

AIR QUALITY MANAGEMENT AND THE SIGNIFICANCE OF MARINE EMISSIONS IN THE GEORGIA BASIN AND PUGET SOUND



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April 21, 2004



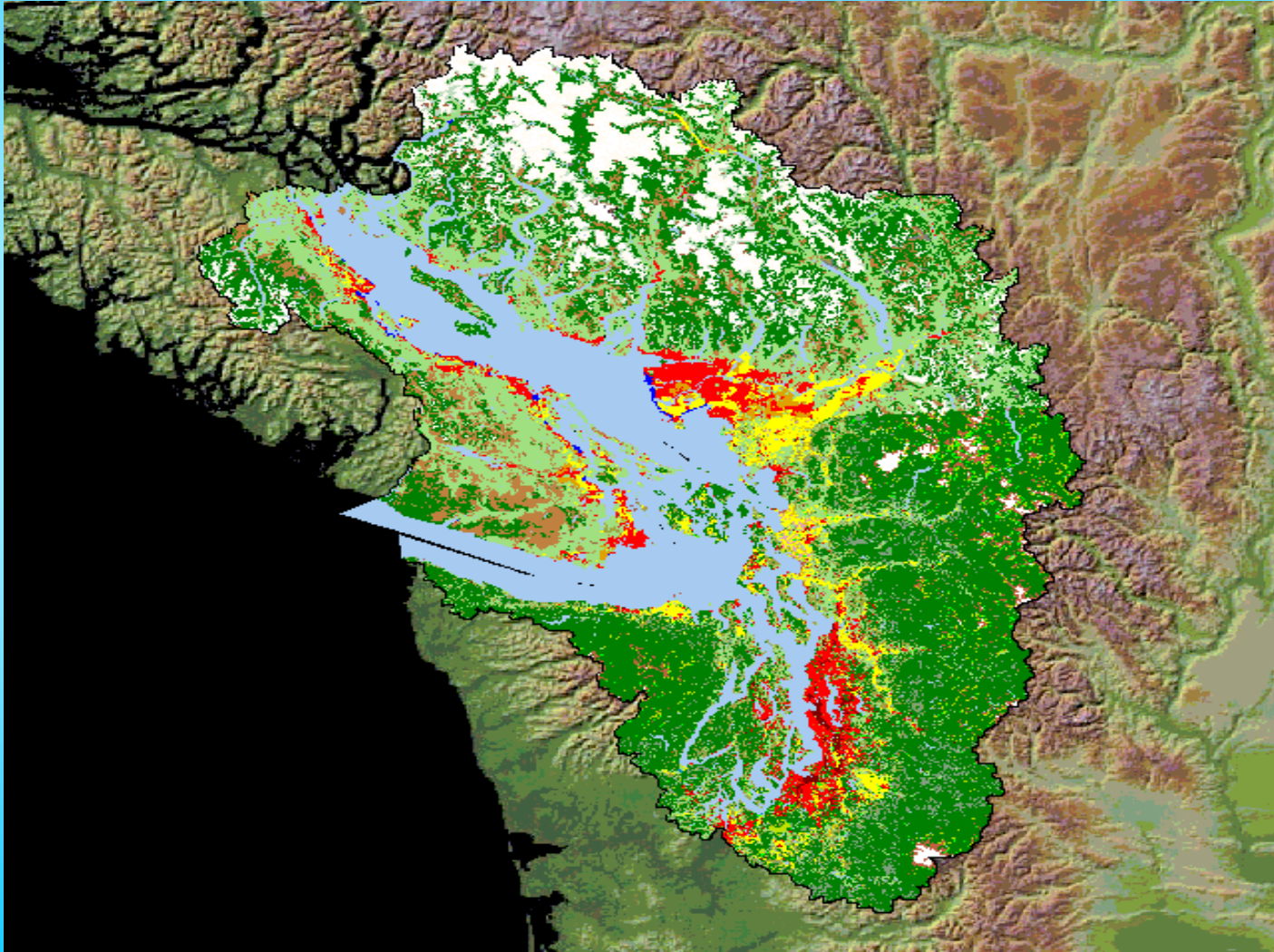
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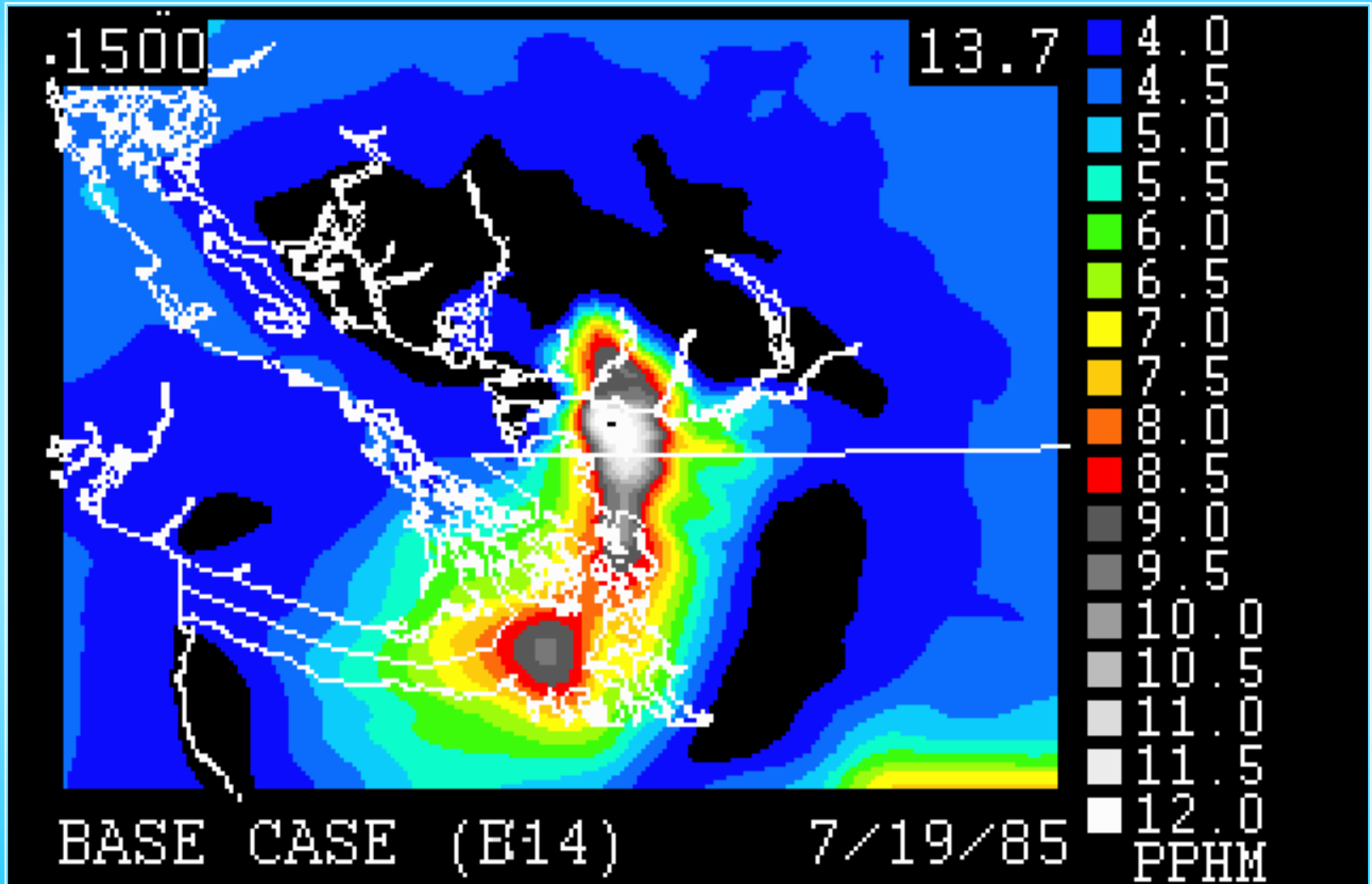
Presentation Outline

- **Air Quality Management in the Vancouver Region**
 - Protecting air quality in a sensitive airshed
- **Ship Emission Initiatives on Canada's West Coast**
 - Technical studies and cooperative action
- **Georgia Basin/Puget Sound International Airshed Strategy**
 - Seeking joint solutions to common problems

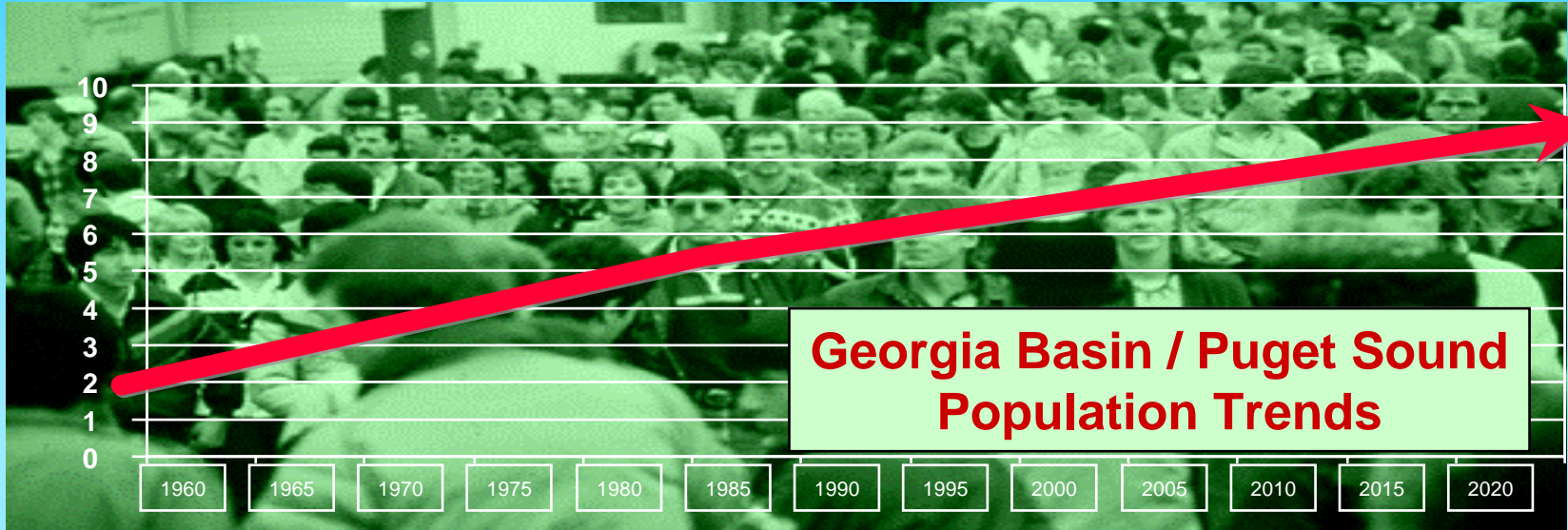
Georgia Basin / Puget Sound International Airshed Planning



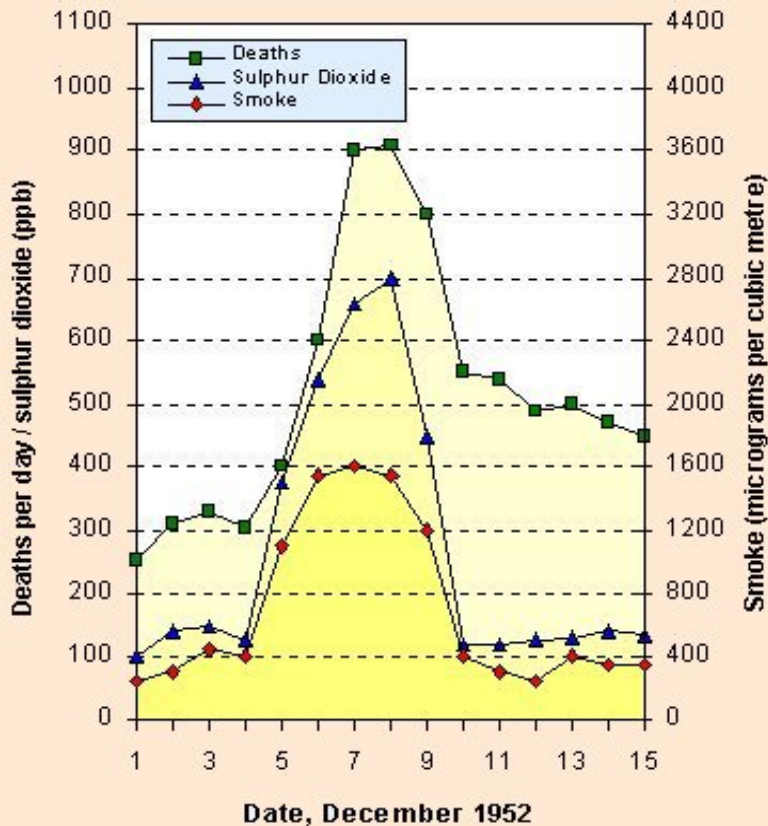
1985 Transboundary Ozone Episode



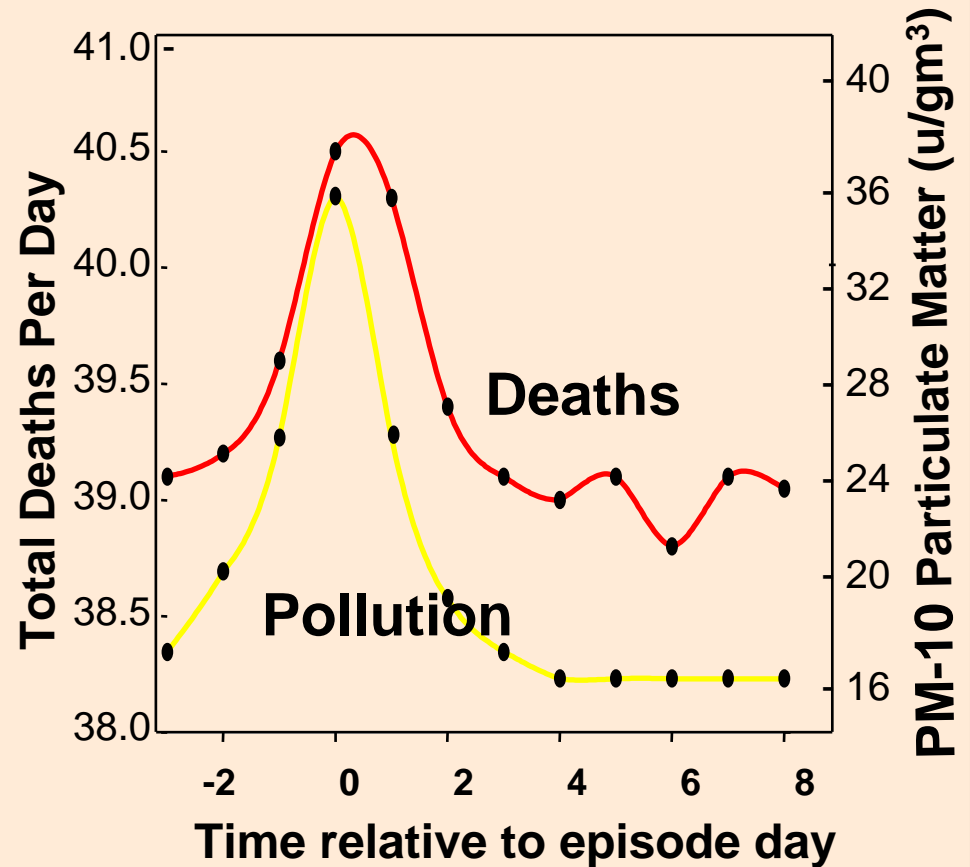
GB/PS Air Quality Challenges



Effects of Air Pollution on Mortality

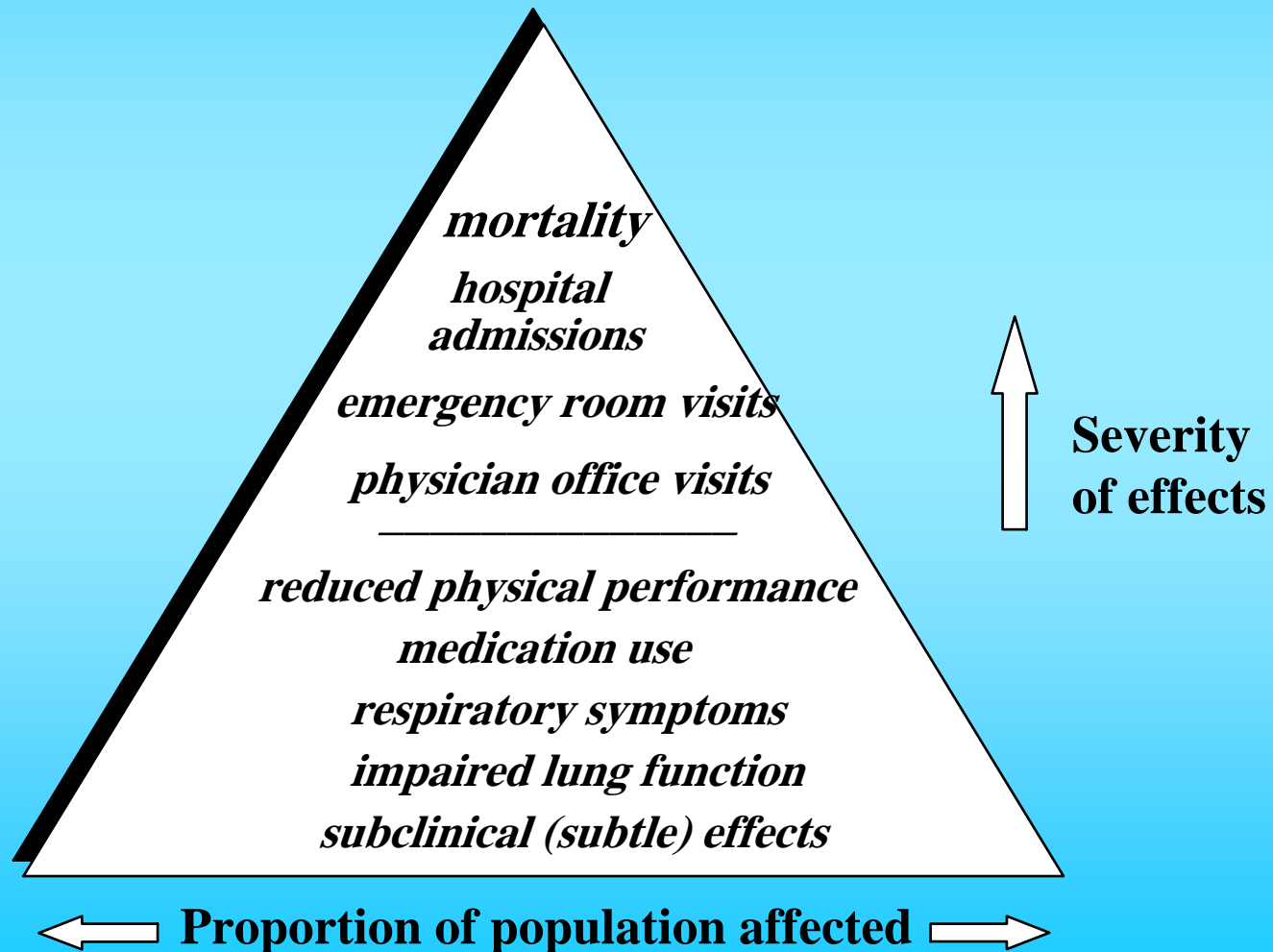


LONDON 1952 SMOG EPISODE




RECENT ANALYSES FOR TORONTO

Air Pollution Health Effects Pyramid



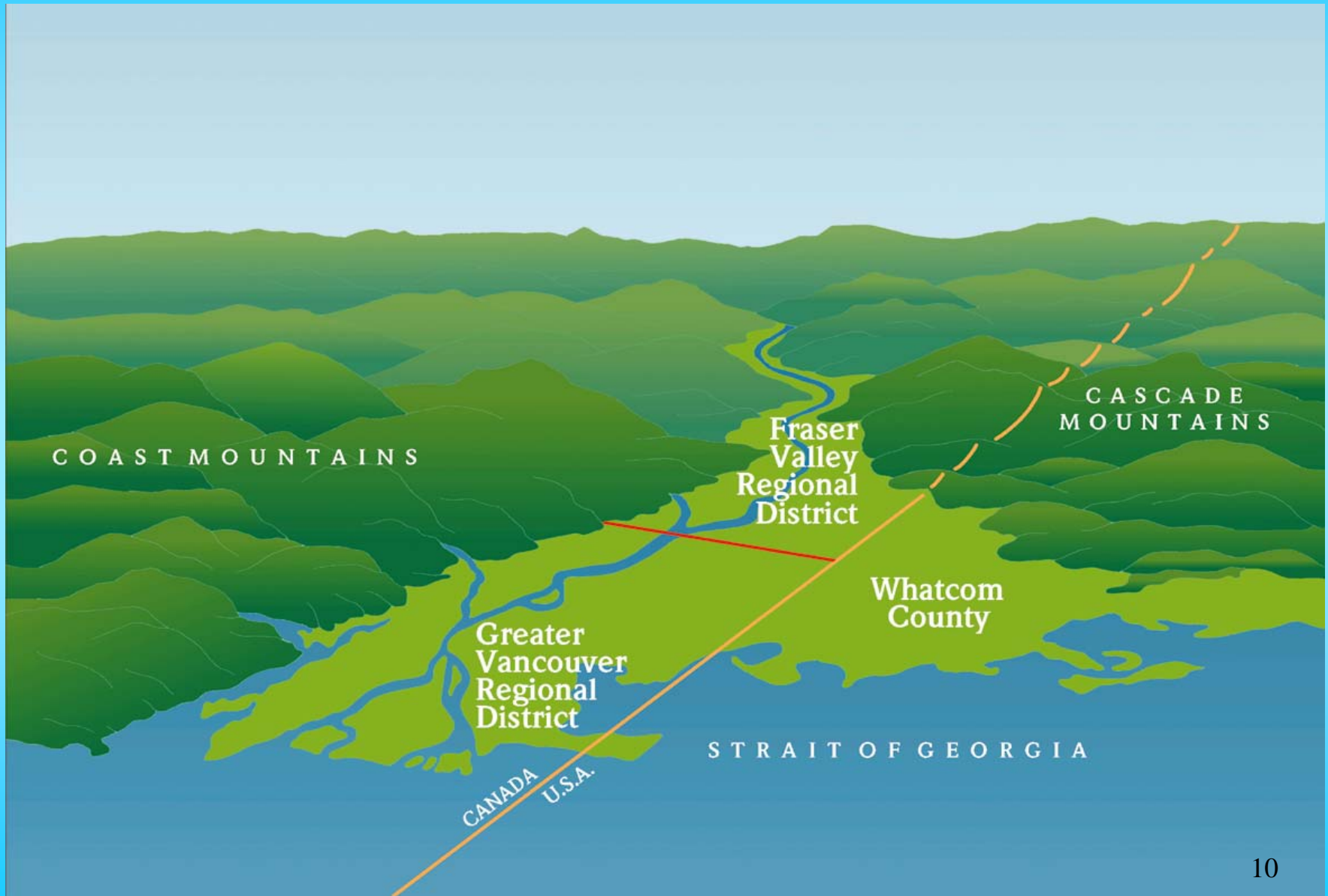
Georgia Basin / Puget Sound Priority Air Quality Issues

- 
- **Ozone**
 - **PM-2.5 Fine Particulate**
 - **Haze and Visibility**

Air Quality Standards

<u>WHO AIR QUALITY GUIDELINES</u>	<u>CANADA-WIDE STANDARD</u>	<u>UNITED STATES STANDARD</u>
<u>Particulate Matter > 2.5 Microns</u>		
No guideline set because there is no evident threshold for PM effects	<ul style="list-style-type: none"> • 30 ug/m³ (24-hour avg.) with implementation by 2010 • Health Ref. Level 15 ug/m³ 	<ul style="list-style-type: none"> • 65 ug/m³ (24-hour avg.) • 15 ug/m³ (annual avg.)
<u>Particulate Matter > 10 Microns</u>		
No guideline set because there is no evident threshold for PM effects	No standard proposed as PM-2.5 is seen to be the key health driver <ul style="list-style-type: none"> • Health Ref. Level 25 ug/m³ 	<ul style="list-style-type: none"> • 150 ug/m³ (24-hour) • 50 ug/m³ (annual avg.)
<u>Ground-Level Ozone</u>		
• 60 ppb (8-hour avg.)	<ul style="list-style-type: none"> • 65 ppb (8-hour avg.) with implementation by 2010 • Health Ref. Level 20-25 ppb 	• 80 ppb (8-hour avg.)

Lower Fraser Valley Airshed



Air Quality Issues in Vancouver Urban Area

- Citizens place high priority on clean air
- Geography and meteorology trap emissions
- Residential and business areas close to emission sources

1985 – 2000 Clean Air Program Achievements in the Vancouver Region

- 1985 – 2000 Regional Growth
 - Population increased by 30% with associated increase in motor vehicle use and economic activity
- Year 2000 emission reduction target achieved
 - Common air contaminants reduced by 40% from 1985
 - Per capita emission reduction of 60%
- Regional ambient air quality improved
 - Average SO_x levels 50% lower, NO_x levels 10% lower
 - Frequency of ozone smog episodes decreased
 - Currently in compliance with Canada-wide standards, but Health Reference Level exceeded 43% of the time at some locations

Actions Contributing to Regional Plan

Federal

Regional airshed scientific research and analysis

National vehicle emissions & fuels initiatives

1991 CCME NO_x and VOC Management Plan

16 CCME Codes of Practice for emission reductions from targeted sources

Agreement with national railways to reduce NO_x emissions

Provincial

Enhanced provincial vehicle emission & fuel regulations

AirCare Program for motor vehicle inspection & maintenance

High-polluting vehicle scrapping program

Burrard Thermal Power Plant retrofit

Public transportation improvements

Regional/Municipal

Regional ambient air quality monitoring and emission inventory program

Commercial and Industrial emission reduction program

Emission reduction at regional refuse incinerator

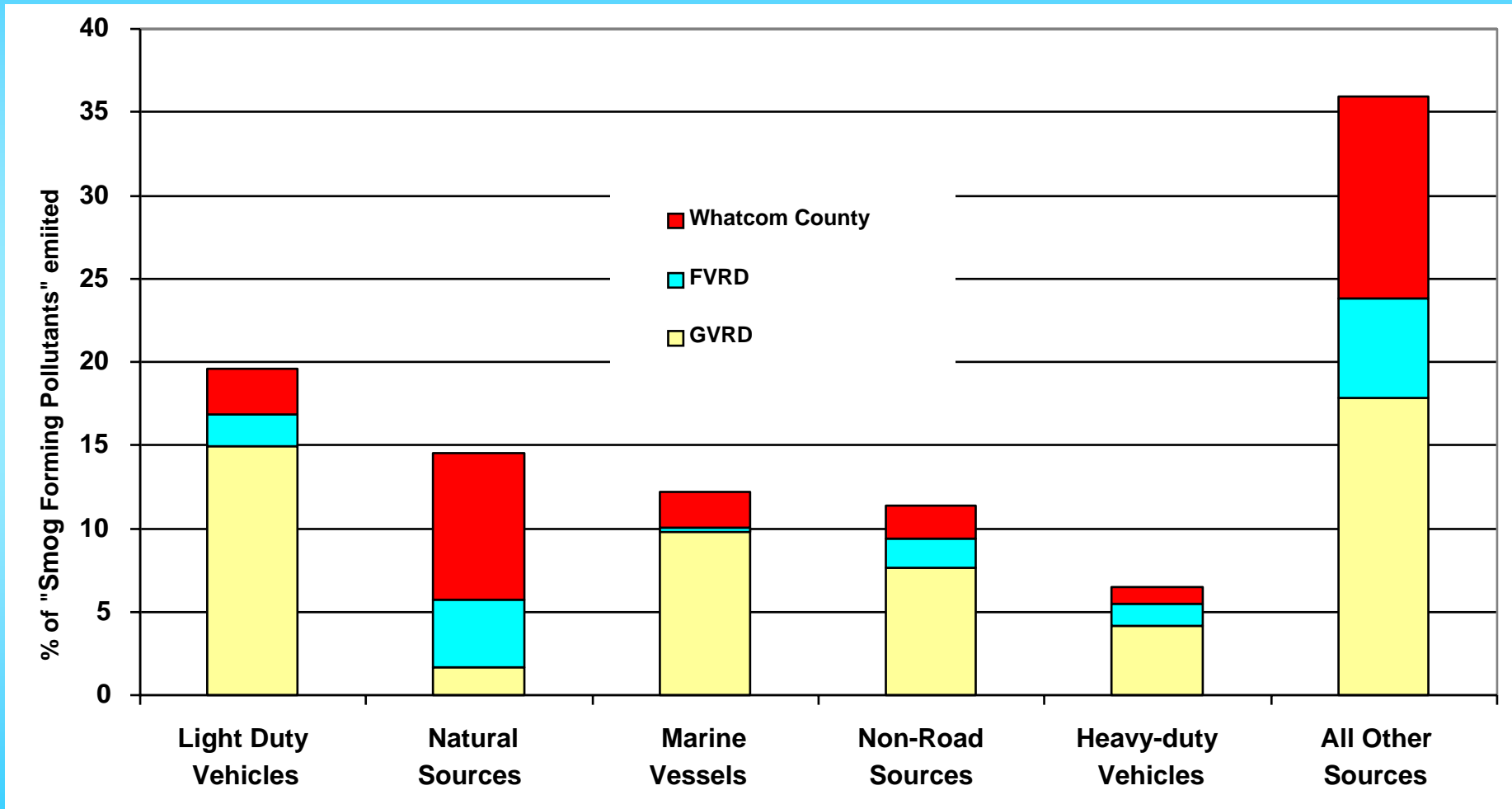
Sustainable land use & transportation planning

Marine Vessel & On-Road Emissions in the Vancouver Region

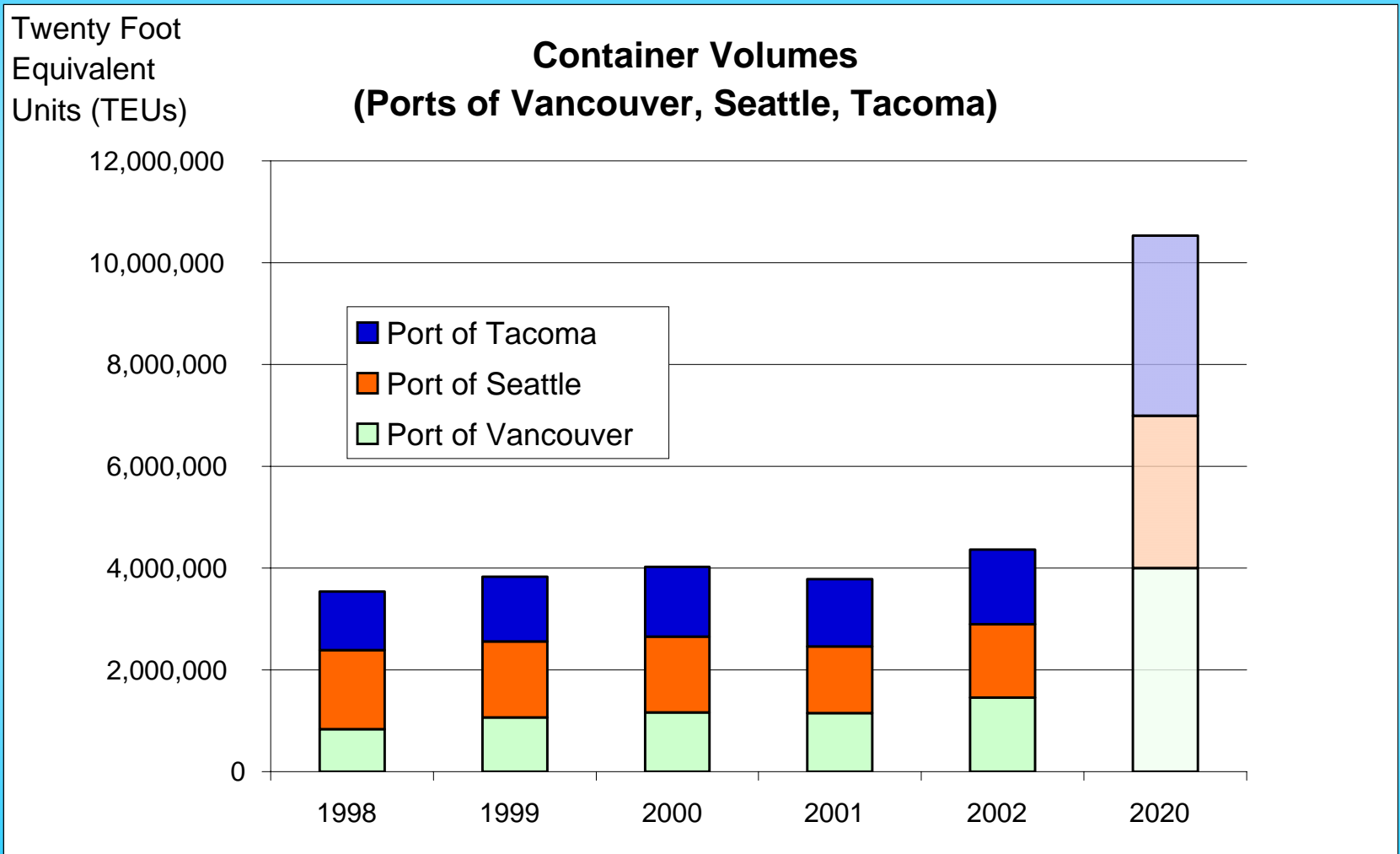
	B.C. FERRIES	HARBOUR VESSELS	OCEAN-GOING VESSELS	TOTAL MARINE VESSELS	HEAVY-DUTY VEHICLES	LIGHT-DUTY VEHICLES
VOC	68	143	149	360	668	16,053
NOx	204	3,663	5,388	9,255	4,077	15,122
SOx	147	157	7,569	7,873	98	561
PM-10	33	57	449	539	300	334
GHGs	98,684	216,681	268,755	584,120	699,071	4,345,749

- Light-duty and heavy-duty vehicle emission data from year 1999 GVRD Emission Inventory Report.
- B.C. Ferry, harbour vessel and ocean-going vessel emission data from year 2000 Marine Vessel Emission Inventory Draft Report, Levelton Engineering Ltd., January 18, 2002.

Top 5 LFV Airshed SMOG Emitters

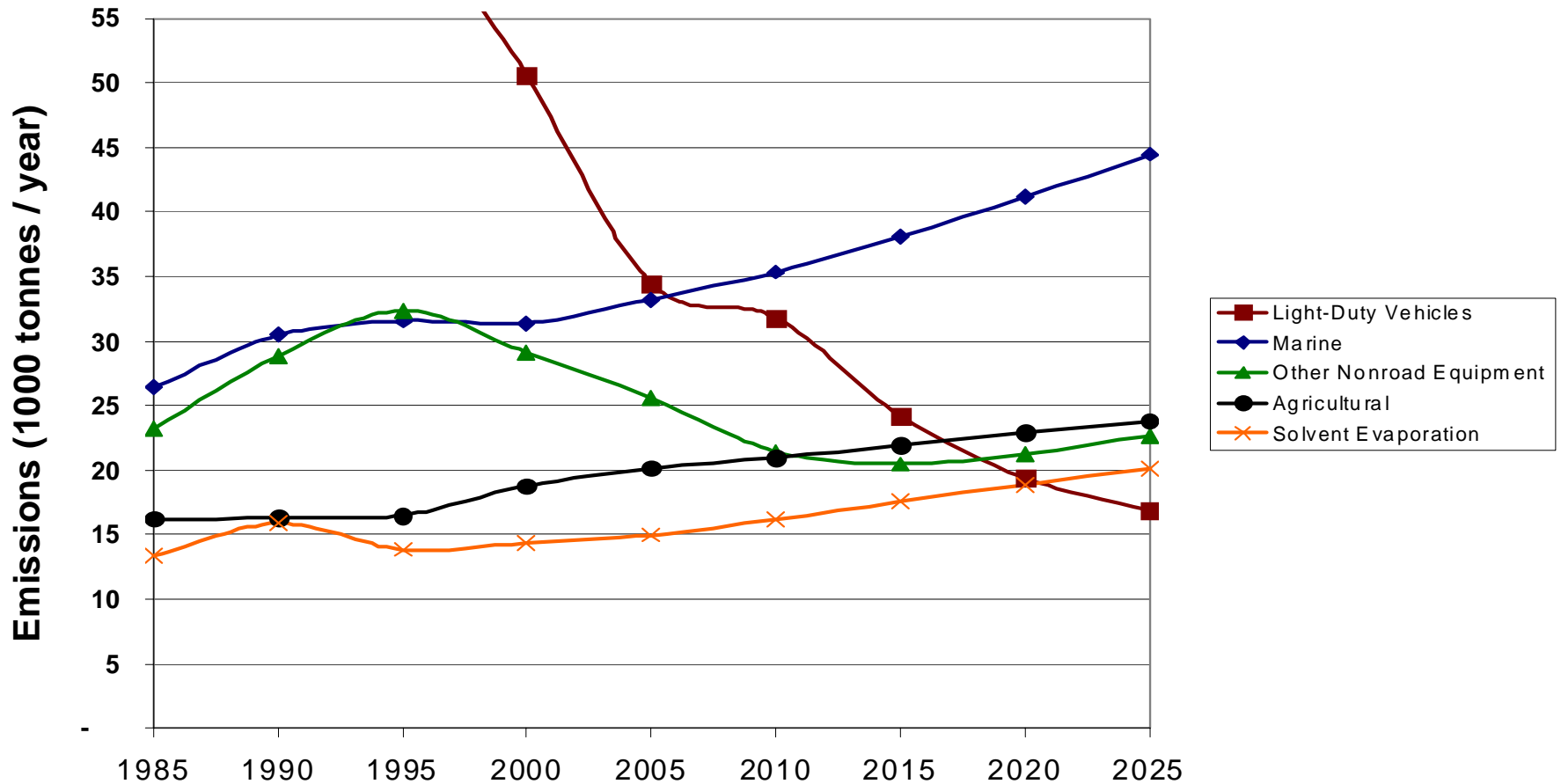


GB-PS Container Terminal Growth



LFV Airshed Emission Trends

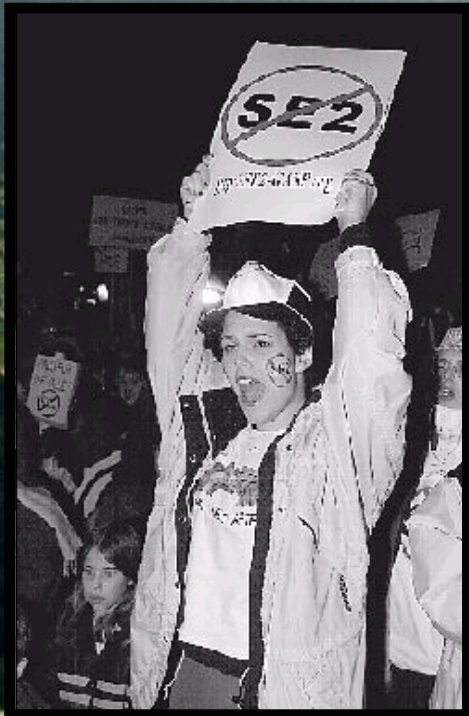
Top 5 Smog-Forming Emission Sources



Ship Emission Initiatives on Canada's West Coast

- **1996 reviews: IMO initiatives & CAC control options**
- **1997/1998 marine vessel emission test project**
- **2000 emission inventory & back / forecast**
- **2002 fuel quality options study**
- **2003 emission reduction technology study**
- **2003 B.C. Marine Industry AQ Work Group established**
- **2004 update and consolidation of 2002 & 2003 studies.**
- **2004 review of marine vessel emission management options**
- **M.A.Turbo/Engine NOx control projects using CWI**

Georgia Basin / Puget Sound Framework for Strategy Development



- **Keeping Clean Areas Clean**
- **Continuous Improvement**
- **Prevention of Significant Deterioration**

Georgia Basin/Puget Sound International Airshed Strategy

U.S. EPA - Environment Canada Joint Statements:

- Jan. 2000 Statement of Cooperation on the Georgia Basin/Puget Sound Ecosystem
- Aug. 2002 Statement of Intent on a GB/PS International Airshed Strategy

11 Priority Issues

Management

5 Early Actions

- Clearinghouse
- Decision Tree (IRIS)
- New Source Review
- Shared Data (TRADE)
- **Clean Vehicles & Fuels**
 - Early introduction of low S diesel
 - HDV on-road emission testing
 - **Ship emissions in/near ports**

Completed Actions

Airshed Characterization

Problems / Options / Strategy

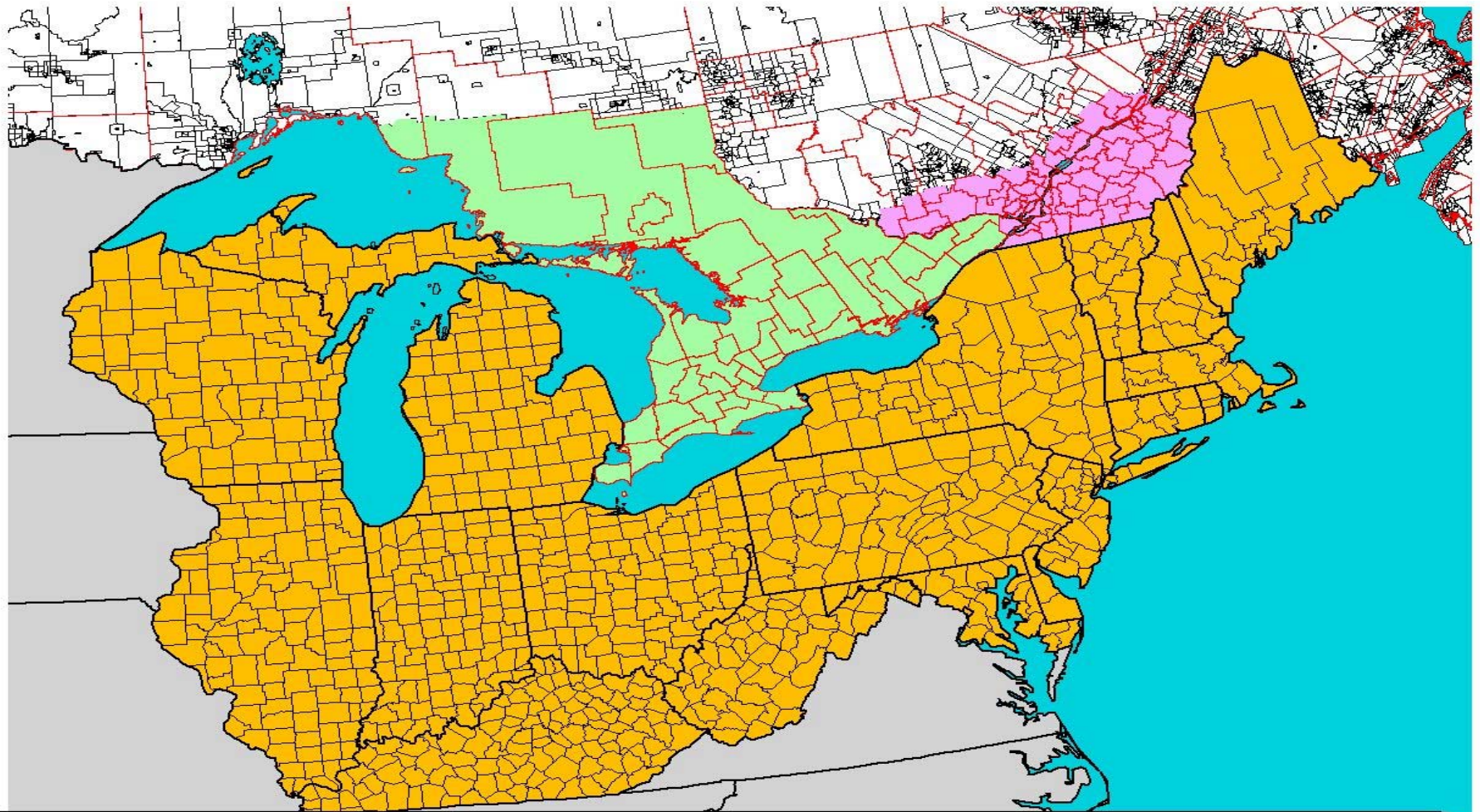
Range of Outcomes

- Share info
- Work collaboratively
- Formal Agreements

Georgia Basin / Puget Sound Project Timeline

	GB/PS Int'l Airshed Strategy			AQ Strategy Pilot Project		
	2001	2002	2003	2004	2005	2006
PROCESS INITIATION						
STATEMENT OF INTENT						
EARLY ACTIONS & SPECIAL STUDIES						
AIRSHED CHARACTERIZATION						
INTERNATIONAL AIRSHED STRATEGY						
STAKEHOLDER CONSULTATION			X	X	X	
IMPLEMENTATION PLAN						
IMPLEMENT ACTIONS						

Canada – U.S. Air Quality Agreement Ozone Annex Domain



 Census Division Boundaries  US Portion of the Domain  Quebec Portion of the Domain  Ontario Portion of the Domain

Climate Change: Kyoto Protocol Implementation

- Canada's Kyoto Protocol commitment
 - Protocol ratified by Canada on December 17, 2002
 - Canada's greenhouse gas target is 6 percent below 1990 levels, or 571 megatonnes, by the 2008 – 2012 Kyoto reporting period
- Canada's Climate Change Plan
 - Increased renewable energy and clean alternative fuels
 - Cleaner and more efficient transportation systems
 - More efficient energy use in buildings
- Co-benefits of clean air & climate change programs
 - Many programs for clean and efficient energy will reduce both greenhouse gases and air contaminants
 - Priority is being placed on the measures with joint benefits

Presentation Summary

AQ Management in the Vancouver Region

A very sensitive airshed with cleaner air than 1980's but challenged by rapid growth in population and motor vehicles

Marine Vessel Emissions

A significant source of SO_x and NO_x in the port which needs to be addressed in the context of a Georgia Basin / Puget Sound transboundary air plan.

Georgia Basin / Puget Sound International Airshed Plan

Work initiated on a transboundary plan to solve common problems and inform a decision on a commitment under the Cabada – U.S. Air Quality Agreement



Long Term Air Quality Improvement in Vancouver's False Creek Area



← 1930's

2000 →

