

## Columbia Gorge Air Study and Strategy Report



March 5, 2008

Oregon Department of Environmental Quality  
Southwest Clean Air Agency

1



## Columbia Gorge Air Study and Strategy Report

### **We'd like to talk with you about:**

- The status of Gorge haze and trends in the next decade.
- What we learned from our multi-year haze study (Causes of Haze).
- What the U.S. Forest Service and Tribes are learning about potential risks to ecosystems and cultural resources.
- What is being done now and what is on the horizon for reducing haze pollution.

2



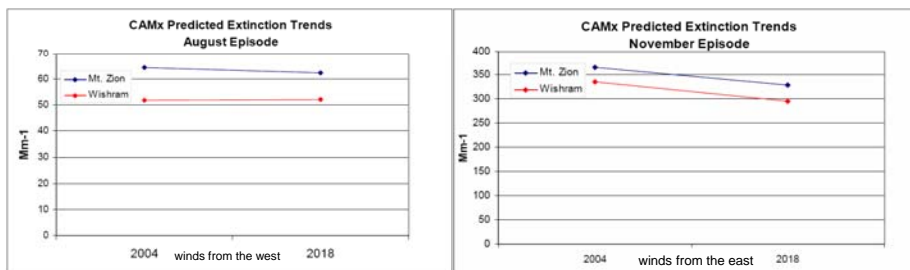
**Additionally:**

- PGE Boardman
- Regional ammonia emissions
- Regional Haze
- “Gorge Solution” emission reduction project concepts
- Your questions, comments, and ideas for addressing Gorge visibility issues.



**Haze in the Gorge ( $Mm^{-1}$ ):**

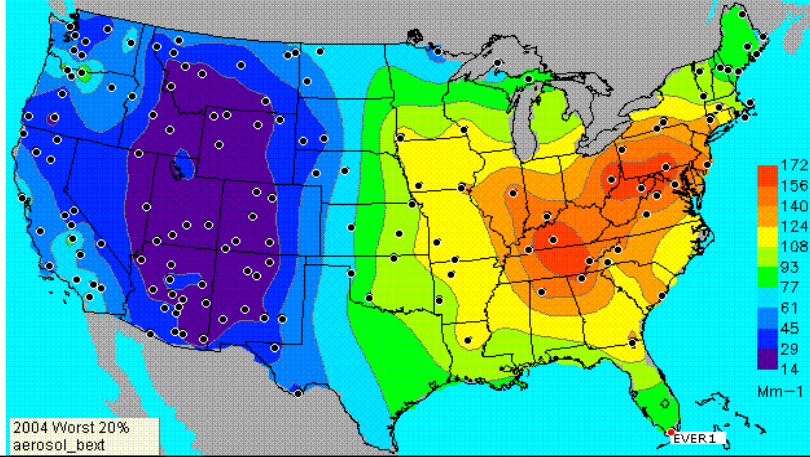
- Significant haze events occasionally occur in the Gorge. Haze is caused by natural and man-made sources from all over the Pacific Northwest. It can be worse than wilderness areas and better than urban areas because it has characteristics of each.
- Based on monitoring, current haze levels in the Gorge have not gotten worse in spite of regional growth pressures. (flat or slightly improving trend since late 1980s to early 1990s)
- Based on modeling, haze levels and visibility in the Gorge are expected to continue to improve slightly over the coming decade (to 2018).



### Contour Map of the Average of the 20% Worst Haze Days Particle Light Extinction for Remote - Area Monitoring Sites - 2004

Gorge haze levels are not as great as in the Eastern U.S., but are among the worst in the West

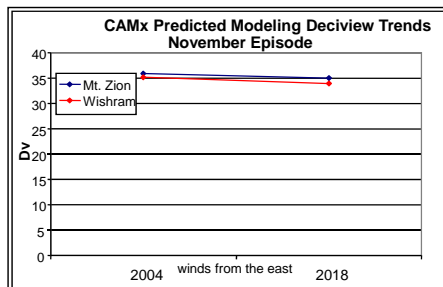
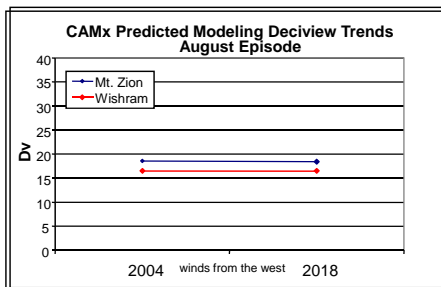
- Wishram (east Gorge) and Mt. Zion (west Gorge) have the highest and third highest haze measured at remote area monitoring sites in the Western U.S.
- Caused largely by winter stagnations that trap pollutants and fog that make the Columbia River Basin particularly productive in the generation of secondary PM from gaseous precursors



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### Haze in the Gorge (dv):

- Significant haze events occasionally occur in the Gorge. Haze is caused by natural and man-made sources from all over the Pacific Northwest. It can be worse than wilderness areas and better than urban areas because it has characteristics of each.
- Based on monitoring, current haze levels in the Gorge have not gotten worse in spite of regional growth pressures. (Flat or slightly improving trend since late 1980s to early 1990s)
- Based on modeling, haze levels and visibility in the Gorge are expected to continue to improve slightly over the coming decade (to 2018).





### Haze in the Gorge:

- Future haze trend is improving and this is encouraging.
- From the agencies' perspective, this trend is consistent with the intent of the National Scenic Area Act to protect and enhance resources.
- The agencies' strategy is designed to produce continued improvement in visibility associated with man-made emissions.
- The specifics will be described in subsequent slides.

7



### Special Issues of Concern:

#### A. PGE Boardman Coal-Fired Power Plant

- In 2008, DEQ will recommend emission controls for Boardman. DEQ will initiate a full public process later this year.
- Boardman is being evaluated for emission controls as part of the Regional Haze program. Depending upon the modeling information used it affects visibility in the Gorge up to 2.3 to 4 dv. Dr. Jaffe's study shows that impacts could be higher on some days. All studies confirm that Boardman has a significant impact on visibility. Boardman also affects many WA & OR wilderness areas.
- Several options are being evaluated for oxides of nitrogen (NOx) and sulfur dioxide (SO<sub>2</sub>) reduction. Feasibility of retrofitting is one of several very important considerations. Costs could top \$300 - \$400 million.
- DEQ will seek fastest installation possible. Engineering and installation will realistically take 3-5 years. (Neither quick, nor easy.)
- Washington BART source analysis is expected in 2009.

8



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### B. Regional Ammonia

- Science studies point to importance of regional ammonia in the formation of haze. Ammonia plays a key role in haze chemistry. Combines with NO<sub>x</sub> and SO<sub>2</sub> to form light scattering particles (sulfates and nitrates).
- The agencies' What-if Analyses showed that the effect of total regional confined animal feeding operation (CAFO) ammonia with the exception of one day, ranges from 0 to 5.4 dv. This highlights the importance of regional ammonia.
- There are many sources of ammonia, including transportation, agricultural fertilizer use, and regional animal feeding operations, including dairies.
- The agencies' study shows the importance of regional ammonia in haze formation. More work needs to be done to better understand and estimate ammonia emissions from all sources, including general agriculture and CAFOs, a subset of which includes dairies.

9



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### C. Dairies

- Oregon Dairy Task Force convened in January to evaluate dairy emissions and explore options for reducing those emissions. Report expected in July 2008. [www.deq.state.or.us/aaq/dairy/index.htm](http://www.deq.state.or.us/aaq/dairy/index.htm)
- DEQ and SWCAA hope Task Force will recommend an emission reduction approach. Using the Task Force's report as a springboard, the agencies would also like to explore potential for bi-state collaborative project for reducing ammonia at Oregon and Washington dairies (other sources).
- Beyond the Dairy Task Force, other sources of regional ammonia should be evaluated as part of future federal Regional Haze work.

10



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**D. Risk to Natural and Cultural Resources**

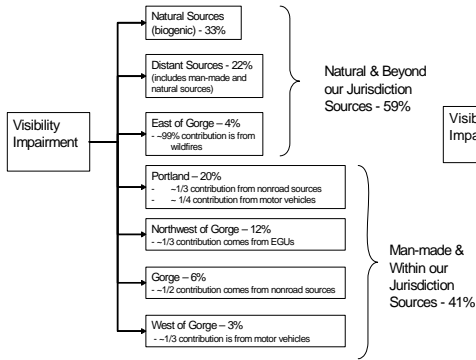
- The U.S. Forest Service (USFS) and Gorge-area Native American Tribes have begun important research into acid deposition and potential risk to cultural and ecosystem resources. More information is needed on current levels of acid deposition and the amount of pollution at which cultural artifacts and ecosystems are affected (critical loads).
- The DEQ and SWCAA encourage the USFS and Tribes to continue this important research. The agencies are happy to participate in design of new studies and peer review of study results.
- Pollutants that cause haze also contribute to acid deposition. Therefore, many of the current and upcoming strategies will also help reduce acid deposition in the Gorge and reduce risks to cultural and natural resources. A new National Park Service study discusses the importance of both local and distant (Asia & Europe) emission sources in the long-range transport of pollution.
- The Agencies cannot fund or lead any new studies for acid deposition or ecosystem impacts.



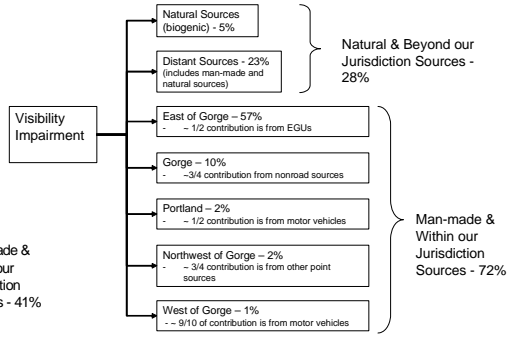
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## Overview of Haze Contributors - 2004

August 2004 – Contributing Sources to Haze at Mt. Zion (western end)



November 2004 – Contributing Sources to Haze at Wishram (eastern end)



- Because haze comes from so many places, no single action can dramatically improve (fix) haze in the Gorge.
- There are strategies that can help make small but meaningful improvements.
- Haze reduction will come over time as many different strategies across the region act together to reduce emissions.
- Something is being done now, or will soon be done, about each of the significantly contributing source categories. (Section VII)

13

### Computer Simulations of Haze Superimposed On a Gorge Photo to Show How Much of the August Haze is Beyond Regional Control

August 2004 episode at Mt. Zion (particle light extinction = 12.8 dv)

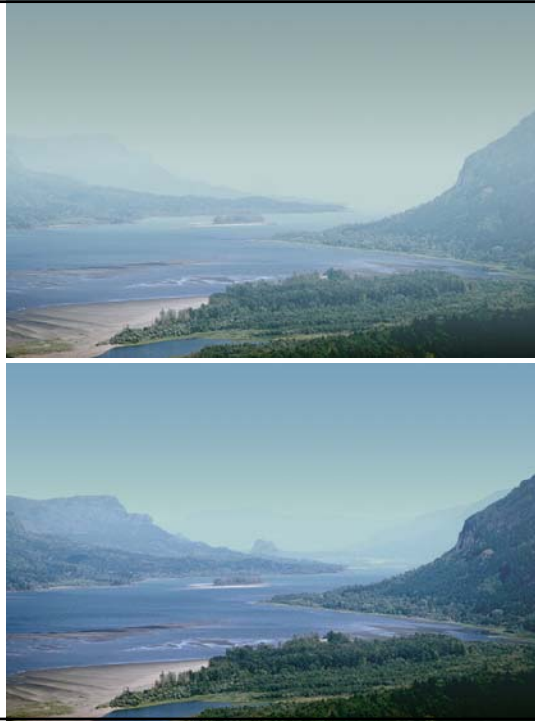
August 2004 episode with **only natural and distant source** contributions to haze (particle light extinction = 7.9 dv)





**Computer Simulations of Haze Superimposed On a Gorge Photo to Show How Much of the November Haze is Beyond Regional Control**

**November 2004** episode at Wishram (particle light extinction = **29.4 dv**)

November 2004 episode at Wishram with **only natural and distant source** contributions to haze (particle light extinction = **16.9 dv**)



  <b>Columbia Gorge Air Study and Strategy Report</b>			
<b>Identified Controllable Sources and Proposed Strategies to Address Them</b>			
<b>Emission Source Category or Region Contributing to Haze</b>	<b>Current &amp; Existing Federal and Statewide Strategies</b>	<b>New Emission Reduction Strategies</b>	<b>Potential Future Strategies and Concepts</b>
<i>Electrical Generating Units (EGU)</i>		Federal Regional Haze Program BART controls	
<i>Motor Vehicles</i>	Motor Vehicle Inspection Program – fleet turnover	Low Emission Vehicle Standards	
<i>Nonroad Sources</i> – typically diesel engines, which include: <ul style="list-style-type: none"> <li>• trucks</li> <li>• construction equipment</li> <li>• farming equipment</li> <li>• locomotive engines</li> <li>• marine engines</li> </ul>	Ultra-low sulfur diesel fuel	Ultra-low sulfur diesel fuel	Bi-State Solutions - Columbia River Regional Diesel Emissions Reduction Project
	Diesel Retrofit on School Buses	Diesel Retrofits for Local Government Fleets	
<i>Area Sources</i> <ul style="list-style-type: none"> <li>• woodstoves</li> <li>• open burning</li> <li>• secondary aluminum plants</li> <li>• auto body refinishing shops</li> </ul>	Woodstove smoke Reduction Project – Woodstove Changeouts	Federal Air Toxics Source Standards	Oregon's Heat Smart Woodstove Upgrade Initiative
	Federal Air Toxics Source Standards		



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### Sources and Proposed Strategies

Emission Source Category or Region Contributing to Haze	Current & Existing Federal and Statewide Strategies	New Emission Reduction Strategies	Potential Future Strategies and Concepts
<i>Pulp Mills</i>	Federal Air Toxics Source Standards	Federal Regional Haze Program	
		BART controls	
<i>Other Point Sources</i>		Federal Regional Haze Program	Federal Air Toxics Source Standards
		BART controls	
<i>Burning</i> • prescribed forestry • agricultural		Smoke Management Program	Agricultural Burning
<i>Portland-area Emissions</i>	Federal Air Toxics Source Standards	Federal Air Toxics Source Standards	Bi-State Solutions - Columbia River Regional Diesel Emissions Reduction Project
	Portland ozone maintenance plan	Portland Air Toxics Solutions plan	
<i>Dust</i>			Dust Management Plan for the Gorge

17



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### Sources and Proposed Strategies

Emission Source Category or Region Contributing to Haze	Current & Existing Federal and Statewide Strategies	New Emission Reduction Strategies	Potential Future Strategies and Concepts
<i>Ammonia</i> • agricultural operations (fertilizer) • dairy operations			Potential Gorge Solutions Agricultural Emissions Reduction Project
			Oregon's Dairy Task Force Recommendations
<i>Acid Rain &amp; Fog Water Chemistry</i>			U.S. Forest Service Additional Studies
<i>Ozone</i>	Portland ozone maintenance plan		State Greenhouse Gas Initiative
<i>Growth in new or expanding major industrial sources</i>	Prevention of Significant Deterioration (PSD) permits		
<i>Tribal and Cultural Issues</i> • fish (mercury) • rock images		Oregon's Utility Mercury Rule	

18



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### Focus on New Actions and Other Follow-up

- PGE Boardman rule and other BART source work in OR and WA
- Consideration of Dairy Task Force report and recommendations.
- Development of federal Regional Haze Plan updates:
  - 2008: Main focus is on BART
  - 2012-13: Evaluate other sources, smoke (Agriculture & Forestry), other industry, contribution of regional ammonia
- Additional study of risks to cultural and natural resources by USFS/Tribes.
- Continued visibility monitoring in Gorge for progress tracking (USFS)
- DEQ and SWCAA available to meet with Tribes and others
- Pursue Gorge Solutions project & explore other potential projects

19



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### **Collaborative Emission Reduction Projects: “Gorge Solutions” National Policy Consensus Center (NPCC) - PSU**

#### **The Value of the Solutions Model**

**A Neutral Forum** – a place where various interests and stakeholders can come together on an equal footing with an impartial convener to identify options and develop collaborative solutions. This approach tends to be more neutral than a project hosted or conducted by one of the participants at the table.

**Multi-Sector Participation** – Projects are more likely to be successful if resources and ideas are contributed by businesses and non-governmental organizations. The Solutions model ensures that the private and non-profit sectors participate in project implementation with governmental partners from the federal, state and local levels.

**State Agency Cooperation** – The Governors designate projects and appoint conveners to chair the project teams. This brings with it the cooperation and engagement of state agencies.

**A Declaration of Cooperation** – Signed by each of the participating team members. Clear statement of commitments and agreements of the participating parties, thus improving accountability. Serves as a framework for implementation. Provides a vehicle for attracting additional funding to a project.

**Proven Experience** – This model has been applied to over 30 collaborative projects over the past 3 years, engaging all levels of government, the private and non-profit sectors, and local citizen groups.

- Provided by NPCC/PSU

20



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### Gorge Solutions Project Concepts in Development:

NPCC has a contract to develop Gorge Solutions possible concepts, including:

- 1) Columbia River Regional Diesel Reduction group. Form a 'Solutions' group, co-convened by the Governors of Washington and Oregon to enhance the sustainability of freight transport in the Portland-Vancouver area and Columbia River Corridor.
- 2) Truck stop electrification to provide electrification at truck stops along the I-5 corridor and into the I-84 corridor.
- 3) Clean diesel for state and municipal construction equipment used in the Gorge.

These concepts will be vetted by the OR and WA Governors' offices.

Additionally, DEQ would like to: A) explore the possibility of a collaborative "Solutions" model for a bi-state ammonia reduction project(s), after the Oregon Dairy Task Force work is complete, and B) hear your ideas today.

21



## Columbia Gorge Air Study and Strategy Report

### Conclusion

The Agencies believe they have met the charge given them by the Gorge Commission in 2000 and respectfully request its concurrence on the following package of four key conclusions and recommendations:

1. The air agencies have:
  - a) Monitored air pollution and visibility levels in the Gorge, and
  - b) Analyzed monitoring and emissions data to identify the sources, both inside and outside the Gorge, that contributes to air pollution.
2. The Gorge strategy is grounded in the chief conclusions of the air agencies' science study that no single action can feasibly be taken to dramatically improve (fix) Gorge visibility, but visibility improvement can only be accomplished through the cumulative effect of many different emission reduction efforts. Any viable approach to achieve further visibility improvement in the Gorge must involve all the governmental entities, stakeholders, and agencies working together to implement a combination of:
  - a) Current and existing federal and statewide strategies for regional air pollution reduction;
  - b) New emission reduction strategies and projects that focus specifically on Gorge visibility improvement;
  - c) Pursuit of future strategies and concepts to benefit the Gorge as they are developed and become available.

22



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### Conclusion, continued

- 3) In five years, (2013), the air agencies will conduct a progress assessment to verify whether visibility improvements in the Gorge attributed to man-made sources have occurred as expected. The agencies will also update the Gorge Commission on the implementation of current and new strategies and the development of potential future strategies.
- 4) The air agencies will continue to work as needed with all affected agencies, stakeholders, elected officials, the public, and Native American Tribes, and will be open to reviewing new research conducted by the USFS, Native American Tribes, and others as it is developed.

23



## Columbia Gorge Air Study and Strategy Report

### Comments:

- DEQ and SWCAA will do a summary of your comments/suggestions.
- We will share this summary with the Columbia Gorge Commission as part of our report at their April 8<sup>th</sup> meeting. The report will include the Agency strategies.
- Review Gorge air studies at: [www.deq.state.or.us/aq/gorgeair/scienceday.htm](http://www.deq.state.or.us/aq/gorgeair/scienceday.htm)
- You can also send us your thoughts through the web: [www.gorgeair.org](http://www.gorgeair.org) by **March 19, 2008**. The Agencies encourage commenters to use the survey form.
- Alternatively, please mail your survey form by March 19<sup>th</sup>:

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24