



Potash in Saskatchewan: An Overview of Exploration and Developments

*Saskatchewan Ministry of
Energy and Resources*

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Presentation Overview

- *Saskatchewan Potash*
- *Geology of Potash Deposits*
- *Current potash mines - production, capacity and planned upgrades*
- *Current Status of Potash Exploration*
- *Saskatchewan global role*
- *New Geoscience*

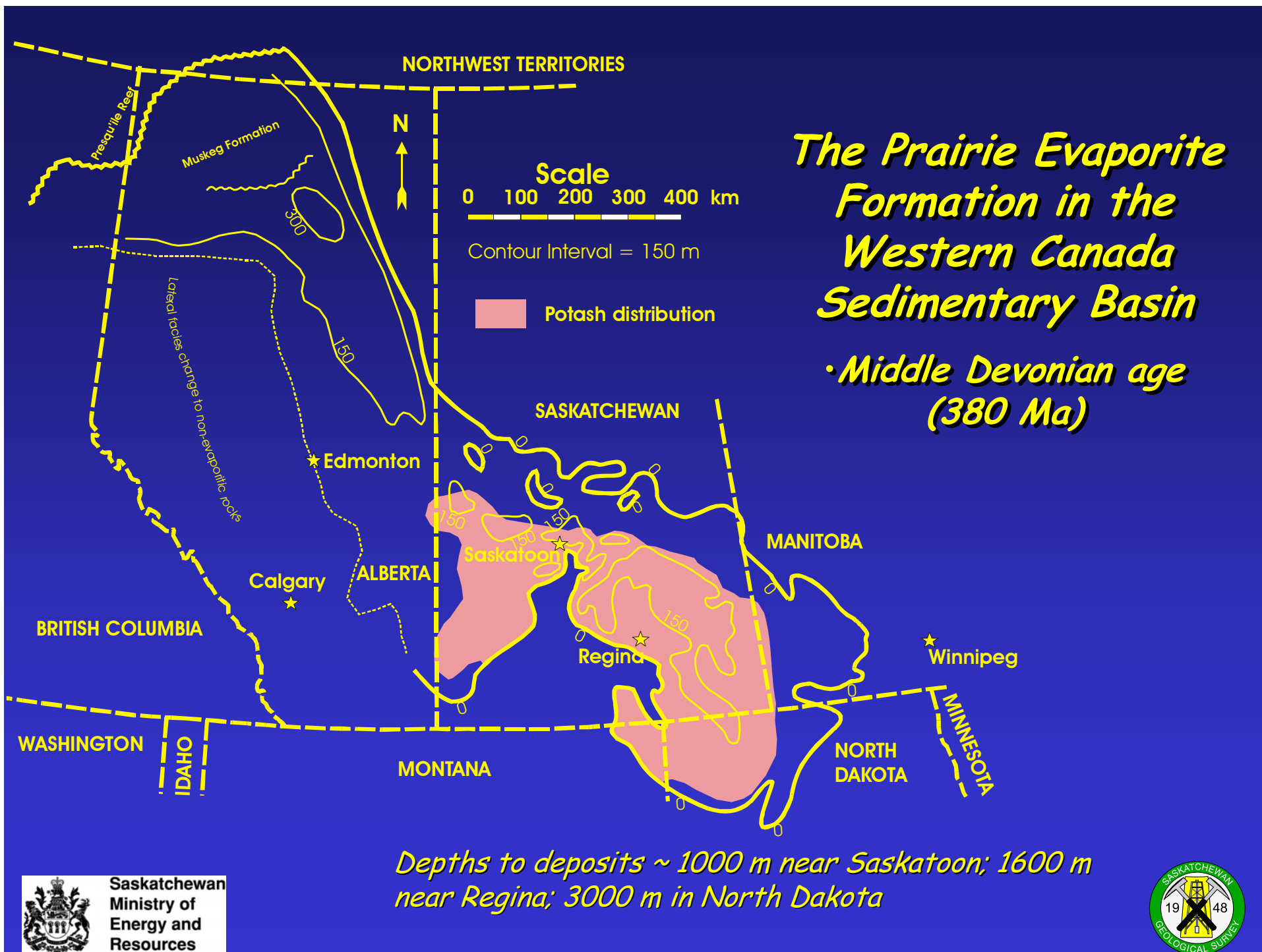


Potash - What is it?



- *Potash - general term for potassium (K) salts*
- *Mineralogy*
 - *Halite (NaCl) - common salt*
 - *Sylvite (KCl) - 60-63% K_2O equivalent.*
 - *Carnallite ($KCl \cdot MgCl_2 \cdot 6H_2O$) only 17% K_2O equivalent.*
- *Product - potassium chloride (KCl)*
 - *Grades of product are subdivided based on varying K_2O purity and particle size*

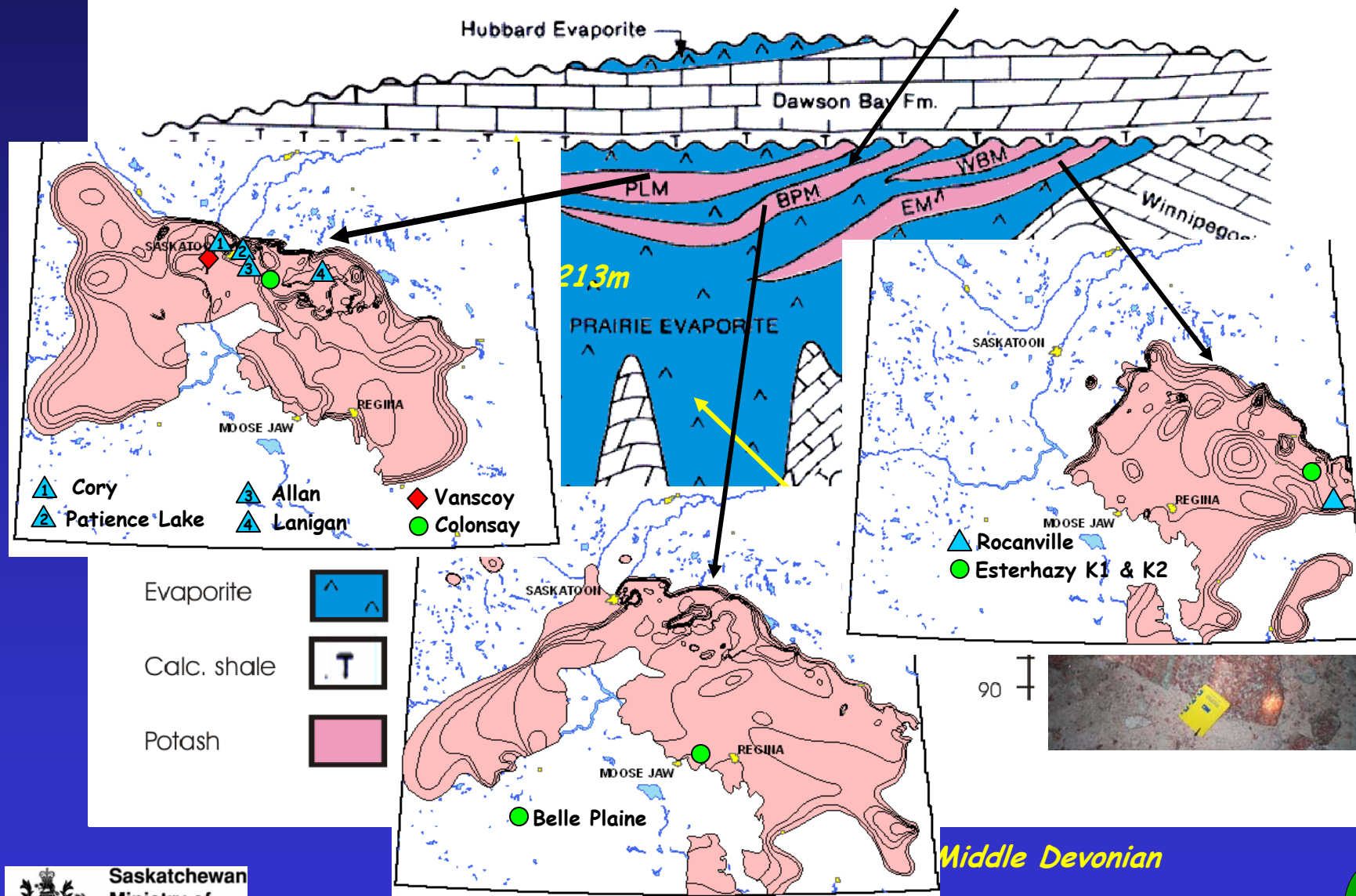




West

East

4 potash-bearing members
(6-15m thick) in upper 60 m



Evaporite



Calc. shale



Potash



Middle Devonian



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Fuzesy (1982) and Holter (1969)



Potash Underground Mines

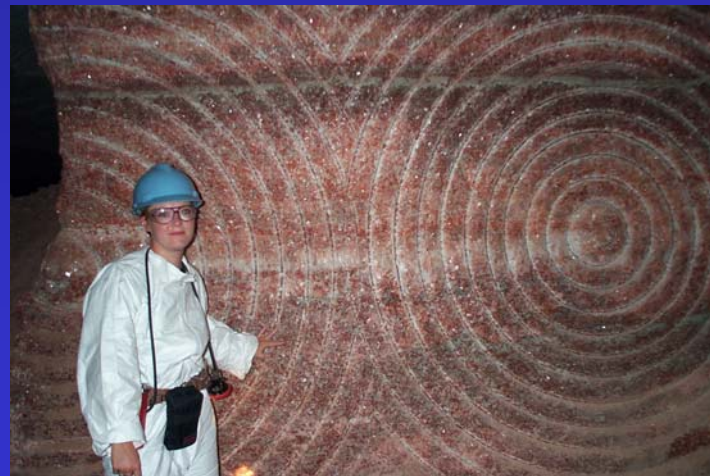
- 8 conventional underground mines
- First mine started in 1962
- 7.4 to 23.0 Bt KCl resources



*Underground Mining at
Esterhazy K2*



PCS Cory



Mined Potash Face PCS Cory



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Potash Solution Mining

- *First solution mine started in 1964*
- *Solution mines are at Belle Plaine and Patience Lake*
- *Outlined Resources 68.9 to 102.5 Bt KCl solution*



Mosaic Belle Plaine solution mine showing surface precipitation ponds



Harvesting boat surface precipitation pond Mosaic Belle Plaine solution mine.



Operating Mines

Vanscoy

- Underground mine
- In 2006 increased annual production capacity by 0.31 Mt to 2.05 Mt KCl
- Considering expansion 0.3-0.8 Mt KCl

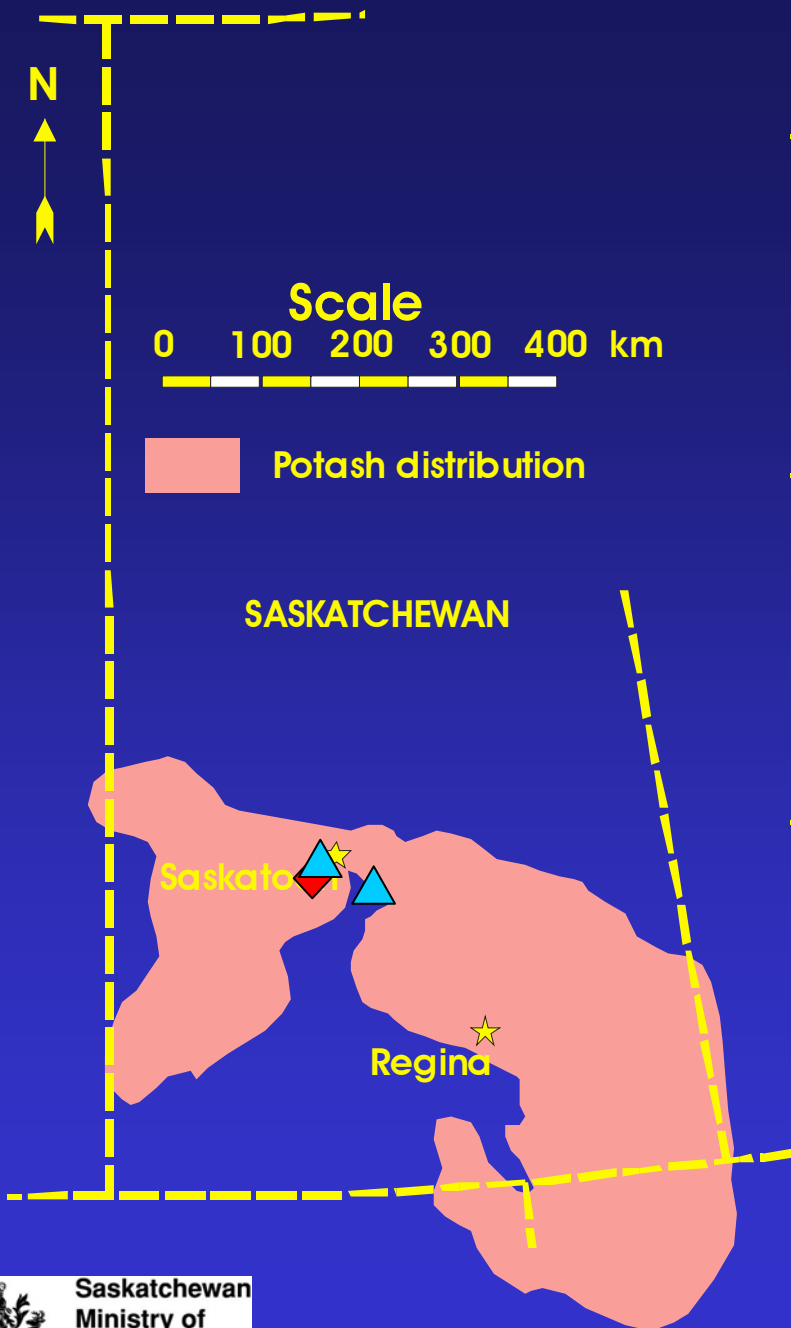
Allan

- Underground mine
- 2007 brought back 0.4 Mt KCl idle capacity
- Annual capacity: 1.89 Mt KCl
- Plan 1 Mt debottleneck/expansion by 2012

Cory

- Underground mine
- Annual capacity: 1.36 Mt KCl
- Two expansions totalling 1.2 Mt KCl by 2010 and 1.0 Mt KCl by 2012

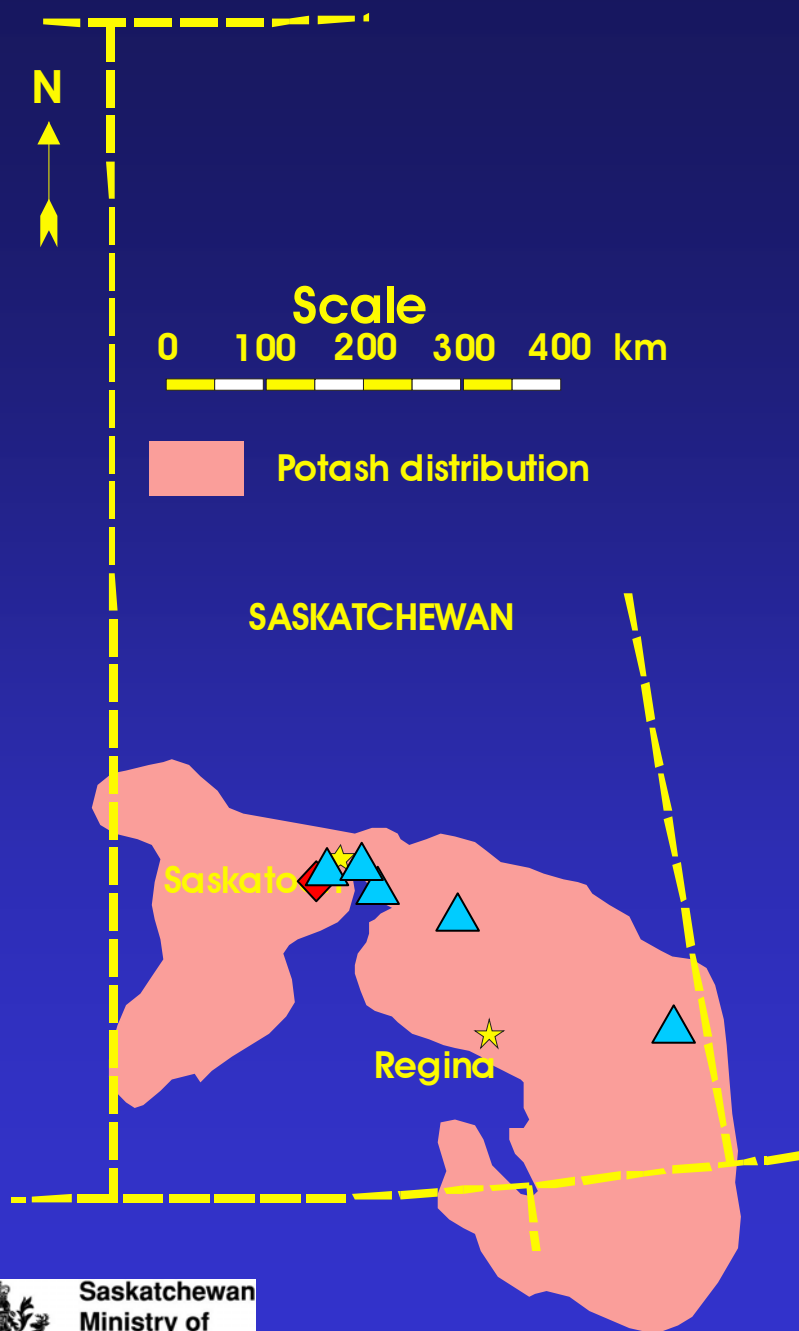
PotashCorp - ▲
Agrium, Inc. - ◆
Mosaic Potash - ●



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All potash production data from public domain company reports.





Lanigan

- Underground mine
- Annual capacity: 3.83 Mt KCl
- Brought back 1.50 Mt KCl idled capacity in 2008

Patience Lake

- Solution mine
- Annual capacity: 1.03 Mt KCl
- Bring back 0.36 Mt KCl idled capacity by 2009

Rocanville

- Underground mine
- 2005 completed expansion increasing capacity 0.75 Mt to 3.04 Mt KCL.
- 2.0 Mt KCl mine and mill expansion - 2012 expanding by additional 0.7 Mt by 2014

PotashCorp - ▲
Agrium, Inc. - ◆

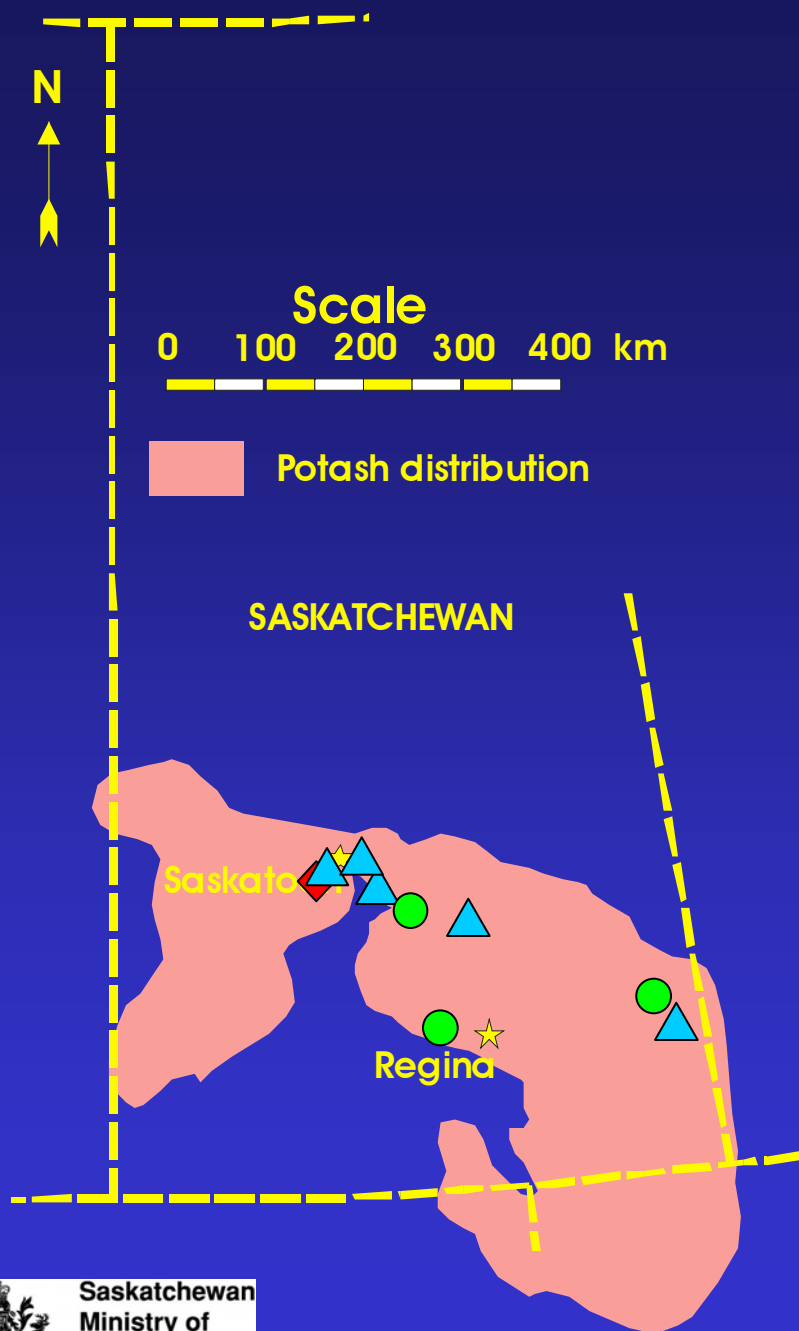
Mosaic Potash - ●

All potash production data from public domain company reports.



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Belle Plaine

- *Solution mine*
- *Annual capacity: 2.80 Mt KCl*
- *Three expansion slated: 0.1 Mt by 2010, 0.4 Mt by 2012, 1.5 Mt 2014-2017*

Colonsay

- *Underground mine*
- *Annual capacity: 1.80 Mt KCl*
- *Two expansions planned: 0.3 Mt by 2009 and 1.0 Mt est. 2013-2016*

Esterhazy (K-1 & K-2)

- *Underground mine*
- *Increased annual capacity by 1.1 Mt to 5.30 Mt KCl in 2007.*
- *Planned expansions of 0.9 Mt in 2012 and 0.9 Mt in 2020.*

PotashCorp - ▲
 Agrium, Inc. - ◆
 Mosiac Potash- ●

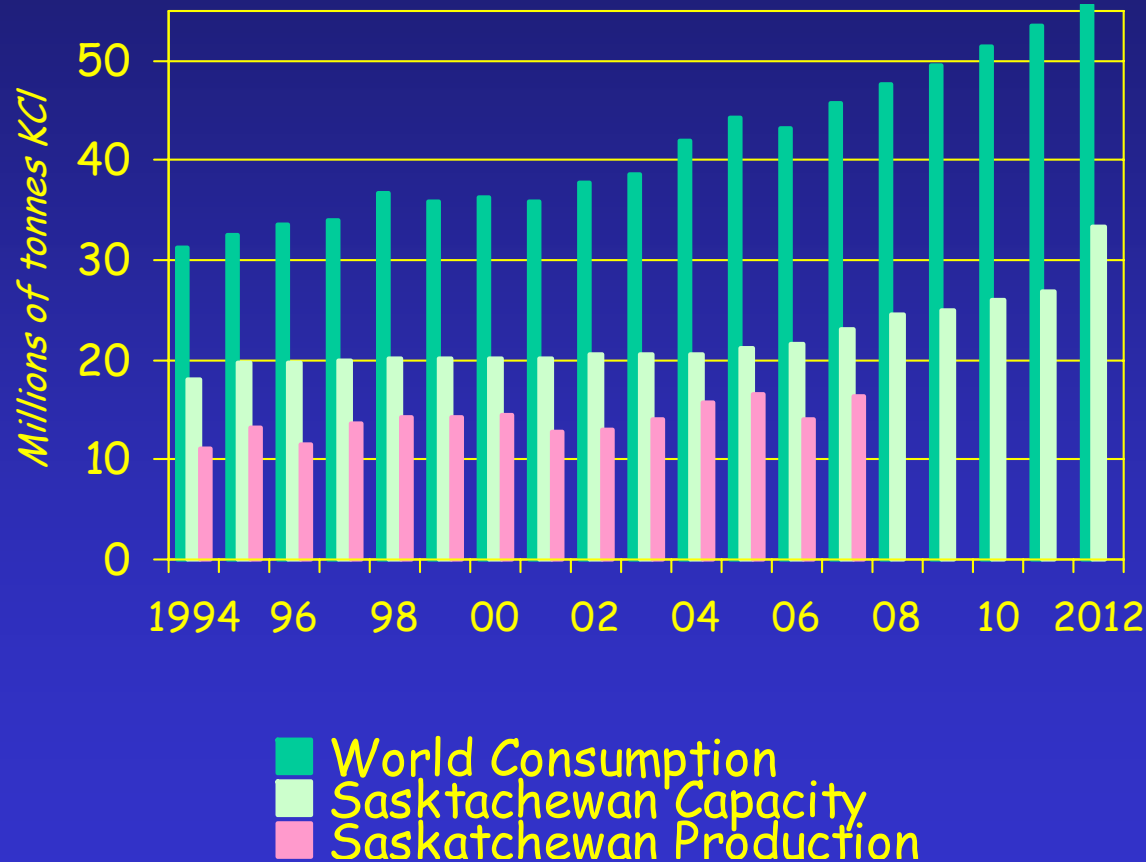
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Performance of Saskatchewan Industry



Production:

2004: 13.6 Mt KCl
 2005: 16.7 Mt KCl
 2006: 13.3 Mt KCl
 2007: 16.9 Mt KCl*

Planned expansions:

9.8 Mt by 2012
 3.4 Mt by 2020
 13.2 Mt total

Future Capacity:

33.3 Mt by 2012 or 60% increase over 2004
 36.7 Mt by 2020 or 75% increase over 2004

Investments:
 \$8.66 billion

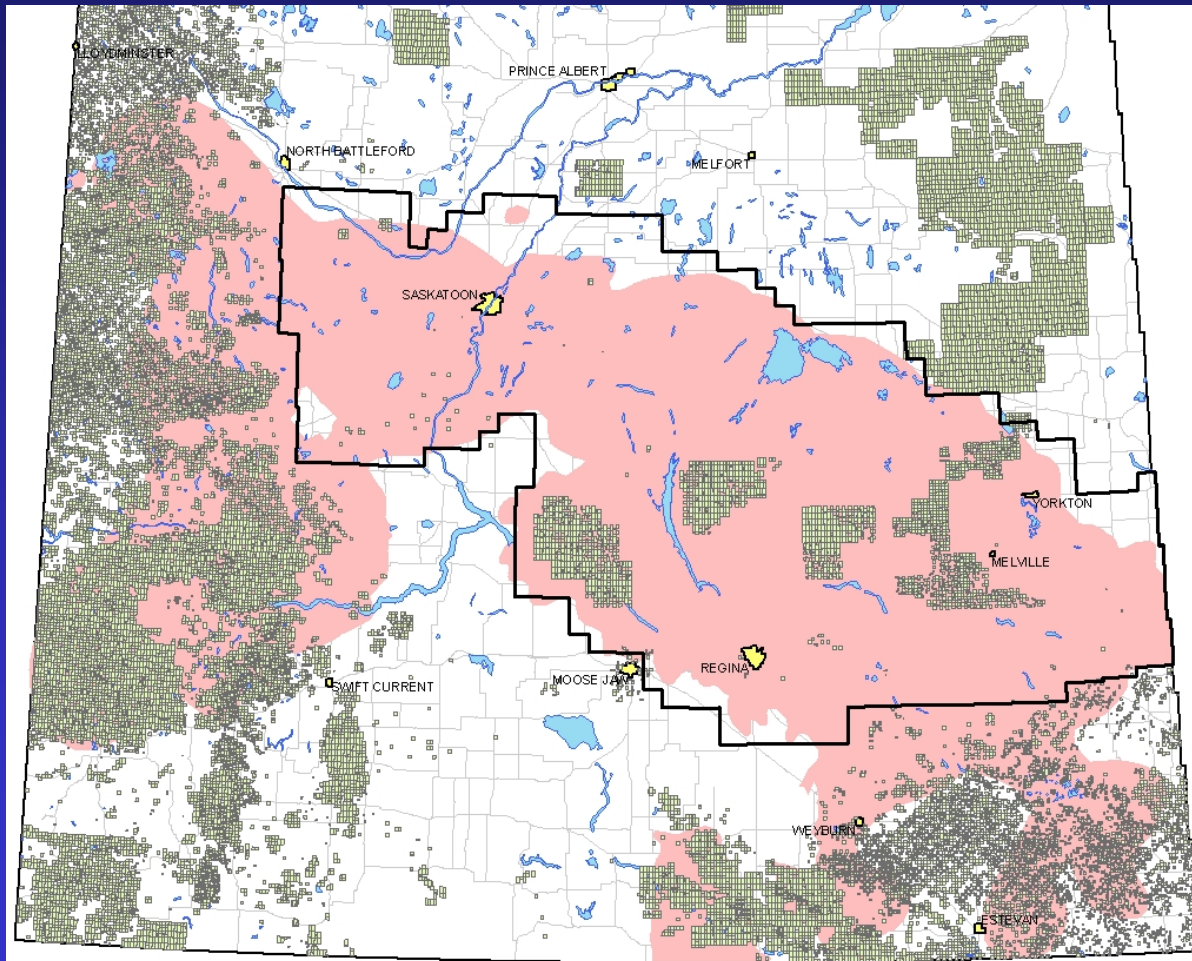


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From: NRCAN and IFA
 *Denotes Record Level



Potash Tenure 2004 vs. 2008



2004
11 Leases
206,306 ha

Oct. 31 2008
176 permits
11 leases
4,382,196 ha

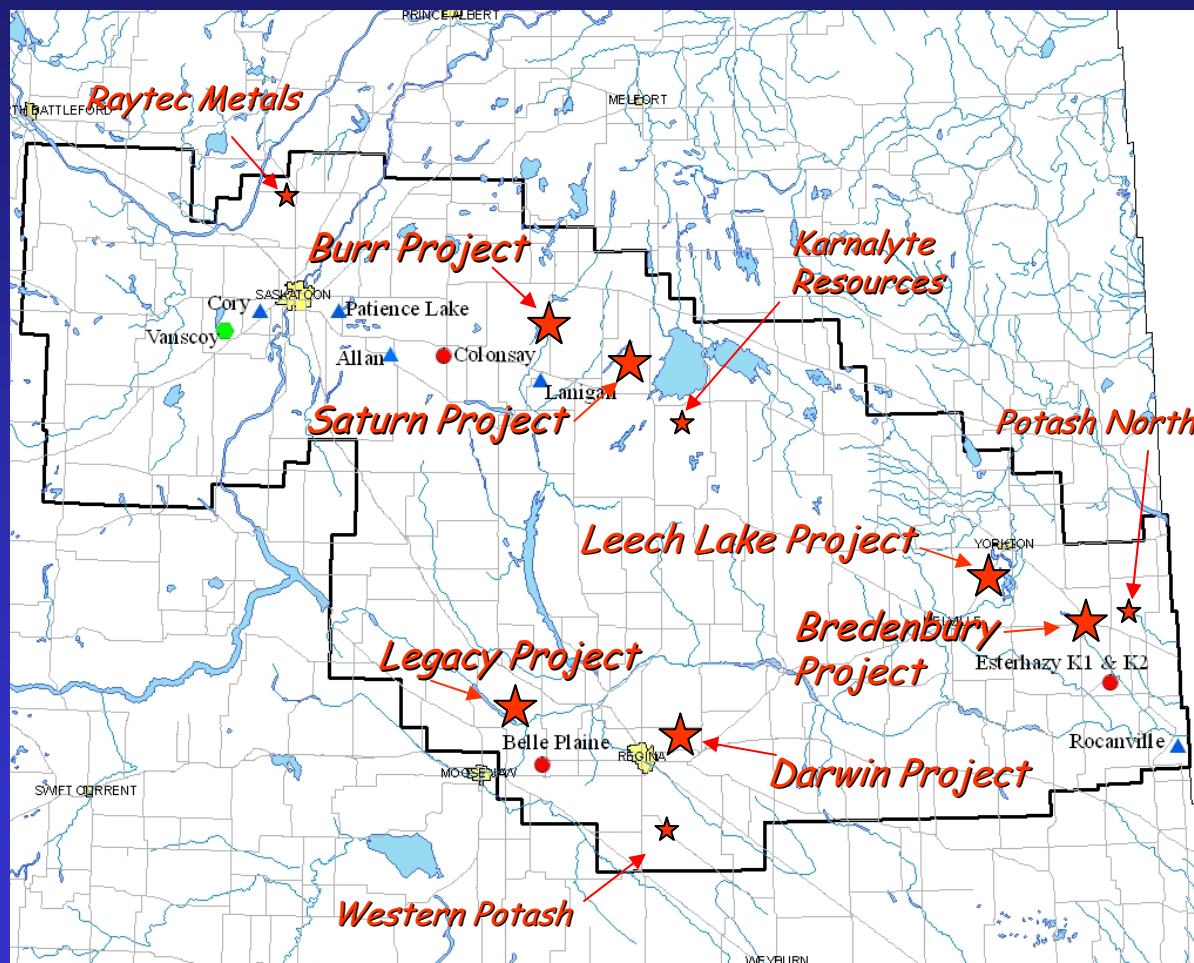
**Pending
Applications:**
11 Permits
227,760 ha



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Potash Exploration



BHP Billiton

- Conducted 3D seismic survey
- Indicated Resource 479 Mt
- Inferred Resource 981 Mt

Athabasca Potash Inc.

- Conducted 3D seismic survey
- 14 wells completed to date
- Indicated Resources 241 Mt
- Inferred Resource 183 Mt

Potash One Inc.

- Conducting 3D seismic survey
- Indicated Resource 36.8 Mt
- Inferred Resource 360.4 Mt

Kennecott Canada Exploration Inc. (Rio Tinto)

- Drilling Test Holes

Agrium - Leech Lake

- Drilling Test Holes

Potash Corp - Bredenbury

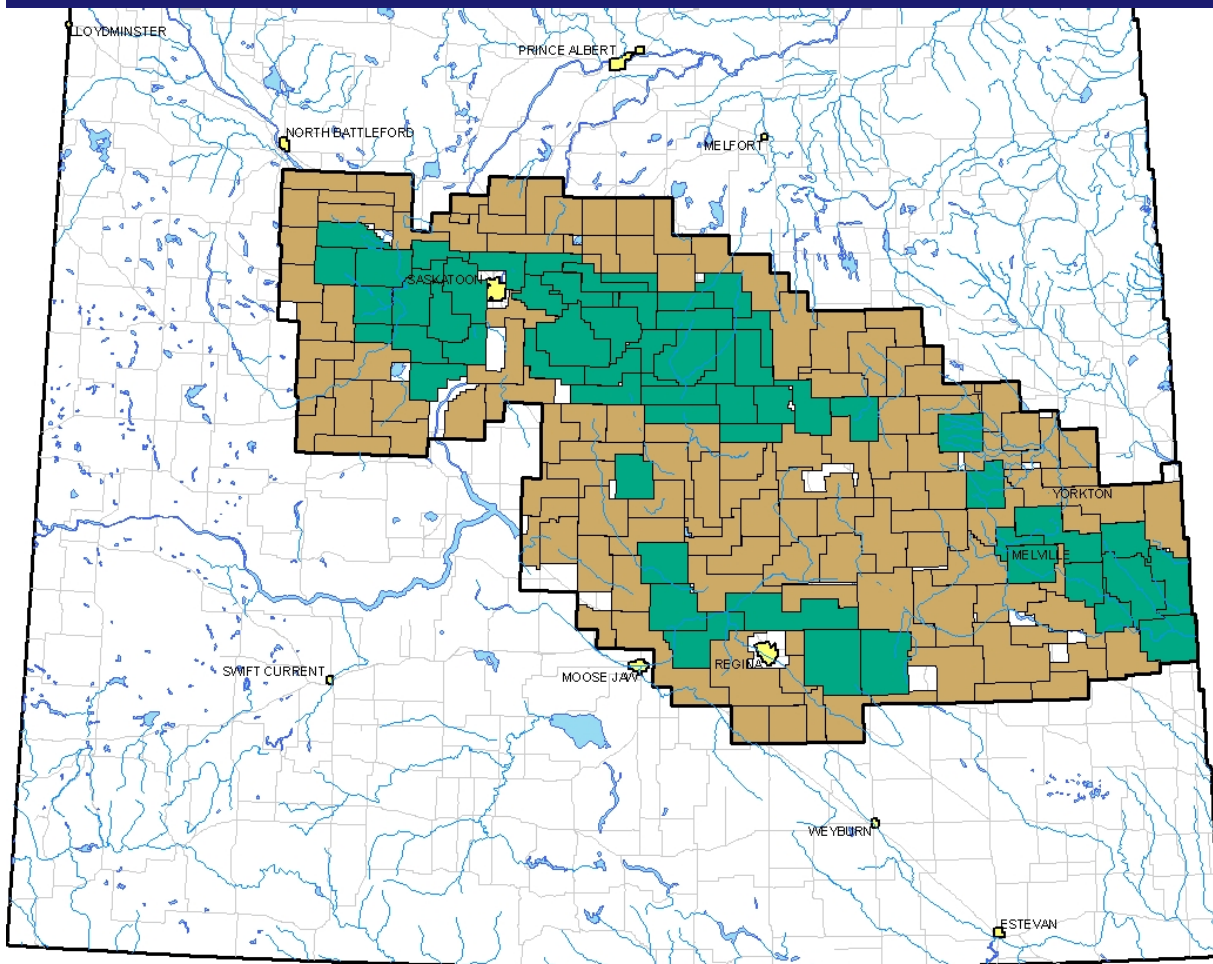
- Drilling Test Holes



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A Renewed Interest



15 New Disposition Holders

Over 20,000 line km of seismic survey applied for from 2007-2008

Geologic Potential

- *Defined by geoscience work.*

Favorable Regulatory Environment

- *Changes to Potash Royalty System*

Demand for Commodity

- *Highest \$ in 30 years*

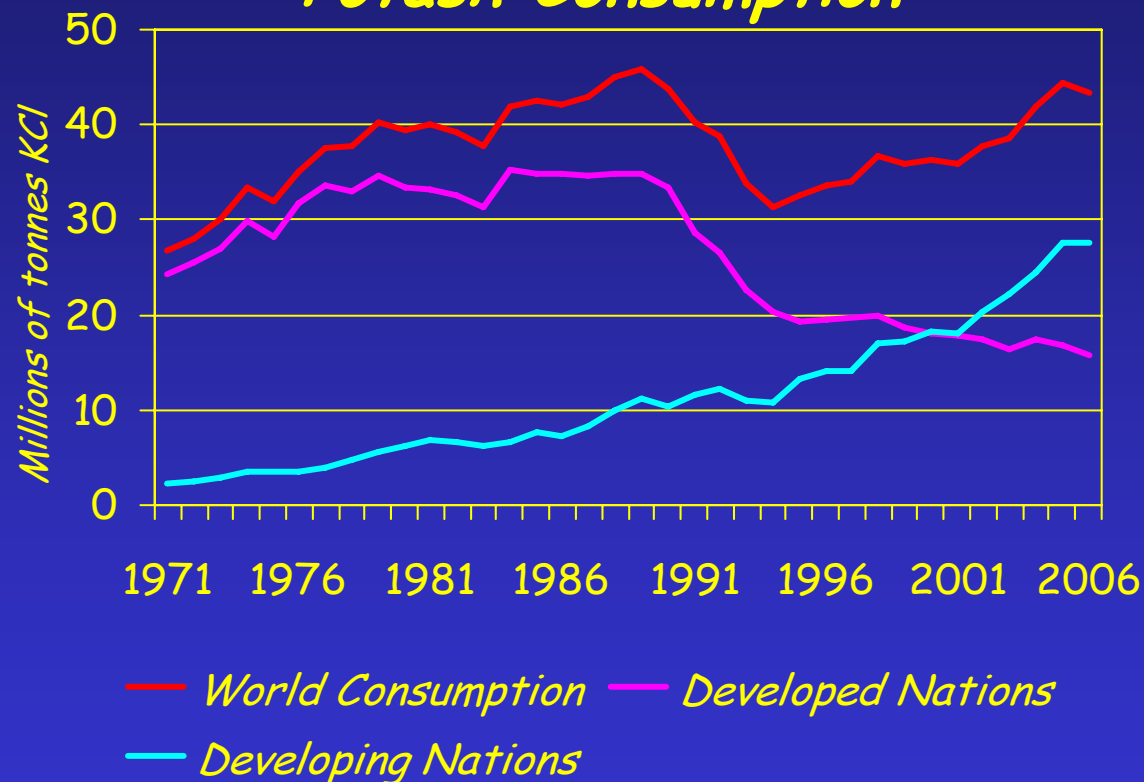


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Outlook for Markets

Potash Consumption



From: International Fertilizer Association and USGS

- 90% demand growth from developing nations: increased populations, less land for agriculture, and economic growth.
- Biofuel incentives in the US and EU will increase nutrient demand.
- Demand growth of 3-4% annually = 2 Mt mine
- No new producers before 2011 means current producers will need to run at capacity to keep up with the forecasted demand.

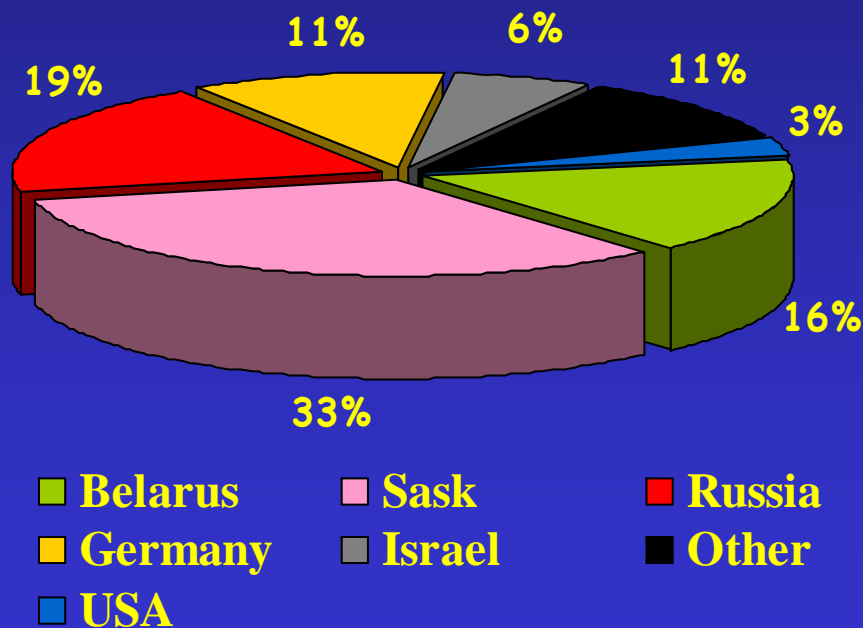


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Position of Saskatchewan Potash in World Industry

2007 Estimated Share of World Potash Production



- *Largest producer: 33% of world production - 40% world trade*
- *Increased prices and volume for foreign sales*
- *Only major competitors: Russia, Belarus, and Germany*
- *Outlined resources:
7.4 to 23.0 Bt KCl conventional
68.9 to 102.5 Bt KCl solution*

From: U.S. Geological Survey, Mineral Commodity Summaries, January 2008

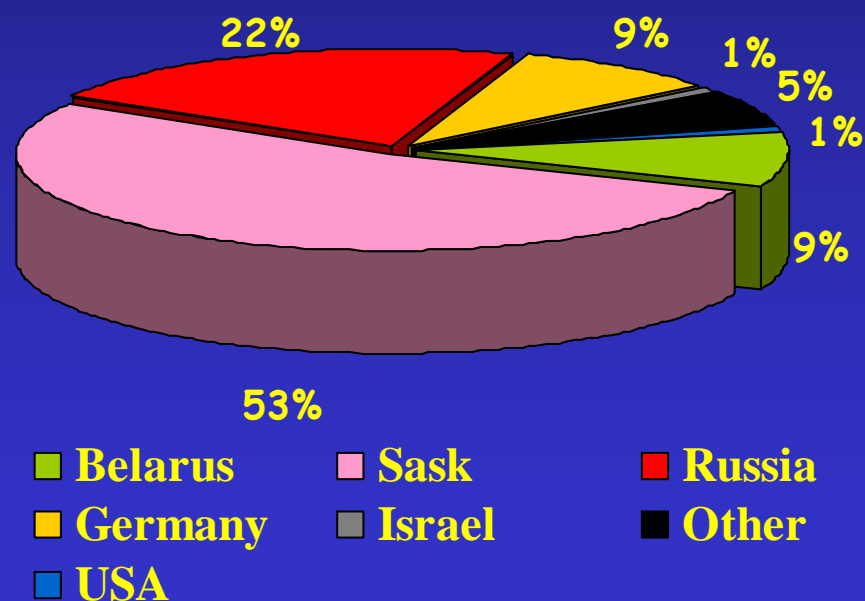


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Position of Saskatchewan Potash in World Industry

Estimated Global Potash Reserves



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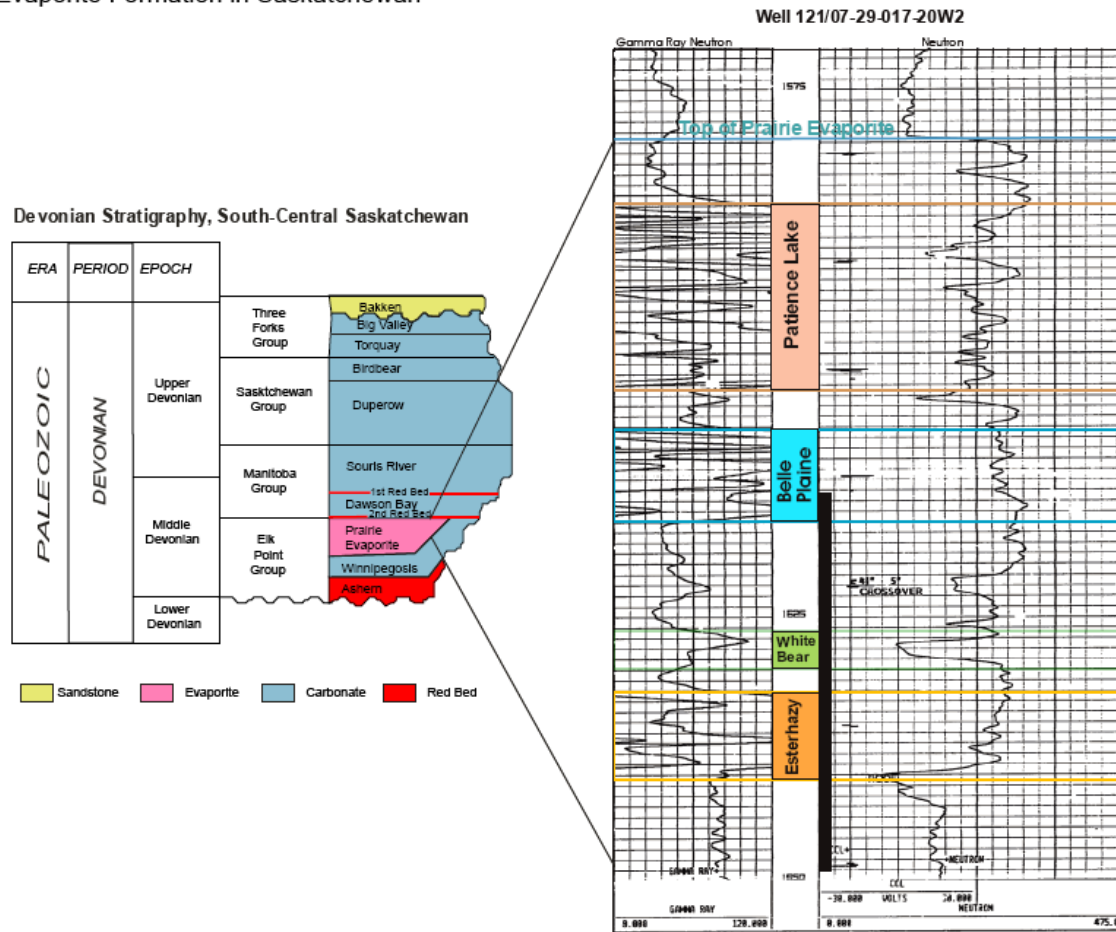


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Potash Member Re-Mapping

Figure 1: Reference Well Illustrating Four Potash Members within the Upper Part of the Devonian Prairie Evaporite Formation in Saskatchewan



Note: The potash members are interpreted from core (1613.2-1658.7m) and geophysical logs.

Well Logs and
Historic Core
intersections

Density Neutron
Gamma Ray, and
Sonic Logs.

1500 logs

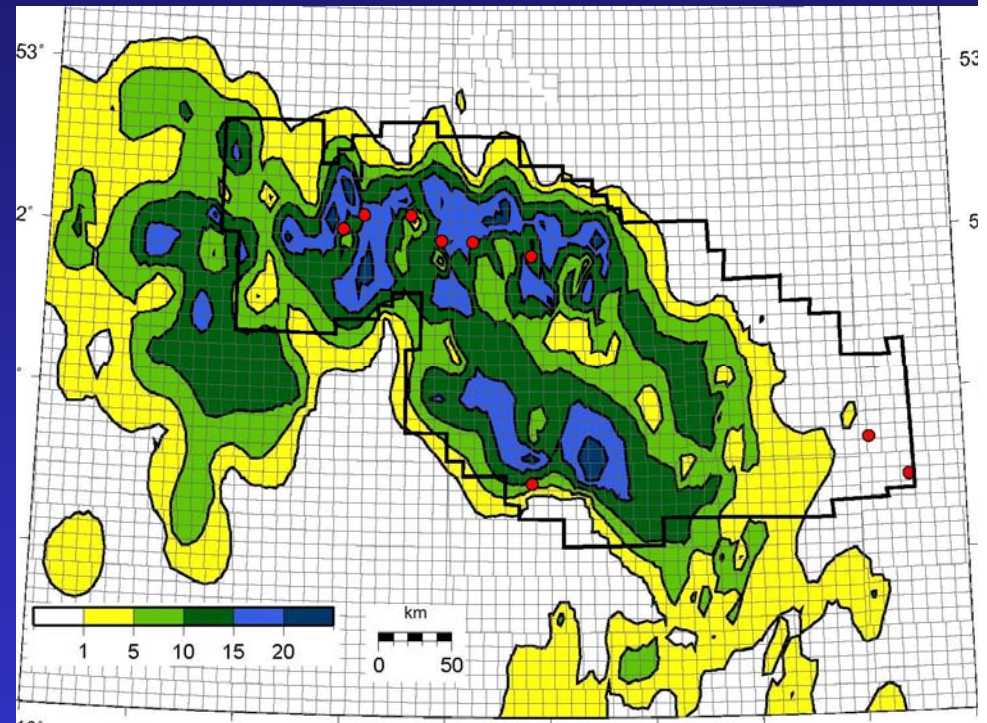
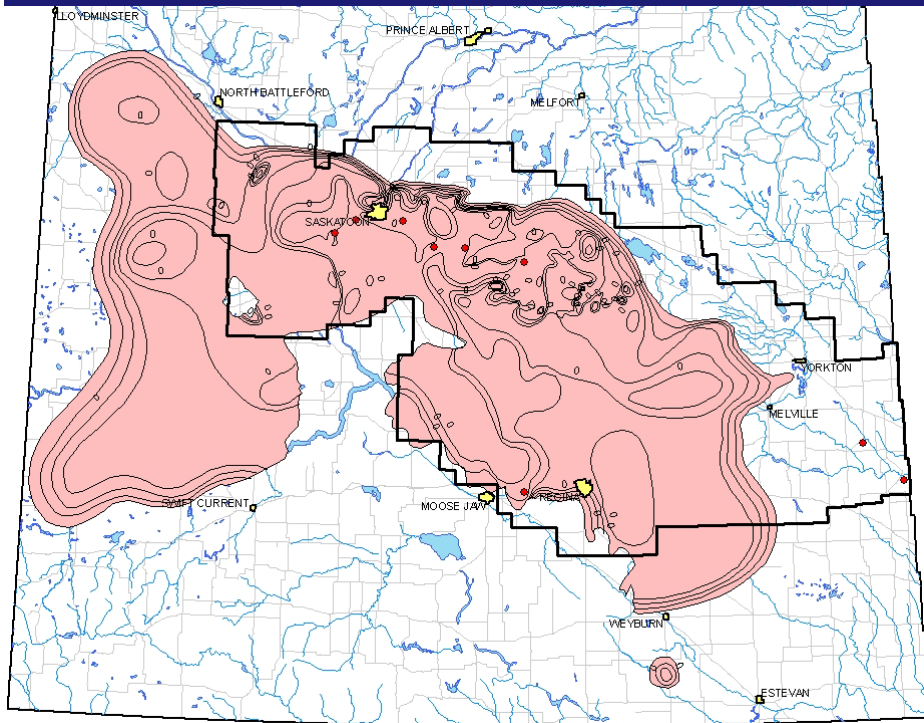
Twice as many as
previous
interpretation



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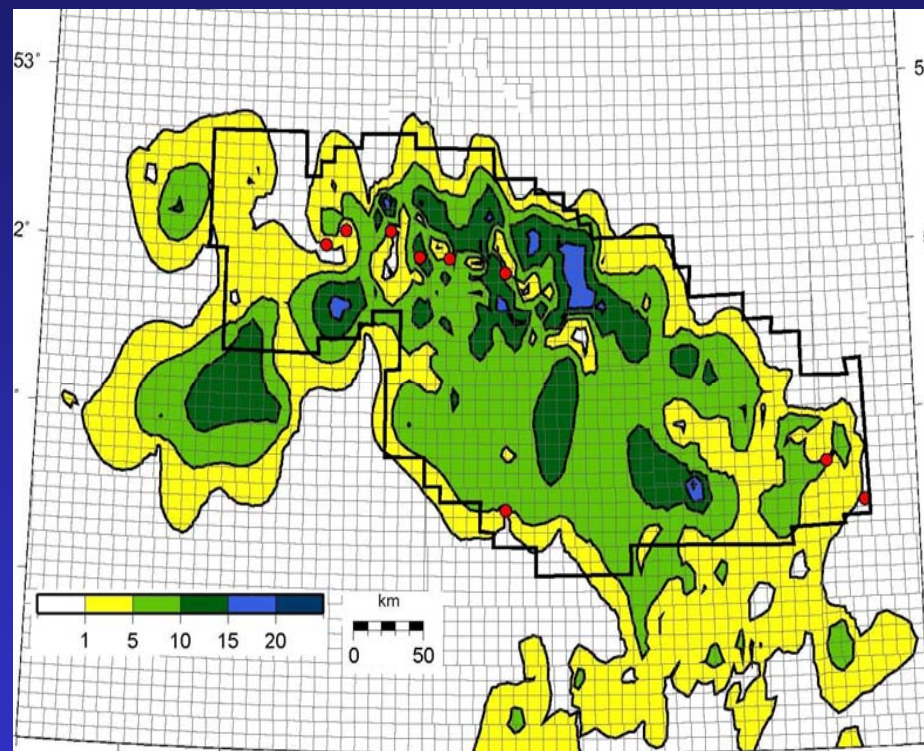
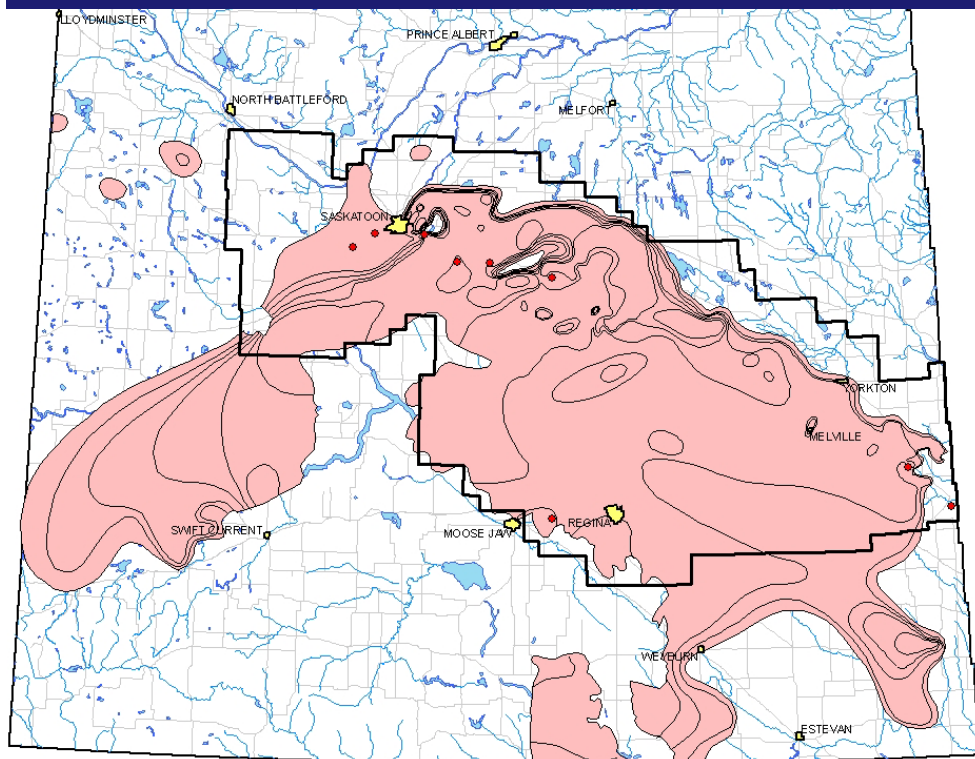
Patience Lake Member



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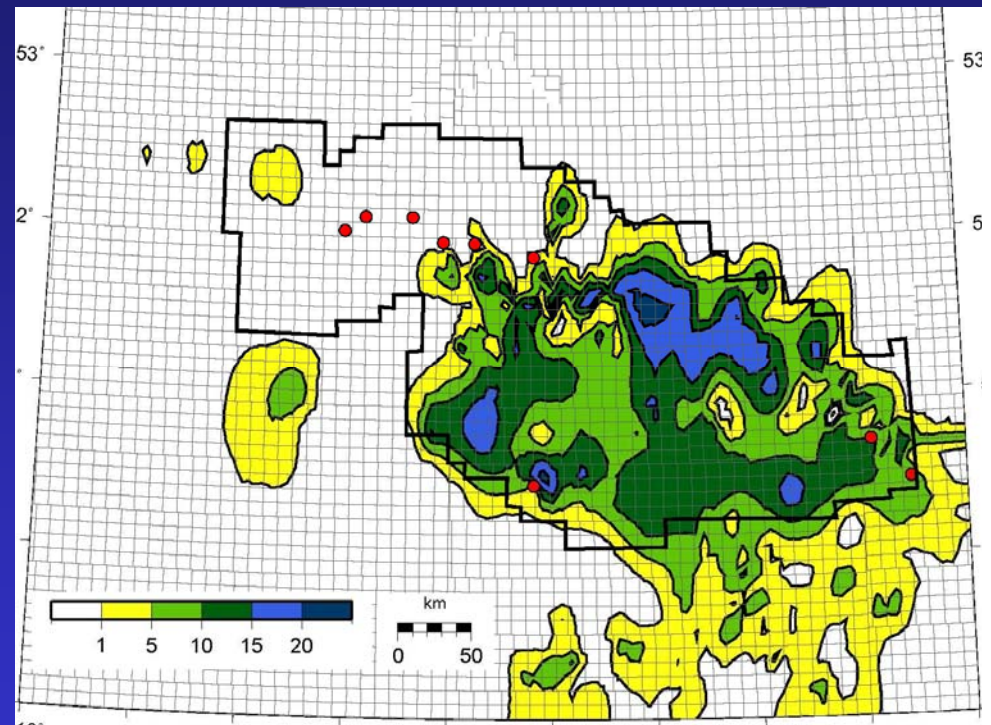
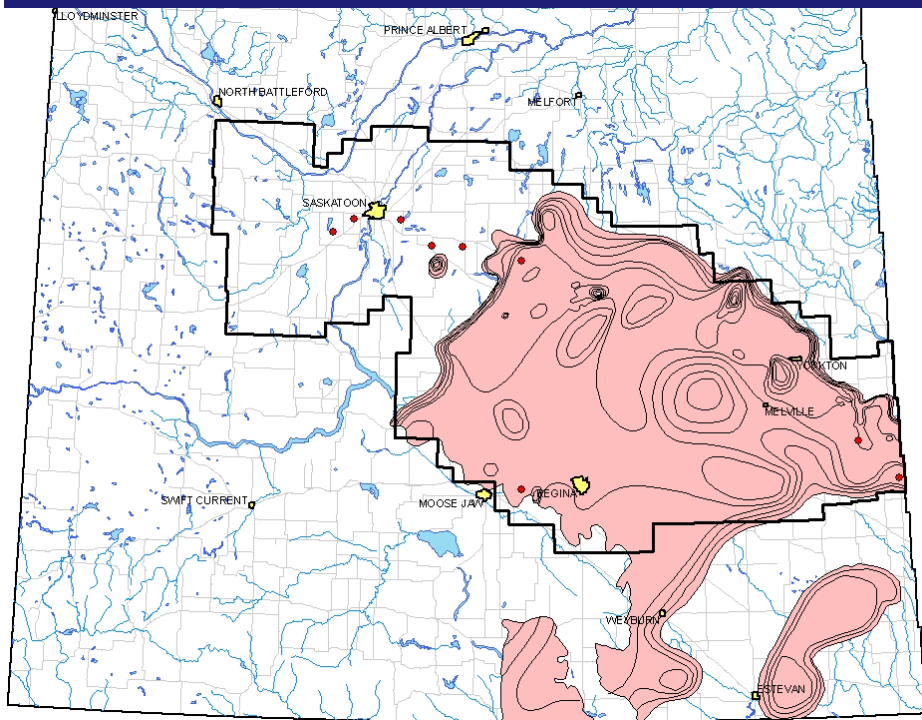
Belle Plaine Member



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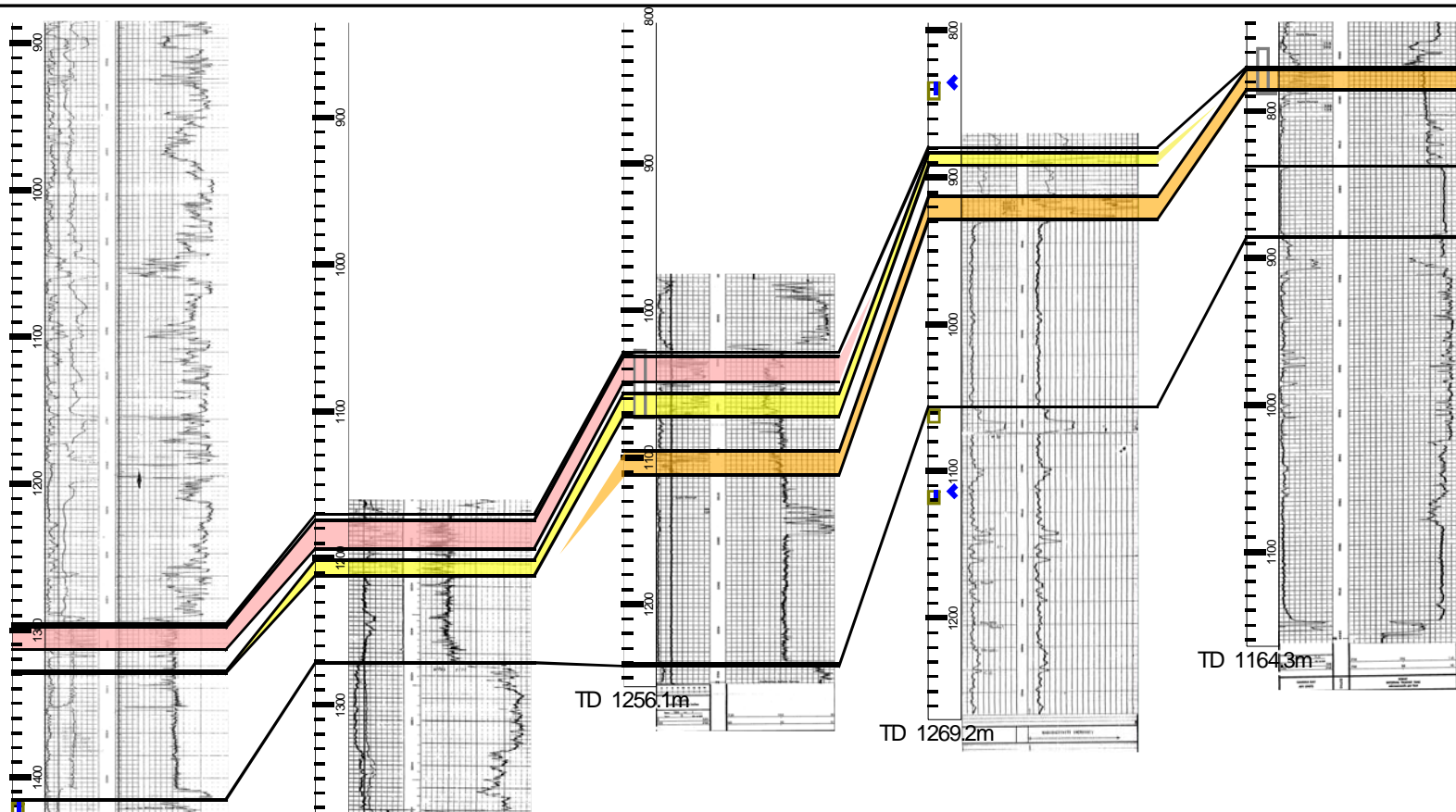
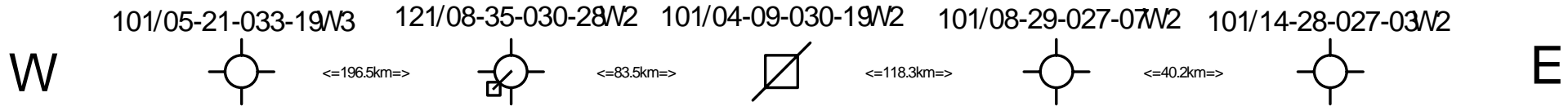
Esterhazy Member



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Cross Sections



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Poster 24 in Adam Ballroom

