Environment Canada Environnement Canada

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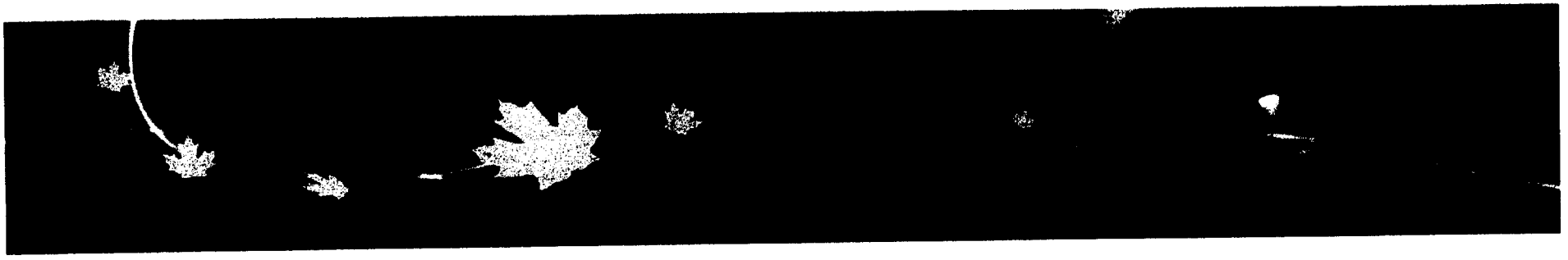
Canada



# Environment Canada and the Oil Sands

**May 2011**

# Presentation Overview

## Purpose

1) Provide an update on environmental performance issues related to the development of the oil sands

2) Present a brief overview of Environment Canada role and approach

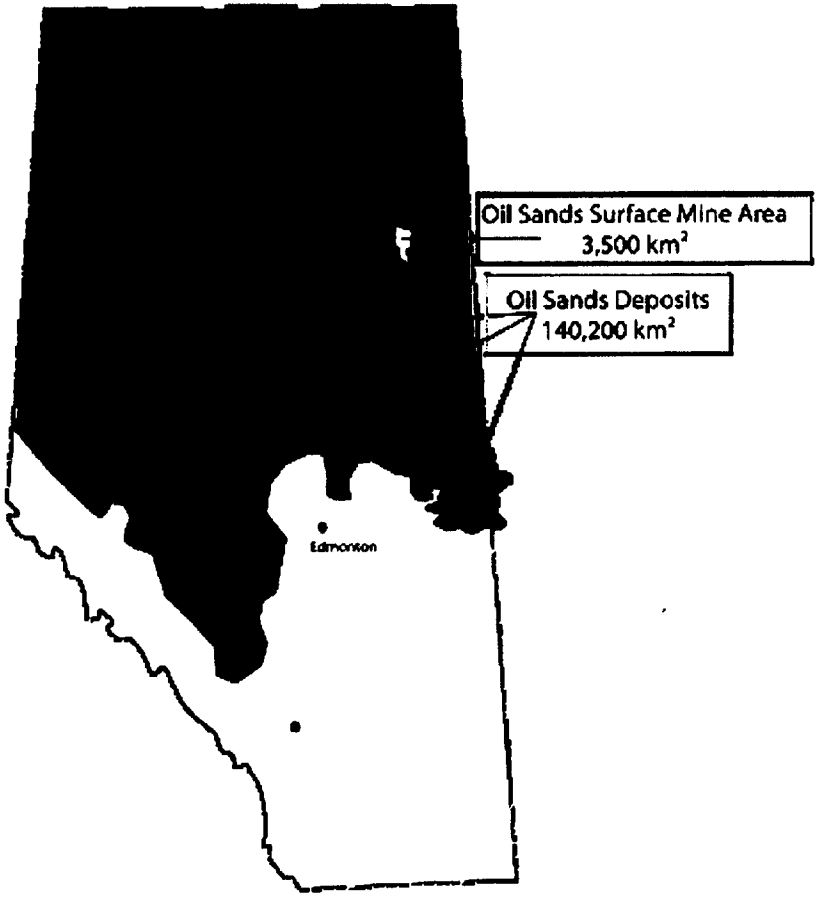
3) Discuss the oil sands issue moving forward, including policy and implementation issues

***Presentation Outline***

- Key environmental pressures
- EC role and approach
- Moving forward

# General Context

- Alberta oil sands underlie approximately 140,000 km$^2$ of Alberta's boreal forest. This represents:
  - 20% of the area of the province of Alberta
  - 40% of Alberta's Boreal forest
- The mineable area represents 2.5% of the area of the total deposit
- The oil sands are the world's second largest oil deposit
  - 97% of Canada's oil reserves



# Economic aspects

- Oil sands development is a vital part of Canada's economy
  - 112,000 direct and indirect jobs
  - 2% of Canada's GDP
  - $91 billion in investments (1999-2008)

- It is expected to contribute $1.7 trillion towards Canada's GDP over the next 25 years

| | Jobs* | GDP ($ millions) |
|---|---|---|
| British Columbia | 20,371 | 45,474 |
| Alberta | 251,914 | 1,574,530 |
| Saskatchewan | 8,629 | 18,694 |
| Manitoba | 6,143 | 11,548 |
| Ontario | 23,200 | 54,850 |
| Quebec | 10,743 | 23,172 |
| New Brunswick | 1,229 | 2,263 |
| Nova Scotia | 1,800 | 3,256 |
| Prince Edward Island | 257 | 457 |
| Newfoundland & Labrador | 1,229 | 2,055 |
| Yukon Territory | 171 | 423 |
| Northwest Territories | 400 | 1,168 |
| Nunavut | 171 | 366 |
| **Total** | **326,257** | **1,738,253** |

Source: Canadian Energy Research Institute

* Note measured in "thousand person years" = total number of jobs (times 1000) divided by assumed employment period of 35 years

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# Oil Sands Mining: Activities and Environmental Pressures

## Mining & Slurry Transport

### Pressures

- -Truck and "fugitive" emissions (air, greenhouse gases (GHG) )
- -Particulate matter (air, water)
- - Habitat removal (biodiversity)
- - Water use (water)

## Separation of Bitumen

### Pressures

- - Tailings ponds (water)
- - Fugitive emissions (air, GHG)
- - Habitat removal (biodiversity)

## Upgrading

### Pressures

- - Smokestack and "fugitive" emissions (GHG, air)

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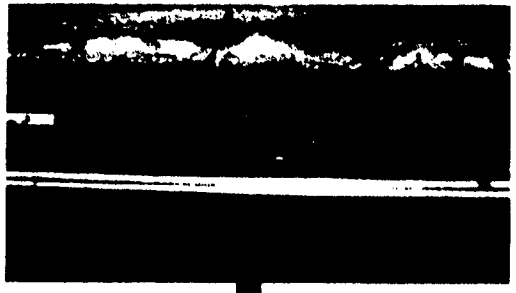
# *In-Situ* Extraction of Bitumen: Activities and Environmental Pressures

Extraction



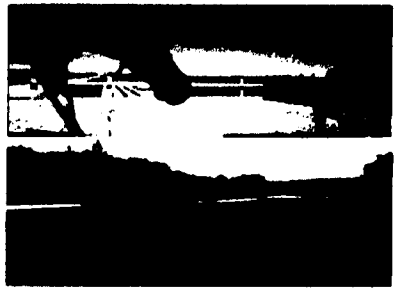
Pressures

- Stack emissions (air, GHG)
- Extra energy use (GHG)
- Water use (water)

Transport to Upgrading

Pressures

- Habitat fragmentation (biodiversity)



**Taken together, mining and in situ methods of extraction have a number of impacts on different aspects of the environment...**

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# Impacts on Water

- Contamination of the Athabasca River is a high-profile concern
  - Recent studies suggest elevated levels of pollutants near mining sites including hydrocarbons and heavy metals
  - Raises questions about possible effects on health of wildlife and downstream communities
  - Current data cannot generate a "big picture" view of impacts on the ecosystem

- Excessive withdrawals forecast as possible concern during low flow periods
  - Bitumen extraction uses between 1 (*in situ*) and 3-4 (mining) barrels of ***fresh*** (i.e. not recycled) water per barrel of oil recovered
  - Industry demand for water is expected to increase
  - Low flow conditions could damage fish habitat, especially during winter
  - River flow has decreased over past thirty years; trend is expected to continue

# Impacts on GHG Emissions

- Between 1990 and 2008, overall oil sands GHG emissions increased by 242% (from 11.7 Mt to 40 Mt), despite a 39% improvement in GHG intensity per unit of energy produced

- The oil sands are Canada's fastest-growing source of GHGs
  - Oil sands-related emissions are predicted to increase by 50 Mt (130%) between 2008 and 2020, to reach about 90 Mt
  - This increase in oil sands' emissions by 2020 is about equal to the increase in Canadian emissions overall, raising oil sands' share of national emissions from ~5% in 2008 to ~12% in 2020

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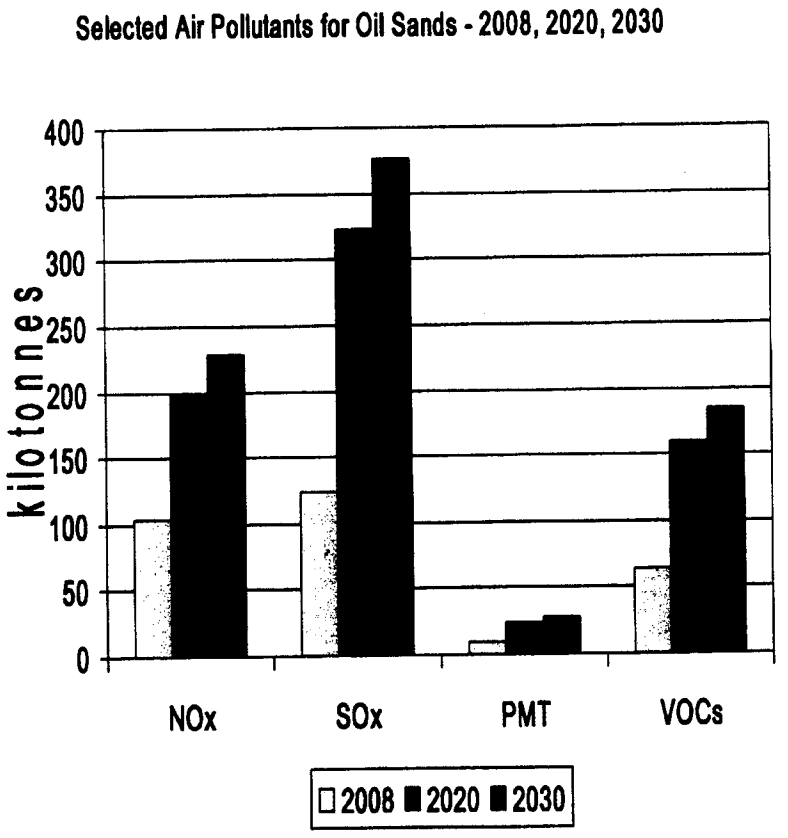
# Impacts on Air Quality

- Ambient air quality in Fort McMurray was rated as "Good" >98% of the time in 2008
- However, emissions of air pollutants will increase with increased production
  - Increased emissions of SOx and NOx may put downwind lakes in Saskatchewan and Alberta at risk of acidification
  - Particulate matter identified as possible source of toxins to river and landscape
  - Increased emission of volatile organic compounds are also of concern




Source: Environment Canada's Emissions Outlook, 2010

# Impacts on Biodiversity

- Oil sands development will continue to put pressure on vulnerable species (e.g. woodland caribou)
- Removal of landscape features for mining reduces available habitat
- Habitat alteration – pipelines, survey "cut lines", reclaimed land – can make habitat less suitable for forest species
- Beyond habitat issues, oil sands pollutants in the ecosystem could harm wildlife
- Wood Buffalo National Park, Canada's largest, is downstream from the oil sands, and is a major migratory bird nesting site

SARA-listed species in the oil sands area include:

- woodland caribou
- peregrine falcon
- whooping crane
- yellow rail
- northern leopard frog
- western toad

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# Overview of Environment Canada's Role

- **Environment Canada's objective is to provide assurance that the oil sands are being developed in an environmentally-responsible manner through discharging its legislative authorities**

- **Environment Canada is recognized as a science leader**
  - Developing world-class monitoring systems for water, air and biodiversity in the oil sands
  - Undertaking research to understand environmental impacts of oil sands pollutants

- **Environment Canada has legislative authority relevant to oil sands issues**
  - Relevant acts
    - *Canadian Environmental Protection Act 1999* – regulates the release of toxic substances into the environment (air, GHG, water, biodiversity)
    - *Fisheries Act* – regulates the deposition of substances deleterious to fish (air, water)
    - *Migratory Birds Convention Act* – protects migratory birds (biodiversity, water)
    - *Species At Risk Act* – provides protection for species at risk (biodiversity)
  - Other responsibilities
    - *Canada Water Act* (water)
    - *Canadian Environmental Assessment Act* (Minister of the Environment – air, water, biodiversity)
    - *Parks Act* (Minister of the Environment – air, water, biodiversity)

# Other Departments' Roles in the Oil Sands

- **Natural Resources Canada**
  - Administers major programs for oil and gas (Canmet Energy, Program of Energy Research and Development, carbon capture & storage)
  - Administers the Major Project Management Office – improves coordination on regulatory review of major projects
  - National Energy Board – regulator for interprovincial projects
- **Department of Foreign Affairs and International Trade**
  - Provides fact-based outreach and communications on oil sands issues internationally
- **Department of Fisheries and Oceans**
  - Administers habitat provisions of the *Fisheries Act*
- **Indian and Northern Affairs Canada**
  - Supports Aboriginal people to develop healthier, more sustainable communities
- **Canadian Environmental Assessment Agency**
  - Responsible for the *Canadian Environmental Assessment Act*
- **Health Canada**
  - Responsible for Aboriginal peoples' health issues in areas of Federal jurisdiction
- **Parks Canada**
  - Peace-Athabasca Delta Monitoring Program in Wood Buffalo National Park

# Questions Raised About Environmental Performance

- Ongoing domestic and international campaigns targetting oil sands and based on environmental performance concerns
  - Potentially affecting access to US markets
  - Damaging Canada's "brand"

- Court cases have raised profile of oil sands' environmental impact
  - e.g. prosecution of Syncrude under the *Migratory Birds Convention Act, 1994*

- Recent reports have highlighted the need for better monitoring in the oil sands area, including
  - Royal Society of Canada (December 2010)
  - Federal Science Advice Panel (December 2010)

- Experts were unanimous in the conclusion that current programs were insufficient to deliver reliable information at a regional scale concerning environmental performance in the oil sands region

# EC Approach: Focus on Improved Environmental Monitoring...

***Why the focus on monitoring?***

By measuring the levels of pollutants and other aspects of the environment, well-designed monitoring systems can provide the information needed for long term sustainability

- In December 2010, the federal government committed to leading, in collaboration with Alberta, the development of a world class monitoring system for the oil sands
  - Environment Canada widely acknowledged to have the best science capacity for this work
  - Industry will be expected to contribute funding to the system
- Phase I of a surface water quality monitoring system plan was released in March 2011
- Work on the Phase II system design continues with expanded geographical scope and more elements monitored (air quality, terrestrial and aquatic biodiversity), target for completion is end of June 2011

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