Overview of Convention on Long-Range Transboundary Air Pollution: North American Scientific Assessment Report 2016

LRTAP EXECUTIVE BODY MEETING

MAY 2-5, 2016

GENEVA, SWITZERLAND

Introduction

- North American Scientific Assessment Report 2016 is based on information found in:
  - Canada-U.S. Air Quality Agreement Progress Report 2014
  - Canada-U.S. Transboundary Particulate Matter Science Assessment 2013

- Information from this report has been incorporated into the Convention's full Scientific Assessment Report 2016 and into its Summary for Policymakers document

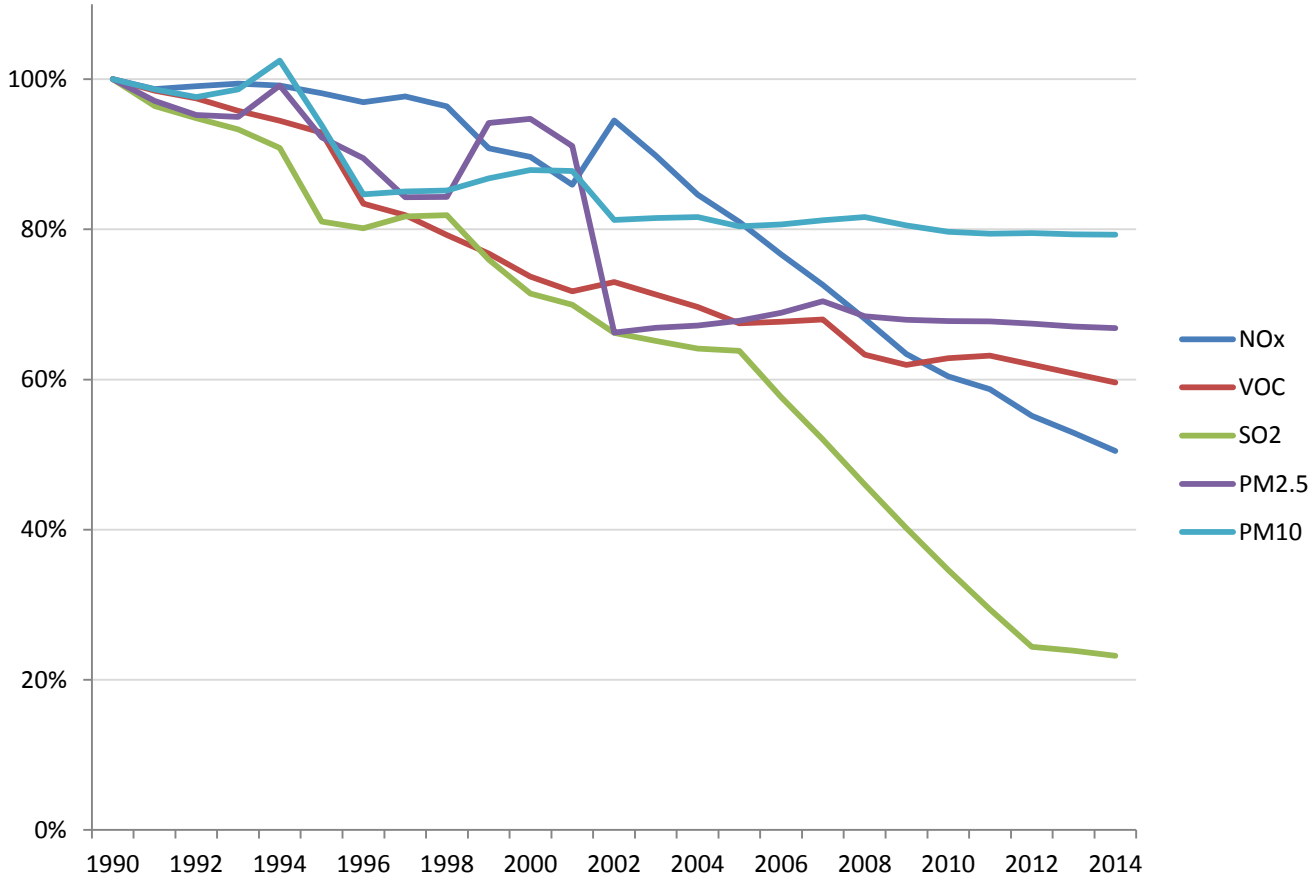
- The North American Scientific Assessment Report is available as an informal document on this meeting's webpage (Informal document)

National trends in ambient concentrations of $PM_{2.5}$ and ozone

- Between 2000 and 2012, national average annual concentrations of $PM_{2.5}$ in the United States and Canada decreased by 33% and 4%, respectively

- Between 1990 and 2014, national average ozone levels decreased by 23% in the United States and 15% in Canada

Significant reduction of key air pollutants has been achieved in North America

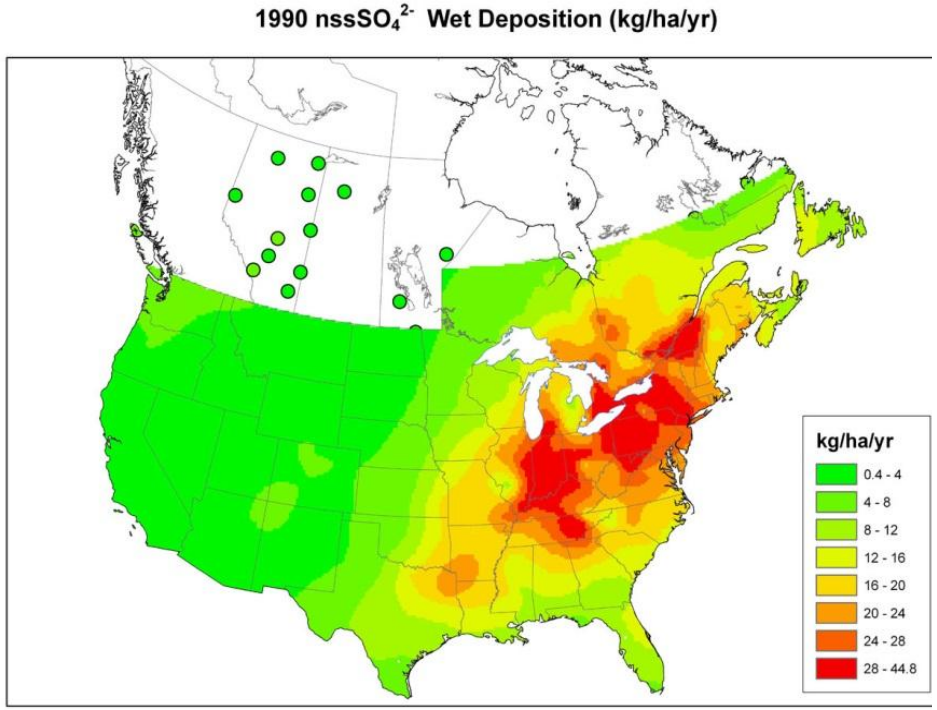


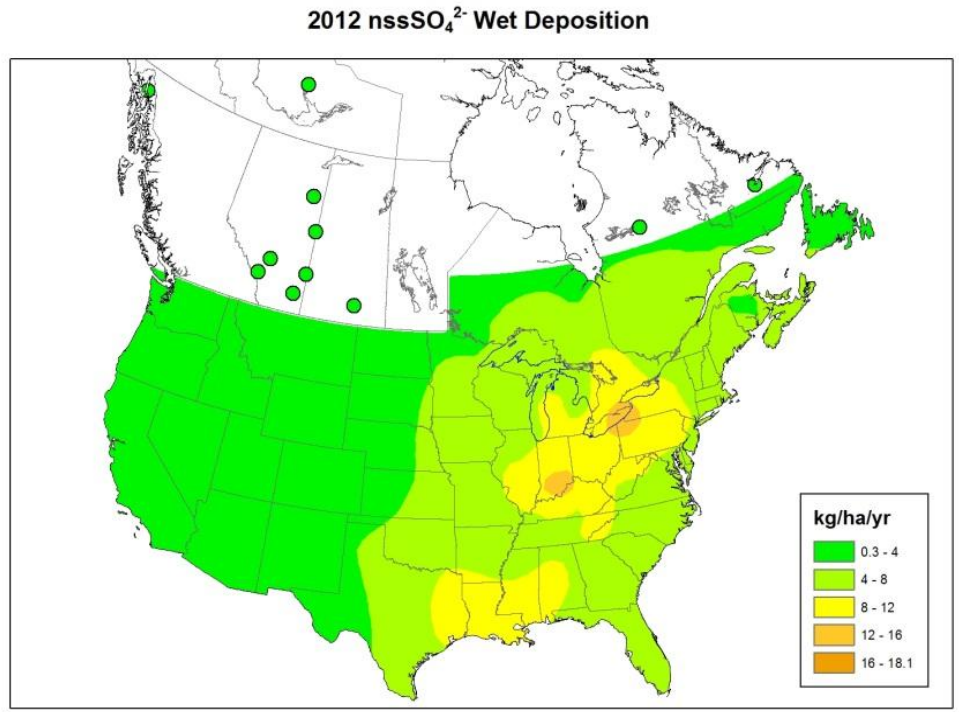
Emissions reductions from 1990 levels :

- NOx: 49%
- VOC: 40%
- SO2: 77%
- $PM_{2.5}$: 33%
- PM10: 21%

Reductions in Acid Rain (wet deposition of sulphate)

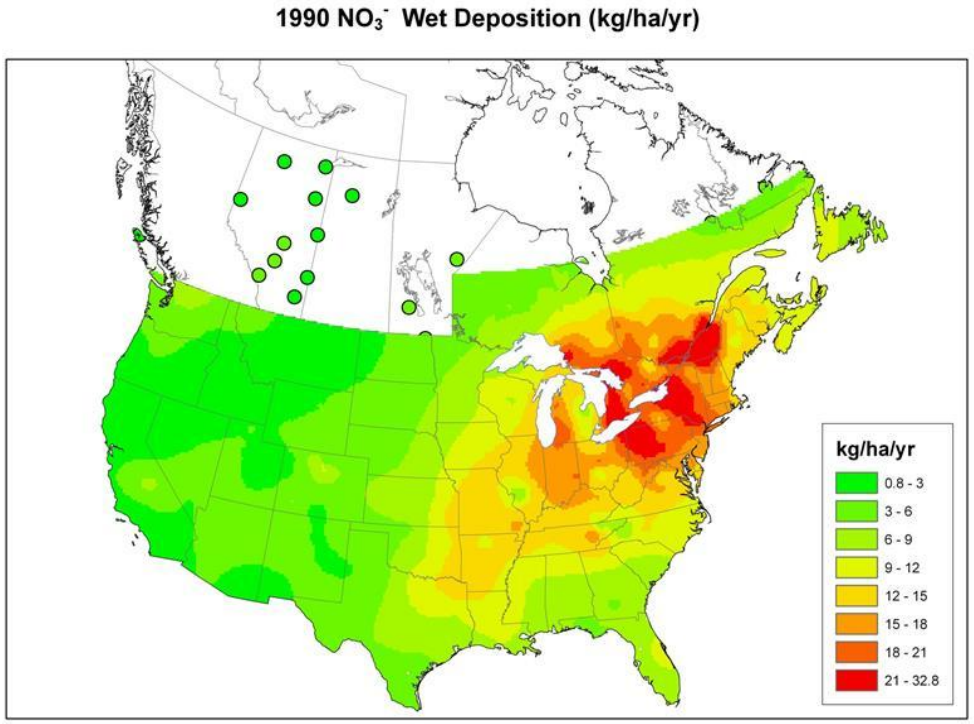
- Reductions in emissions of SO_2 in both Canada and the United States led to substantial reductions in wet sulphate deposition in both countries between 1990 and 2012

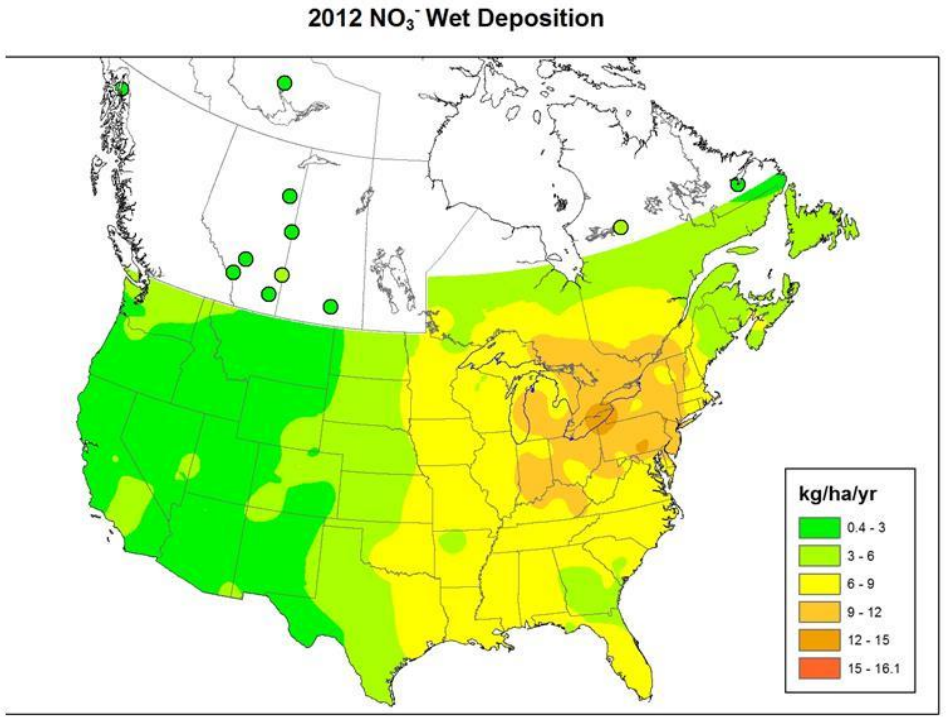




Reductions in acid rain (wet deposition of nitrate)

- Reductions in emissions of NO_X in both Canada and the United States led to substantial reductions in wet nitrate deposition in both countries between 1990 and 2012

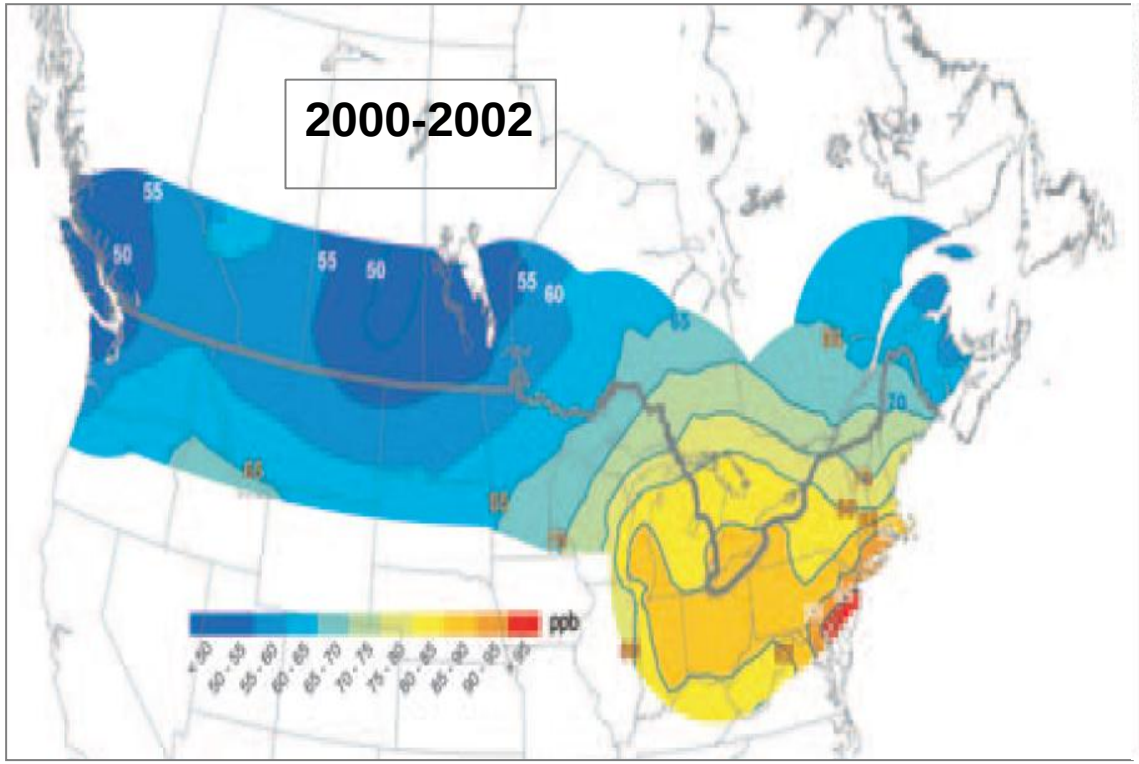


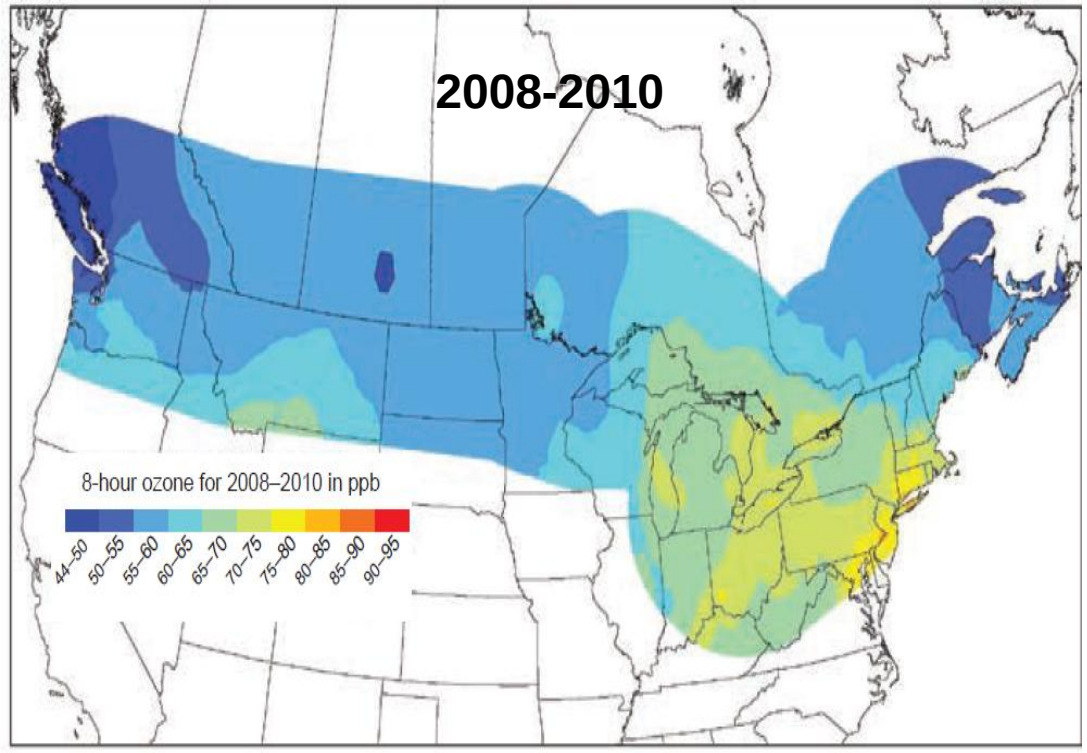


North American Accomplishments under AQA

- Canada and the United States also cooperate on long-range transport of air pollutants under the 1991 Canada–U.S. Air Quality Agreement (AQA) and the Great Lakes Binational Toxics Strategy
- Commitments to reduce air pollutants that contribute to acid deposition and ozone, including SO_2, NO_X, and VOCs have led to significant reductions in regions covered by the agreement
  - For example, between 2000 and 2012, Canada's total NOx emissions in the region covered by the agreement decreased by 45%, while in the United States total NOx emissions in the region declined by 47%
- These emission reductions in turn have led to substantial health and environmental benefits

Ozone Concentrations along the United States-Canada Border





Note: The concentrations are the three-year average of the annual fourth-highest daily-maximum 8-hour average ozone. Colour codes in the two maps are similar, but not exactly the same.

Key challenges remain

- In 2012, 28% of Canadians lived in communities where ambient air concentrations of ground-level ozone exceeded established air quality standards
- Air pollution is estimated to be associated with as many as 21,000 premature deaths per year
  - Hundreds of thousands of asthma and respiratory symptom days, and millions of minor illnesses and restricted-activity days
- The cost in human health damages from air pollution is estimated to exceed $8 billion annually due to premature death, worker absenteeism, higher health care costs and other factors
  - In many cases the public health benefits may exceed the costs of control

Key challenges remain

- In the U.S., 57.3 million people live in counties with air quality concentrations above the levels of the U.S. national ambient air quality standards in 2014
- Exposure to recent air pollution estimated to contribute to 1 of every 20 deaths in the U.S.
  - Reducing exposures to $PM_{2.5}$ and ozone nationwide by 33% would avoid about 43,000 premature deaths, tens of thousands of non-fatal heart attacks and respiratory and cardiovascular hospitalizations and hundreds of thousands of acute respiratory symptoms
- The economic value of premature deaths, heart attacks, hospital admissions, emergency department visits, and missed school work exceeds $1 trillion every year
- Additional emission reductions are necessary for acid-sensitive ecosystems in the eastern United States to fully recover and be protected from acid deposition

Emerging areas of science

Emerging areas of science relevant to the management and reduction of air pollution in the United States and Canada include the need for improved understanding of:

- The combined health effects from exposure to multiple pollutants, including ozone, $PM_{2.5}$ and toxics, and how these combined effects could affect air quality standards and management strategies
- The bidirectional linkages between air quality and climate, including the impacts of climate change on ozone and $PM_{2.5}$ concentrations and of the effects of ozone, $PM_{2.5}$ and its components on climate change
- Changes in the relative importance of natural sources and intercontinental transport that could affect the management of ambient ozone and $PM_{2.5}$ concentrations in Canada and the United States
- The relationship between air quality concentrations and pollutant deposition for multiple pollutants, including NO_x, SO_x and toxic metals, and how these relate to water quality and ecological effects

In Conclusion

- North America has benefited greatly from the U.S. and Canadian participation in the Convention
- The Canada-United States Air Quality Agreement has substantially contributed to reductions in emissions of sulphur dioxide, nitrogen oxides, and volatile organic compounds
- Continued collaboration on transboundary air pollution is needed