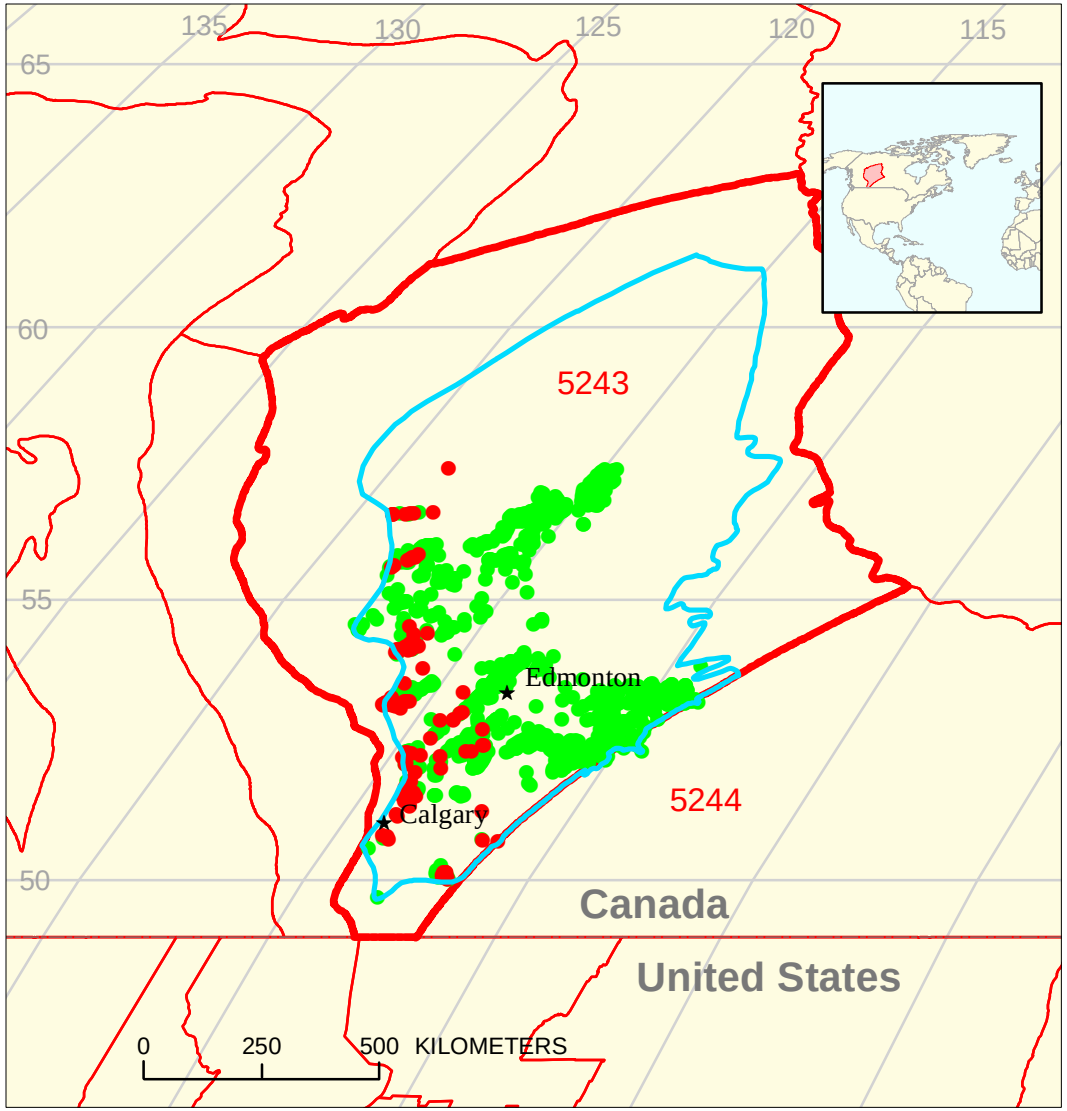
Go to Table of Contents

Go to index map

Leduc Oil and Gas Assessment Unit 52430202



Leduc Oil and Gas Assessment Unit 52430202
Alberta Basin Geologic Province 5243
Other geologic province boundary

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: Alberta Basin and Williston Basin (5243 and 5244)

GEOLOGIST: M.E. Henry

TOTAL PETROLEUM SYSTEM: Duvernay-Leduc (524302)

ASSESSMENT UNIT: Leduc Oil and Gas (52430202)

DESCRIPTION: This oil and gas assessment unit includes virtually all of the Alberta Basin and a small western part of the Williston Basin. The area is generally bounded by the Leduc Gas Assessment Unit to the north and west, the Canadian-United States International Boundary to the south, the Williston Basin to the east, and the Canadian Shield to the northeast.

SOURCE ROCKS: The principal source rock is the Late Devonian Duvernay Formation.

MATURATION: The southwestern part of this unit lies in the area where the Duvernay and equivalent units are known or expected to be mature with respect to liquid petroleum generation.

MIGRATION: The distribution of oil pools assigned to this unit in relation to the distribution of mature source rocks indicates that long distance lateral migration has occurred. Updip lateral migration was enhanced by extensive reef trends and porous shelf carbonates. This system was probably a major contributor to the massive bitumen deposits, which indicates even greater lateral migration distances.

RESERVOIR ROCKS: Most reservoirs occur in dolomite, however, because many pools in the southeastern part of the unit, that produce from Lower Cretaceous sands, were assigned to this petroleum system, sandstone reservoirs are almost as common.

TRAPS AND SEALS: Stratigraphic and combination traps occur in roughly equal numbers and some structural traps also exist. These three trap types occur in the approximate proportion of four to four to one respectively. Seals result from overlying shales and fine-grained carbonates.

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Allen, J., and Creaney, S., 1991, Oil families of the Western Canada Basin: Bulletin of Canadian Petroleum Geology, v. 39, no. 2, p. 107-122.

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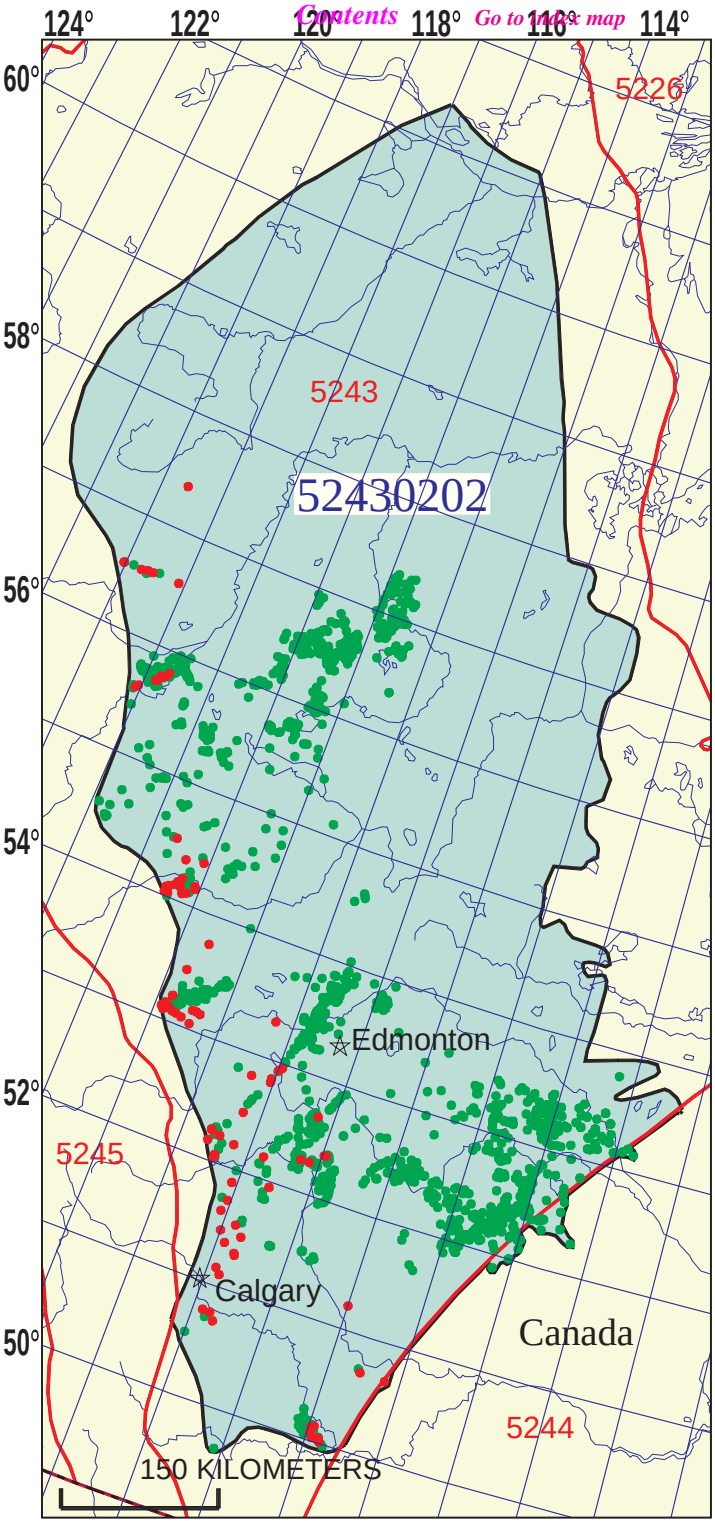
Creaney, S., Allen, J., Cole, K.S., Fowler, M.G., Brooks, P.W., Osadetz, K.G., Macqueen, R.W., Snowden, L.R., and Riediger, C.L., 1994, Petroleum generation and migration in the Western Canada sedimentary basin, *in* Mossop, G.D., and Shetsen, I., comps., Geological atlas of the Western Canada sedimentary 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.

Go to Table of Contents
Go to index map



Leduc Oil and Gas Assessment Unit - 52430202

EXPLANATION

- Hydrography
- Shoreline
- 5243 — Geologic province code and boundary
- Country boundary
- Gas pool centerpoint
- Oil pool centerpoint
- 52430202 — 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:……..	7/15/99		
Assessment Geologist:……..	M.E. Henry		
Region:……..	North America	Number:	5
Province:……..	Alberta Basin	Number:	5243
Priority or Boutique……	Priority		
Total Petroleum System:……	Duvernay-Leduc	Number:	524302
Assessment Unit:……..	Leduc Oil and Gas	Number:	52430202
* Notes from Assessor	Data not grown. Assessing pools, not fields to conform to NRG data set.		

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: 580 Gas: 80

Established (>13 fields)	Frontier (1-13 fields)	Hypothetical (no fields)
X		

Median size (grown) of discovered oil fields (mmboe):

1st 3rd	2nd 3rd	3rd 3rd
5.1	2.7	2

Median size (grown) of discovered gas fields (bcfg):

1st 3rd	2nd 3rd	3rd 3rd
24	7.5	7.5

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)	30	median no.	180	max no.	350
Gas fields:……min. no. (>0)	10	median no.	25	max no.	50

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	1.8	max. size	35
Gas in gas fields (bcfg):……min. size	3	median size	7	max. size	150

Assessment Unit (name, no.)
Leduc Oil and Gas, 52430202

AVERAGE RATIOS FOR UNDISCOVERED FIELDS, TO ASSESS COPRODUCTS

(uncertainty of fixed but unknown values)

Oil Fields:	minimum	median	maximum
Gas/oil ratio (cfg/bo)……	500	1000	1500
NGL/gas ratio (bngl/mmcfg)……	30	60	90

Gas fields:	minimum	median	maximum
Liquids/gas ratio (bngl/mmcfg)……	19	38	57
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)……	11	35	52
Sulfur content of oil (%)……	0.1	0.4	1
Drilling Depth (m) ……	350	1400	3800
Depth (m) of water (if applicable)……			

Gas Fields:	minimum	median	maximum
Inert gas content (%)……	0.4	3	37
CO_2 content (%)……	0.2	2	21
Hydrogen-sulfide content(%)……	0	5	52
Drilling Depth (m)……	1200	2500	4200
Depth (m) of water (if applicable)……			

Assessment Unit (name, no.)
Leduc Oil and Gas, 52430202

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	

2. Province 5243 represents 99 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		99	
Portion of volume % that is offshore (0-100%)……		0	

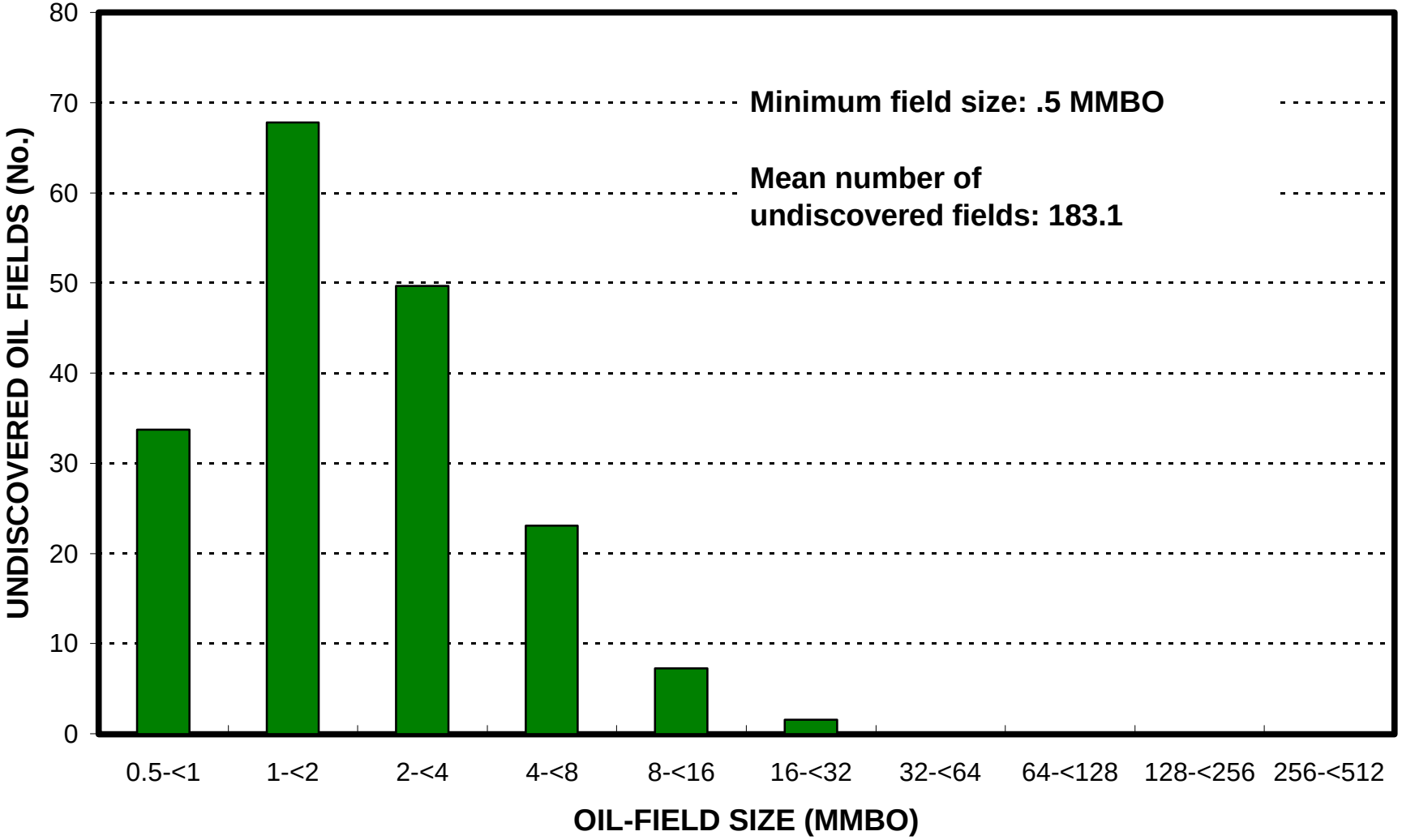
Gas in Gas Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		99	
Portion of volume % that is offshore (0-100%)……		0	

3. Province 5244 represents 1 areal % of the total assessment unit

Oil in Oil Fields:	minimum	median	maximum
Richness factor (unitless multiplier):……			
Volume % in parcel (areal % x richness factor):…		1	
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):…		1	
Portion of volume % that is offshore (0-100%)……		0	

Leduc Oil and Gas, AU 52430202
Undiscovered Field-Size Distribution



Leduc Oil and Gas, AU 52430202
Undiscovered Field-Size Distribution