



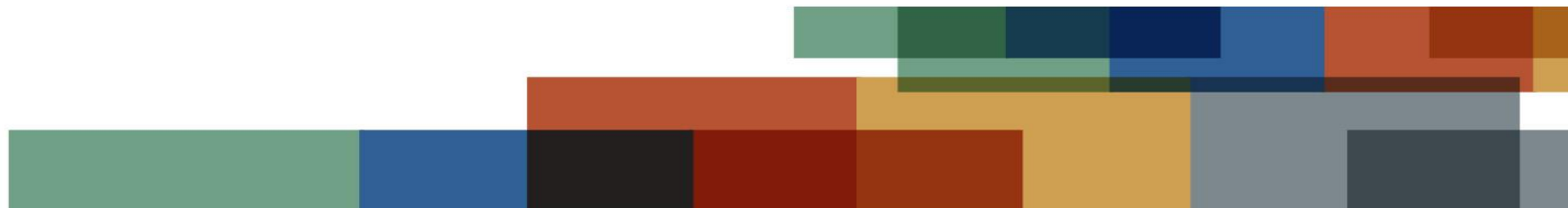
decisions with confidence

Global Unconventional Potential at \$50 Oil

What are you missing?

August 2017

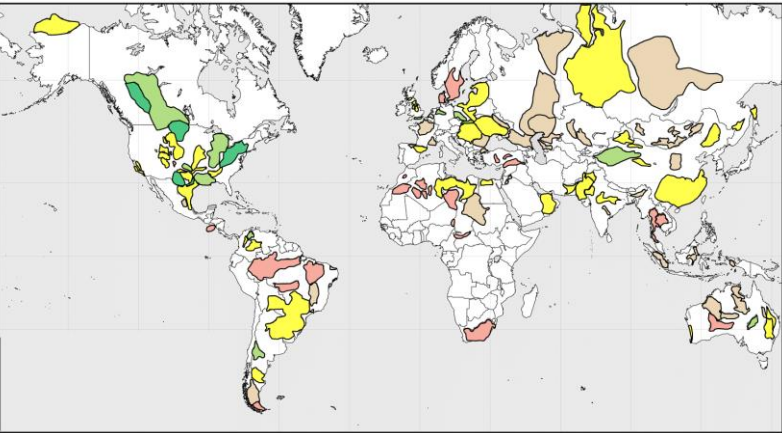
Ian Cockerill



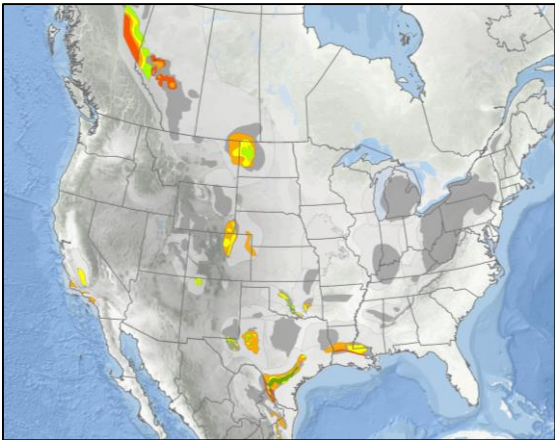
Presentation Outline



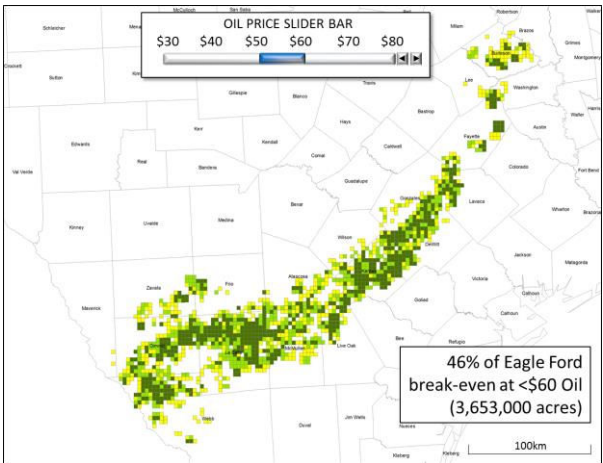
GLOBAL PERSPECTIVE



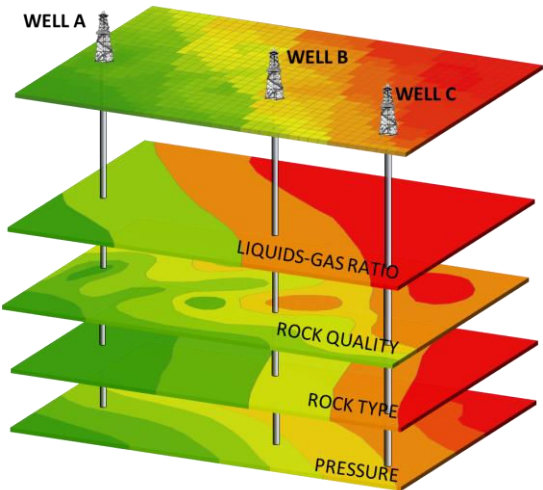
NORTH AMERICAN PERSPECTIVE



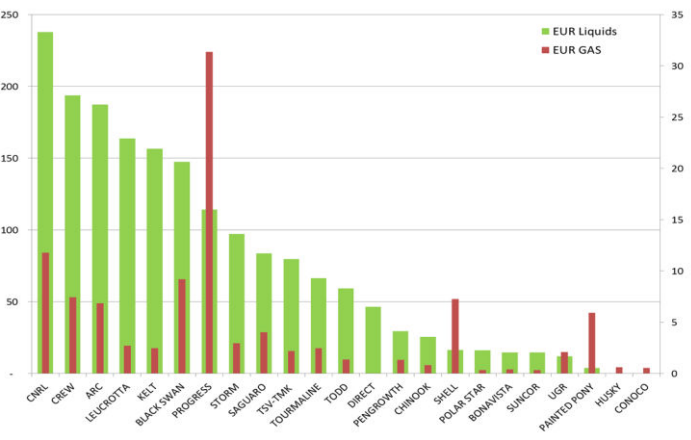
PLAY PERSPECTIVE



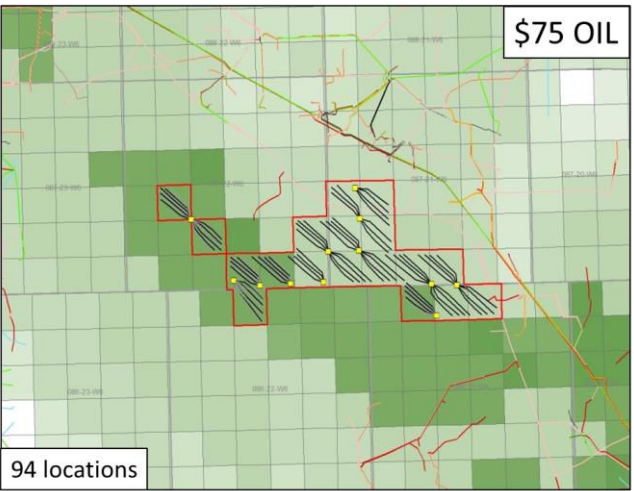
PLAY MAPPING



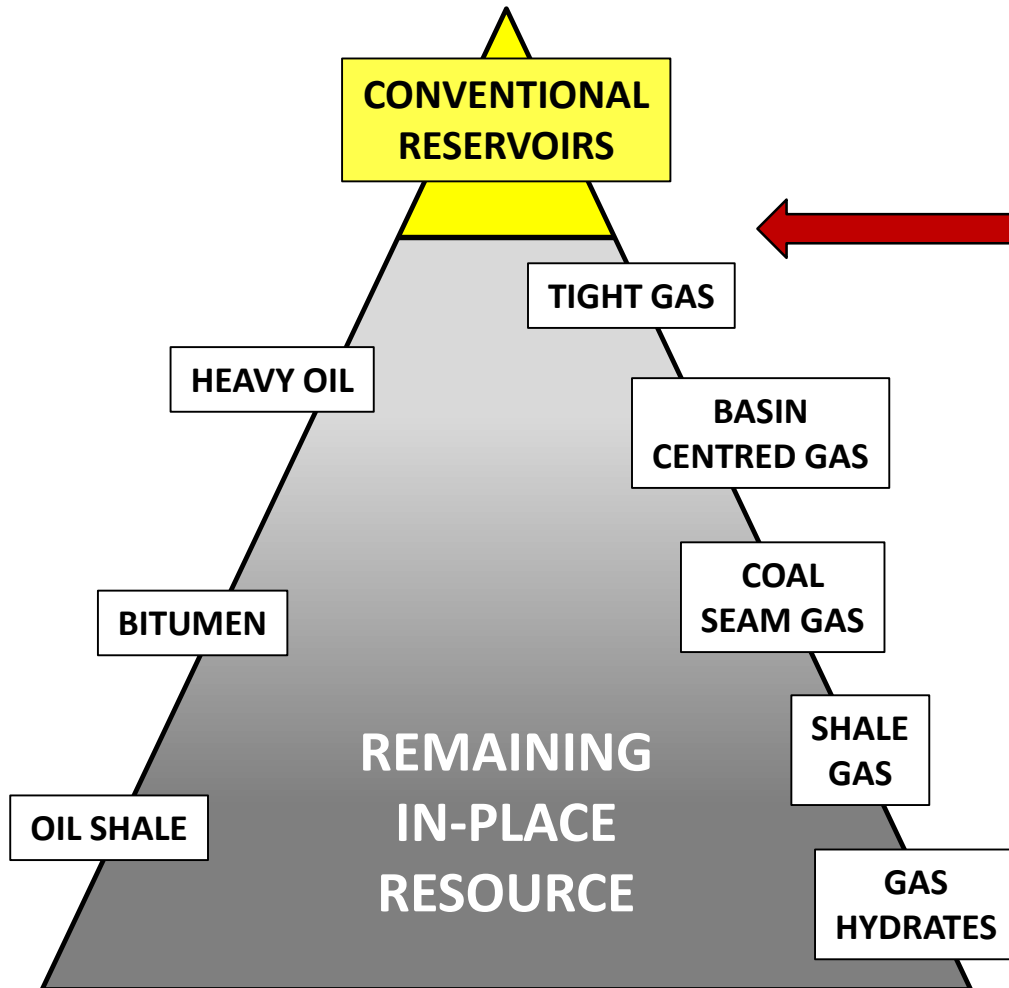
QUANTIFICATION



RESOURCE OPTIMISATION



What is Unconventional?



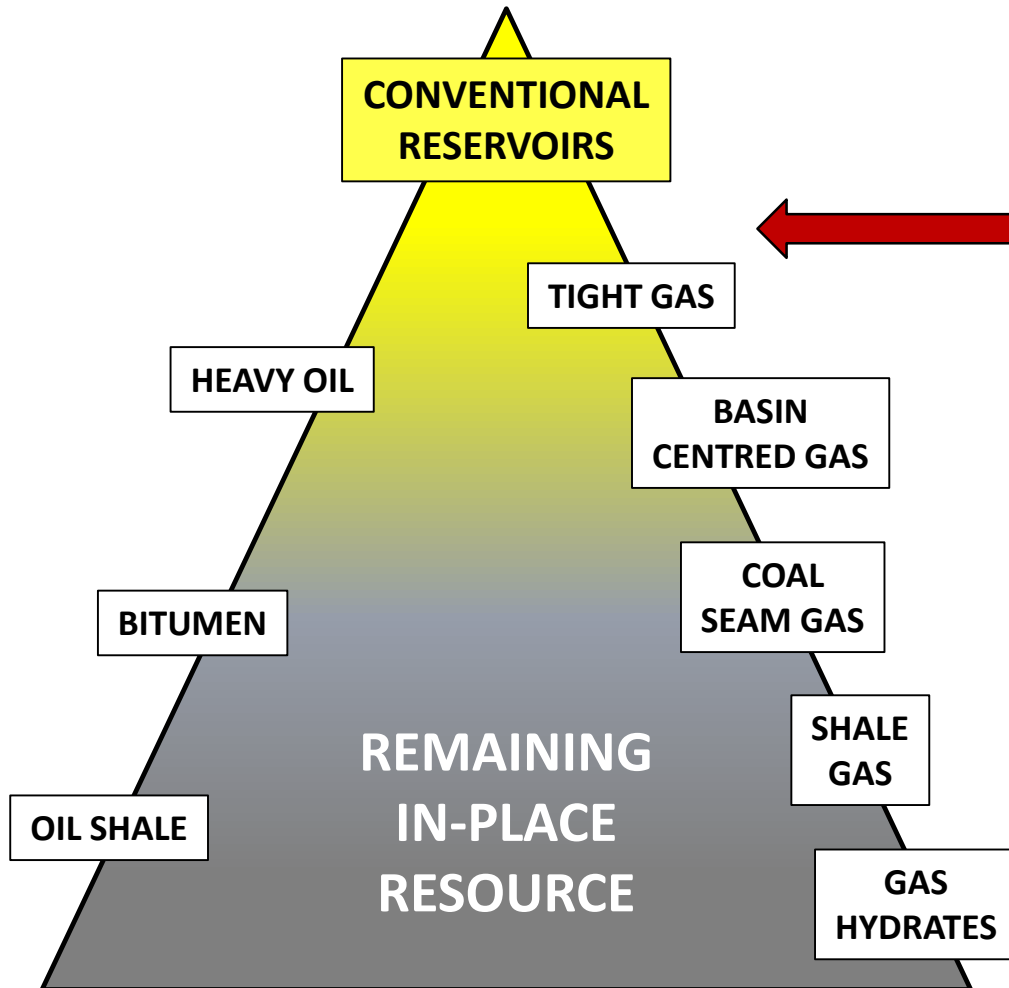
THERE ARE NO HARD LINES
BETWEEN CONVENTIONAL AND
UNCONVENTIONAL RESOURCES

UNCONVENTIONAL RESERVOIRS SHARE A LOT OF SIMILAR CHARACTERISTICS TO CONVENTIONAL RESERVOIRS

- Zones of higher Porosity / Permeability
- Zones of higher Resistivity
- Zones of higher Pressure
- Regional structures or structural highs

**ITS NOT JUST A GAME OF FINDING A SHALE AND
FRACKING THE BEJEEZUS OUT OF IT**

What is Unconventional?



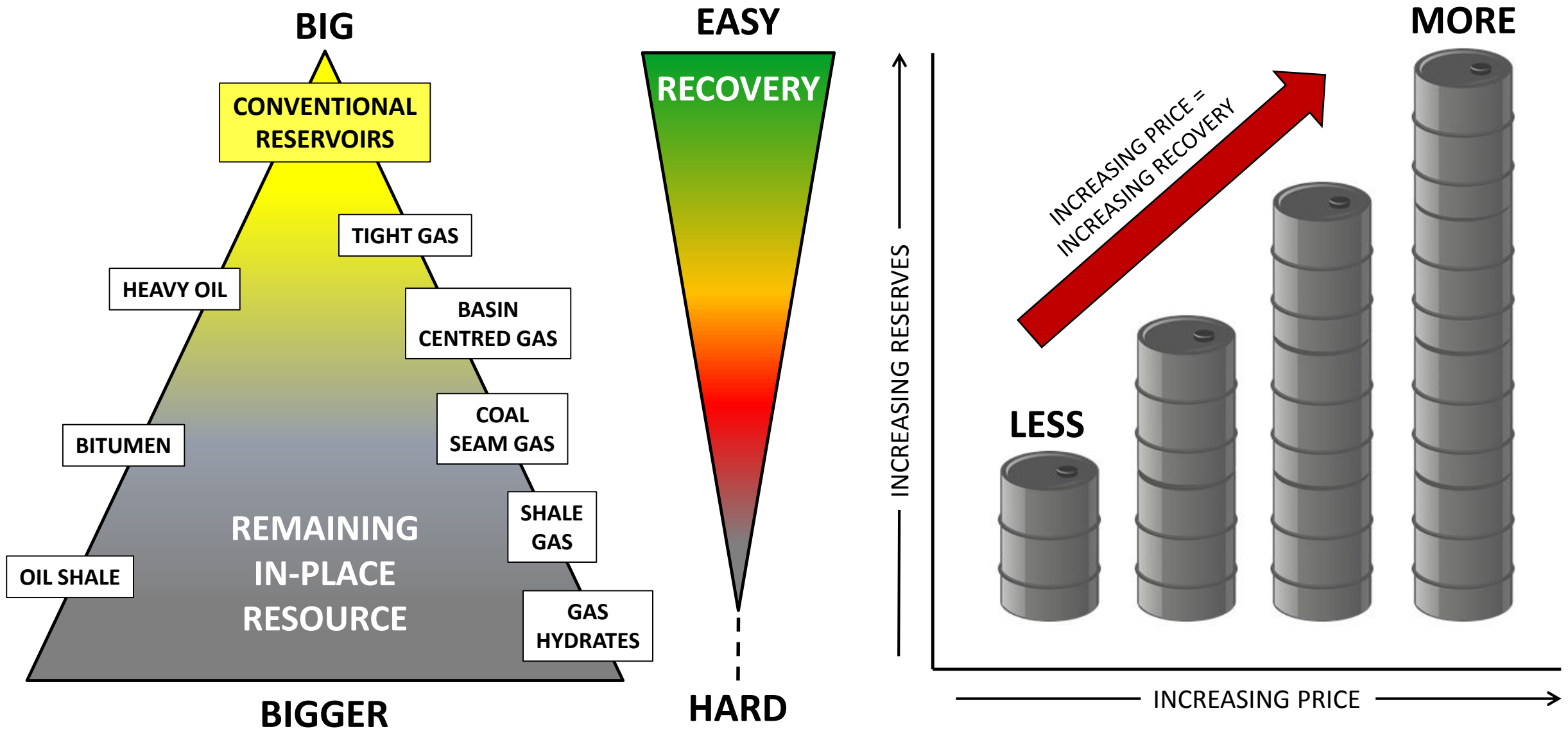
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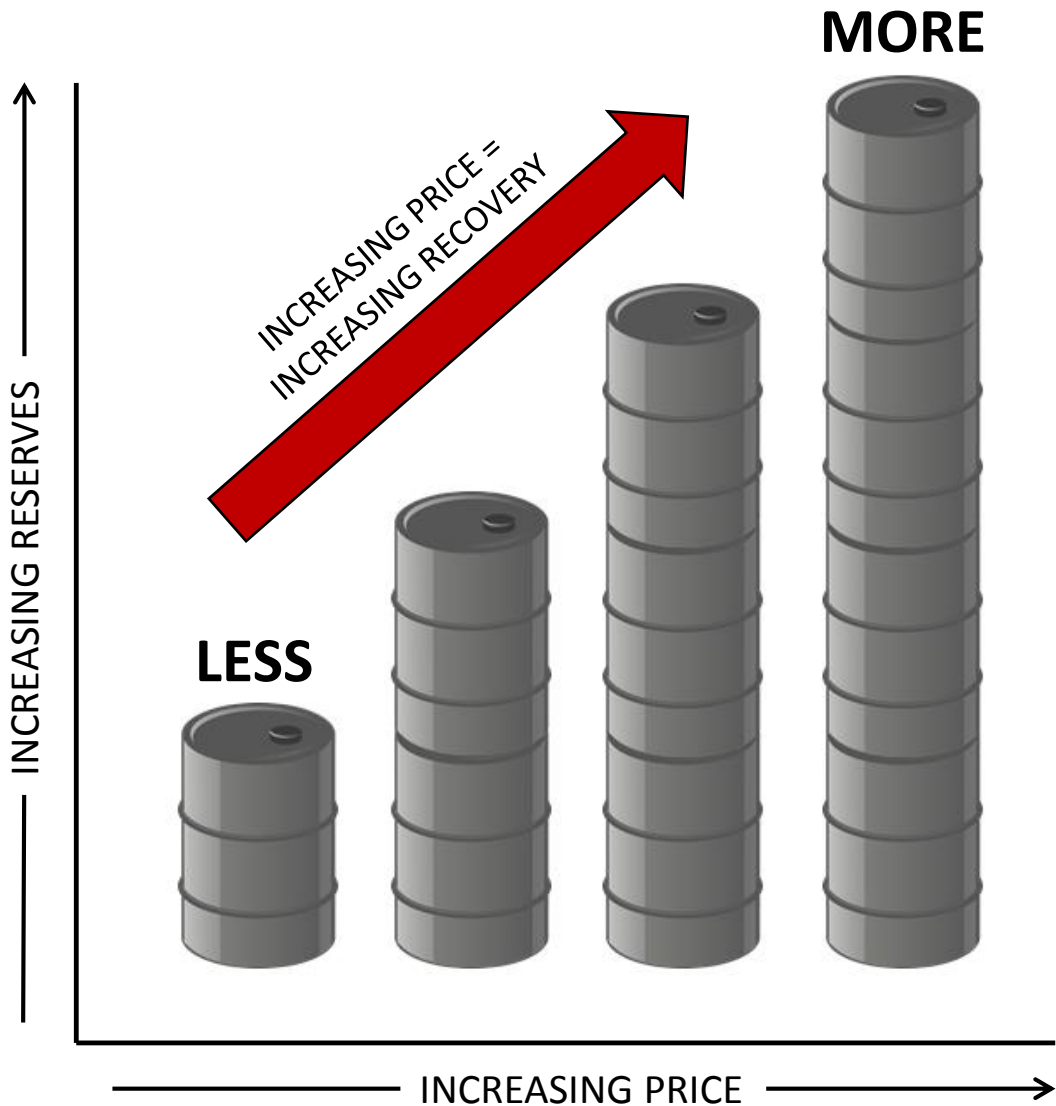
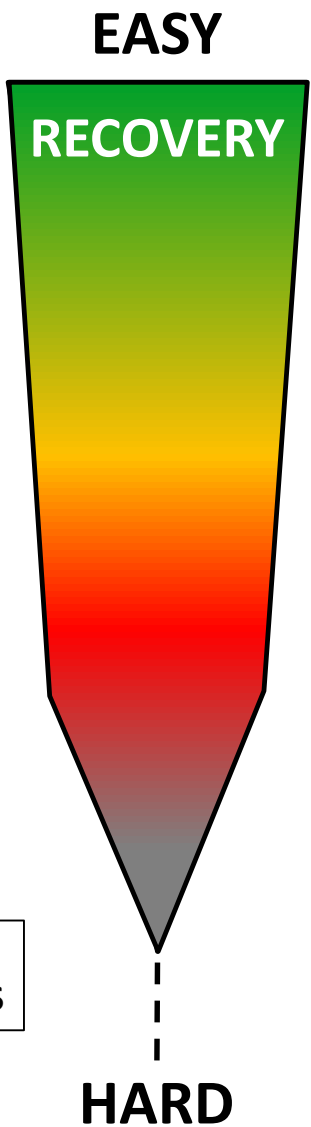
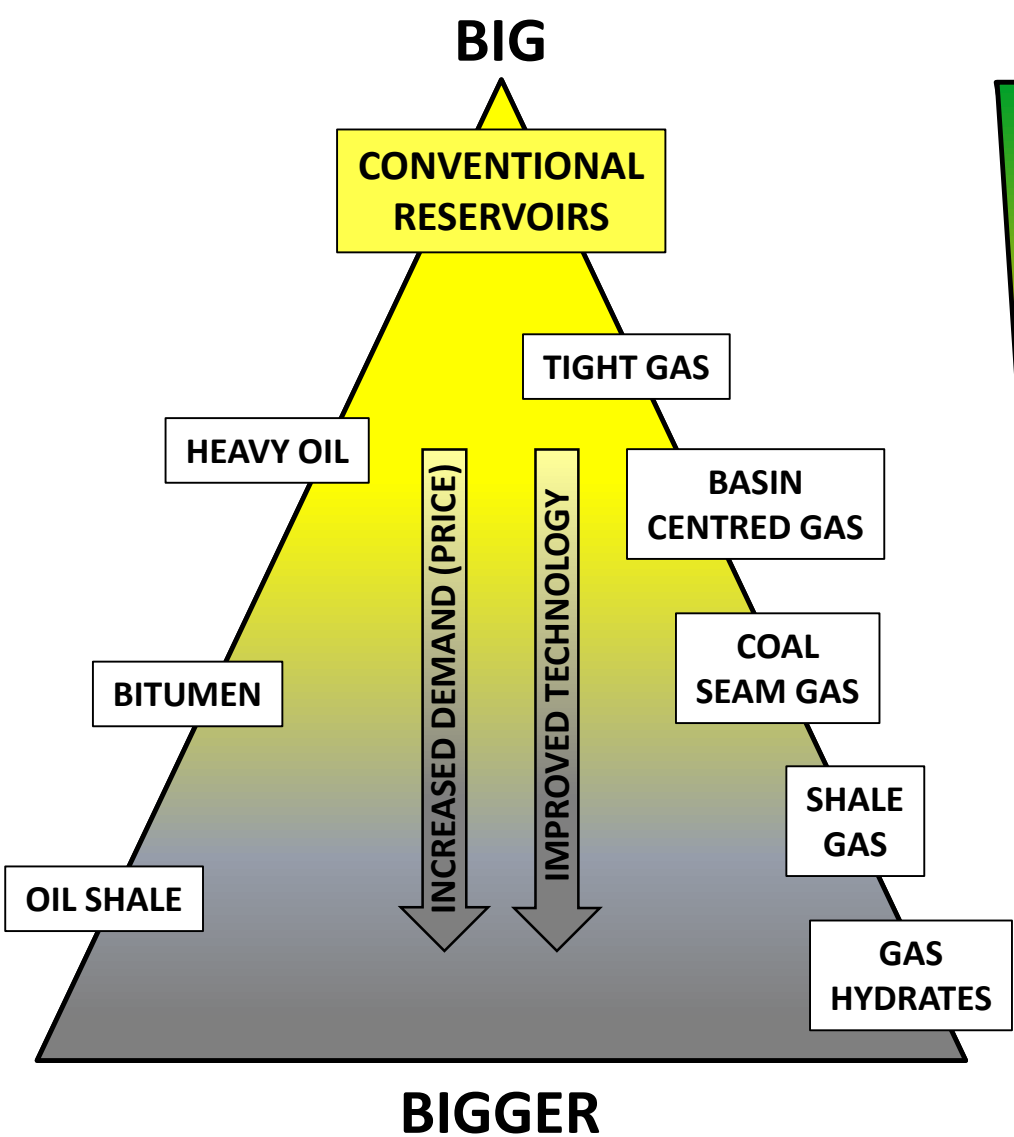
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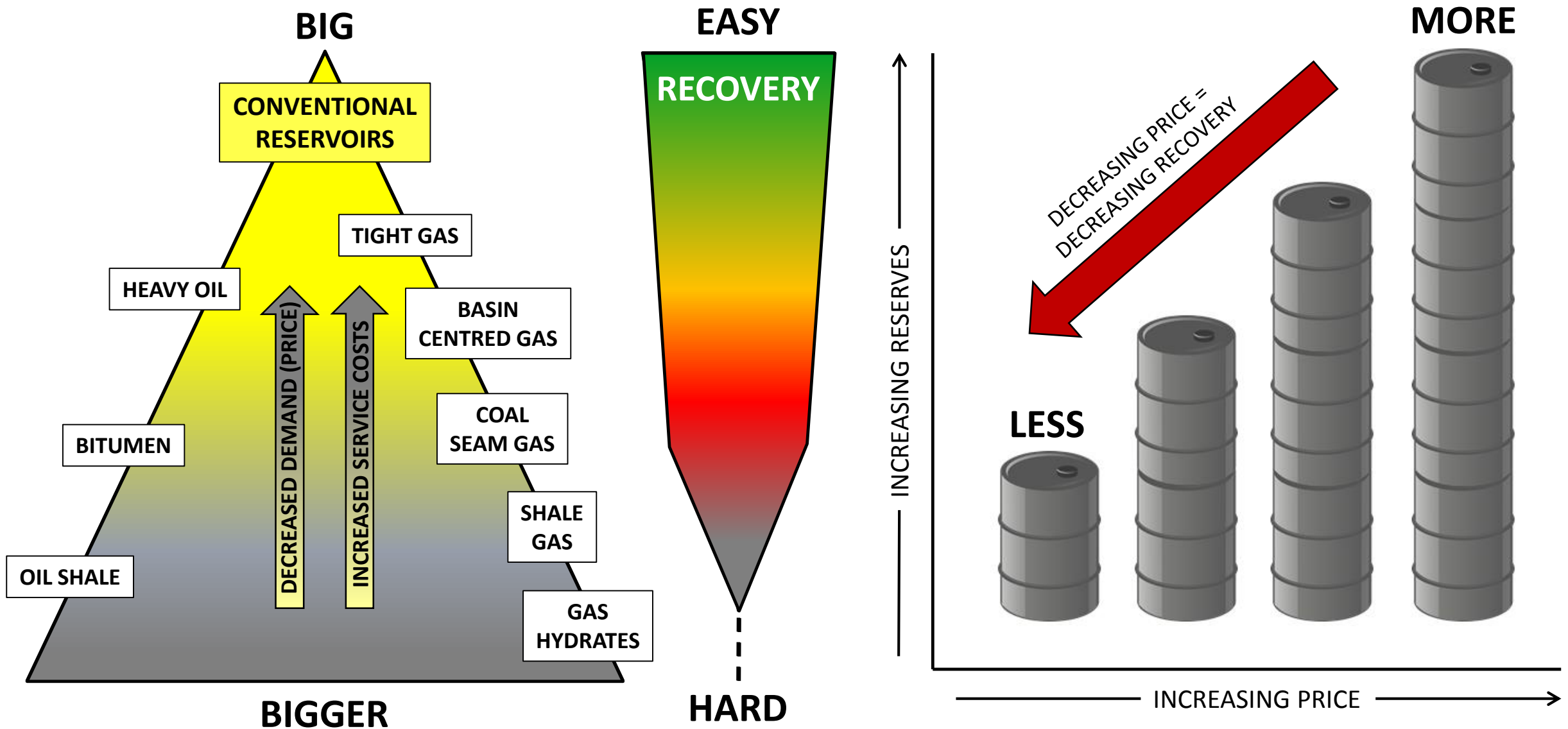
In-place versus Recoverable Hydrocarbons



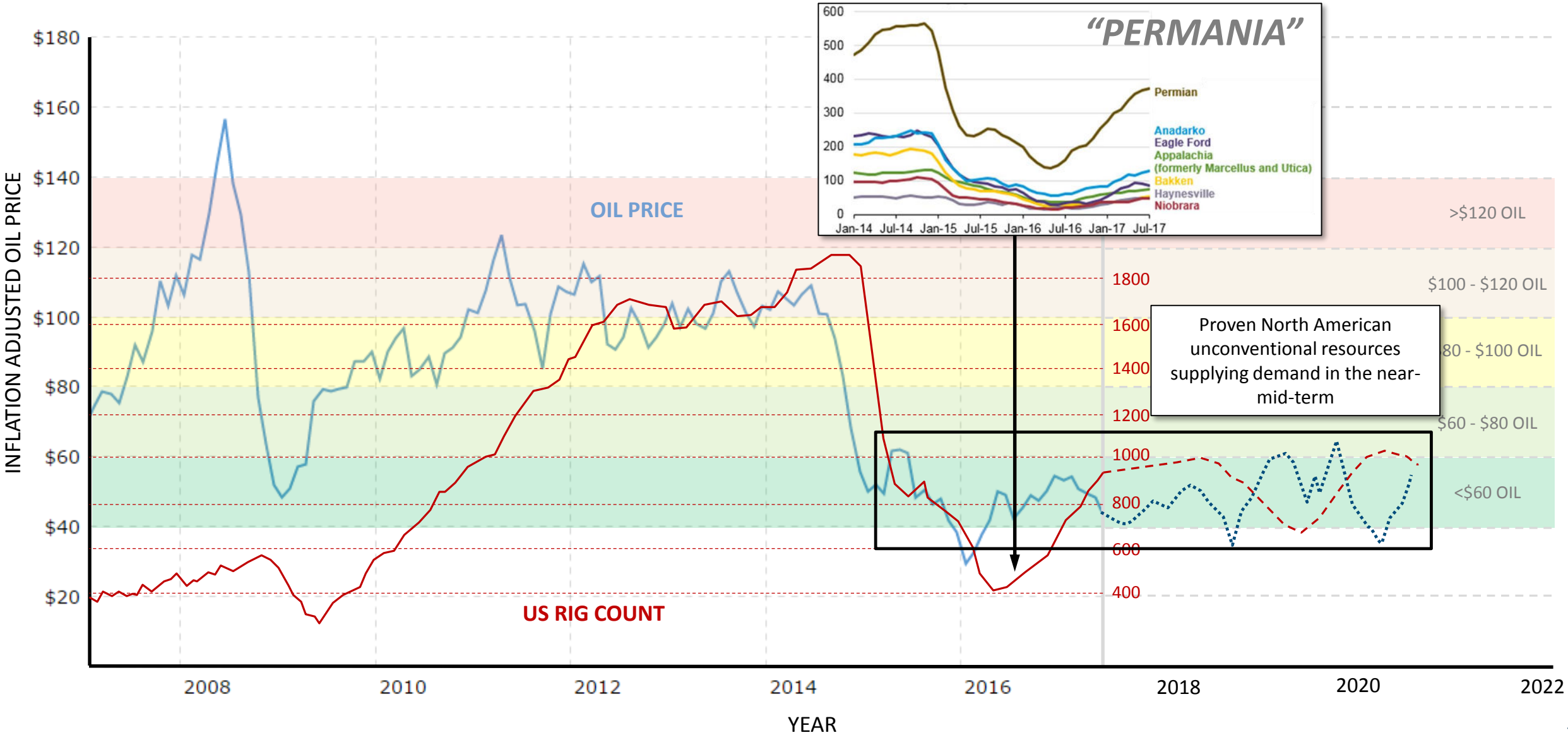
In-place versus Recoverable Hydrocarbons



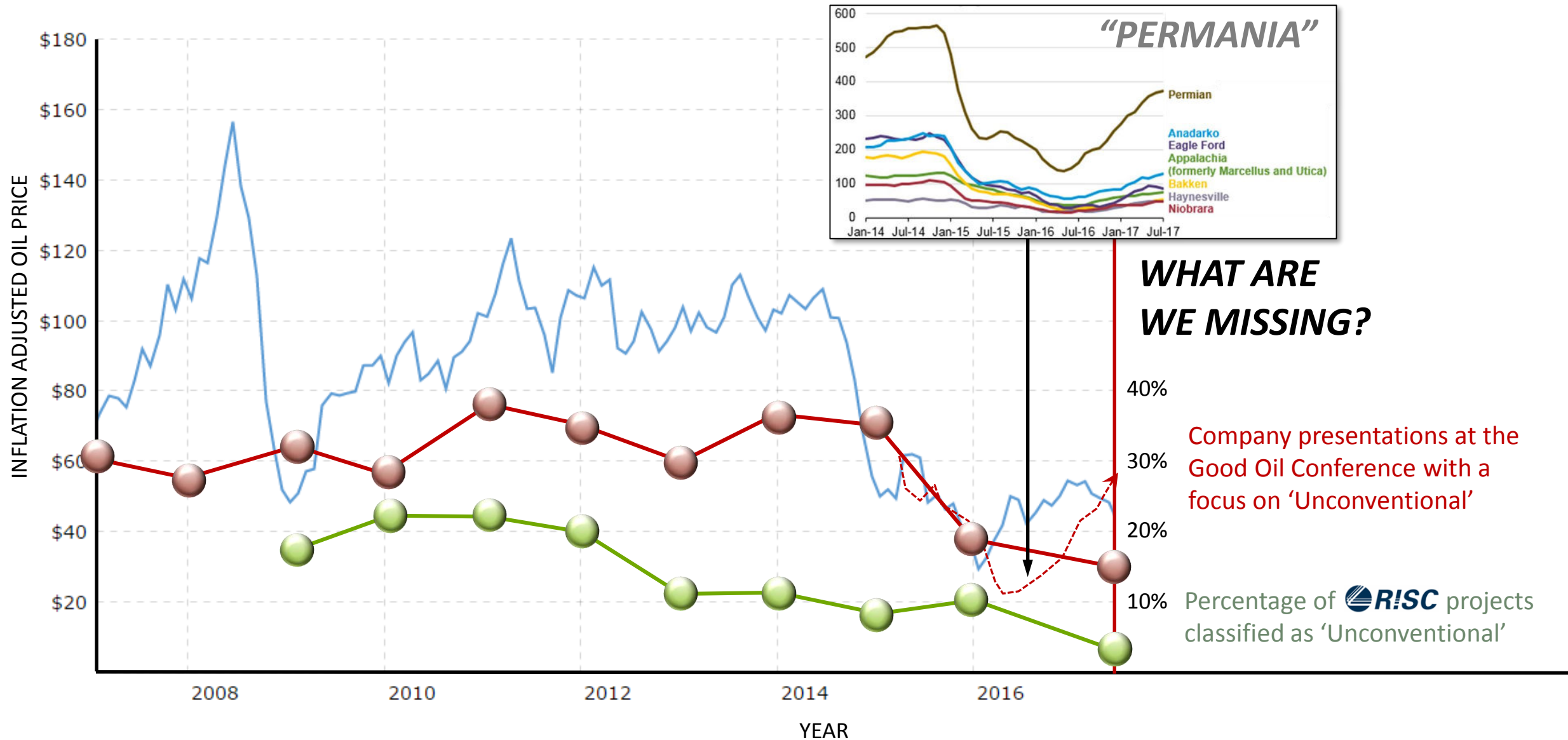
In-place versus Recoverable Hydrocarbons



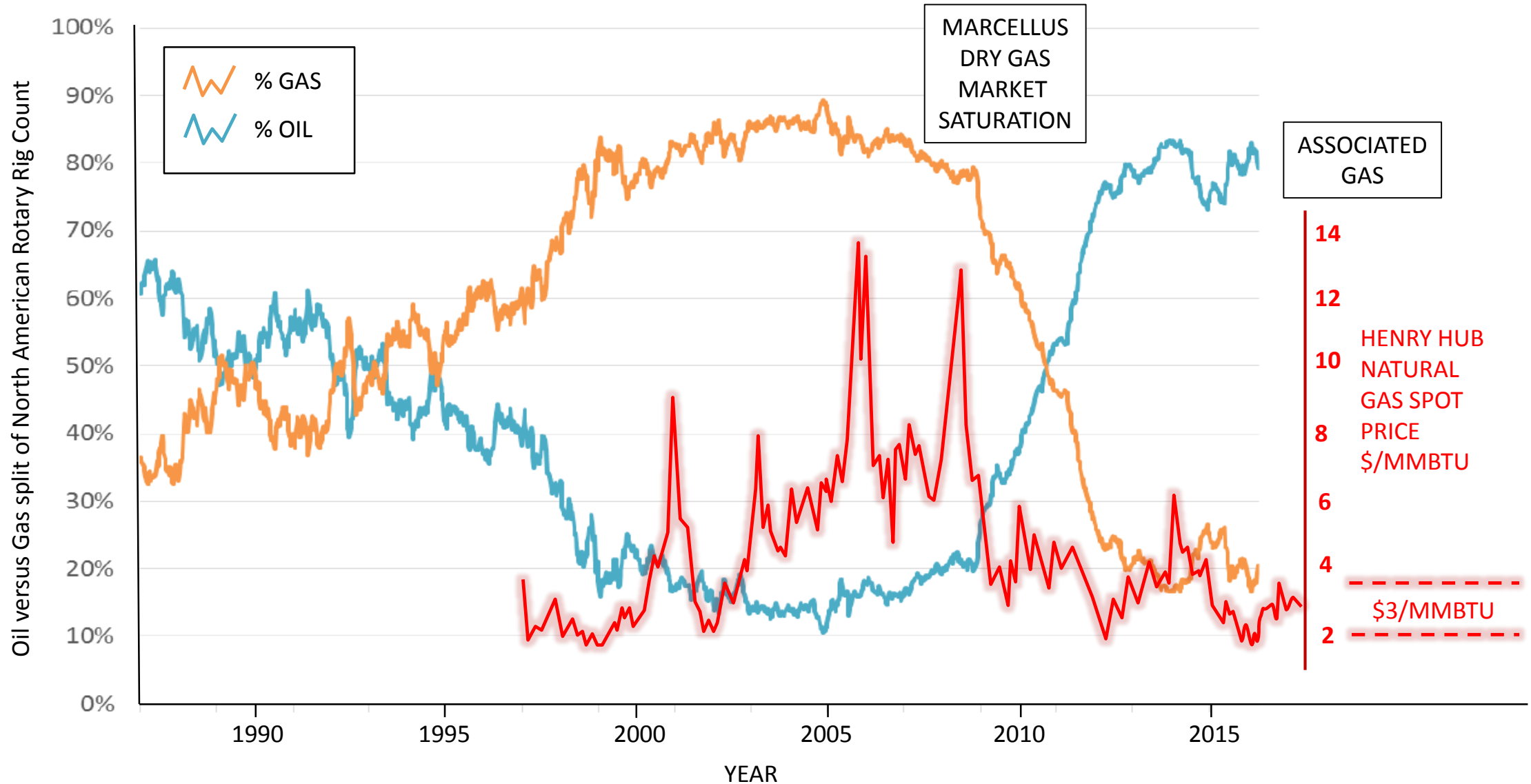
\$50 Oil: The new norm



Good Oil trends – ASX Unconventional focused companies



The Second Coming: North American Shift to Liquids



Global unconventional 'potential'

Technically Recoverable Shale Gas Resource (Tcf)

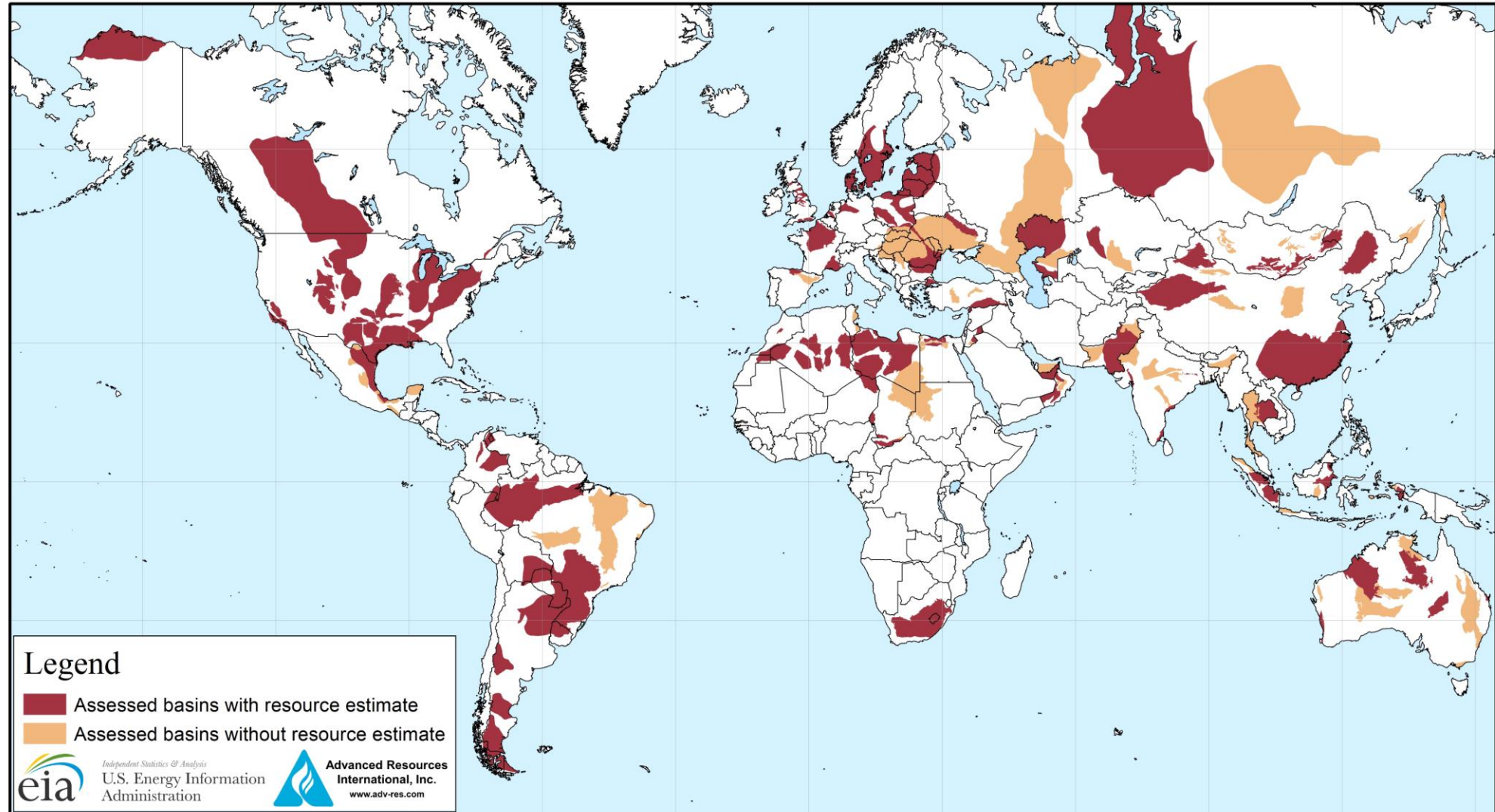
1	US	1,161
2	China	1,115
3	Argentina	802
4	Algeria	707
5	Canada	573
6	Mexico	545
7	Australia	437
8	South Africa	390
9	Russia	285
10	Brazil	245
	Others	1,535
	Total	7,795

Prepared for:
U.S. Energy Information Administration
U.S. Department of Energy

Prepared by:
Advanced Resources International, Inc.
4501 Fairfax Drive, Suite 910, Arlington, VA 22203 USA
P: 703.528.8420 | W: www.adv-res.com

EIA/ARI World Shale Gas and Shale Oil Resource Assessment

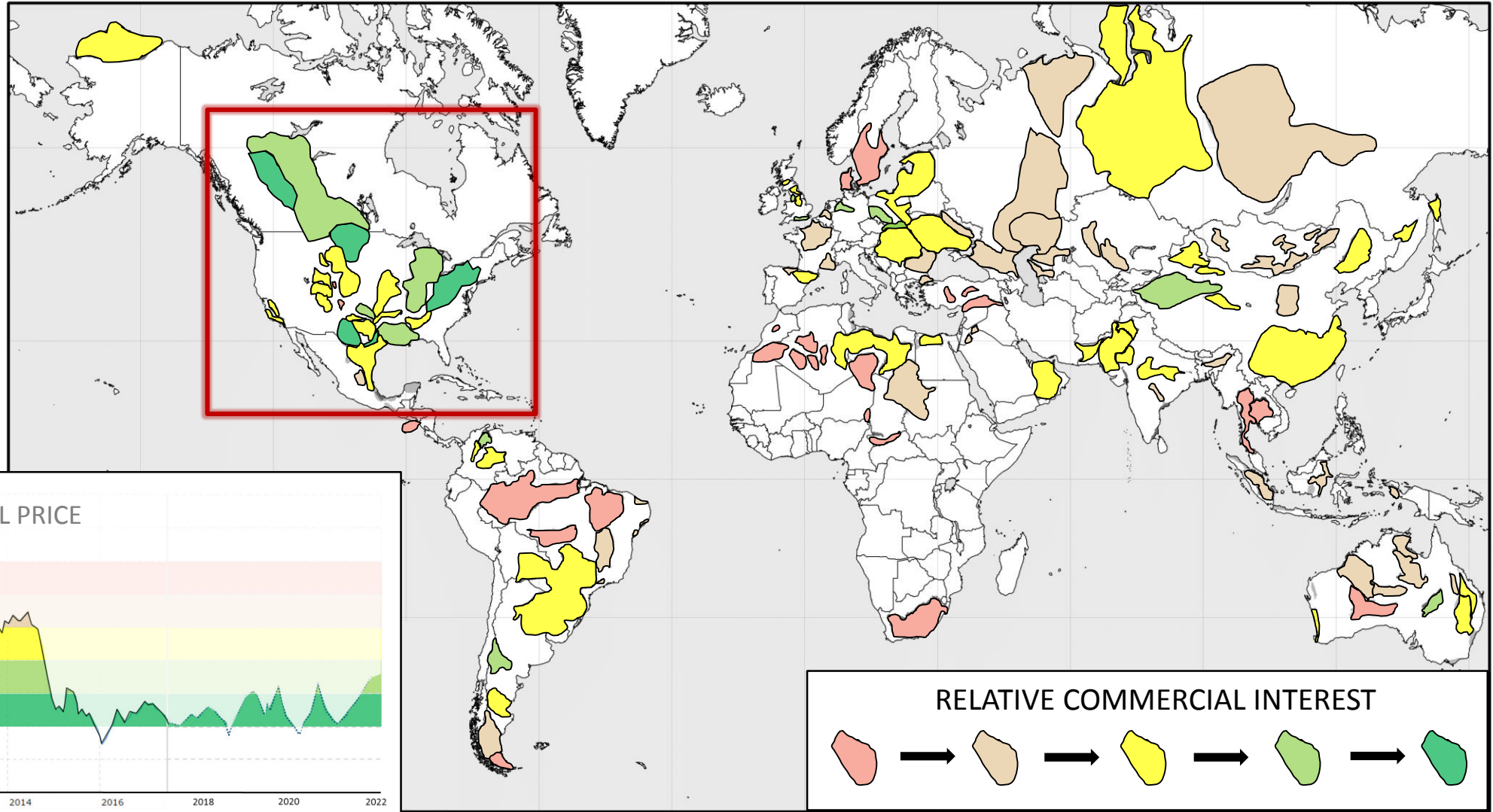
*Technically Recoverable Shale Gas and Shale Oil Resources:
An Assessment of 137 Shale Formations in 41 Countries
Outside the United States*



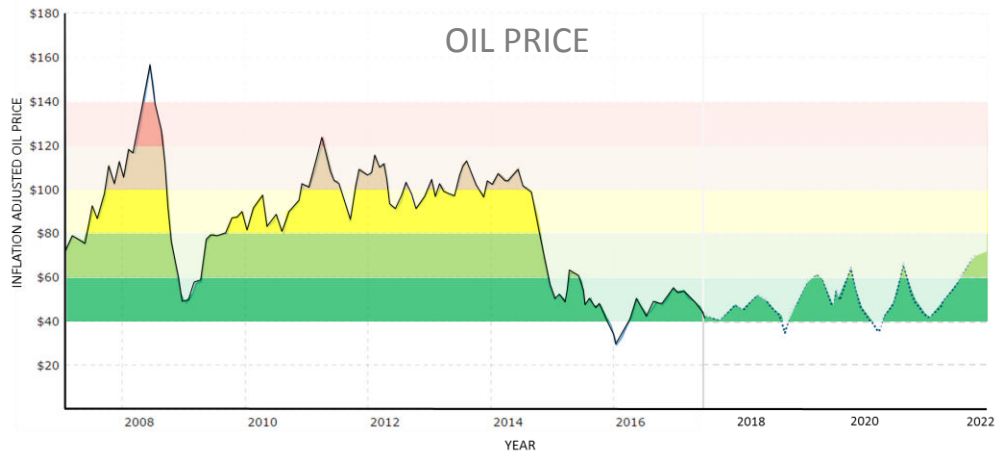
Global unconventional 'interest'

Technically Recoverable
Shale Gas Resource (Tcf)

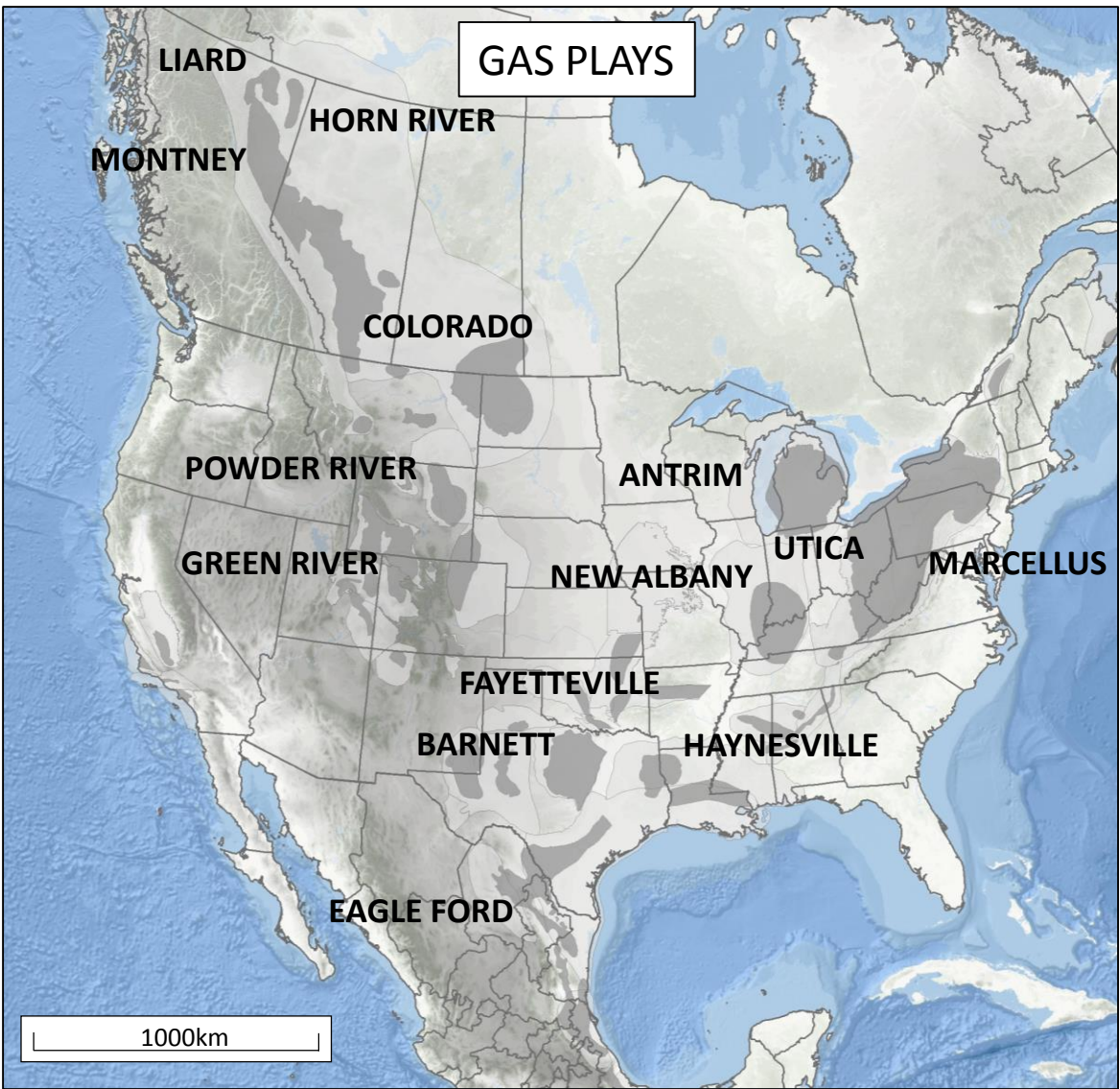
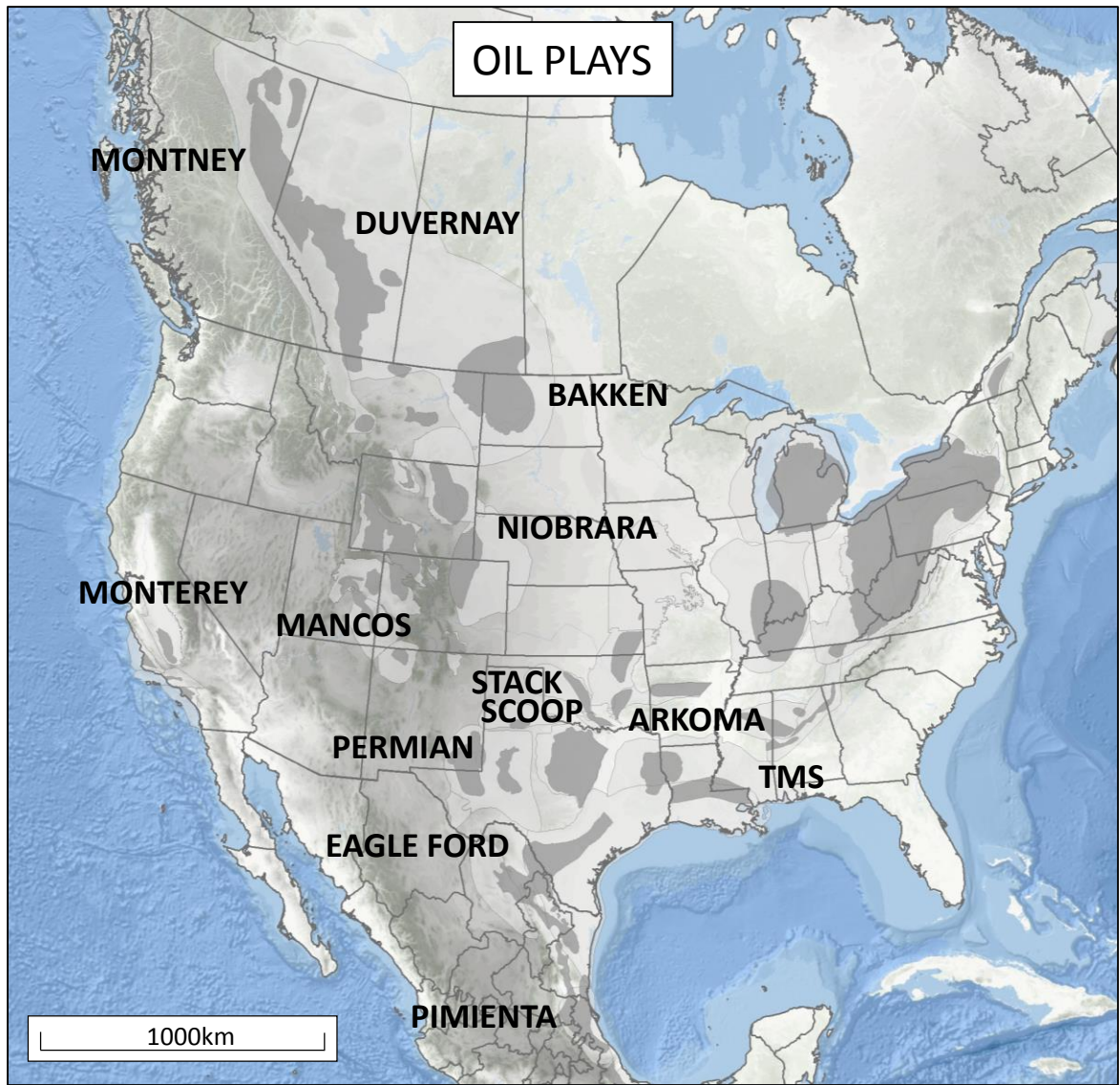
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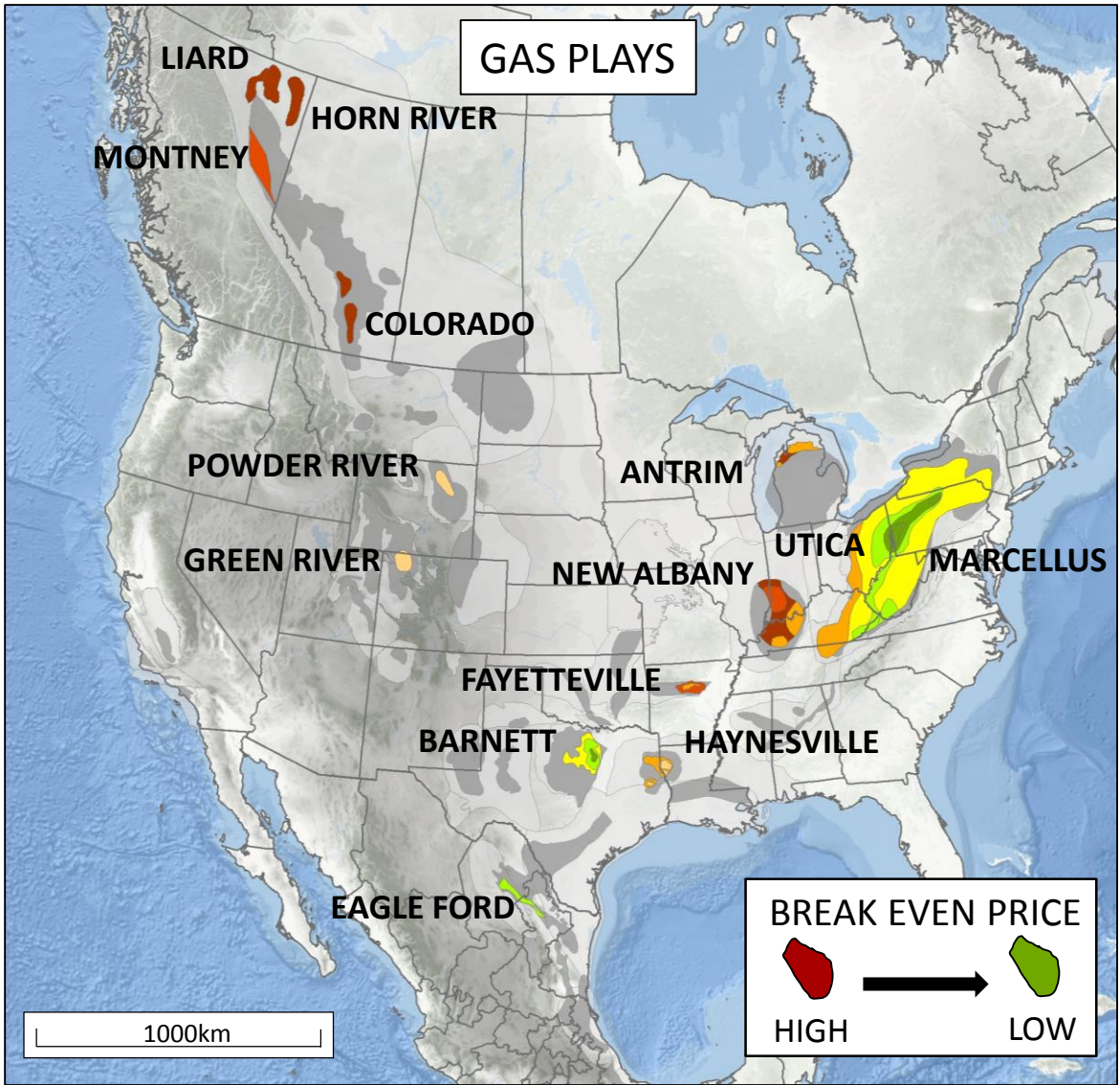
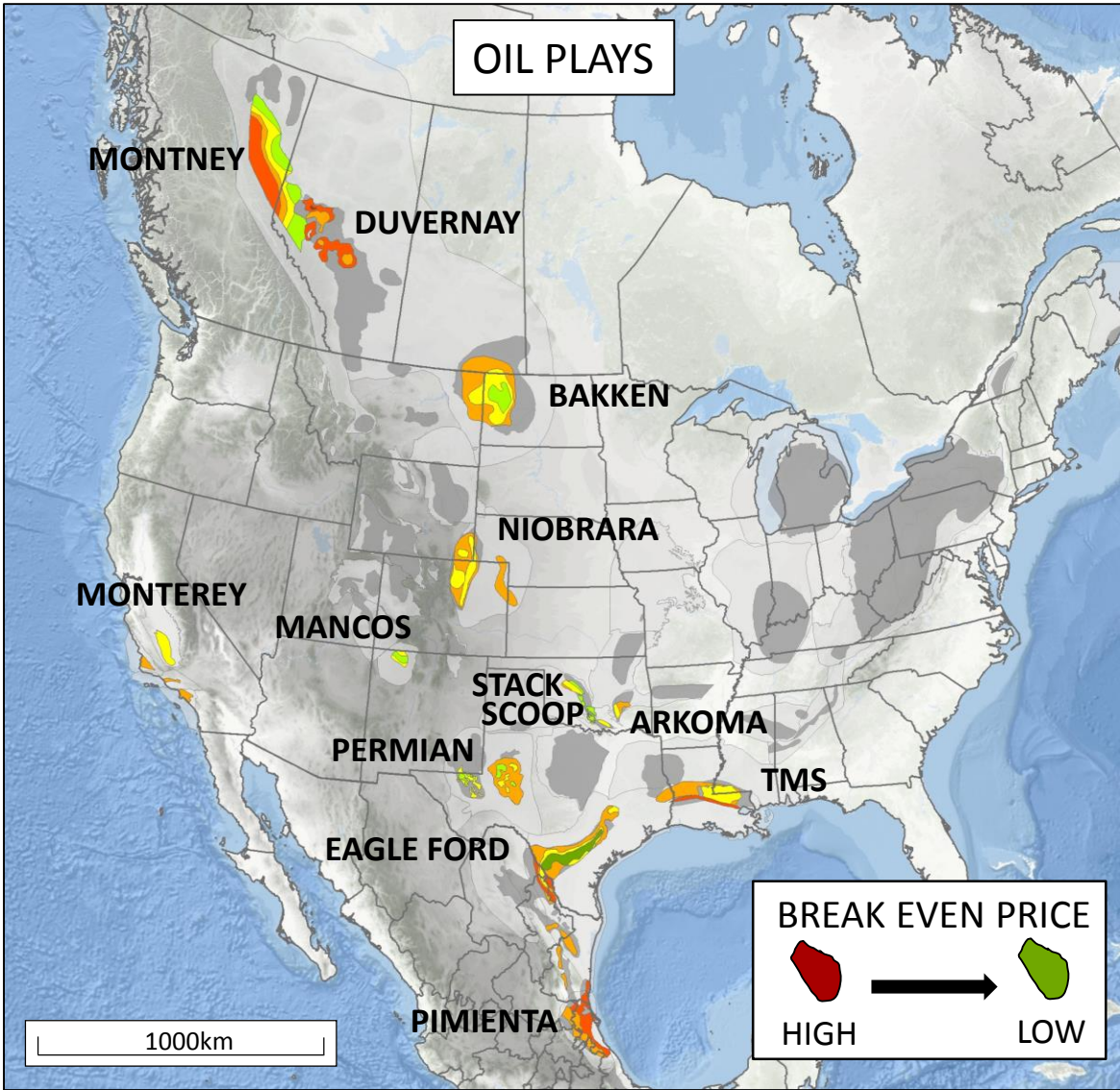
OIL PRICE



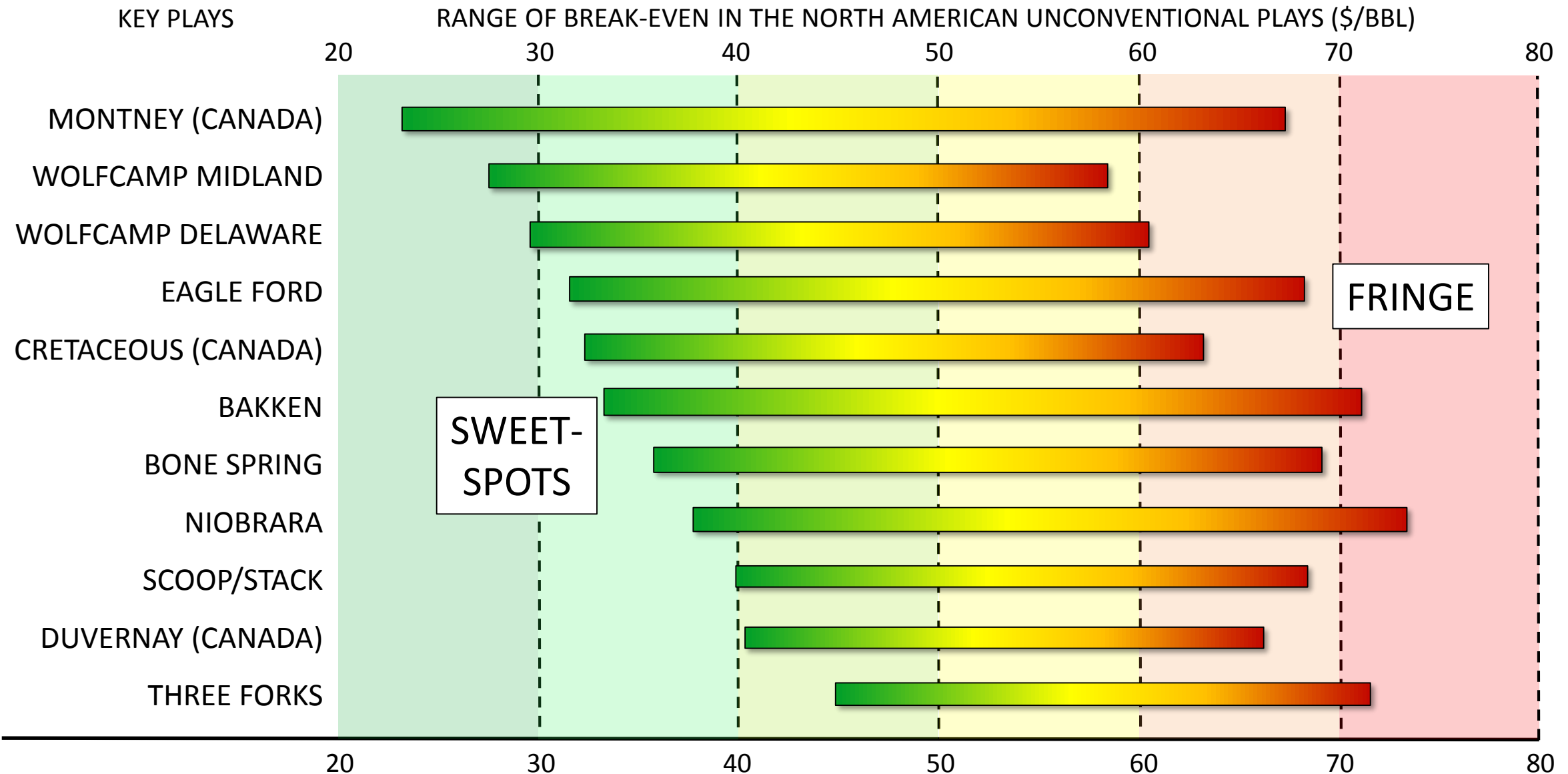
Leading North American unconventional plays



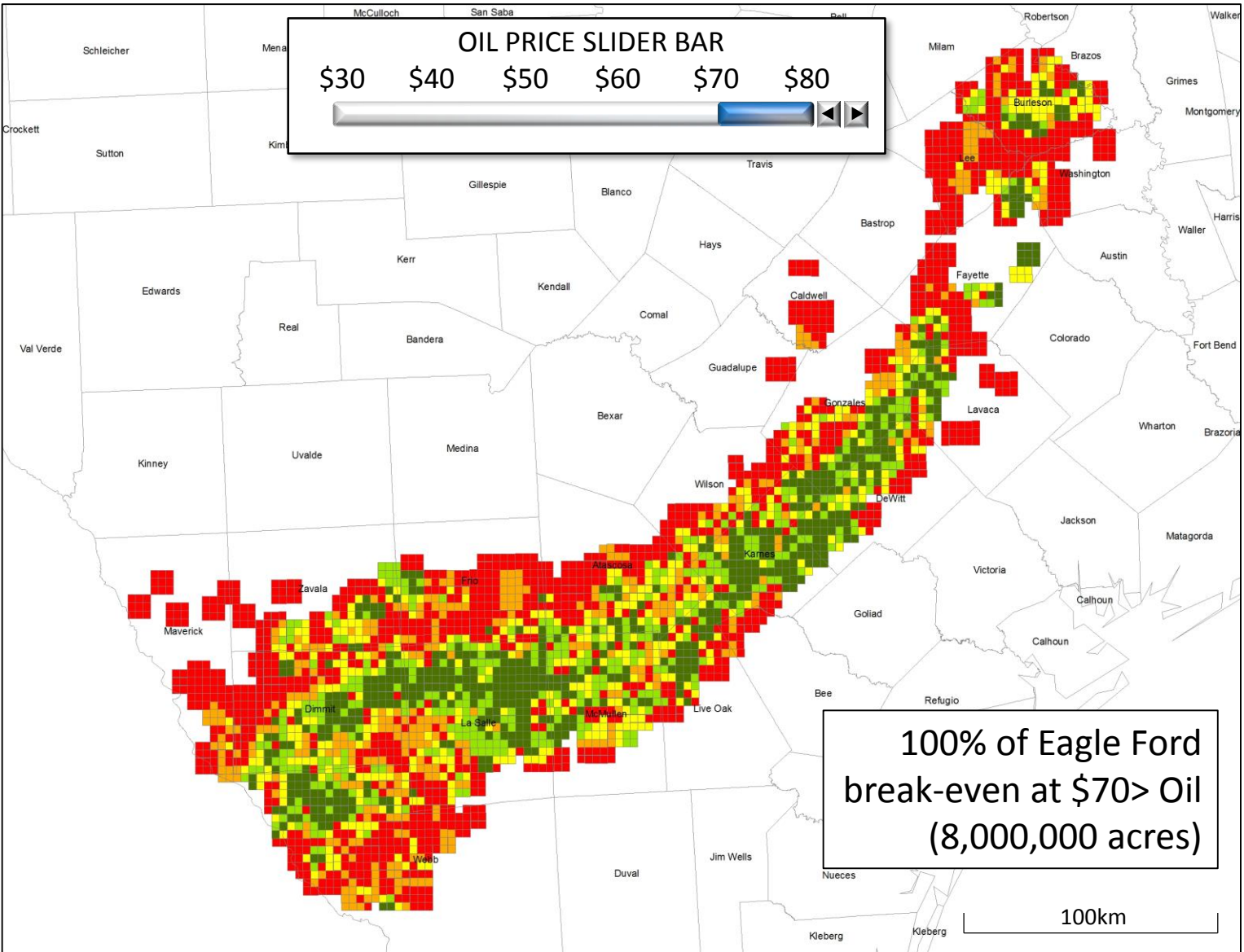
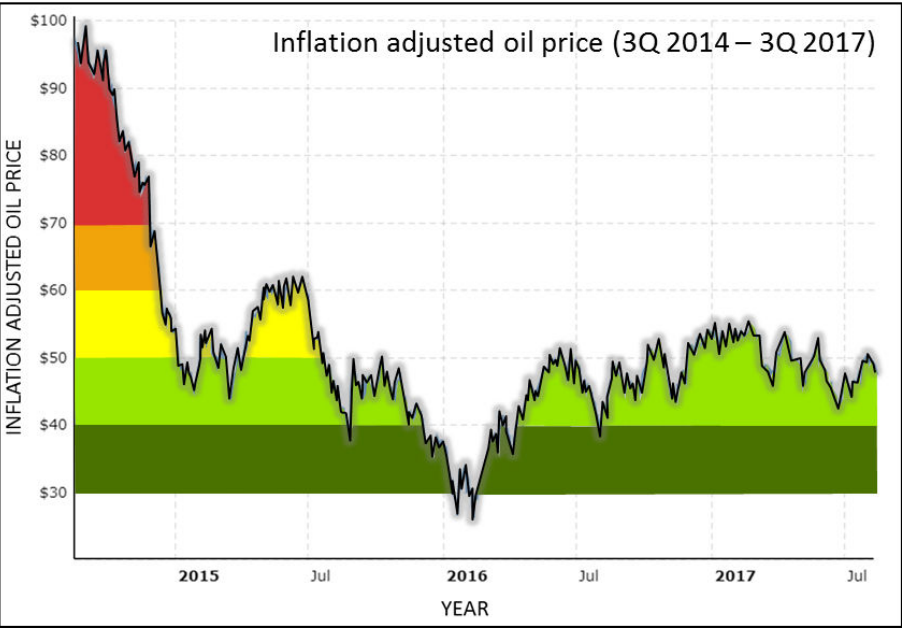
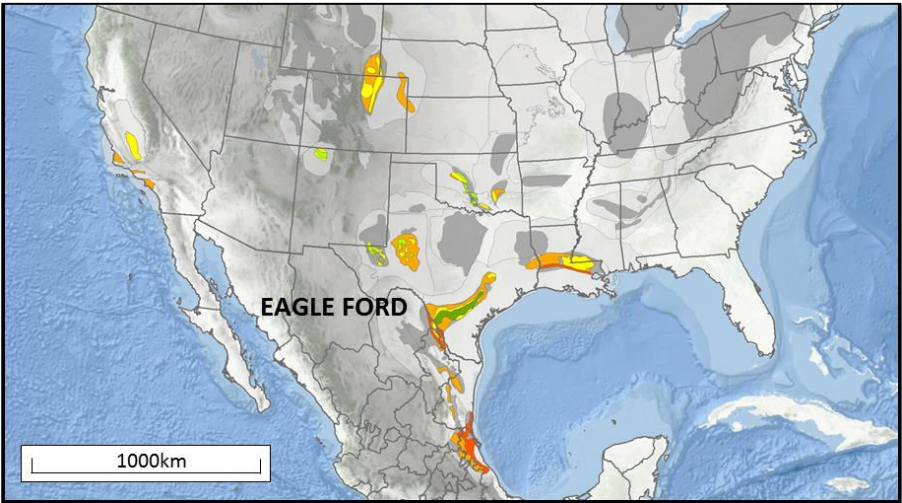
Leading North American unconventional plays



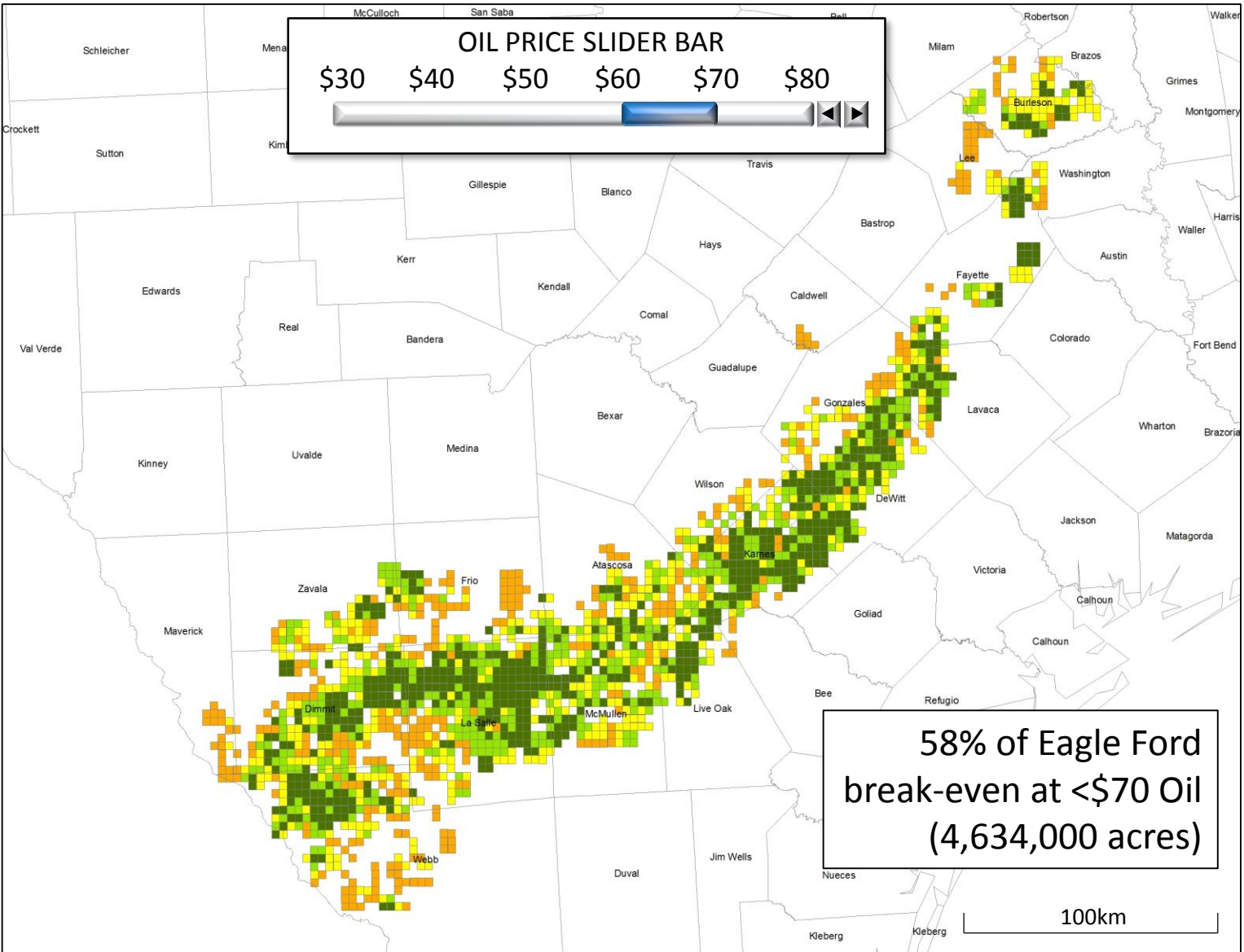
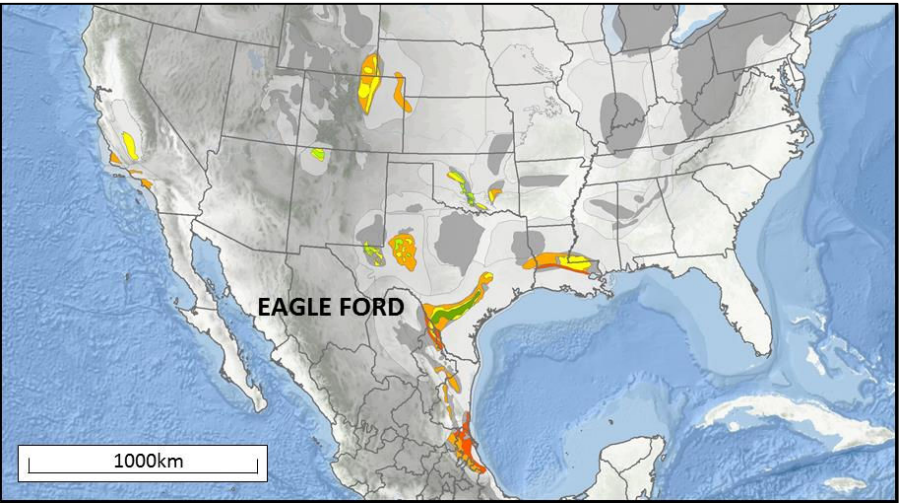
Break-even oil prices for new wells in North American plays



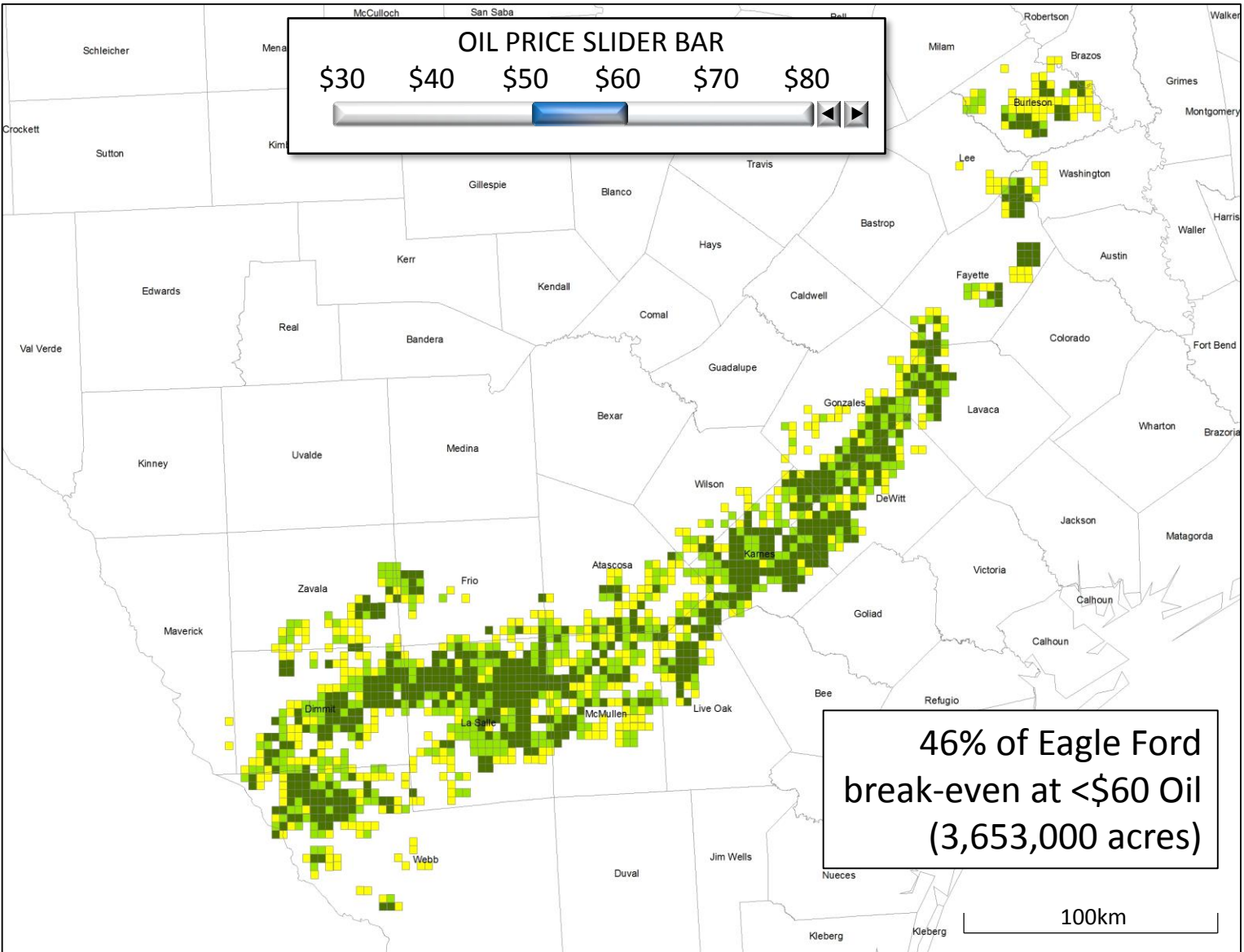
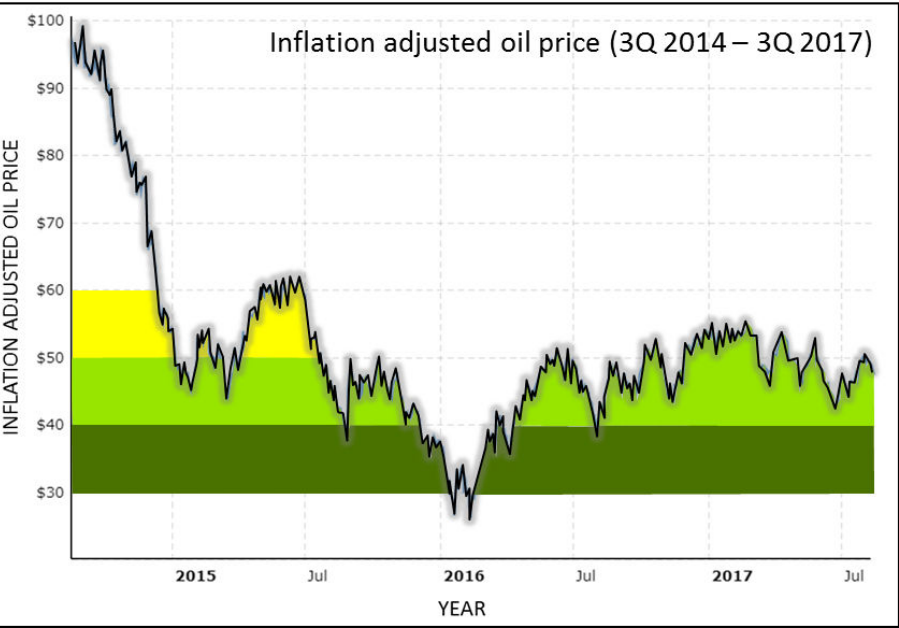
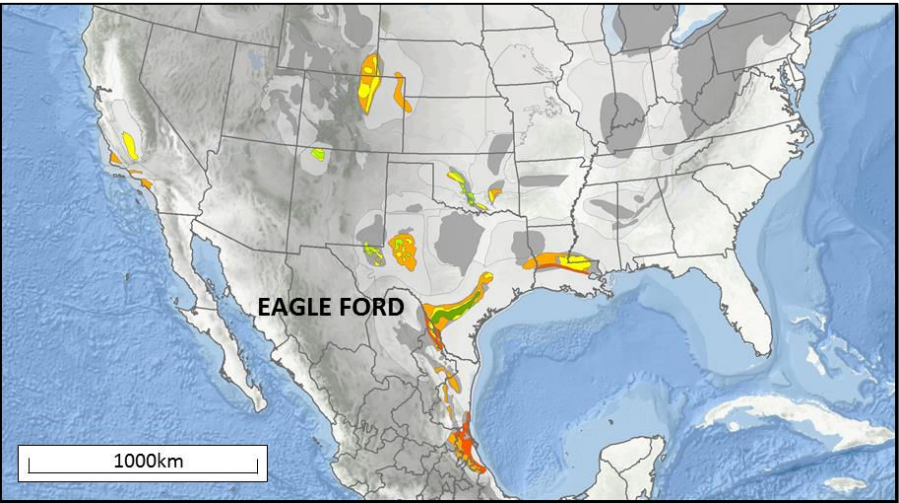
Breaking point in the Eagle Ford



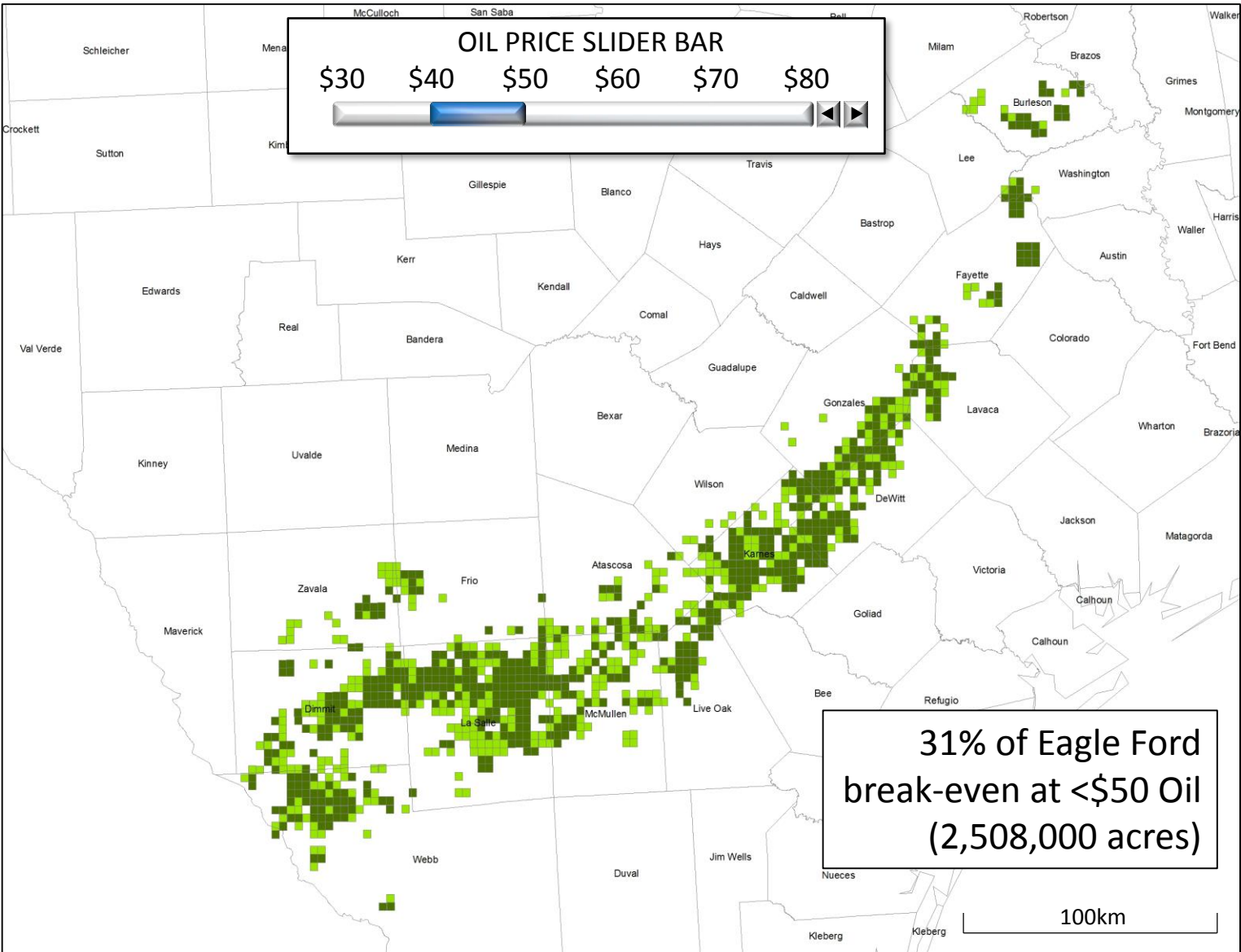
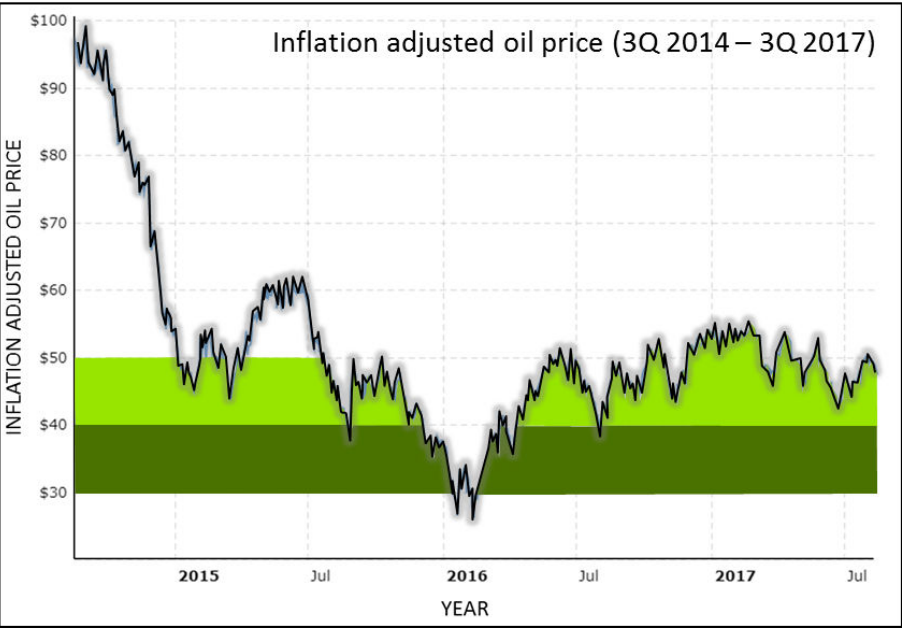
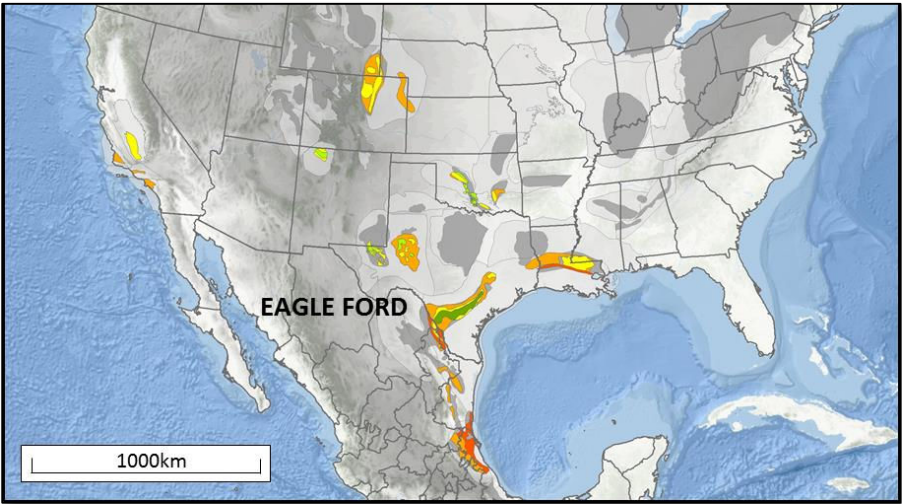
Breaking point in the Eagle Ford



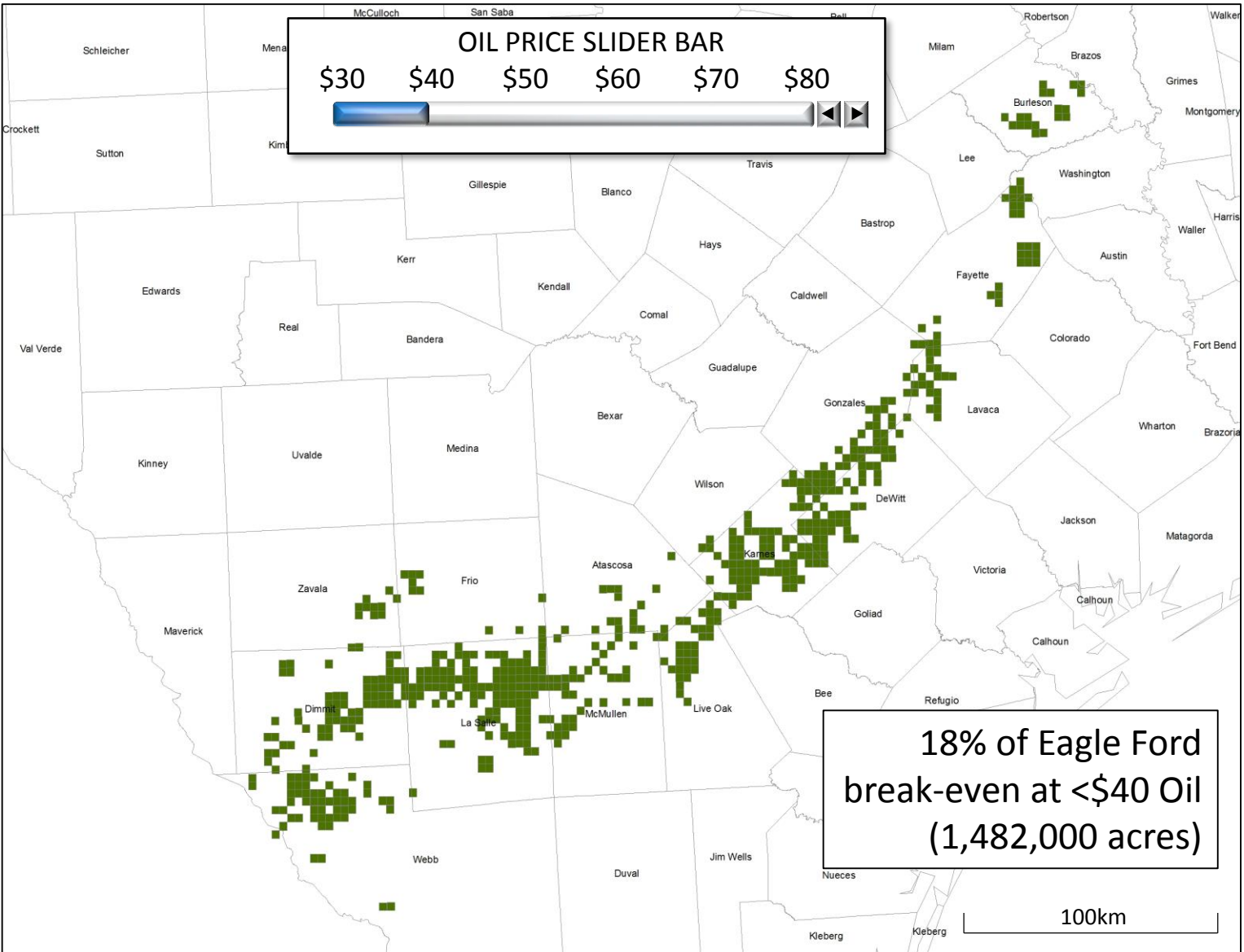
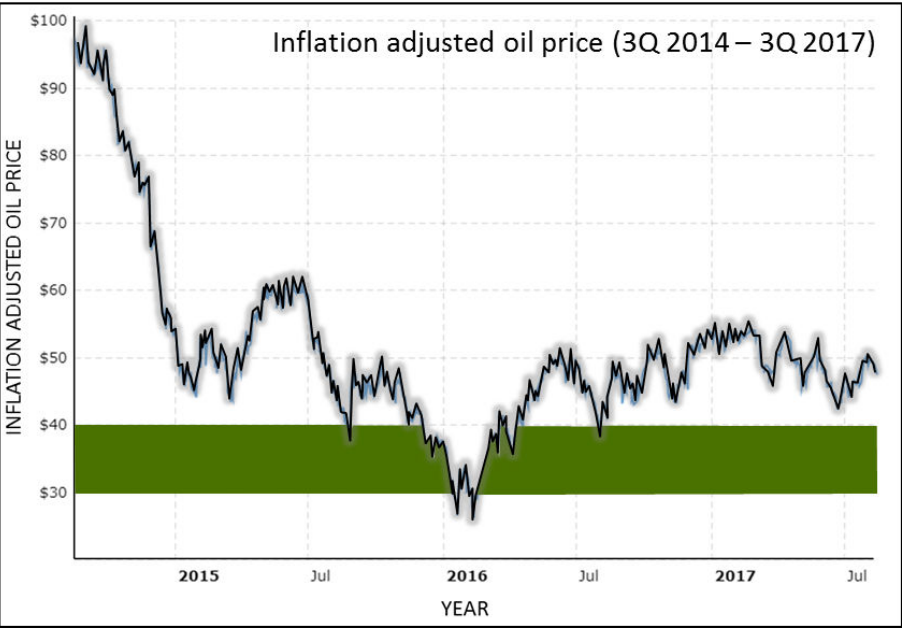
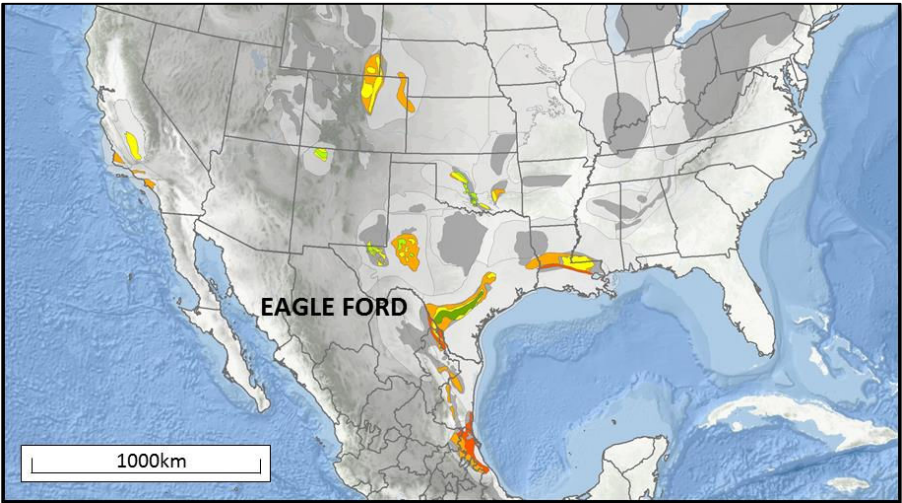
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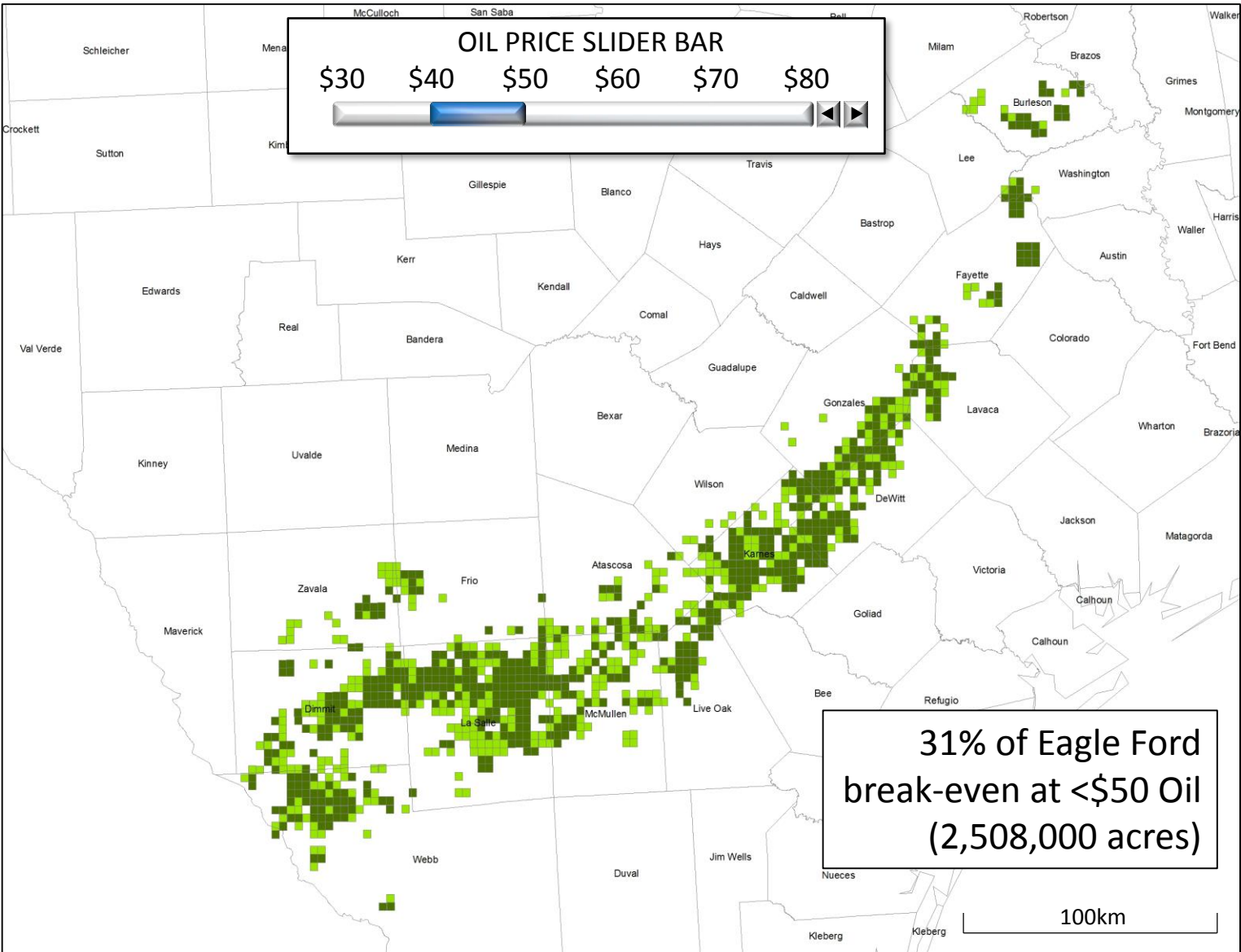
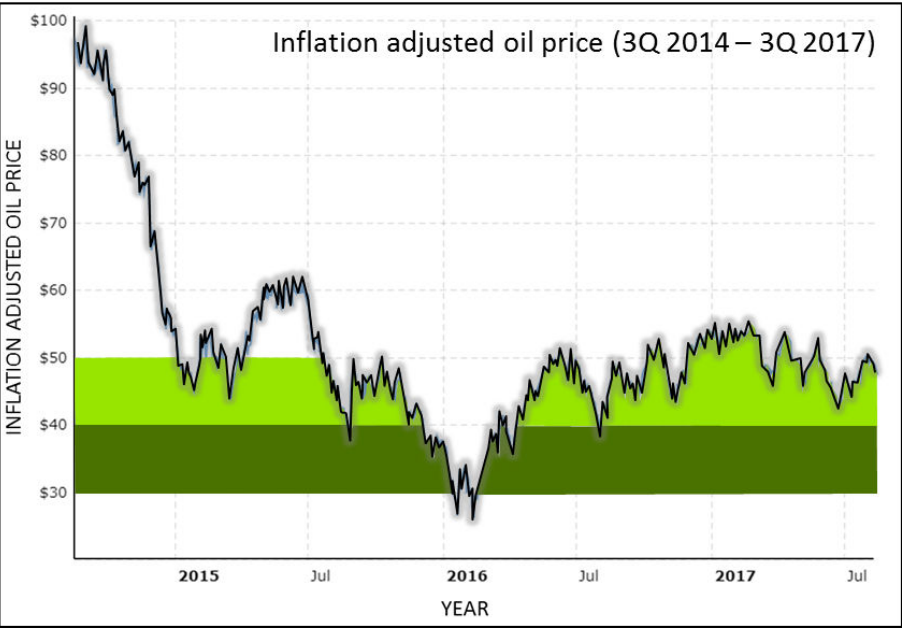
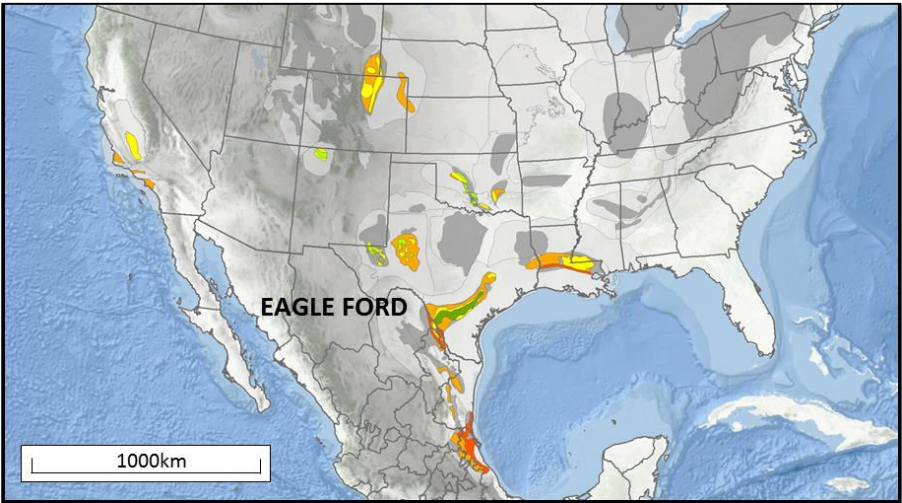
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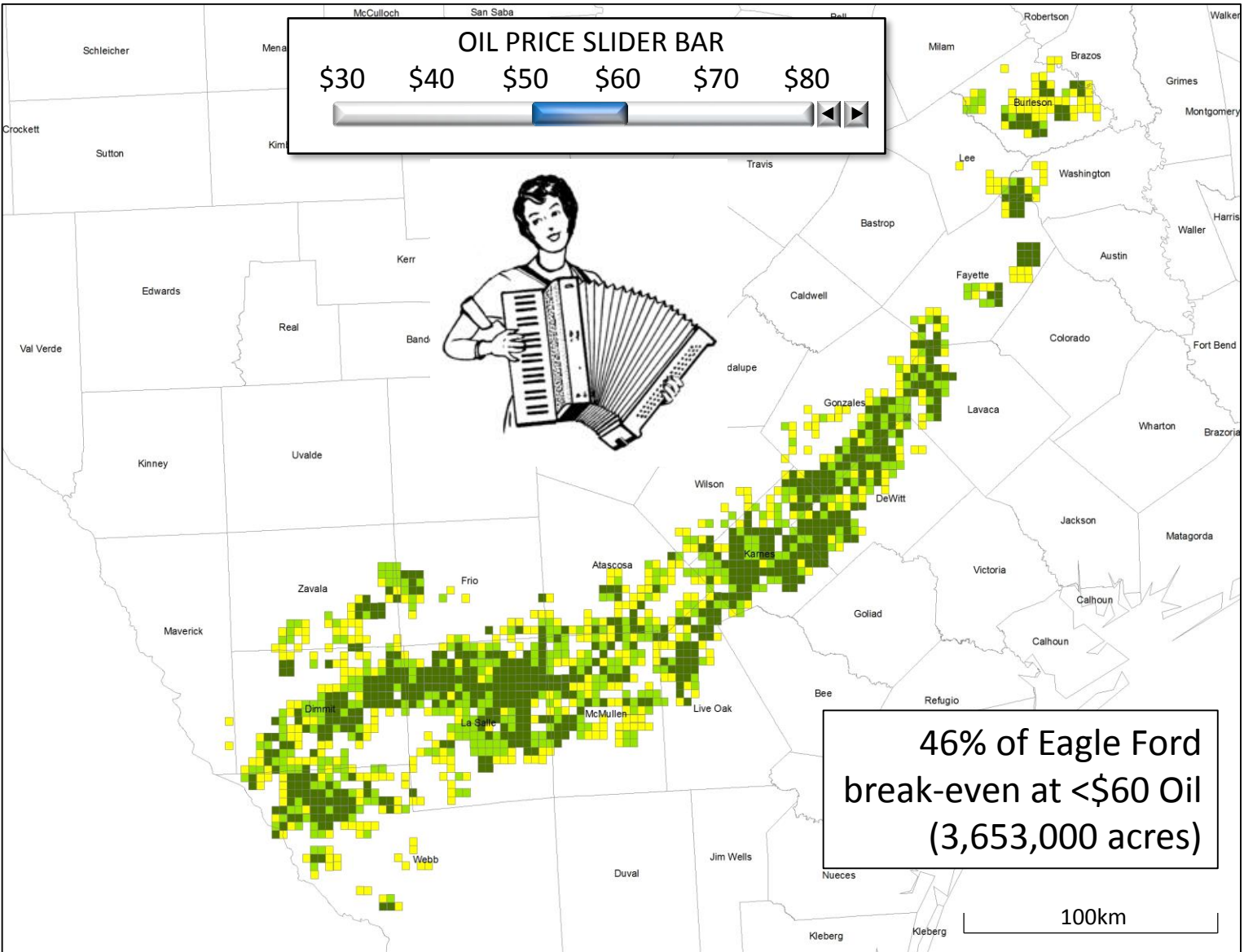
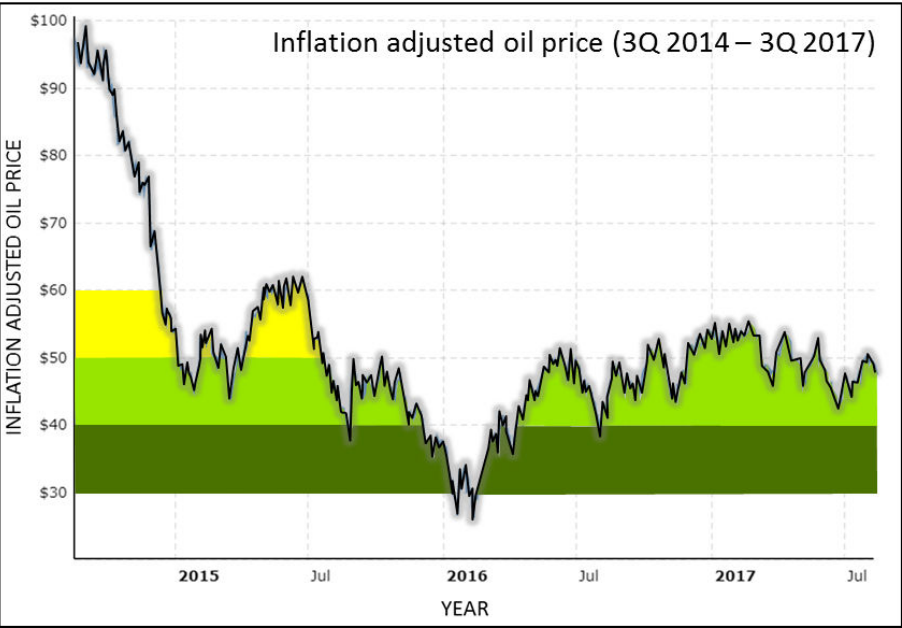
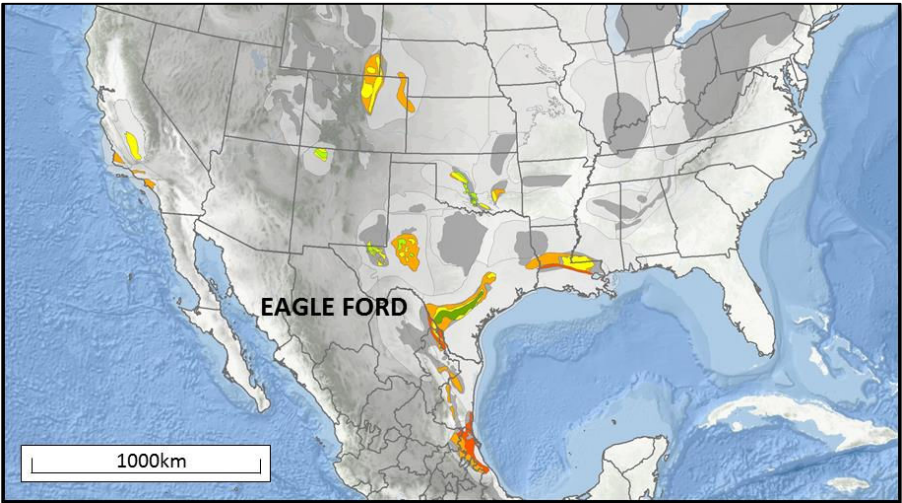
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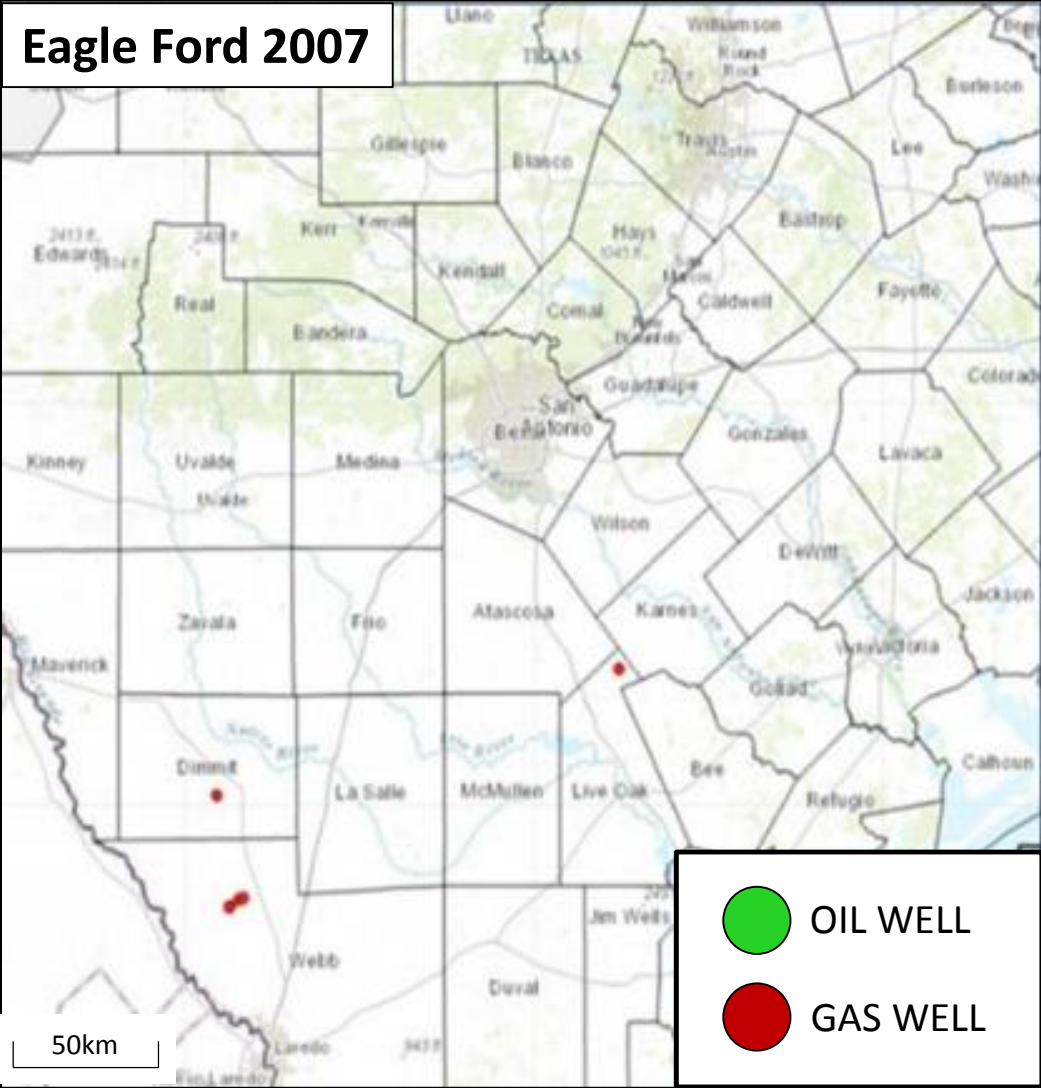
Breaking point in the Eagle Ford



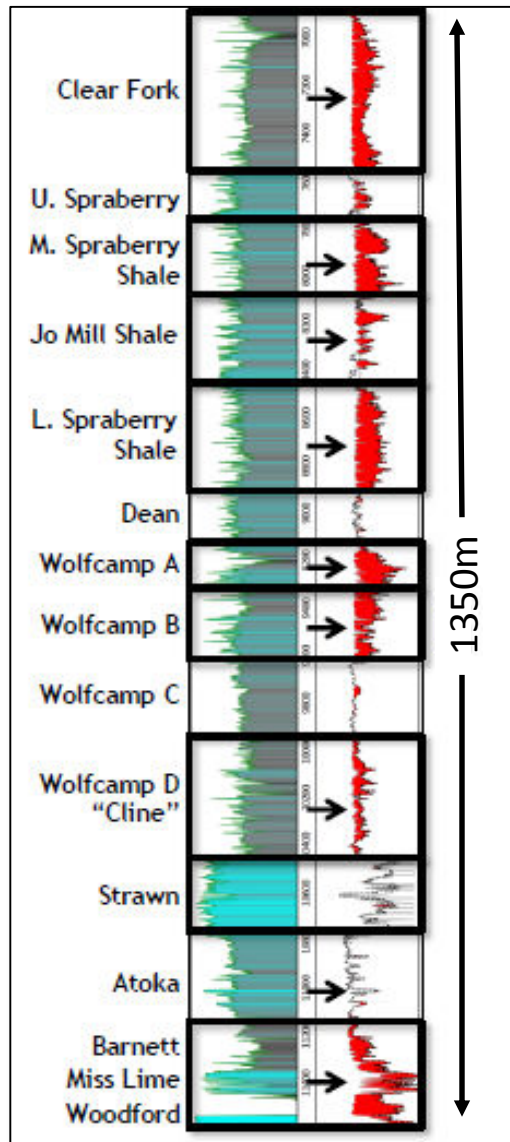
Breaking point in the Eagle Ford



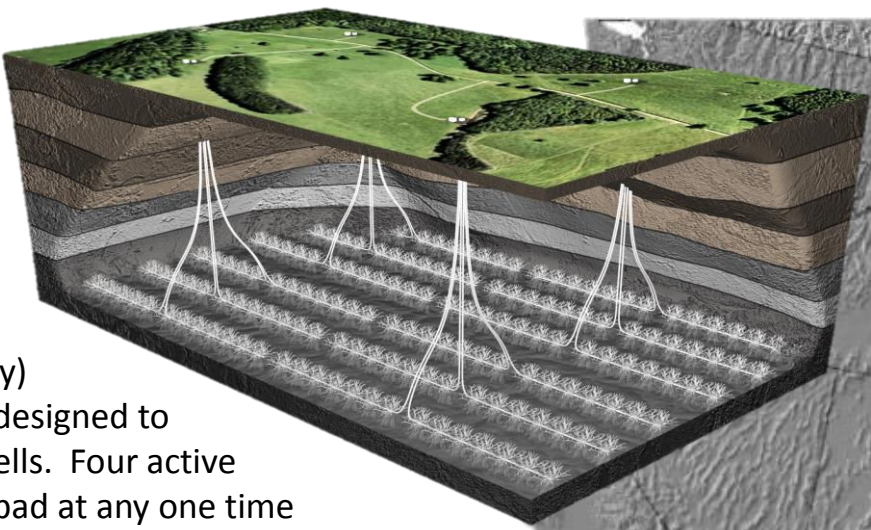
Growth of the Eagle Ford



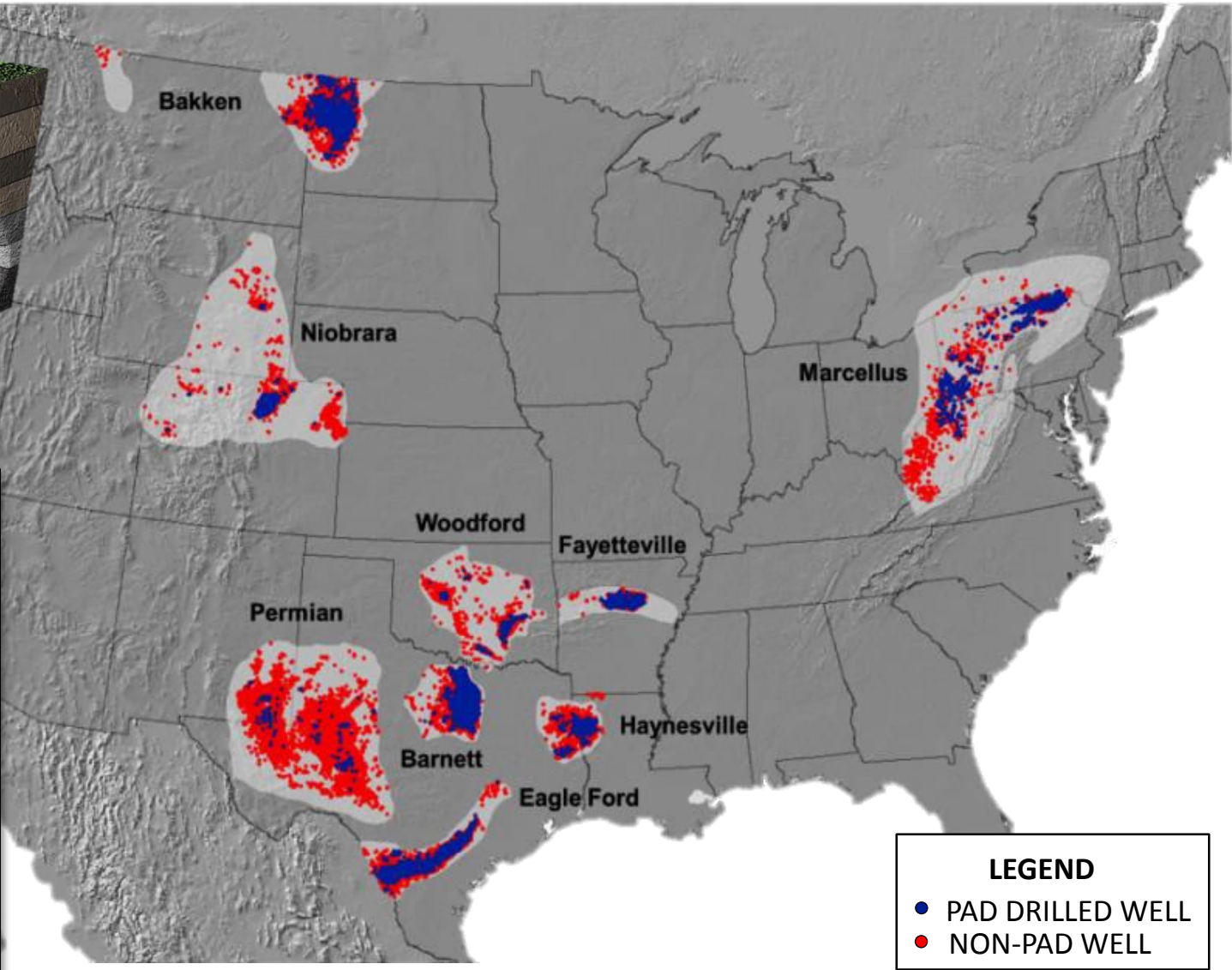
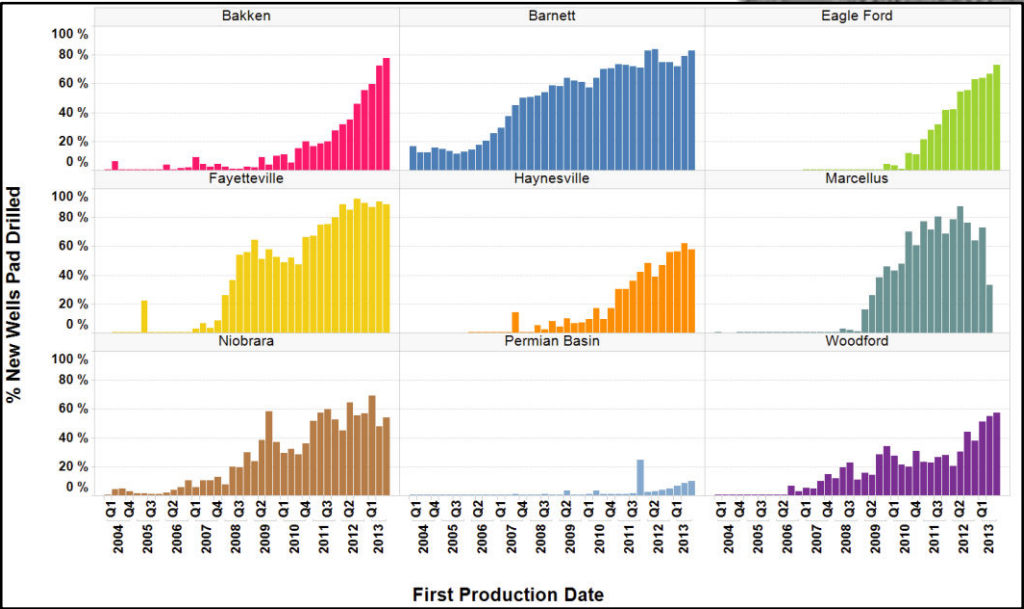
Cost efficiencies: Multi-lateral drilling



Cost efficiencies: The rise of pad based drilling



7G (Montney)
Super pads designed to
House 36 wells. Four active
rigs on one pad at any one time



LEGEND

●

PAD DRILLED WELL

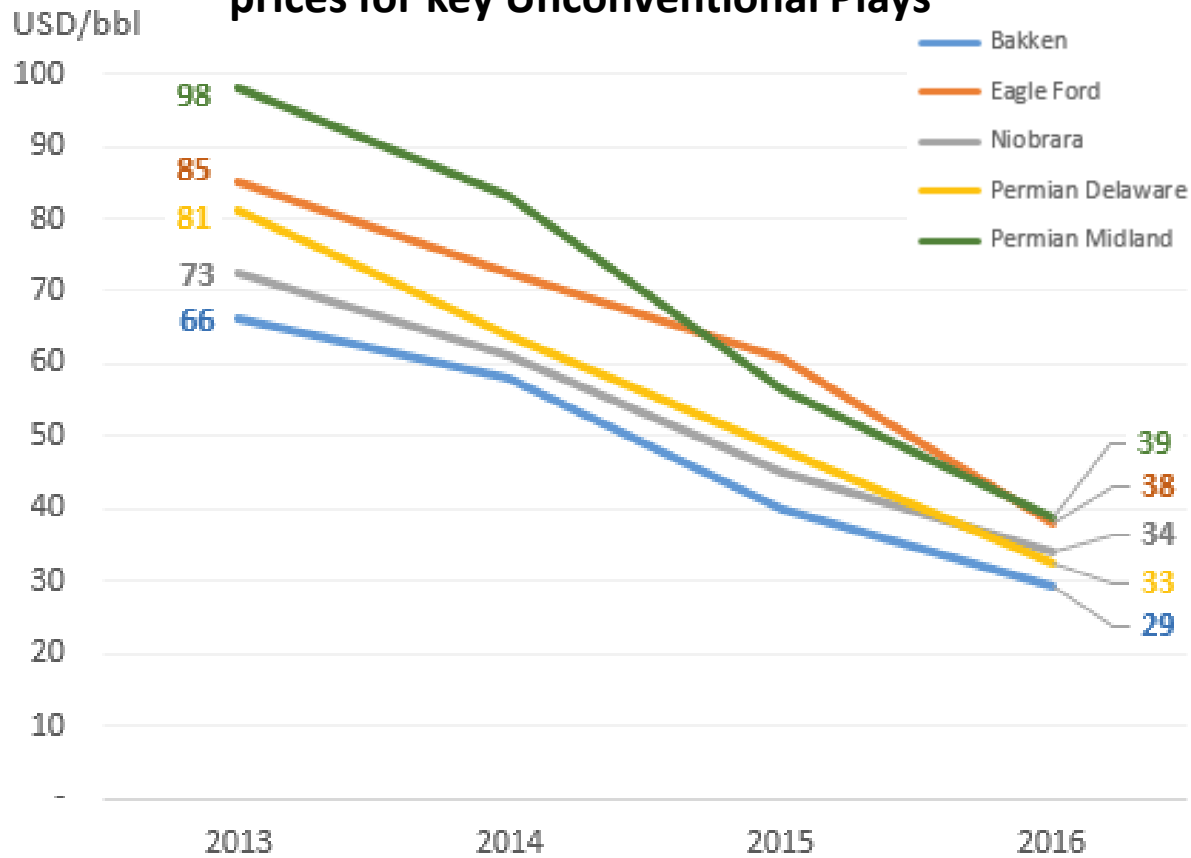
●

NON-PAD WELL

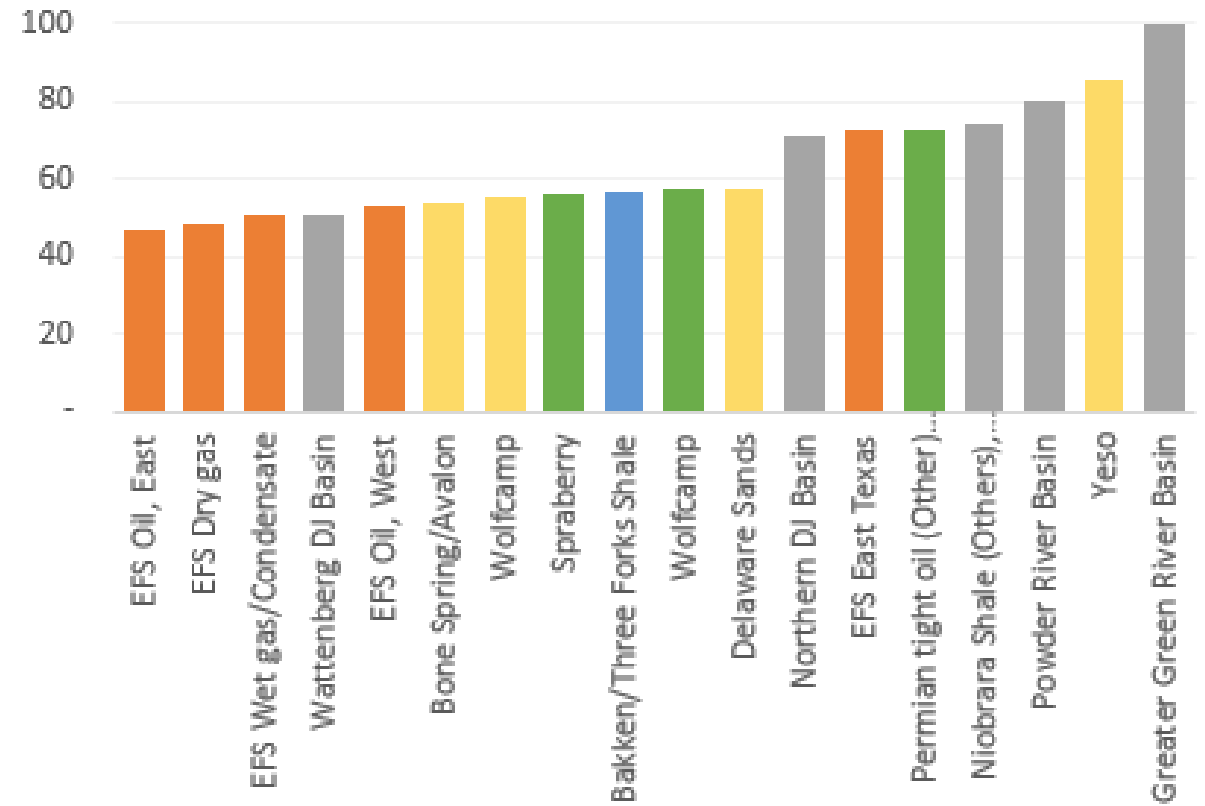
Wellhead break-even prices for key North American Unconventional Plays



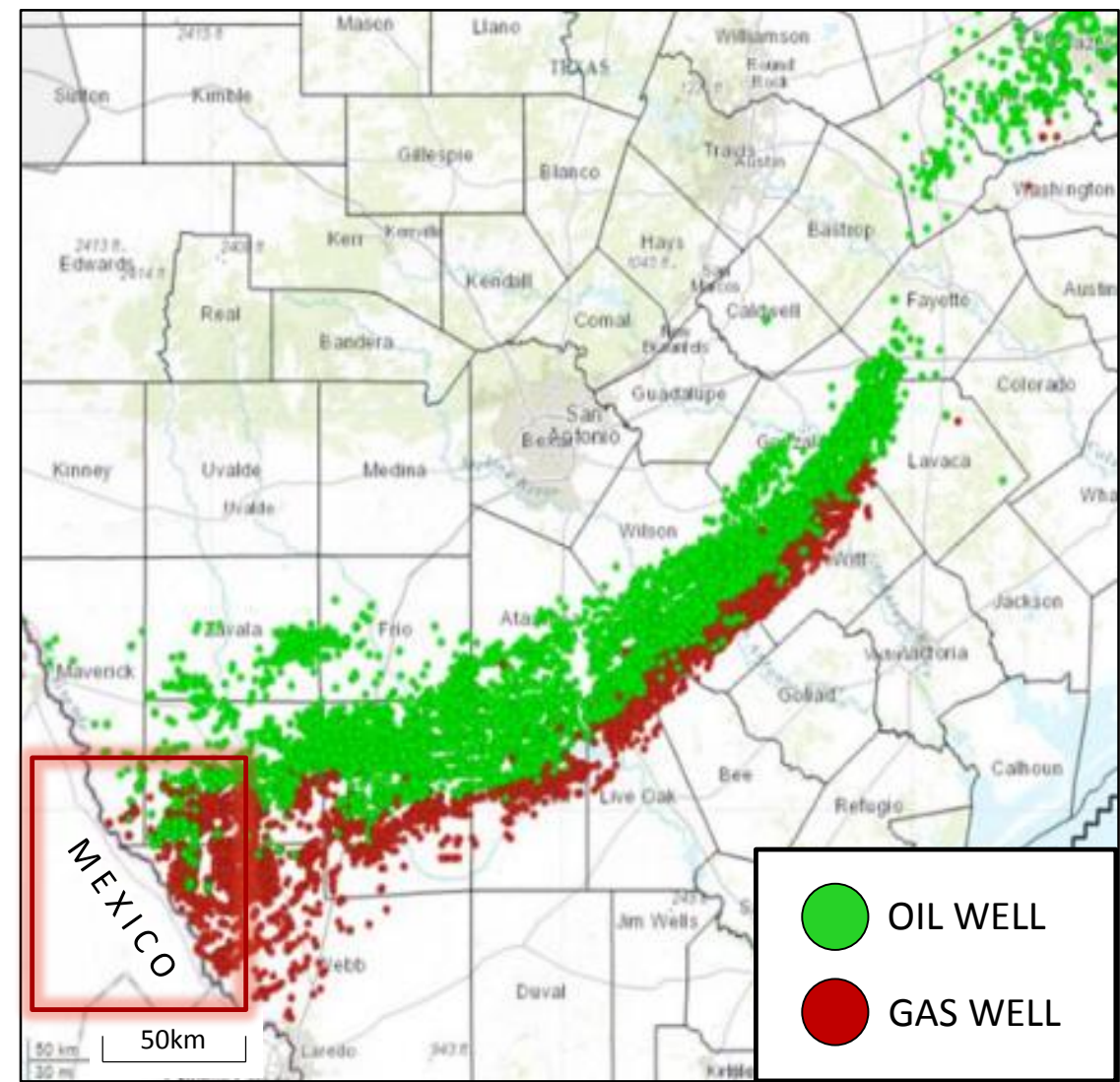
Development in wellhead break-even prices for key Unconventional Plays



Average WTI break-even price for NEW Unconventional wells per play (\$/bbl)



Mexico Eagle Ford extension



Unconventional challenges outside of North America



REGION	HIGHER COSTS	SERVICE SECTOR	REGULATORY FRAMEWORK	OPPOSITION	INFRA-STRUCTURE	SECURITY	WATER SHORTAGES	GAS PRICE
Mexico								

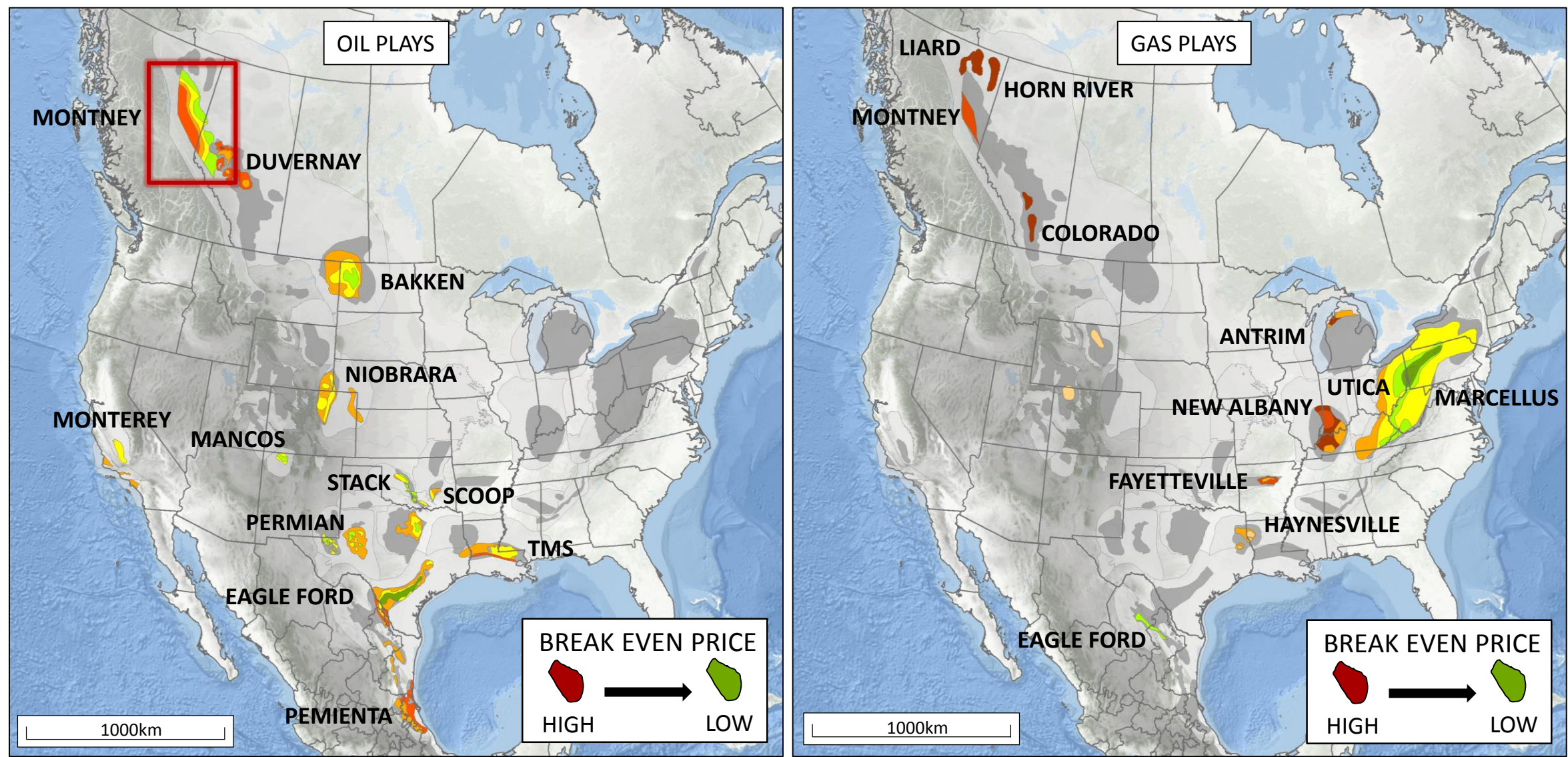
- Higher costs / Smaller service industry
- Poor regulatory framework
- Lack of infrastructure
- Lack of security
- Water shortages
- Low prices – Mexican gas prices are linked to those in the US. 4.5 BCF/D US Gas exported to Mexico*
- Contract sanctity (July 2018 presidential election, where energy nationalist Andrés Manuel López Obrador has been leading in the early polls)

**US gas prices would be a around \$2 without Mexico exports*

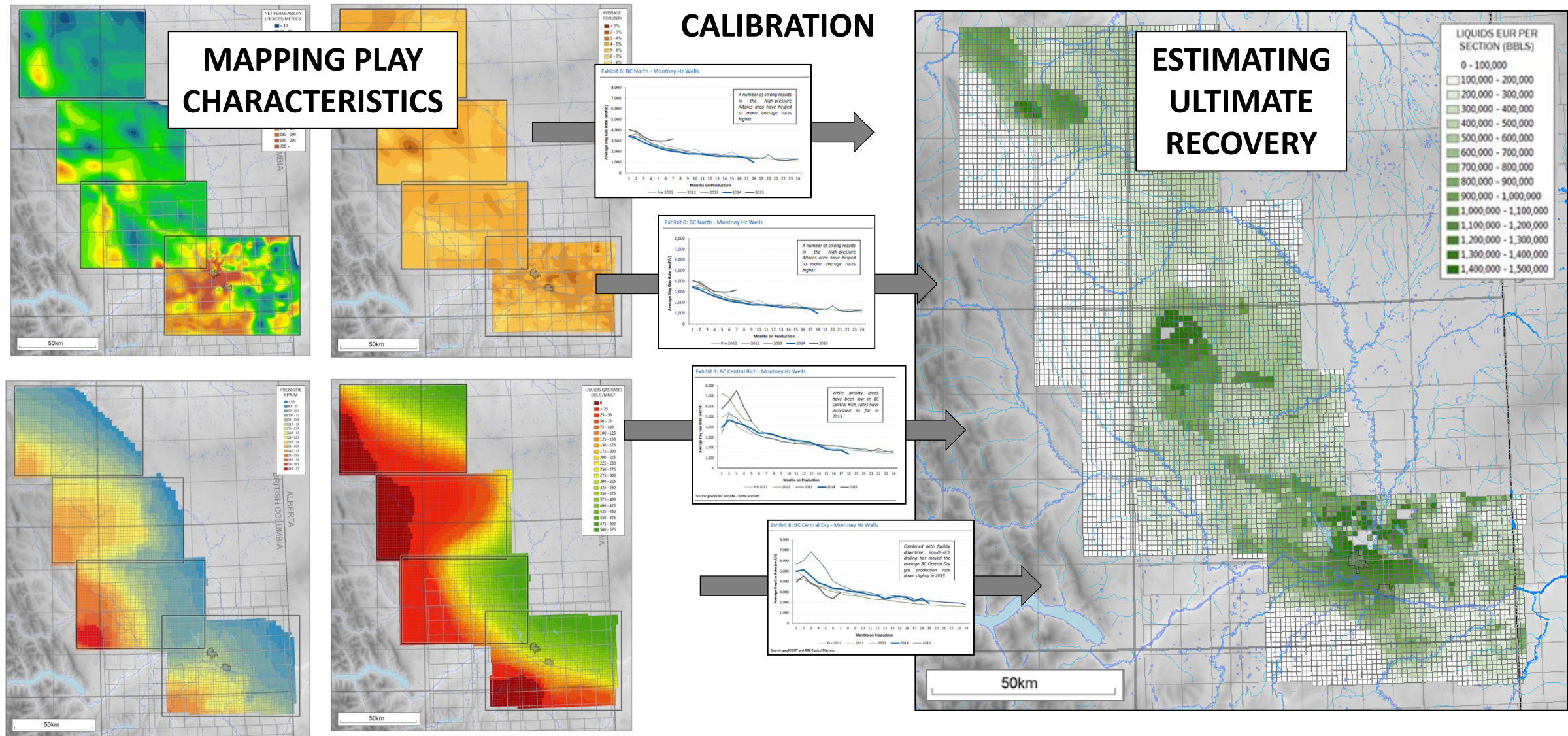
The challenges outside of North America

REGION	HIGHER COSTS	SERVICE SECTOR	REGULATORY FRAMEWORK	OPPOSITION	INFRA-STRUCTURE	SECURITY	WATER SHORTAGES	GAS PRICE
Mexico								
Australia								
Europe								
South America								
Asia								
Africa								

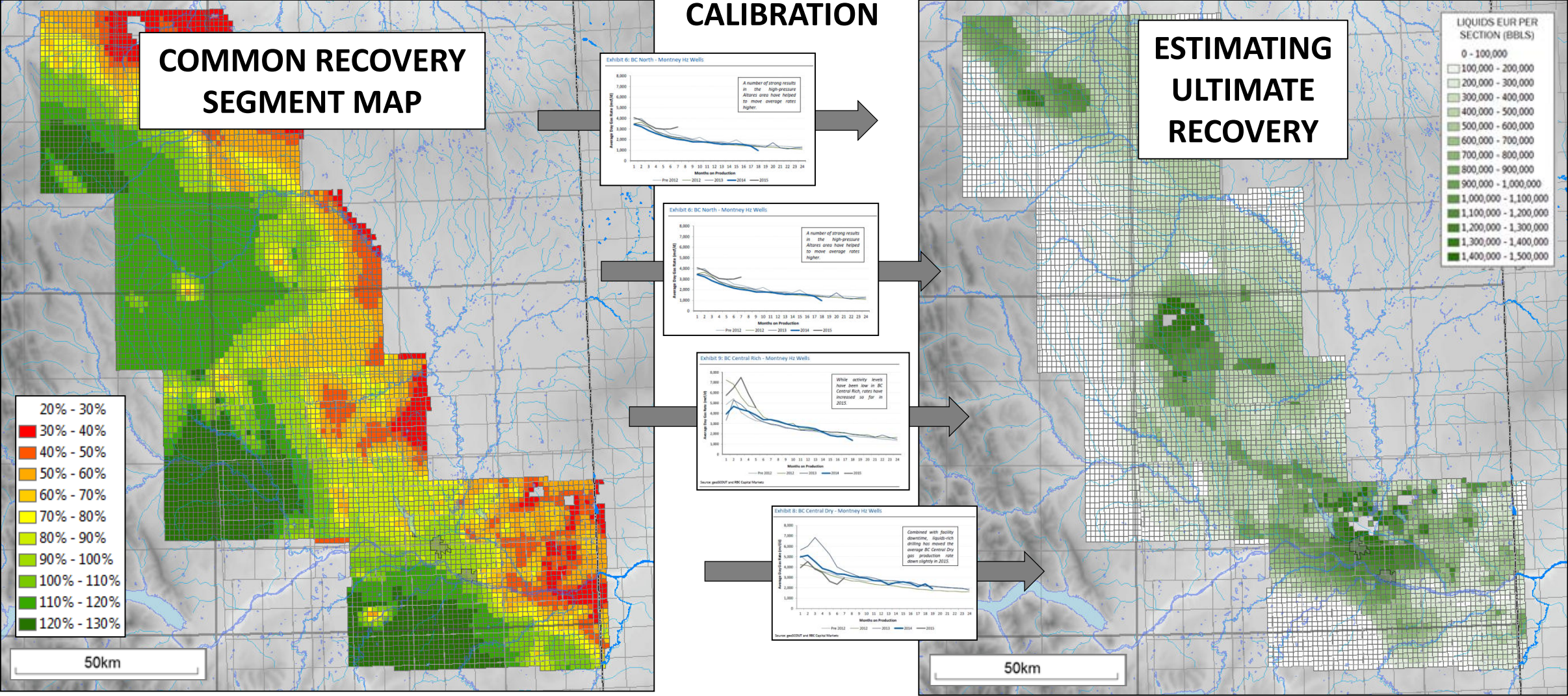
Understanding heterogeneity and finding sweet-spots



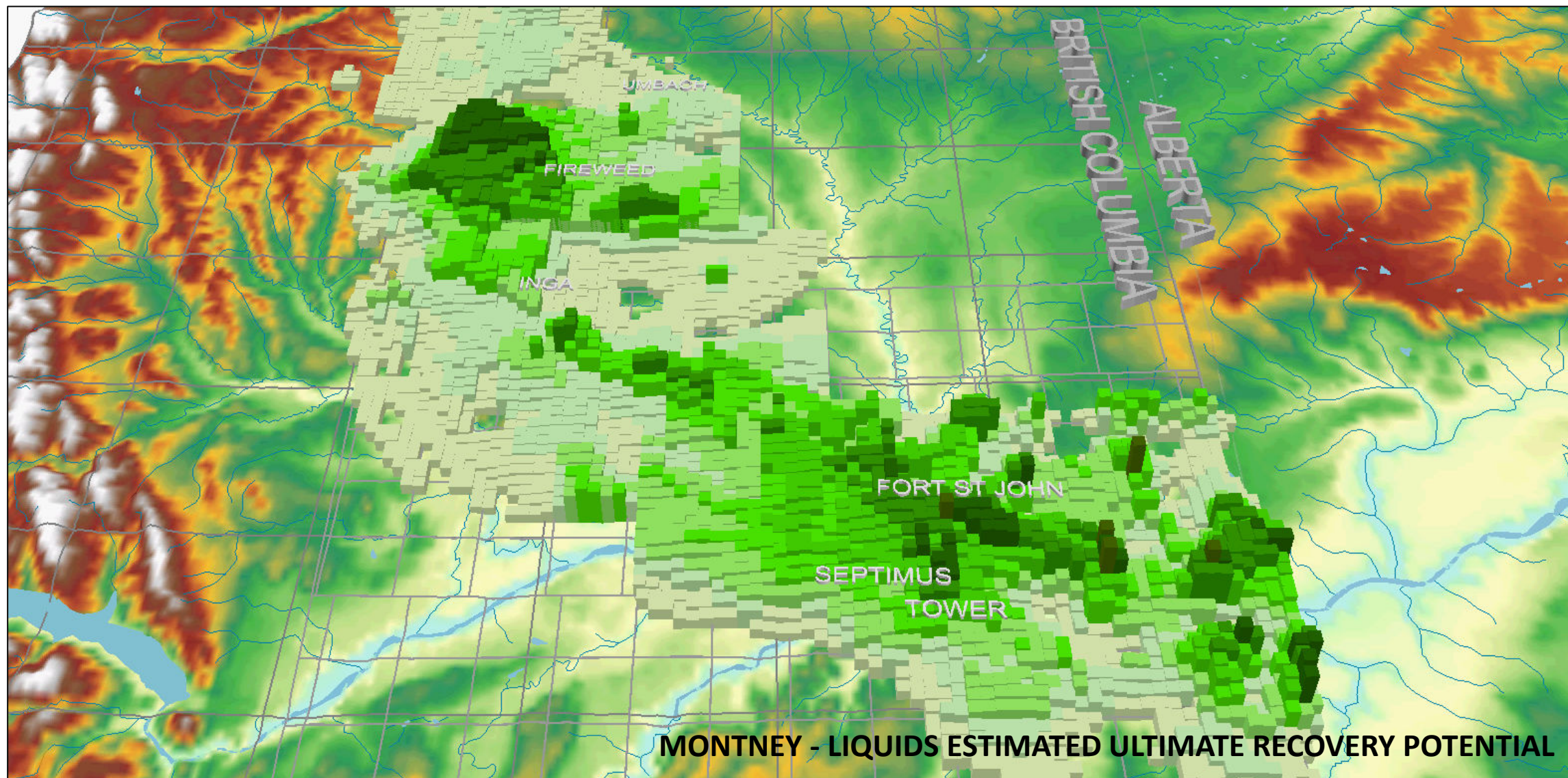
Finding and quantifying sweet-spots



Finding and quantifying sweet-spots



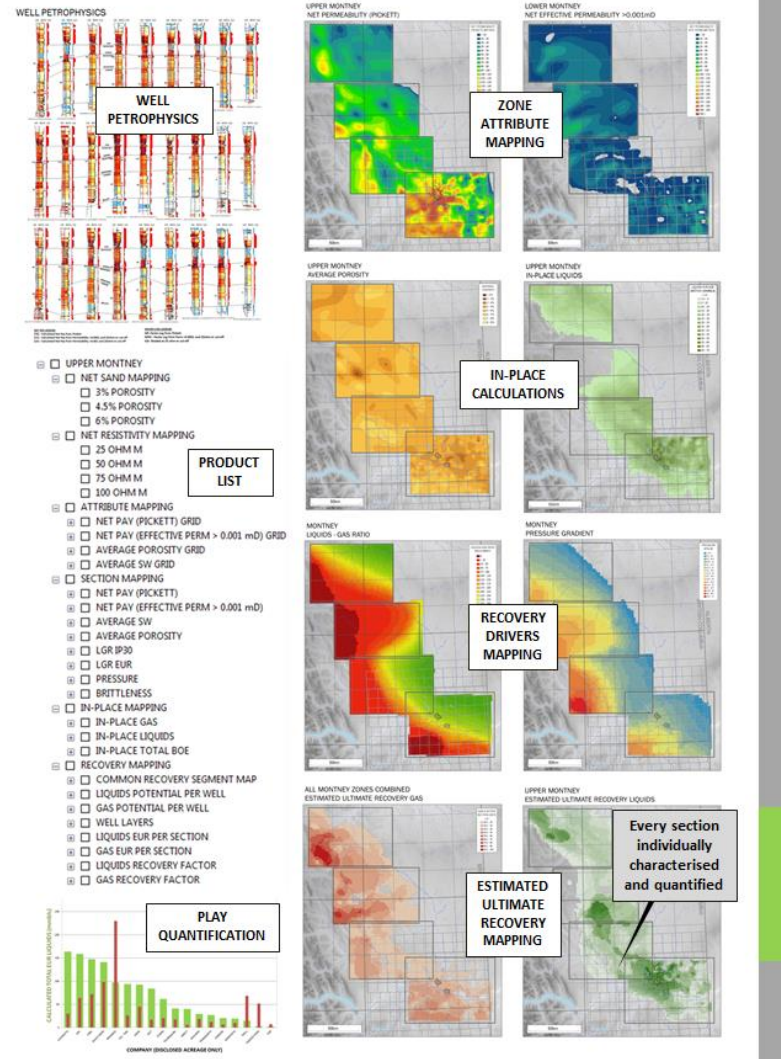
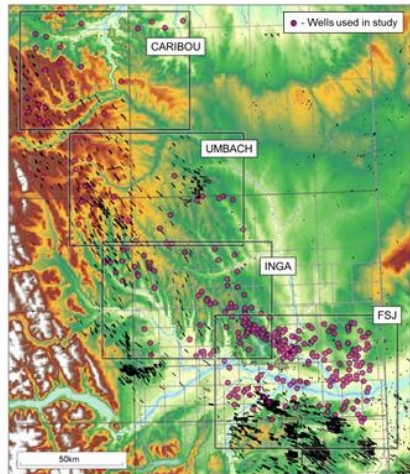
Finding and quantifying sweet-spots



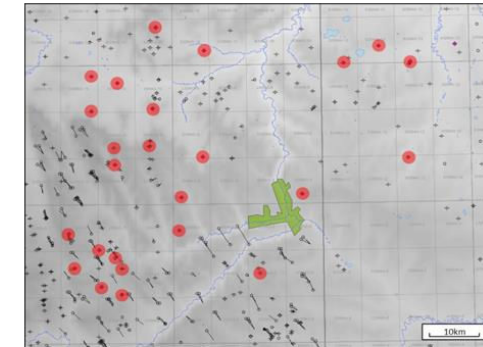
The Montney Play Atlas

The Montney Play Atlas Phase 1 – North-East British Columbia

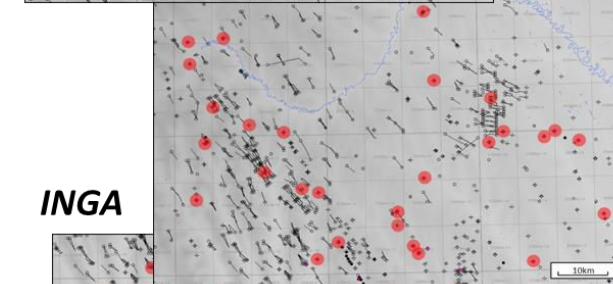
- A full suite of interpreted maps at section level detail characterising individual Montney zones.
- Phase 1 is complete and comprises petrophysical interpretation of 400 wells.
- Calibrated attribute, in-place, and recovery mapping across the play.
- The atlas can be delivered as hard copy maps and digitally as .shp files ready for import directly into your interpretation package of choice.



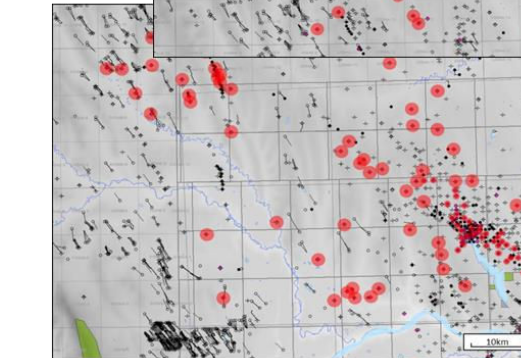
CARIBOU



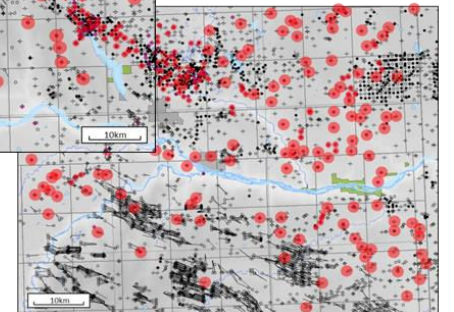
UMBACH



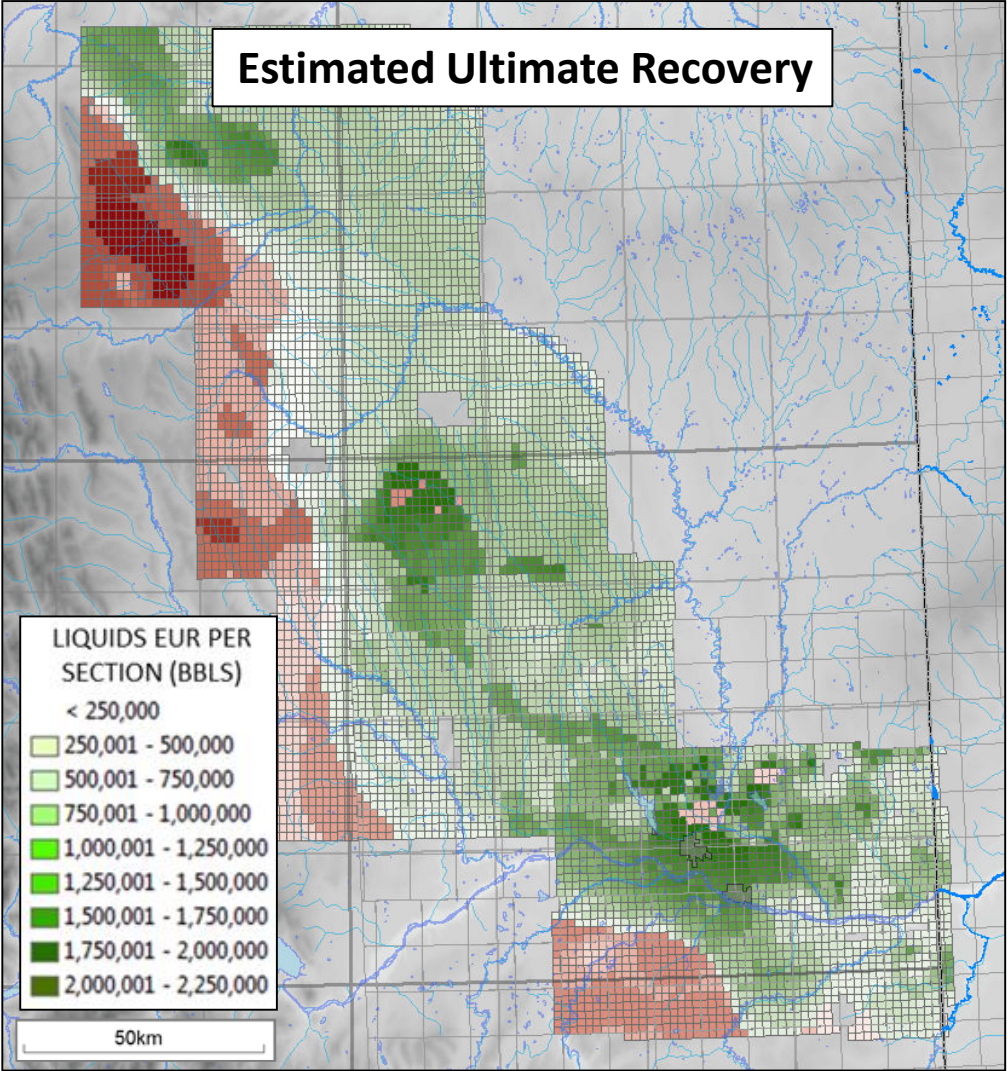
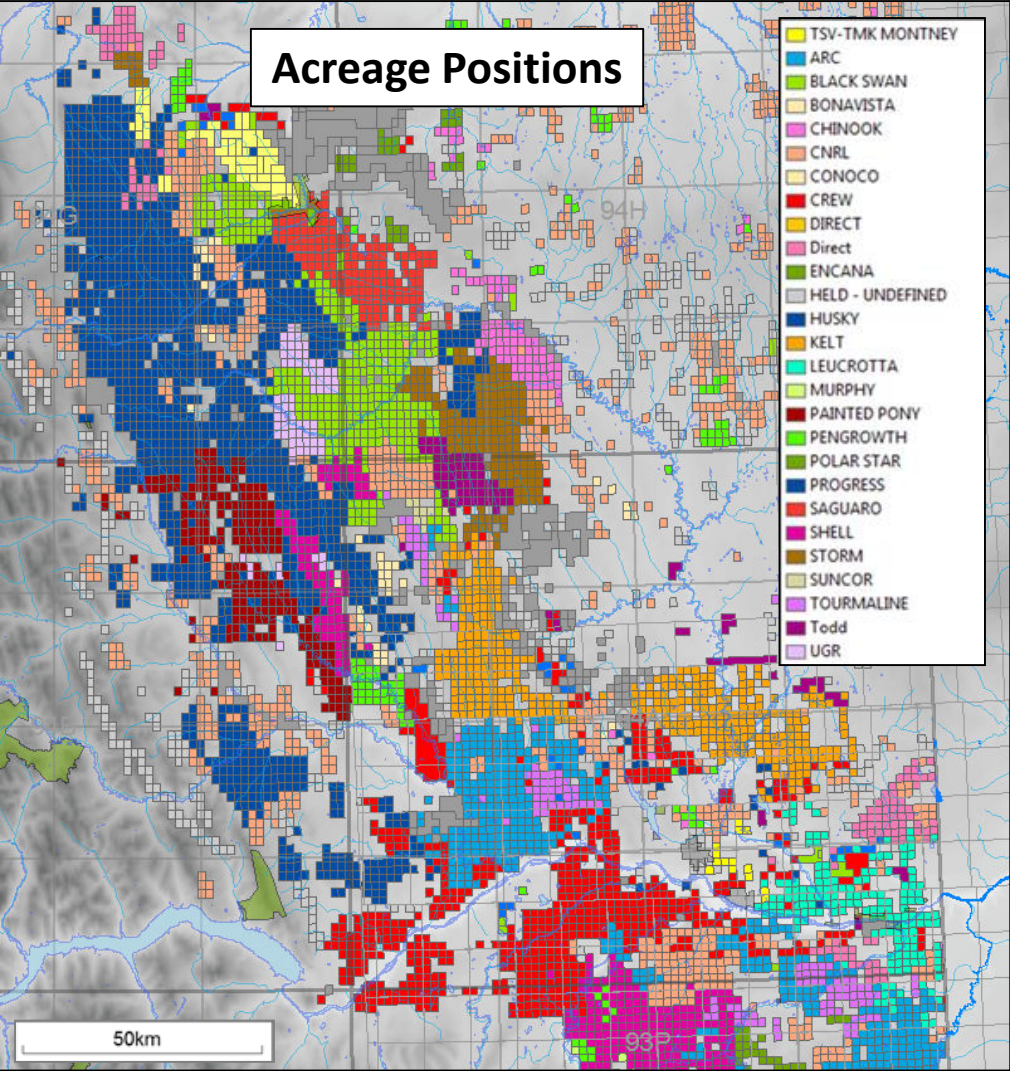
INGA



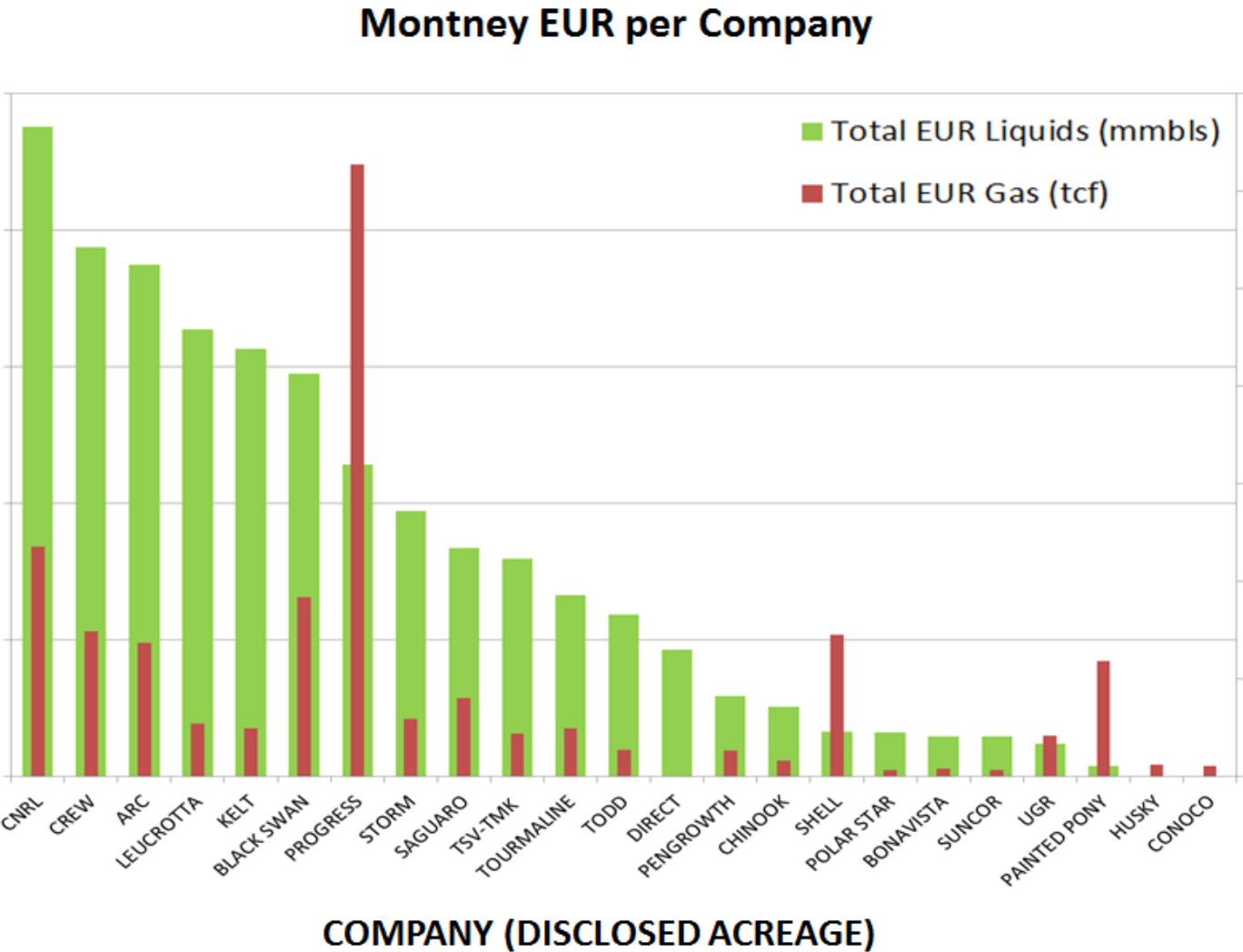
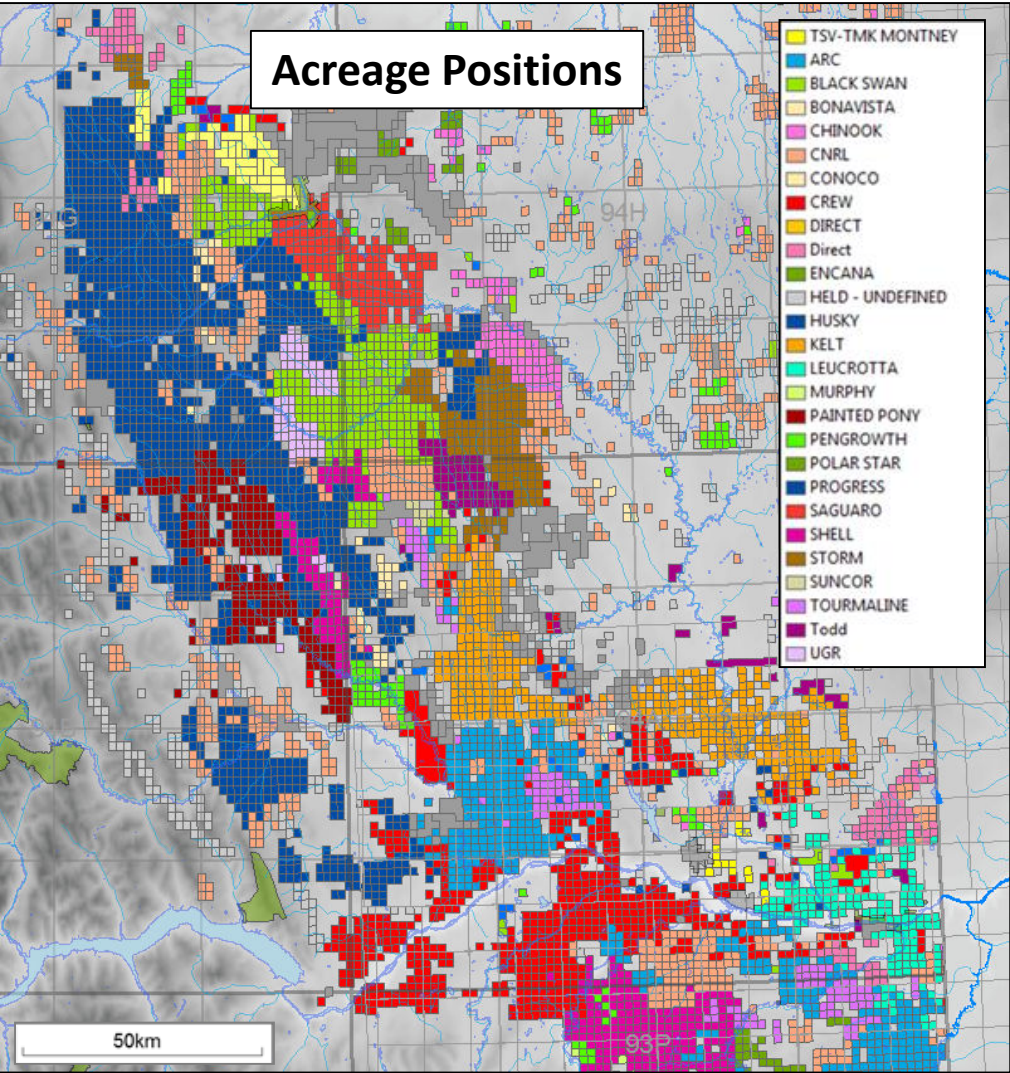
FSJ



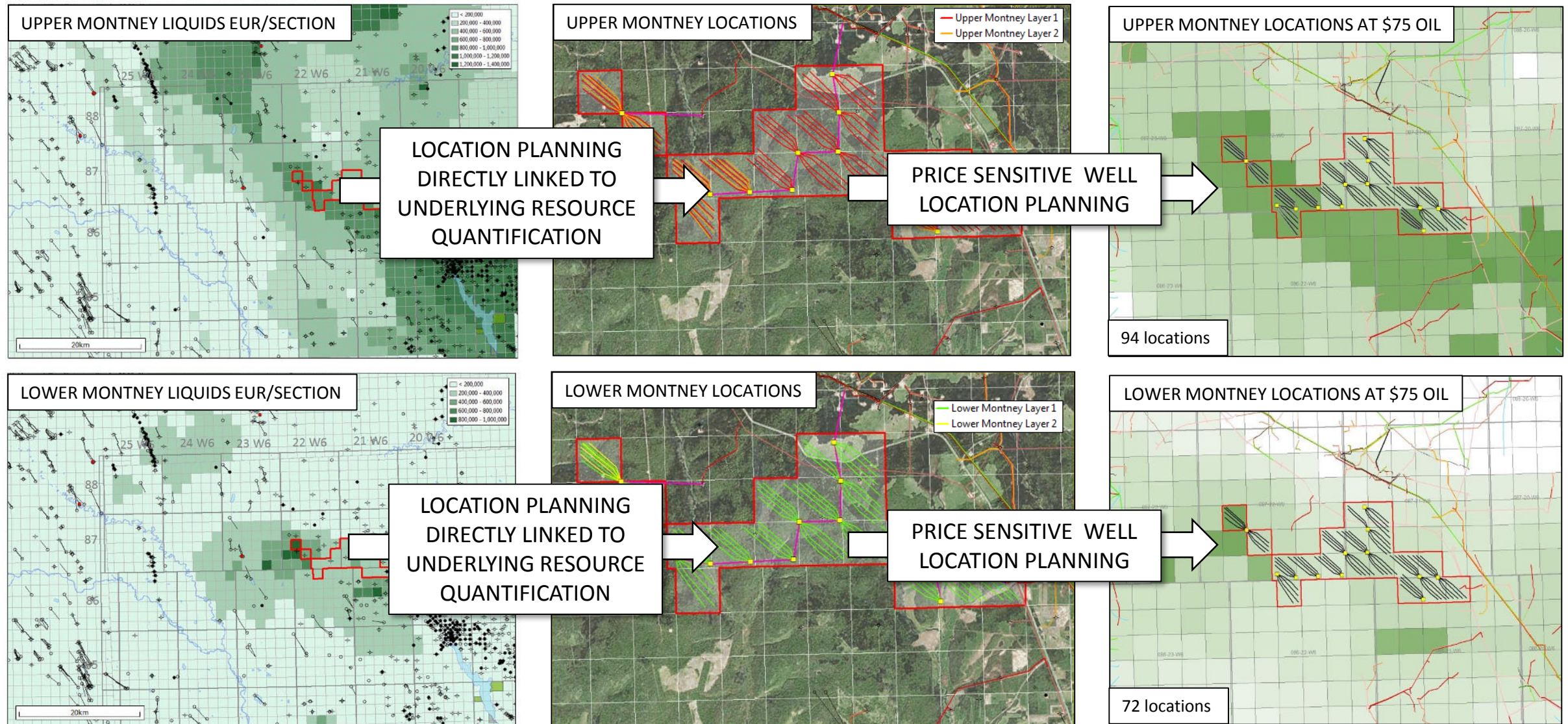
Montney EUR per Company



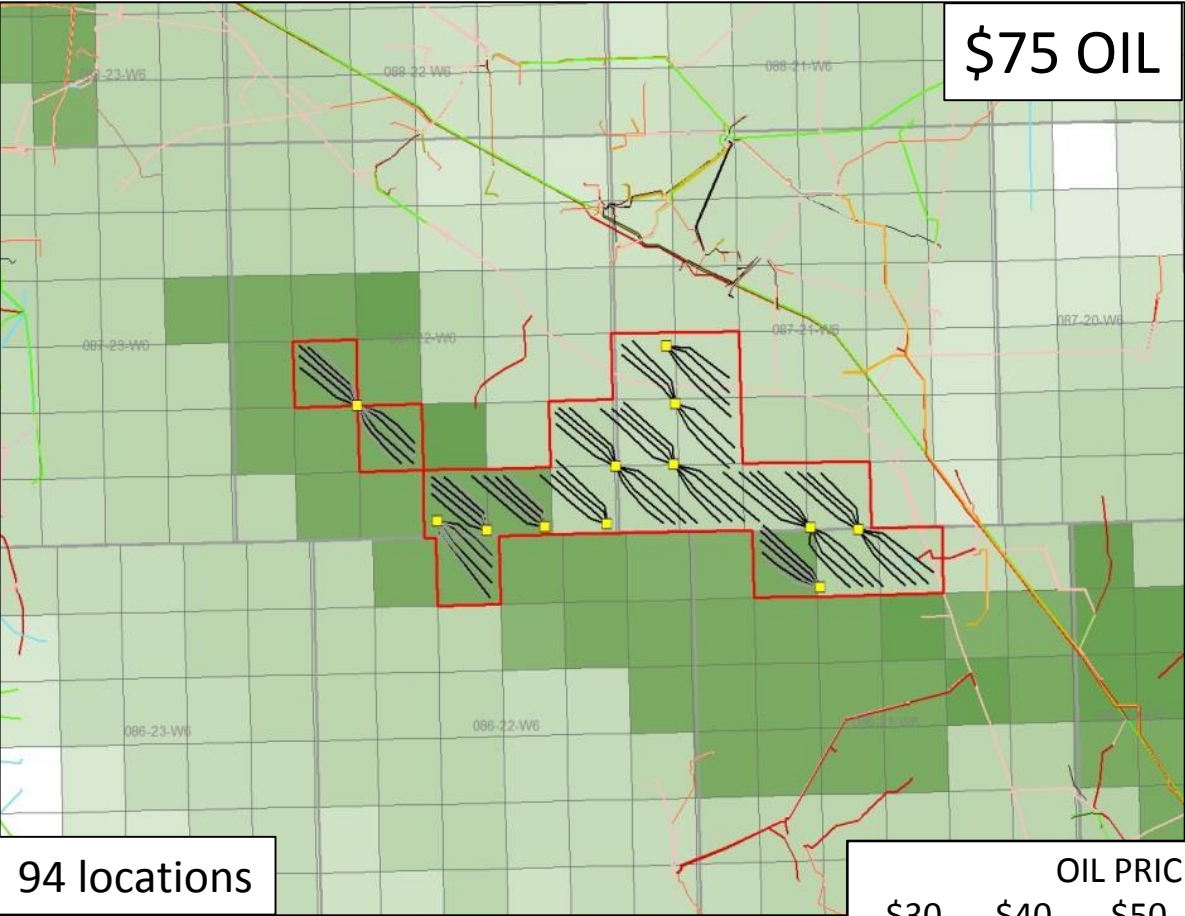
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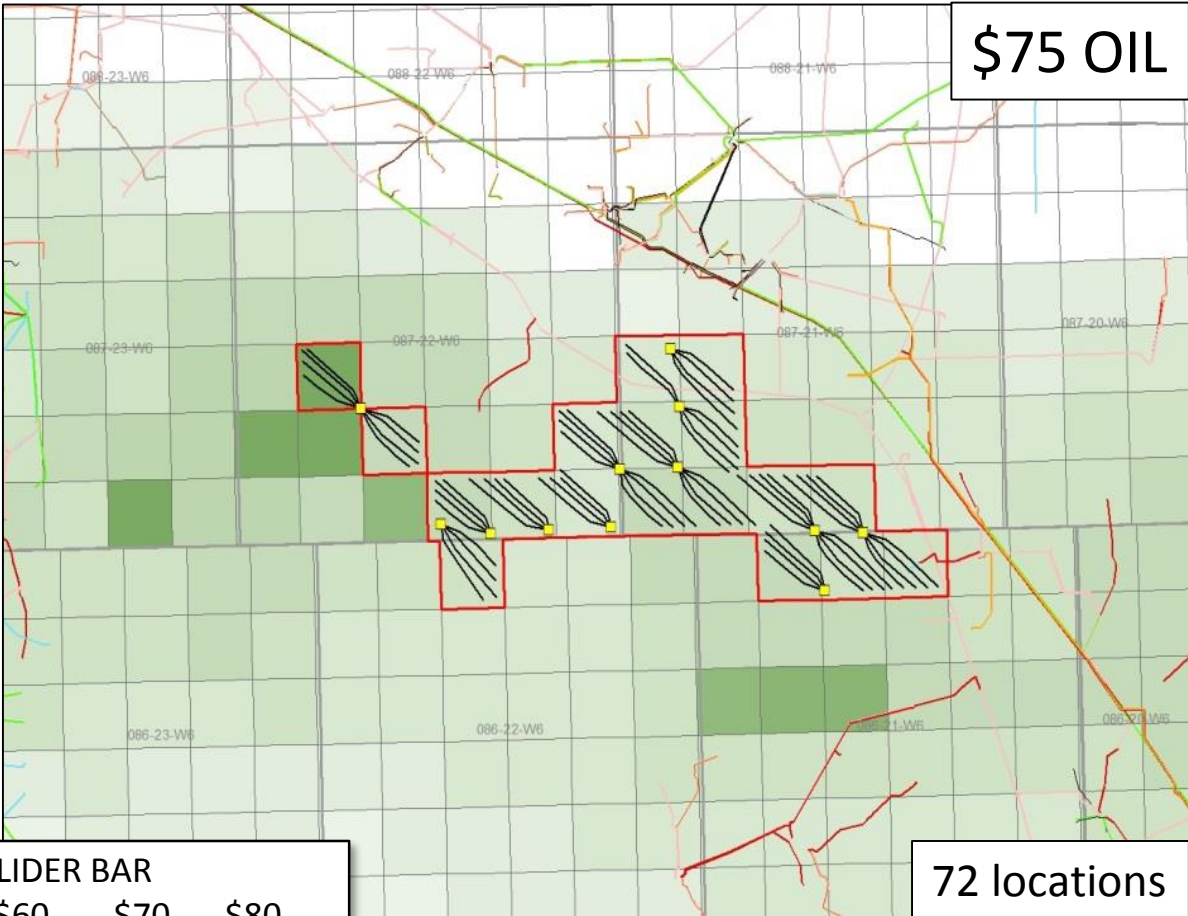
Development Optimisation



UPPER MONTNEY COMMERCIAL LOCATIONS

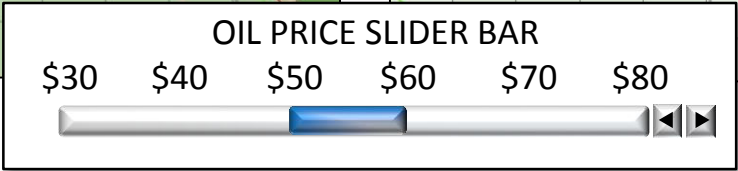
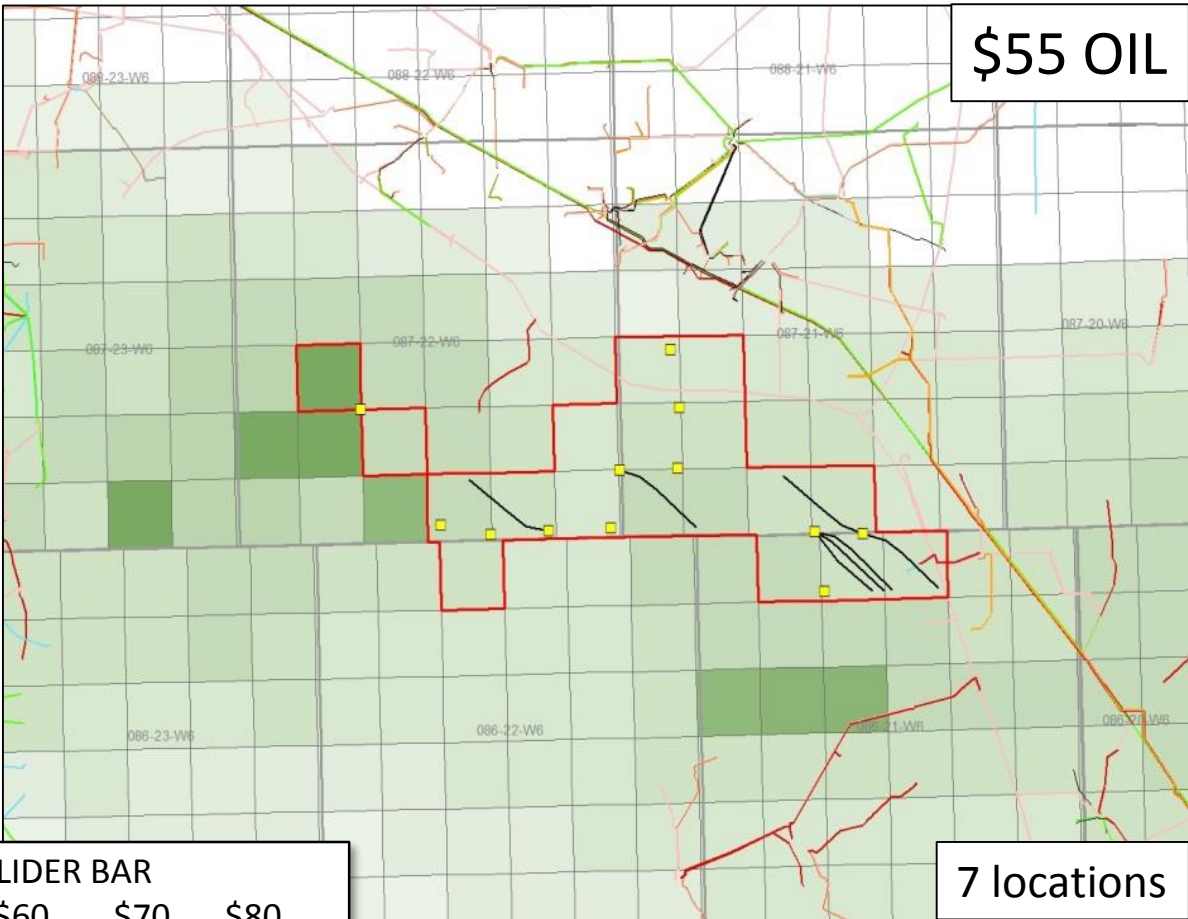
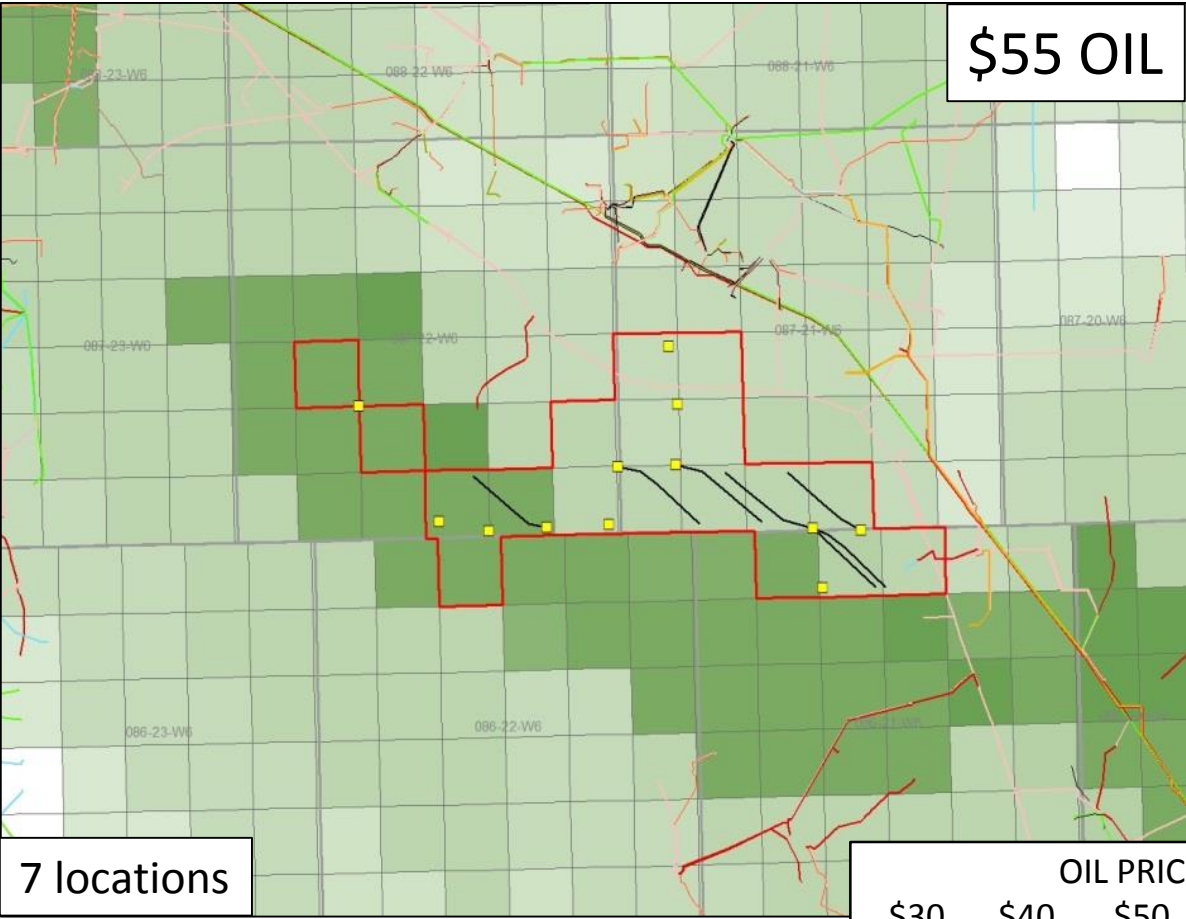


LOWER MONTNEY COMMERCIAL LOCATIONS

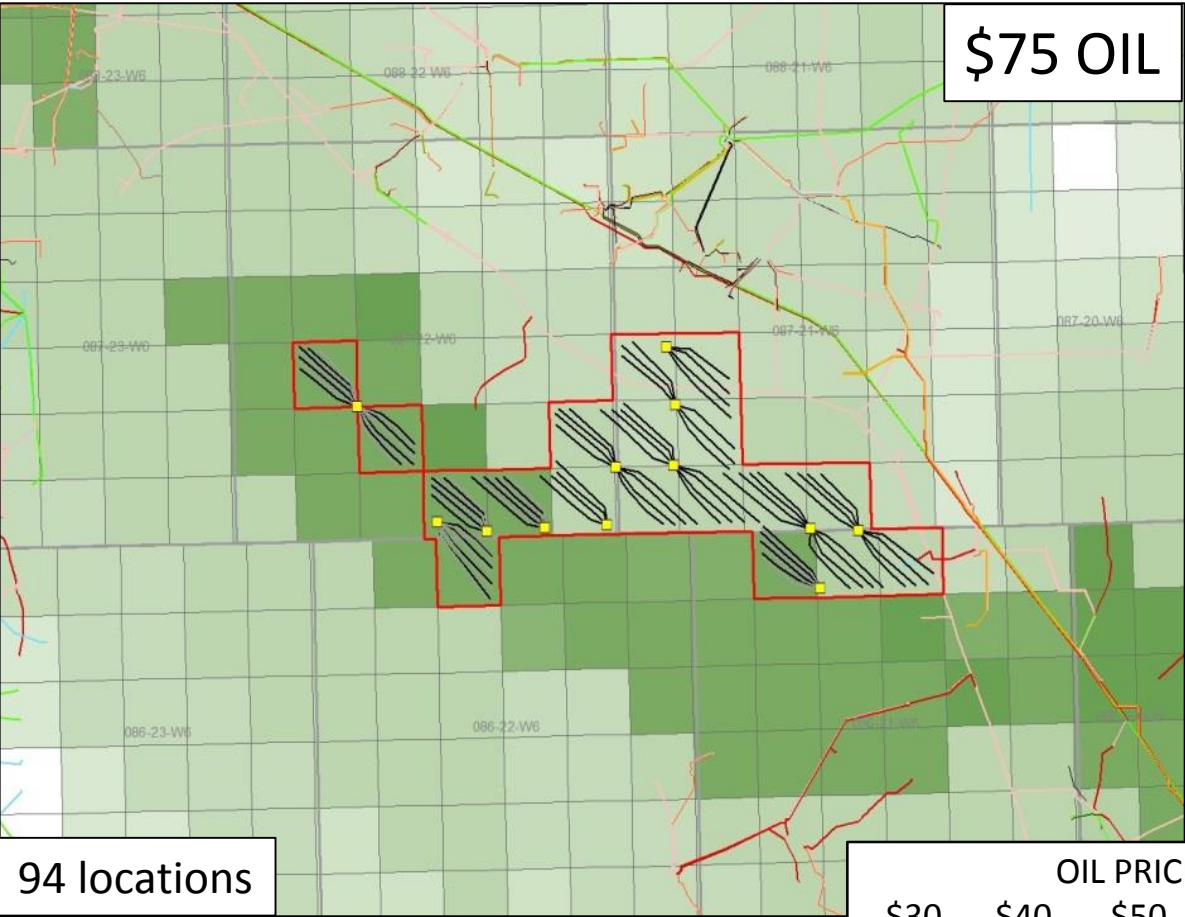


UPPER MONTNEY COMMERCIAL LOCATIONS

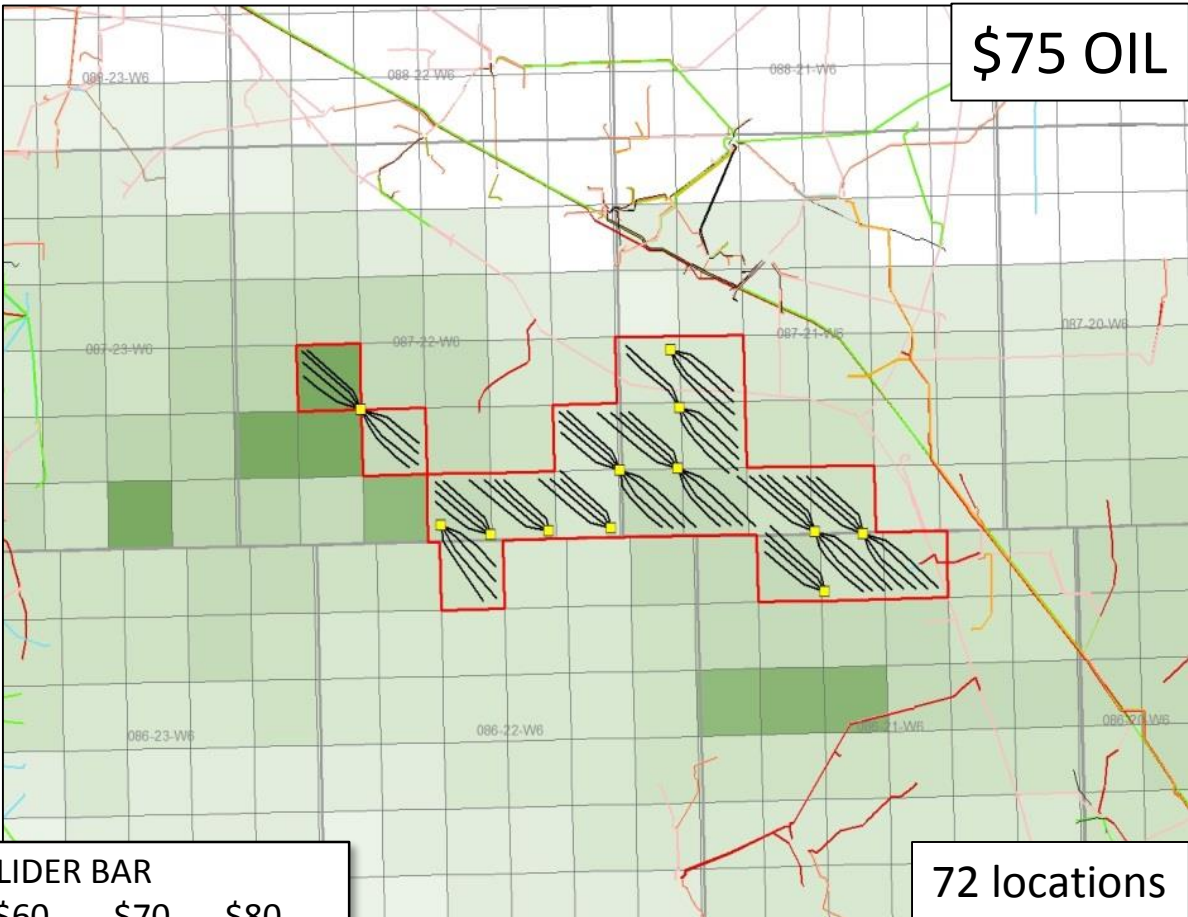
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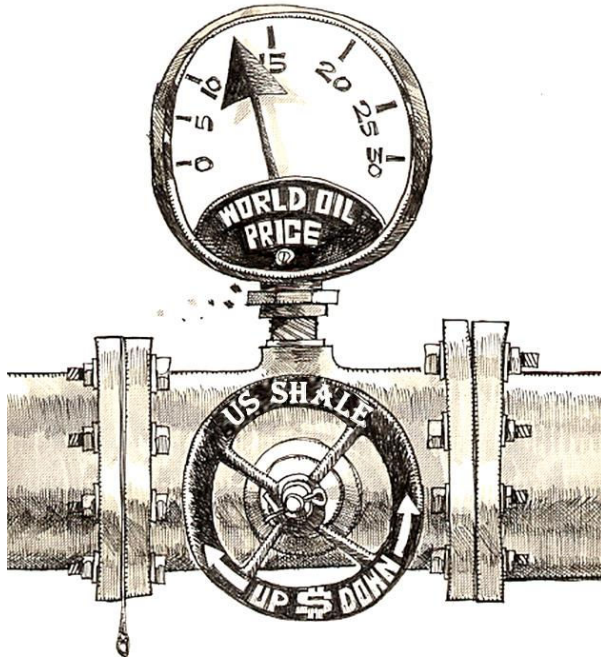


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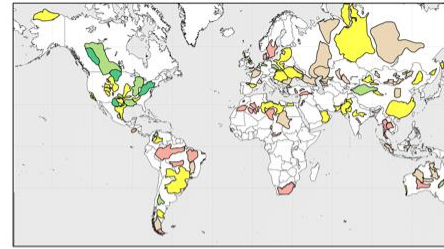


LOWER MONTNEY COMMERCIAL LOCATIONS

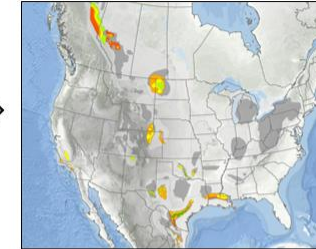




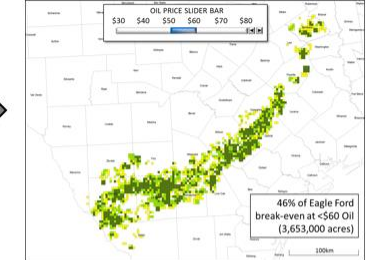
GLOBAL PERSPECTIVE



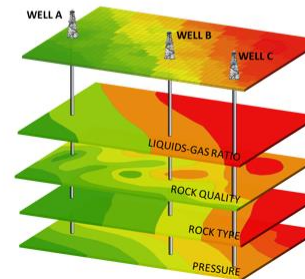
NORTH AMERICAN PERSPECTIVE



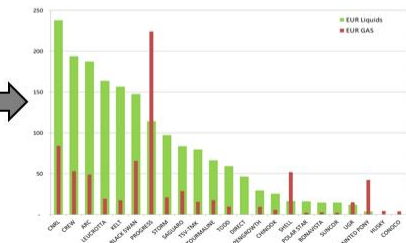
PLAY PERSPECTIVE



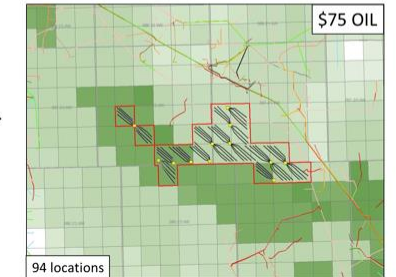
PLAY MAPPING



QUANTIFICATION



RESOURCE OPTIMISATION



- North America Unconventional production will be the short/medium term kingmaker for oil price
- Understanding heterogeneity and sweet-spots in unconventional plays is key
- Opportunities still exist in North American unconventional plays. Providing you do your homework
- Global unconventional opportunities will require a niche market and technical and commercial understanding and expertise





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