Air Quality Trends in and Around the Columbia Gorge Scenic Area

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Sponsored by Klickitat County

Klickitat County with Air Sciences have been active participants in the Gorge AQ study since the initial stages of the project.

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Introduction

- No recent analysis of the long term AQ trends in the region.
- Therefore, Klickitat County sponsored a study to look at the long term AQ trends in and around the Columbia Gorge Scenic Area to add to the current knowledge base of the project.

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Background

- In 2003, Air Sciences provided a brief summary of the AQ trends for the Gorge Commission.
  - The results of that summary concluded that, in general, air quality is improving in the urban areas and that visibility in the region is not getting worse, but was maintaining a constant level.
- This current work expands on that 2003 work by including several more years of data and including more recently available stations.

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The Punchline

- All long term (> 7 years) stations show a downward (improving) trend in AQ.
- Shorter term stations (3 to 7 years) are either flat or show a downward trend.
- No station shows an long term upward trend

  NOTE: Since 1990, PDX/Vancouver Metro area has seen ~40% increase in population and vehicle miles traveled (VMT).
- Because of variability in natural atmospheric processes, more than 5 years of data are needed to see a statistically significant trend.

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Data sources

- All data publicly available
  - Oregon DEQ 2004 and 2005 Annual Reports
  - For Washington, used EPA's Aerometric Information Retrieval System (AIRS) database.
  - For IMPROVE sites, used Interagency Monitoring of Protected Visual Environments (IMPROVE) database and the Visibility Information Exchange Web System (VIEWS).

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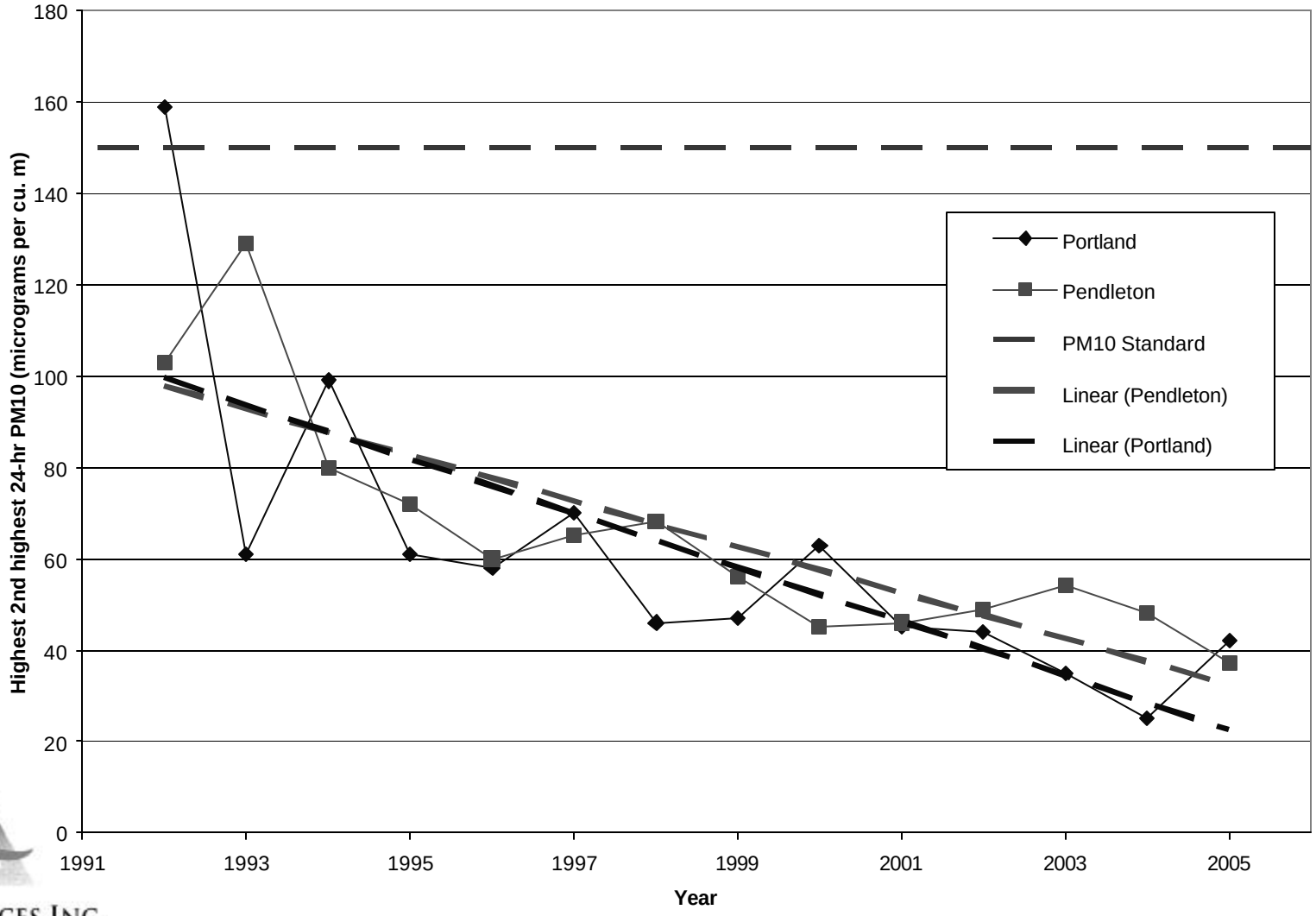
Parameters Considered

- For urban area sites:
  - Looked at NO_2, PM_{10}, $PM_{2.5}$, ozone, and light scattering
- For Regional Haze (IMPROVE) sites
  - Looked at best, middle, and worst 20% day extinction (haziness)

Maximum PM_{10}



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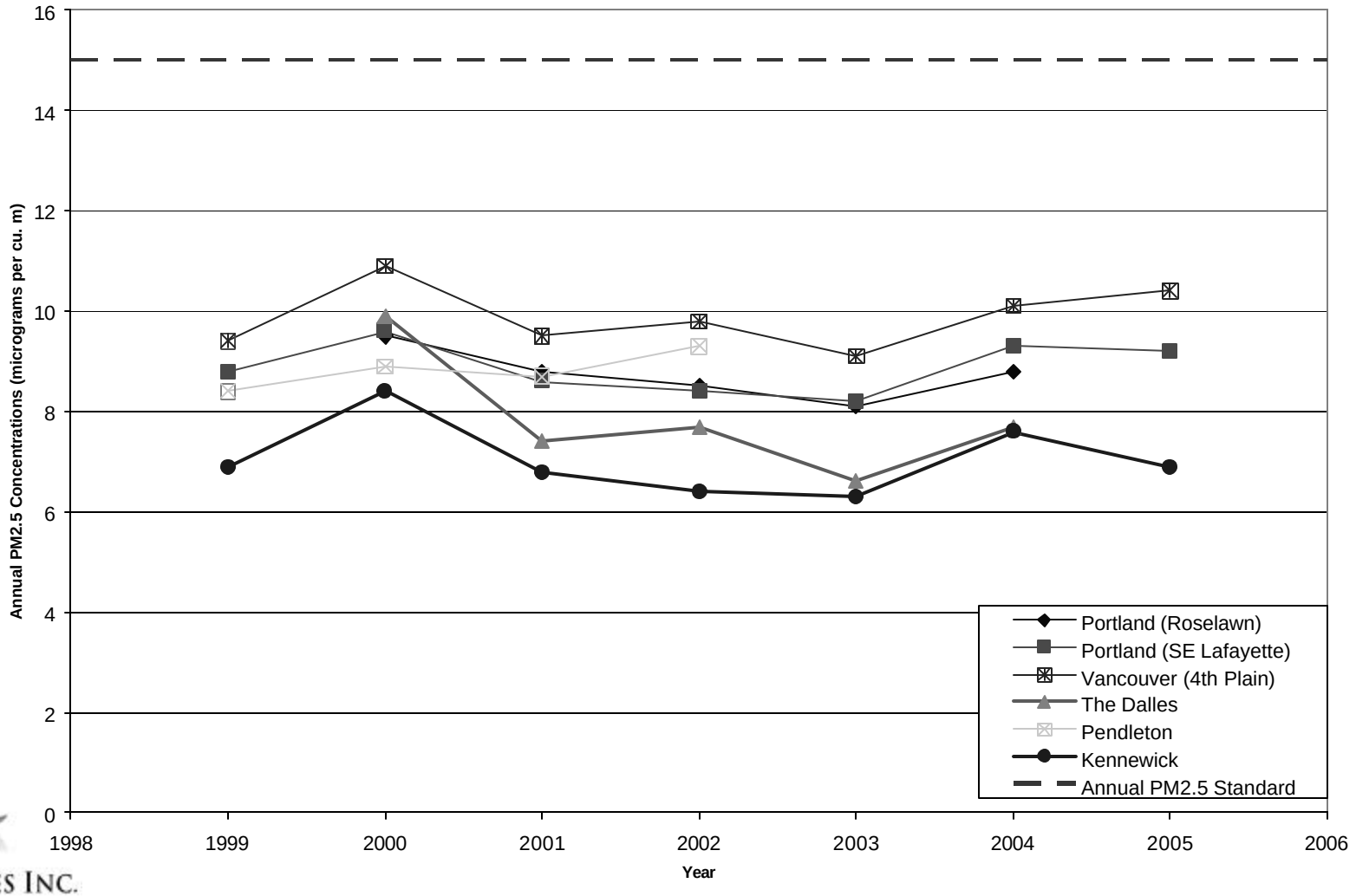
Annual $PM_{2.5}$



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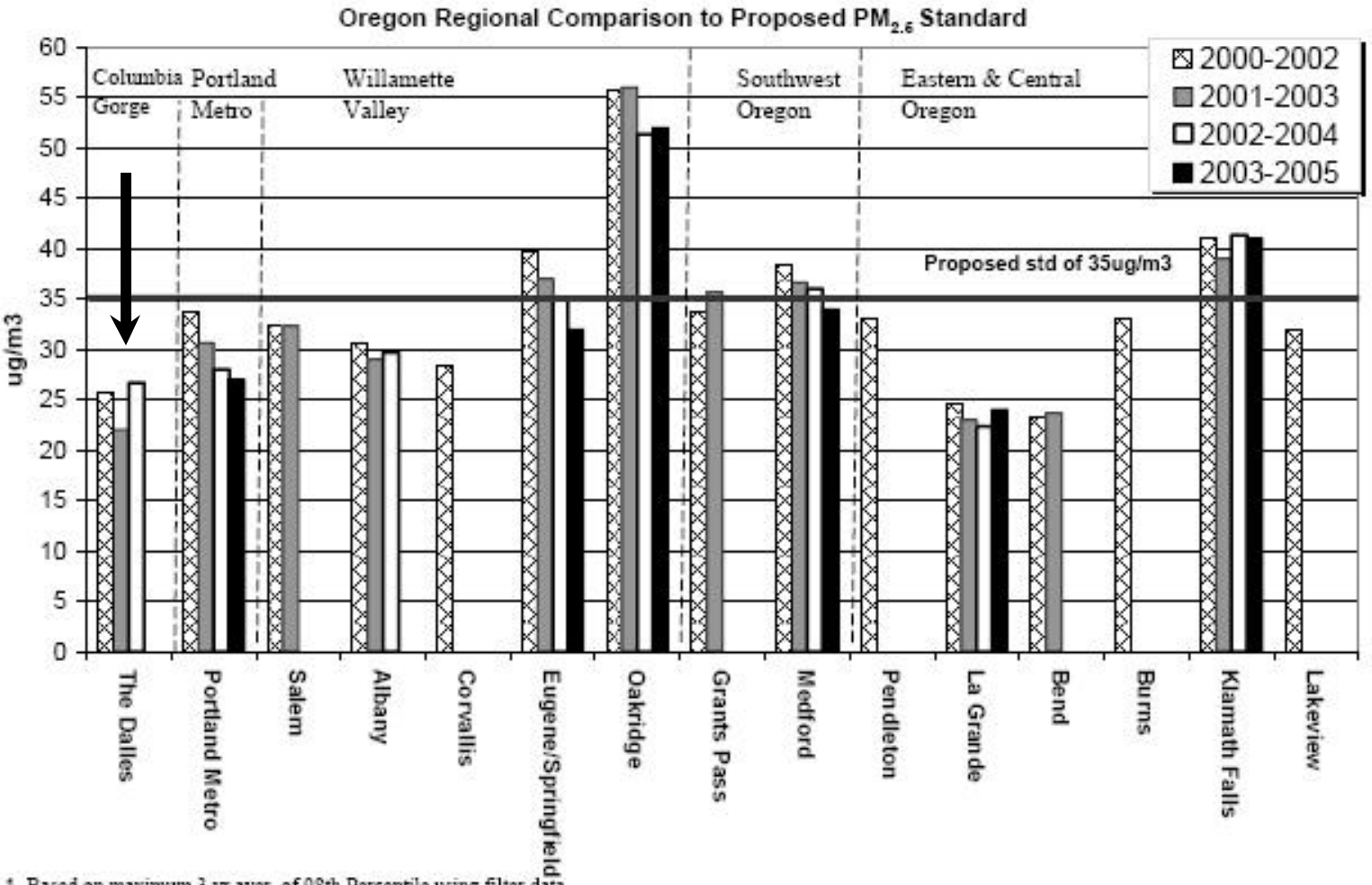
$PM_{2.5}$ Across Oregon



1. Based on maximum 3 yr aver. of 98th Percentile using filter data
2. Many cities do not have 3yr averages after 2002 because of resource reallocation and funding cuts

Regional Haze (IMPROVE) Network

- Monitoring to support Regional Haze Rule (RHR) with numerous new sites installed in 2000 and 2001.
- Most sites are in Class-I areas (National Parks and Wilderness areas), however there are a few sites in non Class-I areas (e.g., Puget Sound, Columbia River Gorge, Spokane Indian Reservation).

NW IMPROVE Sites Considered

Station	Type	Data Period
Puget Sound (WA, urban site)	Urban	1996 to present
Wishram (WA) east side of CRG	Non-Class-I	1993 to present
Mt. Zion (WA) west side of CRG	Non-Class-I	1996-1998, 2001 to present
Spokane Indian Reservation (WA)	Non-Class-I	2001 to present
Hells Canyon (OR)	Remote Class-I	2000 to present
Mt. Hood (OR)	Elevated Class -I	2000 to present
Mt. Rainier (WA)	Elevated Class -I	1988 to present
Starsky (OR, Eagle Cap)	Elevated Class -I	2000 to present
Three Sisters (OR)	Elevated Class-I	1993 to present
White Pass (WA, Mt. Adams, Goat Rocks)	Elevated Class-I	1993 to present

Yellow- new station since 2000

Green- long term data record

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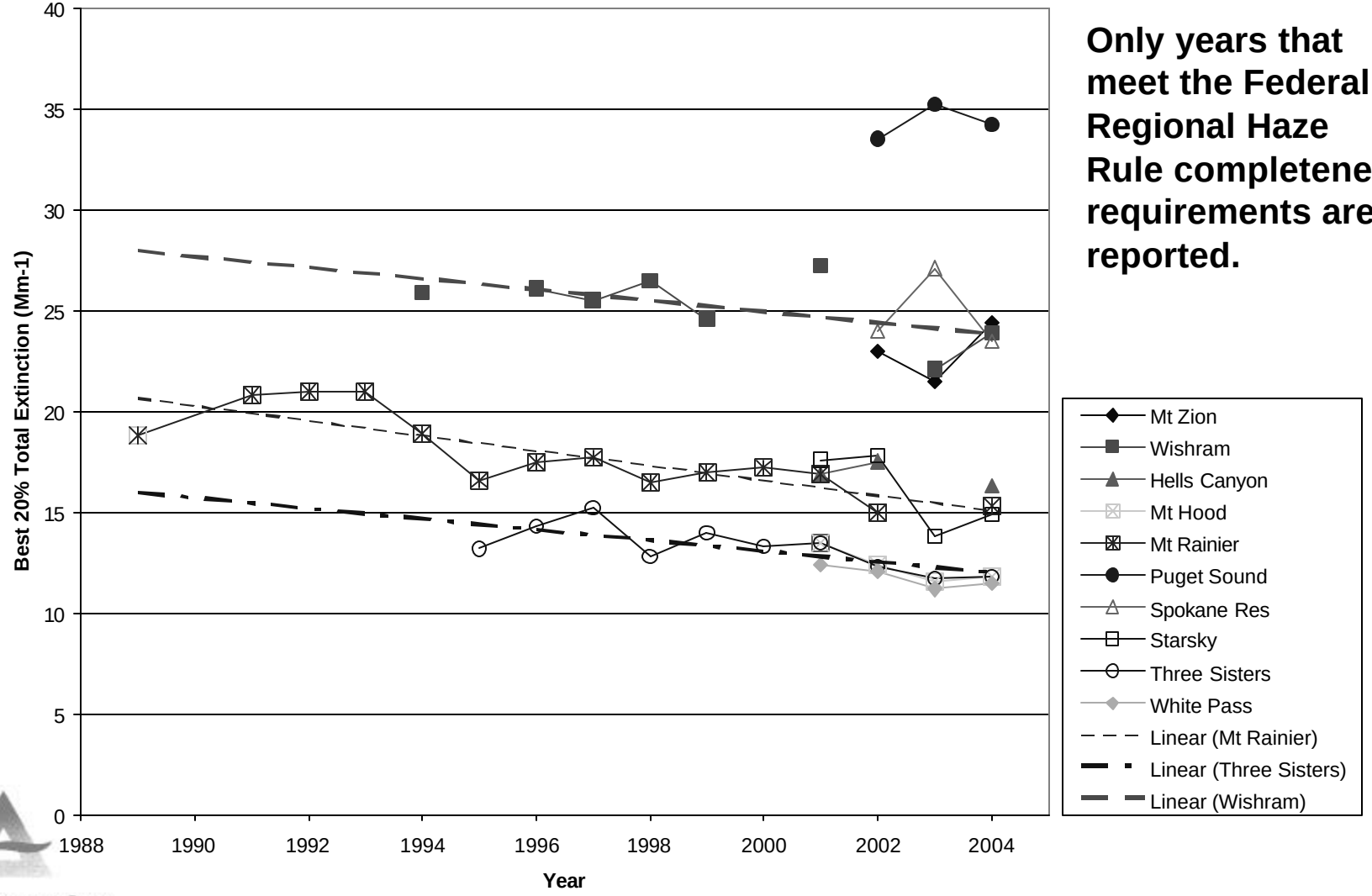
Best 20% Day Extinction



Only years that meet the Federal Regional Haze Rule completeness requirements are reported.

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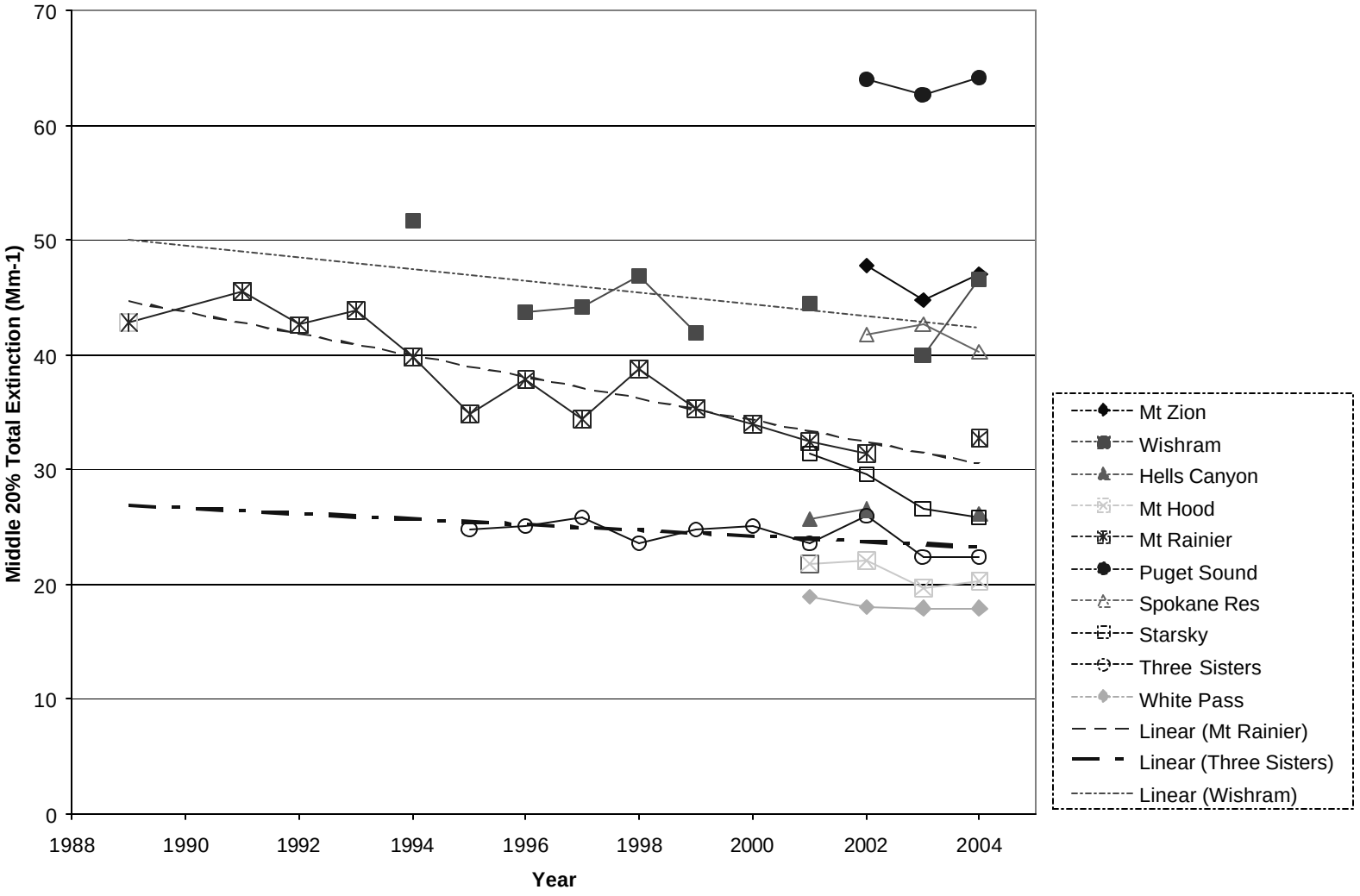
Middle 20% Day Extinction



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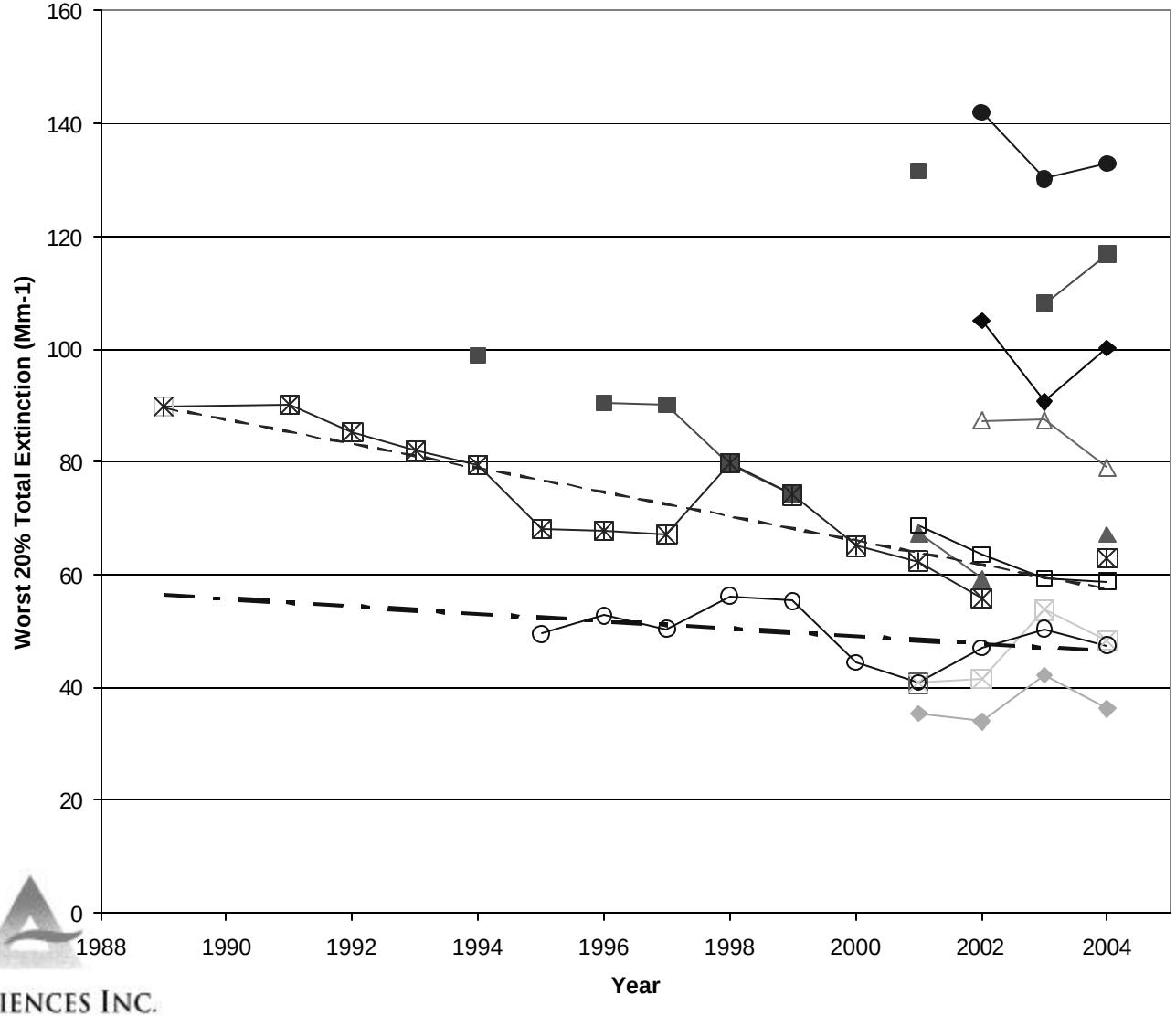
Worst 20% Day Extinction



NOTE: In 2005, UC Davis found a nitrate instrument problem that makes pre-2001 Wishram data invalid.

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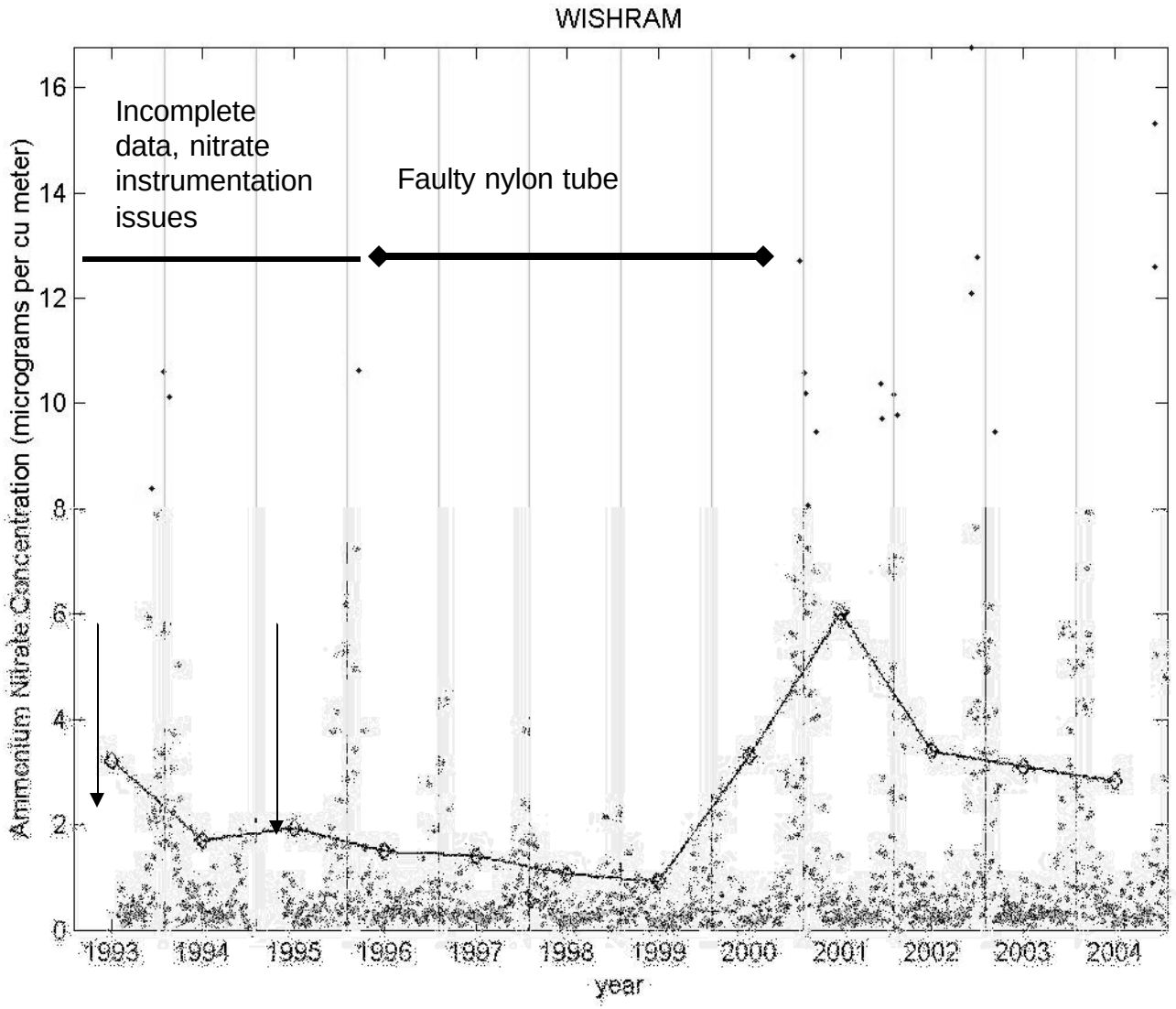
Wishram IMPROVE

- No WC Wishram trend – Why?

  Wishram nitrate data before 2001 are not valid (faulty instrumentation, incomplete dataset).
- Acknowledged problems in pre-1996 nitrate measurements across network. In 1996, new nitrate instrumentation (new method) installed.
- From 1996 to 2000, downward trend in nitrate. Then in 2001, a dramatic nitrate spikes seen in many IMPROVE sites across county.
- Reason: Faulty nitrate nylon tubes used between 1996-2000 significantly under-reported high nitrate concentrations.

Wishram IMPROVE



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Final Punchline

- All long term (> 7 years) stations show a downward (improving) trend in AQ.
- Shorter term stations (3 to 7 years) are either flat or show a downward trend.
- Pre-2001 Wishram nitrate data invalid.
- Wishram and Mt. Zion extinctions are consistent with semi-urban, low elevation, non Class-I stations.

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