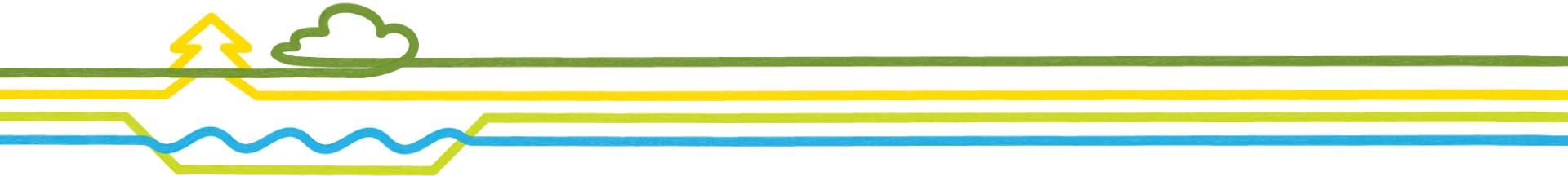




Industry Views on Critical Review of Oil Sands Monitoring

A&WMA Conference, Quebec City

June 27, 2019



Discussion Points



- ❧ Collaboration
- ❧ Technology
- ❧ Source Pathways Relative to Oil Sands Development

Regional Monitoring



- ❧ More than just mining
- ❧ More than the Oil Sands Monitoring Program
 - Wood Buffalo Environmental Association and the Regional Aquatic Monitoring Program initiated in 1997
 - Industry led studies supportive of Oil Sands Monitoring (air, water, groundwater, wildlife, wetlands, caribou, etc.)
 - Industry research of environmental pathways and effects
- ❧ Removal of budget constraints
 - Since 2012 OSM has received \$350,000,000

Collaboration – Air Monitoring



- ❧ TERRA Model Validation - Canadian Natural and ECCC 2012
- ❧ SO₂ from flare
- ❧ Data sharing of emissions on 5 minute intervals to compare to aircraft measurements
- ❧ Achieved correlation to within 5%
- ❧ Why this was possible:
 - Plant upset conditions with flare over 300 t of SO₂ emissions during a 24 hour period
 - Normal operations under 5 t/d
 - All of emissions were within the sample box of the aircraft

Room for Improvement



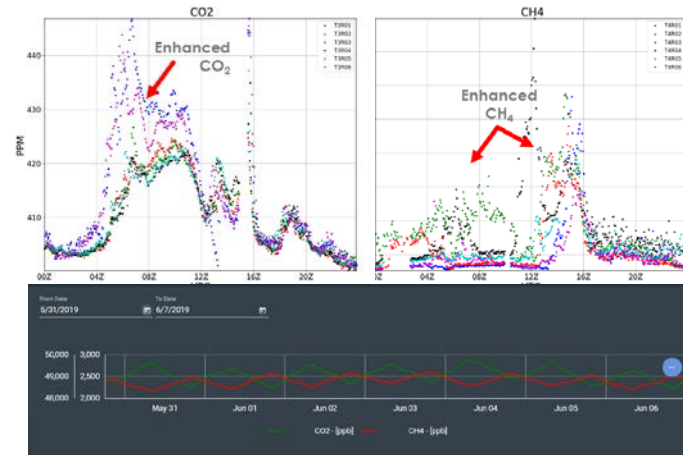
- ❖ TERRA model was not calibrated to non-point source ground emissions from 2012
 - Tailings ponds and Mines
- ❖ 2018 aircraft flights coincidental to ground measurements of CO₂ and CH₄
- ❖ Data from ground measurements available and is being shared amongst researchers, consultants, technology innovators.
 - ECCC data not available
- ❖ Lack of timely data sharing constrains impact assessment value
- ❖ Critical Review data is circa 2013 and development and activities in the region have changed

Technology Innovation

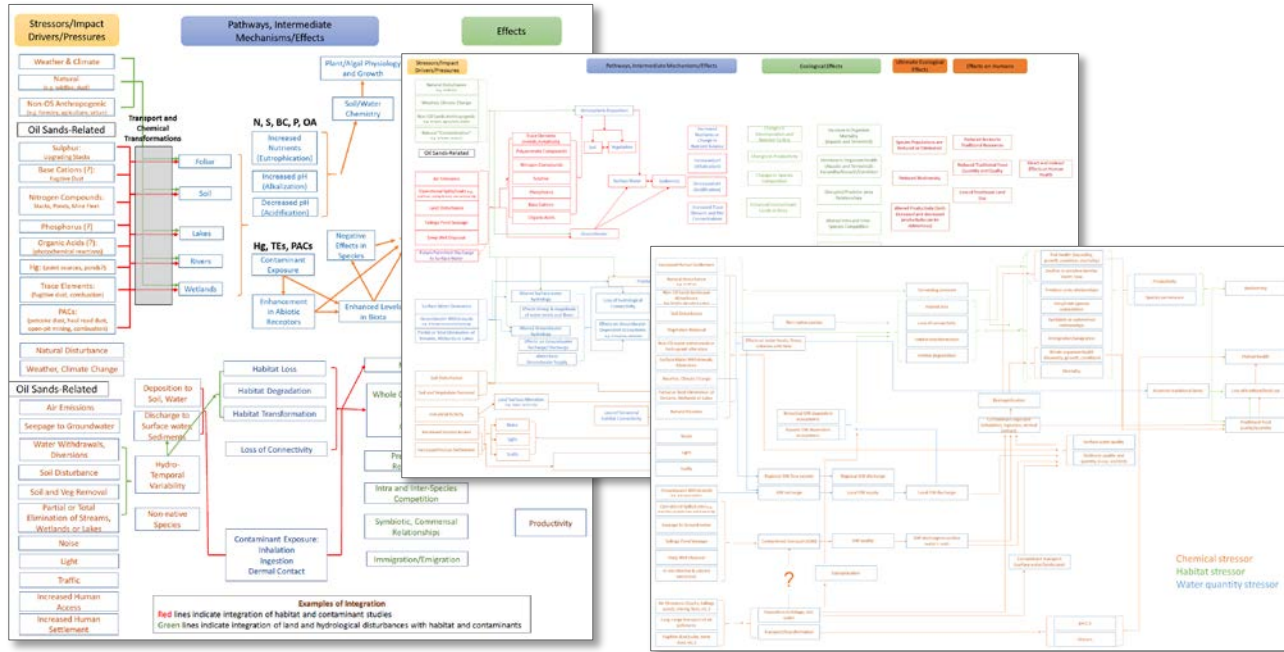


- ❧ Emissions Reduction Alberta Fugitive Emissions Study of CO₂ and CH₄
- ❧ Ground data shows wind activity at low elevations inconsistent with upper elevation
- ❧ Emission concentration diurnal change 32% higher in afternoon
- ❧ CO₂ undetectable above background

- ❧ Assess new technology to measure emissions
 - Telescopic 2-D concentrations
 - Continuous closed path monitor



Impact Pathway Models are Complicated



Top Down or Bottom Up



- ❧ Look for impact and determine cause
- ❧ Determine sources to potential receptor
 - EMS Aspect Review
- ❧ Environmental Impact Assessment Validation
- ❧ Timely data sharing and transparency of data is essential

Cumulative Effects



- ❧ Scope of oil sands impacts vs. cumulative effects
- ❧ Natural bitumen in rivers
- ❧ Forest fires
- ❧ Municipal development
- ❧ Secondary effects such recreational activities

Summary



- ❖ Oil Sands Monitoring is unconstrained in program delivery
- ❖ Reporting has been sporadic through scientific journals
 - Program level annual state of the environment reporting is the expectation
- ❖ Data Availability
 - Key criticism of Regional Aquatic Monitoring Program
 - ECCC air data published 5 years after sampling
- ❖ Collaboration needs to be enhanced, industry is willing to help