Unconventional Oil Extraction
How Do We Assess Potential Costs and Risks to the Great Lakes?

Susan Christopherson
Cornell University
smc23@cornell.edu

What Have We Learned?

- 2012 Study of Port of Albany
- 2013-14 Study of Oil Train Risks and Economic Costs and Benefits
- 2014 Great Lakes Commission Study of Crude Oil Transport Risks and Costs and Benefits
- 2014 Study of Hudson River Community Responses

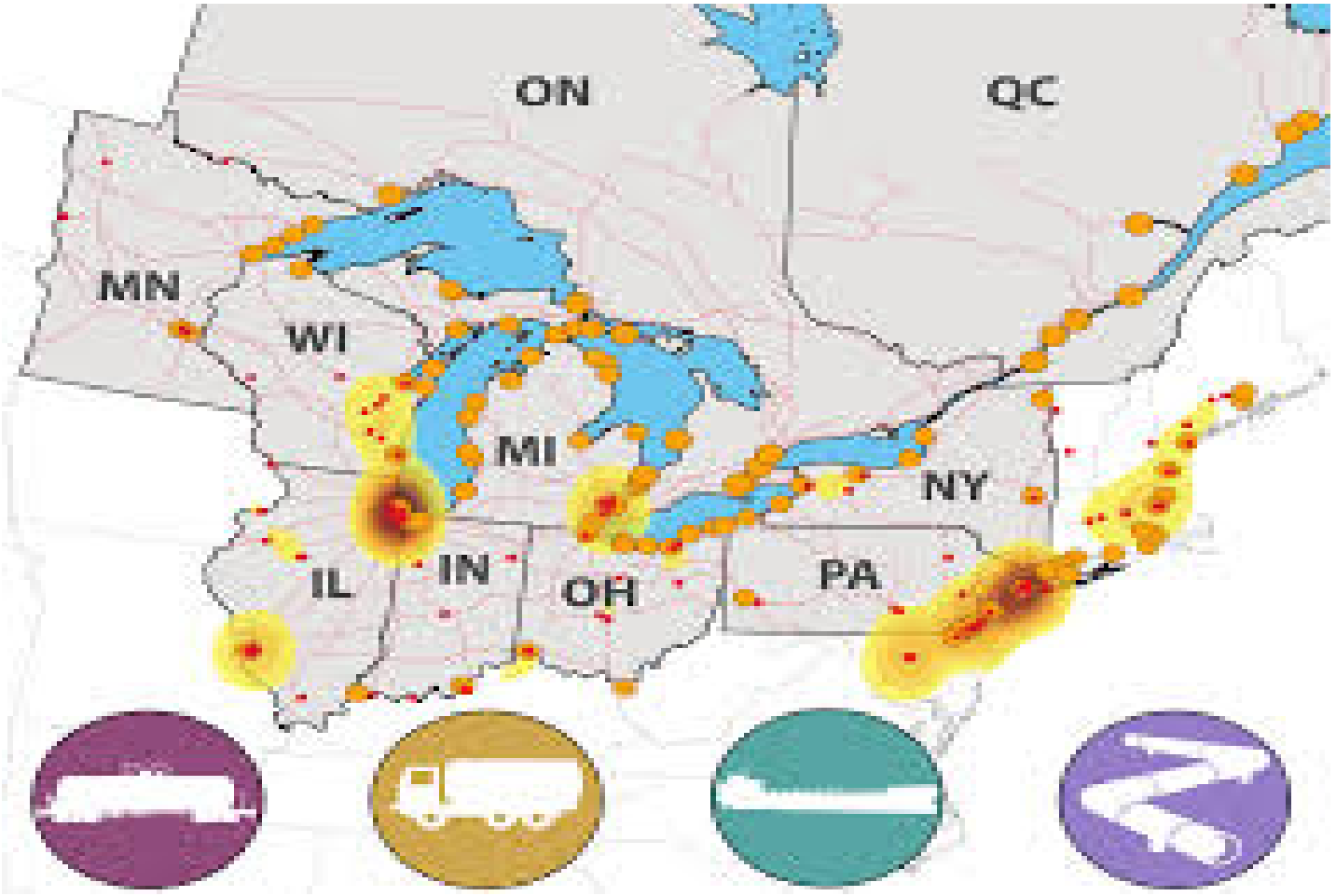
Looking Beyond the Oil Extraction Site

The footprint of shale and tar sands development extends far beyond the extraction site – the well or mining pit. It engages a regional infrastructure and a national and international supply chain, particularly focused on the Great Lakes States.

One critical element: the transportation infrastructure required to move the product to market – pipelines and trains.

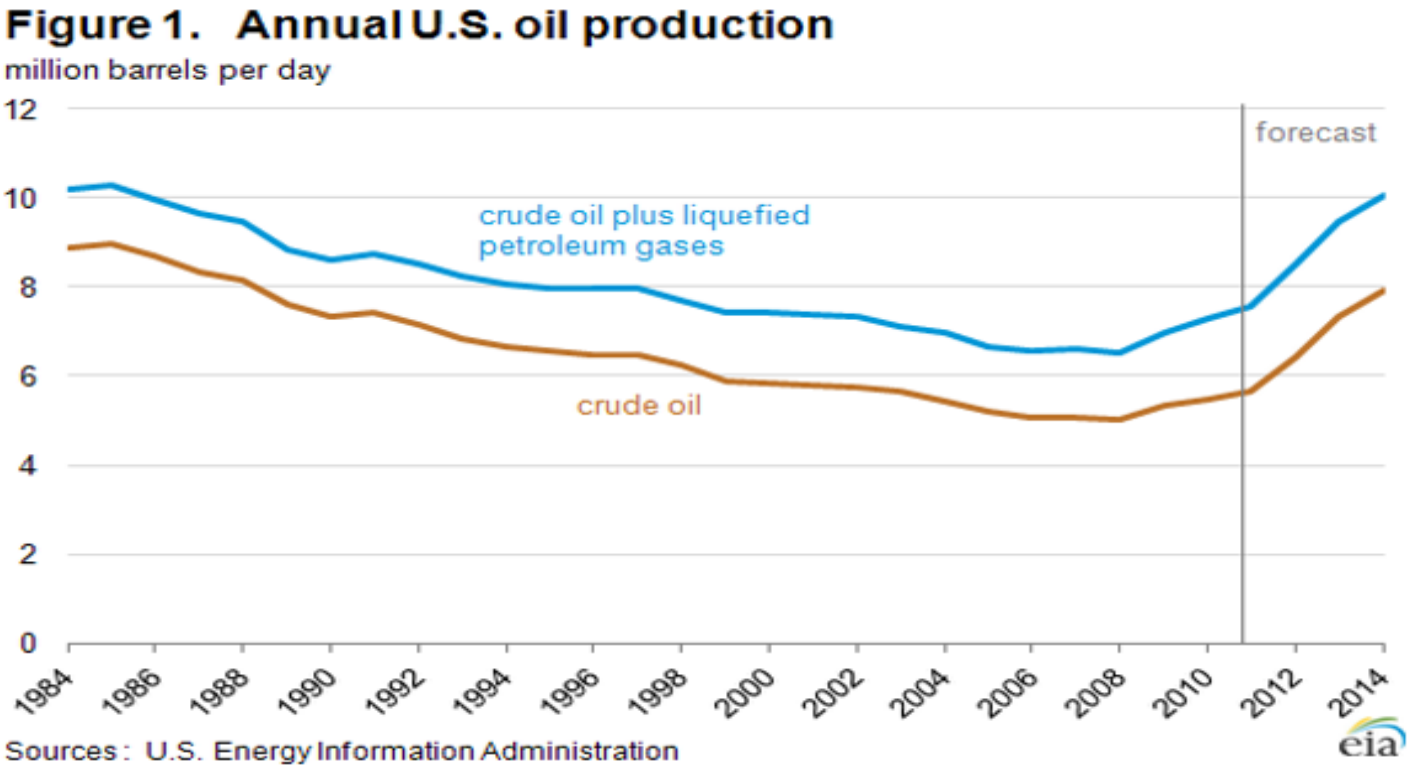
The question: How do we assess and address the increased risks and externalities associated with the extraction industry?

The Great Lakes Are at the Center of the New Era of Crude Oil Transport

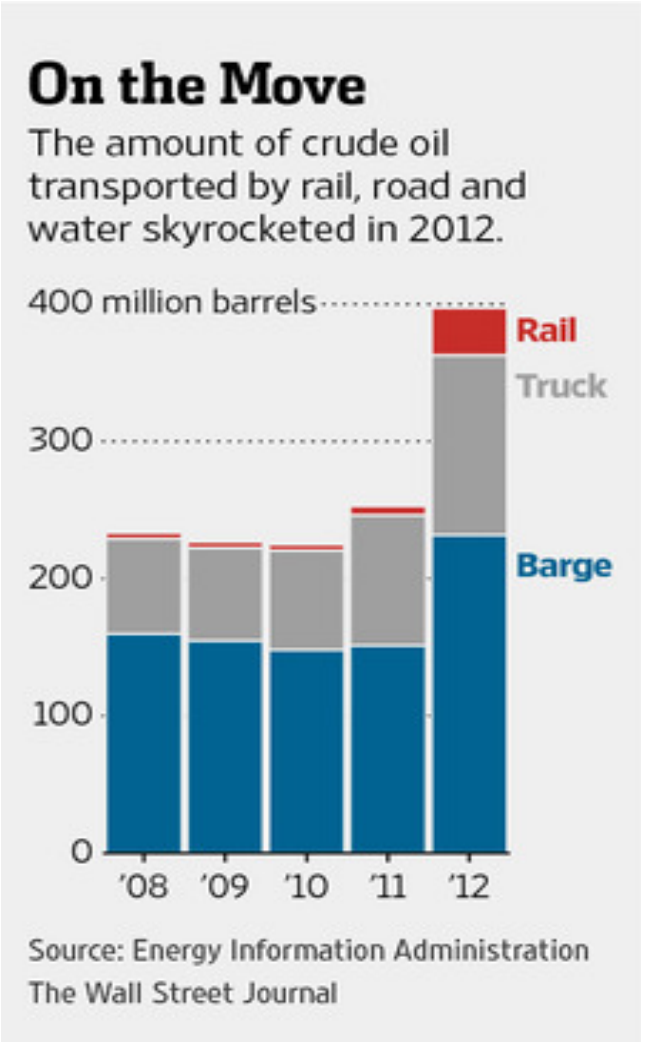


What is the Source of Costs, Benefits and Risks?

US crude oil production risen dramatically since 2010. According to the EIA, crude production, primarily from tight shale formations, should be almost 8 million barrels per day in 2014. This is the highest figure since 1988. Canadian tar sands adds to the volume, creating demand for transport to move the crude.

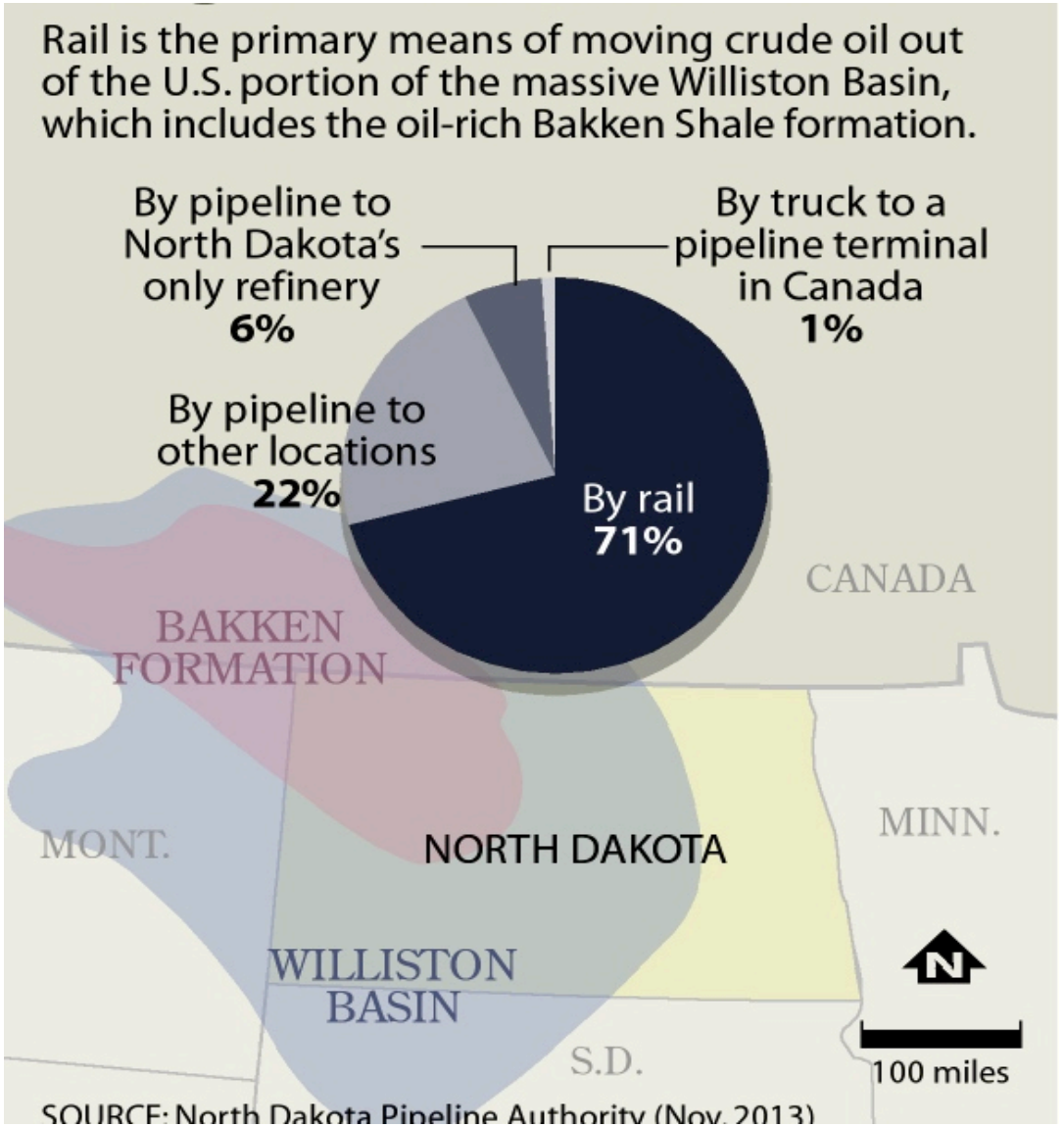


A Surge in Crude Oil Transport By Rail, Truck and Water is Affecting Great Lakes States and Cities. Citizens are Concerned.



Choices Between Pipelines And Other Transport Modes

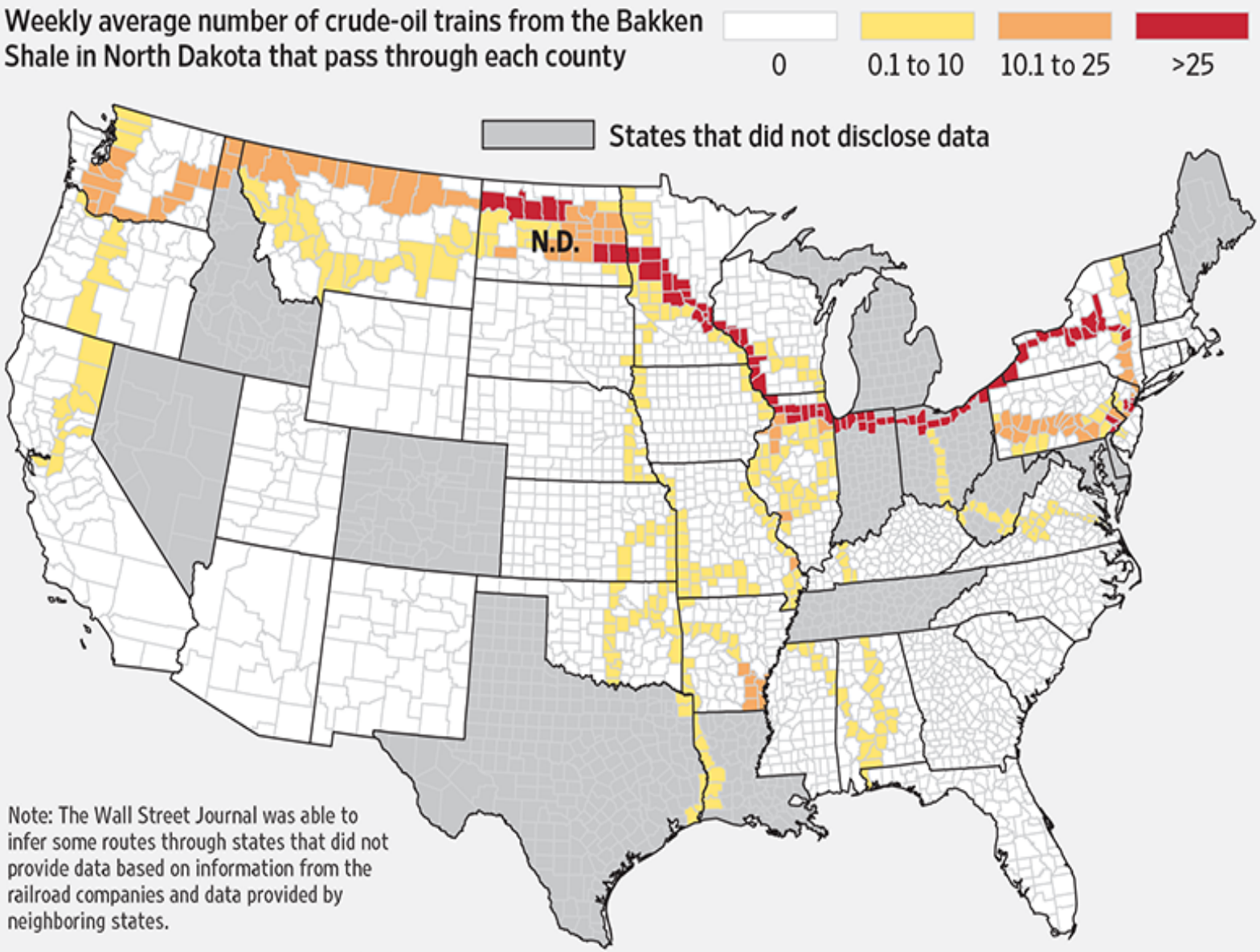
Shippers favor rail & water because they provide flexibility -- as shale plays change in productivity, and as demand changes from refiners on the East and West Coasts as well as in the South.



North American Pipeline Network

Crude By Rail Routes

Railroads have become virtual pipelines carrying crude from North Dakota to the East, West and Gulf Coasts.



Note: The Wall Street Journal was able to infer some routes through states that did not provide data based on information from the railroad companies and data provided by neighboring states.

Source: State Emergency Response Commissions

The Wall Street Journal

Economic Benefits of Crude Oil Extraction and Transport By Rail

- Economic benefits from oil extraction accrue to national and (less so) to state government in the form of various types of revenue.

- Private benefits accrue to railroads and to oil and gas companies through economies of scale and shorter time to market – days versus weeks.

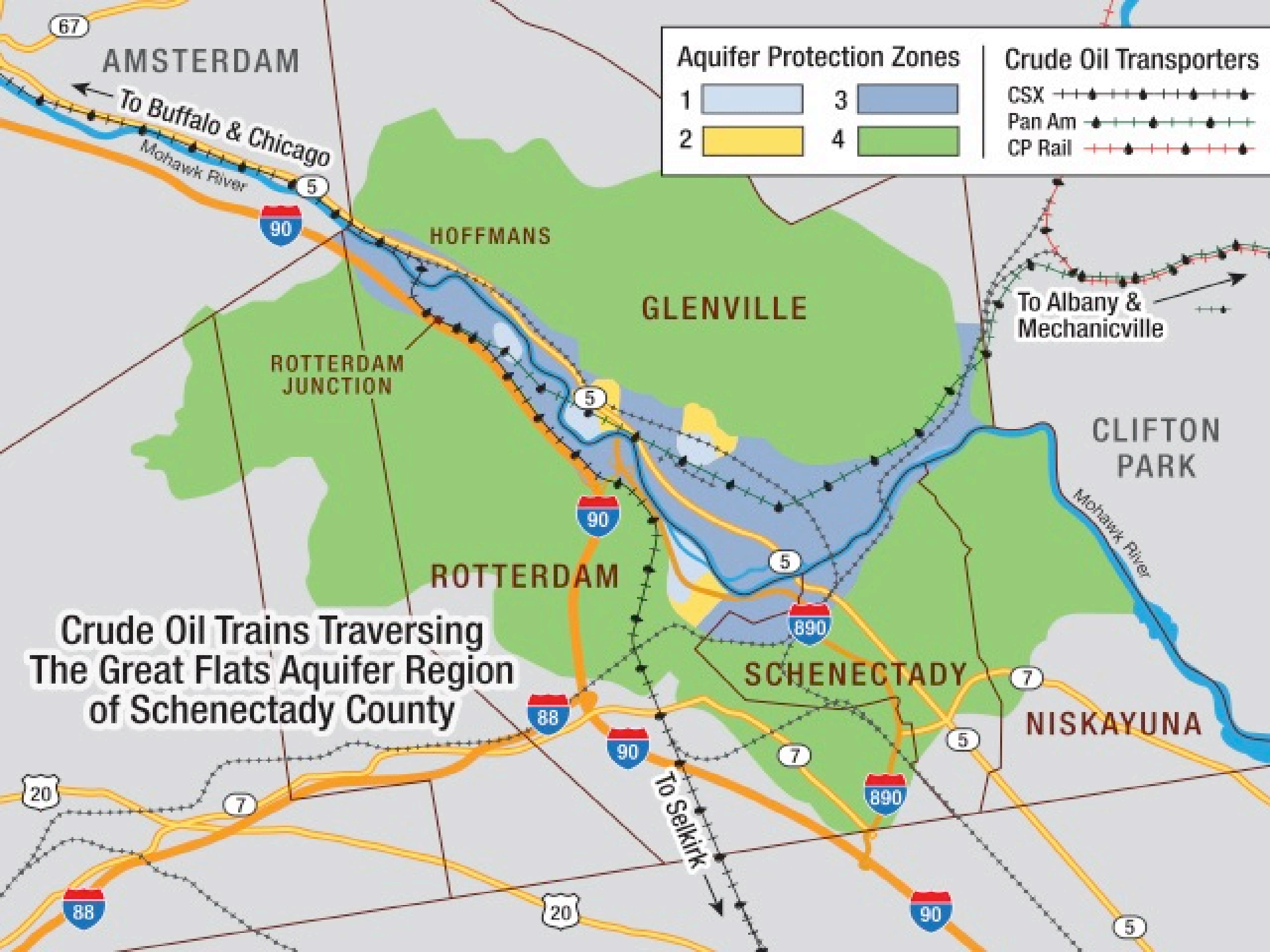
- Economic benefits favor particular actors –shippers and carriers-- and particular states – ie Texas.

Economic Costs of Crude Oil Transport

- Direct public costs – emergency preparedness, monitoring, security
- Potential public costs related to inadequate commercial insurance
- Indirect costs – congestion and …
- Crowding out of the transport of other commodities and of passengers (tourism impacts)

In the Face of These Costs and Benefits, What are the Risks?

Population, Health and Environmental Risks


Aquifer Protection Zones
1
2
3
4
Crude Oil Transporters
CSX
Pan Am
CP Rail
AMSTERDAM
To Buffalo & Chicago
Mohawk River
HOFFMANS
GLENVILLE
ROTTERDAM JUNCTION
To Albany & Mechanicville
CLIFTON PARK
ROTTERDAM
SCHENECTADY
NISKAYUNA
To Selkirk
Crude Oil Trains Traversing The Great Flats Aquifer Region of Schenectady County
67
5
90
88
890
7
20

NTSB and GAO Reports Indicate That Monitoring Capacity, Emergency Response and Infrastructure Do Not Meet the Needs Created by Increasing Oil Transport

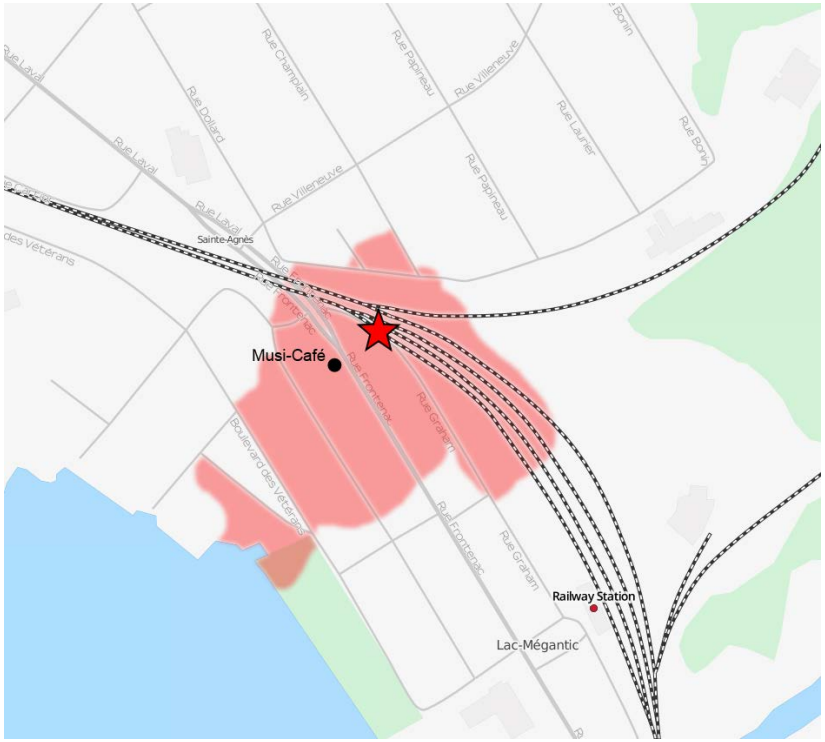
Where are the Risks?

- Rail routes and crossings
- Transshipment points inland and at ports
- On the water

Special risks for low probability, high impact accidents are in:

- Rural communities with poor emergency response capacity
- Environmentally sensitive sites
- Cities – high density and vulnerable populations

A Low Probability But Catastrophic Accident: Lac Megantic – 47 people killed and One-Yhird of the Town Destroyed

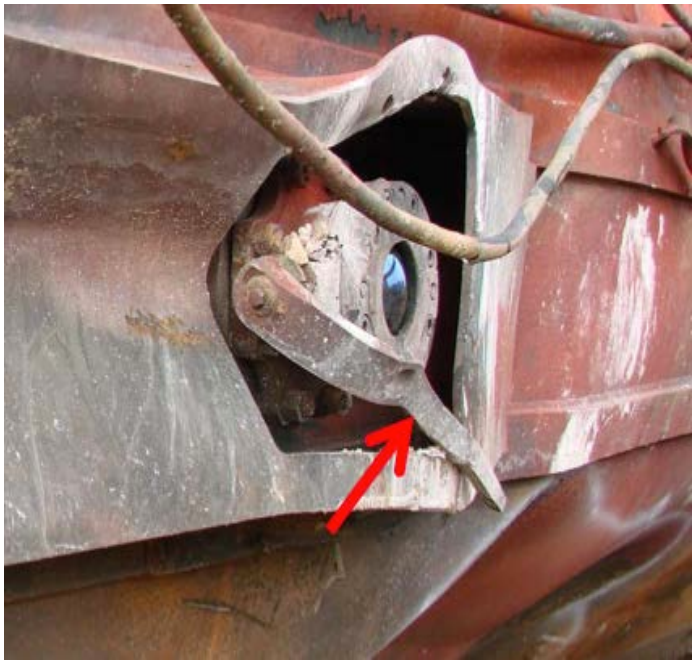


Derailment Risks:
Poor infrastructure maintenance and monitoring along routes and at crossings.

Outdated unsafe rail tank cars in 100-car, mile-long trains.

"We have said they are not safe enough to carry hazardous liquids"

Deborah Hersman
Former Director, NTSB



A Monitoring and Capacity Gap at the Federal Level?

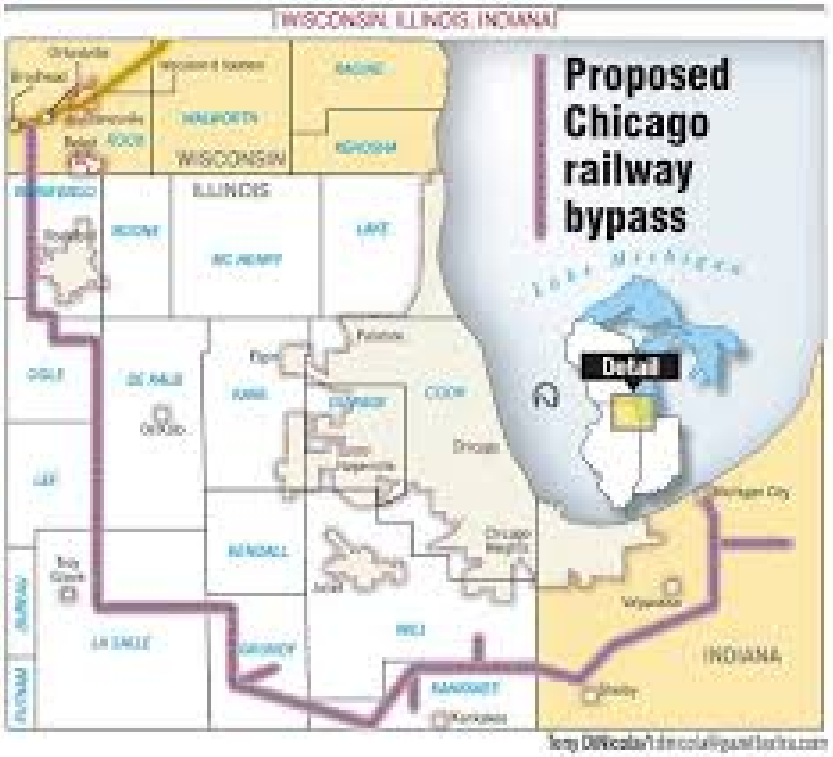
The US National Transportation Safety Board acknowledges that existing regulatory policy and capacity are not sufficient to address the risks to the public, property, or the environment from the dramatic surge in rail transport of crude.

National-level pre-emption of railroad regulation limits risk-reducing action and creates state and local costs or unfunded mandates.

There are few incentives to mitigate risks.

Slow and Partial Responses

Transport routes and safety are federally regulated. States and cities are responding individually but don't have funds or authority to reduce risks.



How Are States and Localities Responding?

- Some local, state and provincial officials are insisting on risk and liability assessments, federal funds to pay for emergency preparedness, and better information-sharing on oil train routes and timing. Emergency training is increasing … but not for catastrophic accidents.

- Indirect costs are not being addressed

- Governors and State legislatures are cooperating to demand that DOT 111 tank cars be replaced by safer models.

- State and local officials are becoming aware of significant government costs (e.g. public safety, monitoring, and emergency preparedness) as well as other unanticipated public costs (e.g. wait times at urban crossings).

- Canada is leading in regulatory response … which may have unexpected consequences in the U.S.

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