Regional Haze in Oregon

- Regional Haze Background
- Oregon’s Class I Areas
- Regulatory Background
- Overview of the Regional Haze Rule

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What is Visibility?

~ *Scientifically Speaking*:

- Visibility is a function of “light scattering” and “light absorption” – the combination of these cause “light extinction”.

~ *Generally Speaking*:

- Visibility is simply a matter of “how far” and “how well” a person can see a distant object.
Visibility at
Crater Lake National Park

Good Visibility Day
Visual range >150 miles

Bad Visibility Day
Visual range <50 miles
Natural Conditions that affect Visibility

- The best visibility is over **200 miles**. Limited by the natural light scattering in the atmosphere.
- Sun angle - the position in relation to the viewer and the target.
- Natural conditions that cause impairment:
  - clouds, rain, mist
  - relative humidity (RH) - a major influence on certain pollutants.
  - wildfire, dust, volcanic, pollen, and sea salt.
Air Pollution and Visibility

- Small amounts of air pollution can have significant effect on visibility.
- Typical visual range in Cascades is 50-200 miles.
- Visibility measured in Deciview:
  - 1 deciview is perceptible change to most people.
  - 0.5 deciview is the “limit of perceptible change.”
5 Fine Particles of Concern

1. **Sulfates*** - from combustion of fuels containing sulfur (e.g., coal power plants)

2. **Nitrates*** - high temperature combustion, mostly motor vehicles

3. **Organics*** - from wood burning, motor vehicles, industry

4. **Elemental Carbon** - incomplete combustion, typically wood burning

5. **Soil Dust** – agricultural fields, roads, natural dust

* formed by gas-to-particle conversion in atmosphere
What is Regional Haze?

- Air pollution from many sources that travels long distances into scenic areas such as national parks and affects visibility (the scenic view).
Sources of Regional Haze

Wildfire

Slash Burning

Field Burning

Motor Vehicles

Road Dust

Woodstoves

Sources of Pollution

Organic Carbons

Sulfur Dioxide

Nitrogen Oxides

Nitrogen Oxides
Average Visibility in U.S. (IMPROVE data)

Source: Introduction to Visibility Report, 1999
What are Class I Areas?

Class I areas in the United States, the West and Oregon
**Definition of a Class I Area**

- Areas designated by US Congress on August 7, 1977:
  - National Parks over 5,000 acres
  - Wilderness areas over 6,000 acres

- Visibility was identified as an important value in these natural areas. A total of 156 Class I areas in the country (see map).

- Oregon has 12 Class I areas (see map).
Class I Areas in US

NP  National Park
IP  International Park
NM  National Monument
NS  National Seashore
W  Wilderness
Mt. Hood Wilderness Class I Area

47,160 acres
Mt. Jefferson Wilderness Class I Area

107,008 acres
Mt. Washington Wilderness Class I Area

52,516 acres
Three Sisters Wilderness Class I Area

285,202 acres
Diamond Peak Wilderness Class I Area

52,337 acres
Crater Lake National Park Class I Area

183,315 acres
Mountain Lakes Wilderness Class I Area

23,071 acres
Gearhart Mtn Wilderness Class I Area

22,809 acres
Kalmiopsis Wilderness Class I Area

179,700 acres
Strawberry Mtn Wilderness Class I Area

69,350 acres
Eagle Cap Wilderness Class I Area

360,275 acres
Hells Canyon Wilderness Class I Area

131,033 acres
Clean Air Act Background and Work of the Grand Canyon Visibility Transport Commission
What is a SIP?

• State Implementation Plan

• Describes plans and strategies state will use to meet Clean Air Act and federal rules.

• SIPs refer to state rules and regulations and other enforceable measures
1977 Clean Air Act

• Prevention of Significant Deterioration (PSD) rules, to protect AQ & Class I area visibility from major new or modified industrial sources.

• Set National Visibility Goal:

   *Remedy any existing and prevent any future impairment of visibility from man-made emissions in Class I areas.*

• Required EPA to adopt rules (in addition to PSD) to protect visibility and meet the national goal.
EPA 1980 Visibility Rules

- Adopted rules to address visibility impairment from sources near Class I areas, where direct impacts could be shown.

- EPA postponed adopting Regional Haze rules until more study could be conducted.
1990 Clean Air Act

• Increased focus on regional haze problem.

• Gave EPA authority to establish “visibility transport commissions”.

• Required EPA to establish a visibility transport commission for the Grand Canyon National Park.
Regional Haze in Grand Canyon National Park Clear Day
Regional Haze in Grand Canyon National Park Average Day
Regional Haze in Grand Canyon National Park
Bad Day
Grand Canyon Visibility Transport Commission (GCVTC)

- Established 1991 to focus on regional haze in 16 Class I areas of the Colorado Plateau.
- 9 states, including Oregon, identified as “Transport Region States”.
- Conducted 4 years of technical work on regional haze problem.
- Identified strategies to address regional haze.
- GCVTC recommendations became the basis for EPA adopting RHR in 1999.
GCVTC Membership

• Governors (or Designees) of States
  Arizona (Chair) Nevada
  Utah (Vice Chair) New Mexico
  California Oregon
  Colorado Wyoming

• Native American Tribal Leaders
  The Navajo Nation The Hopi Tribe
  The Pueblo of Acoma The Hualapi Tribe

• Ex-officio Members
  US Forest Service
  US Environmental Protection Agency
  US Fish & Wildlife Service
  Columbia River Inter-Tribal Fish Commission
  Bureau of Land Management
  US National Park Service
9 Transport Region States

16 Class I areas of the Colorado Plateau
The WRAP

- The Western Regional Air Partnership - voluntary organization of western states, tribes, federal agencies, and stakeholders.
- Successor to the GCVTC – to carry forward the Commission’s work.
- Developed policies & doing the technical work for States to meet the Regional Haze Rule.
EPA’s Regional Haze Rule
Overview of the EPA’s Regional Haze Rule

- Adopted by EPA July 1999
- To address visibility problems in 156 federally designated Class I scenic areas in the U.S.
- Rule addresses ALL SOURCES of air pollution - industry, motor vehicles, fire, and dust.
Overview of the EPA’s Regional Haze Rule

• Must make “Reasonable Progress” in improving regional haze. Focused on:
  ✓ Improving 20% worst visibility days.
  ✓ Protecting (no degradation) of 20% best visibility days.

• For 20% worst days:
  ▪ achieve “natural visibility conditions” in 60 years, or by 2064.
  ▪ establish a “uniform rate of progress” for each Class I area.
Overview of the EPA’s Regional Haze Rule

- State must adopt a regional haze plans, update every 5 yrs.
- First haze plan must show progress by 2018 Milestone.
- First plan must address BART (Best Available Retrofit Technology). Applies to larger industrial sources pre-1977, before Class I visibility protection was required.
- First plan must contain Long-Term Strategy for making future improvements.
A 60-year goal

20% WORST Days

Crater Lake NP

20% BEST Days

Crater Lake NP

Oregon’s 12 Class I areas:
- improve the “worst” days
- protect the “best” days

Show “Reasonable Progress”

DEQ adopts Regional Haze Plan in 2009

Achieve Natural Conditions

present day

2064

20% WORST Days

20% BEST Days

No Degradation
What’s in the Oregon 2009 Regional Haze Plan?

1. Comprehensive analysis of regional haze in Oregon’s 12 Class I areas.


3. Demonstration how Oregon is showing “Reasonable Progress” by 2018 Milestone.

4. Long-Term Strategy of how visibility improvements will be made in next 10 years.

5. DEQ’s BART review, including PGE Boardman Power Plant controls and visibility improvement from BART.
Crater Lake National Park

20% Best Day
2 dV = 200 miles
Crater Lake National Park

20% Worst Day

14 dV = 50 miles
Is Oregon going to meet the 2018 Milestone?

• Yes, for protecting the “best” or clearest days.

• Too early to tell for “worst” days. Can show “reasonable progress” based on following:

  1. Significant visibility improvements expected from PGE Boardman BART

  2. Natural sources - wildfire and dust – are obstacles to visibility improvements.

  3. Trends in “man-made” pollutants (SO2 & NOx) show much improvement by 2018. Additional visibility improvements expected from “on-the-books” regulations, especially for mobile sources.
Protection of Columbia Gorge NSA

- Not a Class I area - not directly addressed under Oregon Regional Haze Plan.

- Will see some benefits under Oregon RH Plan, mostly due to BART requirements for PGE Boardman power plant.