Yukon Conservation Society

Presentation to Select Committee on the Risks and Benefits of Hydraulic Fracturing

November 22nd 2013

CONTEXT

- Why are we talking about fracking now?
  - We are now in the era of Extreme hydrocarbons,
- Why does YCS care?
  - YCS vision for Yukon
  - Diversion of resources

ACKNOWLEDGEMENT and ASSUMPTIONS

- The Committee has been the beneficiary of several briefings, this briefing will build on those briefings, add our perspective, fill gaps we identified and attempt to tie it all together.
- We are not exploring in depth some topics that have already been covered.

Themes for this presentation

- Environment
- Society
- Economy

Environment

- Climate
- Ecological / spatial footprint
- Effects on fish and wildlife
- Water
  - Quantity
  - Quality
- Air

CLIMATE

- The world's climate is warming due to increases in GHGs
- Hydraulic fracturing increases GHGs:
  - More CO2 from high intensity energy production
  - Natural gas is methane which is 30-90 times as potent a GHG than CO2 is.
  - Evidence shows fugitive emissions outweighing the GHG saving from gas over coal or diesel
  - Gas wells leak!

ECOLOGICAL AND SPATIAL FOOTPRINT

- Surface disturbance is mainly drill pads and roads
  - Experience shows that frack jobs must be about 500 feet apart to fully exploit a field, to be economic
  - This level of activity exceeds all allowable levels of disturbance in the North Yukon Land Use Plan.
  - Despite multiple wells on each pad, a fully developed field will have pads every couple of km.
  - Cannot rely on winter roads because of the level of very heavy traffic, the need to work year round and the paucity of water in winter

A fully developed shale gas field in Wyoming

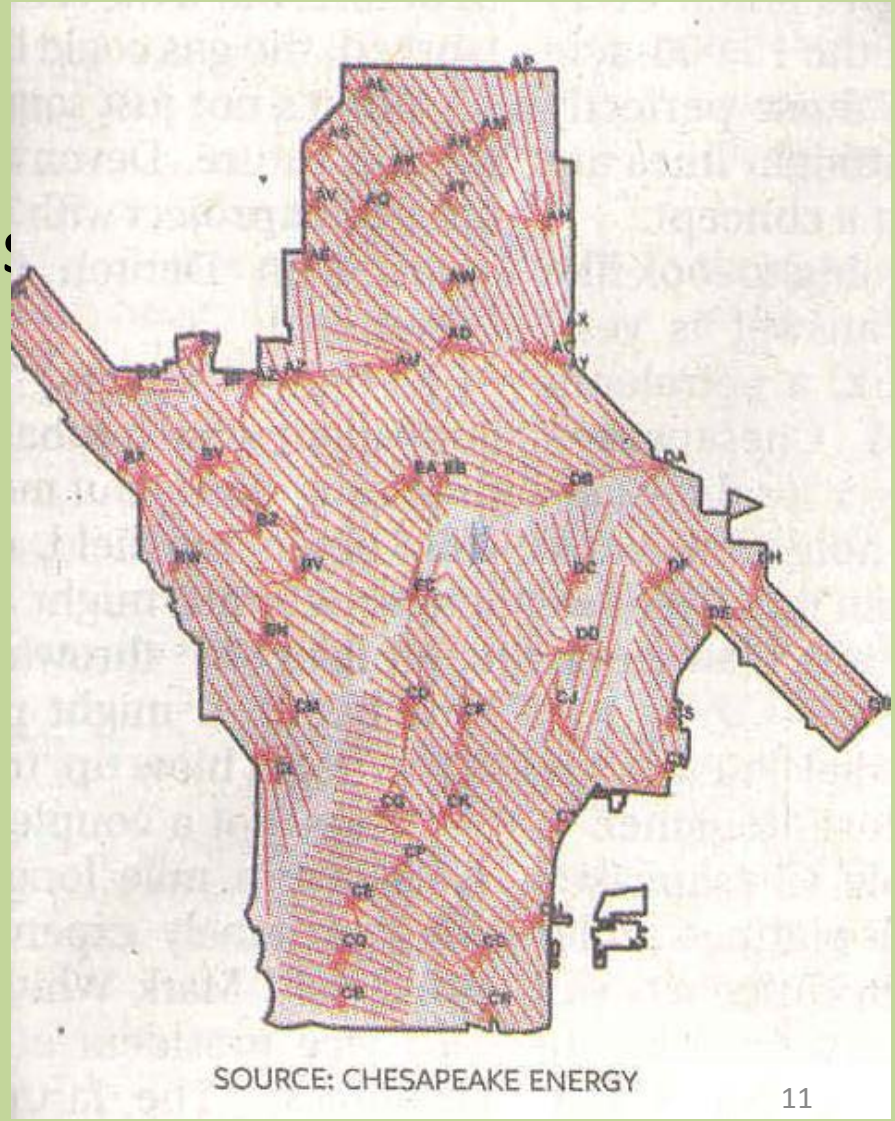
Shale gas frack job

FOOTPRINT CASE STUDY

- The Pembina institute estimated the levels of disturbance expected from conventional development of the Peel Plateau at 12,000 km of linear disturbance and 190 km2 of surface disturbance.
- The NYLUP allows, in zone IV areas, 1km/km2 linear and 1% surface disturbance. The Pembina estimates exceed the plan parameters at 1.2 km/km2 and 1.9% of its 10,000 km2 area
- Unconventional development typically involves a higher well density with multiple wells per pad

DALLAS-FT. WORTH AIRPORT

- 53 pads on 18,076 acres (30 square miles)
- Each red dot is a pad
- Each red line is a well
- Almost complete coverage



Effects on Fish and Wildlife

- Direct:
  - Displacement by intensive activity e.g. Eagle Plains is core winter range of Porcupine caribou
  - Bamberger and Oswald study showed effects on reproduction (most commonly), respiratory issues, burning of the eyes, nosebleeds, diarrhea, vomiting, rashes, headaches and neurological problems, and sudden death in animals that had contact with drilling and hydraulic fracturing fluids and wastes
- Indirect:
  - Influx of young males translates to higher numbers of hunters-

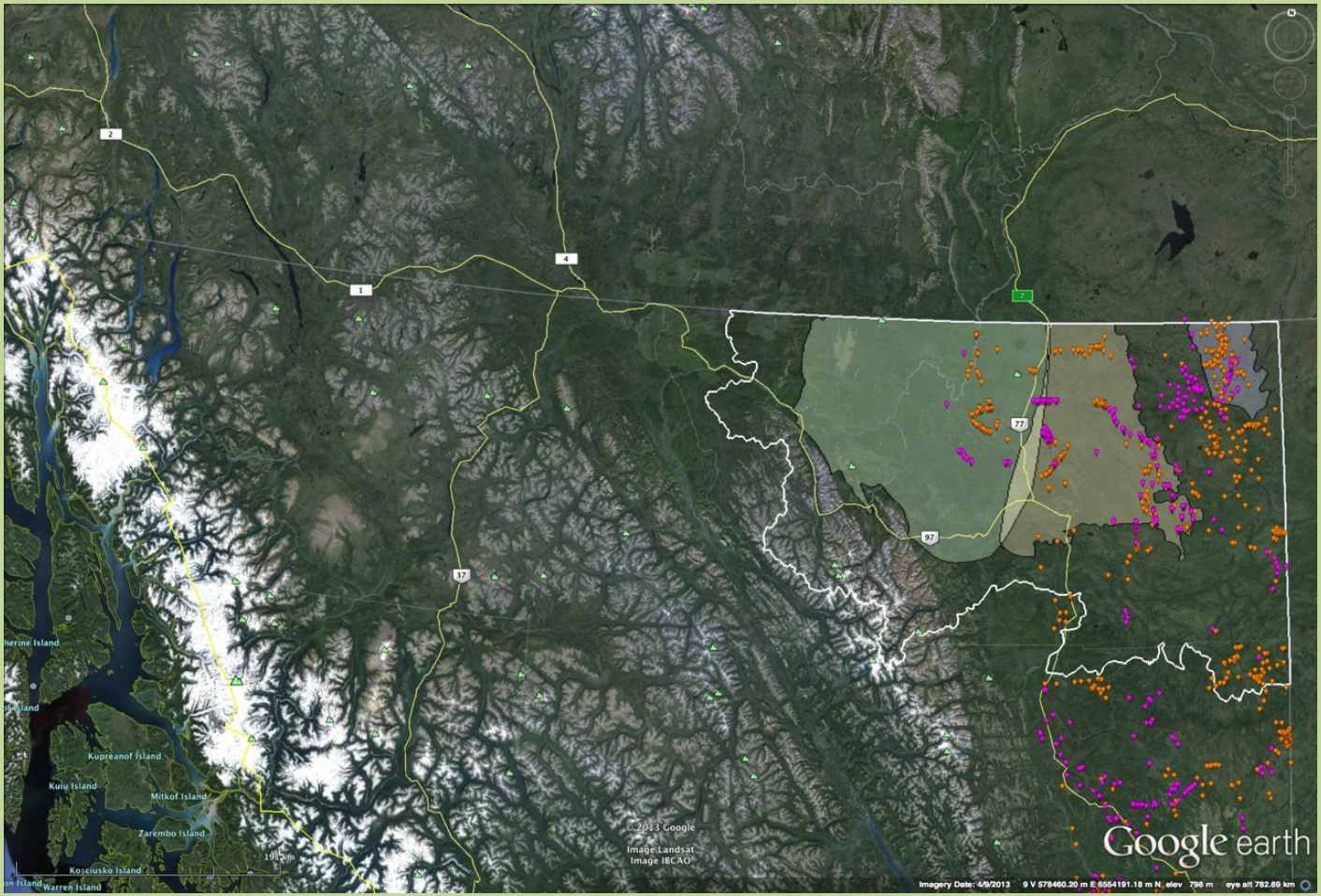
WATER QUANTITY

- Hydraulic fracturing uses a tremendous amount of water.
- Frack fields have thousands of wells- 29,000 have been drilled in B.C., 24,000 since 2000.
- In the Horn River Basin alone, BC Oil and Gas Commission has approved over 5.8 million m3 of water use for 2013
- Water is of limited availability in Yukon and in the north, many water bodies freeze solid in winter.
- Suitable sources of year round water are few and are not always convenient

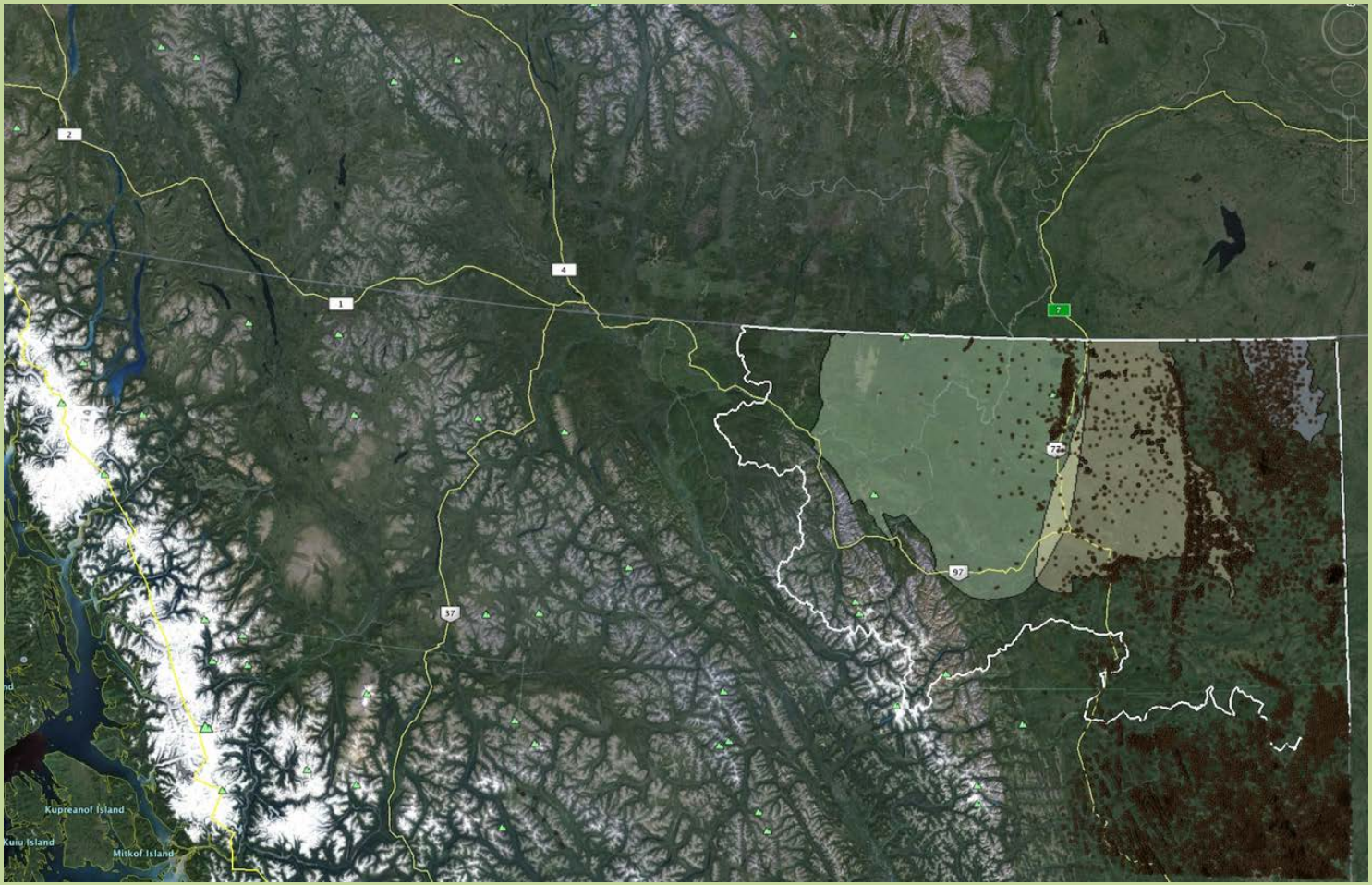
WATER QUALITY

- This water can rarely be placed back into surface waters or surface tied aquifers because of the changes to it wrought by the process
- Waste water from the recent Eagle plains wells was trucked to B.C. This is not a sustainable solution to full scale development.
- If water is treated, there are considerable quantities of (often radioactive) solid wastes

Short term water licenses in N.E. B.C.



Gas wells in N.E. B.C.



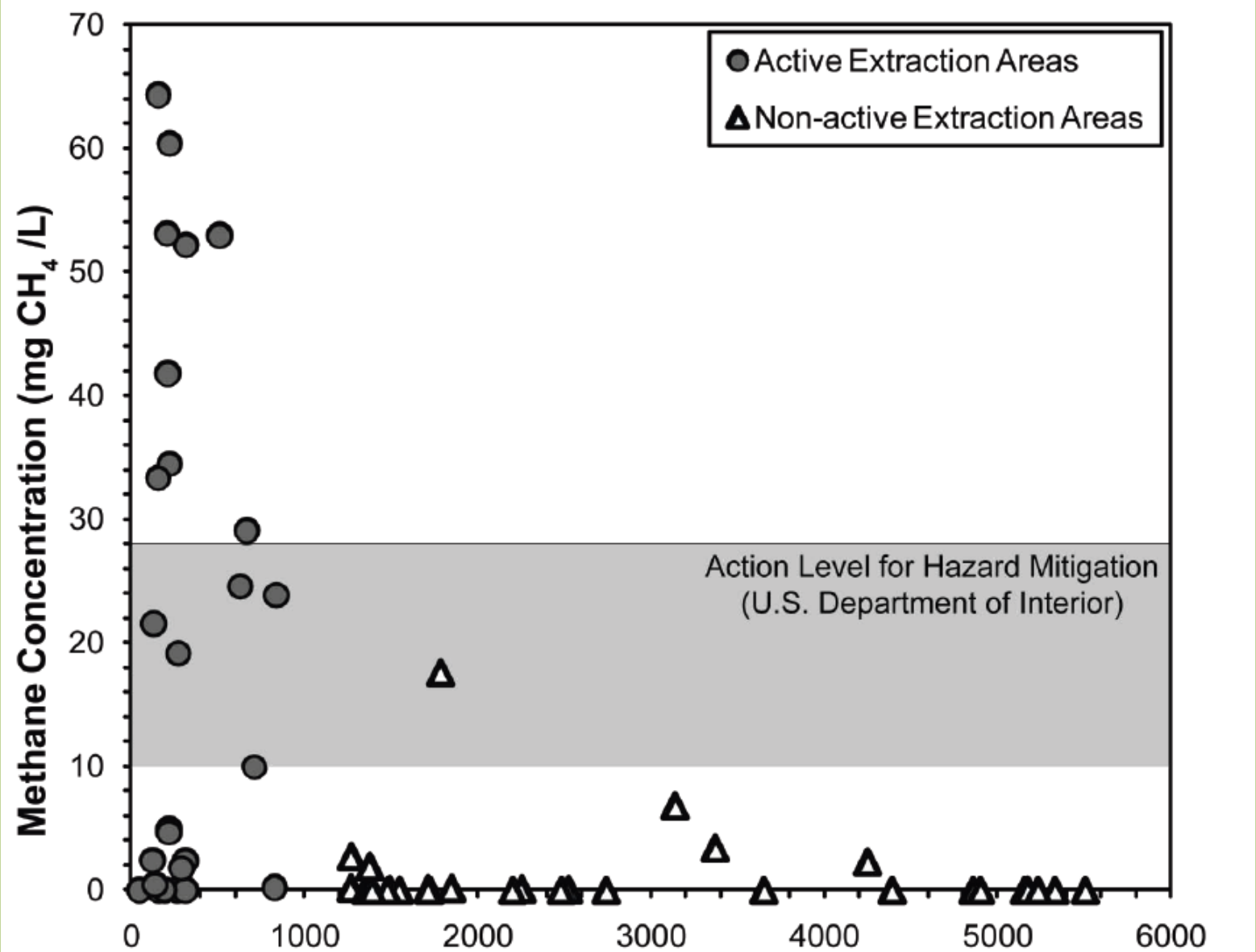
WATER QUALITY continued

- The geology in Yukon is complex and not fully understood, with multiple terranes. This raises the likelihood of frack fluids and gas migrating unexpectedly
- Current and planned water monitoring in Yukon will not produce a comprehensive baseline analysis of water
- Recent experience in the Mackenzie Delta shows us that we cannot depend on permafrost to act as confining layers for drilling waste

AIR

- Most gas in Yukon is “sour”, that is it contains the potent neurotoxin H2S
- Studies in Colorado and Pennsylvania showed elevated levels of CO2, particulates, methane, ethane, pentane, benzene, nitrogen oxide and dozens of other hydrocarbons in the air near drilling sites.

Methane levels near gas wells



Society

- Population fluctuations
- Demographic shifts
  - Pulse of young males = increased crime, traffic violations
- Rising inequality
- Who will pay for the clean up after the companies have left?

Economy

- Infrastructure costs: who will pay for the roads impacted by increased traffic?
- Effect on territorial coffers- currently the province with the most O&G development has reduced its royalties, at the behest of O&G companies to the point it now runs a deficit.
- Price of natural gas will rise towards the world price and cost more than diesel
- Fracking is an Expensive technique, much more so than conventional: According to SEC filings most shale gas plays in the U.S. cost $7:50/mcf
- Its EROI is very low, it is not clear whether the increased energy required to extract the gas in Yukon, get it to market and comply with regulations adequate to keep it safe will be less than that embedded in the gas itself

Economy

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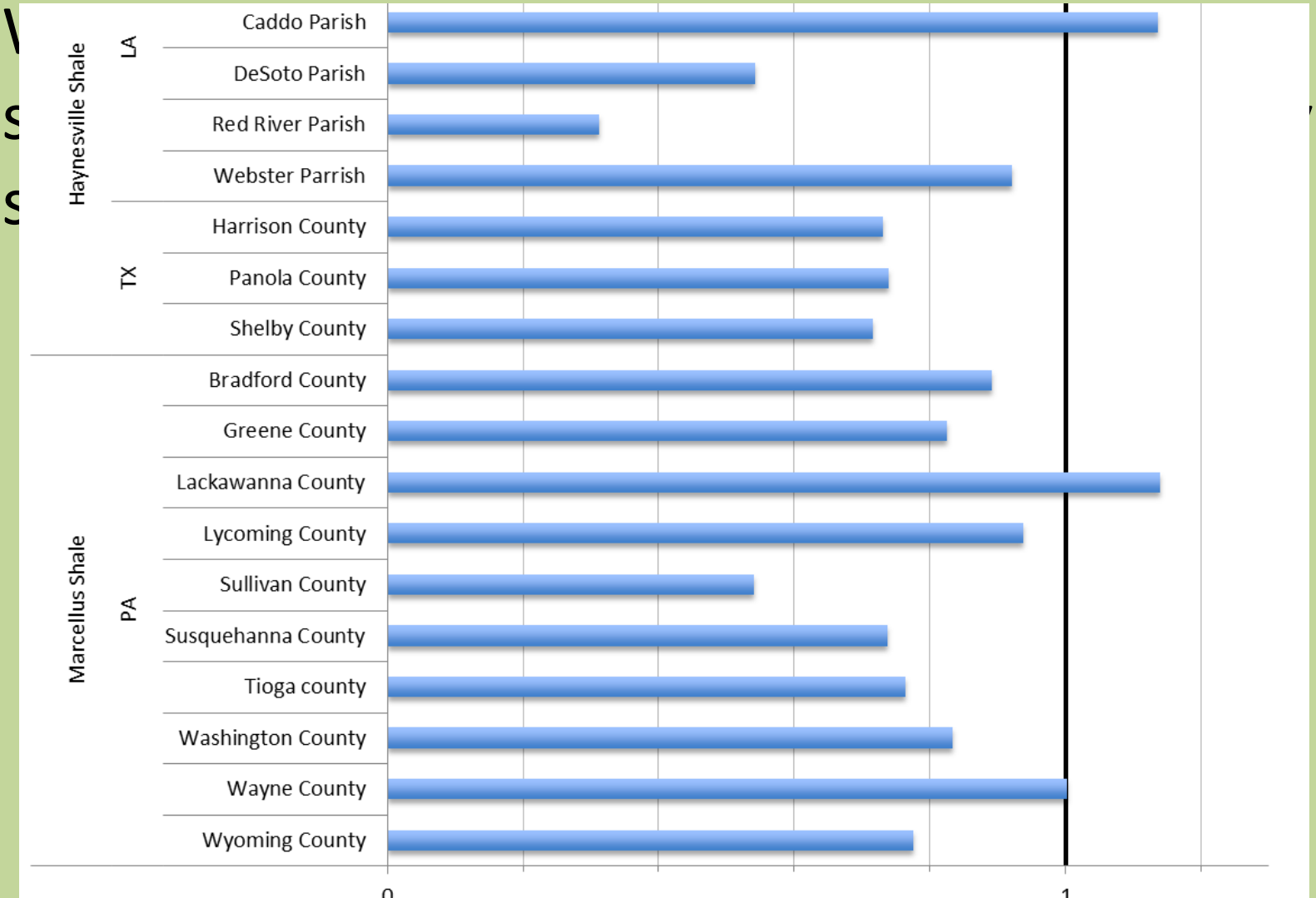
Haynesville Shale
LA
Caddo Parish
DeSoto Parish
Red River Parish
Webster Parrish
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Panola County
Shelby County
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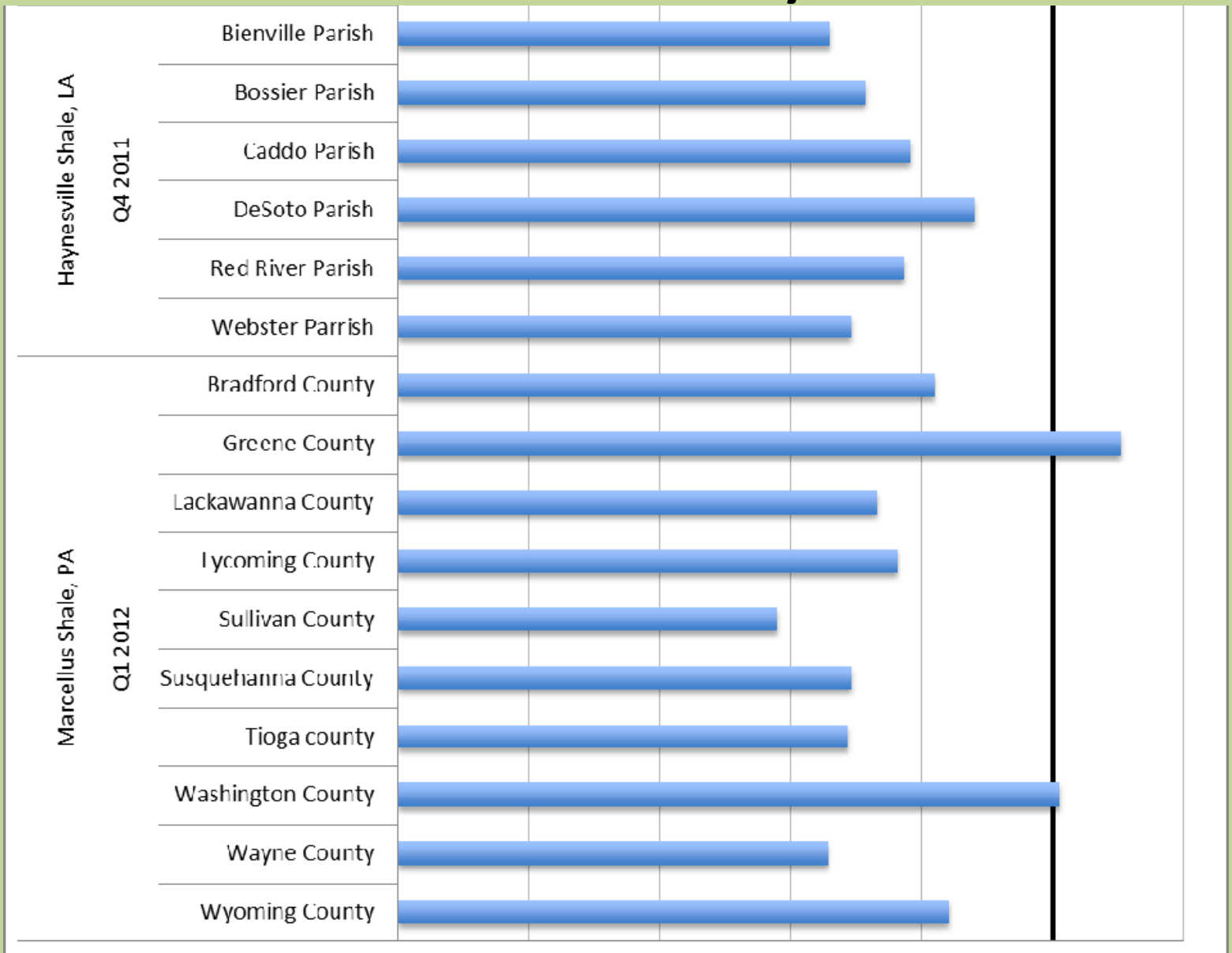
Economy


Haynesville Shale, LA
Q4 2011
Bienville Parish
Bossier Parish
Caddo Parish
DeSoto Parish
Red River Parish
Webster Parrish
Marcellus Shale, PA
Q1 2012
Bradford County
Greene County
Lackawanna County
Lycoming County
Sullivan County
Susquehanna County
Tioga county
Washington County
Wayne County
Wyoming County

Conclusion

- We tried to show how the Costs to Yukon outweigh Benefits of permitting hydraulic fracturing.
- We can apply regulations to reduce the chances of negative impacts and we can adequately resource independent agencies to enforce these regulations.
- The industry cannot profitably absorb the costs of this regulatory environment on top of the costs imposed by our natural environment.

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