

A decorative graphic on the right side of the page. It features three concentric blue circles of varying sizes. Two thin blue lines intersect at a point on the left side of the circles, extending towards the top right corner of the page. The circles are positioned in the upper right and lower right areas of the page.

# North Dakota's Oil Transportation Infrastructure

North Dakota Pipeline Authority

Industrial Commission of North Dakota

Governor Jack Dalrymple

Attorney General Wayne Stenehjem

Agriculture Commissioner Doug Goehring

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## NORTH DAKOTA OIL PRODUCTION

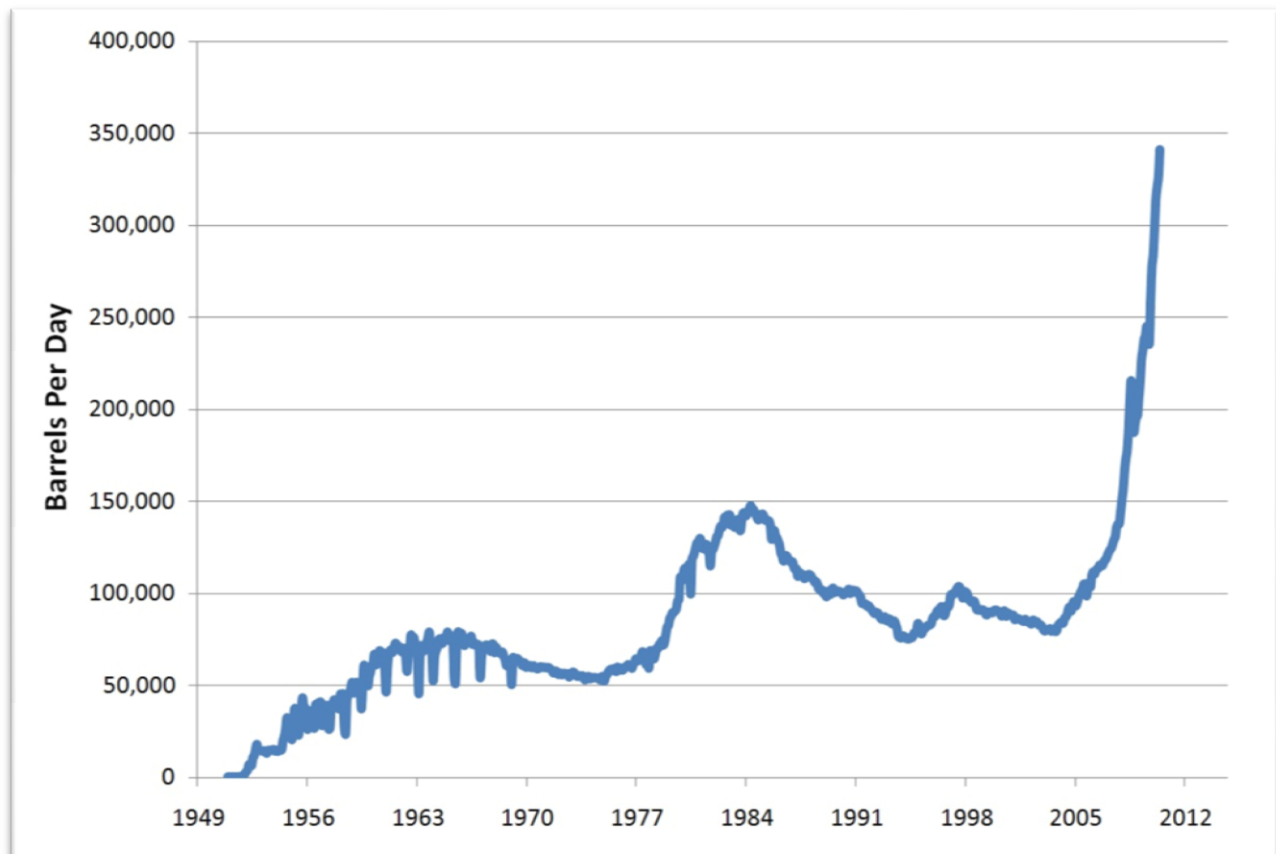
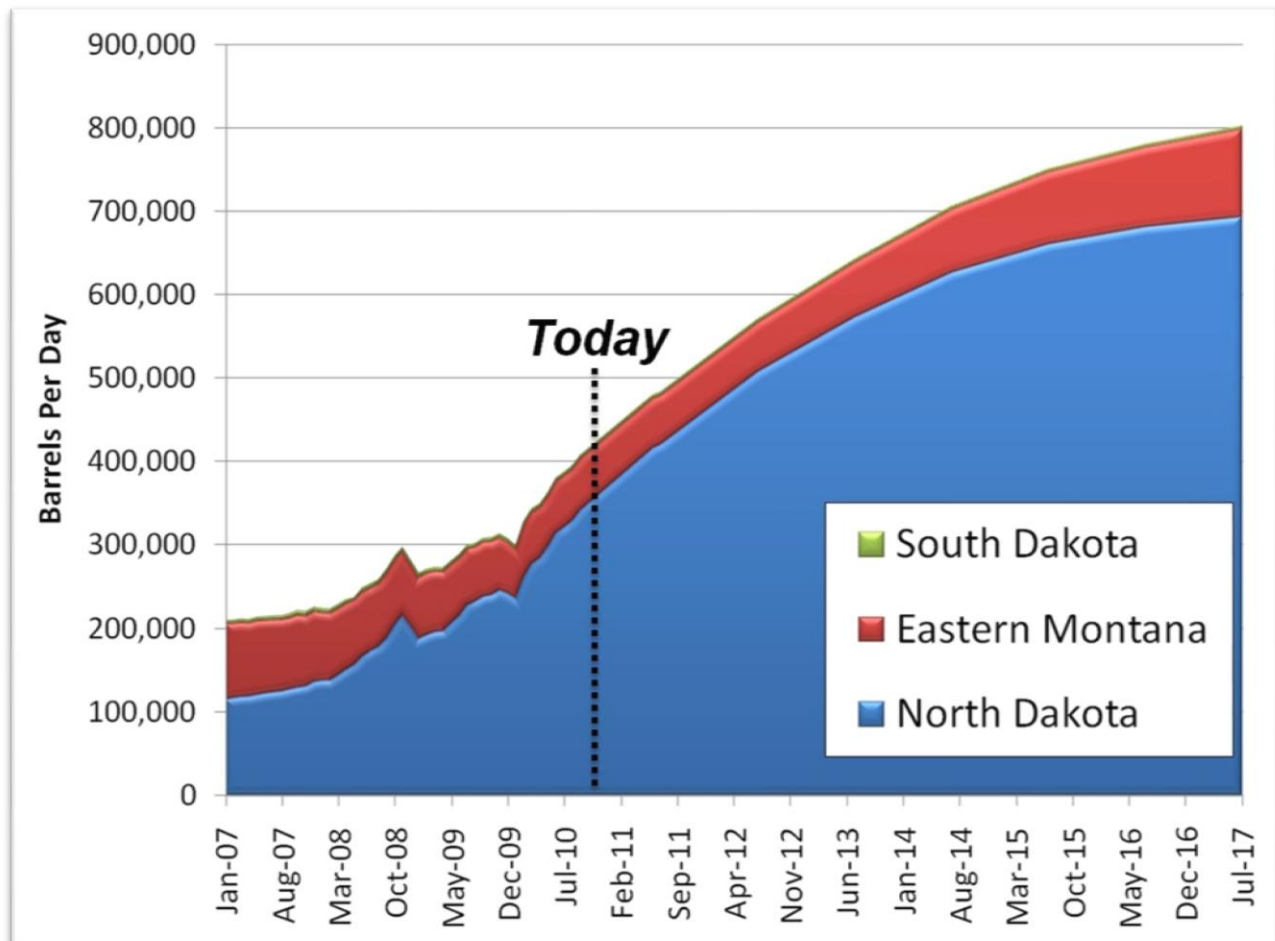


Figure 1. Historic oil production for North Dakota in barrels of oil per day.

For the last four years, the state's petroleum industry has been on a fast paced journey to unlock the vast resources held deep inside the Bakken and Three Forks formations. Thanks to the Bakken and Three Forks formations, the state of North Dakota is currently the fourth largest producer of oil in the United States. North Dakota has been setting new production records almost every month, with current oil production just over 342,000 barrels of oil per day (BOPD) (Figure 1). Additional oil plays within North Dakota, including the Lodgepole, Tyler, and Spearfish, are also generating a great deal of industry interest, as it is believed that new drilling and completions technology may be very successful in these intervals as well. Studies conducted by the North Dakota Department of Mineral Resources in 2008 and 2010 indicate 4.0-6.3 billion barrels of recoverable reserves in North Dakota's Bakken and Three Forks formations alone. With a resource base as large as that found in Western North Dakota, experts predict at least an additional ten to twenty years of intense drilling and development, followed by several more decades of continued petroleum production.

## FUTURE OIL PRODUCTION



**Figure 2. Crude oil production forecast for the United States portion of the Williston Basin. A sustained rig count of 150 was used for the North Dakota portion.**

A properly sized and economic transportation system is essential to ensure continued expansion and development in the Williston Basin. In order to develop a long term vision for oil transportation in the Williston Basin, a comprehensive oil production forecast must be in place.

The North Dakota Department of Mineral Resources periodically updates a comprehensive state oil production forecast that includes all producing formations, including the Bakken and Three Forks. The most recent forecast indicates that oil production may reach 450,000 to 700,000 BOPD within the next 3-7 years. Coupled with increasing interest in the Bakken and Three Forks formations in Eastern Montana, the United States portion of the Williston Basin could potentially be producing 550,000-800,000 BOPD between 2015-2020 (Figure 2). This anticipated growth has kept industry busy working to come up with solutions to move these never before seen volumes of oil.

## CURRENT CRUDE OIL INFRASTRUCTURE

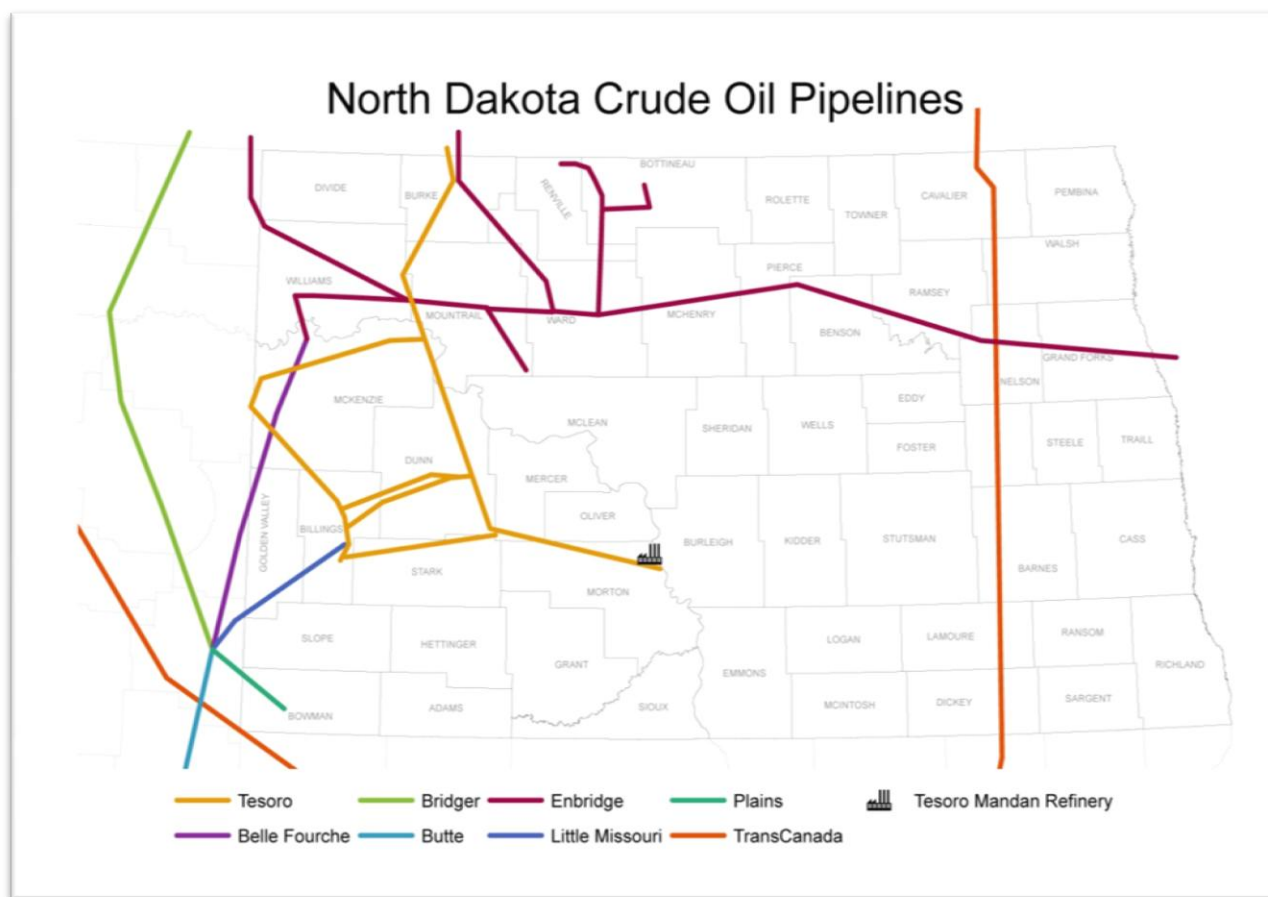


Figure 3. Map of the major crude oil transmission pipelines in the Williston Basin. Small scale gathering pipelines are not included.

| Transportation System Capacity, Barrels Per Day            | 2007           | 2008           | 2009           | 2010           |
|--|----------------|----------------|----------------|----------------|
| <b>Pipeline Transportation</b>                             |                |                |                |                |
| Butte Pipeline   | 92,000         | 104,000        | 118,000        | 118,000        |
| Enbridge North Dakota                                      | 80,000         | 110,000        | 110,000        | 161,500        |
| Tesoro Mandan Refinery                                     | 58,000         | 58,000         | 58,000         | 58,000         |
| <b>Pipeline Only Total</b>                                 | <b>230,000</b> | <b>272,000</b> | <b>286,000</b> | <b>337,500</b> |
| <b>Rail Transportation</b>                                 |                |                |                |                |
| Various Sites including: Minot, Dore, Donnybrook, Stampede | -              | 30,000         | 30,000         | 30,000         |
| EOG Rail, Stanley, ND (Up to 90,000 BOPD)                  | -              | -              | 65,000         | 65,000         |
| Dakota Transport Solutions, New Town, ND                   | -              | -              | -              | 20,000         |
| <b>Rail Only Total</b>                                     | <b>-</b>       | <b>30,000</b>  | <b>95,000</b>  | <b>115,000</b> |
| <b>Pipeline and Rail Combined Total</b>                    | <b>230,000</b> | <b>302,000</b> | <b>381,000</b> | <b>452,500</b> |

## MOVING TOMMORROW'S PRODUCTION

Several major projects have been planned to address the growing volumes of crude oil post 2010. Figure 4 and the table below outline the scale and timing of upcoming pipeline expansions in the Williston Basin. It can be noted that pipeline capacity is not expected to keep pace with production until early 2013, leaving incremental volumes to find alternative transportation methods, primarily rail.

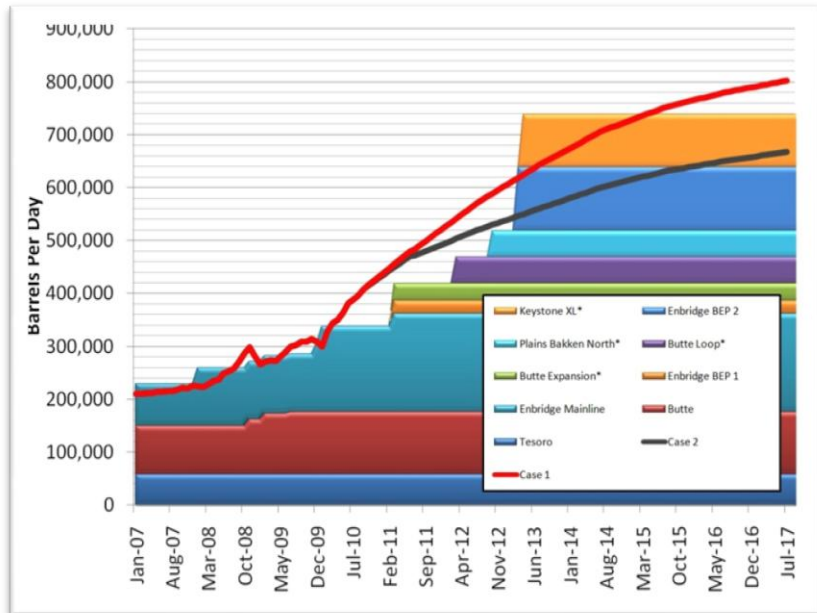


Figure 4. Forecasted oil production for the Williston Basin with the planned and proposed pipeline projects. Oil production Cases 1 and 2 assumed 150 and 120 drilling rigs, respectively.

| Transportation System Capacity, Barrels Per Day | 2007           | 2008           | 2009           | 2010           | 2011           | 2012           | 2013           |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>Pipeline Transportation</b>                  |                |                |                |                |                |                |                |
| Butte Pipeline                                  | 92,000         | 104,000        | 118,000        | 118,000        | 118,000        | 118,000        | 118,000        |
| Enbridge North Dakota                           | 80,000         | 110,000        | 110,000        | 161,500        | 161,500        | 161,500        | 161,500        |
| Tesoro Mandan Refinery                          | 58,000         | 58,000         | 58,000         | 58,000         | 58,000         | 58,000         | 58,000         |
| Enbridge Sweet Only                             | -              | -              | -              | -              | 23,500         | 23,500         | 23,500         |
| Enbridge Bakken Expansion                       | -              | -              | -              | -              | 25,000         | 25,000         | 145,000        |
| Butte Pipeline Expansion*                       | -              | -              | -              | -              | 32,000         | 32,000         | 32,000         |
| Butte Loop*                                     | -              | -              | -              | -              | -              | 50,000         | 50,000         |
| Plains Bakken North*                            | -              | -              | -              | -              | -              | 50,000         | 50,000         |
| Keystone XL Interconnect*                       | -              | -              | -              | -              | -              | -              | 100,000        |
| <b>Pipeline Only Total</b>                      | <b>230,000</b> | <b>272,000</b> | <b>286,000</b> | <b>337,500</b> | <b>418,000</b> | <b>518,000</b> | <b>738,000</b> |

\*Project still in the proposed or internal review phase

## RAIL TRANSPORTATION'S VITAL ROLE

It is clear from Figure 5 and the table below that rail transportation has kept, and will continue to keep, Williston Basin oil moving to market during the tremendous growth period anticipated to continue for the next several years. Although some speculate for its continued use in reaching niche markets, it is relatively unclear at this time if, or how, rail transportation will be used after the early 2013 pipeline expansions.

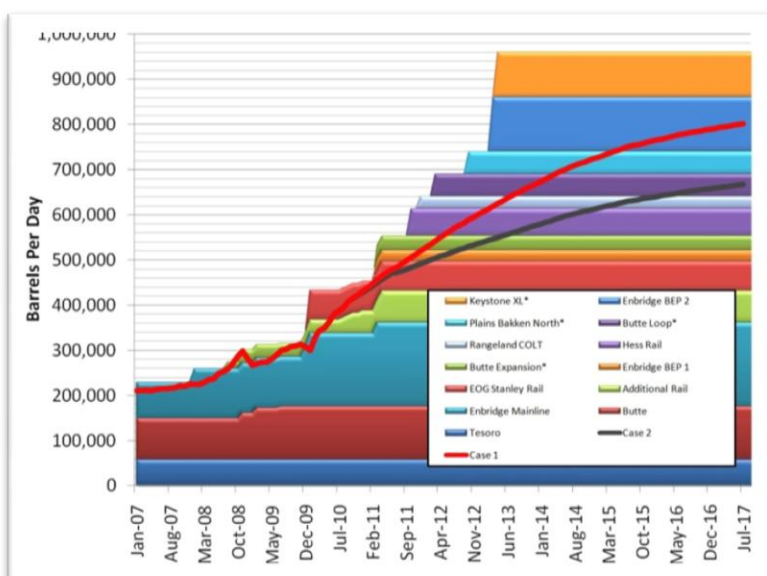


Figure 5. Forecasted oil production for the Williston Basin with all planned and proposed transportation projects. Oil production Cases 1 and 2 assumed 150 and 120 drilling rigs, respectively.

| Transportation System Capacity, Barrels Per Day | 2007           | 2008           | 2009           | 2010           | 2011           | 2012           | 2013           |
|---|----------------|----------------|----------------|----------------|----------------|----------------|----------------|
| <b>Pipeline Transportation</b>                  |                |                |                |                |                |                |                |
| Butte Pipeline                                  | 92,000         | 104,000        | 118,000        | 118,000        | 118,000        | 118,000        | 118,000        |
| Enbridge North Dakota                           | 80,000         | 110,000        | 110,000        | 161,500        | 161,500        | 161,500        | 161,500        |
| Tesoro Mandan Refinery                          | 58,000         | 58,000         | 58,000         | 58,000         | 58,000         | 58,000         | 58,000         |
| Enbridge Sweet Only                             | -              | -              | -              | -              | 23,500         | 23,500         | 23,500         |
| Enbridge Bakken Expansion                       | -              | -              | -              | -              | 25,000         | 25,000         | 145,000        |
| Butte Pipeline Expansion*                       | -              | -              | -              | -              | 32,000         | 32,000         | 32,000         |
| Butte Loop*                                     | -              | -              | -              | -              | -              | 50,000         | 50,000         |
| Plains Bakken North*                            | -              | -              | -              | -              | -              | 50,000         | 50,000         |
| Keystone XL Interconnect*                       | -              | -              | -              | -              | -              | -              | 100,000        |
| <b>Pipeline Only Total</b>                      | <b>230,000</b> | <b>272,000</b> | <b>286,000</b> | <b>337,500</b> | <b>418,000</b> | <b>518,000</b> | <b>738,000</b> |
| <b>Rail Transportation</b>                      |                |                |                |                |                |                |                |
| Various Sites including                         | -              | 30,000         | 30,000         | 30,000         | 30,000         | 30,000         | 30,000         |
| EOG Rail  | -              | -              | 65,000         | 65,000         | 65,000         | 65,000         | 65,000         |
| Dakota Transport Solutions                      | -              | -              | -              | 20,000         | 40,000         | 40,000         | 40,000         |
| Hess Rail                                       | -              | -              | -              | -              | -              | 60,000         | 60,000         |
| Rangeland COLT Hub                              | -              | -              | -              | -              | -              | 27,000         | 27,000         |
| <b>Rail Only Total</b>                          | <b>-</b>       | <b>30,000</b>  | <b>95,000</b>  | <b>115,000</b> | <b>135,000</b> | <b>222,000</b> | <b>222,000</b> |
| <b>Total Pipeline and Rail</b>                  | <b>230,000</b> | <b>302,000</b> | <b>381,000</b> | <b>452,500</b> | <b>553,000</b> | <b>740,000</b> | <b>960,000</b> |

\*Project still in the proposed or internal review phase

## THE ROAD AHEAD

With over a billion dollars of completed or planned oil transportation expansions, North Dakota is positioned for many more years of successful oil and natural gas development. The combination of pipeline and rail transportation that has evolved in North Dakota over the past two years has shown a great deal of creativity and ingenuity on the part of industry. At least in the near term, the challenges of moving crude oil out of the Williston Basin that have plagued the region over the past several years have been alleviated. With increasing efficiencies in drilling and completion, the current debate is how high oil production in the Williston Basin will be in the coming years. A close eye is being kept on new production advances and what transportation options may need to be in place post 2013.

Along with the large export projects discussed in this report, industry is also investing a great deal of time and money to solve a second challenge of efficiently and safely moving crude oil within the state. Crude oil gathering pipelines are being constructed around the Williston Basin to help lower the overall transportation costs and reduce some of the trucking issues associated with heavy road traffic and North Dakota's harsh winters.