

# **Columbia River Gorge Visibility Project 2006 Interim Progress Report**



Oregon Department of Environmental Quality  
Southwest Clean Air Agency  
March 14, 2006

# Interim Report

## Columbia River Gorge Visibility Project

### Presentation Overview:

- **Project Overview**
- **Final Haze Gradient Report.**
- **Preliminary Findings from Draft Causes of Haze in the Gorge Report.**
- **Other Programs that are On-line and Likely to Benefit Gorge Visibility.**
- **Next Project Steps:**
  - Public meeting tonight at Best Western Hood River Inn: 6:30 to 8:30 PM.
  - Model development, performance testing, draft and final modeling report to provide a glimpse into the future.
  - Some initial “What-if” questions answered.
  - Then, the Gorge Science Summary Report will summarize both the CoHaGo and Modeling reports and will also work on reconciling differences, if any, in the findings of the two prior reports.
  - In August 2007, we will provide the Commission an assessment and a plan. It is premature today to know what they will be.

# Interim Report

## Columbia River Gorge Visibility Project

### Project Background:

#### Technical Study Plan Mission:

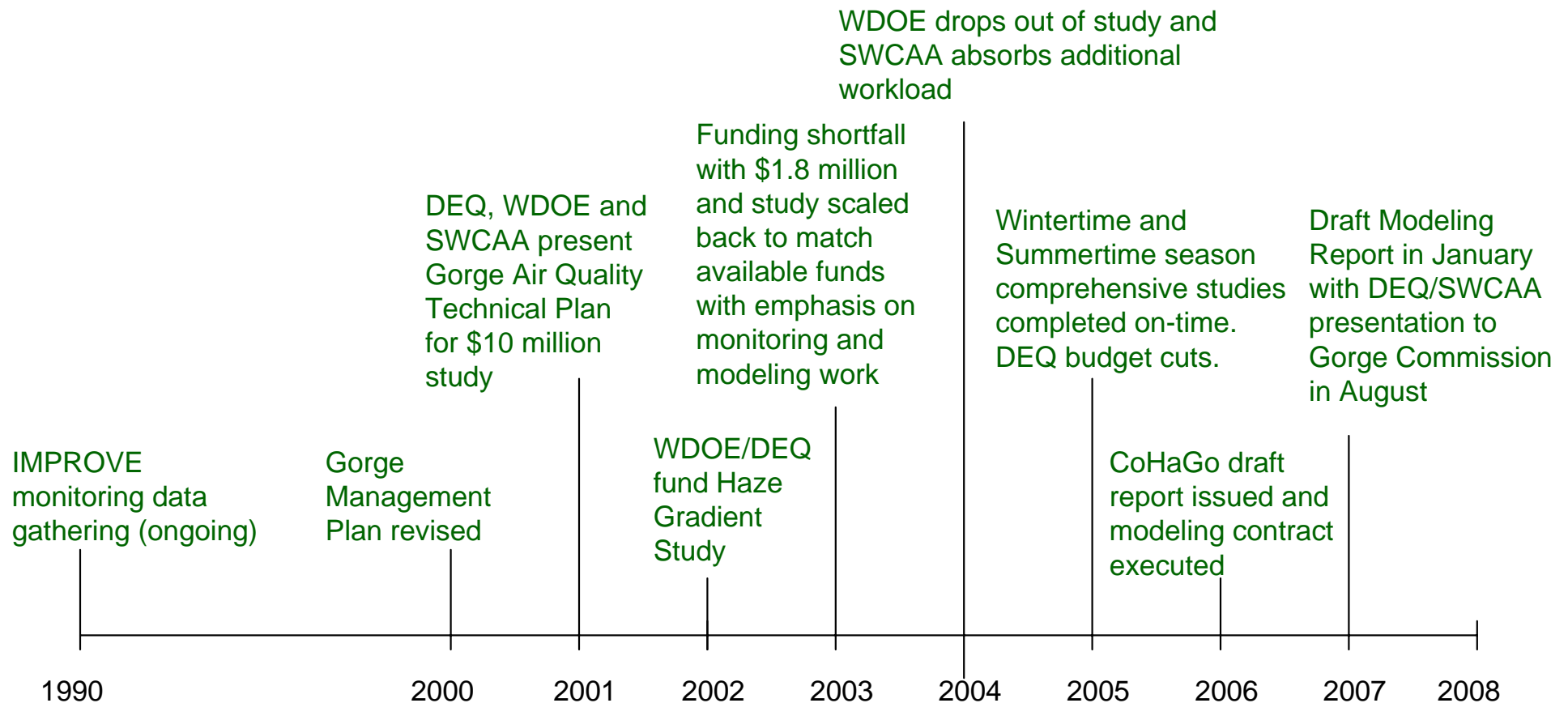
- a) Provide an assessment of the causes of visibility impairment in the Columbia River Gorge National Scenic Area;
- b) Identify emission source regions, emission source categories, and individual emission sources significantly contributing to visibility impairment in the Gorge;
- c) Provide predictive modeling tools or methods that will allow the evaluation of emission reduction strategies;
- d) Provide an initial assessment of air quality benefits to the Gorge from upcoming state and federal air quality programs; and
- e) Refine or adapt predictive modeling tools already being developed for visibility or other air quality programs, including but not limited to EPA's Regional Haze Rule.



# Interim Report

## Columbia River Gorge Visibility Project

### Project Timeline:



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## Columbia River Gorge Visibility Project

### Project Finances:

- **Gorge studies initially funded by WDOE and DEQ at \$223K for Haze Gradient Study**
  - 9 Nephelometers and meteorological stations in Gorge.
  - Minimum 1 year of concurrent data from all sites.
  - Final Haze Gradient Report issued January 2006.
- **Congressional funding of \$670k in mid-2003 provided for additional gaseous pollutant measurements and modeling to better understand which pollutants contribute the most to visibility impairment.**
- **Additional Congressional funding of \$422k in mid-2004 provided monitoring for additional 6 months to get 1 year's worth of data.**
- **Additional funding of \$205K from WA Legislature just received. WDOE can't be used for FTE and still can't re-engage at policy level. Meeting with SWCAA and DEQ.**

# Interim Report

## Columbia River Gorge Visibility Project

### Project Phases:

- **Five phases to project approach:**
  - 1) Haze Gradient
  - 2) Final Monitoring report (anticipated July 2006)
  - 3) Computer Modeling report (anticipated early 2007)
  - 4) Gorge Science Summary Report (anticipated Summer 2007)
  - 5) SWCAA and DEQ policy assessment of results (anticipated August 2007)
- **Today's update focuses on the Final Haze Gradient Report and the draft Causes of Haze in the Gorge (CoHaGo) Report. CoHaGo provides additional insights to Haze Gradient Study by including analysis of additional pollutants monitored such as sulfates, nitrates, sulfur dioxide, nitrogen dioxide, elemental carbon/organic carbon and IMPROVE particulate matter filter analysis.**
- **Remember, CoHaGo findings are preliminary and need to be compared in Phase Four to the Phase Three modeling work.**

# Interim Report

## Columbia River Gorge Visibility Project

### Project Studies:

- **What have we learned to date?**
  - Confirmed that the Scenic Area has a complex environment
  - Confirmed that there are two distinct seasons with unique transition periods
  - Monitoring data provides general understanding of impairment processes
  - Monitoring data provides solid basis to evaluate model performance
- **Project is NOT complete.**
- **Monitoring program is complete and provides opportunity to proceed with next phases of project: finalizing CoHaGo, modeling, reconciling CoHaGo and modeling, and Gorge Science Summary Report**

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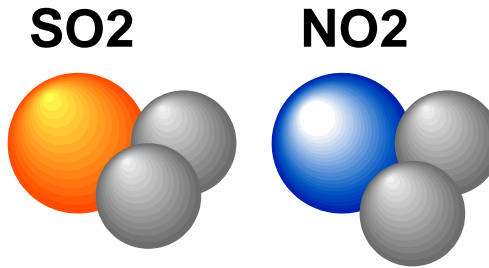
## Columbia River Gorge Visibility Project

- **Please remember the scope and funding for this project does not allow for a comprehensive and exhaustive evaluation of all air pollution effects.**
- **However, this project will have more data and insight than any other study performed in the USA with the complex terrain and meteorology of the Gorge.**
- **By working to improve visibility in the Gorge, we will both directly and indirectly benefit all the valued resources to be protected under the Scenic Area Act.**
- **The following slide depicts the relative ranges of pollutant level impacts (e.g. human health), as you requested at our last presentation:**



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## Columbia River Gorge Visibility Project



### Federal Stds.

Particulate  
Public  
Health  
Impacts

### Federal Stds.

Ozone  
Public  
Health

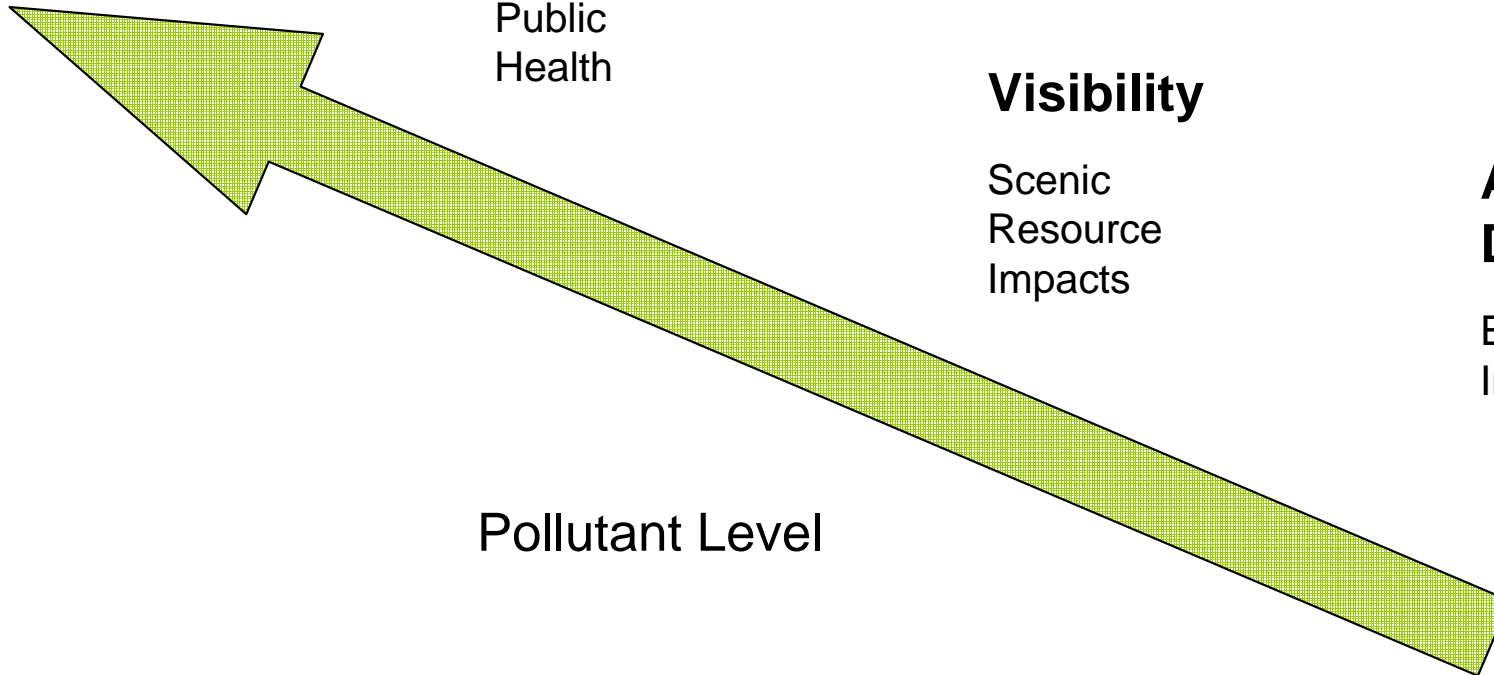
### Visibility

Scenic  
Resource  
Impacts

### Acid Deposition

Ecosystem  
Impacts

Pollutant Level



# Interim Report

## Columbia River Gorge Visibility Project

### Background Conclusion:

- In August 2007, we will provide the Commission an assessment and a plan. It is premature today to know what they will be. It will include an analysis of the benefits expected from existing programs effecting the Gorge:
  - Regional Haze
  - Clean Air Mercury Rule
  - Clean Fuels and CAL-LEV
  - Mobile sources & heavy duty diesel engines
  - Smoke management/Outdoor Burning programs (WA & Or.)
- Reports on Project Web: [www.gorgeair.org](http://www.gorgeair.org)  
[www.swcleanair.org/reports.html](http://www.swcleanair.org/reports.html)



**The project is on track, on schedule, and on budget!**

# Interim Report

## Columbia River Gorge Visibility Project

# Part I. Final Haze Gradient Study

Dr. Mark Green

Dr. Jin Xu

Division of Atmospheric Sciences  
Desert Research Institute

# Interim Report

## Columbia River Gorge Visibility Project

### **Introduction:**

- **Dr. Mark Green with Desert Research Institute (DRI) is the principal investigator and author for Haze Gradient Report and CoHaGo Report.**
  - Nationally recognized expert in visibility issues.
  - Big Bend National Park visibility study (BRAVO).
  - Grand Canyon visibility study.
  - Under contract to EPA to perform analysis of visibility impairment in all Class I areas nationwide (CoHaz).

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## Columbia River Gorge Visibility Project

### What Causes Haze?

- Haze is caused by scattering and absorption of light by particles and gases
- Most haze is due to scattering of light by particles – sulfate, nitrate, dust, organic carbon compounds
- Ammonia enables the formation of nitrate particles
- Some haze caused by absorption of particles (elemental carbon or soot)
- Scattering of light by air is natural

# Interim Report

## Columbia River Gorge Visibility Project

### Key Processes:

- Haze Gradient Study
- Causes of Haze in the Gorge analysis
- Air quality modeling for selected episodes
- Technical Team reviews
- Overall program includes data analysis and modeling components – reconcile analysis and modeling results and subject all to peer-review
- By the completion of the process have a better understanding and more confidence in results
- Always some uncertainty in source contributions
- Final conclusions await modeling and Gorge Science Summary Report.

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## Columbia River Gorge Visibility Project

### Design of Haze Gradient Study:

- Measured the main portion of haze (scattering of light by particles or “bsp” or “haze”) with nephelometers at 9 sites within, and outside the gorge, on each end
- Measured at several sites near river level and sites well above river levels to look at vertical and horizontal gradients of haze and how they vary diurnally and seasonally
- Measured wind speed and direction, temperature and relative humidity at nephelometer sites to relate wind speed and direction to haze levels
- Field study from July 2003 through February 2005

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## Columbia River Gorge Visibility Project

### Haze Gradient Purpose:

- Whether haze is from sources west of the Gorge, east of the Gorge, or within the Gorge
- Understand how these general source areas affect the Gorge under different weather conditions and seasons
- Cannot tell much about specific sources without chemical component data
- Haze Gradient Study provides a good foundation for more source specific study in CoHaGo



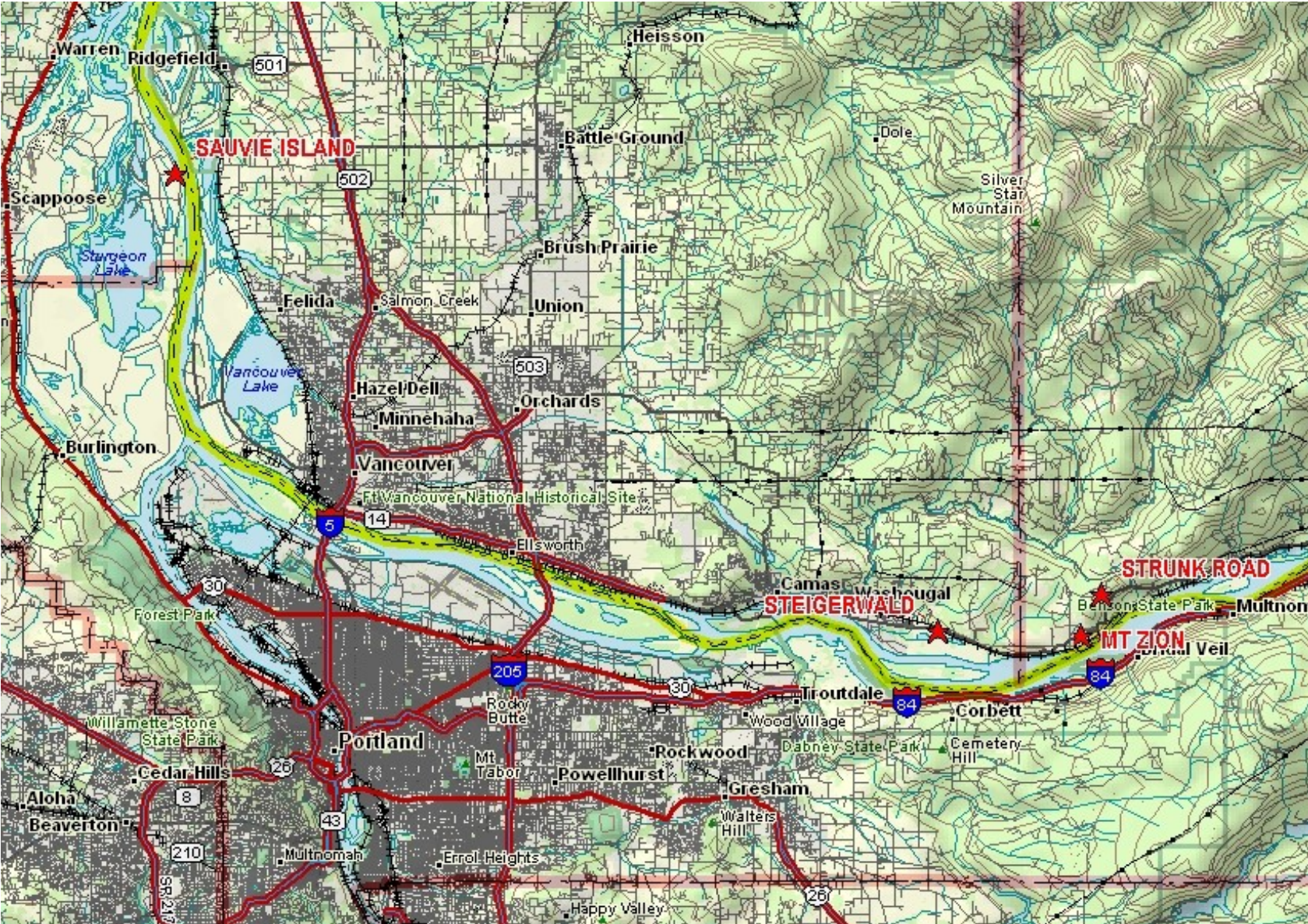
# Interim Report

## Columbia River Gorge Visibility Project

### **Summary of Haze Gradient Study Findings:**

- Haziest pattern with winter Downgorge (easterly) flow – sources east of Gorge mainly responsible
- Summer patterns – see increased haze as Portland metro area emissions transported through gorge (seen mostly western-central gorge – eastern Gorge much cleaner due to dispersion)
- Light Downgorge – see increase in haze across The Dalles as winds shift from westerly to easterly

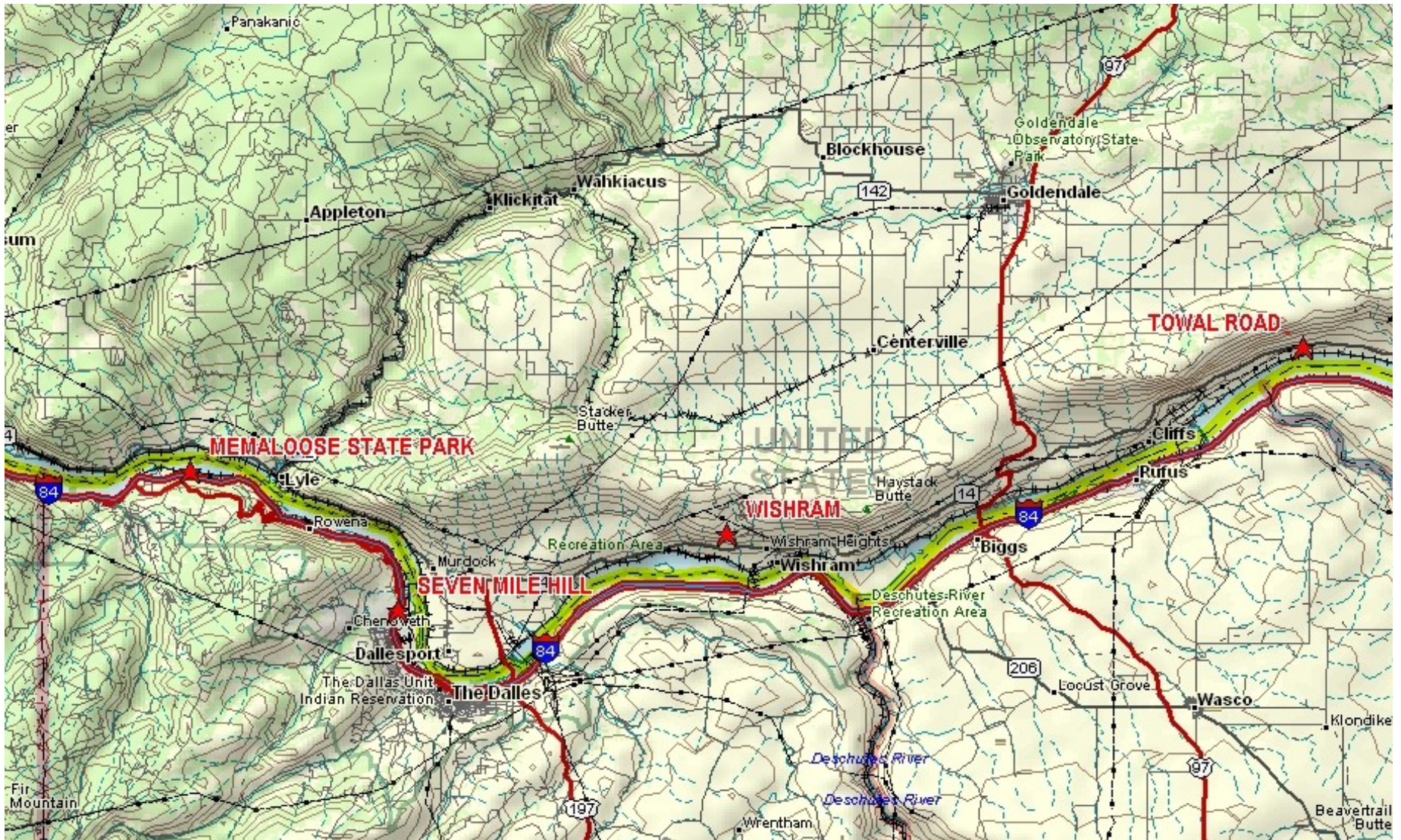
# Western Gorge Sites: Sauvie Island, Steigerwald, Mt. Zion, & Strunk Rd.



# Central Gorge Sites: Bonneville Dam, Memaloose State Park, & Sevenmile Hill



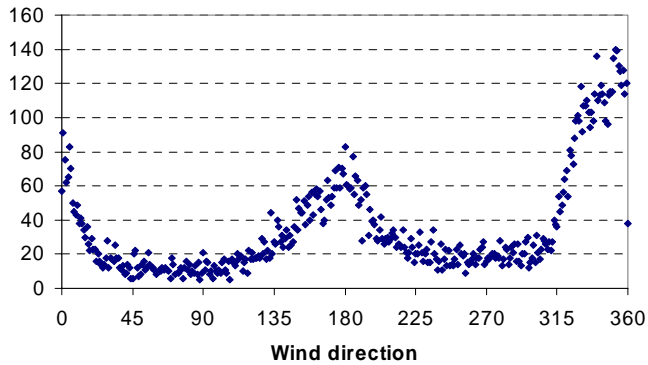
# Eastern Gorge Sites: Memaloose State Park, Sevenmile Hill, Wishram, & Towal Rd.



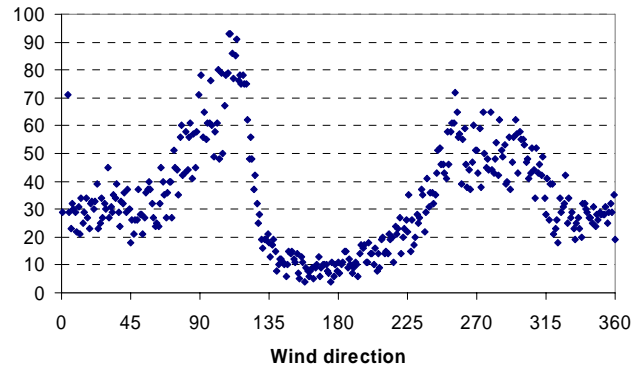
# Frequency of Wind Direction

## 2 Main Directions: Upgorge and Downgorge

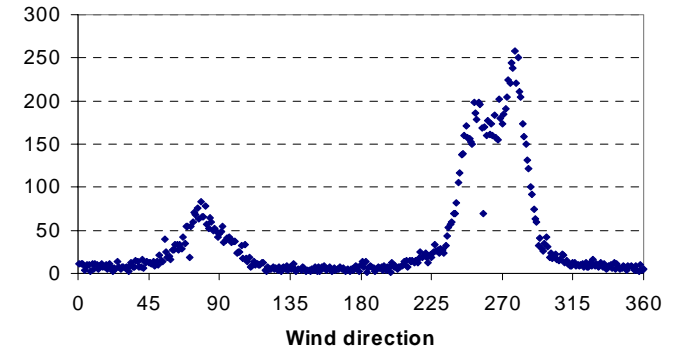
Sauvie Island



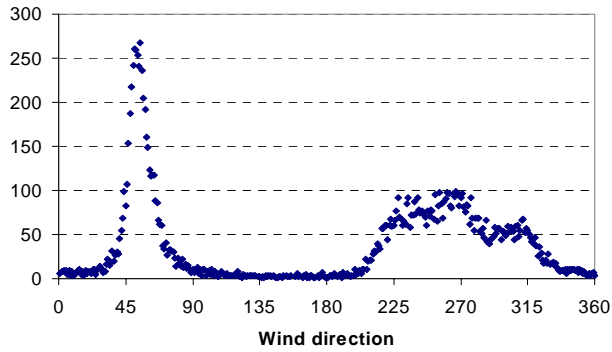
Steigerwald



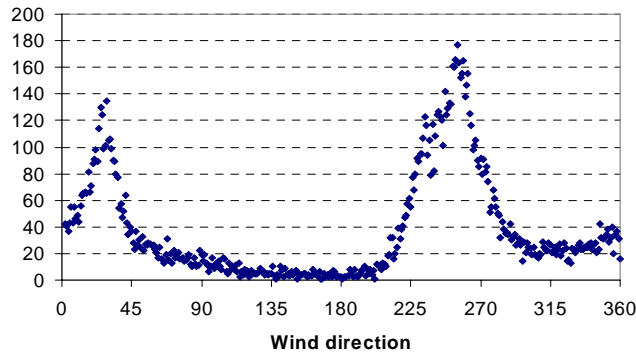
Wishram



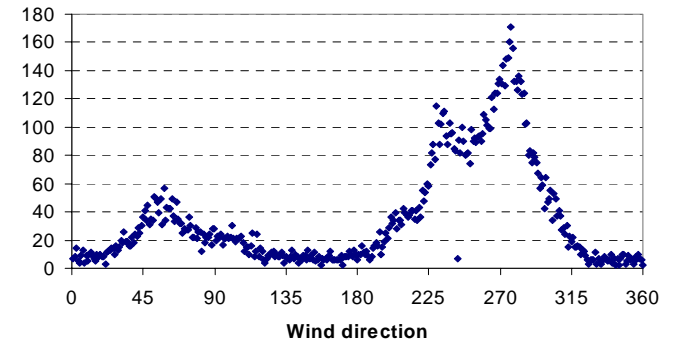
Mt Zion



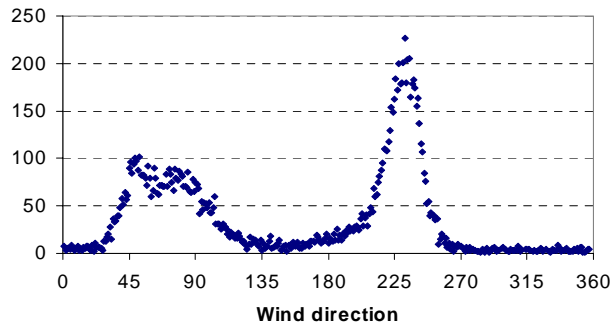
Strunk Road



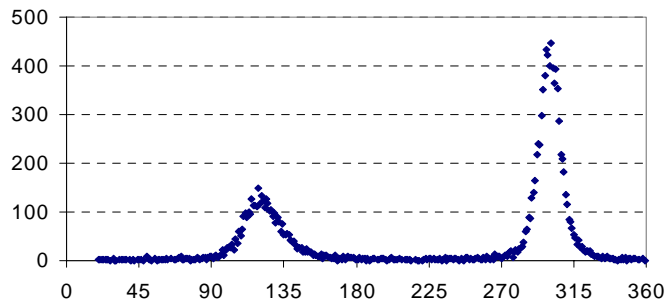
Iowai Road



Bonneville



7 mile hill



# Interim Report

## Columbia River Gorge Visibility Project

### **Analysis Methodology:**

- Too much information to try to describe all 600 days of data, 24 hours per day
- Use wind data to form groups of days with similar spatial and diurnal wind field patterns (cluster analysis)
- Used hourly component of the wind along Gorge axis
- Compute typical spatial and diurnally varying wind field patterns for each cluster (group of similar days)
- Compute and study light scattering (bsp) patterns for each group of similar days
- Also computed pressure patterns for each cluster to better understand wind field patterns (in the Gorge winds blow from high to low pressure)

# Interim Report

## Columbia River Gorge Visibility Project

### **Typical Wind Patterns:**

- Five clusters of similar days were identified:
  - 1) Light Upgorge flow,
  - 2) Moderate Upgorge flow,
  - 3) Strong Upgorge flow,
  - 4) Light Downgorge flow (diurnal reversal at eastern sites), and
  - 5) Winter Downgorge flow (light at east end, strong at west end).

# Interim Report

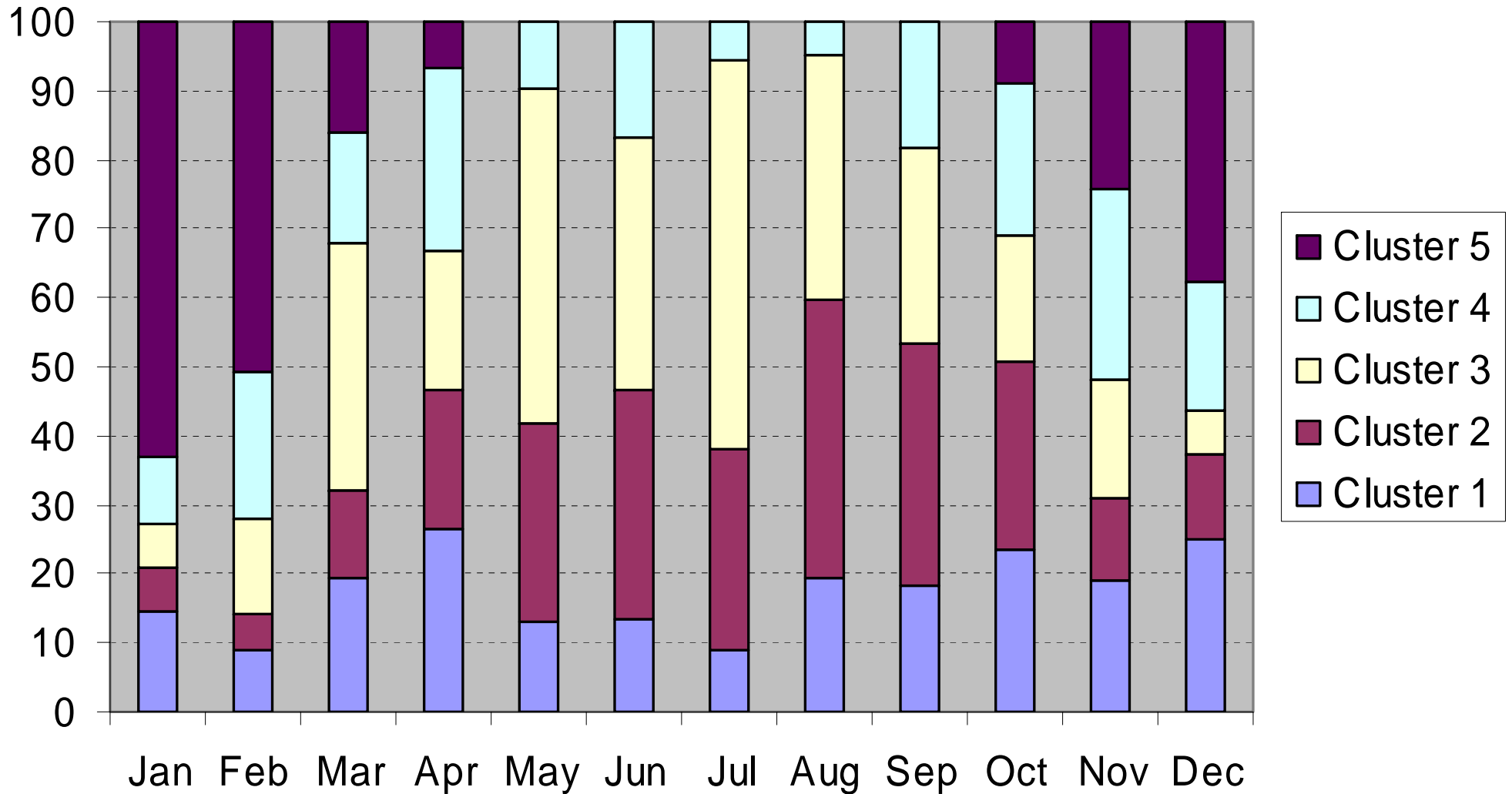
## Columbia River Gorge Visibility Project

### **Seasonality of Wind Patterns:**

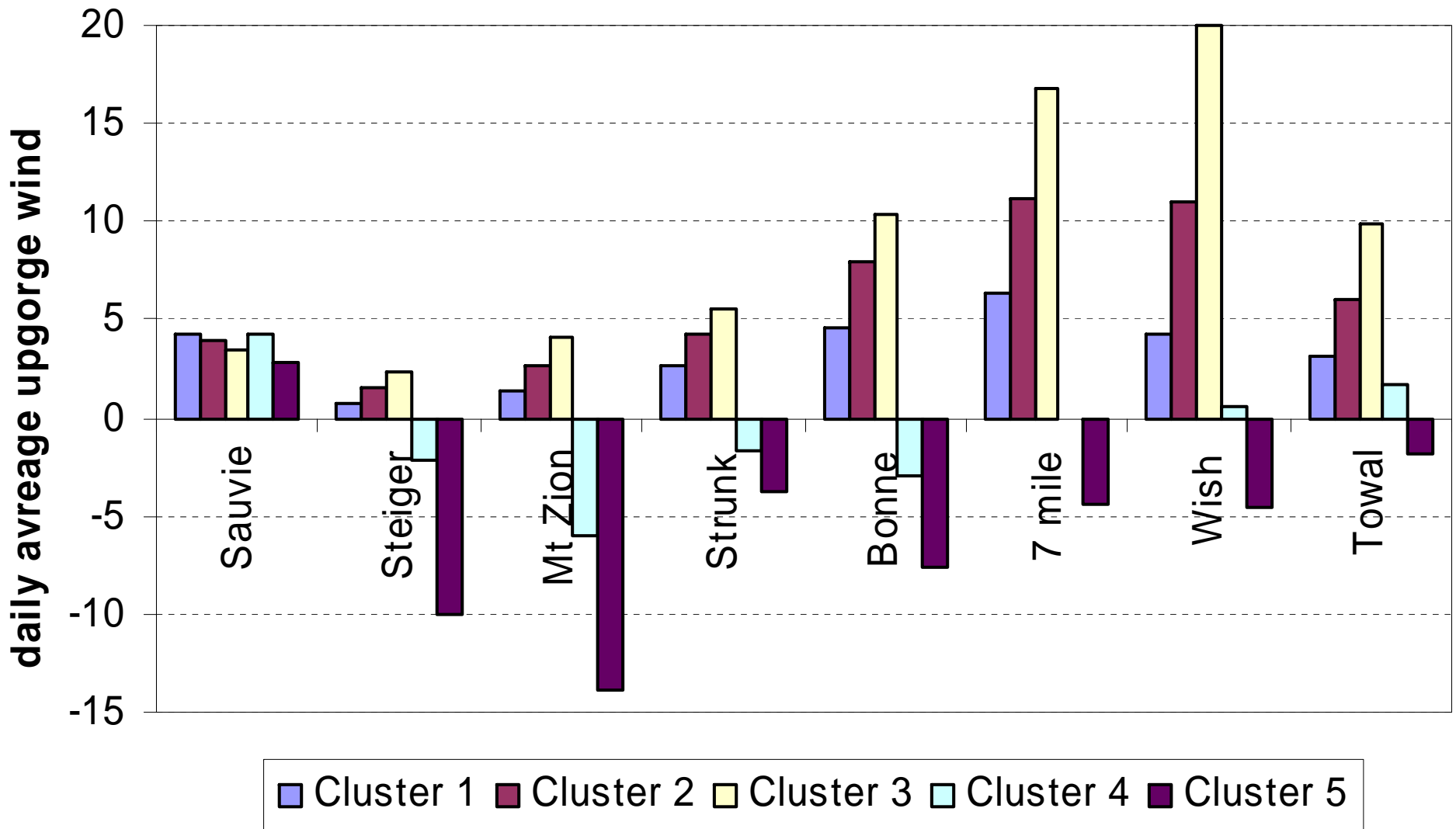
- 1) Light Upgorge: transitional – April and October peaks
- 2) Moderate Upgorge: late summer/early fall – peak in frequency
- 3) Strong Upgorge: main summer pattern – July peak frequency
- 4) Light Downgorge: transitional – April and November peaks
- 5) Winter Downgorge: main winter pattern, never occurred in summer



# Frequency of Each Wind Pattern by Month

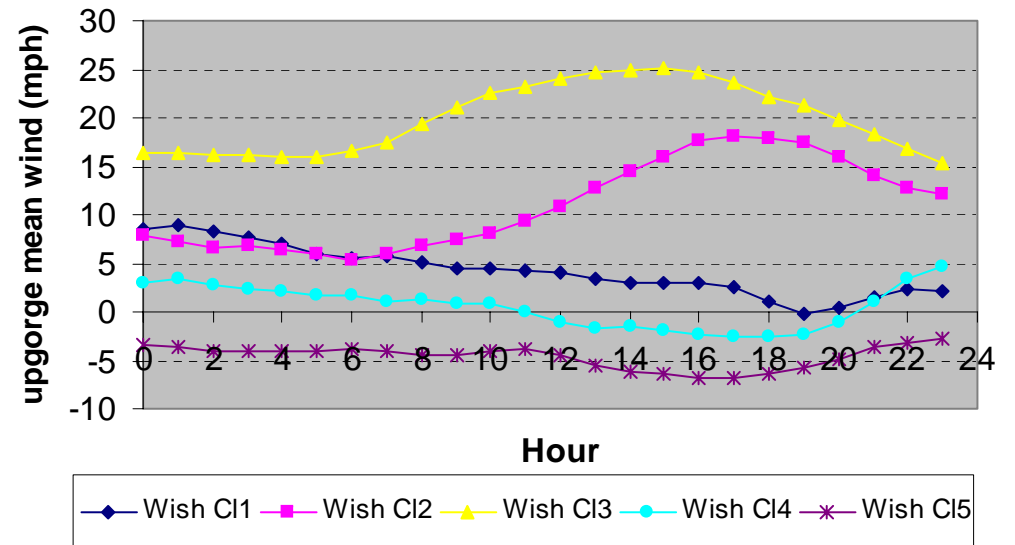


# Daily Average Upgorge (west to east) Wind at Each Site by Wind Pattern (Cluster)

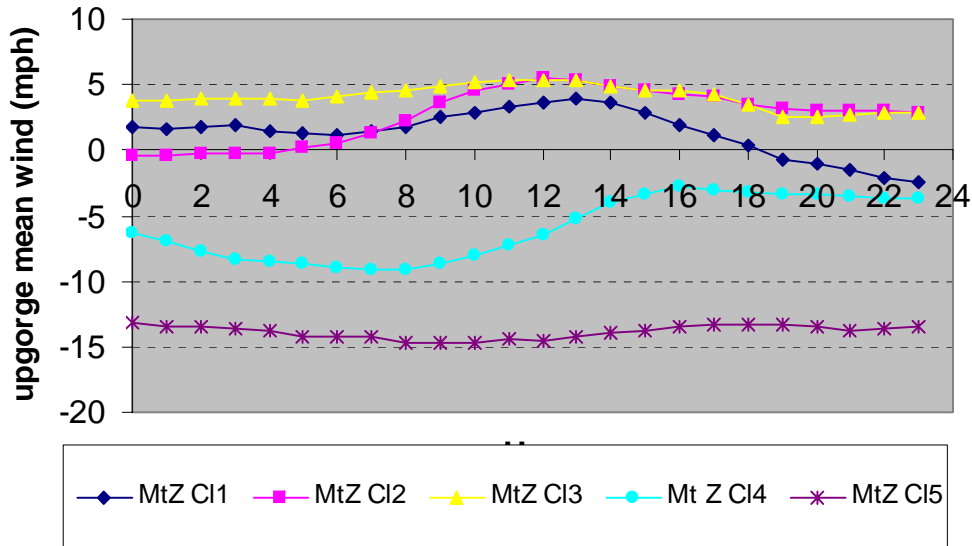


# Diurnal Variation of Winds by Cluster for a Western, Central, and Eastern Site

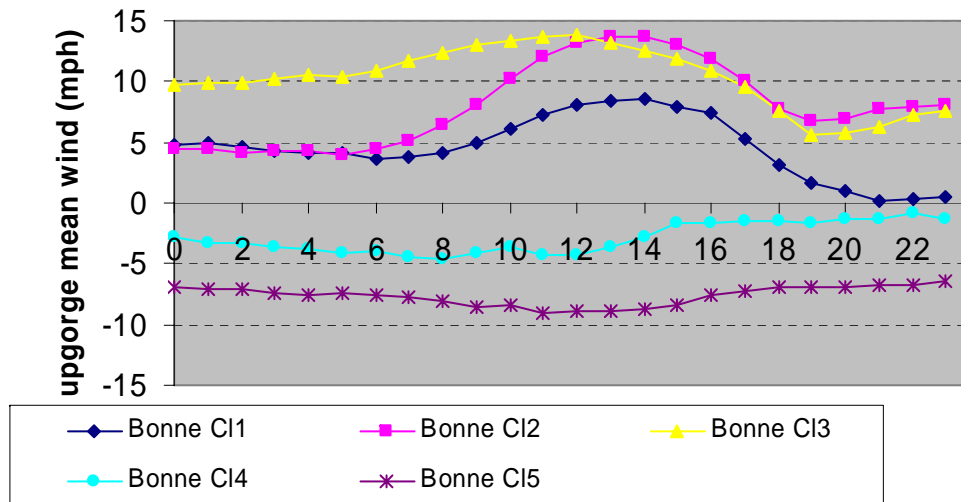
Wishram - diurnal wind by cluster



Mt Zion - diurnal wind by cluster

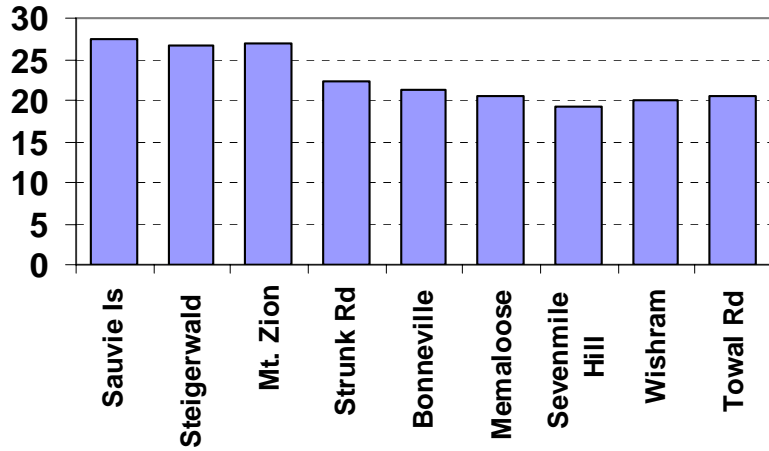


Bonneville - diurnal wind by cluster

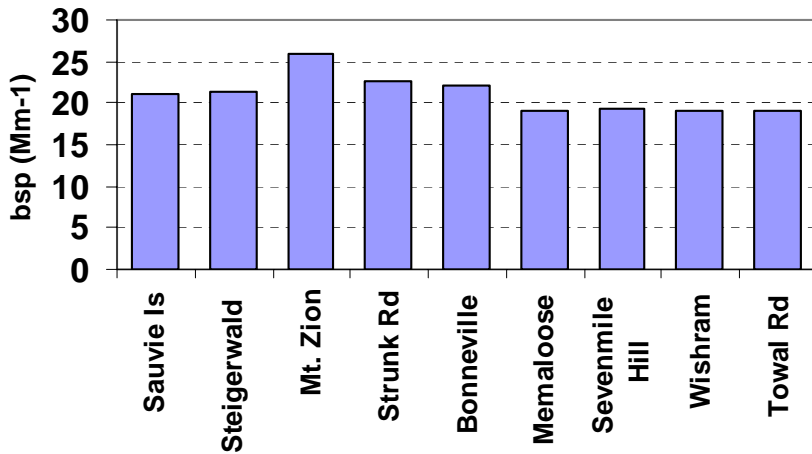


# Haze Levels by Wind Pattern Type

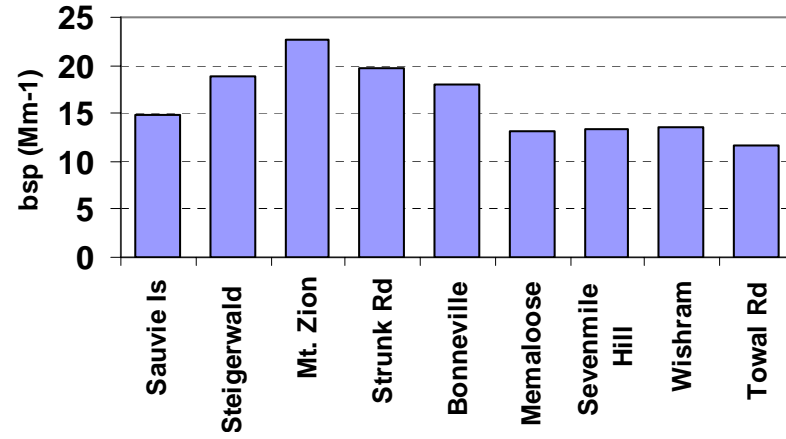
Weak upgorge (1)



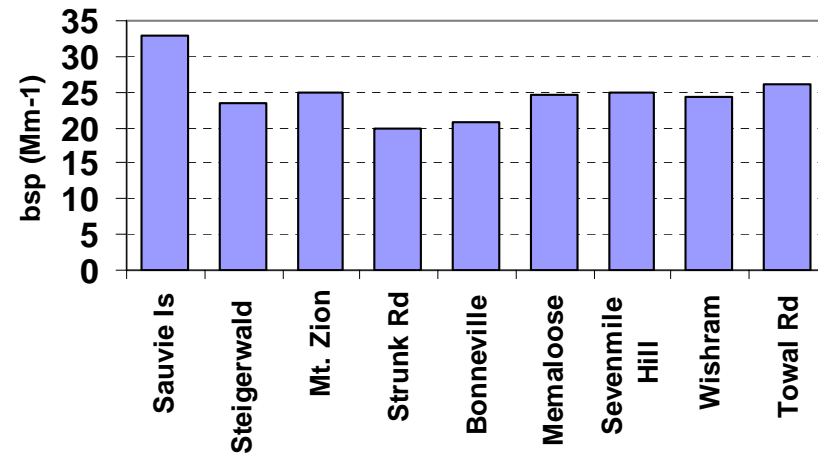
Moderate upgorge (2)



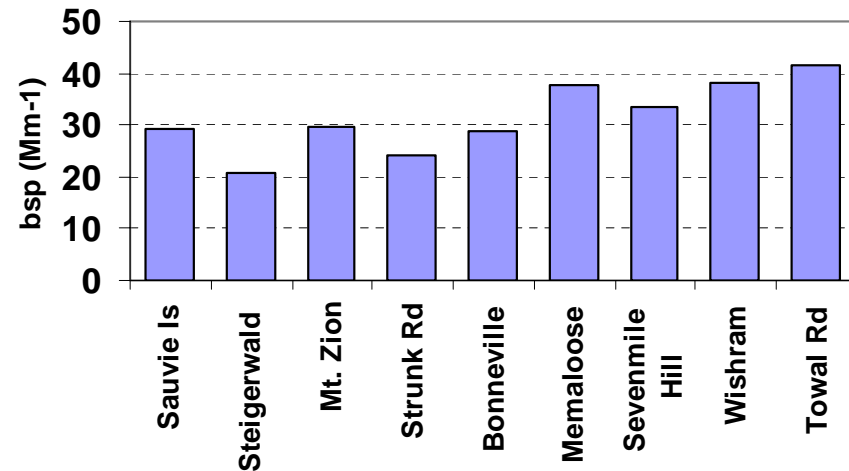
Strong upgorge (3)



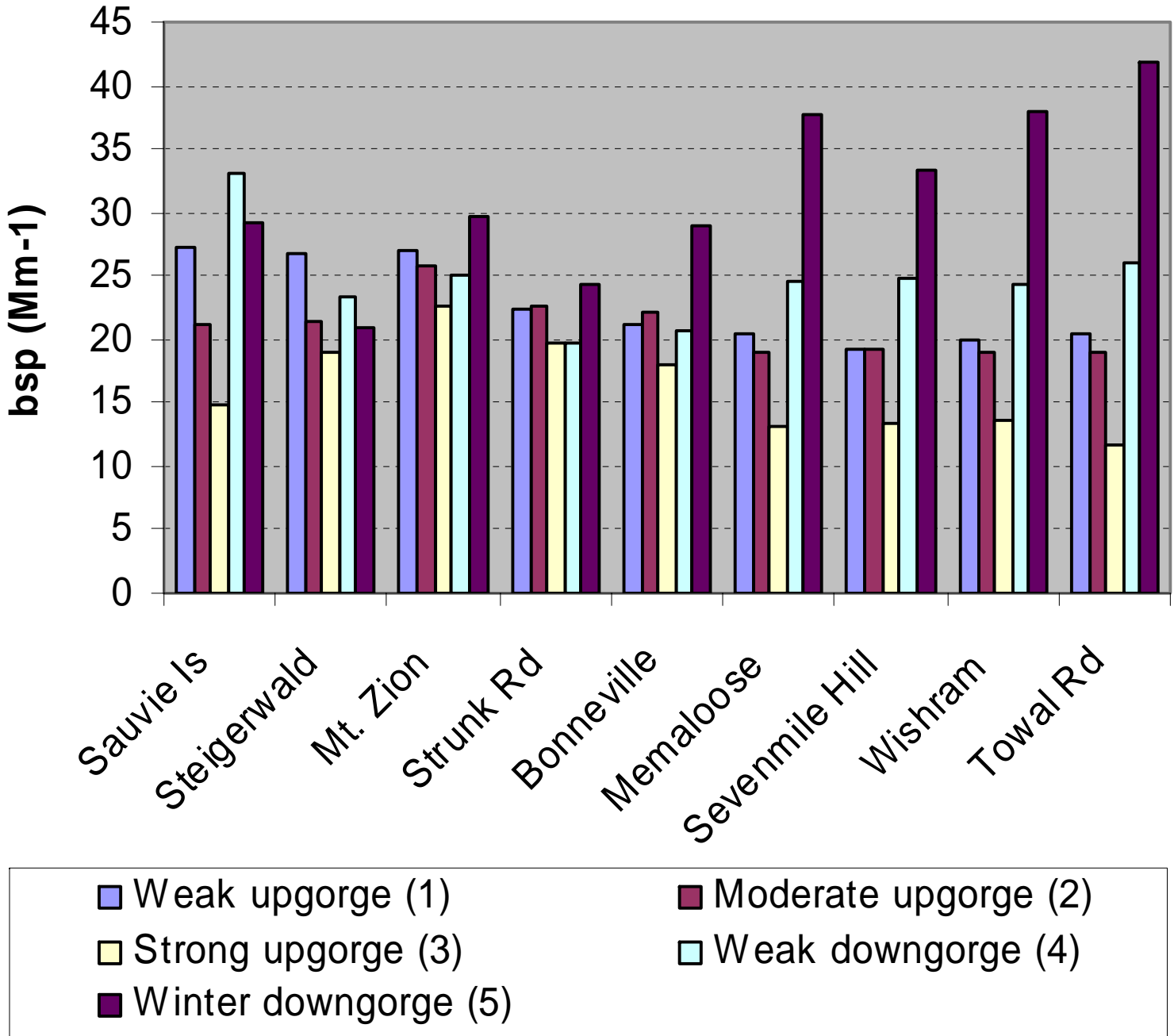
Weak downgorge (4)



Winter downgorge (5)



# Haze Levels for Each Wind Pattern Type



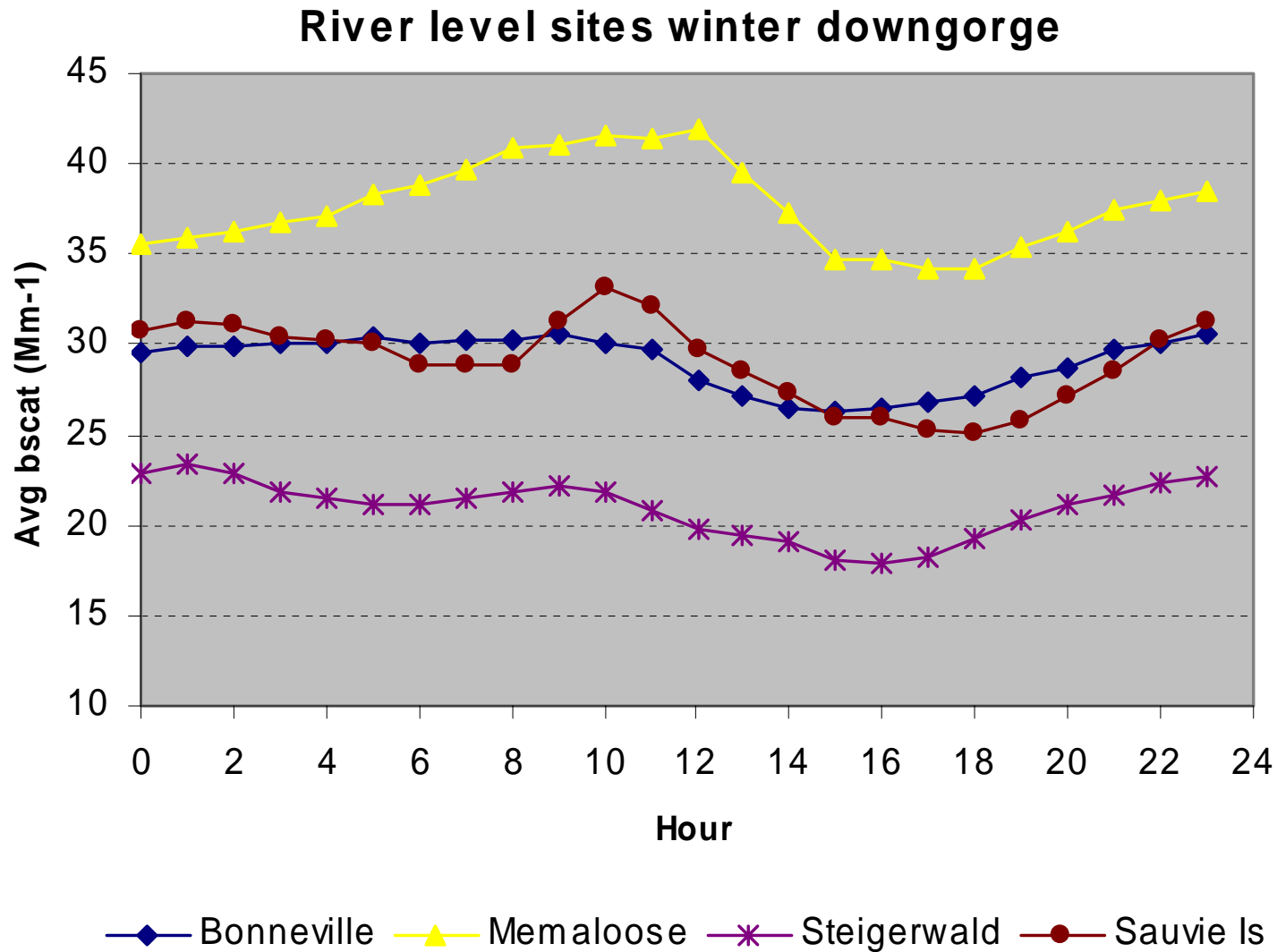
# Interim Report

## Columbia River Gorge Visibility Project

### **Summary of Haze by Wind Pattern Type:**

- Winter Downgorge highest average light scattering at all sites except Steigerwald and Sauvie Island (eastern sites haziest)
- All sites strong Upgorge lowest light scattering (and large gradient from west to east)
- So main summer pattern cleanest; main winter pattern dirtiest
- Sauvie Island and eastern Gorge sites have greater variation between patterns than other sites
- Days with precipitation generally have lower light scattering than days without precipitation

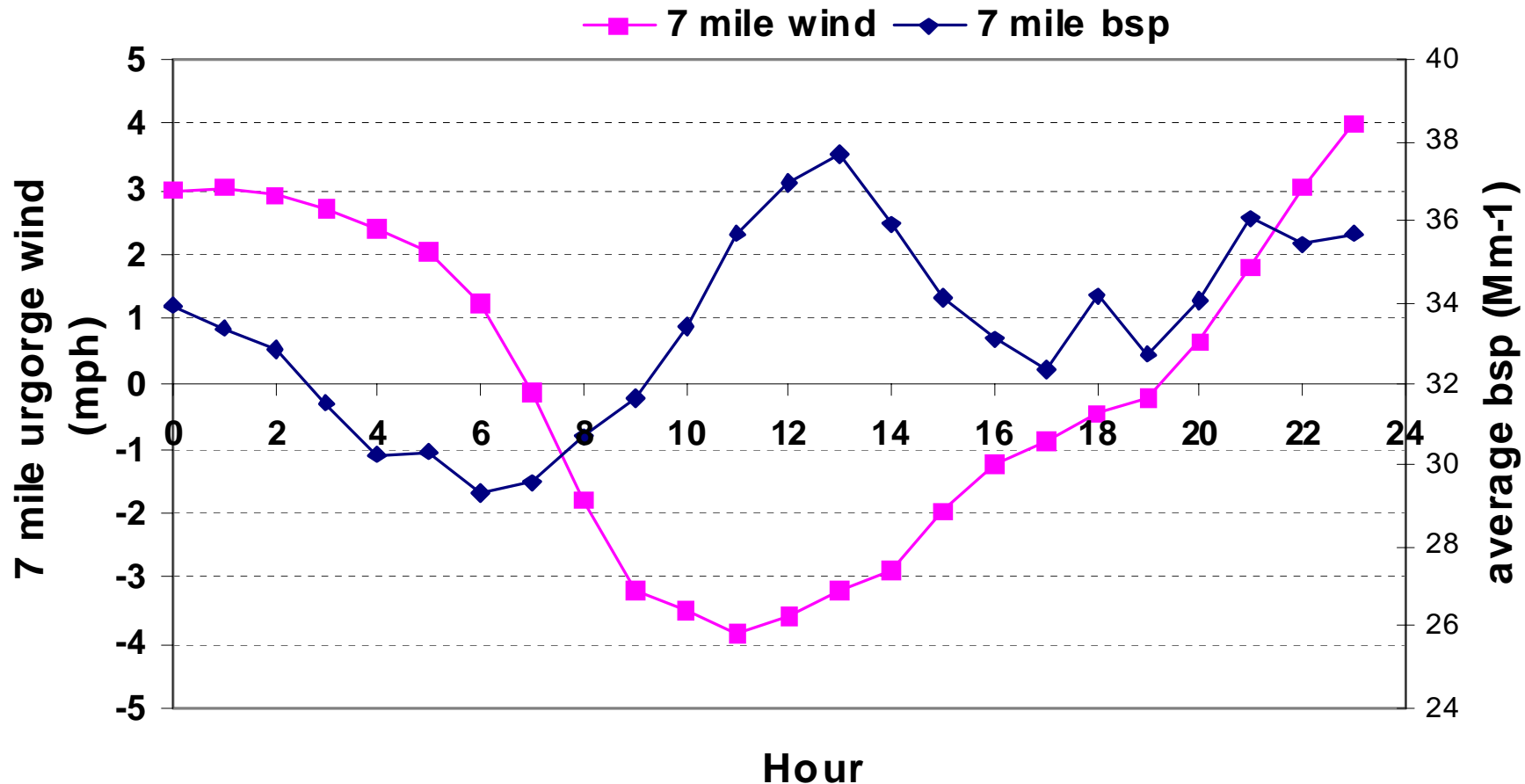
# Decrease in Haze Downriver to Steigerwald Increase Across Portland Metro Area to Sauvie Is.



# Light Downgorge has Flow Reversal at Sevenmile Hill, Wishram, Towal Road.

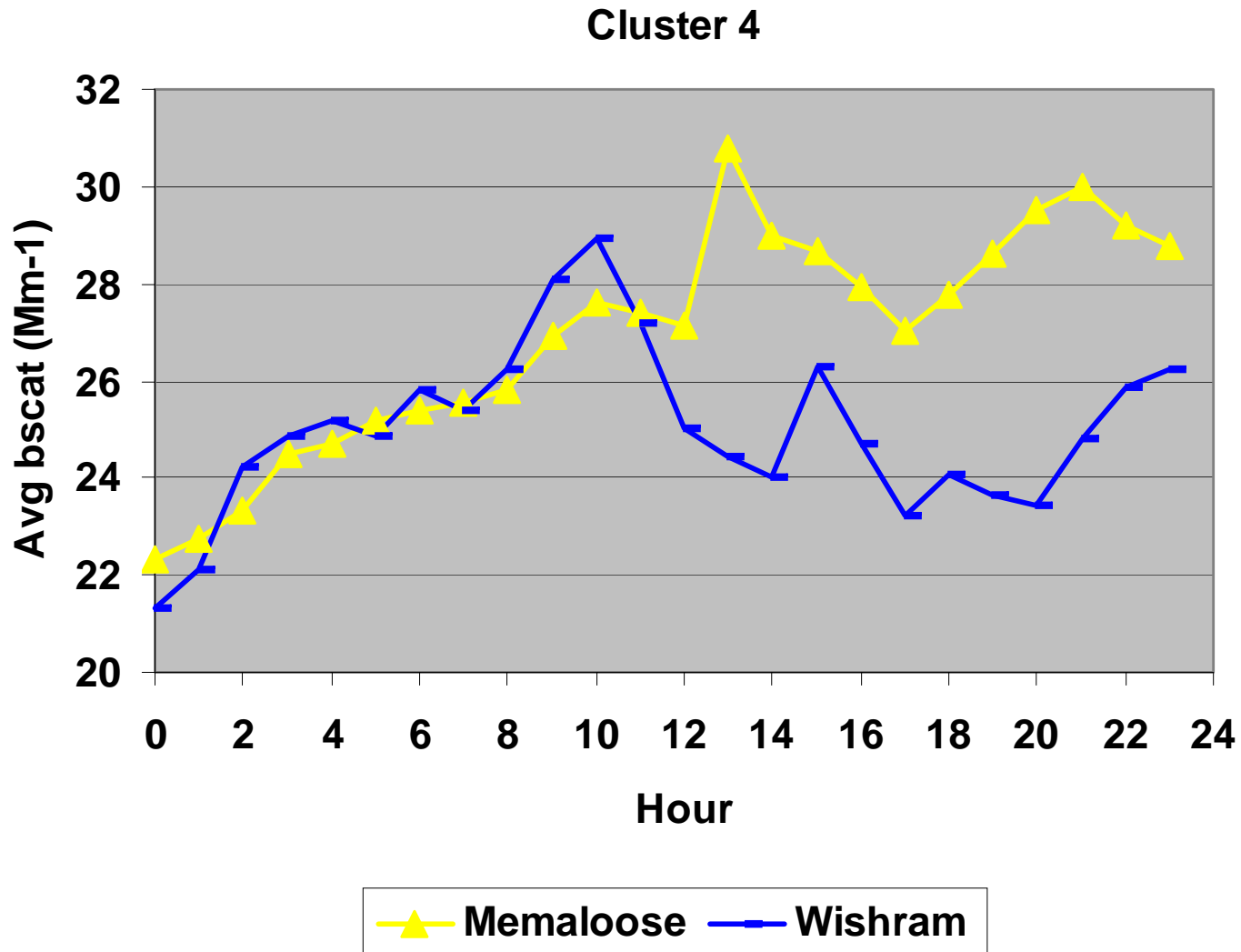
## As Wind Changes from Westerly to Easterly at Sevenmile Hill, Haze Increases

Light downgorge (4)



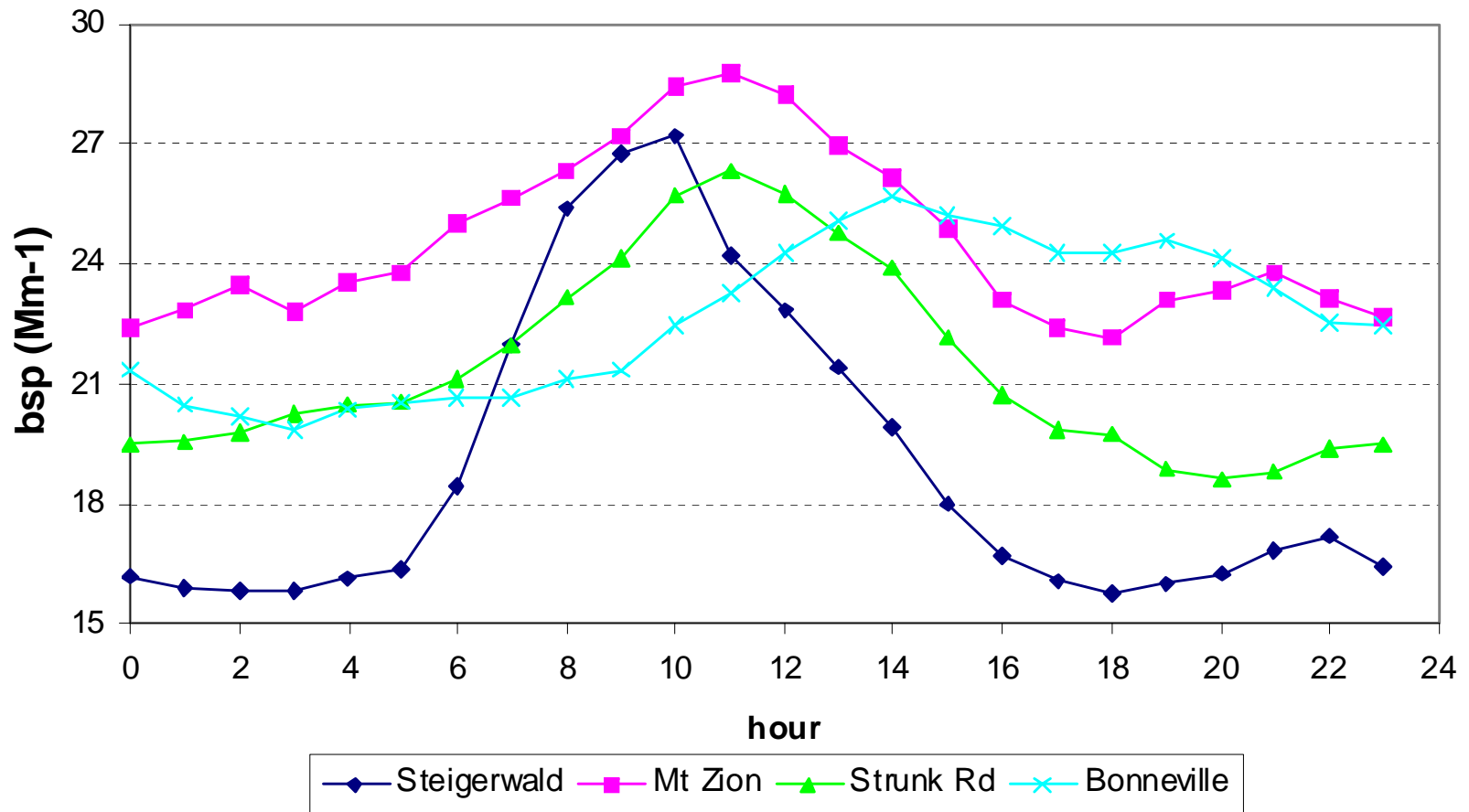


# Wind Shift Followed by Increase of Haze at Memaloose Compared to Wishram (4-6 Mm<sup>-1</sup>) Increase Across The Dalles



# Increase in Haze Gradually Works Eastward Through Gorge as Westerly Winds Transport “Slug” of Hazy Air from Portland Metro Area

Diurnal variation of bsp (Mm<sup>-1</sup>) in summer (Jun-Aug) western gorge



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## Columbia River Gorge Visibility Project

### **Recap of Haze Gradient Study Findings:**

- Haziest pattern with winter Downgorge (easterly) flow – sources east of Gorge mainly responsible
- Summer patterns – see increased haze as Portland metro area emissions transported through gorge (seen mostly western-central gorge – eastern Gorge much cleaner due to dispersion)
- Light Downgorge – see increase in haze across The Dalles as winds shift from westerly to easterly

# Interim Report

Columbia River Gorge Visibility Project

## Part II.

# Causes of Haze in the Gorge (CoHaGo)

## Draft Report

Dr. Mark Green

Dr. Jin Xu

Division of Atmospheric Sciences

Desert Research Institute

# Interim Report

## Columbia River Gorge Visibility Project

### Purpose of CoHaGo Study?

- Haze gradient study answered questions about spatial patterns of haze and how they relate to wind directions and seasons. It gives insight into general source areas, but not source types of haze.
- CoHaGo, with its expanded chemical component data, was done to help understand source types responsible for haze.
- If we know source types and direction the haze is coming from, we can say something about which individual sources are likely to be contributing significantly to haze.

# Interim Report

## Columbia River Gorge Visibility Project

### **CoHaGo Approach:**

- First, review and quality assure all data used.
- Compare measurements of same compounds using different instruments (such as high-time resolved sulfate and 24-hour averaged sulfate).
- Summarize chemical and optical measurements and look at average differences along the Gorge in terms of chemical components responsible for haze.
- Perform receptor modeling analysis (PMF) to assess impacts from each source type identified from the chemical data.
- Perform case study analysis to help understand causes of haze for worst winter and worst summer episodes.
- Will compare with source modeling results to be obtained later. Part of Gorge Science Summary Report.

# Interim Report

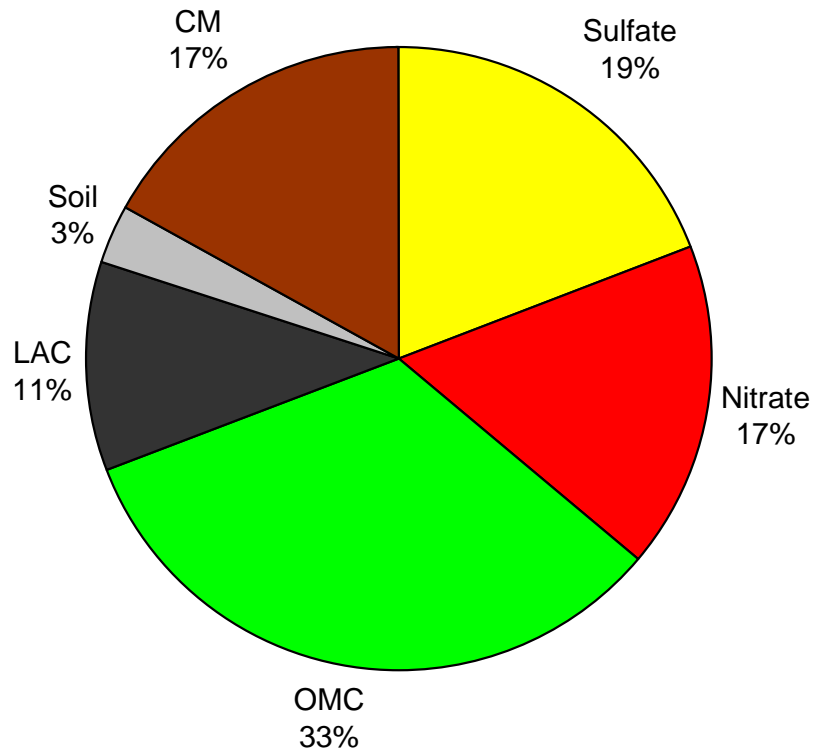
## Columbia River Gorge Visibility Project

### **Preliminary Findings of Draft CoHaGo Study:**

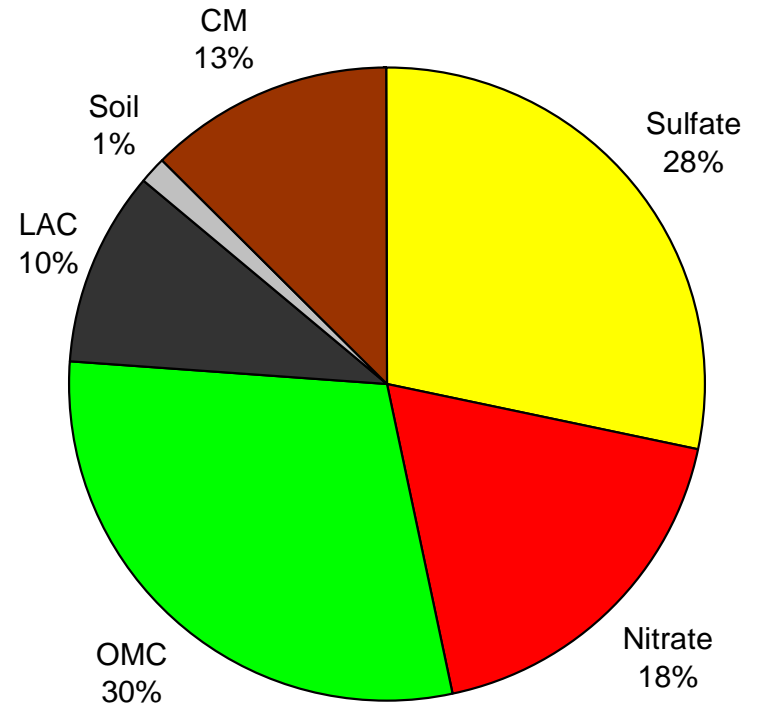
- Summertime haze mainly organics and sulfate – organics mainly burning
- Sulfate variety of sources, specifically including oil combustion (shipping), paper mill
- Portland Metro area contributing significantly in summer
- Wintertime haze worse than summer – nitrates, sulfates, and organics – sources mainly from the east
- Wood burning, Columbia River Basin cities, and Boardman power plant probable contributors to winter haze
- Some impact of The Dalles noted under certain conditions
- These findings will be further analyzed using existing source profiles in project's next phases: modeling and Summary Report.

# Summary of Preliminary Results

## Wishram



## Mt Zion

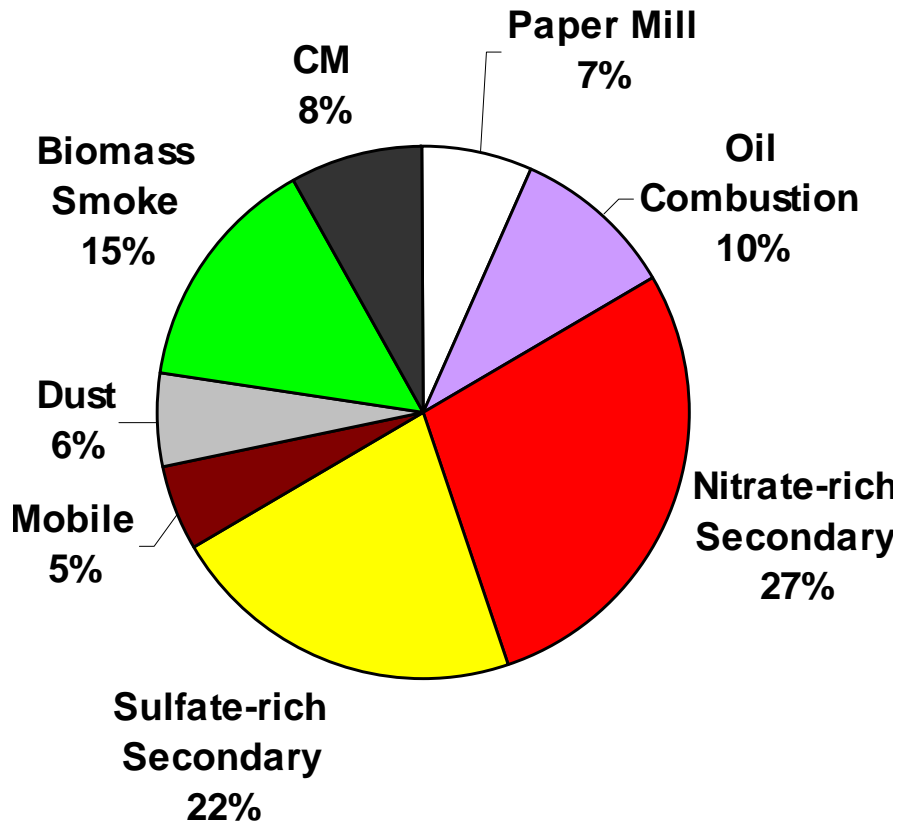


Organic carbon, sulfate, and nitrate in eastern Gorge.

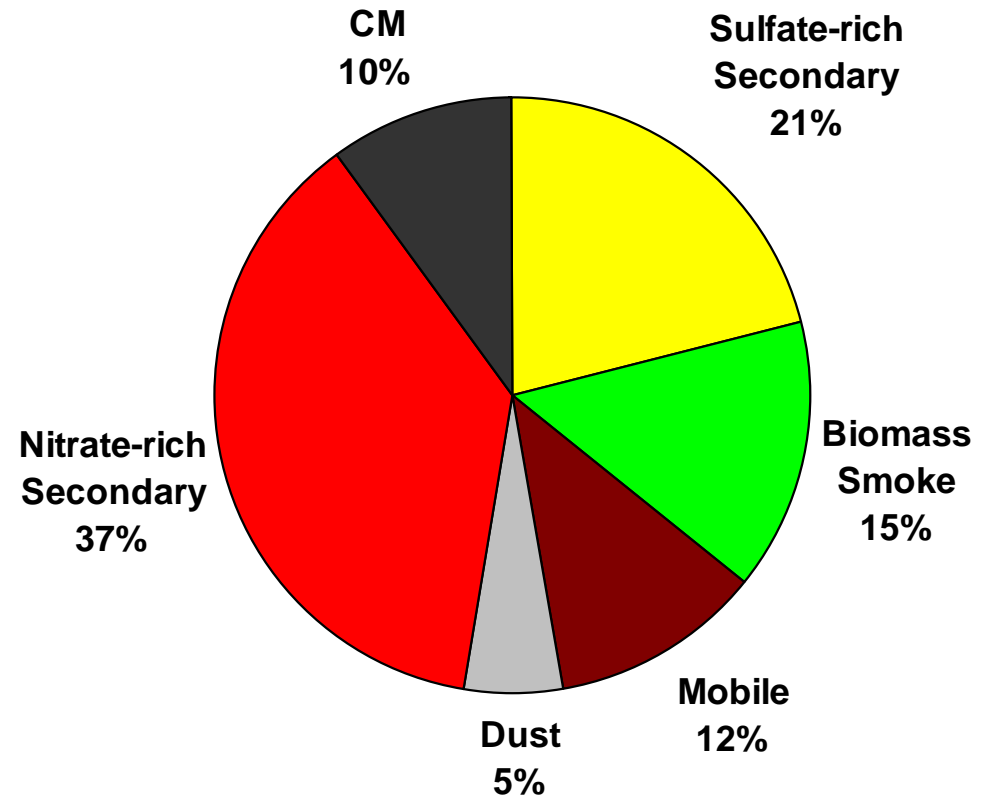
Organic carbon and sulfate, then nitrate are the biggest contributors to haze in western Gorge.



# Western Gorge (Mt. Zion) 8 Source Factors Identified



# Eastern Gorge (Wishram) 6 Source Factors Identified



# Interim Report

## Columbia River Gorge Visibility Project

### Summary of Episode Analyses:

- November 2004: Flow from the east – biomass burning and nitrate-rich secondary with sulfate important (home heating/electricity generation)?
- February 2004: Flow from the east – nitrate rich and sulfate rich secondary – electricity generation?
- August 2004: Light westerly flow – regionally high OC (fires) more locally high sulfate.
- July 2004: Light westerly flow – high regional OC (fires), locally enhanced sulfate due to paper mill.

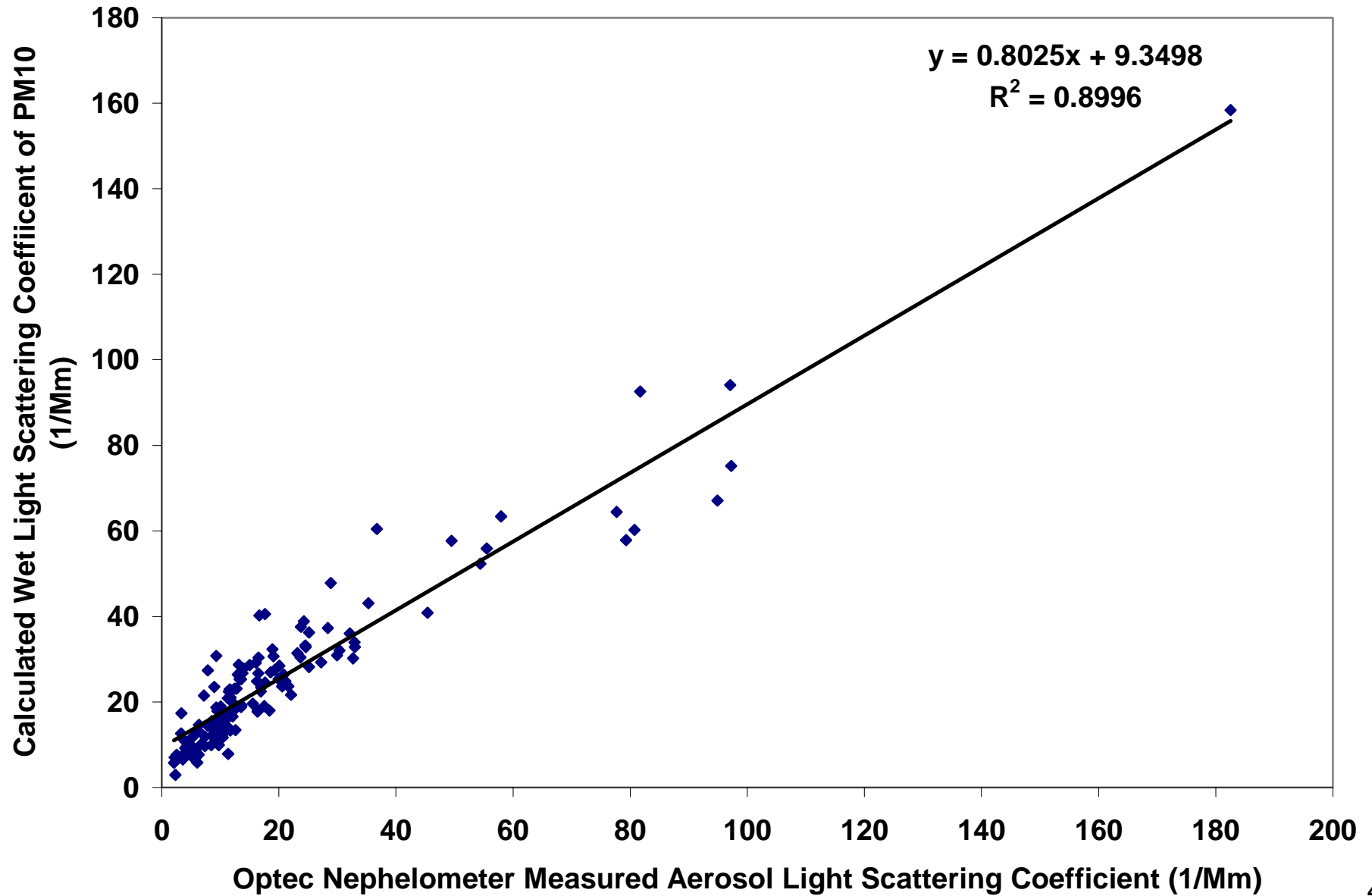
# Interim Report

## Columbia River Gorge Visibility Project

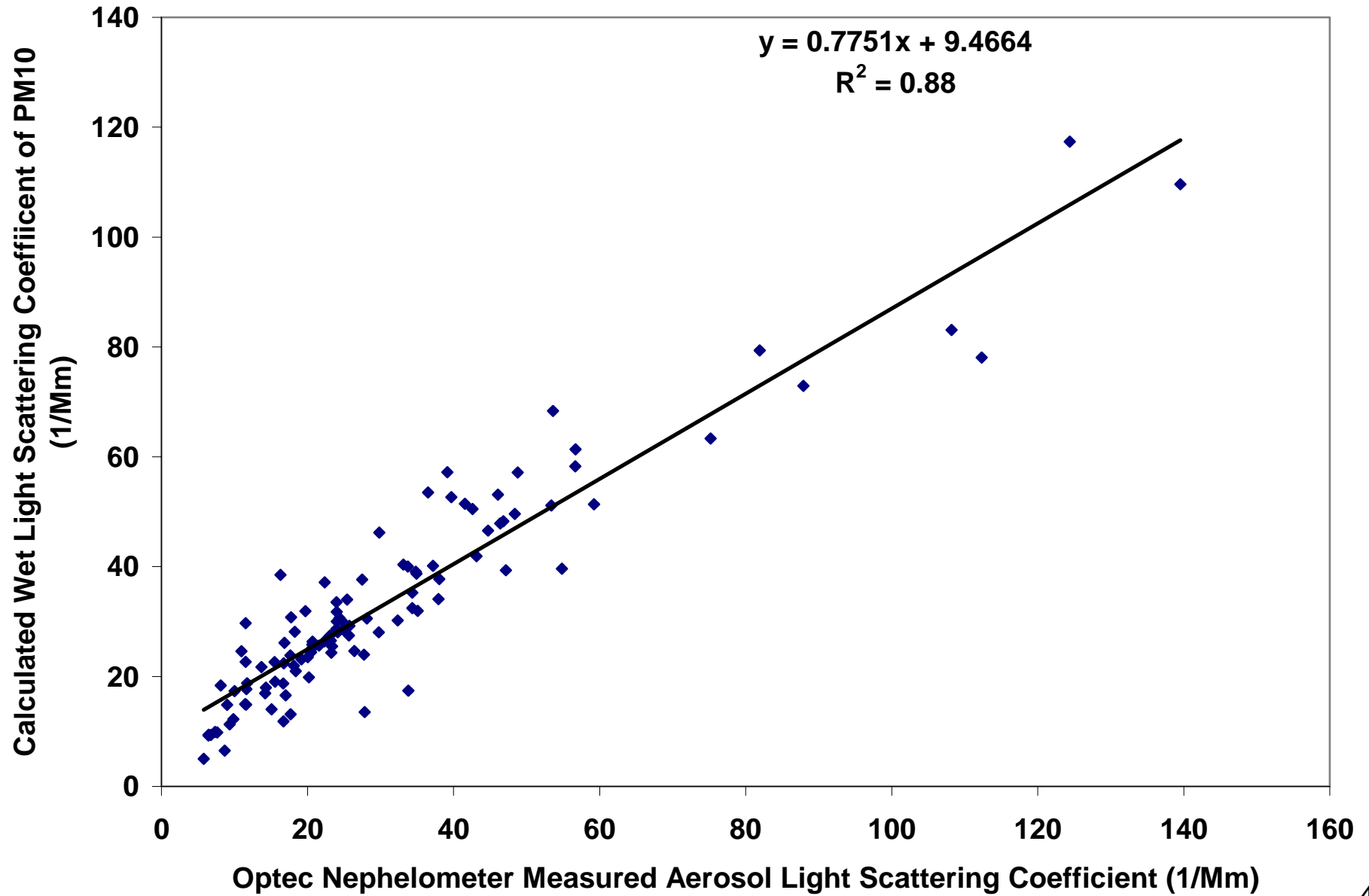
### Enhanced Measurements:

- Enhanced measurements made for 2 winter periods and one summer-fall period: (12/1/03 - 2/28/04, 12/1/04 - 2/28/05, and 7/1/04 - 11/30/04)
- Added instruments remained at Bonneville. All episodes and another set moved from east end (Wishram) to west end (Mt. Zion) for summer - fall, then back to Wishram for 2<sup>nd</sup> winter
- Main instrumentation added high-time resolved sulfate, nitrate, organic and elemental carbon. Size resolved (DRUM) aerosol data
- Also additional 24-hour filter samplers at Sauvie Island (summer) and Towal Road (winter)

# Calculated Versus Measured Haze: Wishram



# Calculated Versus Measured Haze: Mt. Zion



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## Columbia River Gorge Visibility Project

### **Positive Matrix Factorization (PMF):**

- PMF is a statistical method that extracts “factors” from chemical composition data.
- The various factors are profiles that give the ratio of chemical elements to each other. These are extracted from the measured data and can then be compared to profiles from sources, as available.
- Ideally, the factors represent specific sources or source types. In reality, different source types sometimes get mixed together in a factor.
- By using wind direction and other information, we can get better confidence in the results and more specificity, at least regarding direction of sources.

# Interim Report

## Columbia River Gorge Visibility Project

### PMF:

- The output is the profile of each factor (abundance of each chemical element) and a weighing of each factor for each measurement period.
- This output lets us attribute each source type for a share of the particles and haze.
- PMF was applied to data from Wishram and Mt. Zion for the years 2003 – 2004. These are the only sites in the Gorge with sufficient data for this method.

# Interim Report

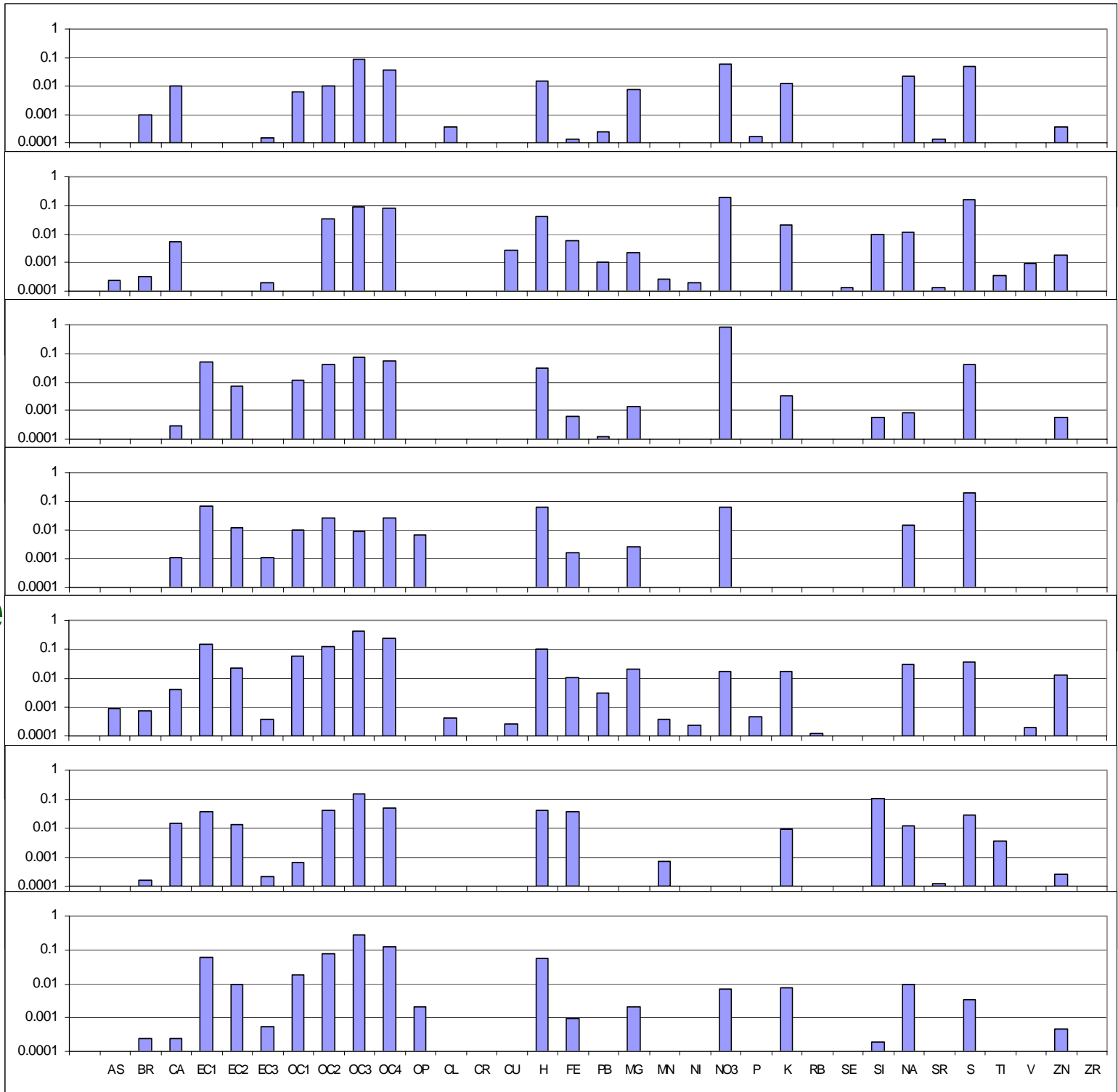
## Columbia River Gorge Visibility Project

### PMF Results – “Markers” at Mt. Zion:

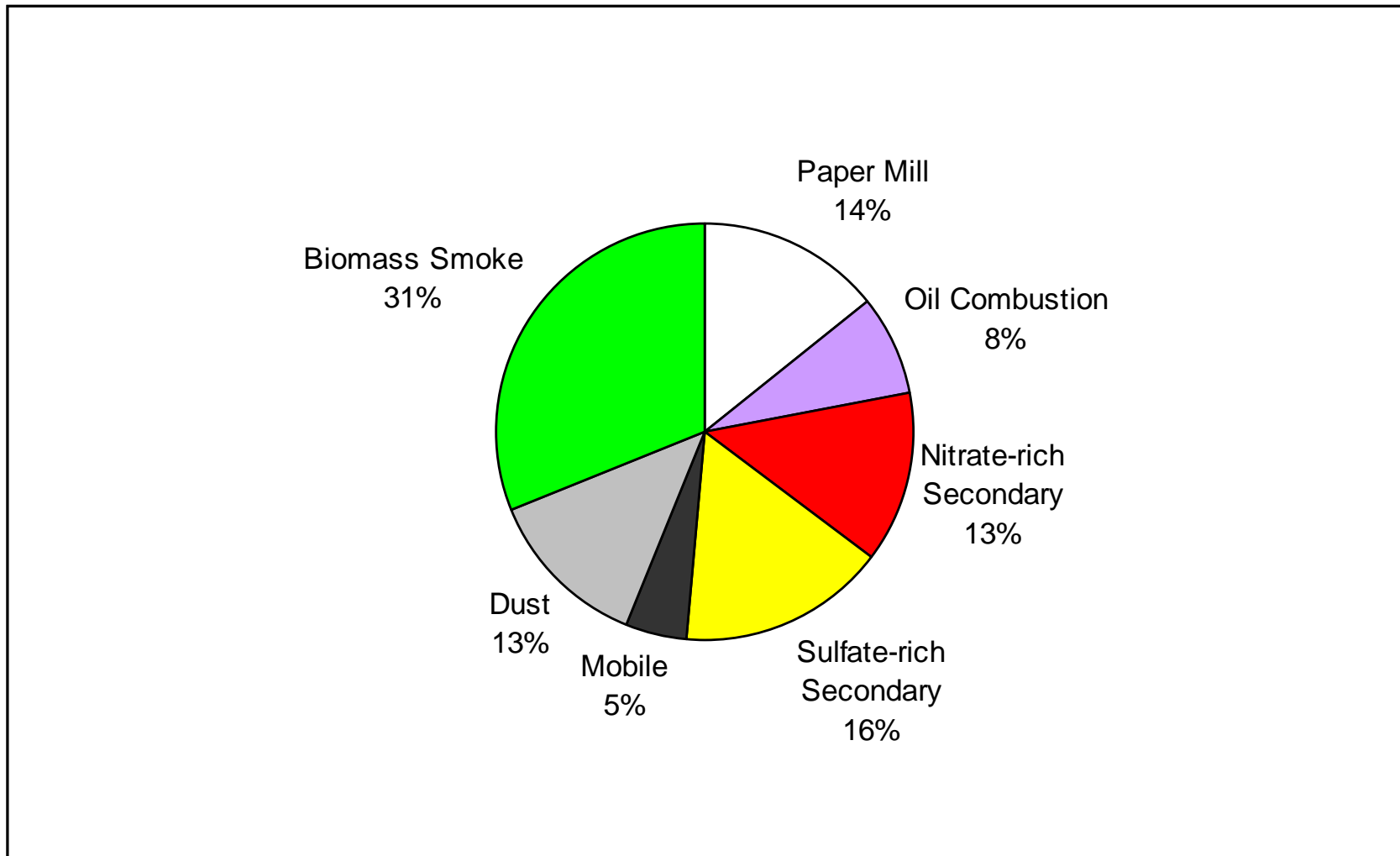
- 7 “factors” identified at Mt. Zion:
  - 1) Paper mill: rich in Na, K, and Cl
  - 2) Oil Combustion: excess V, Ni
  - 3) Biomass smoke: high in OC, EC, K
  - 4) Secondary sulfate
  - 5) Secondary nitrate
  - 6) Mobile: high EC, Zn
  - 7) Dust: high in Si, Ca, Fe, K



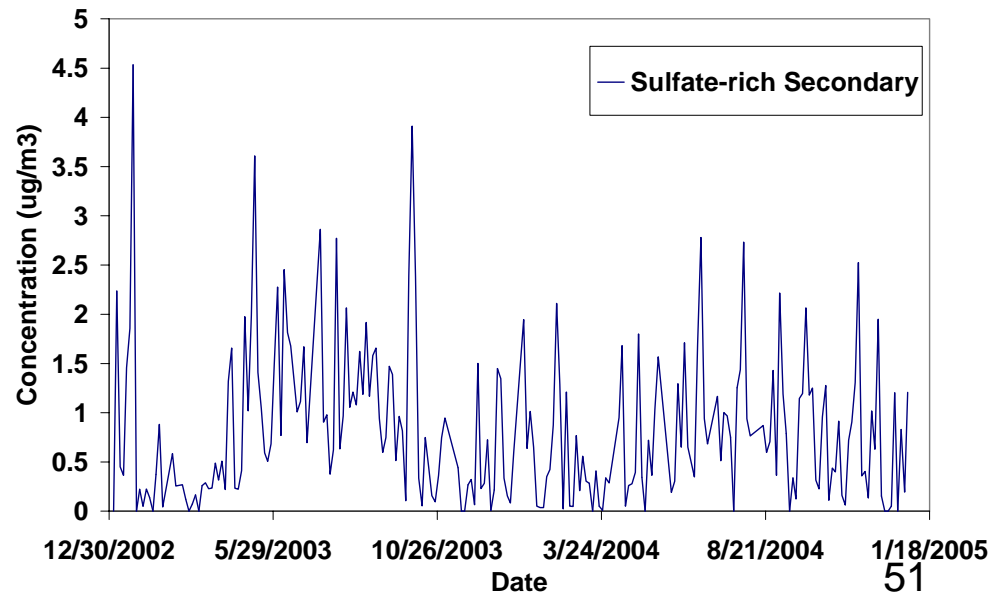
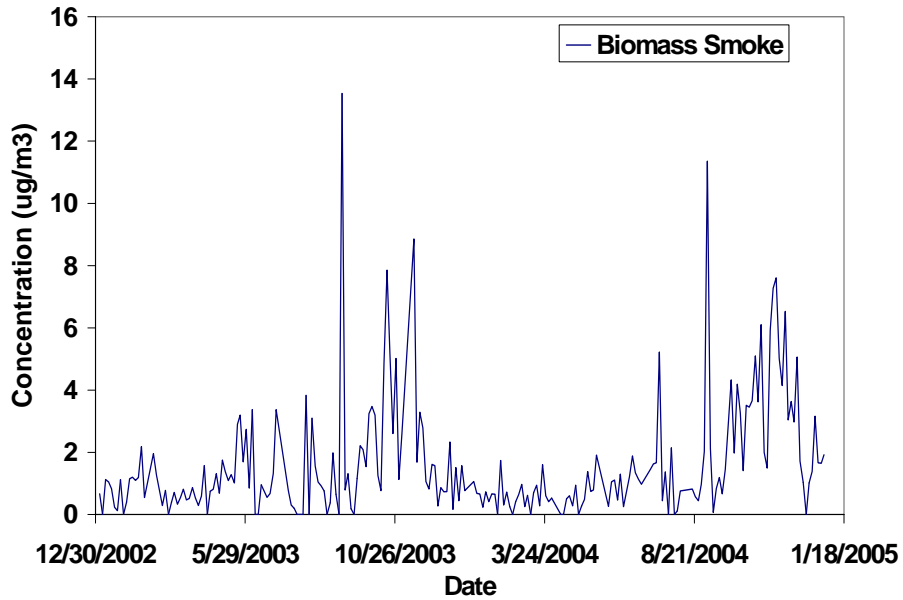
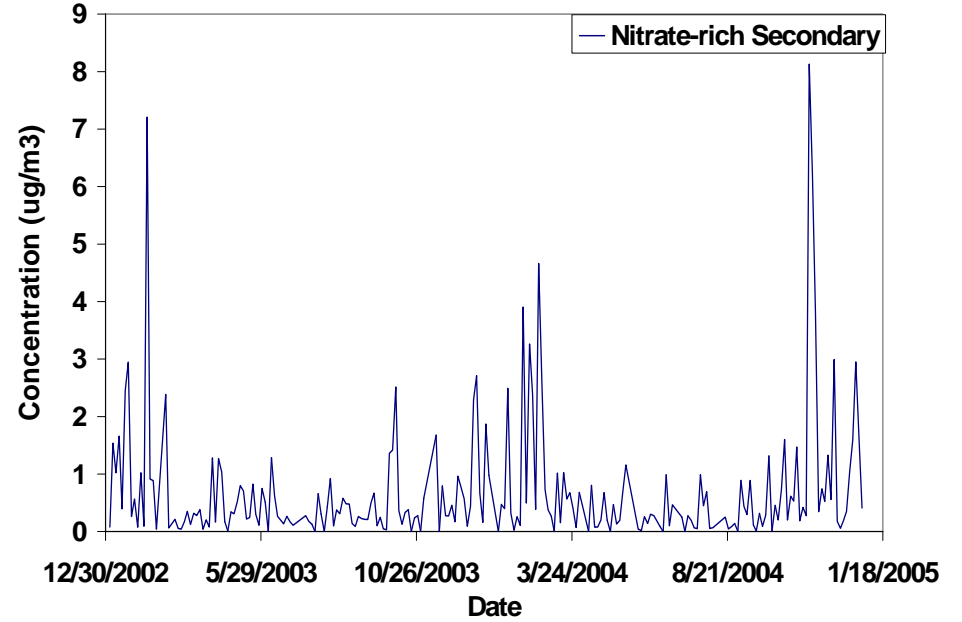
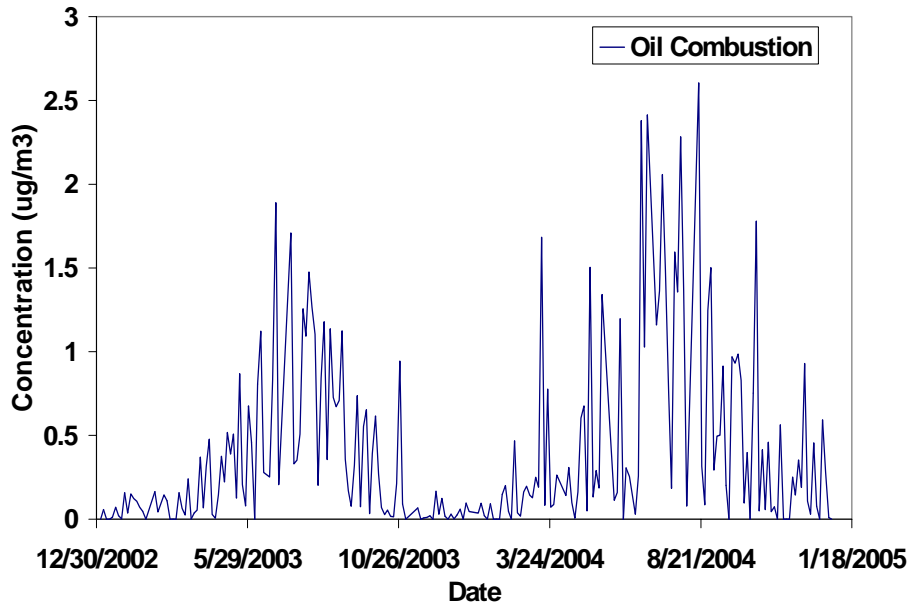
# Mt. Zion's 7 Source Profiles



# Average Contribution of Each PMF Factor to PM2.5 Mass at Mt. Zion



# Time Series-Factor Contributions Example: Mt. Zion



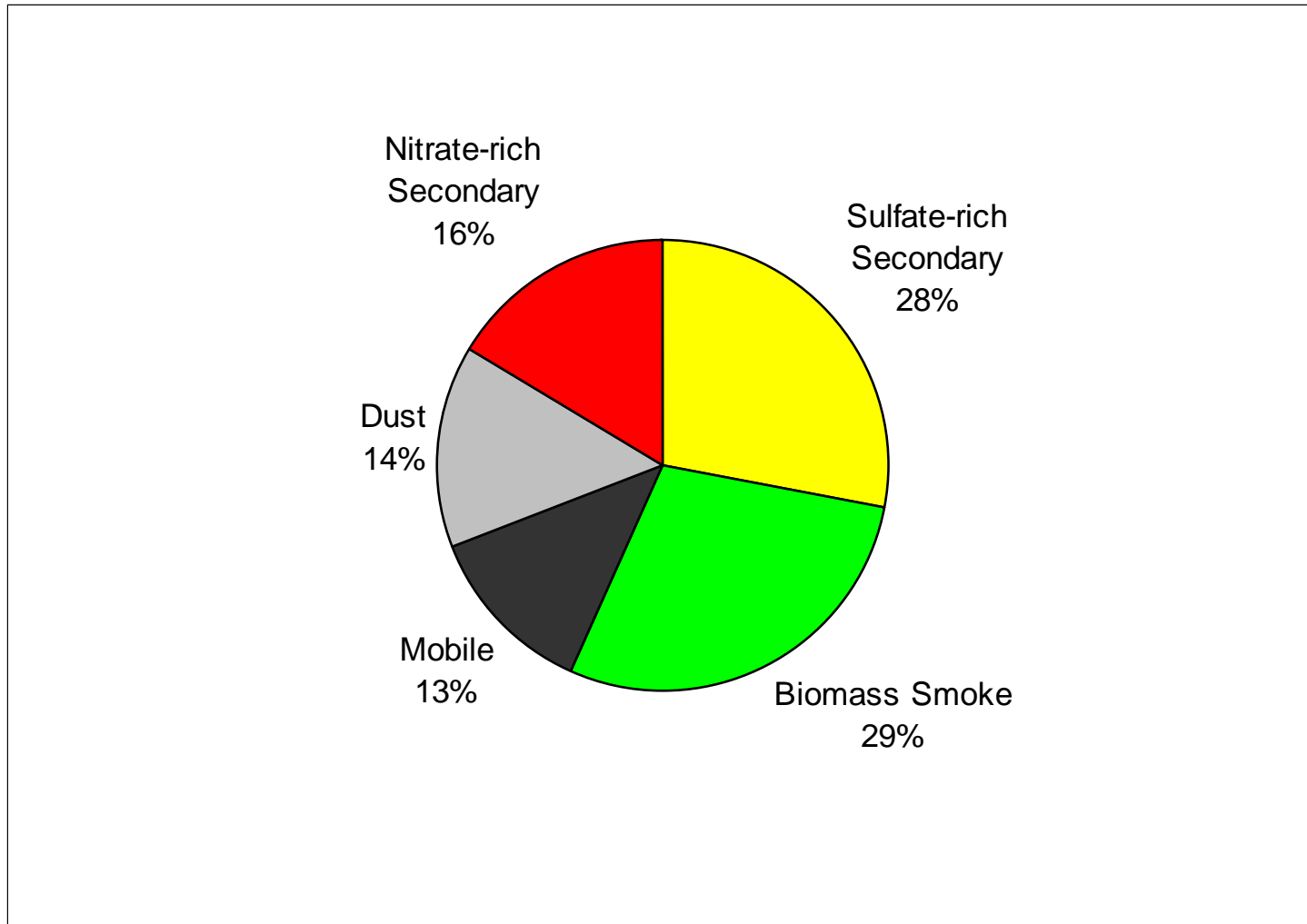
# Interim Report

## Columbia River Gorge Visibility Project

### **PMF Results - “Markers” at Wishram:**

- 5 “factors” identified at Wishram:
  - 1) Sulfate-rich secondary,
  - 2) Nitrate-rich secondary,
  - 3) Biomass smoke,
  - 4) Mobile,
  - 5) Dust
- Paper mill and oil combustion factors from Mt. Zion not distinguished here

# Average Contribution of Each PMF Factor to PM2.5 Mass at Wishram



## Percentage of PM2.5 by Source for Each Wind Pattern: Mt. Zion

Percentage of PM2.5	Light Upgorge (1)	Moderate Upgorge (2)	Strong Upgorge (3)	Light Downgorge (4)	Winter Downgorge (5)
Paper Mill	14	15	19	10	6
Oil Combustion	8	14	14	3	1
Nitrate-rich secondary	10	7	9	12	34
Sulfate-rich secondary	17	13	16	10	19
Mobile	5	4	5	5	3
Dust	14	18	12	16	5
Biomass smoke	32	29	25	43	32

Paper mill, oil combustion mainly with westerly flow  
Nitrate mainly easterly  
Sulfate and biomass all types

## Percentage of PM2.5 by Source for Each Wind Pattern: Wishram

Percentage of PM2.5	Light Upgorge (1)	Moderate Upgorge (2)	Strong Upgorge (3)	Light Downgorge (4)	Winter Downgorge (5)
Sulfate-rich secondary	33	33	44	16	9
Biomass smoke	31	28	19	37	33
Mobile	17	12	10	16	9
Dust	15	22	22	12	6
Nitrate-rich secondary	5	5	5	19	44

Sulfate-rich secondary mostly from west,  
Nitrate-rich secondary mostly from east,  
Biomass burning all types

## Percentage of Sulfate Attribution at Wishram by PMF Factor and Wind Type

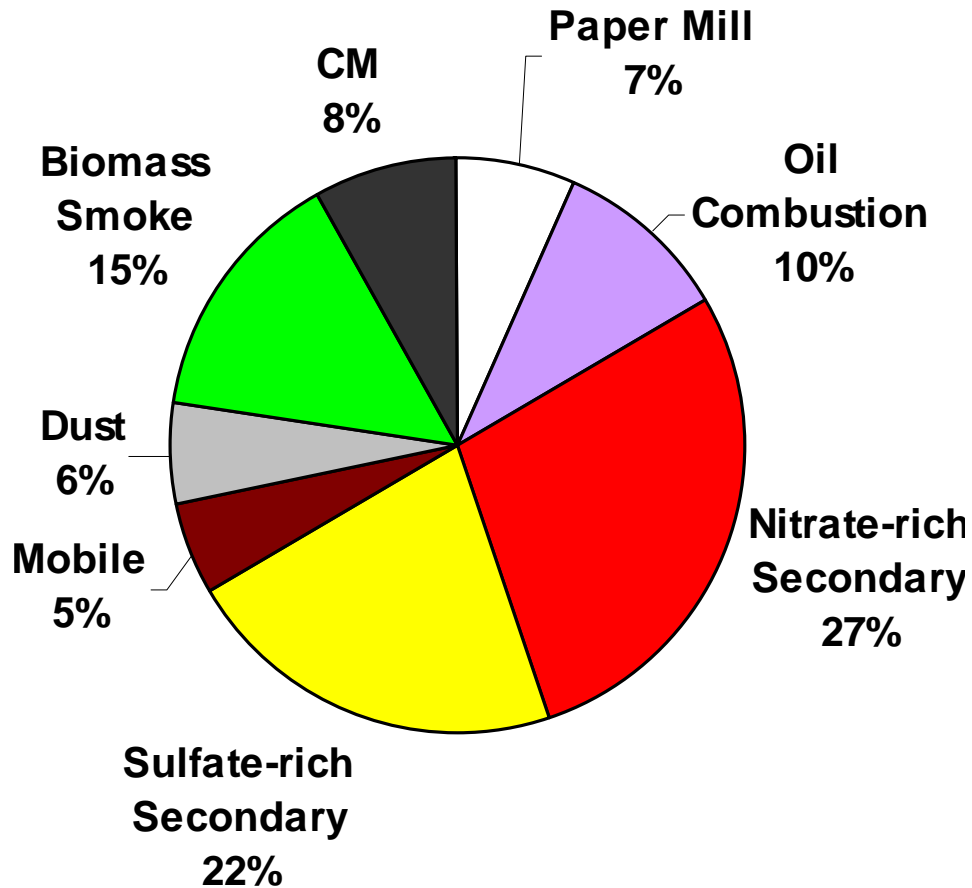
Wishram	Light Upgorge (1)	Moderate Upgorge (2)	Strong Upgorge (3)	Light Downgorge (4)	Winter Downgorge (5)	All types
% Sulfate-rich secondary	70	70	78	44	24	61
% Biomass smoke	10	9	5	15	14	10
% Mobile	8	6	4	10	5	6
% Dust	8	11	9	8	4	8
% Nitrate-rich secondary	5	4	4	23	53	14

Over ½ of Sulfate at Wishram for winter  
Downgorge is with Nitrate-rich Secondary  
Source (Possibly from Same Source)

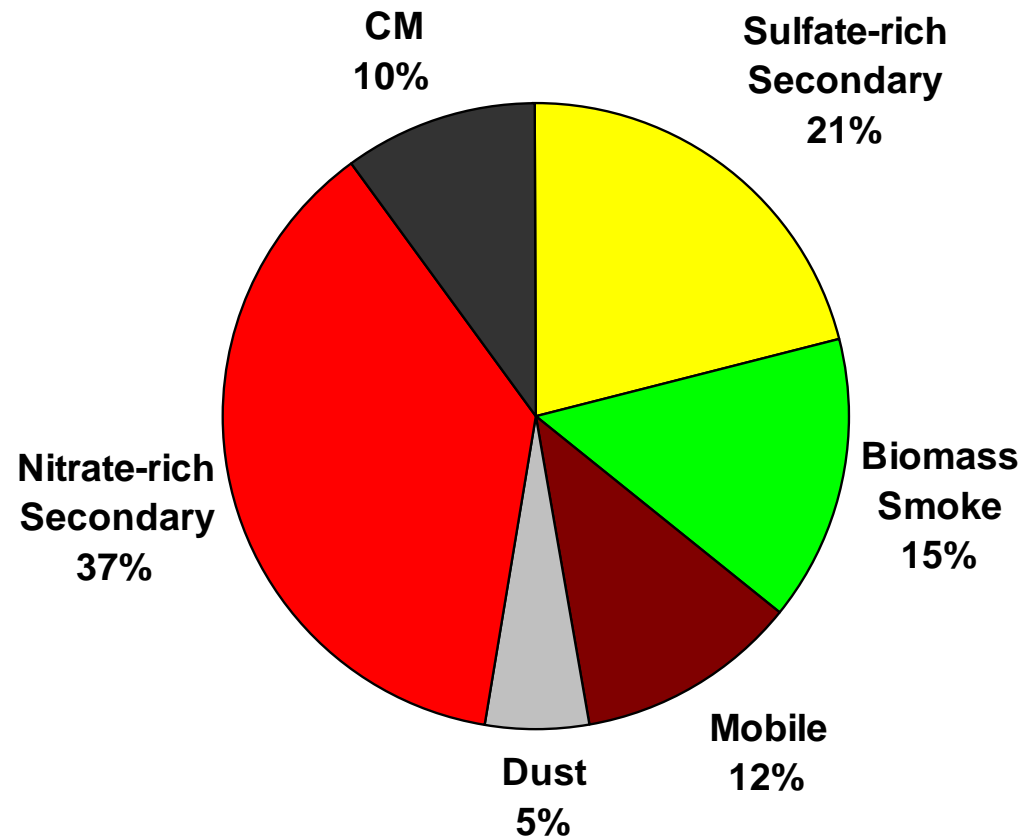


# Source Type Contributions to Haze

Western Gorge (Mt. Zion)



Eastern Gorge (Wishram)



# Interim Report

## Columbia River Gorge Visibility Project

### **Episode Analysis:**

- Purpose: to better understand periods of high haze by more detailed study.
- Describe characteristics of episodes to be modeled later. What features do models need to reproduce?
- Selected 2 winter and 2 summer episodes (winter episodes much hazier)
- February, July, August, and November 2004

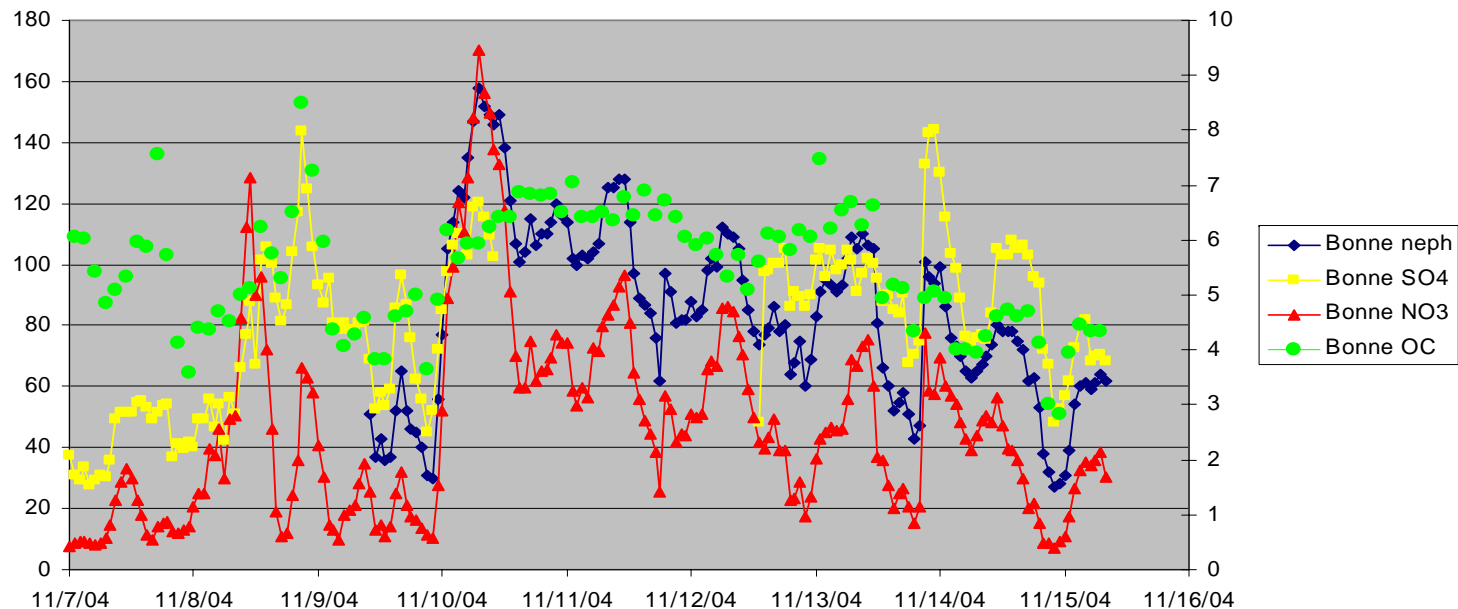
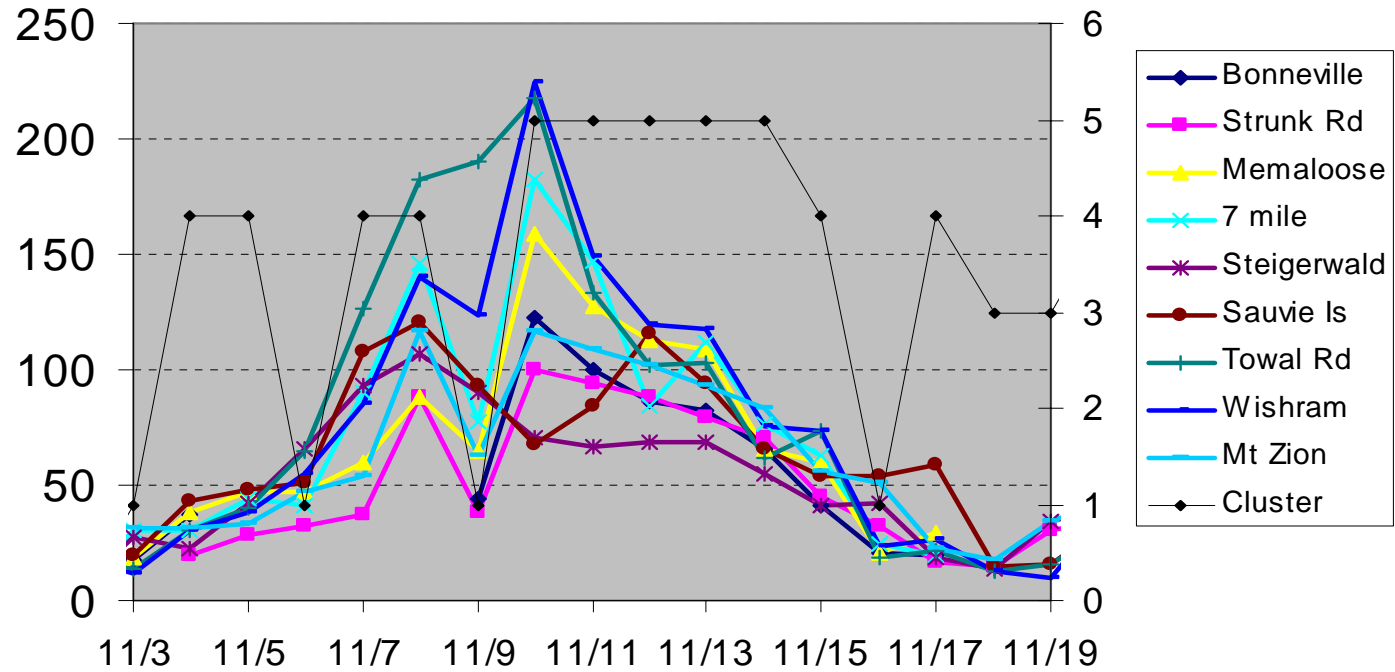
# Nov 2004 Episode

Worst haze at eastern sites, decreasing to west - easterly flow

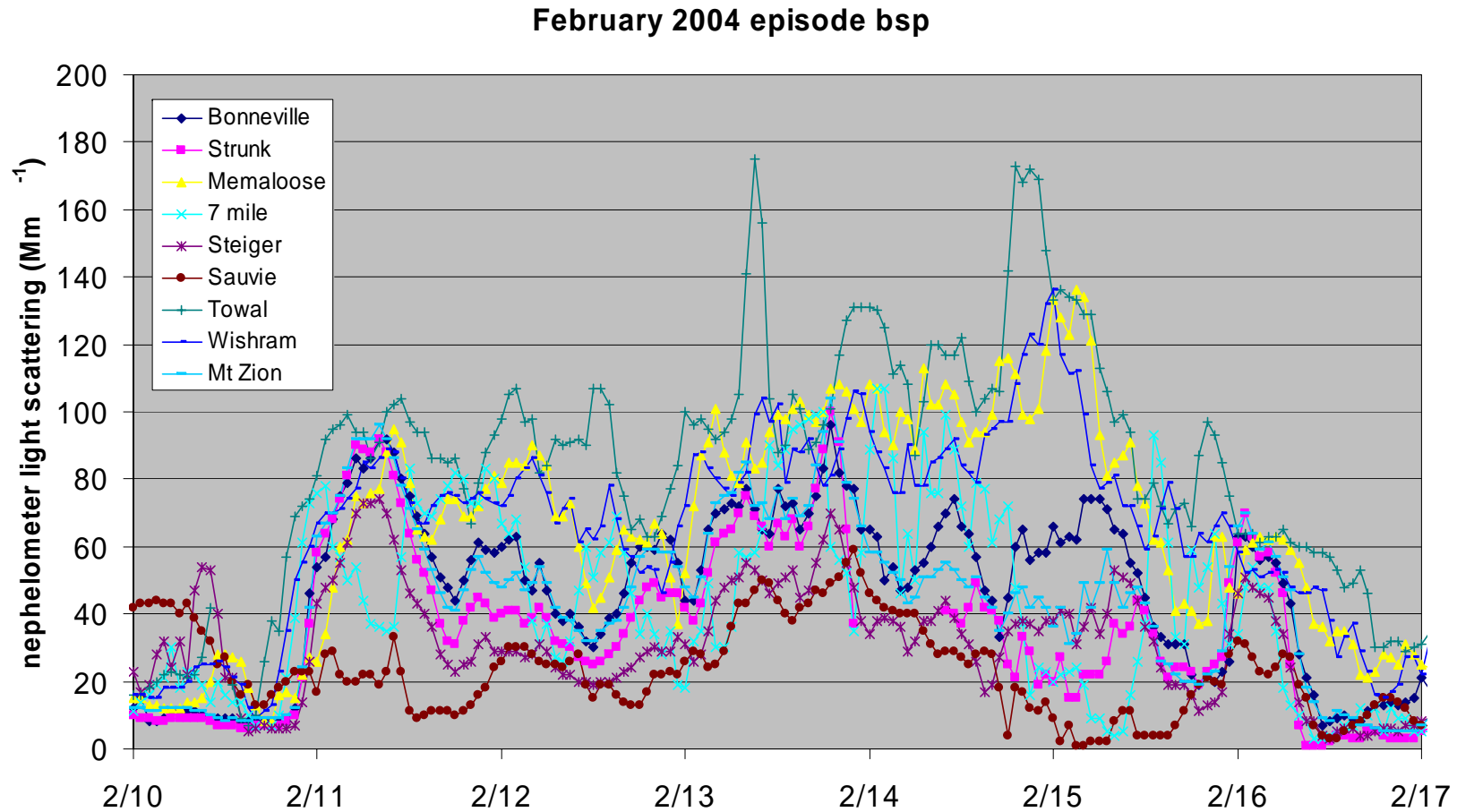
Worst episode of study: High OC, SO<sub>4</sub>, NO<sub>3</sub>

Biomass burning, NO<sub>3</sub>-rich factors dominant

Daily average bsp November 2004



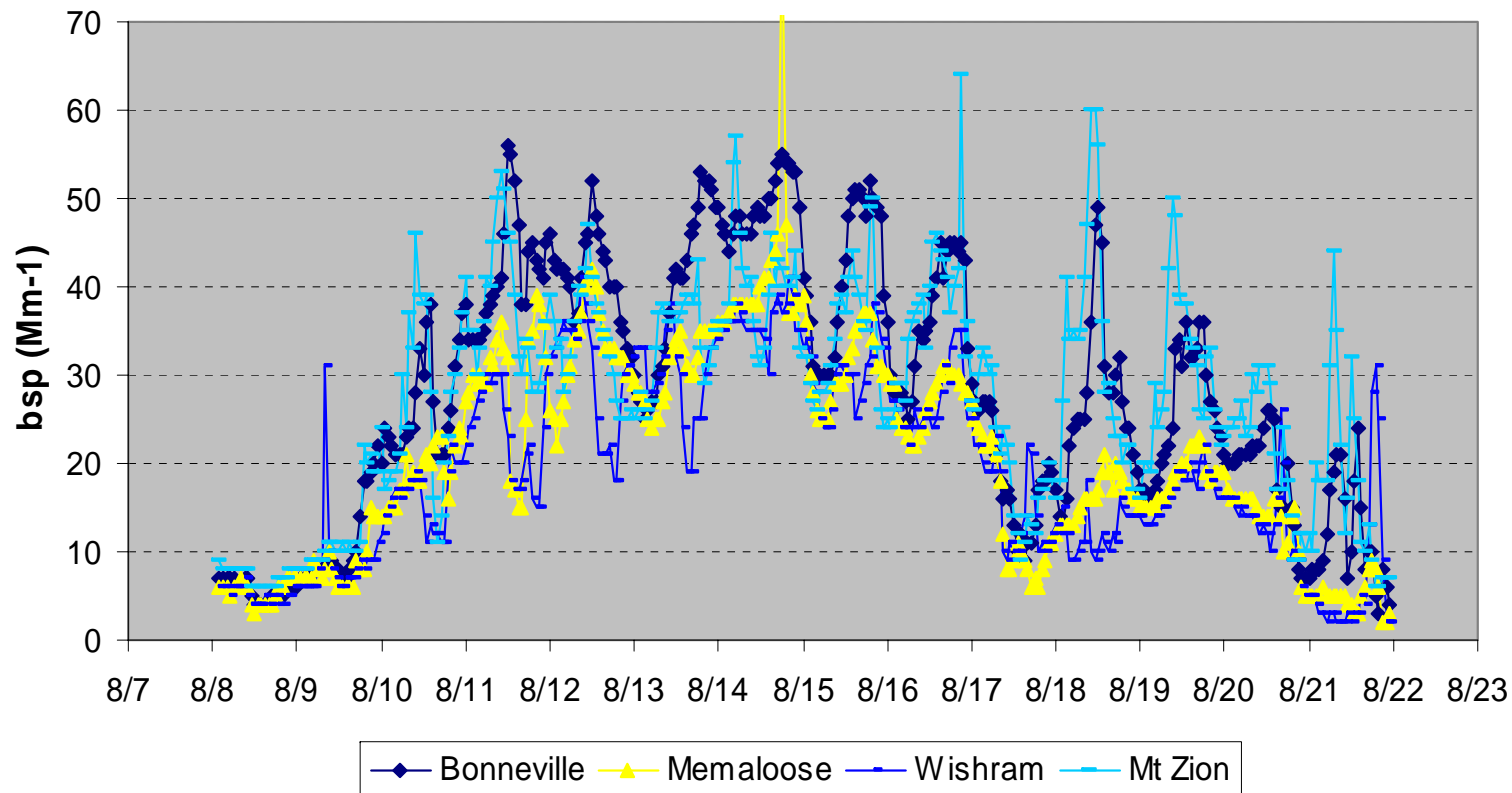
# February 2004 – Easterly Flow Highest Haze at Eastern Sites



Nitrate-rich secondary dominant source  
Sulfate-rich secondary also significant  
Some biomass burning

# August Episode – Light Westerly Flow Higher Haze at Western Sites

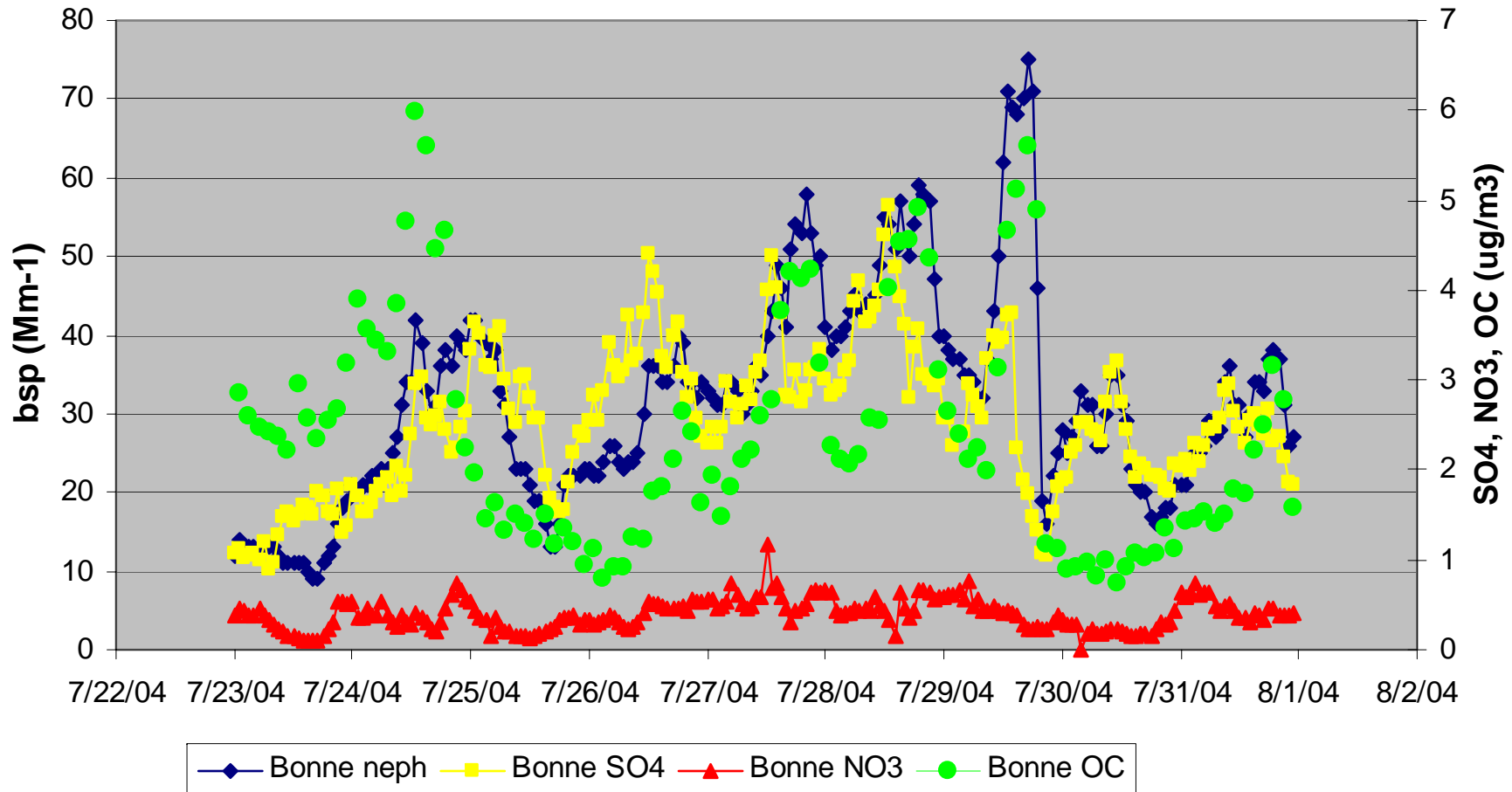
August 2004 episode hourly bsp at selected sites



OC and SO<sub>4</sub> about equally culpable - OC regional (fires)  
SO<sub>4</sub> more local unknown sources

# July 2004 Episode – Westerly Flow

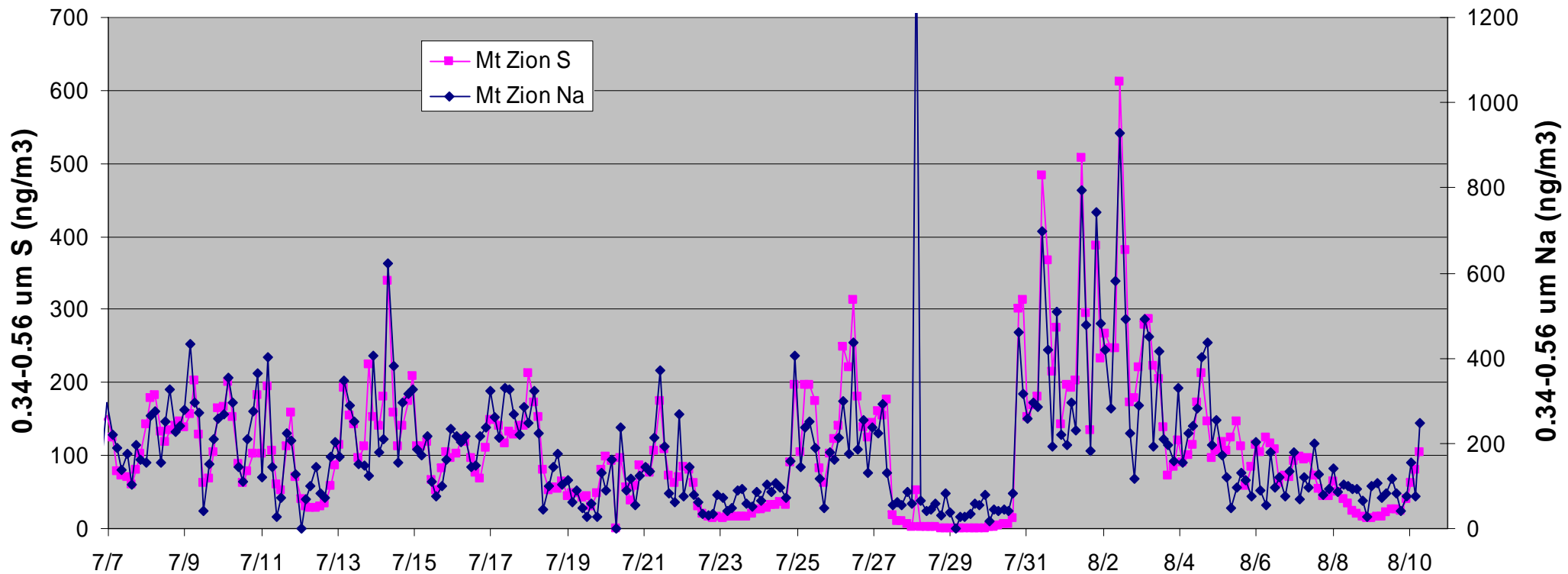
Bonneville July 2004 episode



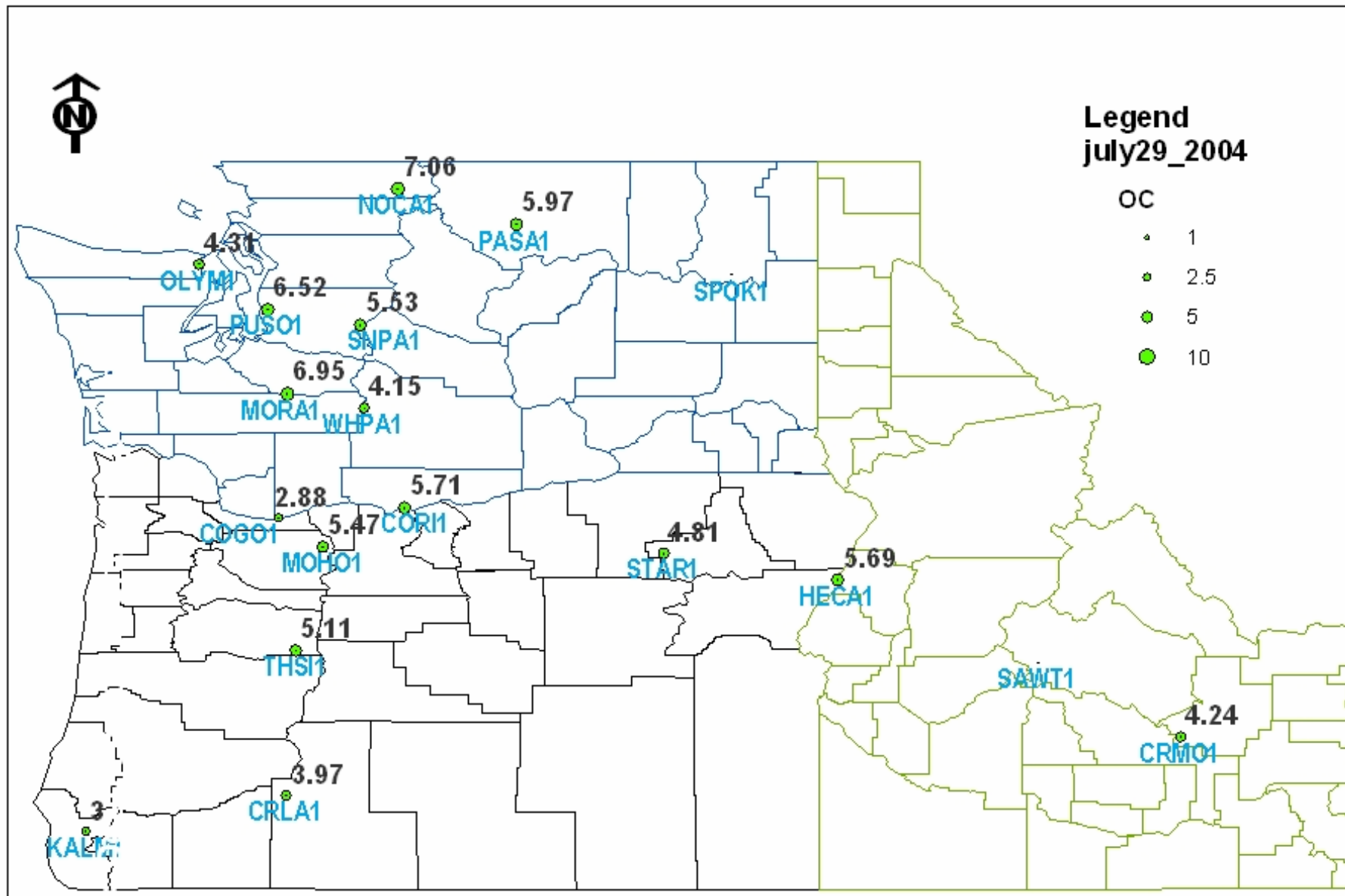
OC About 45% of Haze (regional-fires), SO<sub>4</sub> About 35% (more local) of Haze for Episode

# Close Tracking of Fine Sodium and Fine Sulfur Suggest Paper Mill Impacts to Sulfate

Mt Zion 0.34-0.56  $\mu\text{m}$  S vs Na July-Aug 2004



# OC High Throughout Northwest Due to Fires





# Interim Report

## Columbia River Gorge Visibility Project

### Recap of Preliminary CoHaGo Findings:

- Summertime haze mainly organics and sulfate - organics mainly burning
- Sulfate variety of sources, specifically including oil combustion (shipping), paper mill
- Portland Metro area contributing significantly in summer
- Wintertime haze worse than summer - nitrates, sulfates, and organics - sources mainly from the east
- Wood burning, Columbia River Basin cities, and Boardman power plant probable contributors to winter haze
- Some impact of The Dalles noted under certain conditions
- These findings will be further analyzed using existing source profiles in project's next phases: modeling and Summary Report.

# Interim Report

## Columbia River Gorge Visibility Project

### Next Project Steps:

#### Model Development & Performance Testing

- Monitoring identified, visibility events to be used in the modeling evaluation
- By April/May 2006, modeling will begin

#### Draft and Final Modeling Report: What Could the Future Look Like in 2018?

- A modeling assessment of current year conditions
- A 2018 visibility trend projection based on complex meteorology and emission changes due to growth and emission reduction strategies already required, but not yet implemented.
- Draft Modeling Report expected in early 2007
- Final Modeling Report expected in spring 2007



# Interim Report

## Columbia River Gorge Visibility Project

### Reprogramming for “What-if” Scenarios

- **Consistent with our August 2005 presentation involving DEQ’s budget cuts, we are still not able to participate in significant public outreach and policy development until after the final study results are available in 2007, if at all.**
  - We are reprogramming \$50K of facilitation money for “What-if” scenarios that were not part of the initial plan.
  - Designed to give decision makers more information.
  - Results from the hypothetical analyses will be reported as part of Draft and Final Modeling Reports in 2007
  - DEQ & SWCAA think this is a wise investment

# Interim Report

## Columbia River Gorge Visibility Project

- We have resources to conduct only a few model runs.
- Potential topics to be explored include: E.g. point sources, mobile sources, Portland plume, Boardman, cattle, other?
- Public will have the opportunity to offer comments during the informal CoHaGO report comment period, which starts today and extends to April 17, 2006.
- As a result, we request to move our annual presentation to you from August to September 2006 at which time we will have our decision on the specific model runs that will be done.



# Interim Report

## Columbia River Gorge Visibility Project

### **Other Programs Benefiting the Gorge:**

#### **I. Regional Haze**

- Regional Haze is a federal program required by the Clean Air Act to improve visibility in the nation's Class I wilderness areas and national parks (ex. Mt. Hood, Mt. Adams and Crater Lake).
- Oregon and Washington must develop regional haze plans by December of 2007. One of the key plan elements is to address the contribution of older industrial facilities to haze.
- DEQ has begun a process of identifying all industrial sources that could be subject to the Best Available Retrofit Technology (BART) requirements under the federal Regional Haze Rule.
- WDOE and SWCAA have begun a similar process with EPA.

# Interim Report

## Columbia River Gorge Visibility Project

- Under BART, certain older sources (over 250 tons potential to emit, built between 1962 and 1977) must be evaluated to see how much they contribute to regional haze, and if retrofitting with controls is feasible and cost effective.
- This involves a three-step process:
  - (1) determine BART eligibility,
  - (2) conduct a modeling analysis of regional haze impacts from eligible sources,
  - (3) and if they have a significant impact, conduct a BART analysis or “best retrofit” analysis for those eligible sources which significantly contribute to regional haze.

# Interim Report

## Columbia River Gorge Visibility Project

- The Regional Haze (BART) rule provides a well defined and established federal process to evaluate haze impacts and establish controls, if needed.
- PGE has volunteered to go first and analyze their impacts under the regional haze rule. PGE will be a pilot for all other BART sources in Oregon.
- DEQ is not presuming a particular outcome at this point. We are working with PGE to conduct the analysis step-by-step. We will know more by end of summer.
- PGE has started collecting information on emission control options.
- Any emission controls needed to address BART would also benefit visibility in the Gorge.

# Interim Report

## Columbia River Gorge Visibility Project

### II. CAMR: Clean Air Mercury Rule

- Federal rule requiring reduction in Mercury from coal fired power plants by 2018. Mercury caps become more stringent over time.
- DEQ currently working on a rulemaking proposal for June 2006.
- Several air initiatives converging (Gorge air issues, regional haze, acid rain phase II and mercury).
- DEQ taking a big picture view, and is evaluating a holistic, multi-pollutant approach to addressing regional haze, mercury, and acid deposition issues.



# Interim Report

## Columbia River Gorge Visibility Project

### **III. Oregon Diesel Initiative**

- Both DEQ and EPA are offering financial and technical assistance to help diesel fleet owners refit their existing engines with emission control technology.
- Tax incentive (35%) is available.
- Retrofit options include diesel truck fleets, locomotive and marine vessel engines.

### **IV. Clean Fuels**

- Low Sulfur fuels.

### **V. Regulations**

- MACT rules, Mercury rule, Oregon LEV and Washington's Clean Cars rules.

### **VII. Summary**

- It is these programs that are on-line and likely to benefit Gorge visibility. Their impacts will be considered with the study results when we report to you in August 2007.

# Interim Report

## Columbia River Gorge Visibility Project

### **Additional Items of Interest:**

- **Additional Fog/Water study by USFS performed in Winter 2005/Spring 2006**
  - We are awaiting the USFS response to our inquiries surrounding the necessary information to help us with our ongoing scientific efforts.
  - While we were not invited to participate in the first and subsequent Fog/Water study, we hope to consider USFS data in our decision-making.
- **SWCAA is hoping to have 1 - 2 Native American interns this summer assist with the Gorge project.**

# Interim Report

## Columbia River Gorge Visibility Project

### **Next Steps – Recap:**

**At our 2006 Annual Report to Gorge Commission, we will report:**

- Progress on model development and performance testing.
- Final CoHaGo report (Any significant changes in draft report based on comments).
- Hopefully, more details on outcome of Regional Haze BART analysis.

**In 2007, our Gorge Science Summary Report will summarize both the CoHaGo and Modeling reports. This Summary Report will also work on reconciling differences, if any, in the findings of the two prior reports.**

# Interim Report

## Columbia River Gorge Visibility Project

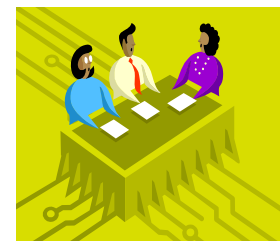
### **The Summary Report will provide:**

- A conceptual understanding of the causes of haze in the Gorge (CoHaGo).
- An understanding of historic trends.
- Enhanced knowledge and understanding of the complex processes that lead to the formation of haze in the Scenic Area so that informed management decisions can be made.
- A better understanding of emission regions, categories, and possible individual sources, both inside & outside the Scenic Area.
- An assessment of current year conditions with a model and a future year visibility trend projection based on complex meteorology and emission changes due to growth and emission reduction strategies already required, but not yet implemented (vehicle emission standards, fuel sulfur content, Regional Haze, etc.).
- A tool that will be capable of conducting hypothetical analysis to evaluate the impacts or effectiveness of additional control strategies.
- More data and insight than any other study performed in the USA with the complex terrain and meteorology of the Gorge.

# Interim Report

## Columbia River Gorge Visibility Project

- **We will combine this information with any supplemental work on acid deposition conducted by the USFS and Tribes.**
- **DEQ and SWCAA will then:**
  - Participate in any formal tribal consultation process the USFS sponsors.
  - Evaluate comments from the public, stakeholders, and local governments regarding the study results and plan for the future.
  - Meet (hopefully) with Washington Department of Ecology to discuss the study results and comments.
- **In August 2007, we will provide the Commission an assessment and a plan. It is premature today to know what they will be.**
- **You will be asked whether our assessment and plan meet the intent of the Scenic Area Management Plan.**



# Interim Report

## Columbia River Gorge Visibility Project

### **Conclusion:**

**Holding a public meeting tonight to update the public, receive comments, and answer questions:** Best Western Hood River Inn, Riverside Room  
1108 East Marina Way, Hood River  
6:30 p.m. – 8:30 p.m.

**Accepting public comments until April 17, 2006. Comments can be submitted to:** Paul Mairose: [paul@swcleanair.org](mailto:paul@swcleanair.org)  
Southwest Clean Air Agency  
11815 NE 99<sup>th</sup> St, Suite 1294  
Vancouver, WA 98682

**Full Project Reports on Web:** [www.gorgeair.org](http://www.gorgeair.org)  
[www.swcleanair.org/reports.html](http://www.swcleanair.org/reports.html)

**The Columbia River Gorge Visibility Project is on track,  
on schedule, and on budget!**

**Thank You!**