PROSPERITY = PROBLEMS
WHAT’S NEW IN OIL COUNTRY

Michael Knox
ROW Program Manager
North Dakota DOT (NDDOT)
Issues are still the same...

- Infrastructure Needs...
  - New roads, road repairs, road improvements
  - Demand for WATER...(still high)
  - Housing...(getting better – catching up)
  - Electrical power needs...(also better – demand is stabilizing)
More Emphasis

- Safety
  - Roads and Highways

- Environmental concerns
  - Air = Flaring and CO$_2$
  - Water = contamination
  - Soil = wellsite footprints
  - Spills and CONTAMINATION!!!
Same old song...FUNDING!

Money, Money and MORE Money...
PLEASE!!!
PLEASE!!!
PLEASE!!!
Major Focus = Safety

• From a legislative point of view...
• From a public opinion perspective...
• And internally, at the NDDOT...
Fact: # 1

- Crude oil is moving around the world, around our country, around pristine wilderness, around our cities and towns.

- It’s going to keep moving; it will undoubtedly increase during our new energy boom.
The $ Million Question....

So what is the safest way to move it?

Pick Your Poison....

VS.
...and the answer is...

- The short answer is:
- Trucks are worse than trains are worse than pipelines are worse than boats...

...but that’s only for human death and property destruction!

Oilprice.com
OR....

- For the normalized amount of oil spilled...

...it's *trucks are worse than pipelines are worse than trains are worse than boats*...
OR…..

- Different yet again is for environmental impact (dominated by impact to aquatic habitat)...

...where it’s *boats are worse than pipelines are worse than trucks worse than trains*...
So it depends upon what your definition is for “WORSE”.

- Is it death and destruction?
- Is it amount of oil released?
- Is it land area or water volume contaminated?
- Is it habitat destroyed?
- Is it CO₂ emitted?
Fact # 2

- In the U.S., 70% of crude oil and petroleum products are shipped by pipeline.
- 23% of oil shipments are on tankers and barges over water.
- Trucking only accounts for 4% of shipments, and rail for a mere 3%.
- In Canada, it’s even more lopsided. Almost all (97%) of natural gas and petroleum products.
Fact # 3

- In both the United States and Canada...

“more crude oil, petroleum products, and natural gas are transported in pipelines than by all other modes combined” using the unit of ton-mile which is the number of tons shipped over number of miles.
Pipelines vs. Trains

- While moving crude by pipeline still costs about half to one-third what it does to move it by rail, trains don’t require long-term contracts or need to wait for pipelines to be built.

- And while pipes stretch only from point A to point B, refiners can access nearly any market in the U.S. by rail.
Fact # 4

- The Congressional Research Service estimates that transporting crude oil by pipeline is cheaper than rail, about $5/barrel versus $10 to $15/barrel (NYTimes.com).

- But rail is more flexible and has 140,000 miles of track in the United States compared to 57,000 miles of crude oil pipelines. Building rail terminals to handle loading and unloading is a lot cheaper, and less of a hassle, than building and permitting pipelines.
Famous Bakken formation named for North Dakota homesteaders

Lora Bakken, pictured here on Oct. 23, 2017, walks on his family homestead near the site of the Henry O. Bakken well near Tioga, N.D. The well gave the Bakken oil formation its name. Amy Dalrymple/Forum Communications

TIOGA, N D. — Lorin Bakken recalls it was 2007 when he began seeing his name in the newspaper and on TV frequently as the oil boom started to heat up.

Since then, his family name has become synonymous with oil and opportunity.

“I feel so honored,” Lorin said in a rare interview.

Lorin is the only son of Henry O. Bakken. The Bakken formation — the pool of oil that lies beneath western North Dakota, northeast Montana and part of Canada — is named for the well drilled in 1951 and 1952 on the Henry O. Bakken farm northeast of Tioga.
Selected Oil Spills by State
2009-2012
Pipeline spews 20,600 barrels of oil

Some 20,600 barrels of crude oil have spewed out of a Tesoro Corp. oil pipeline in a wheat field in northwestern North Dakota, the state Health Department said Thursday.

Spill is nine miles south of Tioga
UGH...!

- BISMARCK, N.D. (AP) — One year after a pipeline rupture flooded a wheat field near Tioga, in northwestern North Dakota with more than 20,600 barrels of crude, Tesoro Corp. is still working around the clock cleaning up the oil spill — one of the largest to happen onshore in U.S. history.

- Cleanup costs have soared from the company's original estimate of $4 million to a forecast of more than $20 million, and it may be at least another year before work is completed, the company and state officials said. The oil-sopped parcel of land, about the size of seven football fields, is no longer usable for planting at present.
A North Dakota pipeline just spilled 865,200 gallons of crude oil. It was caused by a hole this big.
Fact # 5

**Crude Oil and Petroleum Products during Domestic Transportation**

- **1990-1995**: Pipelines, Tank Vessels/Barges, Tanker Trucks, Rail
- **1996-2001**: Pipelines, Tank Vessels/Barges, Tanker Trucks, Rail
- **2002-2007**: Pipelines, Tank Vessels/Barges, Tanker Trucks, Rail


**Notes:** Pipelines include onshore and offshore pipelines. The time periods were chosen based on the available annual data for both spill volume and ton-miles. The values for each time period are averages of annual data for each six-year period.
Fact # 6  Export Capacity

Export Capacity of the Williston Basin
Thousands of barrels per day

GRAPHIC BY BLOOMBERG BUSINESSWEEK; DATA: NORTH DAKOTA PIPELINE AUTHORITY
Fact # 7

The Bakken produces nearly 1,200,000 barrels of oil per day. But with all that oil pumping out of the ground, it has to be transported, somehow, to refineries for processing. BNSF has added nine additional trains every day and they’re carrying more than 100 cars of oil.
Fact # 8

In Tioga, a BNSF train prepares to load oil from the Bakken formation.

A Hess rail terminal, one of 10 BNSF uses in North Dakota.

A typical train can carry roughly 70,000 barrels of oil.
Train loading terminal facility
and more facts...

- A rail tank car carries about 30,000 gallons (÷ 42 gallons/barrel = about 700 barrels).

- A train of 100 cars carries about 3 million gallons (70,000 barrels) and takes over 3 days to travel from Alberta to the Gulf Coast, about a million gallons per day.

- Hauling crude can sometimes be more lucrative; according to David Vernon, a transportation analyst at Sanford C. Bernstein (AB), Railroads generate about $2,500 per carload of crude vs. $2,200 for a carload of coal or $1,100 for small grains because of the high demand for crude by rail...
The Keystone will carry about 35 million gallons per day (830,000 barrels).

This puts pressure on rail transport to get bigger and bigger, and include more cars per train, the very reason that crude oil train wrecks have dramatically increased lately.
Police helicopter view of Lac-Mégantic, Quebec the day of the derailment.

The death toll of 47 due to the crash and resultant explosion makes it the fourth-deadliest rail accident in Canadian history, and the deadliest involving a non-passenger train. It is also the deadliest rail accident since Canada’s confederation in 1867.
A numbers game…..

Two seemingly opposite facts:

1) from 1980 to 2012, the train accident rate in the United States fell 80 percent, the rail employee injury rate fell 85 percent and the RR crossing collision rate fell 82 percent, but

2) more crude oil was spilled in U.S. rail incidents in 2013 than was spilled in the previous thirty-seven years.

Huh?

Using data from the Pipeline and Hazardous Materials Safety Administration, 1.5 million gallons of crude oil were spilled from rail cars in 2013. On the other hand, from 1975 to 2012, railroads spilled a total of 800,000 gallons of crude oil.
Highway costs

- The growth has come at a cost, however. At a conference on oil field infrastructure in October, one executive noted that McKenzie County, which sits in the heart of the oil patch and had a population of 6,360 people in 2010, required nearly $200 million in road repairs.
• In 2014, the population of McKenzie County was estimated at 10,996.

• NDDOT projects alone in McKenzie county were in excess of $300 million PER YEAR in 2013 and in 2014.

• The proposed NDDOT budget for the 2015-2016 biennium is $2.8 billion.
In fiscal year 2014, estimated per capita spending in North Dakota equaled $9,163, the fifth-highest in the nation.

In the 2013-2015 biennium the NDDOT budget was approximately $3.4 billion

NDDOT budget for the 2015-2017 biennium was proposed at $3.2 billion.
### 2011-13 and 2013-15 Estimated Oil Tax Allocations

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<tr>
<th>Fund</th>
<th>2011-13</th>
<th>2013-15</th>
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<tr>
<td>Oil and Gas Impact Grant Fund</td>
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<td>Oil and Gas Research Fund</td>
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<td>Counties and Cities</td>
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<td>Tribal Allocations</td>
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<td>ND Outdoor Heritage Fund</td>
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<td>Strategic Investment &amp; Improvements Fund</td>
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<td><strong>Total Oil and Gas Taxes</strong></td>
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Questions...??????
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