



Oil in the Kindersley area: a key part of the Saskatchewan Resources Story

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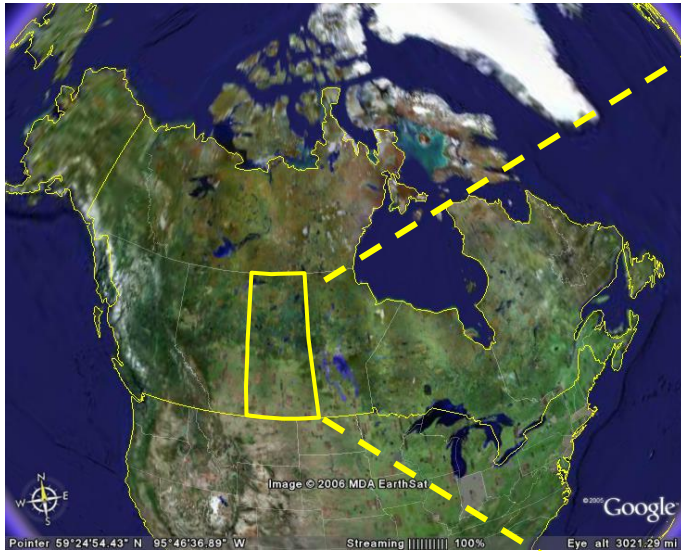


Ministry of the
Economy

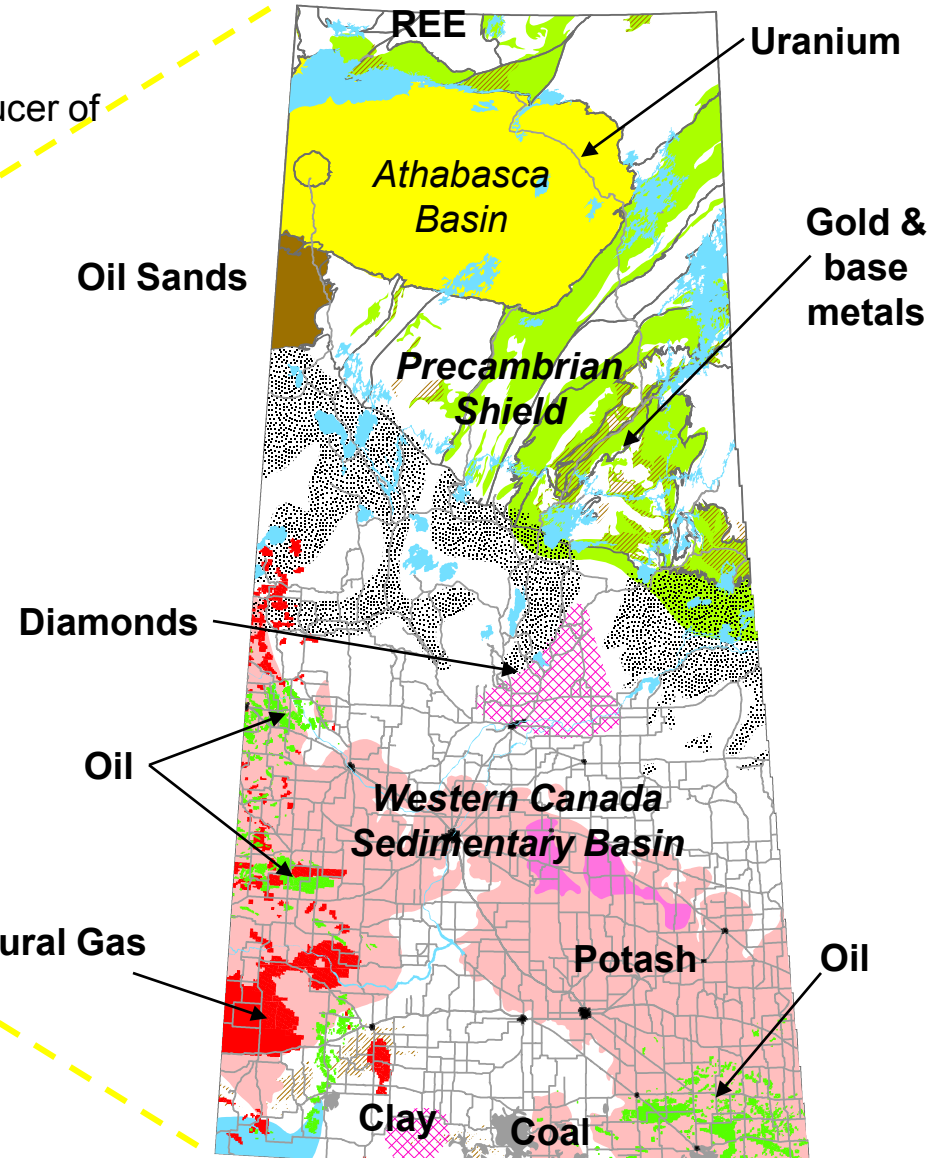
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Rich and Diverse Endowment of Minerals, Petroleum and Natural Gas

A major global producer of uranium and potash.
Canada's 2nd largest producer of oil and 3rd largest producer of natural gas



651,036 km²



Saskatchewan's Petroleum Sector

- **Natural gas and crude oil have been produced in Saskatchewan since the 1930s.**
- **Currently, Saskatchewan is:**
 - **Canada's 2nd largest producer of oil**
 - **Canada's 3rd largest producer of natural gas**



Importance of the Petroleum Sector

- **\$12.8 billion (B) in oil and gas sales in 2011**
- **\$4.5 B invested by industry in 2011**
- **33,200 direct and indirect jobs in the upstream oil and gas industry**
- **Approximately \$1.7 B in oil and gas revenue to the Provincial Government in 2011/12**
 - **Approx. 17% of total government revenues**

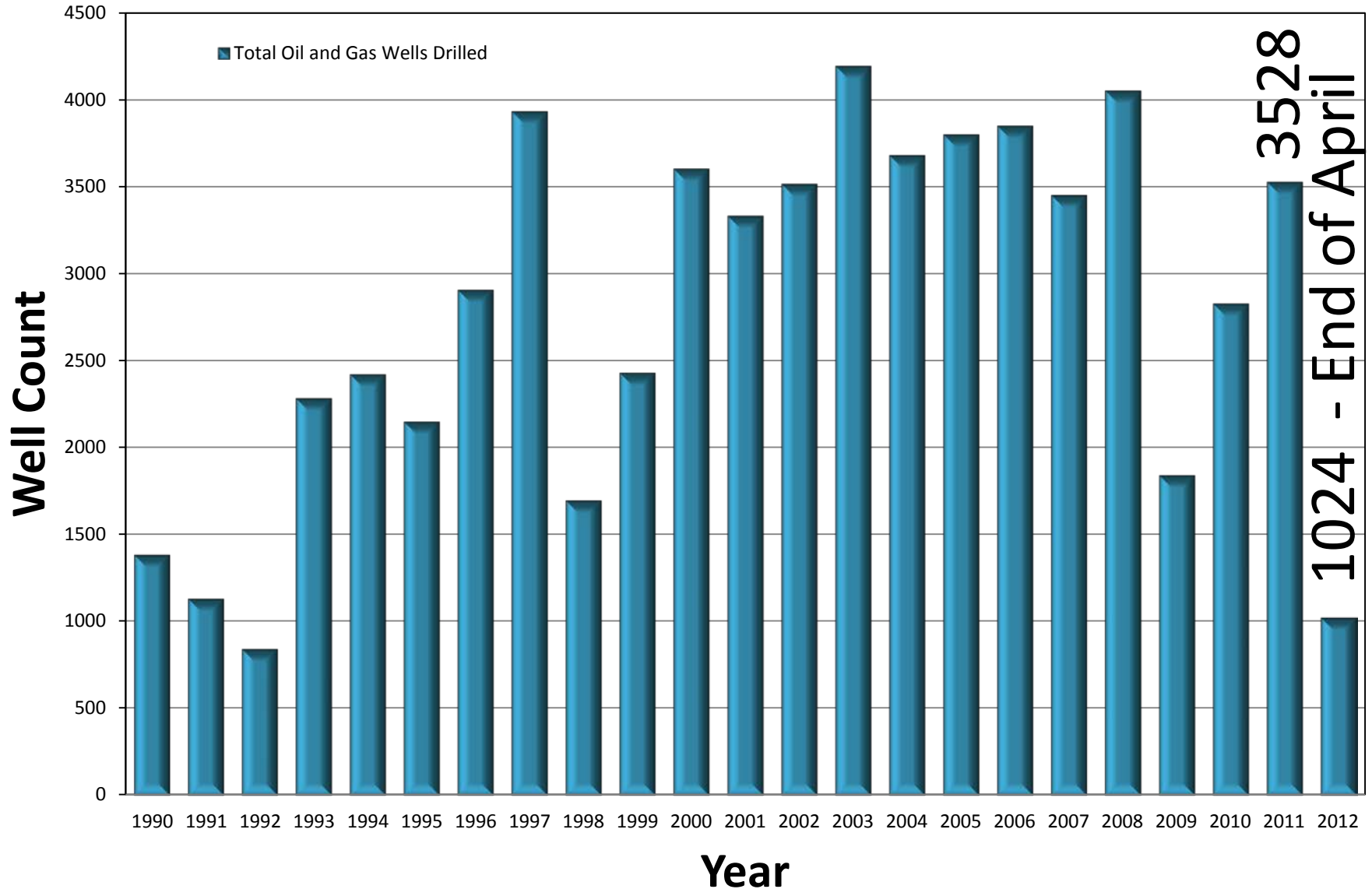


Oil and Gas Companies

- **Approximately 300 companies operate in Saskatchewan**
- **Large and mid-sized companies still account for most of the production and drilling activity.**
 - **Top 20 oil companies account for over 80% of total oil production.**
 - **Top 20 gas companies account for over 90% of total gas production.**

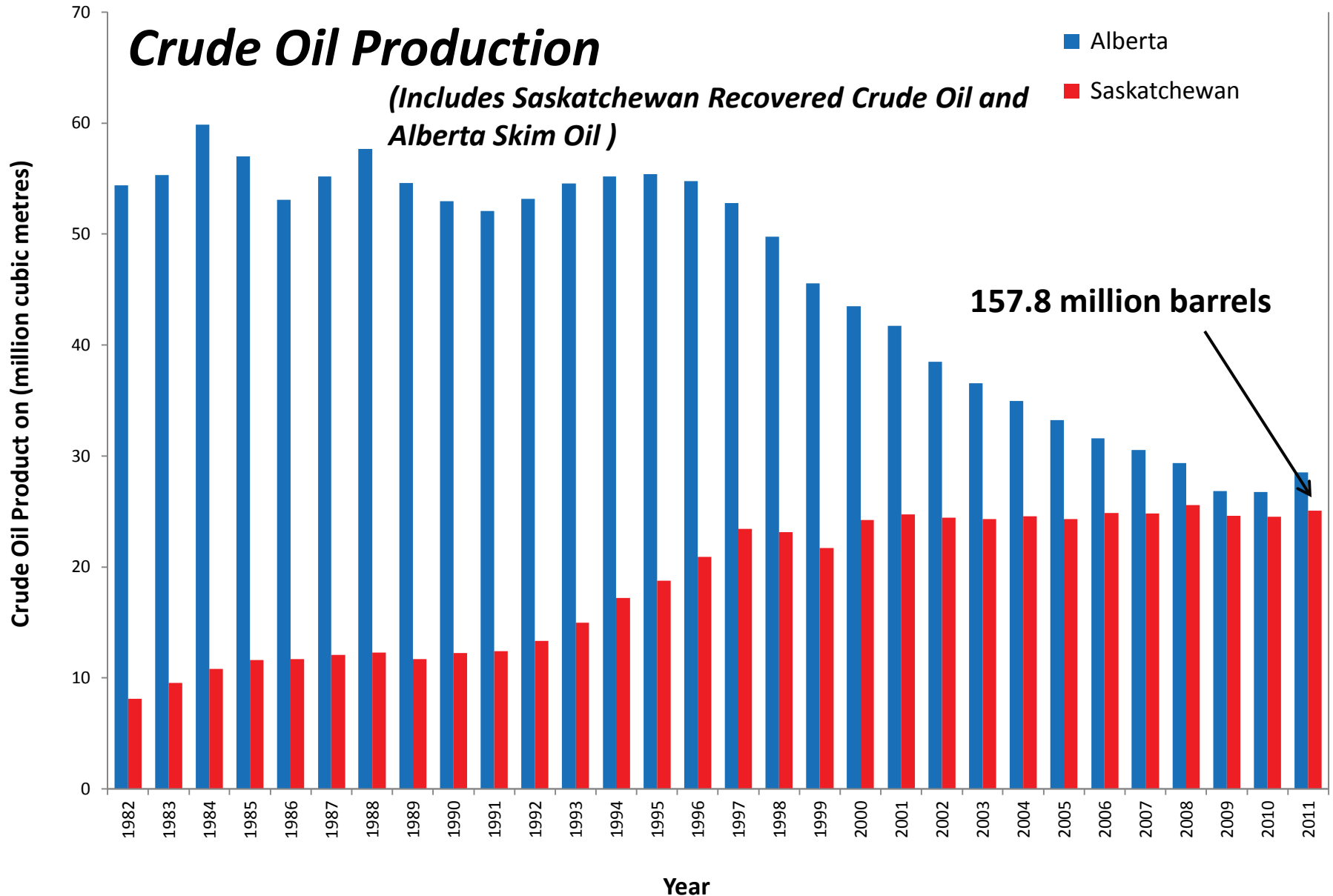


Saskatchewan Oil and Gas Well Drilling

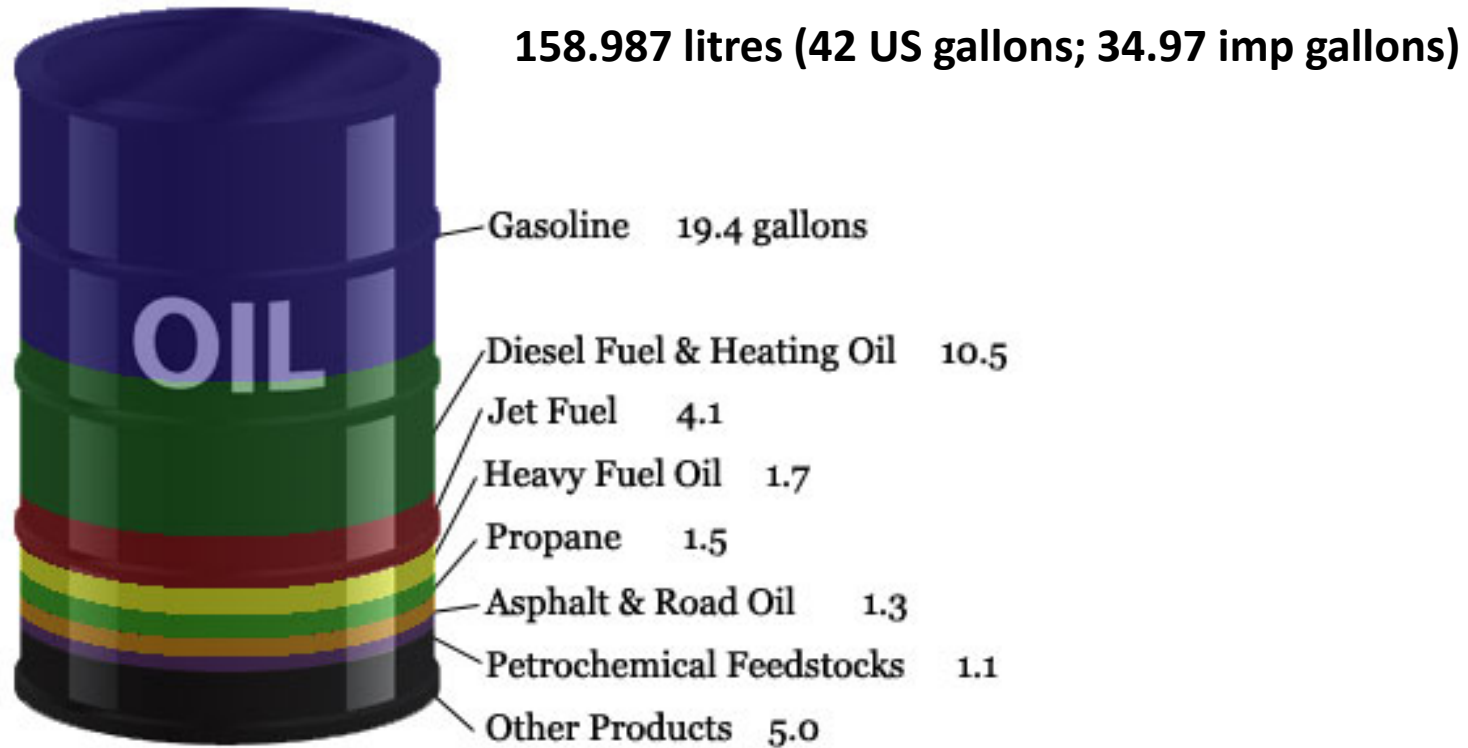


Alberta vs Saskatchewan Conventional Crude Oil Production

(Includes Saskatchewan Recovered Crude Oil and Alberta Skim Oil)



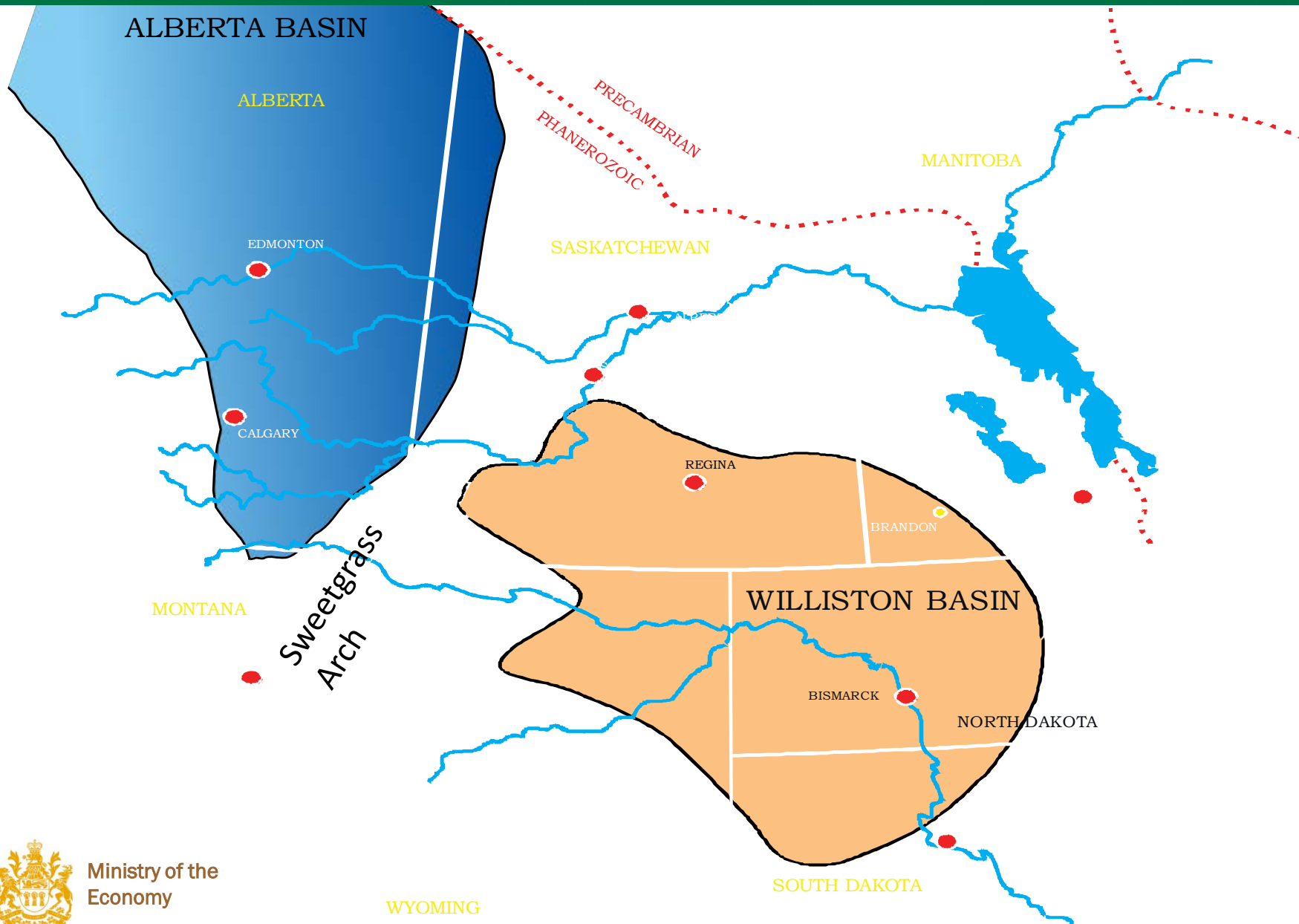
Insight: Barrel of Oil





Location of the Western Canada Sedimentary Basin

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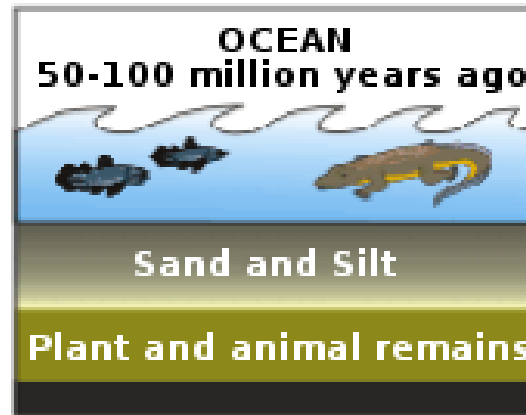
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Insight: Oil and gas generation

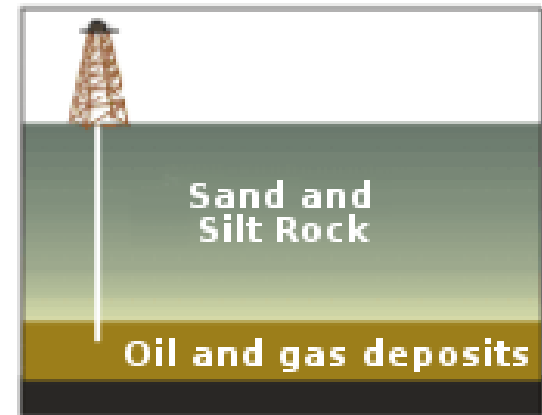
Petroleum and natural gas formation



Tiny sea plants and animals died and were buried on the ocean floor. Over time they were covered by layers of silt and sand.



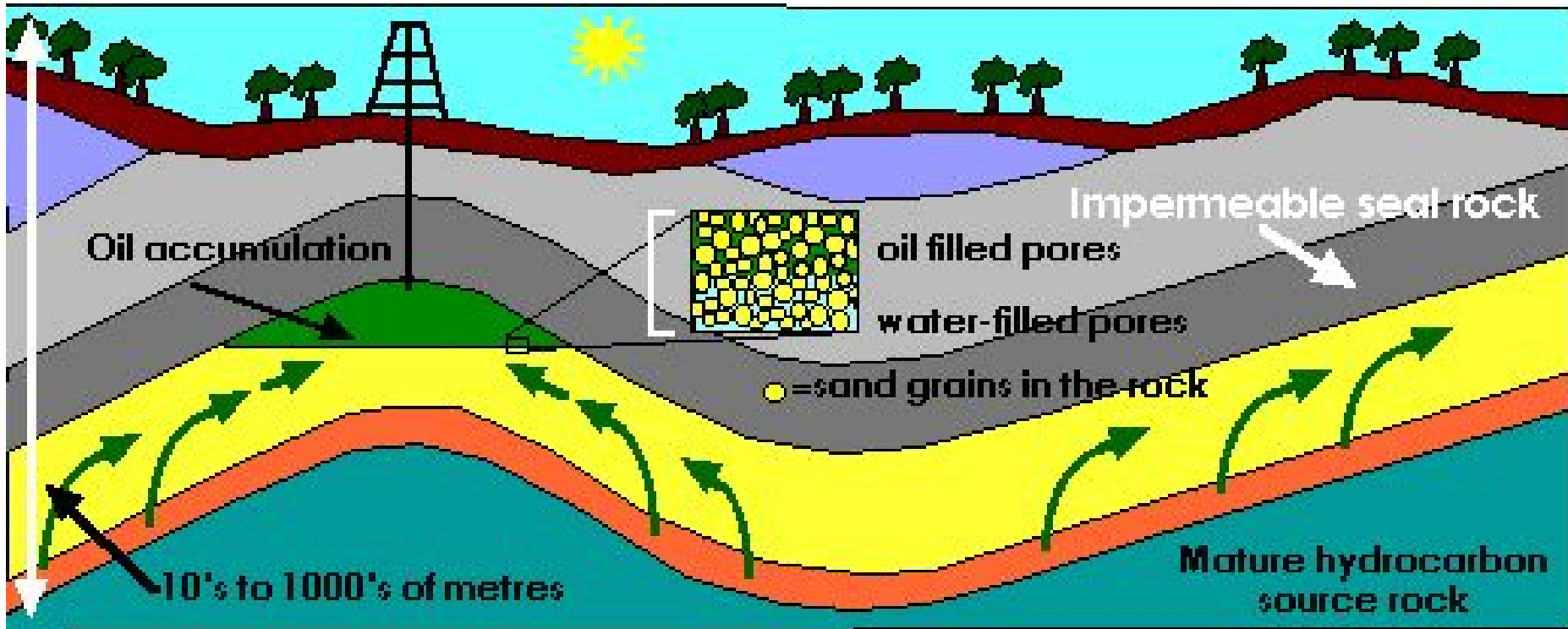
Over millions of years, the remains were buried deeper and deeper. The enormous heat and pressure turned them into oil and gas.



Today we drill down through layers of sand, silt and rock to reach the rock formations that contain oil and gas deposits.



Insight: Oil migration and trapping



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Insight: Oil types found in Saskatchewan

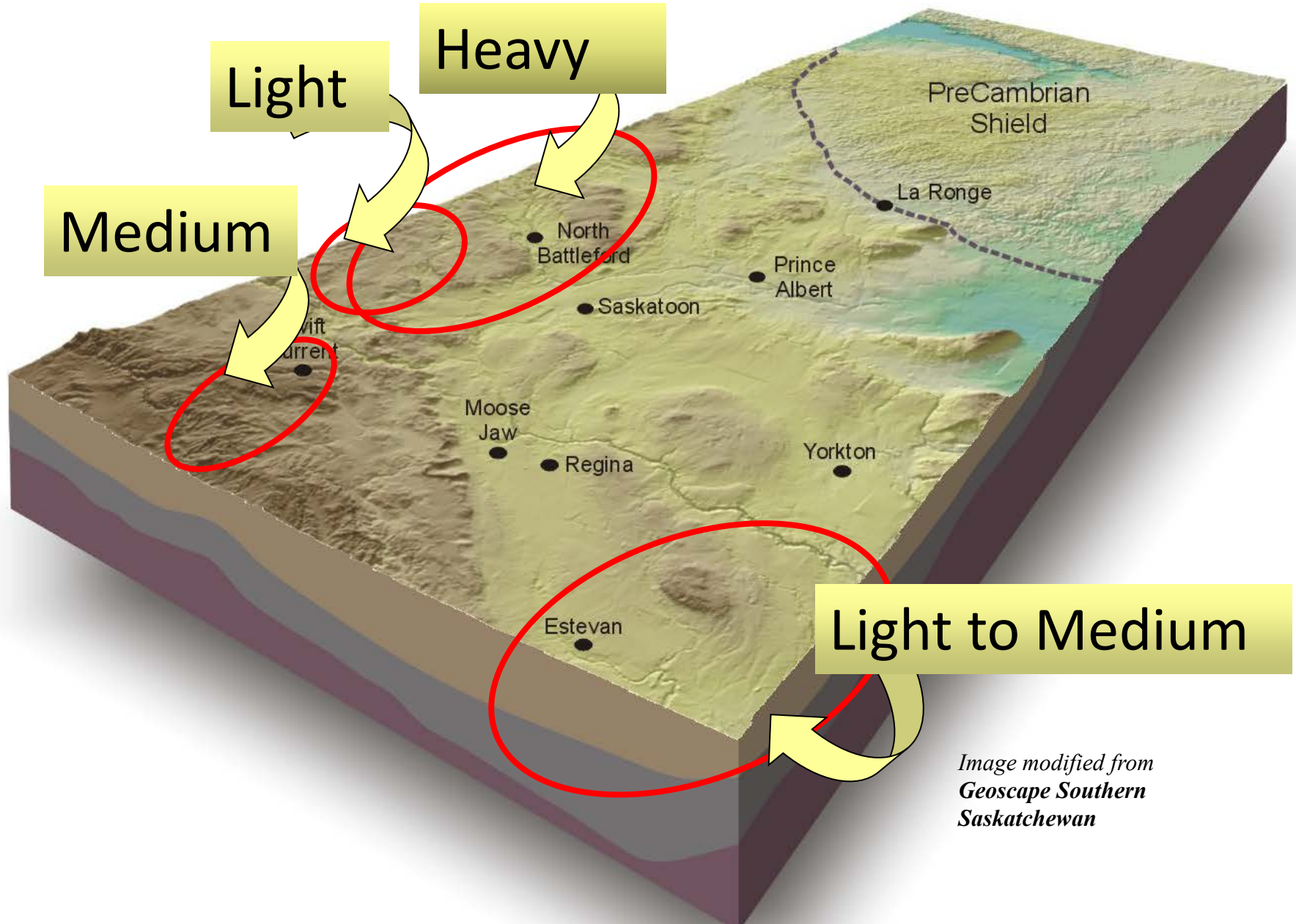
| Gravity (API) | Density (kg/m ³) | Crude Type |
|------------------|---------------------------------|------------|
| <25 | >903 | Heavy Oil |
| 25 to 30.5 | 870 to 903 | Medium Oil |
| >30.5 | <870 | Light Oil |



Photo from: www.rbnenergy.com



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*Image modified from
Geoscape Southern
Saskatchewan*

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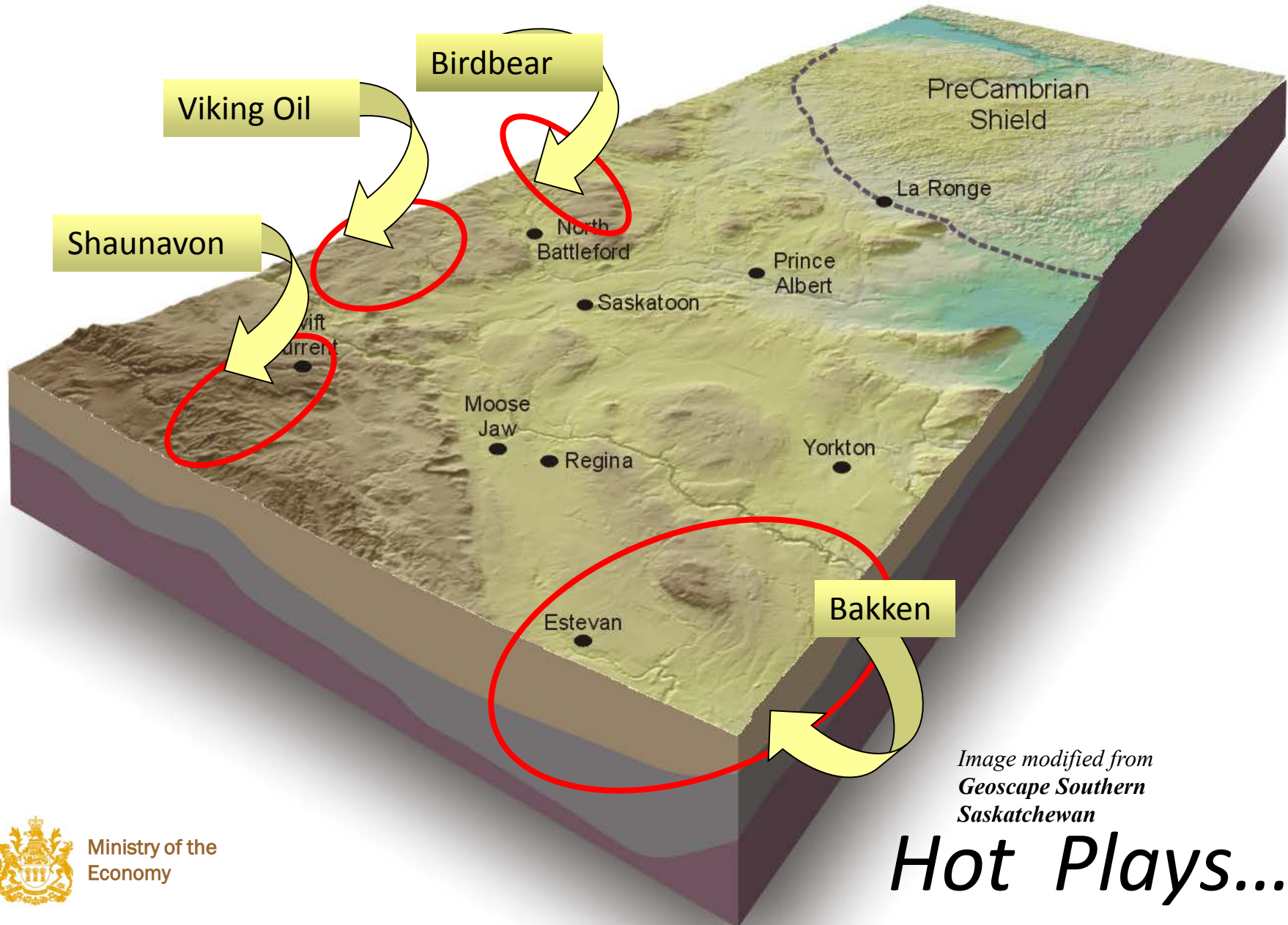


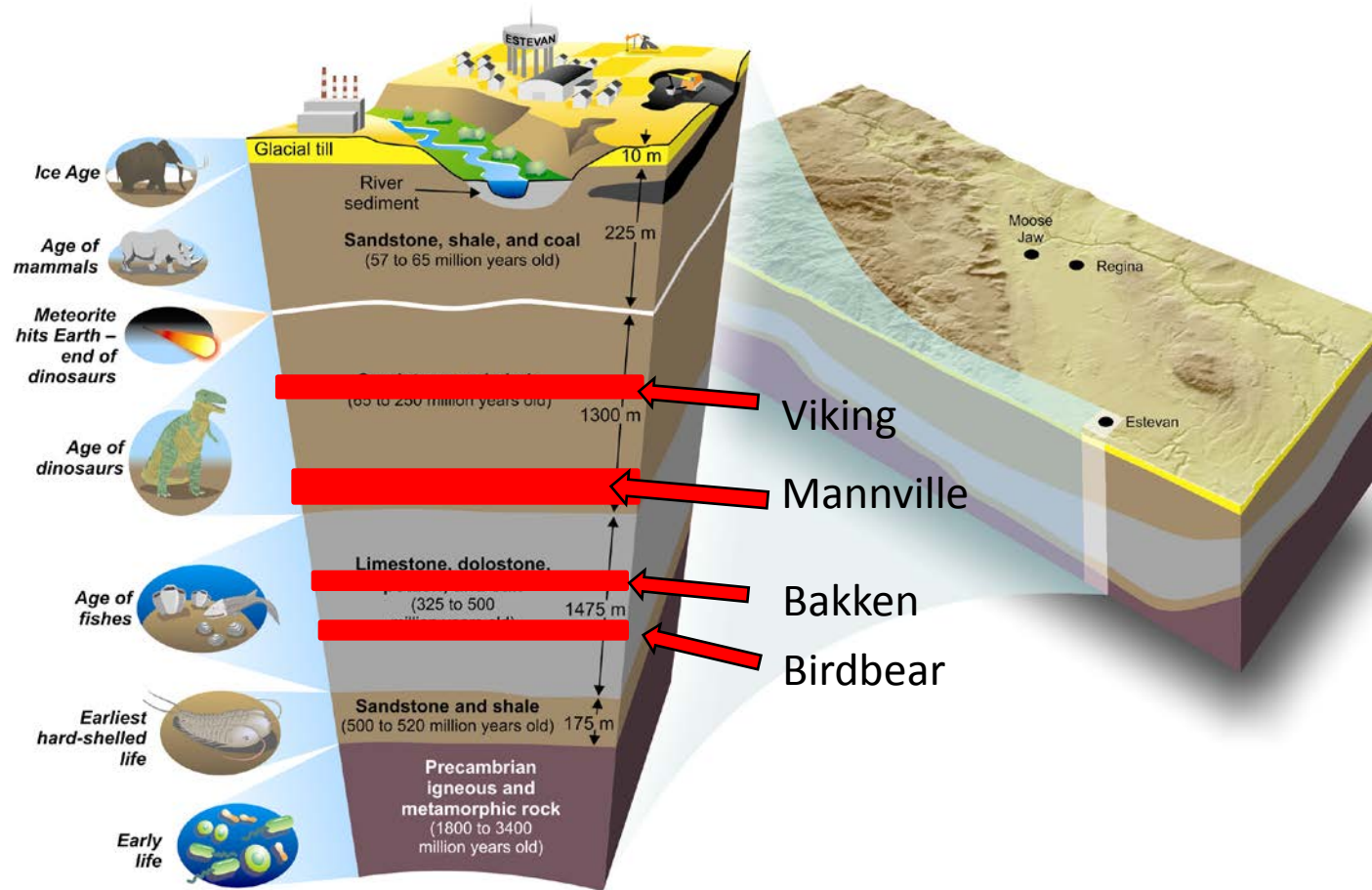
Image modified from
*Geoscape Southern
Saskatchewan*

Hot Plays....



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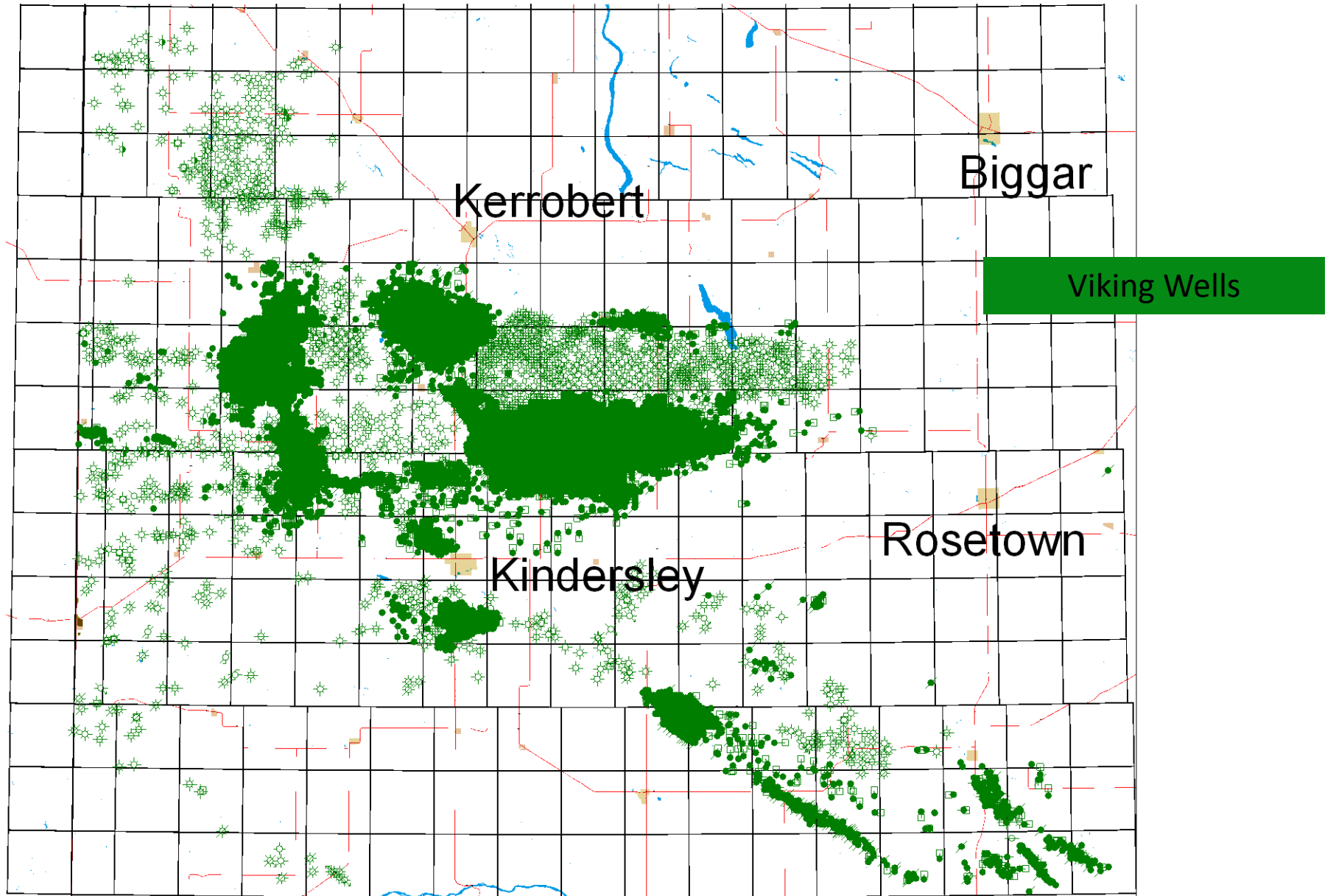


Major producing Formations underlying the Kindersley area



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Viking Oil

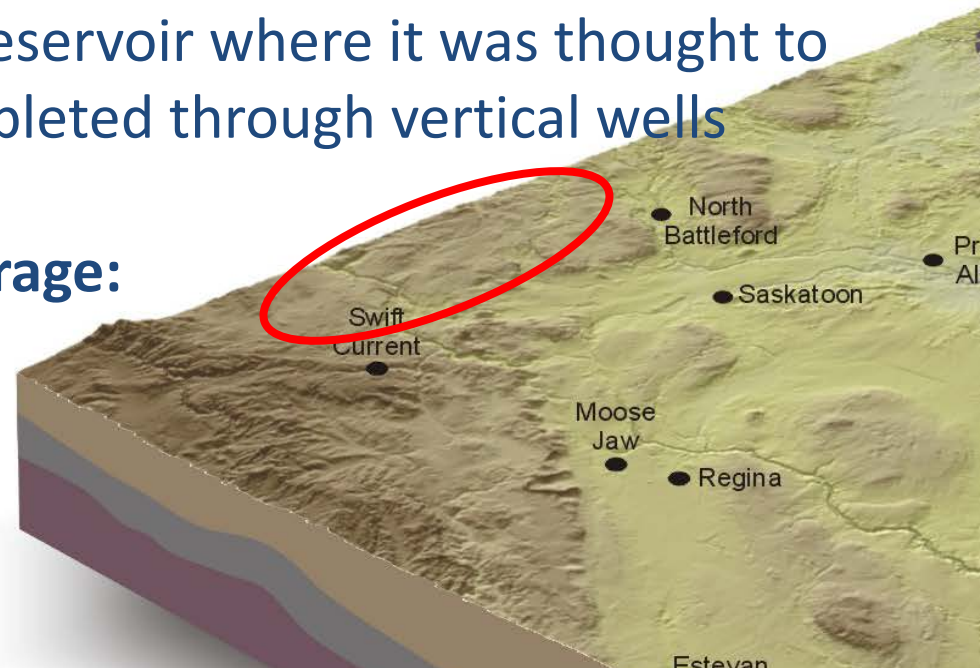


Oil Density: 840 KG/m³ (API ~ 36) – Light Oil

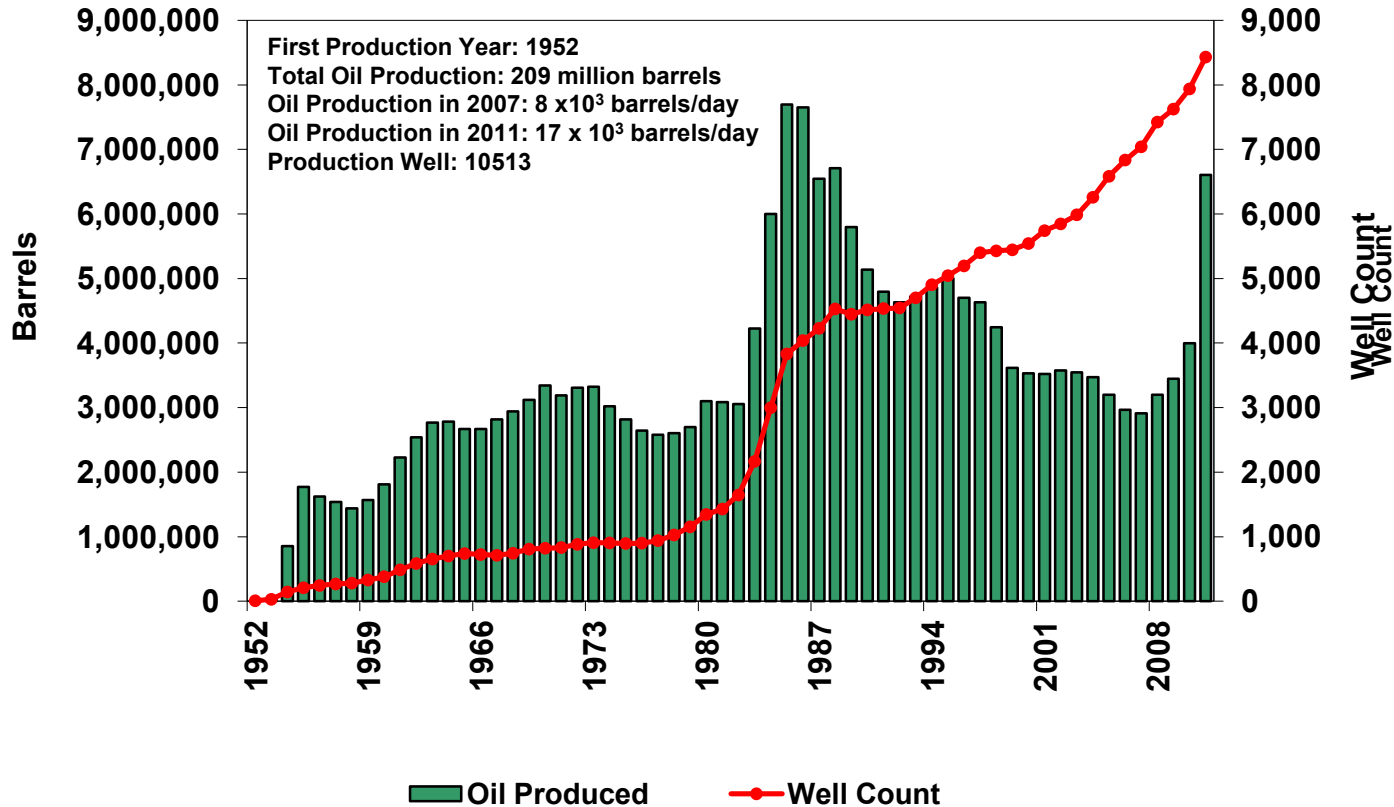
Production since 1950's: Oil recovery factors are low (5-15%), but has a large oil-in-place potential (2.3 billion barrels)

Production Since 2008 : ~ 760 horizontal wells with, multi-stage hydraulic fracturing drilled in areas of the reservoir where it was thought to have been depleted through vertical wells

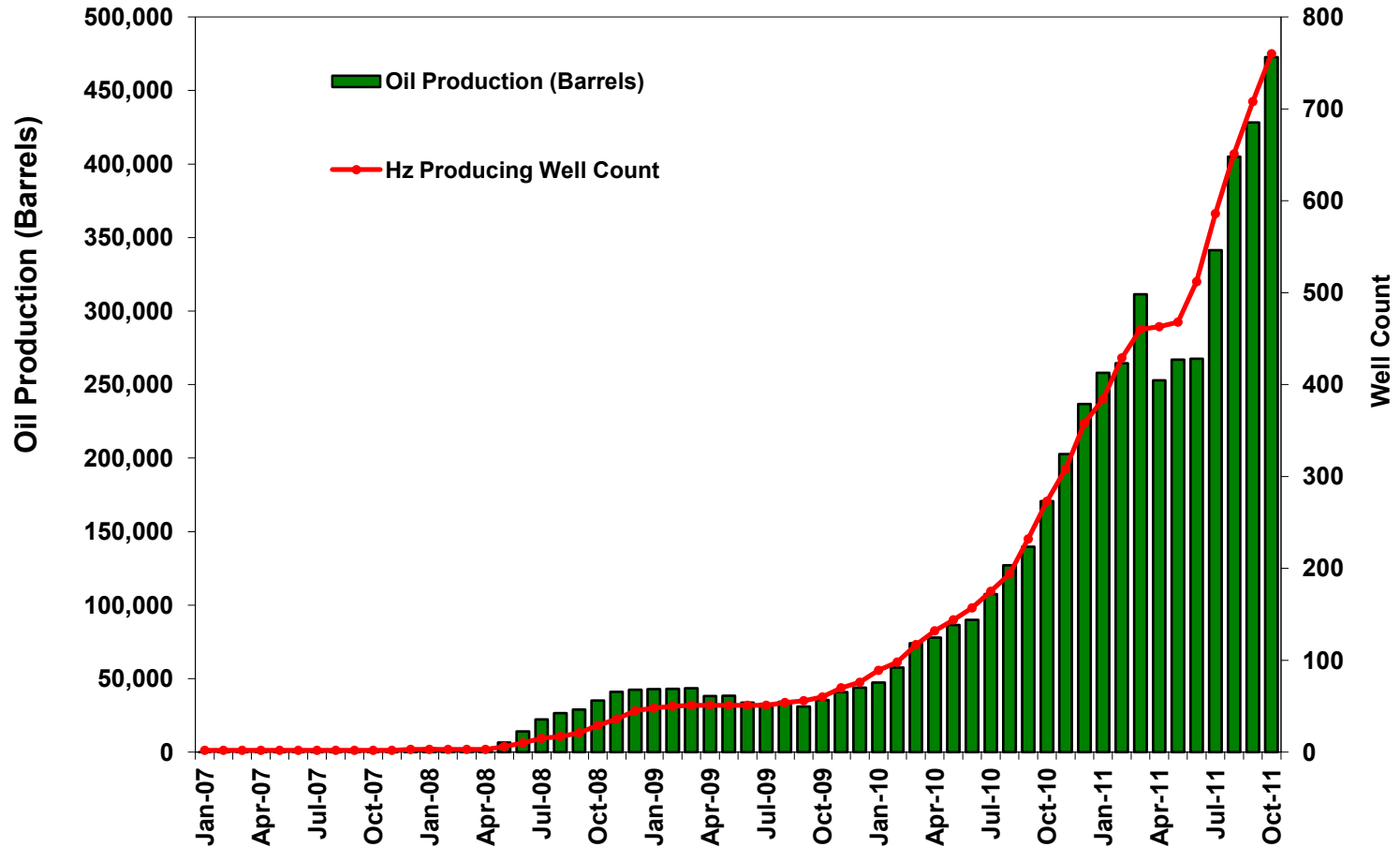
Recovery average:
~22 bbl/day



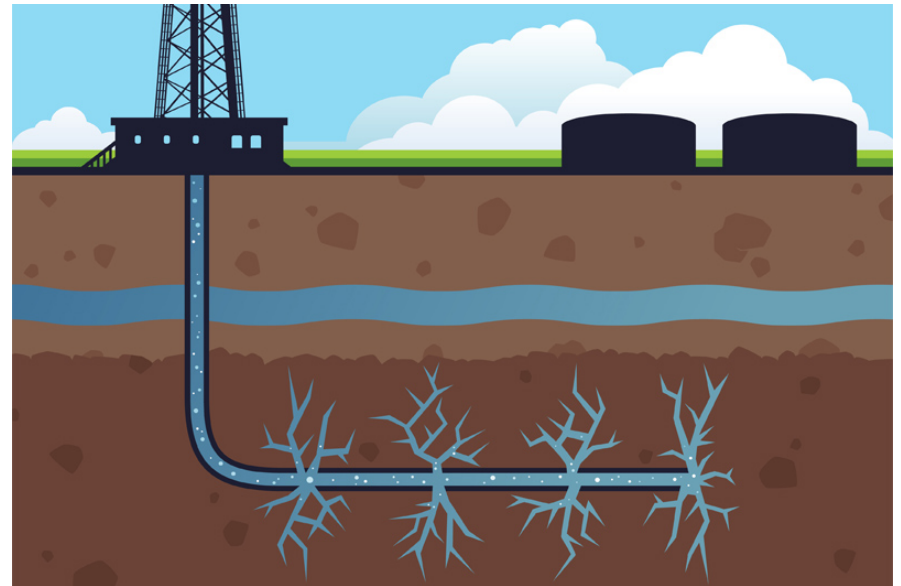
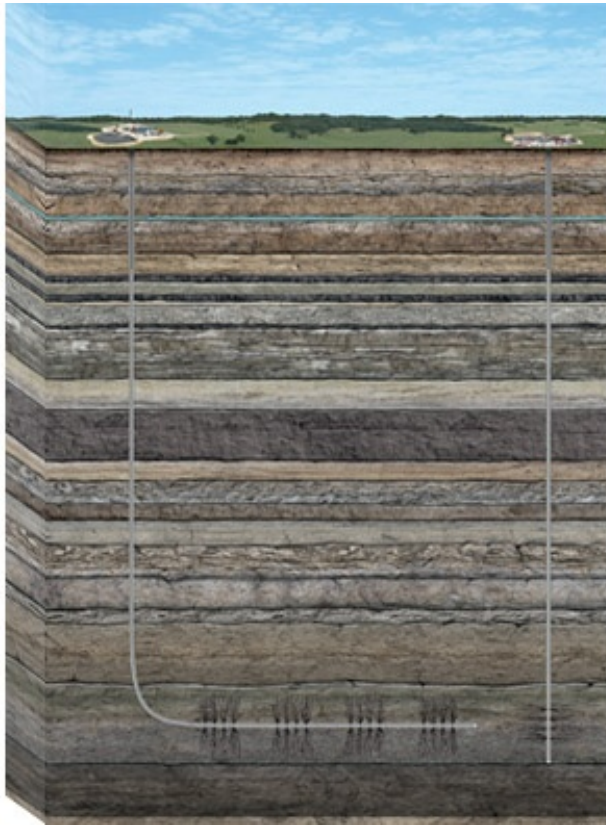
Viking Formation - Production in the Kindersley area



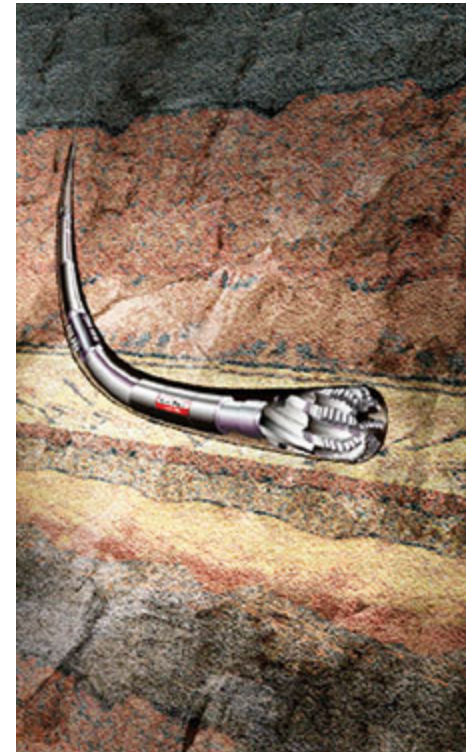
Saskatchewan Viking Horizontal Well Oil Production and Well Count



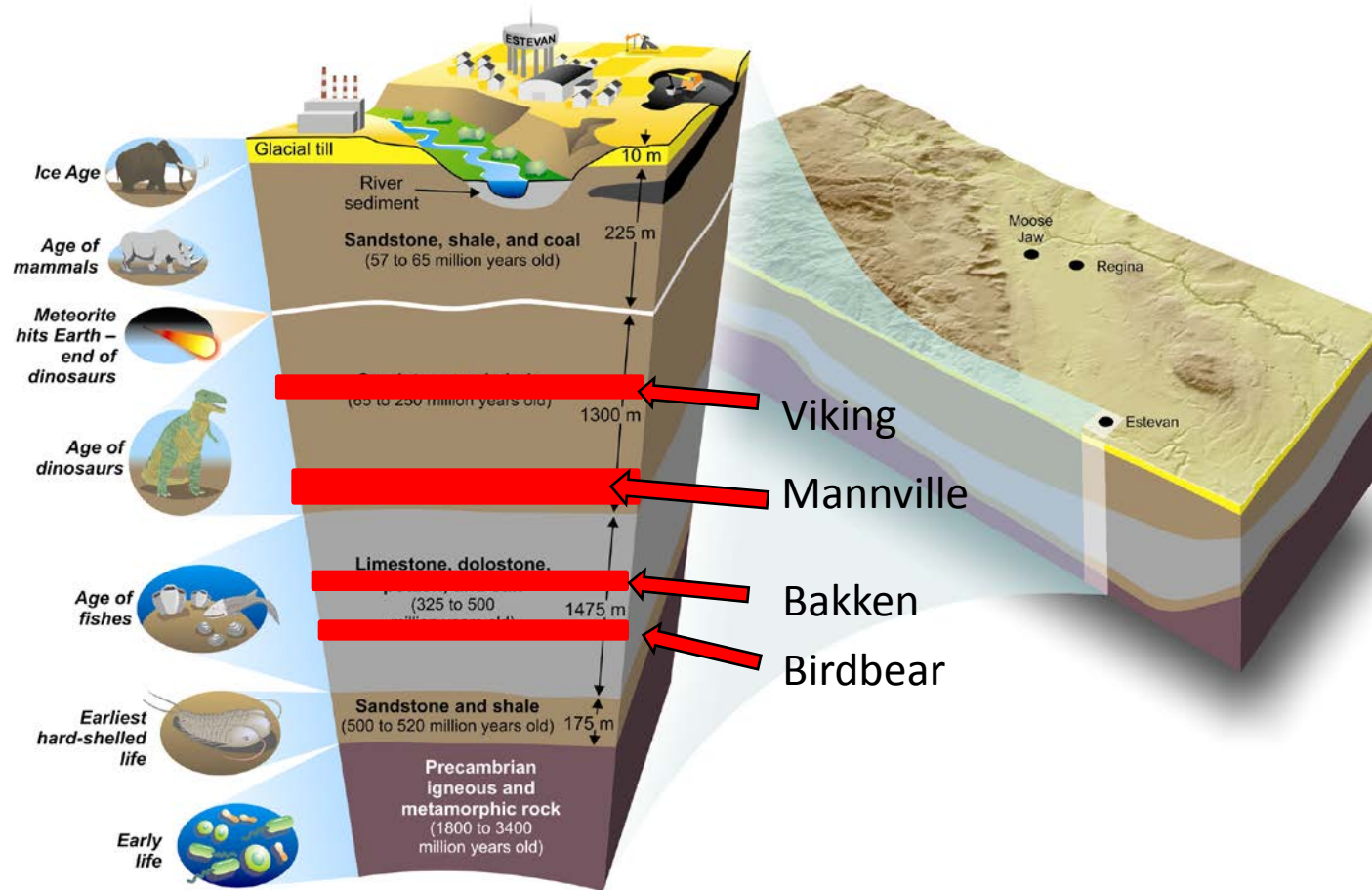
Insight: Innovation and technology to improve oil recovery: horizontal drilling and fracking



Insight: Innovation and technology to improve oil recovery: horizontal drilling and fracking



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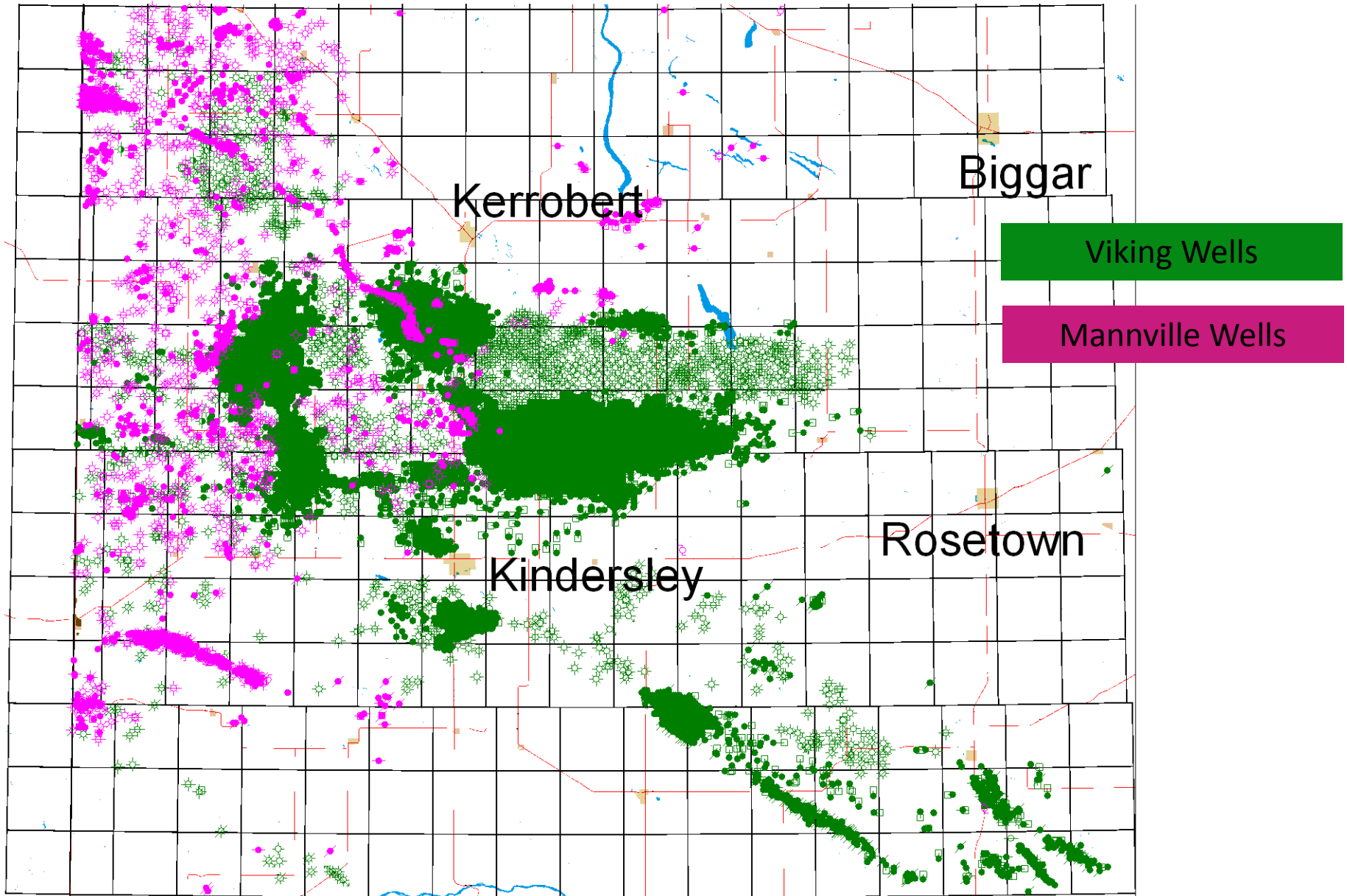


Major producing Formations underlying the Kindersley area



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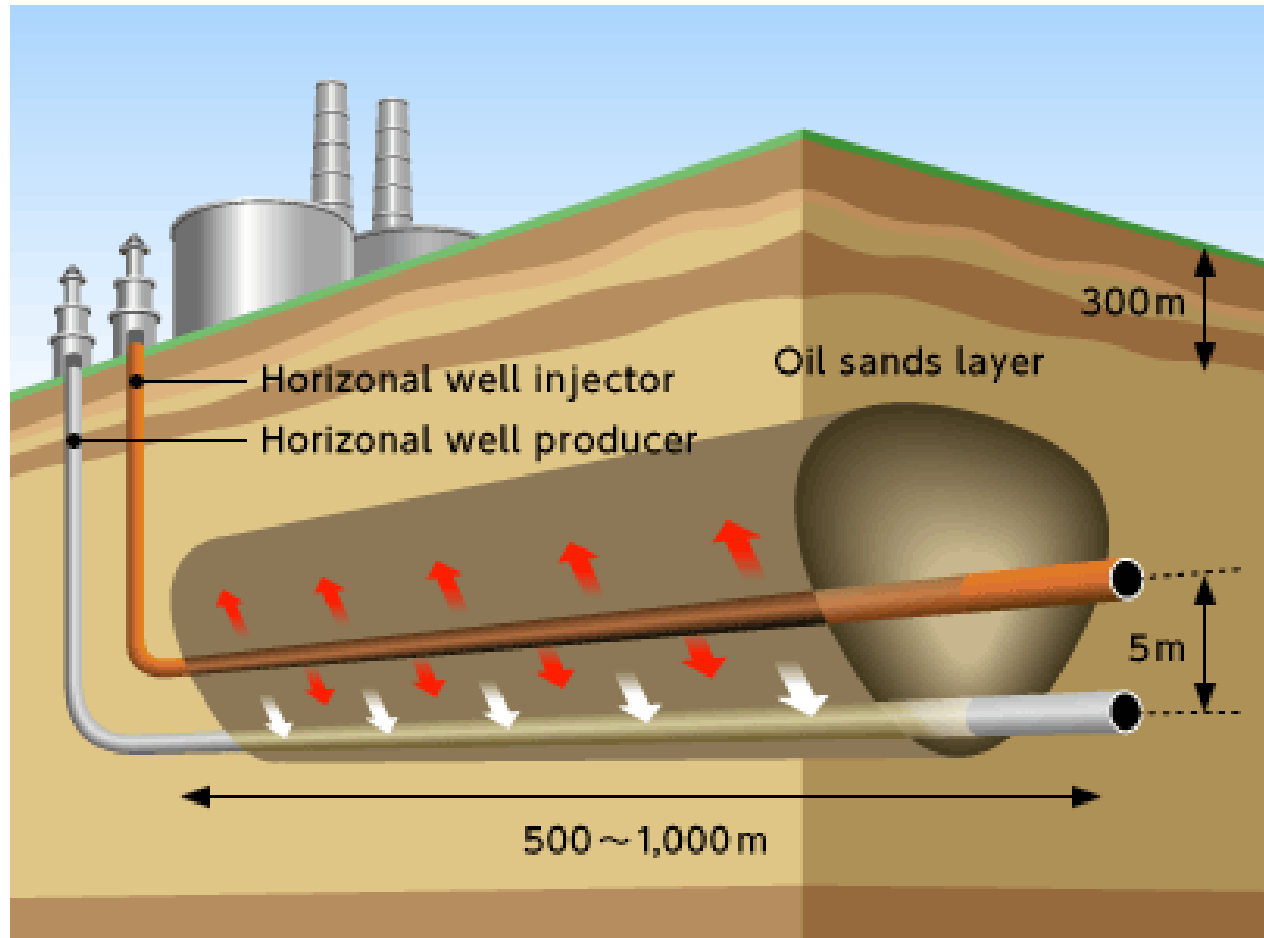
Kindersley Mannville Production

RGAC 38-30-Cole B-11-20
11-30-31-23W3M
Depth:784.M m

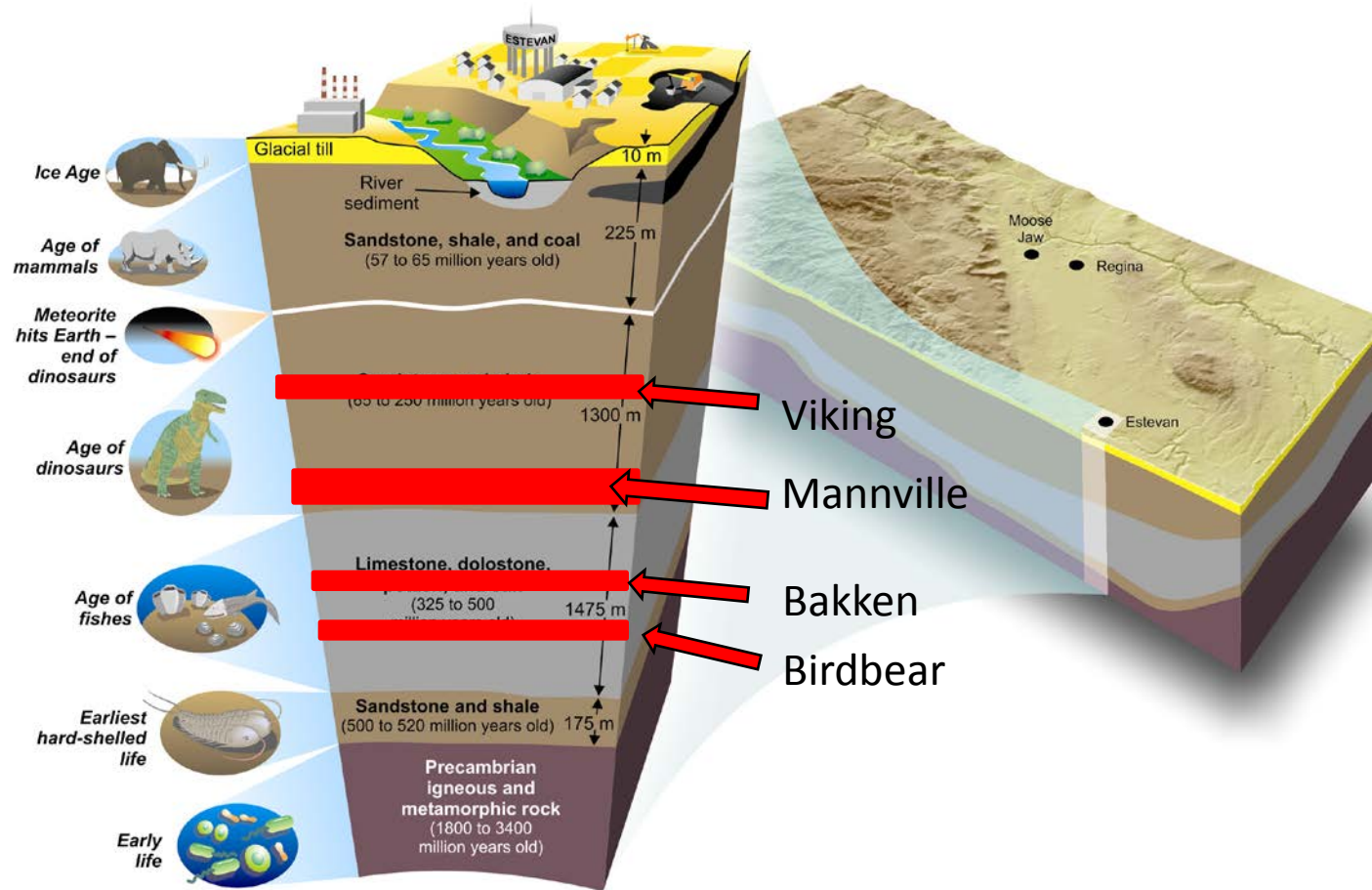
- Total Mannville Oil Production: 114.5 million barrels
- Total Production Well: 1826
- Average per-well production: 62799 barrels
- Total Mannville Gas Production: 287.5 million MCF
- All heavy oil



Insight: Steam assisted gravity drainage (SAGD)



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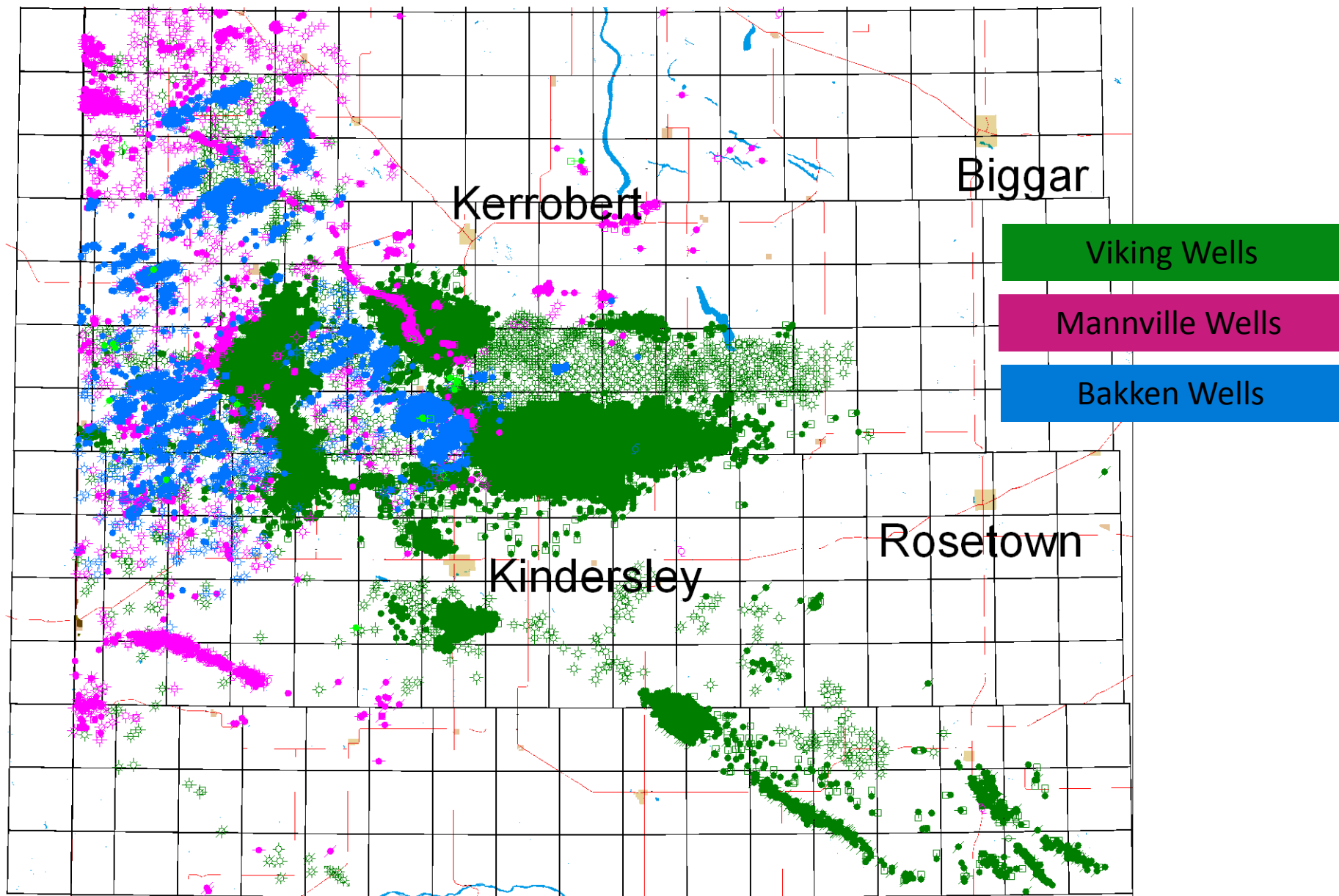


Major producing Formations underlying the Kindersley area



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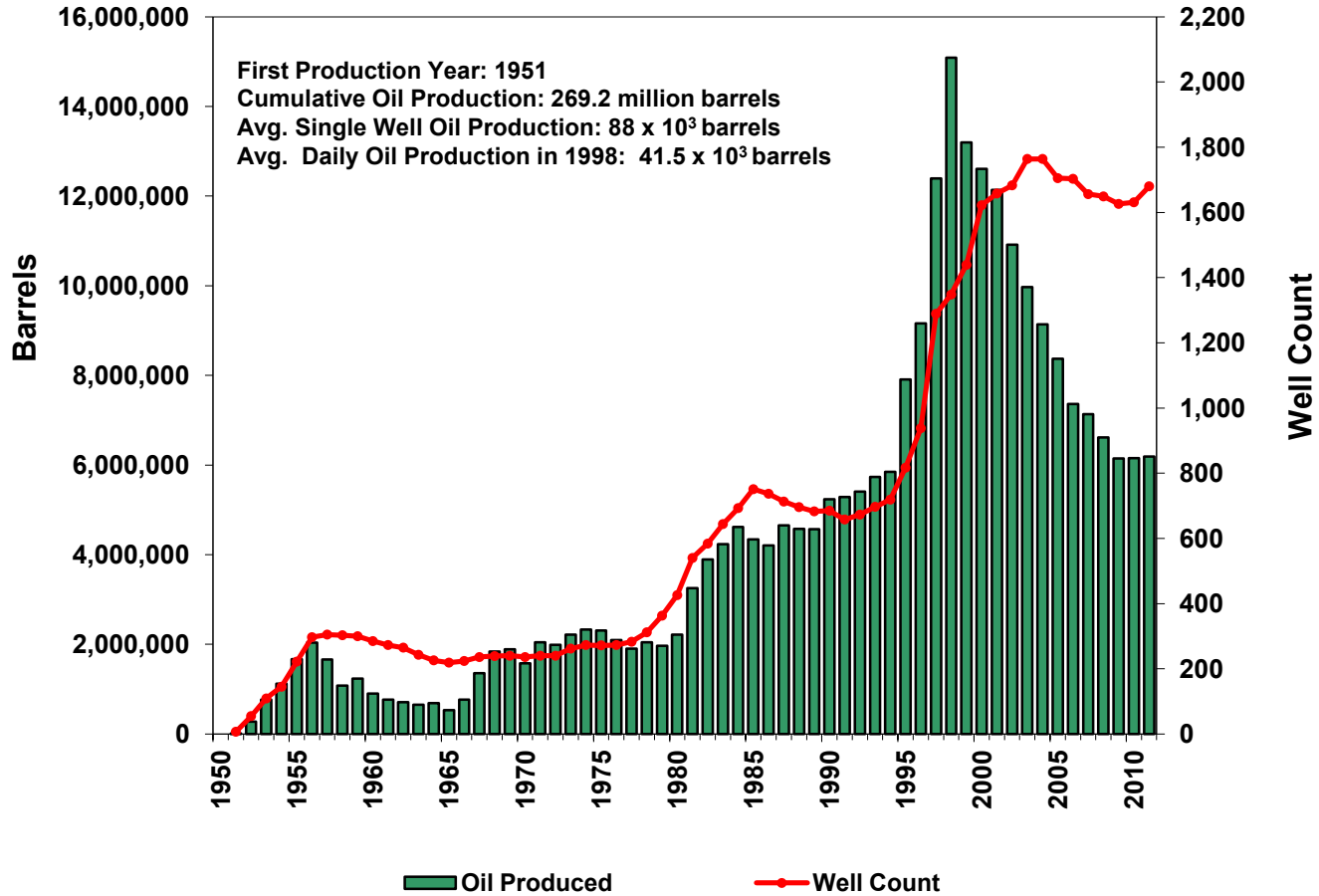
Kindersley Bakken

PCI Salt Lake
14-14-39-25W3M
Depth = 778.0 m

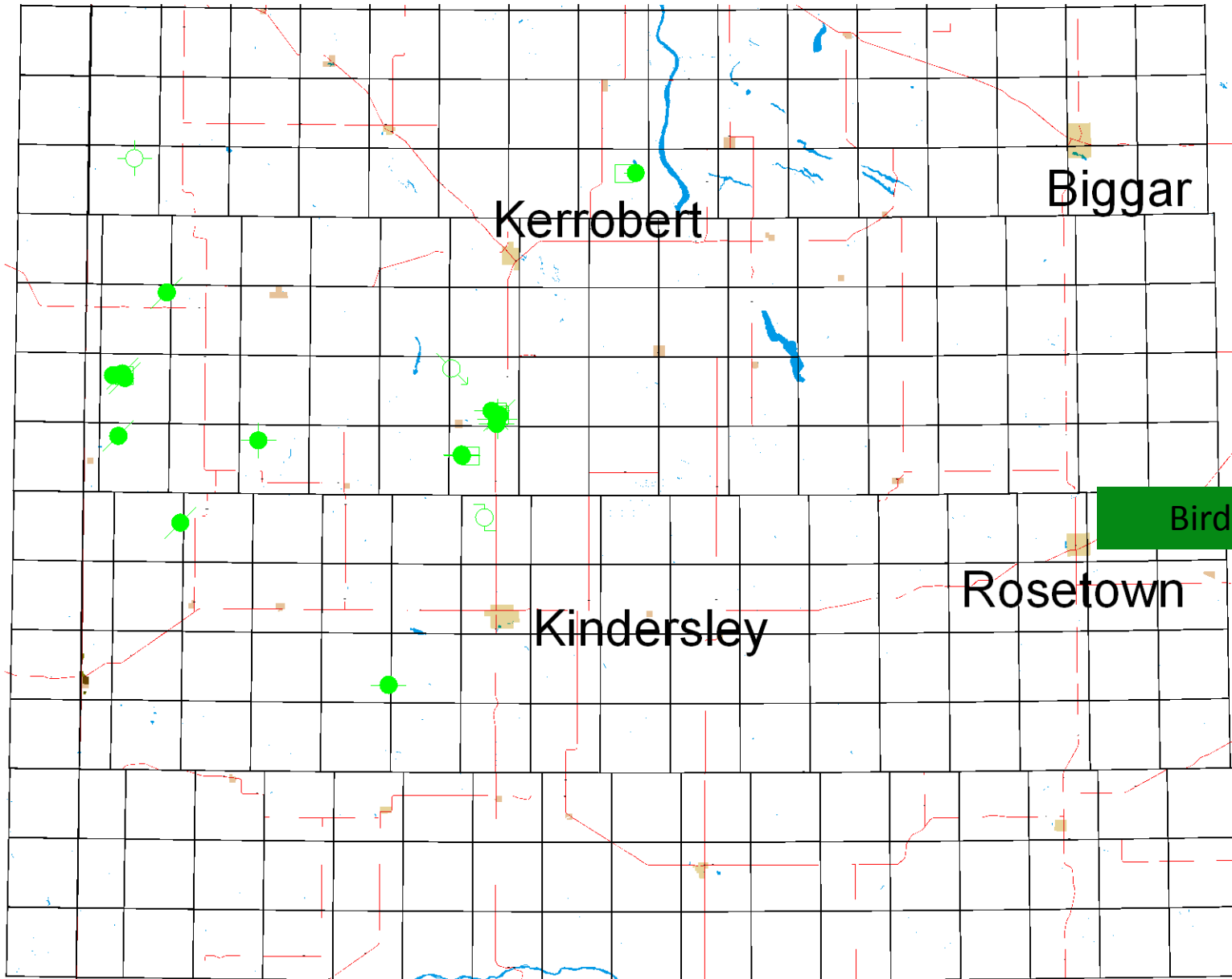
- Very fine grained sandstone, siltstones and mudstones middle member
- Sandwiched by black organic rich shales of the Lower and Upper members
- Middle member is the oil bearing unit
- Oreo cookie effect....but the filling is a gooey heavy oil saturated sandstone (~ 13-15 API)



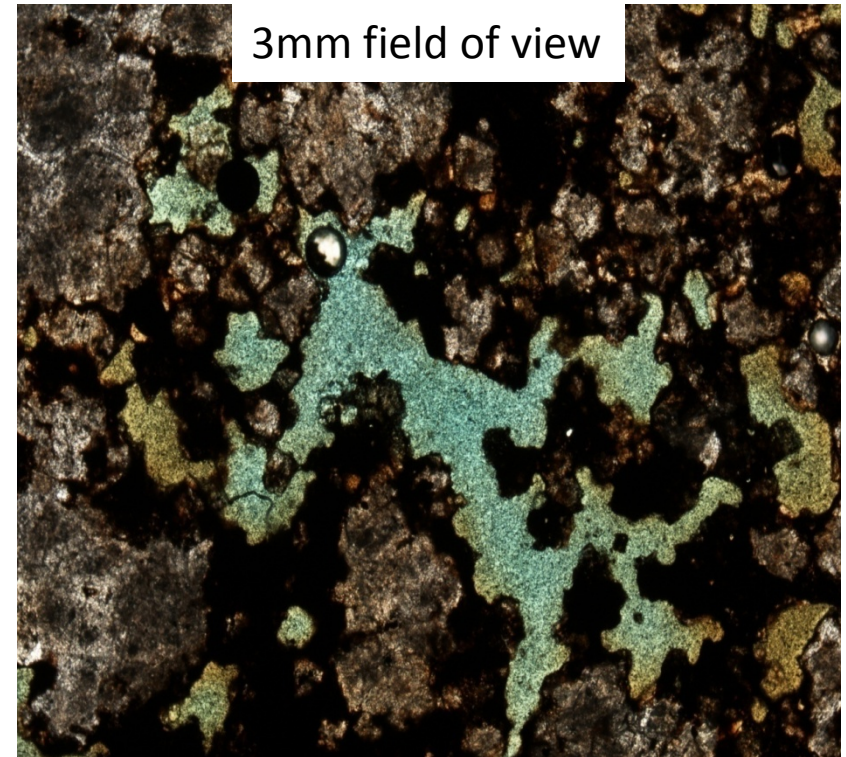
Bakken Formation (West-Central Saskatchewan)



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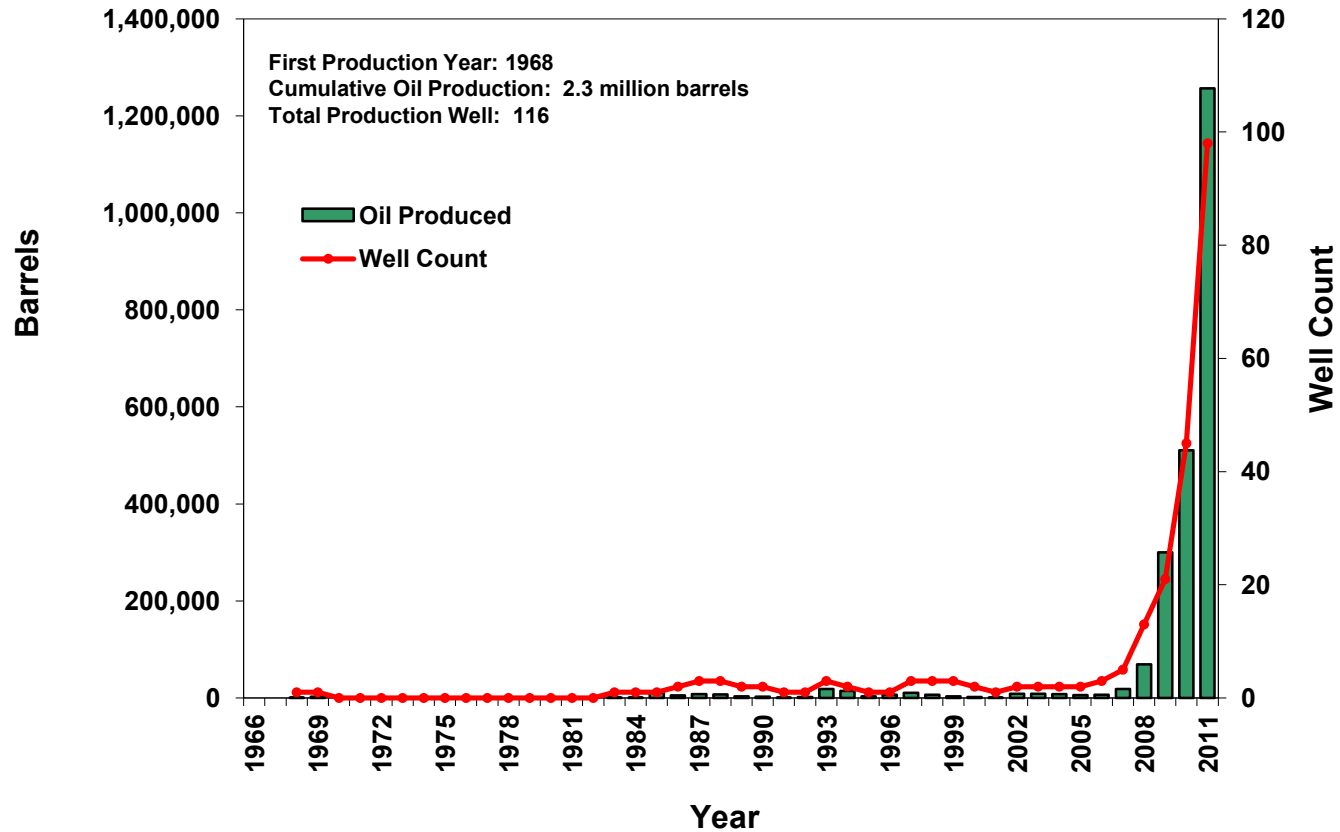


Well: 14-2-32-23W3

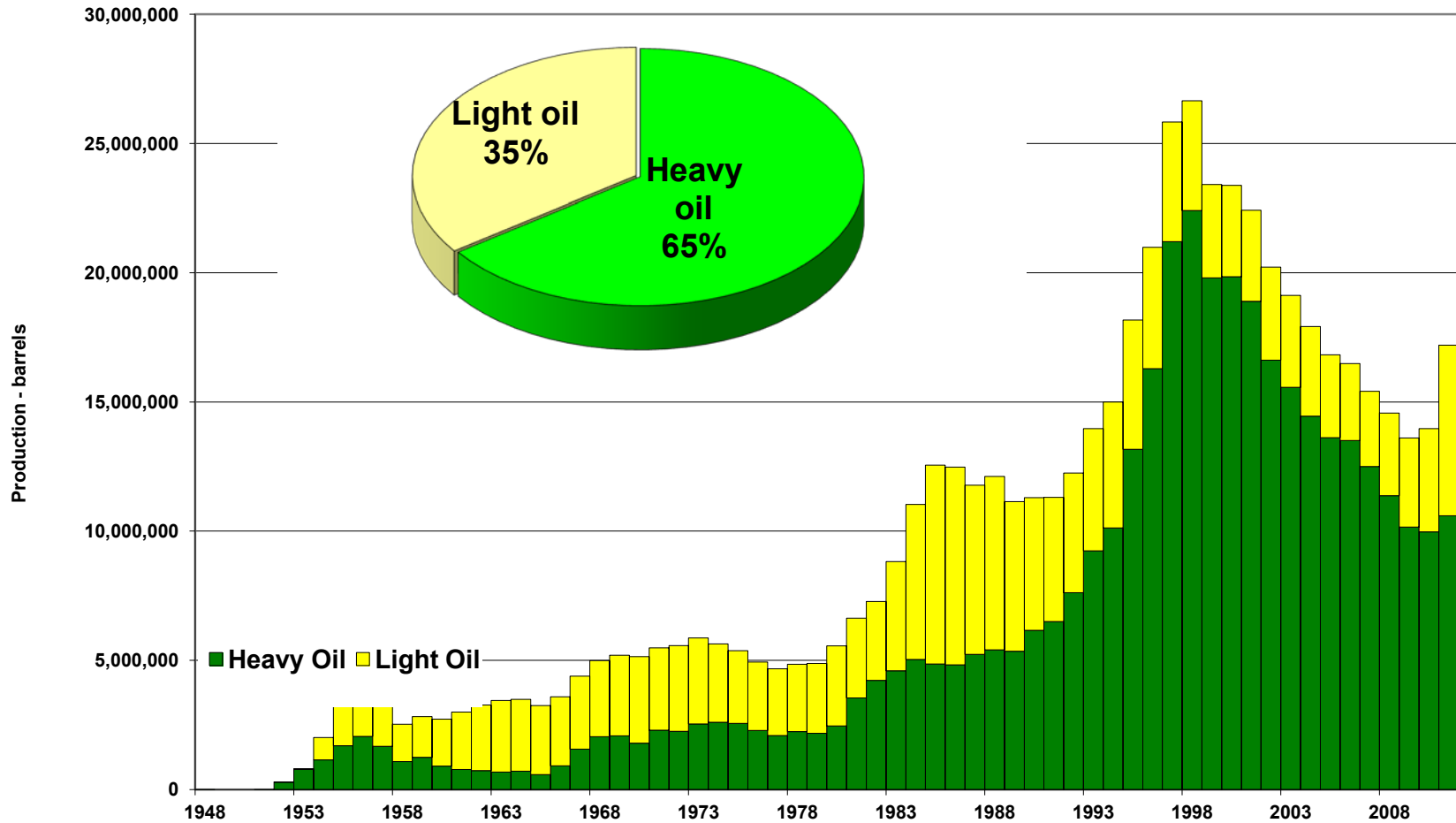


- inter-particle porosity
 - enhanced porosity by dissolution
- Porosity ranges from 11-27%, average 19%
 - K90 Permeability as high as 1730 mD
 - Cumm. Production 17,600 bbl, of API 9.6 oil

Birdbear Formation (West-Central Sask)



Crude Oil Production to the end of 2011



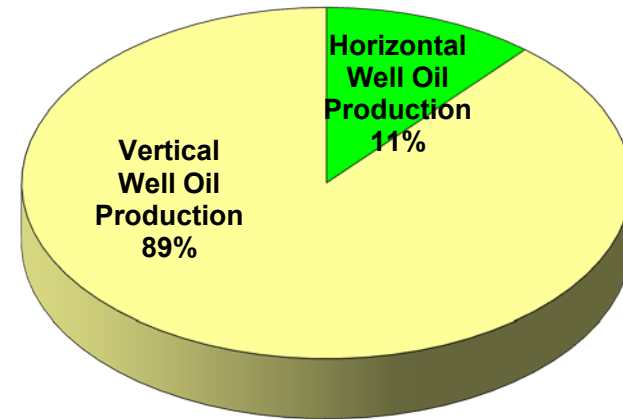
- Total Oil production: 597.6 million barrels
- Heavy Oil Production: 389.4 million barrels
- Light Oil Production: 208.9 million barrels

Oil and Gas Production to the end of 2011

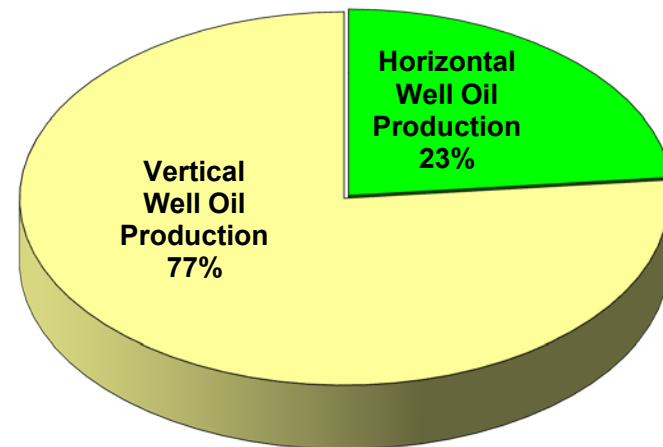
KINDERSLEY AREA

- Total Oil production: 597.6 million barrels
- Total Horizontal Well Oil Production: 67.9 million barrels
- 2011 Oil production: 3.1 million barrels
- 2011 Horizontal Well Oil Production: 2.4 million barrels
- Total Gas Production: 1.6 billion MCF
- Horizontal well Gas production: 53.2 million MCF

Total cum production



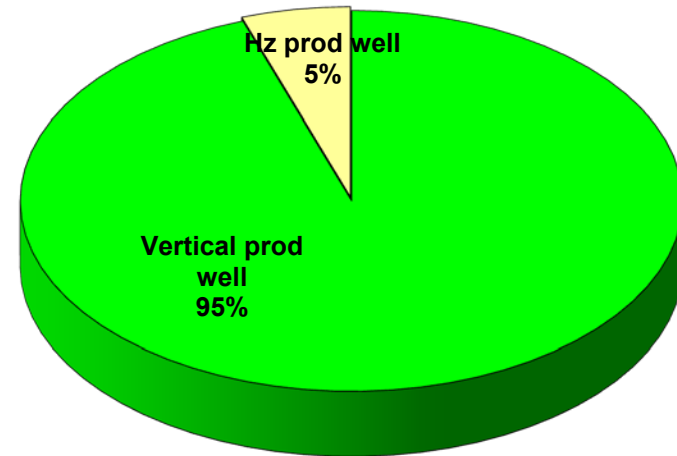
2011 production



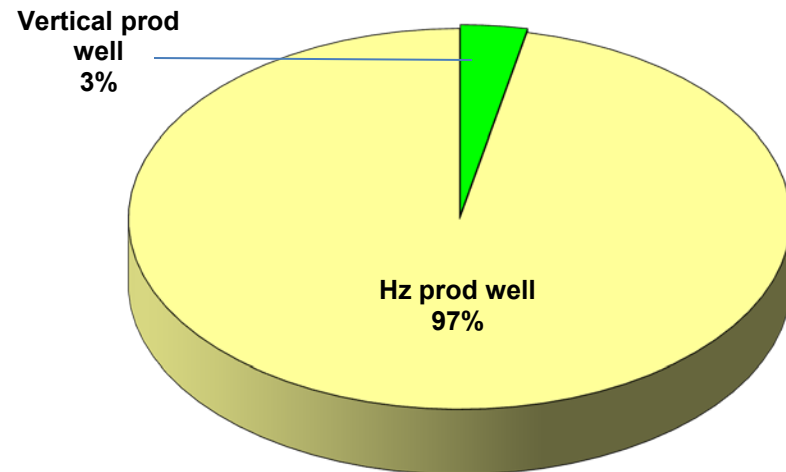
Production Wells ***KINDERSLEY AREA***

- Total Production Wells: 16096
- Total Oil Wells: 14072
- Total Horizontal Production Wells: 857
- Total Production Wells started in 2011: 460, among them 445 are Horz well

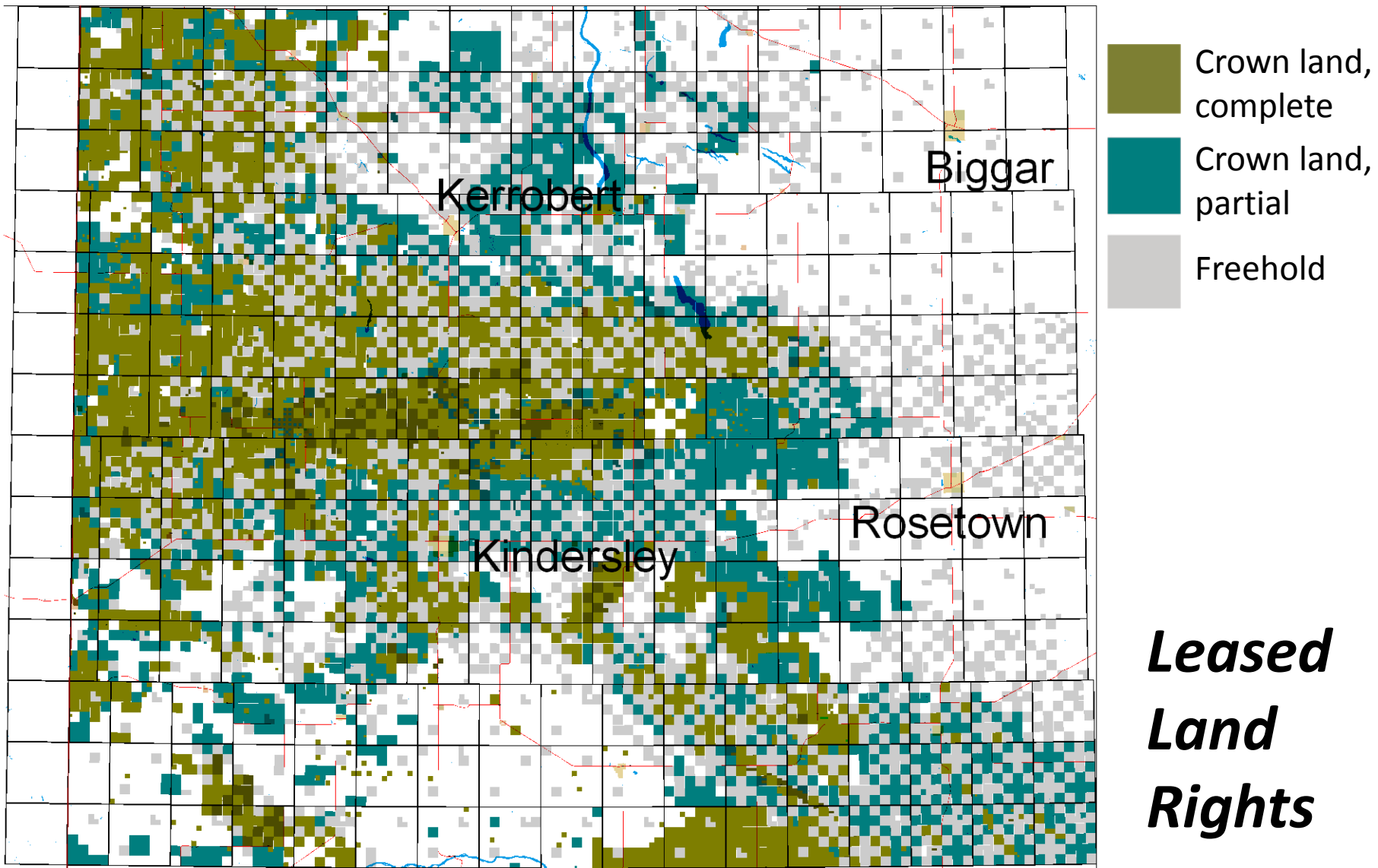
Total OIL PRODUCTION Well



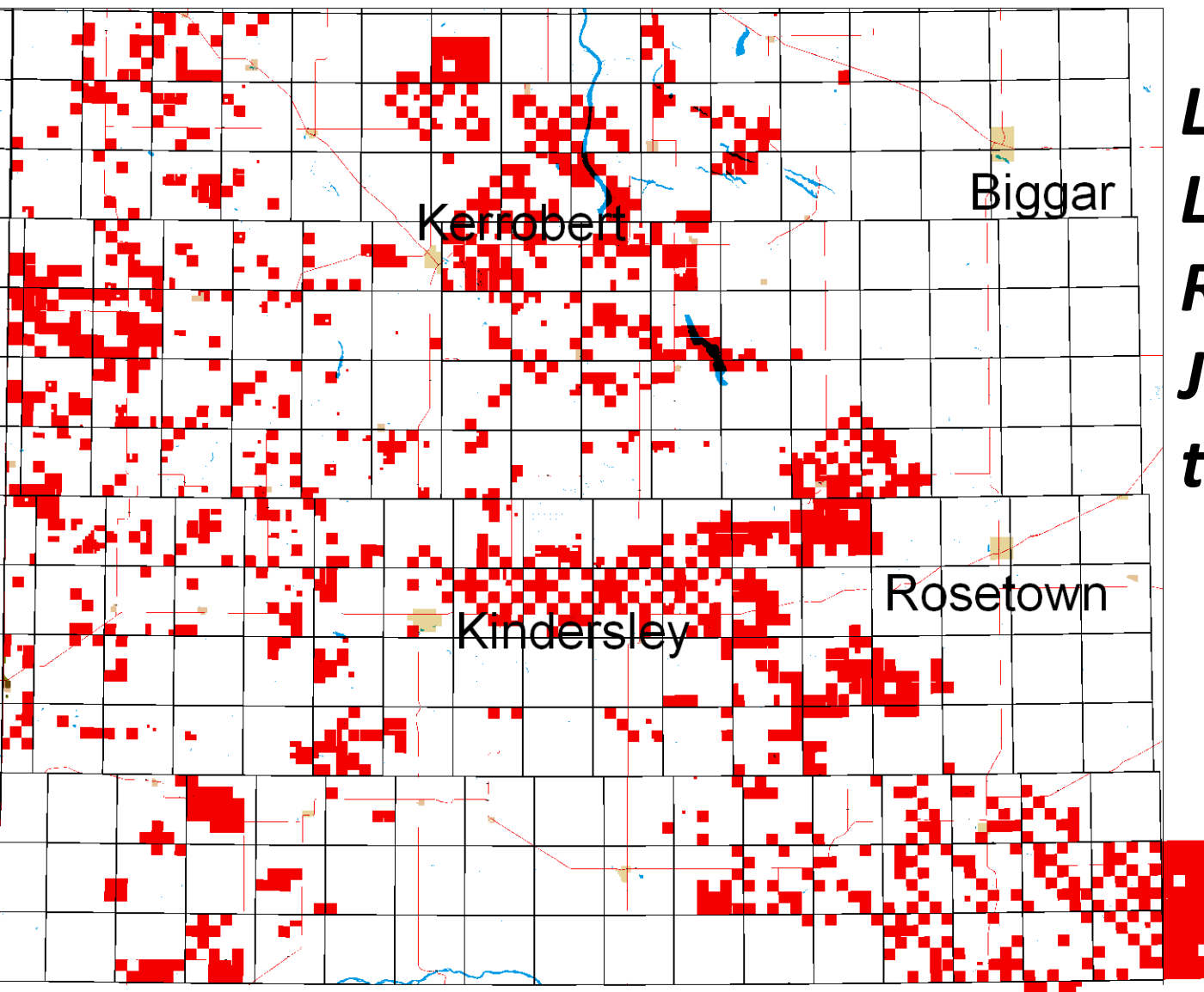
Total OIL PRODUCTION Well Started in 2011



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Data derived from GeoScout, June 2102



***Leased
Land
Rights from
January 1 2009
to date***

Insight: Oil Prices

- The price of oil you hear in the news is one a group of global references that are defined on three parameters:
 1. Geographic location it is produced
 2. API gravity (measure of density)
 3. Sulphur content (sweet/sour)

Examples:

- West Texas Intermediate
- Brent Blend
- Dubai Oman
- Midway sunset



Insight: Oil Prices in the Kindersely area

- The following are recent average for prices of the two main types of oil recovered in the Kindersely – Rosetown – Kerrobert areas:
- Light: \$81.70
- Heavy: \$59.46



Summary: Oil in the Kindersley area



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Thank you!



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