

*Potash in Saskatchewan:
An Overview of Exploration
and Developments*

*Saskatchewan Ministry of
Energy and Resources*

Jason Berenyi, Chao Yang, and Gavin Jensen



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Presentation Overview

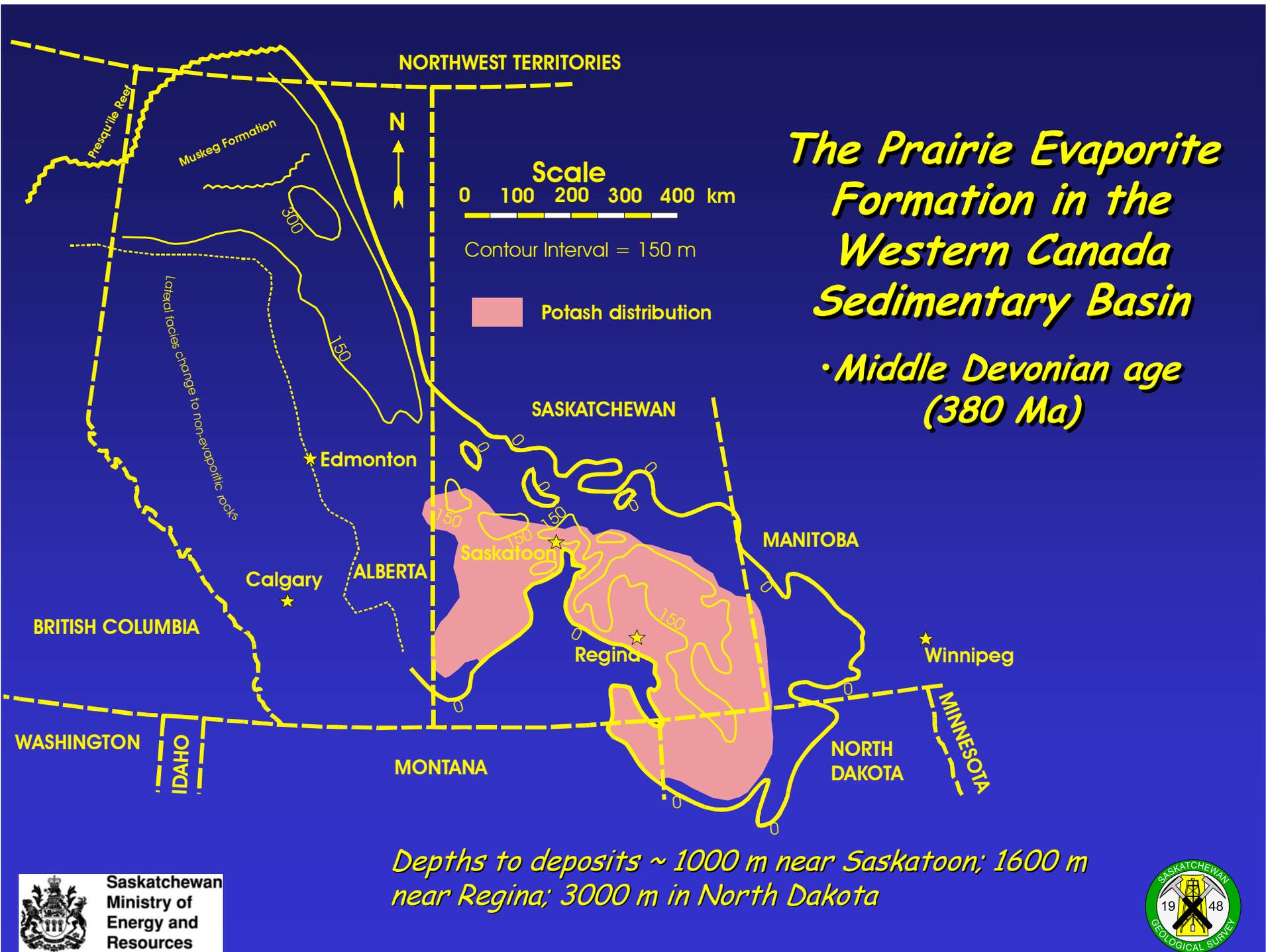
- *Saskatchewan Potash*
- *Geology of Potash Deposits*
- *Current potash mines - production, capacity and planned upgrades*
- *Current Status of Potash Exploration*
- *Saskatchewan global role*
- *New Geoscience*



Potash - What is it?

- *Potash - general term for potassium (K) salts*
- *Mineralogy*
 - *Halite (NaCl) - common salt*
 - *Sylvite (KCl) - 60-63% K₂O equivalent.*
 - *Carnallite (KCl.MgCl₂.6H₂O) only 17% K₂O equivalent.*
- *Product - potassium chloride (KCl)*
 - *Grades of product are subdivided based on varying K₂O purity and particle size*





West

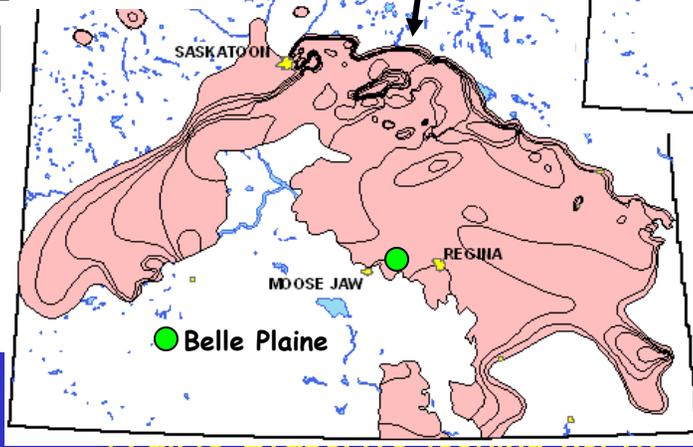
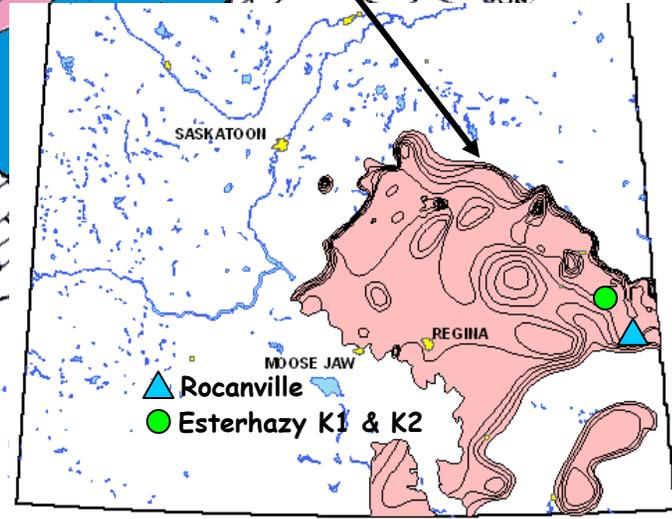
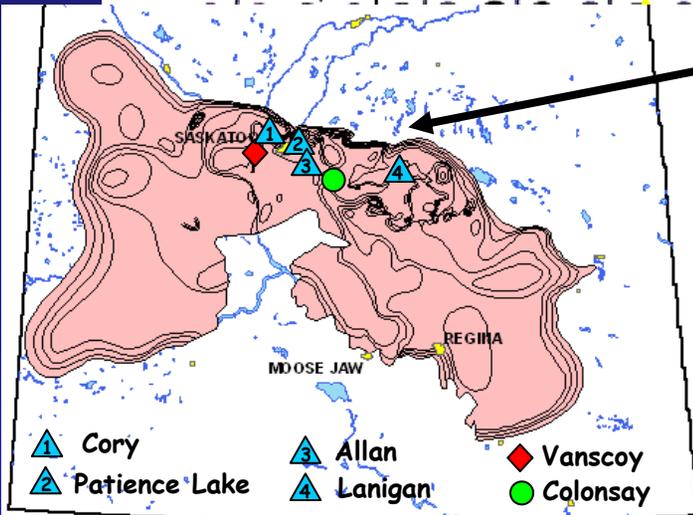
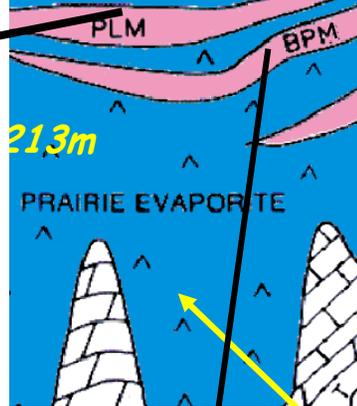
East

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

Hubbard Evaporite

Dawson Bay Fm.

Winnipegoc...



Evaporite



Calc. shale



Potash



90



Middle Devonian



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Fuzesy (1982) and Holter (1969)



Potash Underground Mines

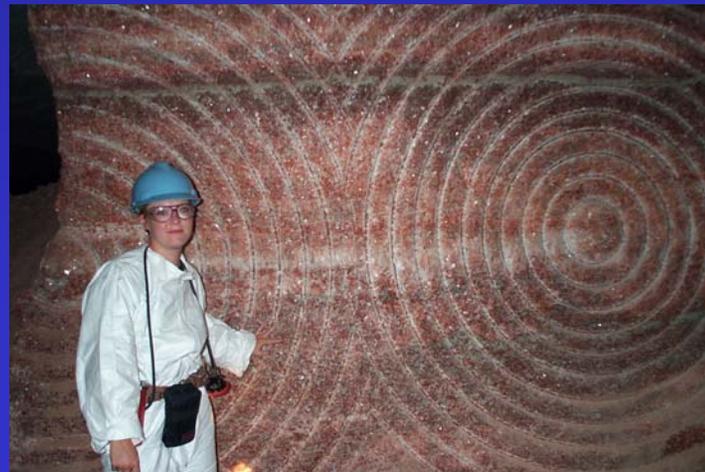
- 8 conventional underground mines
- First mine started in 1962
- 7.4 to 23.0 Bt KCl resources



PCS Cory



Underground Mining at Esterhazy K2



Mined Potash Face PCS Cory



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

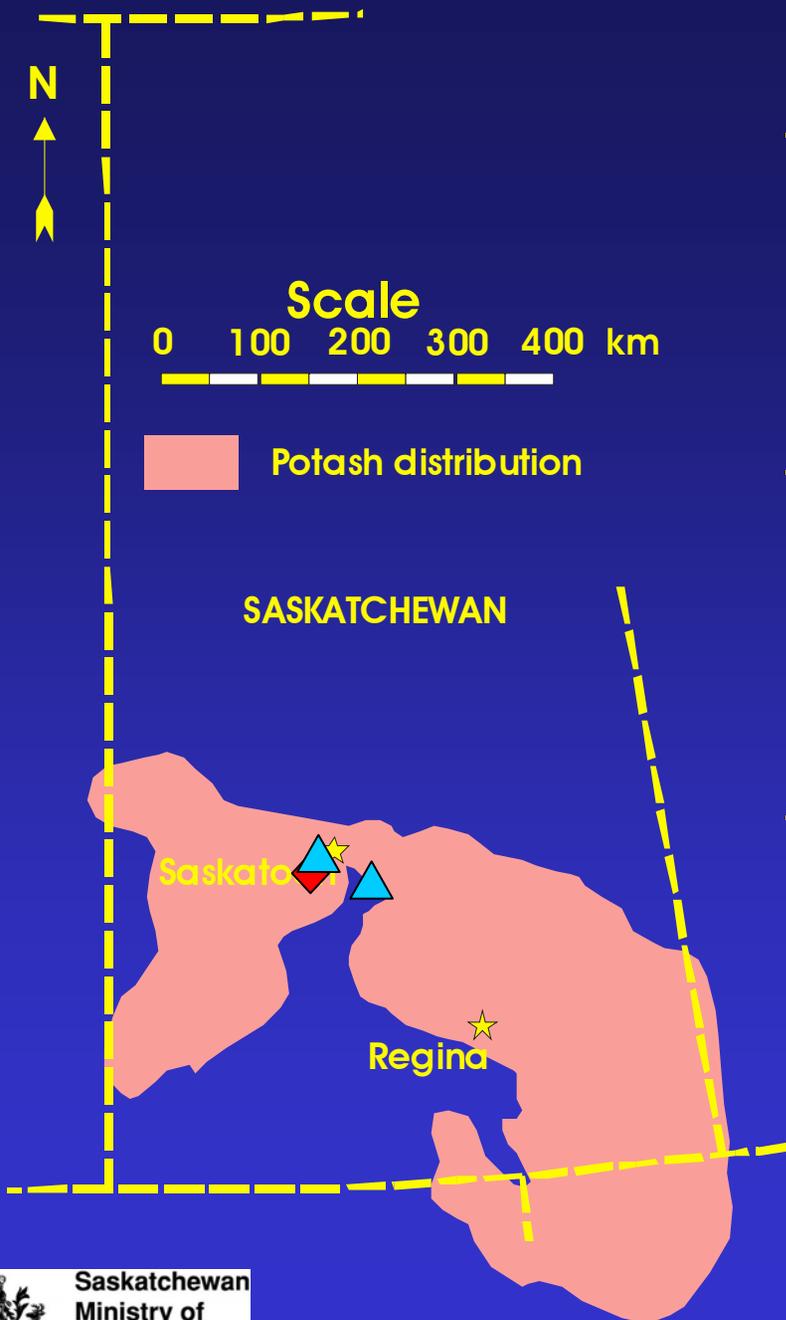
Cory

- 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. - ◆

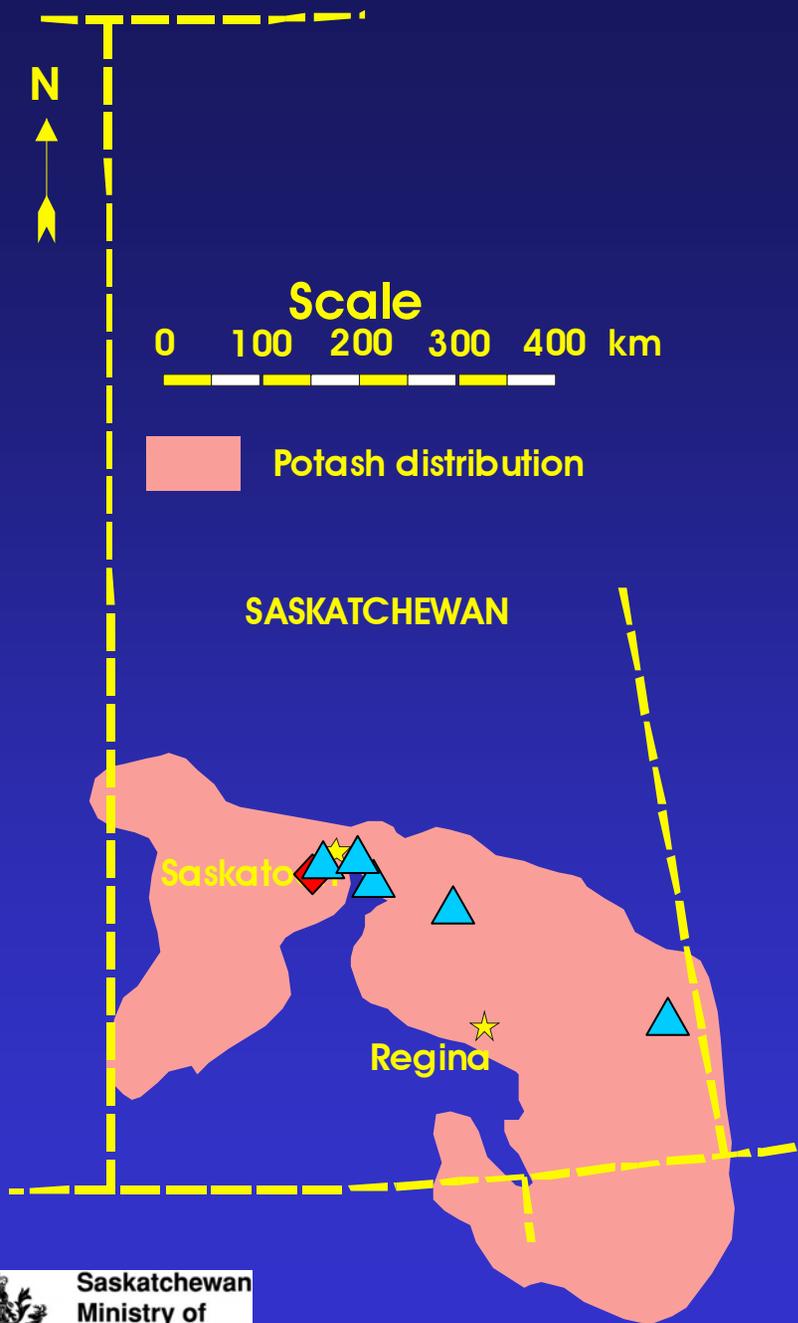
Mosaic Potash - ●



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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*

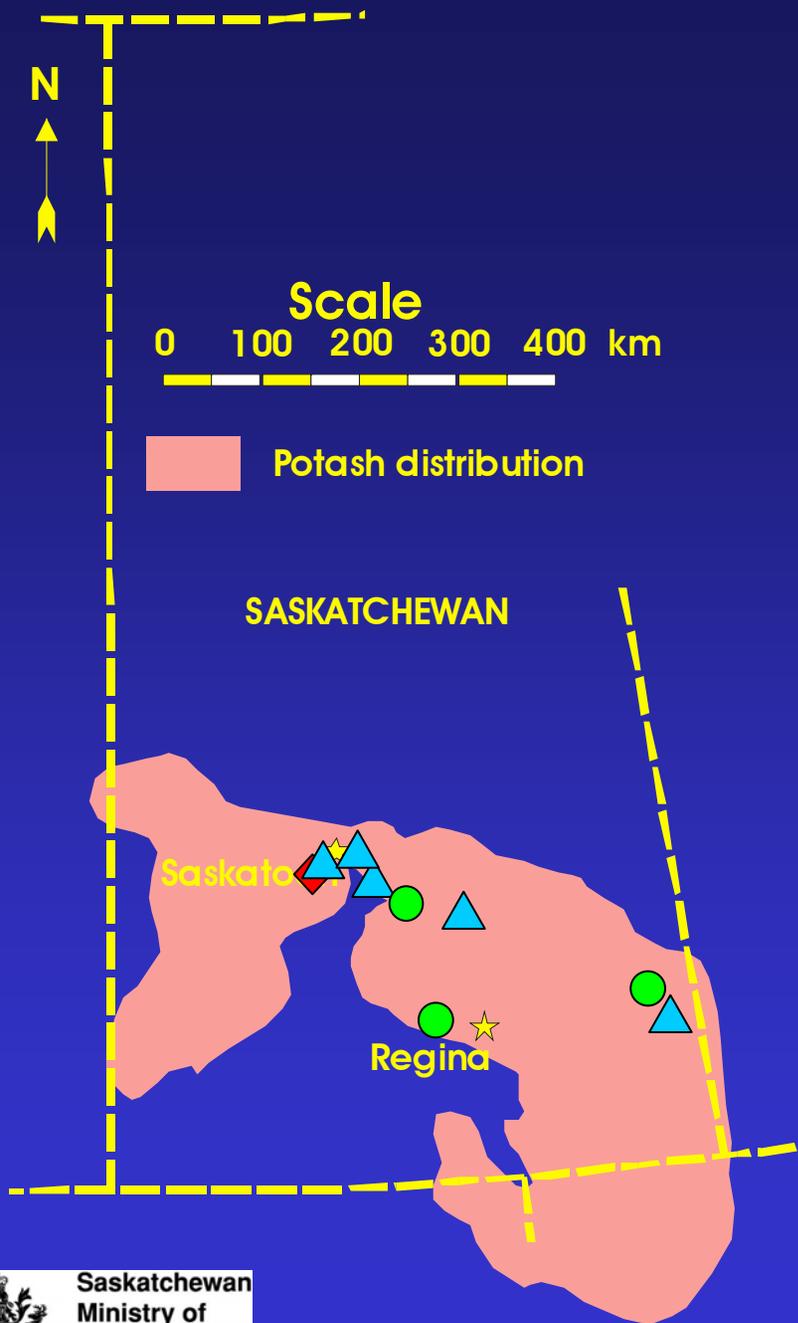
Rocanville

- *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.





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. - ◆
- Mosaic Potash - ●

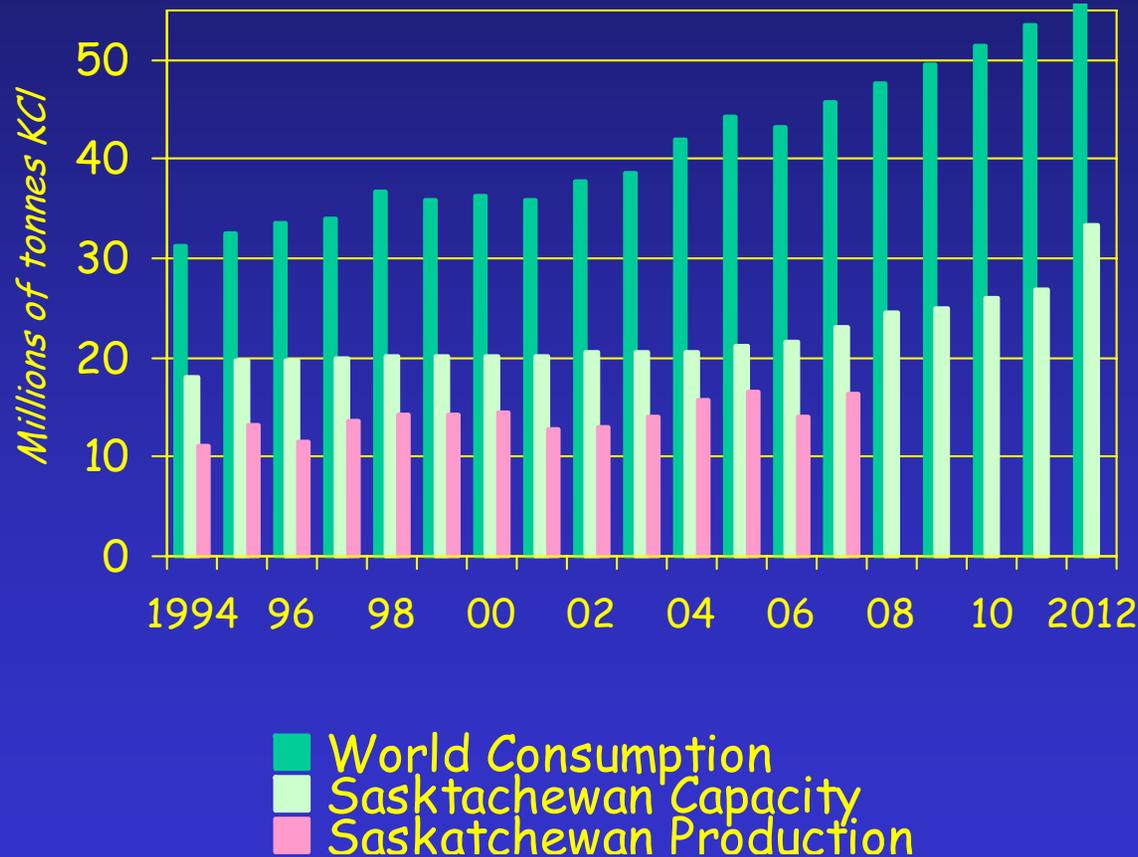
All potash production data from public domain company reports.



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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

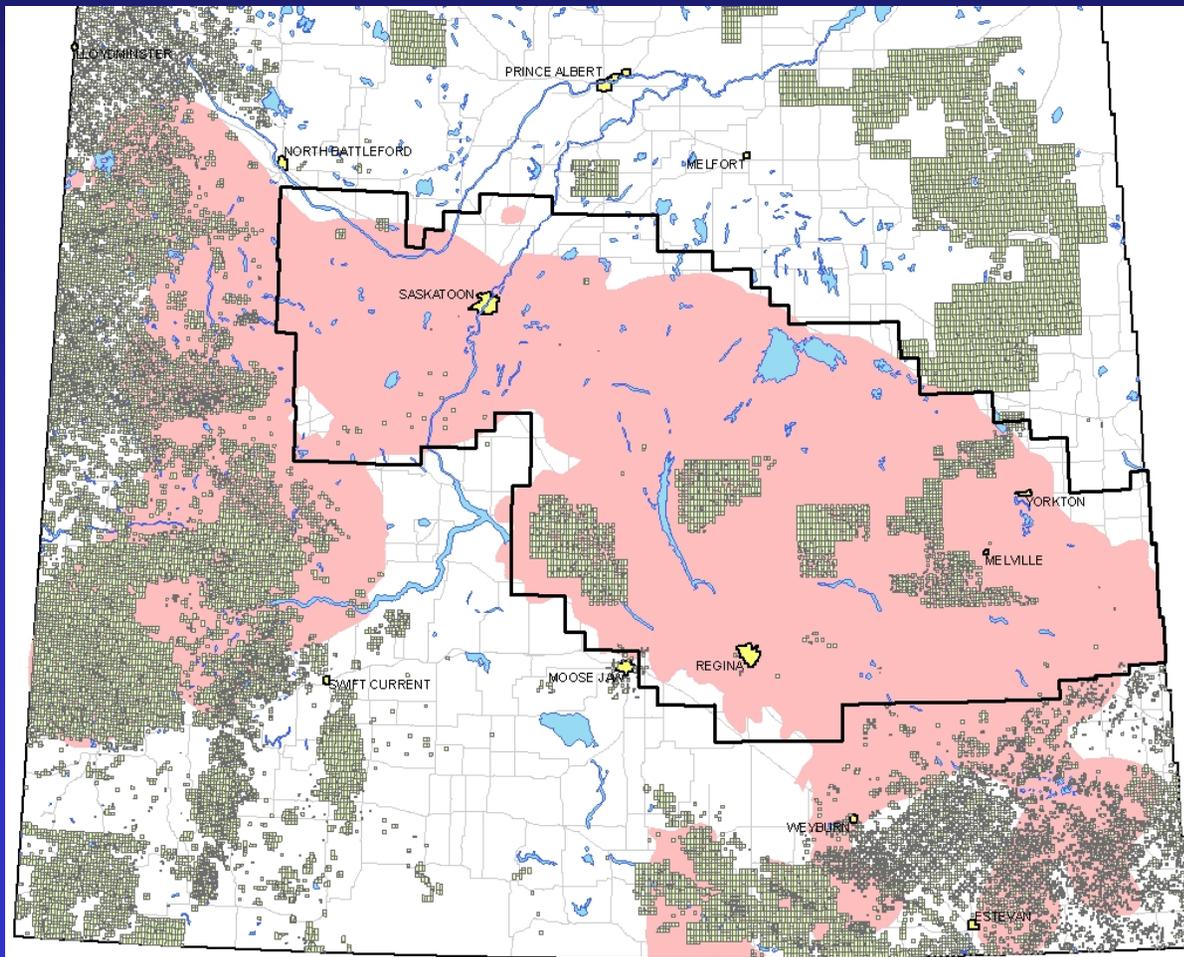


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From: NRCAN and IFA
*Denotes Record Level



Potash Tenure 2004 vs. 2008



2004
11 Leases
206,306 ha

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

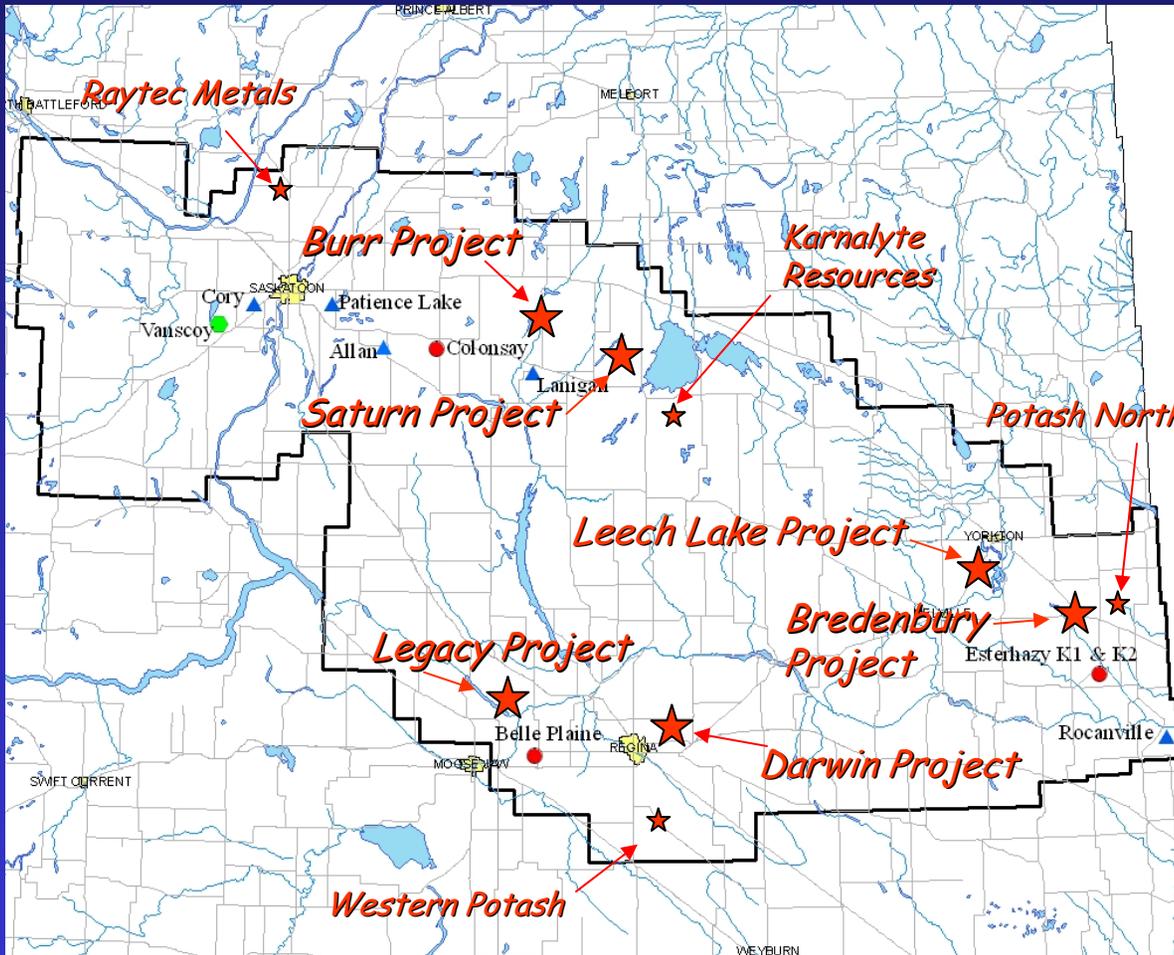
**Pending
Applications:**
11 Permits
227,760 ha



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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 - Bredenburg

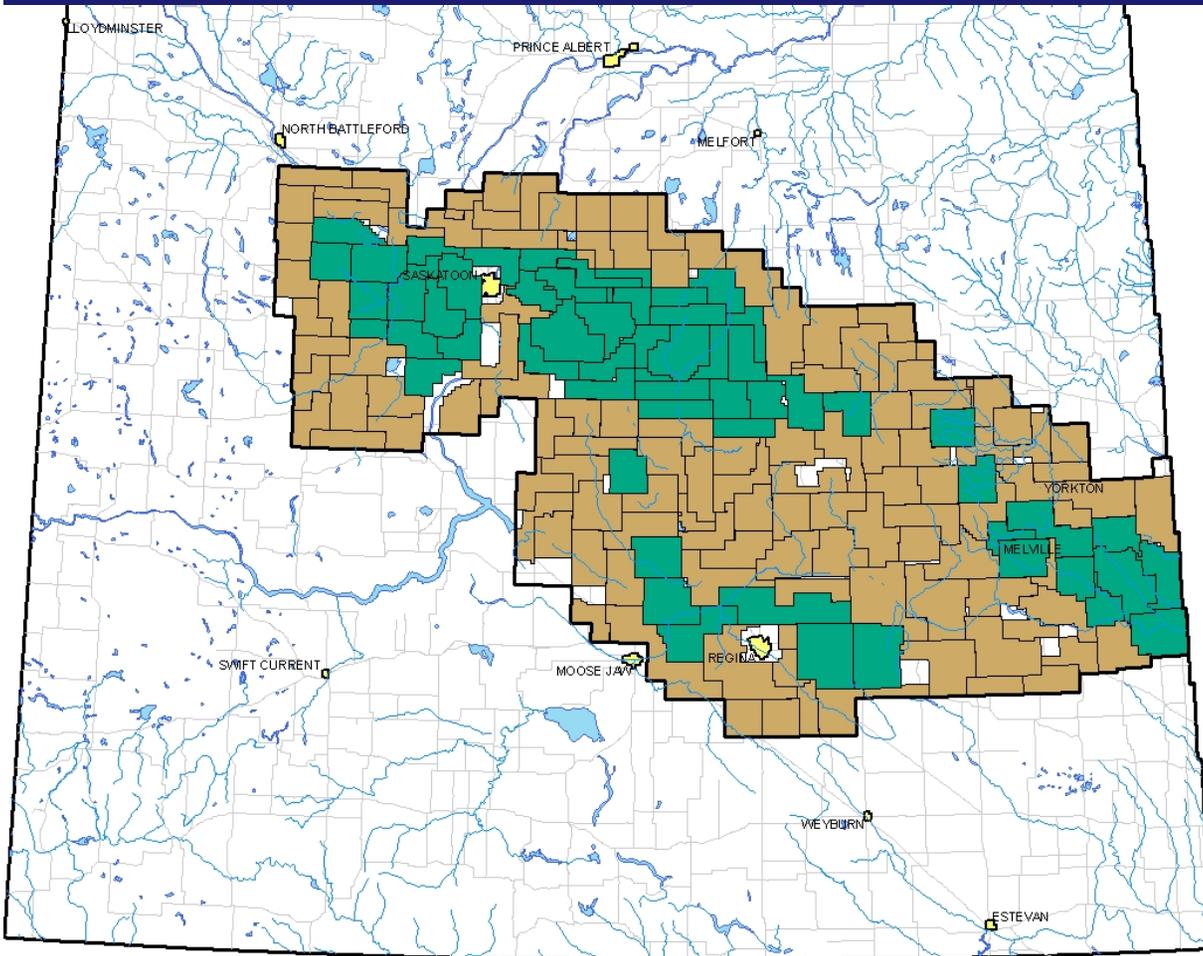
- Drilling Test Holes



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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*

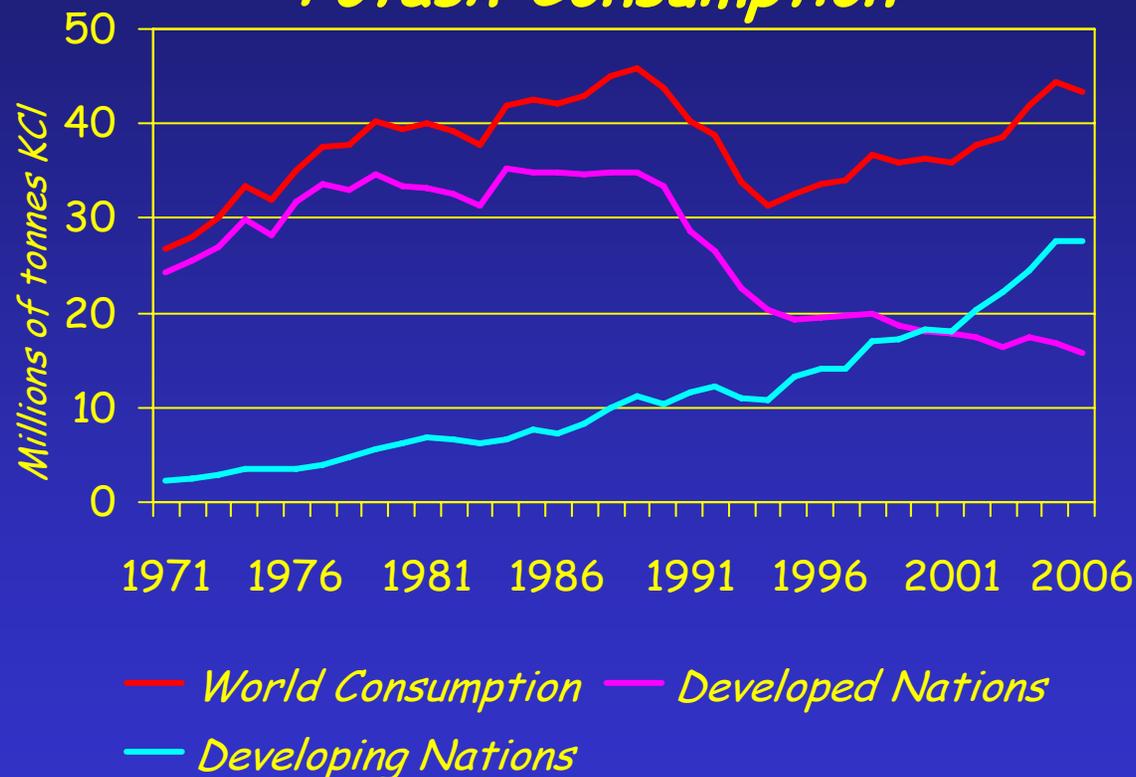


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Outlook for Markets

Potash Consumption



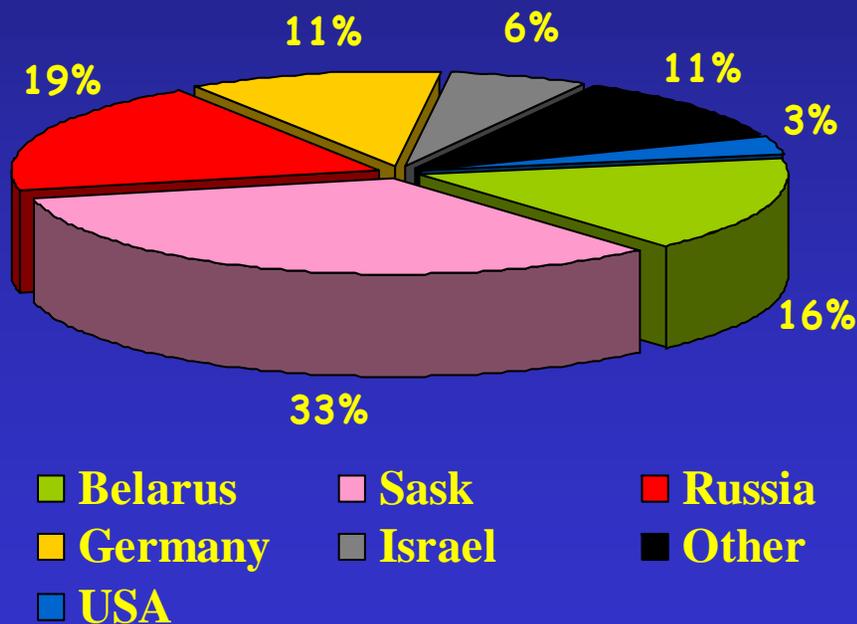
From: International Fertilizer Association and USGS

- 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.



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

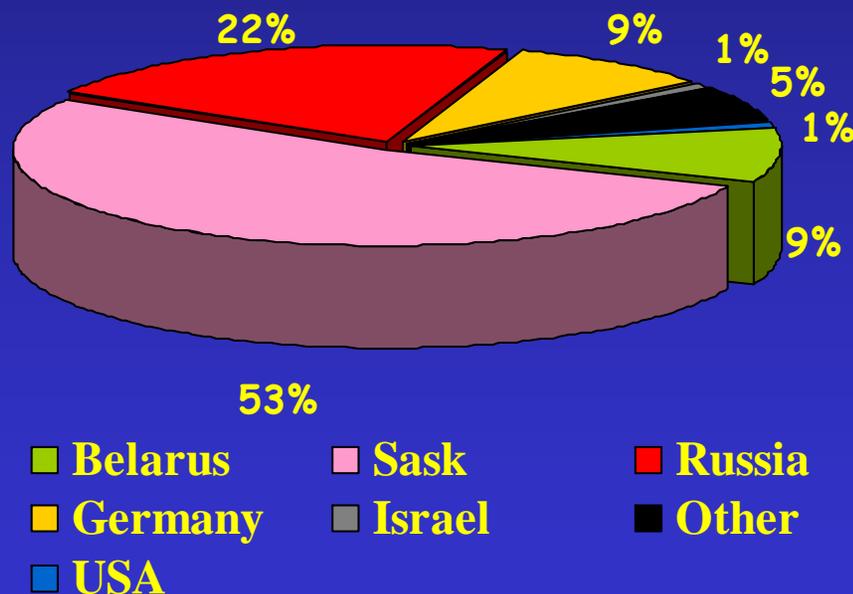


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Position of Saskatchewan Potash in World Industry

Estimated Global Potash Reserves



- *Largest producer: 33% of world production - 40% world trade*
- *Increased prices and volume for foreign sales*
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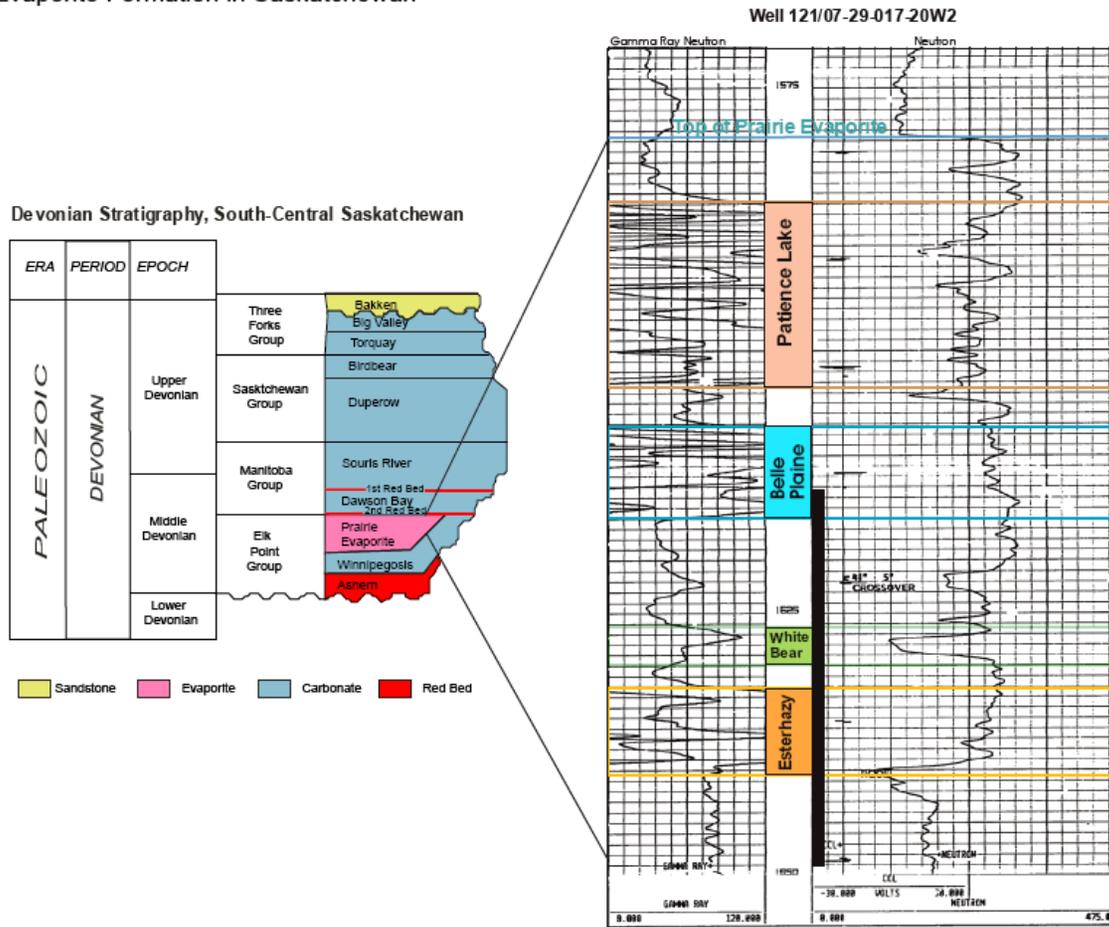


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Potash Member Re-Mapping

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

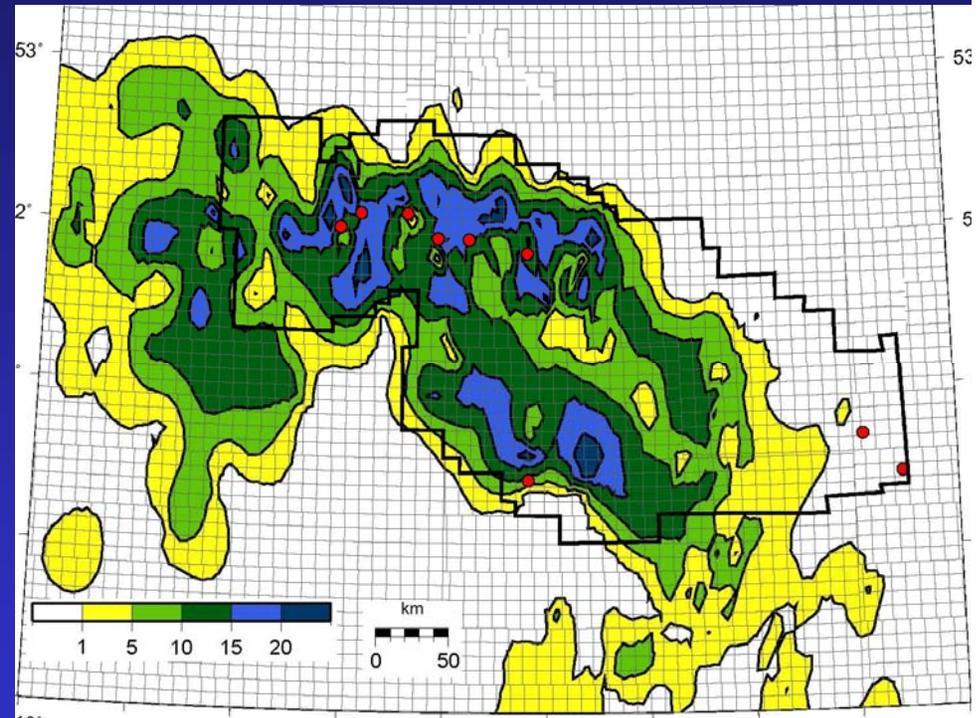
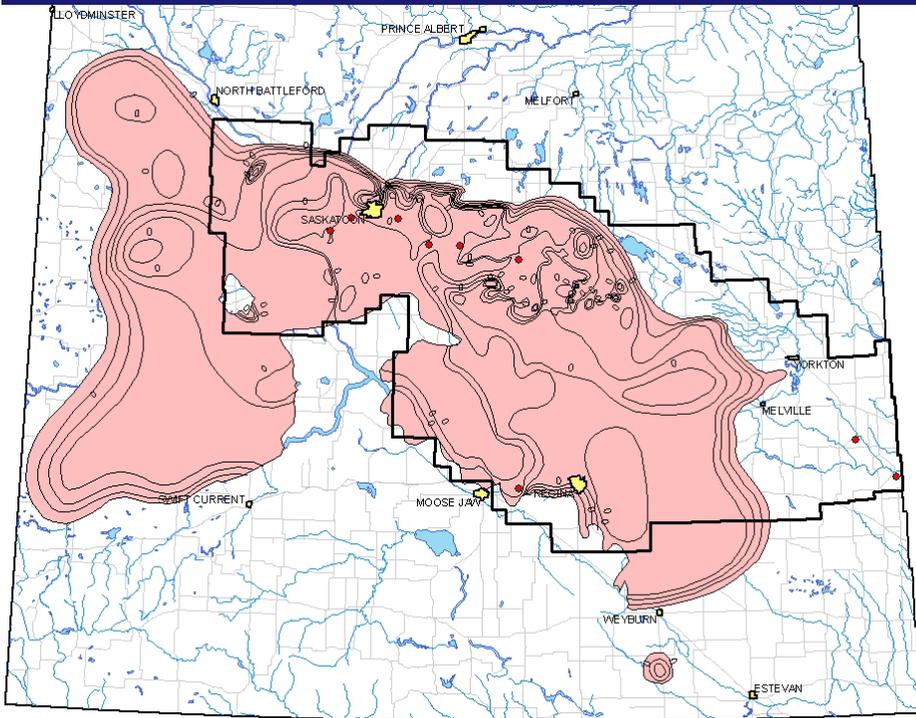
Twice as many as
previous
interpretation



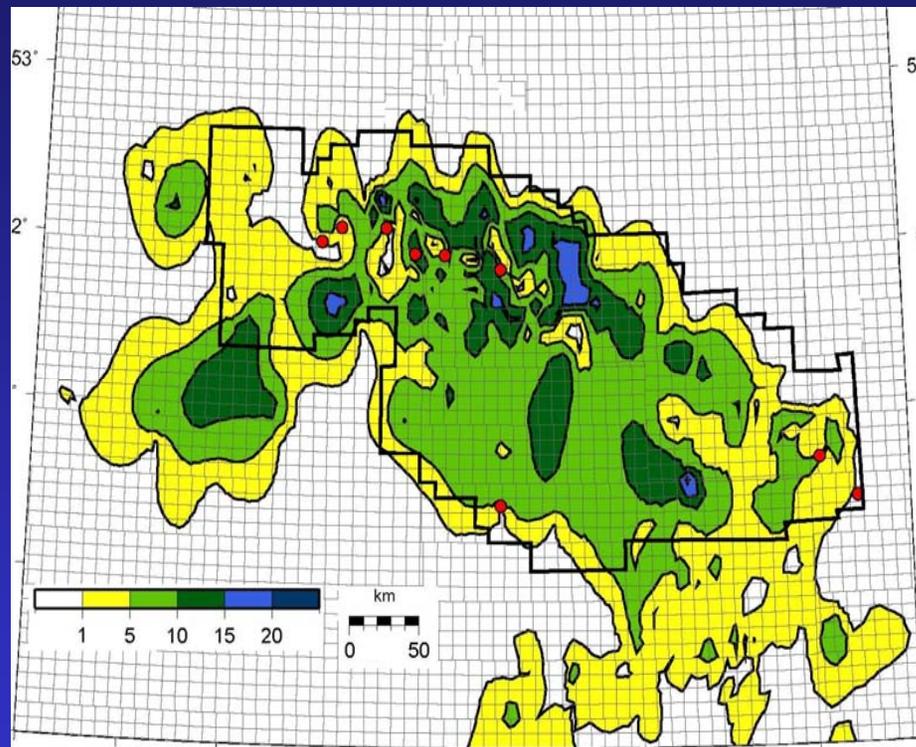
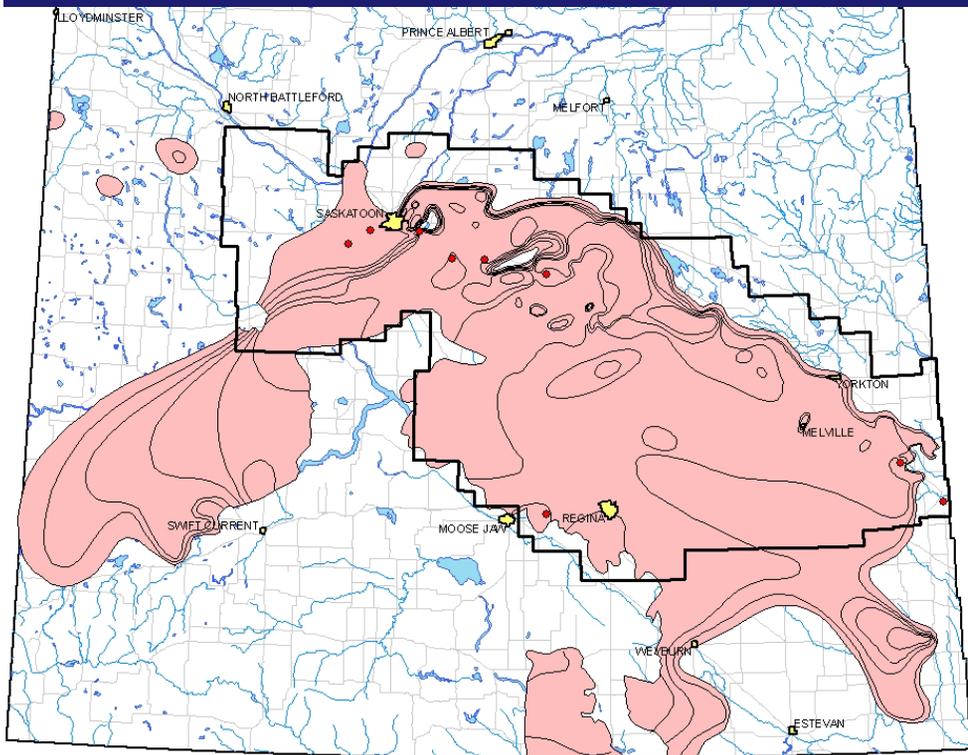
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Patience Lake Member



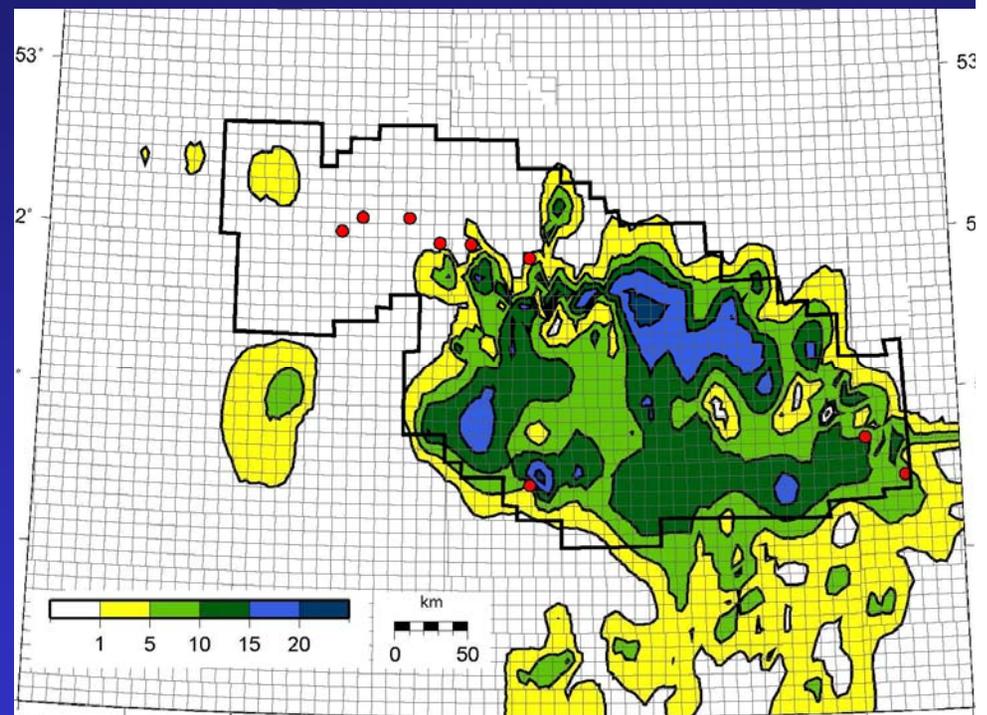
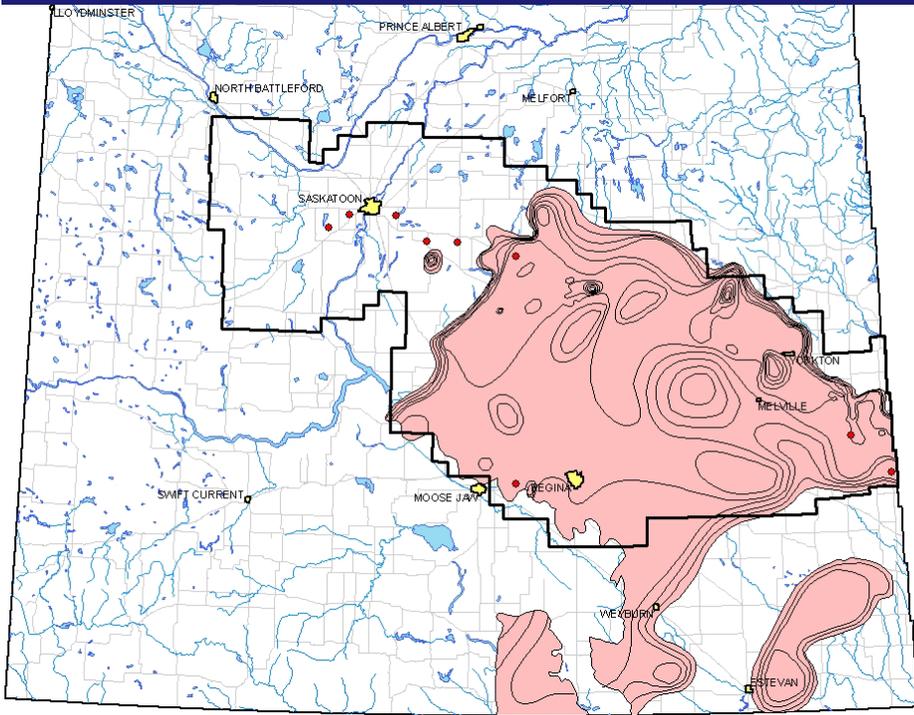
Belle Plaine Member



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Esterhazy Member



Cross Sections

101/05-21-033-19N3 121/08-35-030-28N2 101/04-09-030-19N2 101/08-29-027-07N2 101/14-28-027-03N2

W



<=196.5km=>



<=83.5km=>



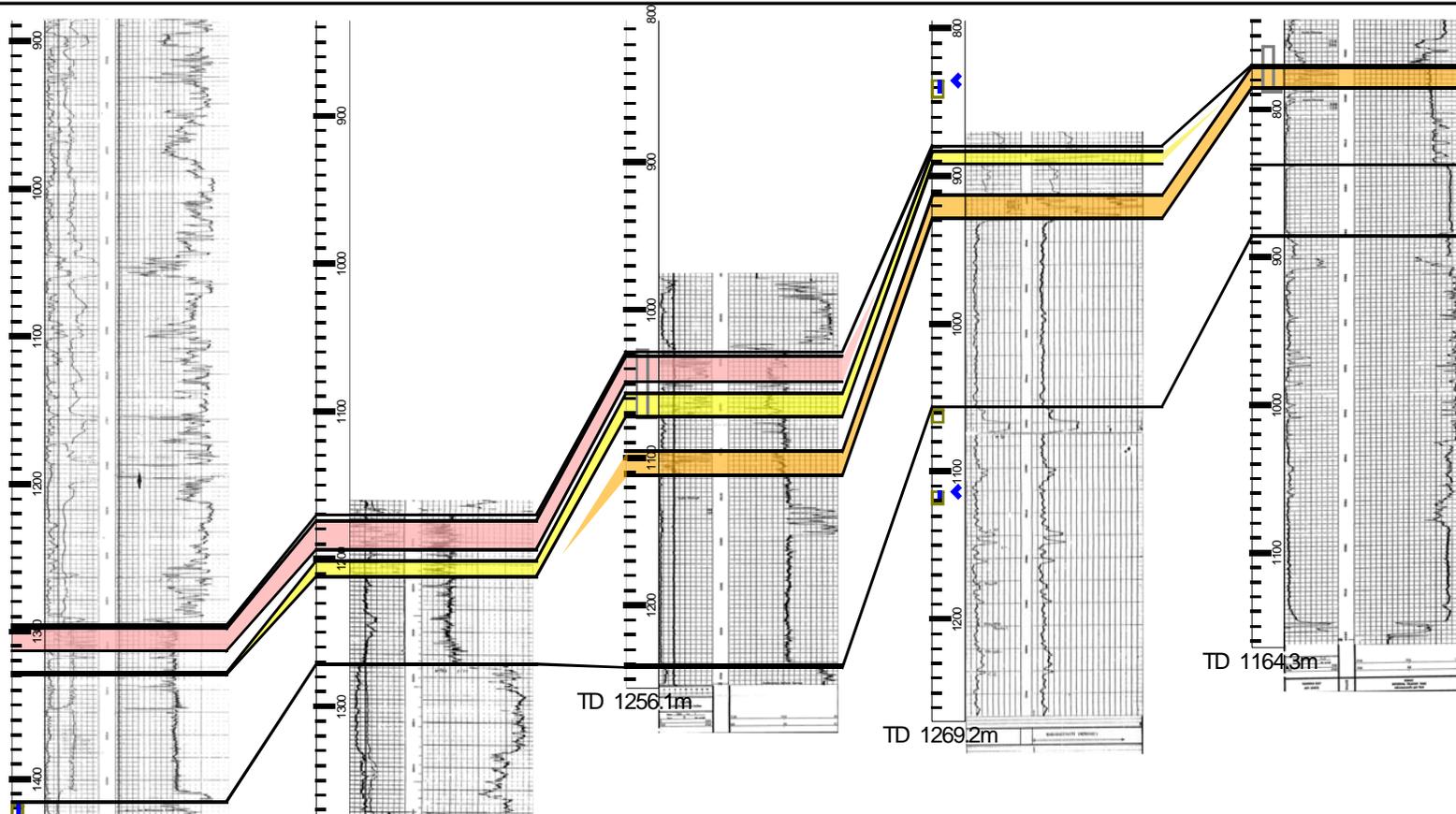
<=118.3km=>



<=40.2km=>



E



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Poster 24 in Adam Ballroom

