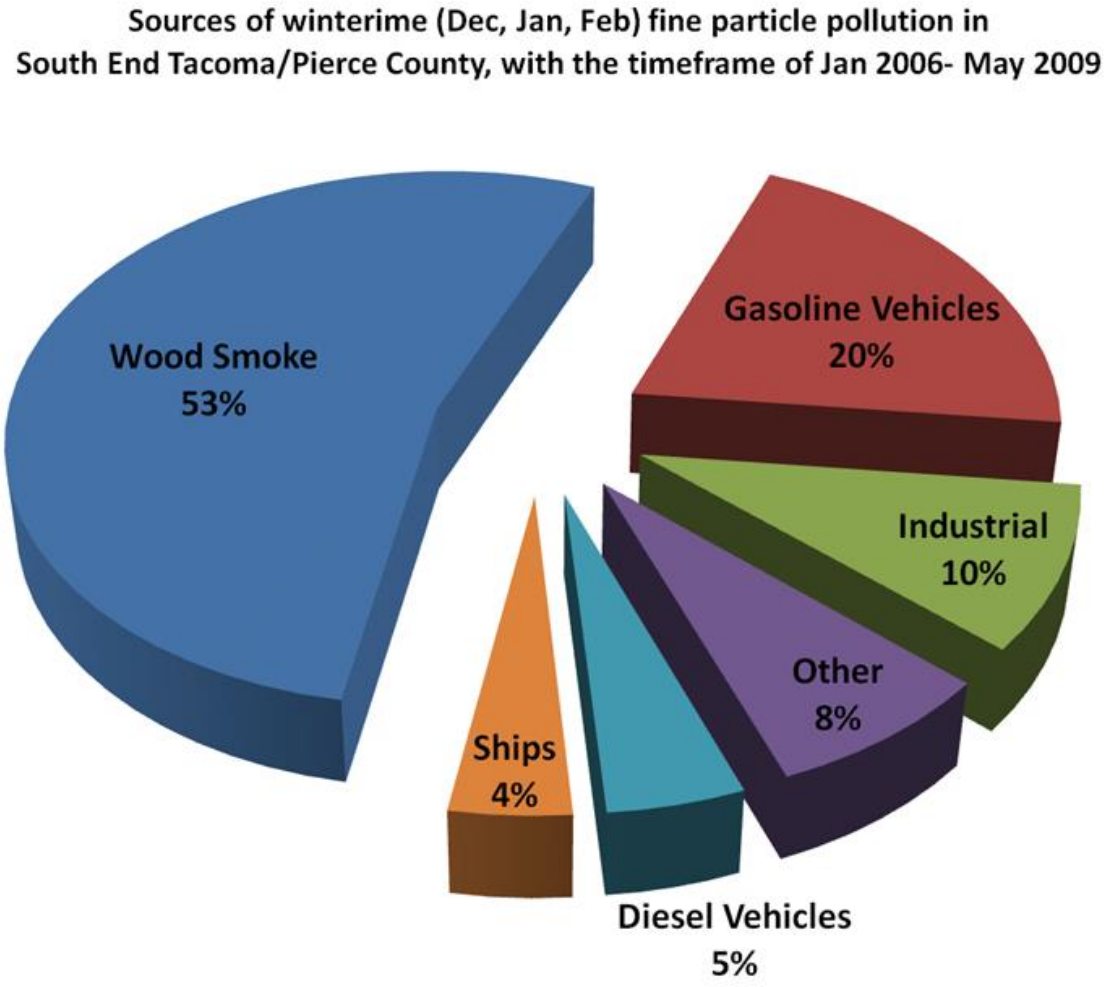
Sources of fine particles



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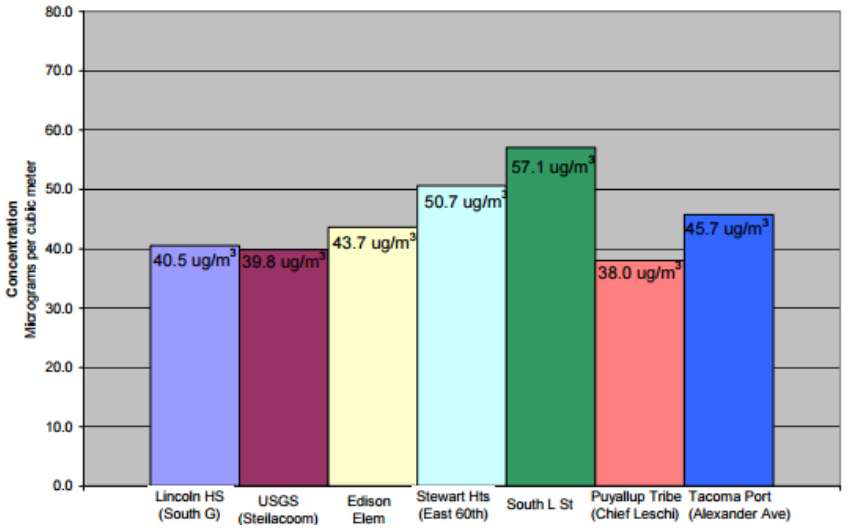
Historic monitoring

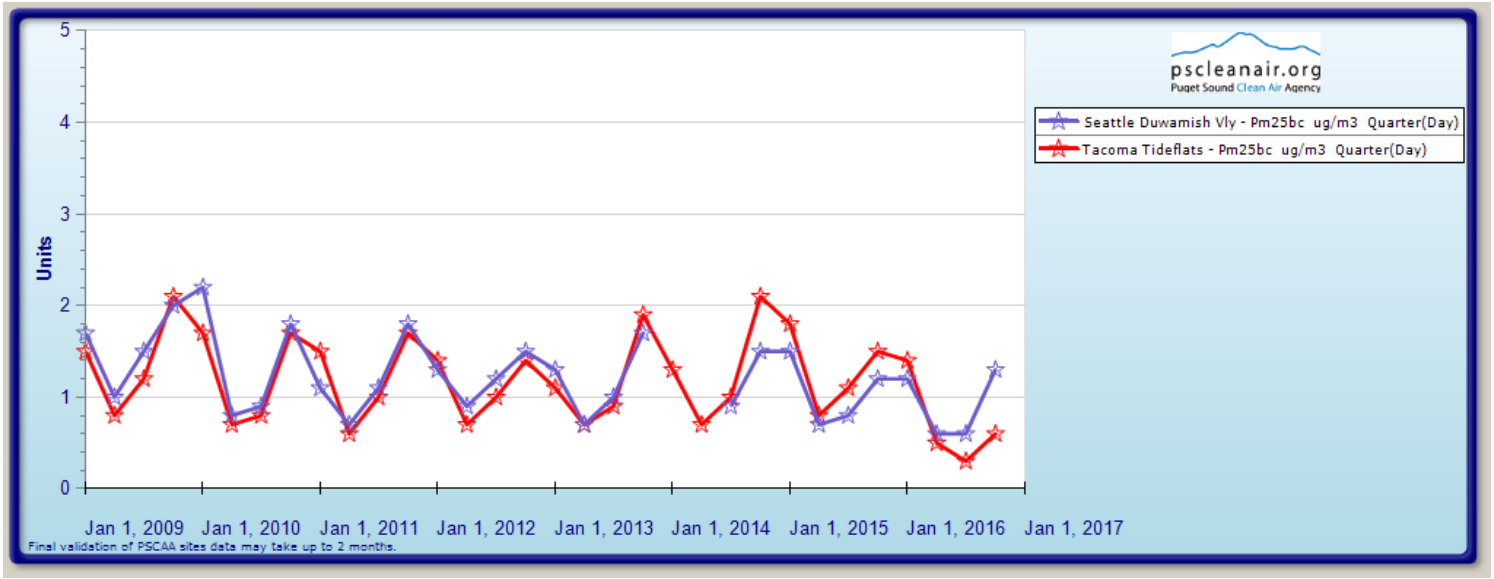
Figure 7: Location of Four Temporary and Three Regular Network $PM_{2.5}$ Monitors

PM2.5 daily concentrations, 98th percentile
Sept 2006-Feb 2007
Concentrations exceed the daily federal standard and local health goal



Black carbon levels in port/industrial areas track

Diesel indicator



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Site Selection Tacoma Tideflats

- Industrial/port area
- Seasonal wind shifts
- Established monitor
  - Elevated fine particle levels
  - Neighborhood scale

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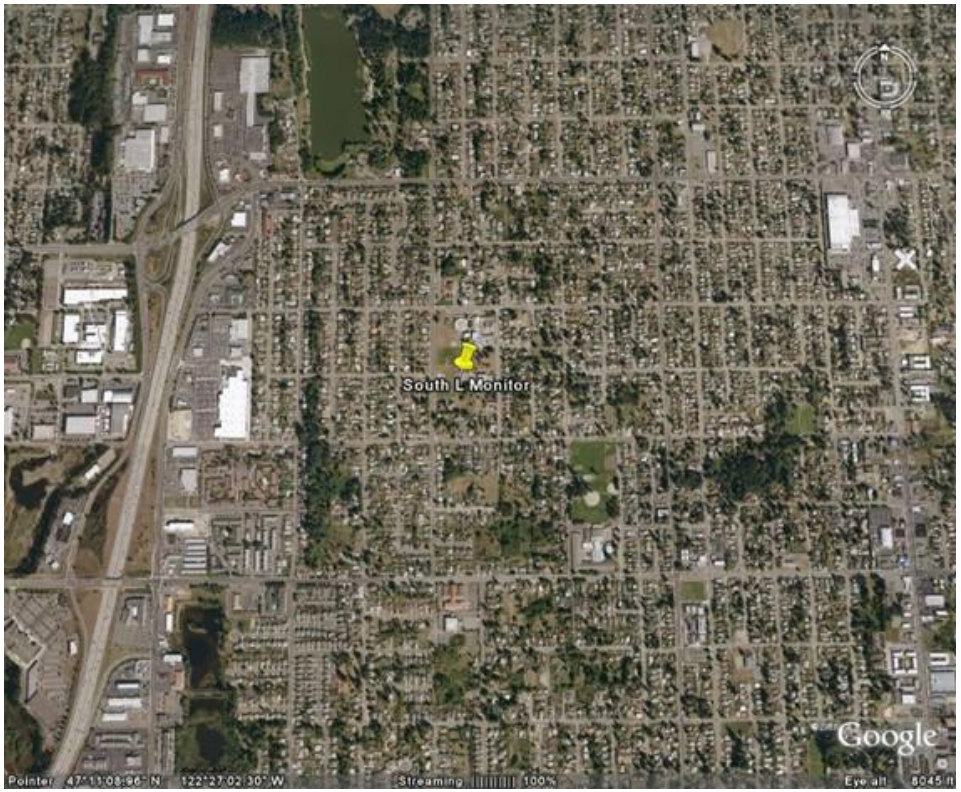
Site Selection Tacoma South L



- Largely residential area
- Residential and roadway impacts
- Established monitor
  - Elevated fine particle levels
  - Neighborhood scale
  - Environmental justice component