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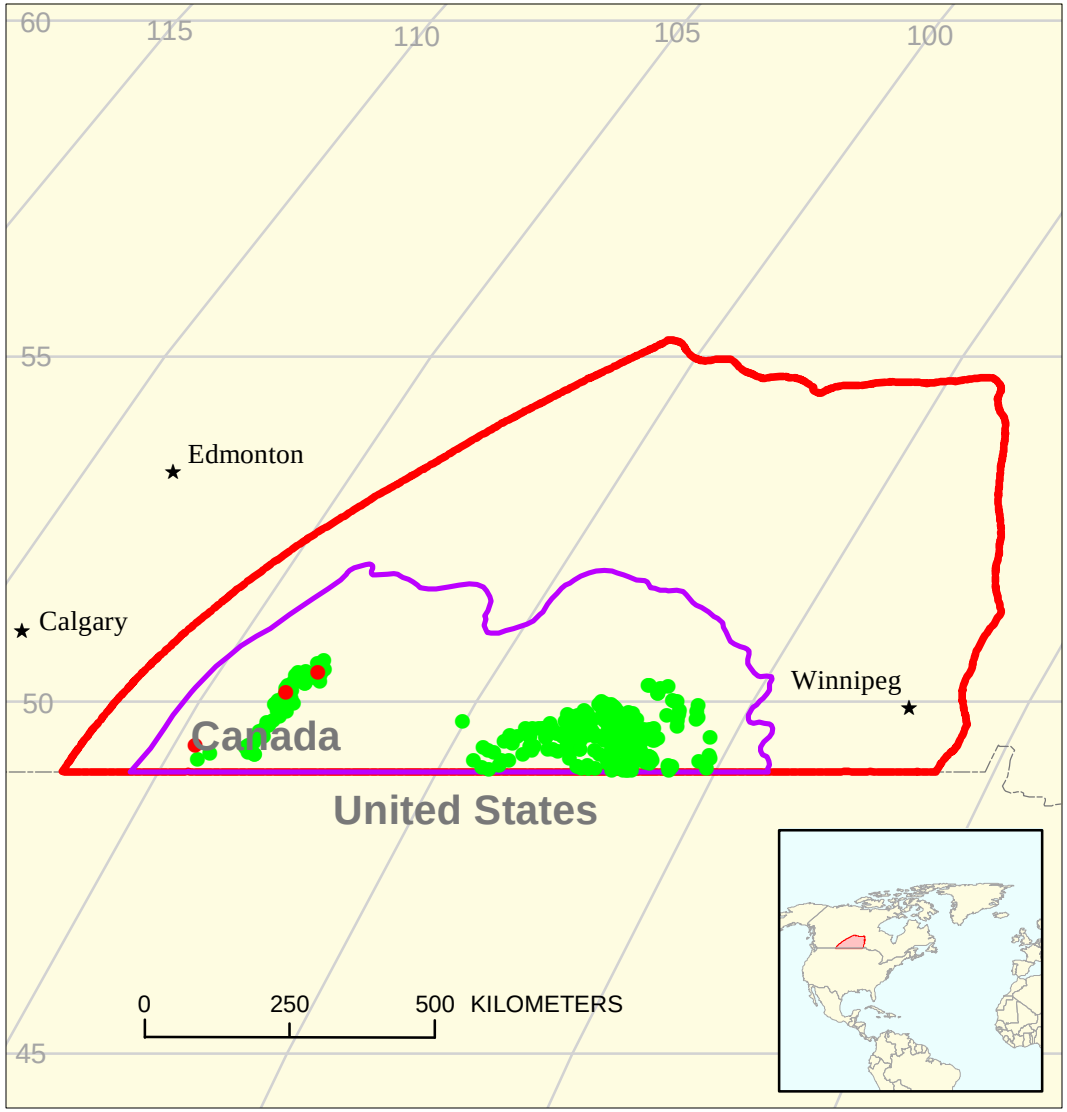
Lodgepole Oil
Assessment Unit 52440401



Lodgepole Oil Assessment Unit 52440401

Williston Basin, Canada Geologic Province 5244

Geologic Summary

Detailed map of this assessment unit

Exploration/Discovery-History Data

- Plots of Known Field Sizes
- Tables

Assessment Input Data

Assessment Results

- Assessment Unit Summary
- Detailed Assessment Results
- Undiscovered Field-Size Distributions

USGS PROVINCES: Williston Basin (5244) **GEOLOGIST:** M.E. Henry

TOTAL PETROLEUM SYSTEM: Lodgepole (524404)

ASSESSMENT UNIT: Lodgepole Oil (52440401)

DESCRIPTION: This assessment unit covers the south-central part of the Williston Basin province. It includes the southern quarter of Saskatchewan, a small southwestern corner of Manitoba and a small southeastern part of Alberta. The northern and eastern boundaries approximate the subsurface limits of Mississippian rocks, the southern boundary is the Canadian-United States International Boundary and the western boundary is the eastern limit of the Exshaw petroleum system of the Alberta Basin.

SOURCE ROCKS: The main source rock for this system is considered by many workers to be the Mississippian Lodgepole Formation.

MATURATION: Source rocks are mature for liquid hydrocarbon generation only in the central part of the unit and possibly two smaller areas to the north of the main area. There is, however, an area of thermal maturity for this part of the section, which continues southward across the International Border into the United States.

MIGRATION: The relationship between the distribution of pools assigned to this unit and the extent of thermal maturity indicates lateral migration distances of about 150 km toward the east and possibly more than 300 km toward the west.

RESERVOIR ROCKS: Reservoir rocks are generally developed in limestones although the western cluster of pools is typically found in sandstones. The ratio of carbonate to sandstone reservoirs is about three to one, respectively.

TRAPS AND SEALS: Stratigraphic traps are most common in this assessment unit but combination and structural traps exist. These traps occur in the approximate ratio of 25 to 5 to one. Seals are generally related to overlying evaporites or shales.

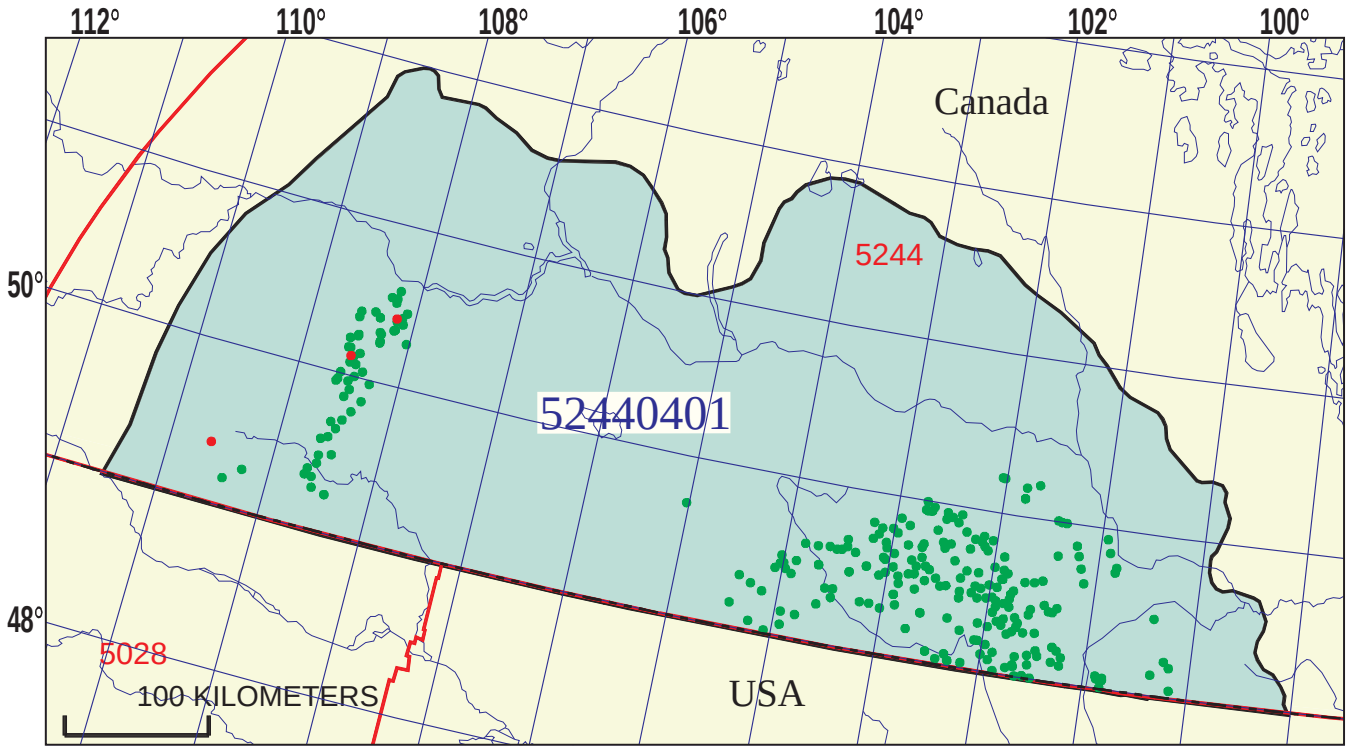
REFERENCES:

Creaney, S., Allen, J., Cole, K.S., Fowler, M.G., Brooks, P.W., Osadetz, K.G., Macqueen, R.W., Snowden, L.R., and Riediger, C.L., 1994, Petroleum generation and migration in the Western Canada sedimentary basin, *in* Mossop, G.D. and Shetsen, I., comps., Geological atlas of the Western Canada sedimentary basin: Calgary, Canadian Society of Petroleum Geologists and Alberta Research Council, p. 455-468.

NRG Associates, Inc., 1994, The significant oil and gas pools of Canada: Colorado Springs, Colo., NRG Associates, Inc. Database available from NRG Associates, Inc., P.O. Box 1655, Colorado Springs, CO 80901.

Osadetz, K.G., Brooks, P.W., and Snowden, L.R., 1992, Oil families and their sources in Canadian Williston basin, (southeastern Saskatchewan and southwestern Manitoba): Bulletin of Canadian Petroleum Geology, v. 40, no. 3, p. 254-273.

Peterson, J.A., Williston basin province (031), *in* Gautier, D.L., Dolton, G.L., Takashi, K.I., and Varnes, K.L., Results, methodology, and supporting data for the 1995 National Assessment of United States oil and gas resources: U.S. Geological Survey Digital Data Series DDS-30.



Lodgepole Oil
Assessment Unit - 52440401

EXPLANATION

- Hydrography
- Shoreline
- 5244 Geologic province code and boundary
- Country boundary
- Gas pool centerpoint
- Oil pool centerpoint
- 52440401 Assessment unit code and boundary

Projection: Lambert. Standard parallels: 49 and 77. Central meridian: -92

SEVENTH APPROXIMATION
NEW MILLENNIUM WORLD PETROLEUM ASSESSMENT
DATA FORM FOR CONVENTIONAL ASSESSMENT UNITS

Date:……..	10/19/99		
Assessment Geologist:……..	M.E. Henry		
Region:……..	North America	Number:	5
Province:……..	Williston Basin, Canada	Number:	5244
Priority or Boutique……	Priority		
Total Petroleum System:……	Lodgepole	Number:	524404
Assessment Unit:……..	Lodgepole Oil	Number:	52440401
* Notes from Assessor	No growth function applied. Only Canadian pools are considered.		

CHARACTERISTICS OF ASSESSMENT UNIT

Oil (<20,000 cfg/bo overall) **or** Gas (≥20,000 cfg/bo overall):… Oil

What is the minimum field size?……. 0.5 mmboe grown (≥1mmboe)
(the smallest field that has potential to be added to reserves in the next 30 years)

Number of discovered fields exceeding minimum size:…… Oil: 217 Gas: 2
Established (>13 fields) X Frontier (1-13 fields) _____ Hypothetical (no fields) _____

Median size (grown) of discovered oil fields (mmboe):
1st 3rd 7.3 2nd 3rd 3.5 3rd 3rd 1.6
Median size (grown) of discovered gas fields (bcfg):
1st 3rd 18.6 2nd 3rd 9.4 3rd 3rd _____

Assessment-Unit Probabilities:

Attribute	Probability of occurrence (0-1.0)
1. **CHARGE:** Adequate petroleum charge for an undiscovered field ≥ minimum size……	1.0
2. **ROCKS:** Adequate reservoirs, traps, and seals for an undiscovered field ≥ minimum size……	1.0
3. **TIMING OF GEOLOGIC EVENTS:** Favorable timing for an undiscovered field ≥ minimum size	1.0

Assessment-Unit GEOLOGIC Probability (Product of 1, 2, and 3):…….. 1.0

4. **ACCESSIBILITY:** Adequate location to allow exploration for an undiscovered field ≥ minimum size…… 1.0

UNDISCOVERED FIELDS

Number of Undiscovered Fields: How many undiscovered fields exist that are ≥ minimum size?:
(uncertainty of fixed but unknown values)

Oil fields:……min. no. (>0)	20	median no.	75	max no.	175
Gas fields:……min. no. (>0)	1	median no.	2	max no.	4

Size of Undiscovered Fields: What are the anticipated sizes (**grown**) of the above fields?:
(variations in the sizes of undiscovered fields)

Oil in oil fields (mmbo)……min. size	0.5	median size	1	max. size	15
Gas in gas fields (bcfg):……min. size	3	median size	5	max. size	60

Assessment Unit (name, no.)
Lodgepole Oil, 52440401

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	220	440	660
NGL/gas ratio (bngl/mmcfg)……	34	68	102

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	22	44	66
Oil/gas ratio (bo/mmcfg)……			

SELECTED ANCILLARY DATA FOR UNDISCOVERED FIELDS

(variations in the properties of undiscovered fields)

Oil Fields:	minimum	median	maximum
API gravity (degrees)……	15	35	50
Sulfur content of oil (%)……			
Drilling Depth (m) ……	450	1300	2500
Depth (m) of water (if applicable)……			

Gas Fields:	minimum		maximum
Inert gas content (%)……			
CO_2 content (%)……			
Hydrogen-sulfide content (%)……			
Drilling Depth (m)……	450	1300	2500
Depth (m) of water (if applicable)……			

Assessment Unit (name, no.)
Lodgepole Oil, 52440401

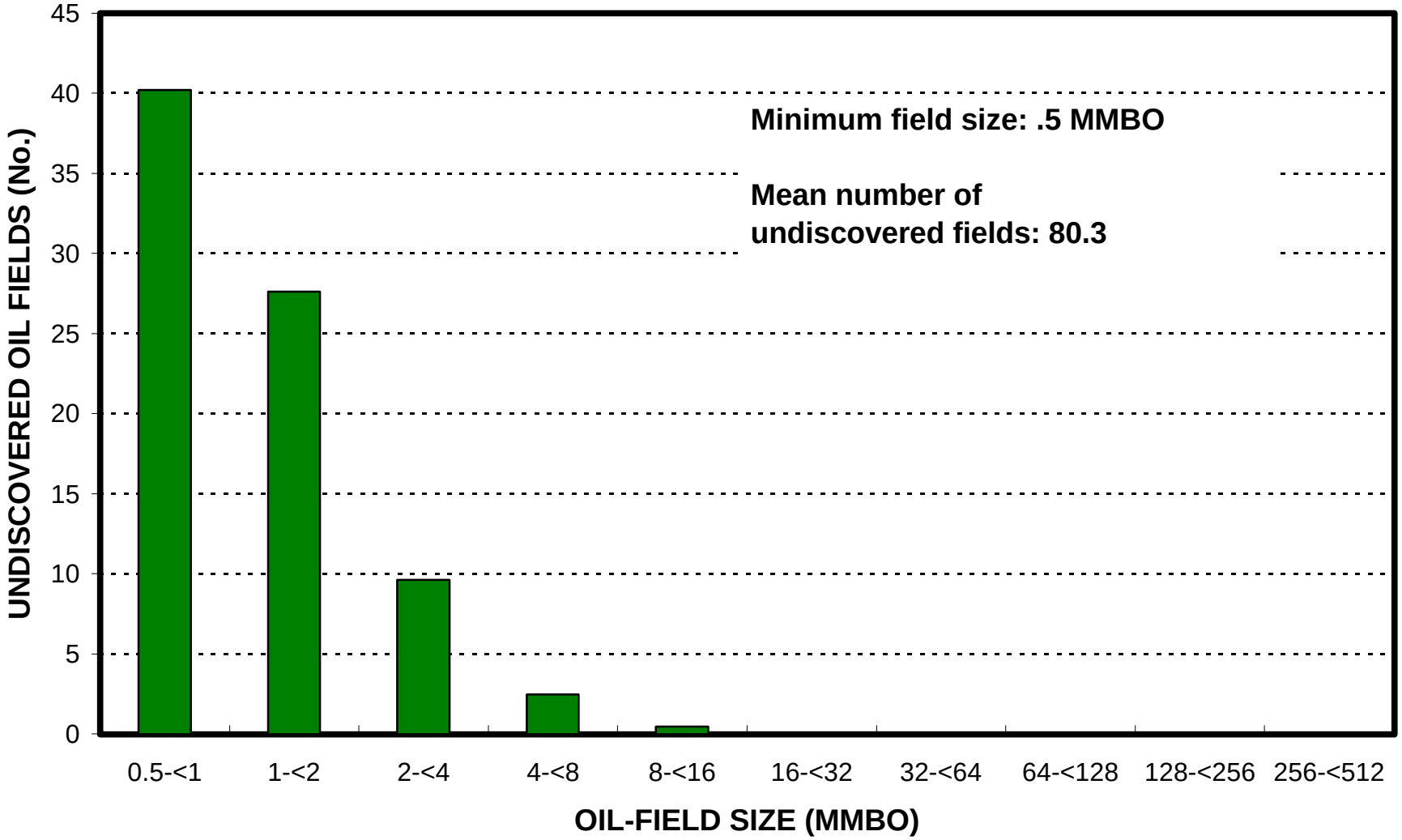
ALLOCATION OF UNDISCOVERED RESOURCES IN THE ASSESSMENT UNIT TO COUNTRIES OR OTHER LAND PARCELS (uncertainty of fixed but unknown values)

1. Canada represents 100 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		100	
Portion of volume % that is offshore (0-100%)……		0	

Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		100	
Portion of volume % that is offshore (0-100%)……		0	

Lodgepole Oil, AU 52440401
Undiscovered Field-Size Distribution



Lodgepole Oil, AU 52440401
Undiscovered Field-Size Distribution