

# ***Industrial Commission Update***

**Justin J Kringstad**

*Geological Engineer*

*Director*

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**January 24, 2018**

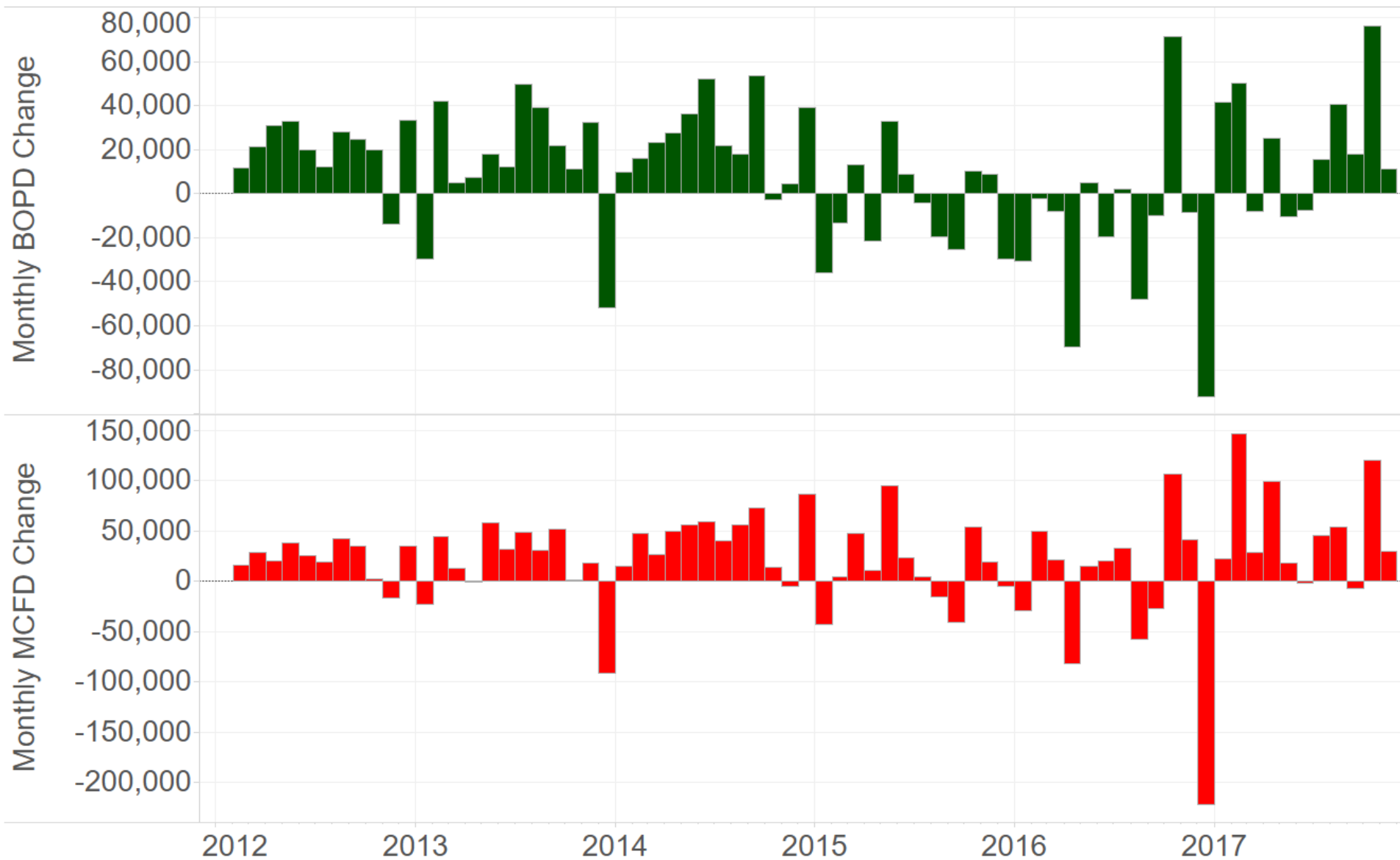


# US Williston Basin Oil Production - 2017

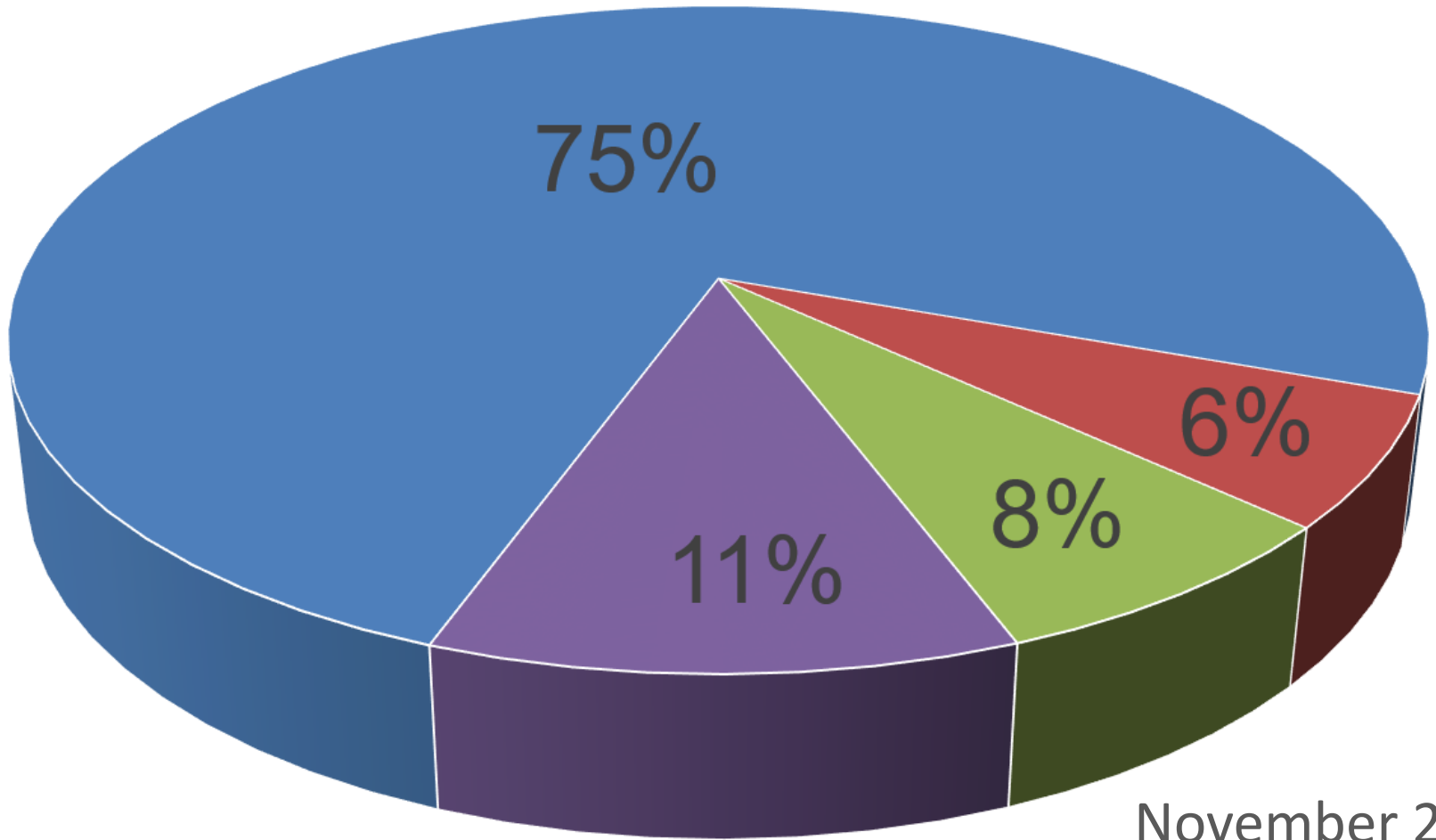
MONTH	ND	Eastern MT*	SD	TOTAL
January	983,840	52,727	3,553	1,040,120
February	1,034,148	53,959	3,718	1,091,825
March	1,025,932	52,901	3,705	1,082,537
April	1,050,892	52,437	3,768	1,107,096
May	1,040,658	52,980	3,389	1,097,027
June	1,032,921	52,947	3,563	1,089,430
July	1,048,560	51,767	3,529	1,103,856
August	1,089,289	51,041	3,565	1,143,894
September	1,107,345	51,184	3,568	1,162,096
October	1,183,810	49,385	3,611	1,236,806
November	1,194,920			
December				



# Monthly Production Change



# Estimated Williston Basin Oil Transportation



■ Pipeline Export

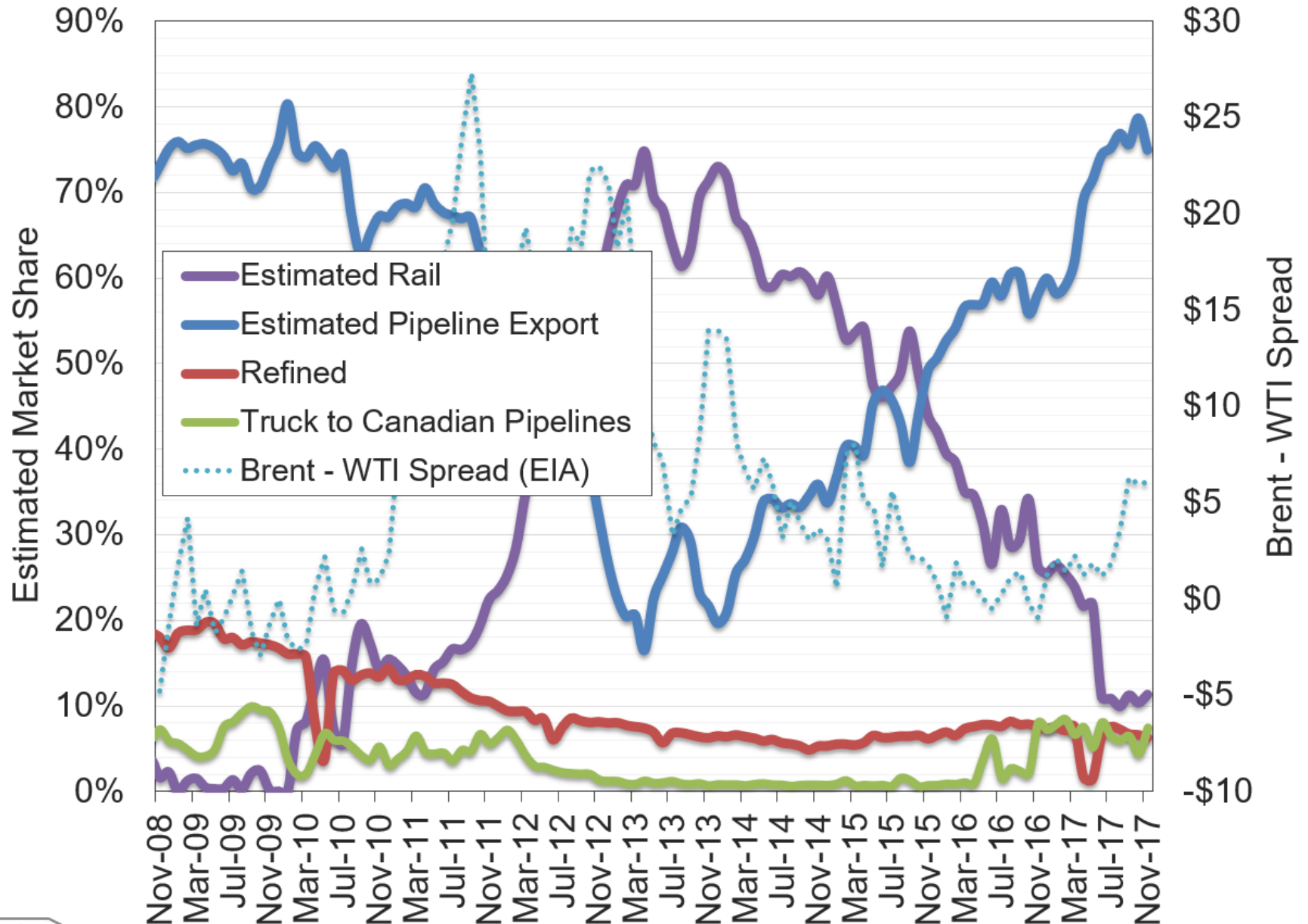
■ Refined

■ Truck to Canadian Pipelines

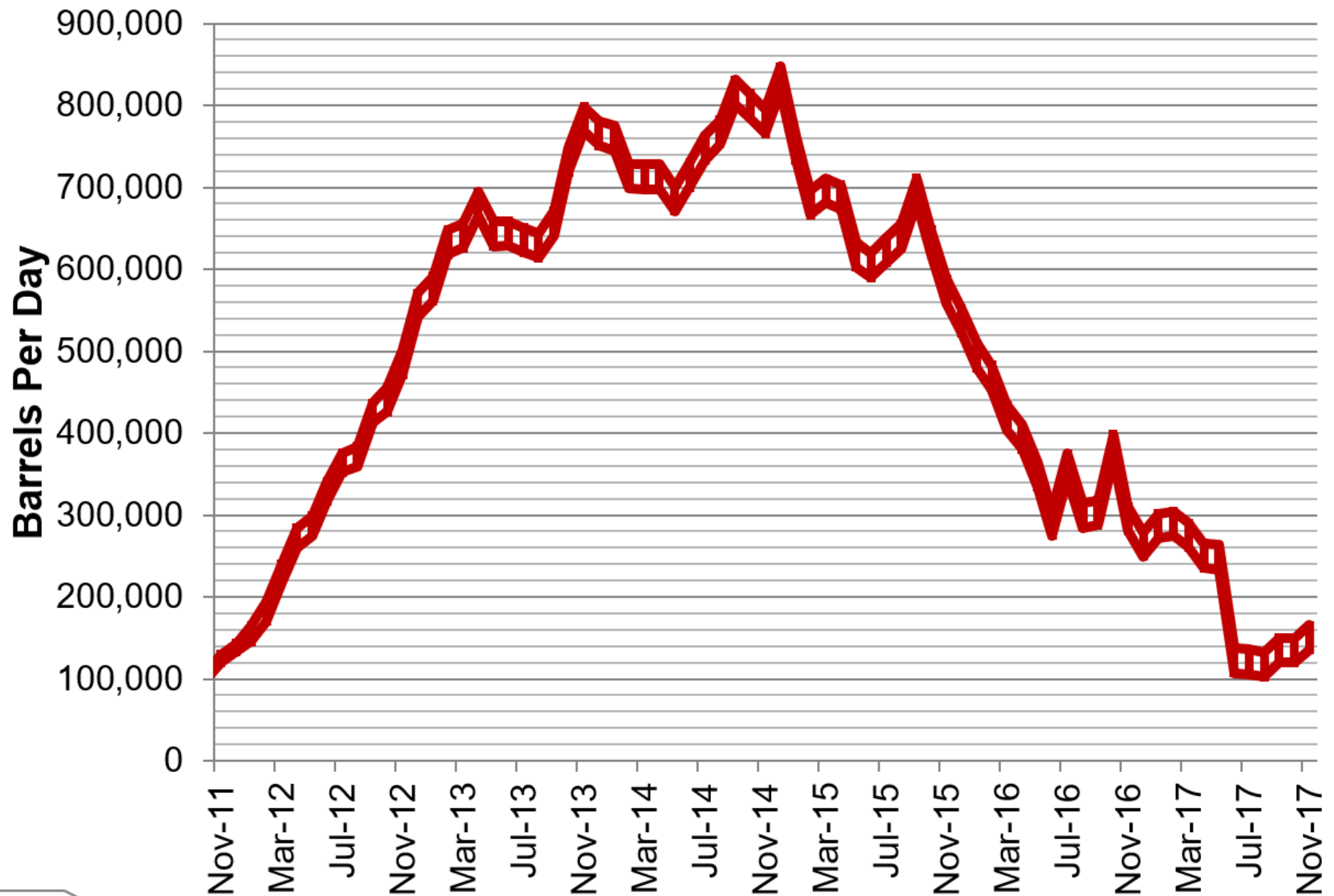
■ Estimated Rail



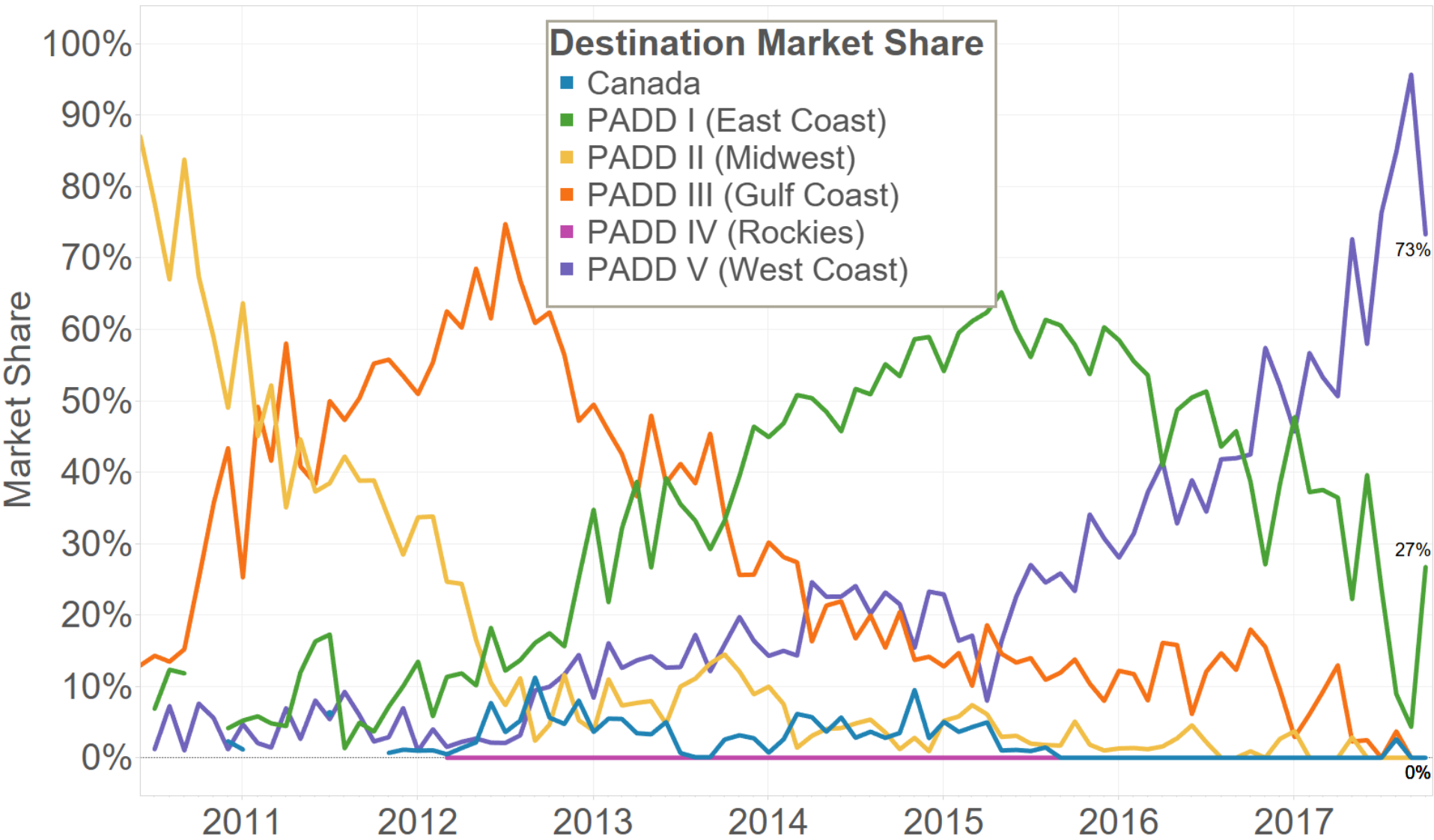
# Estimated Williston Basin Oil Transportation



# Estimated ND Rail Export Volumes



# Rail Destinations Market Share (Oct 2017)

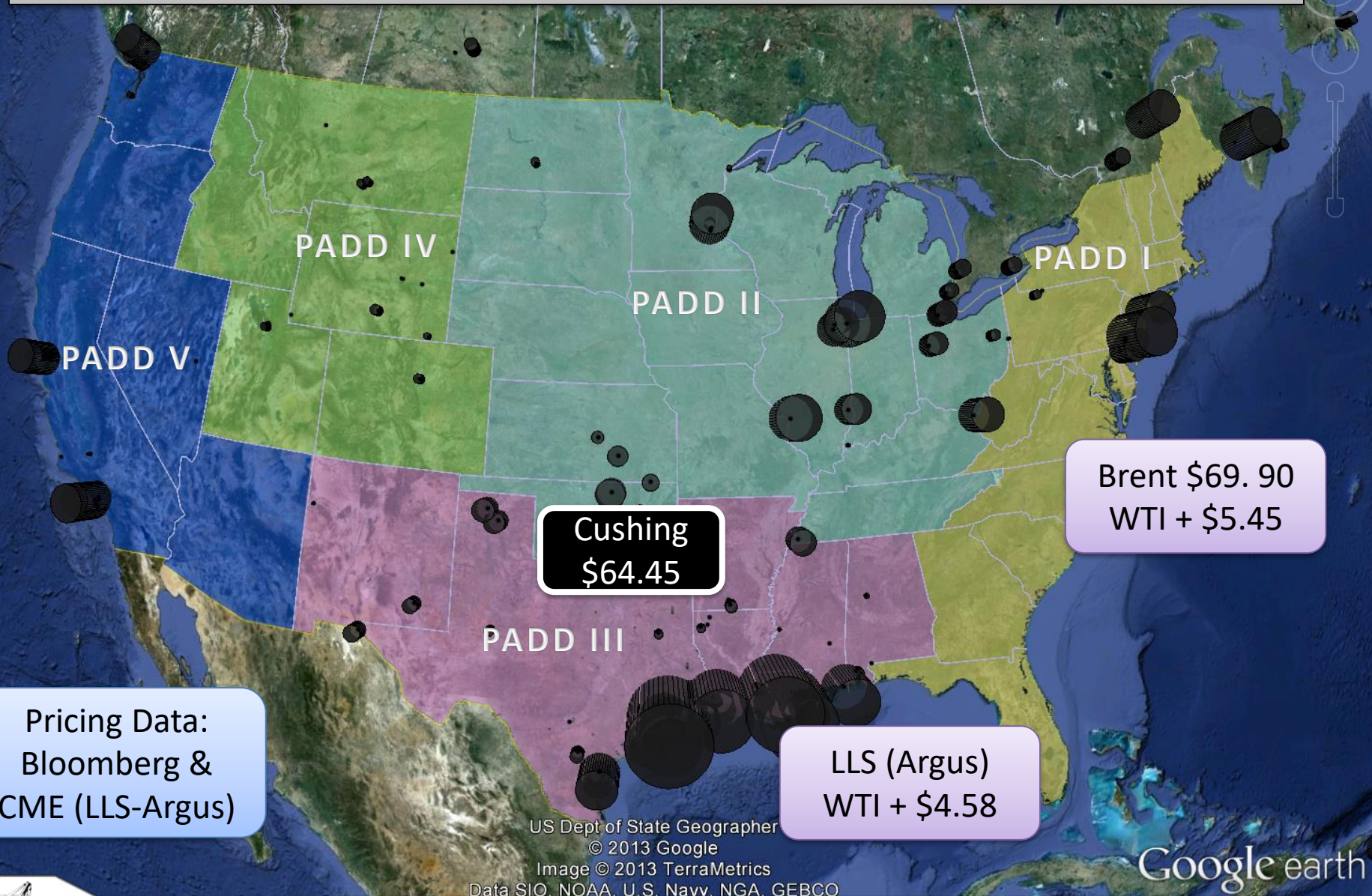


*Data for Rail Destination Market Share Provided by the US Energy Information Administration*



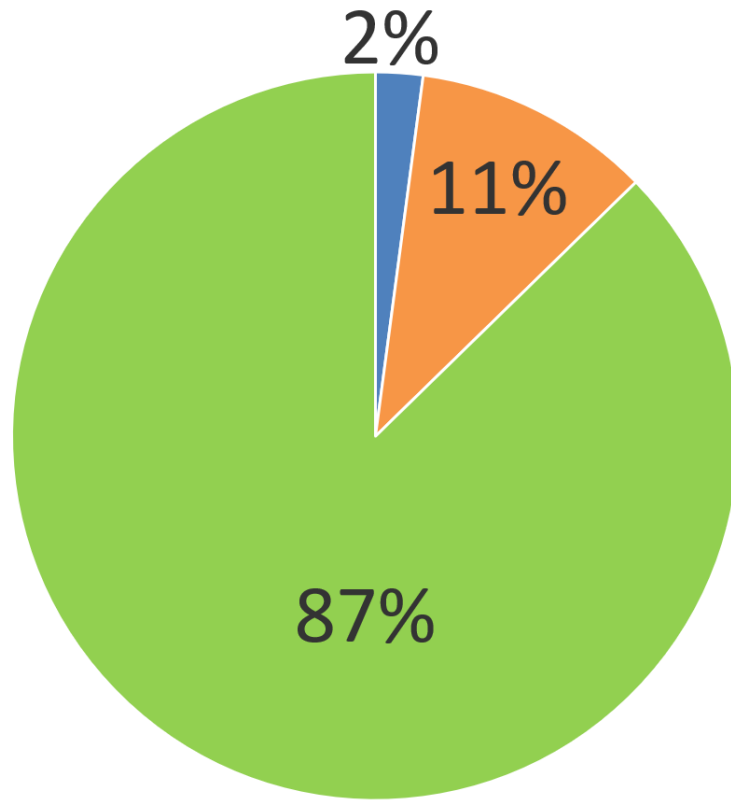


# Crude Oil Prices – Jan. 23, 2018





# Solving the Flaring Challenge



Statewide

**GREEN** – % of gas captured and sold  
**Blue** – % flared from zero sales wells  
**Orange** – % flared from wells with at least one mcf sold.

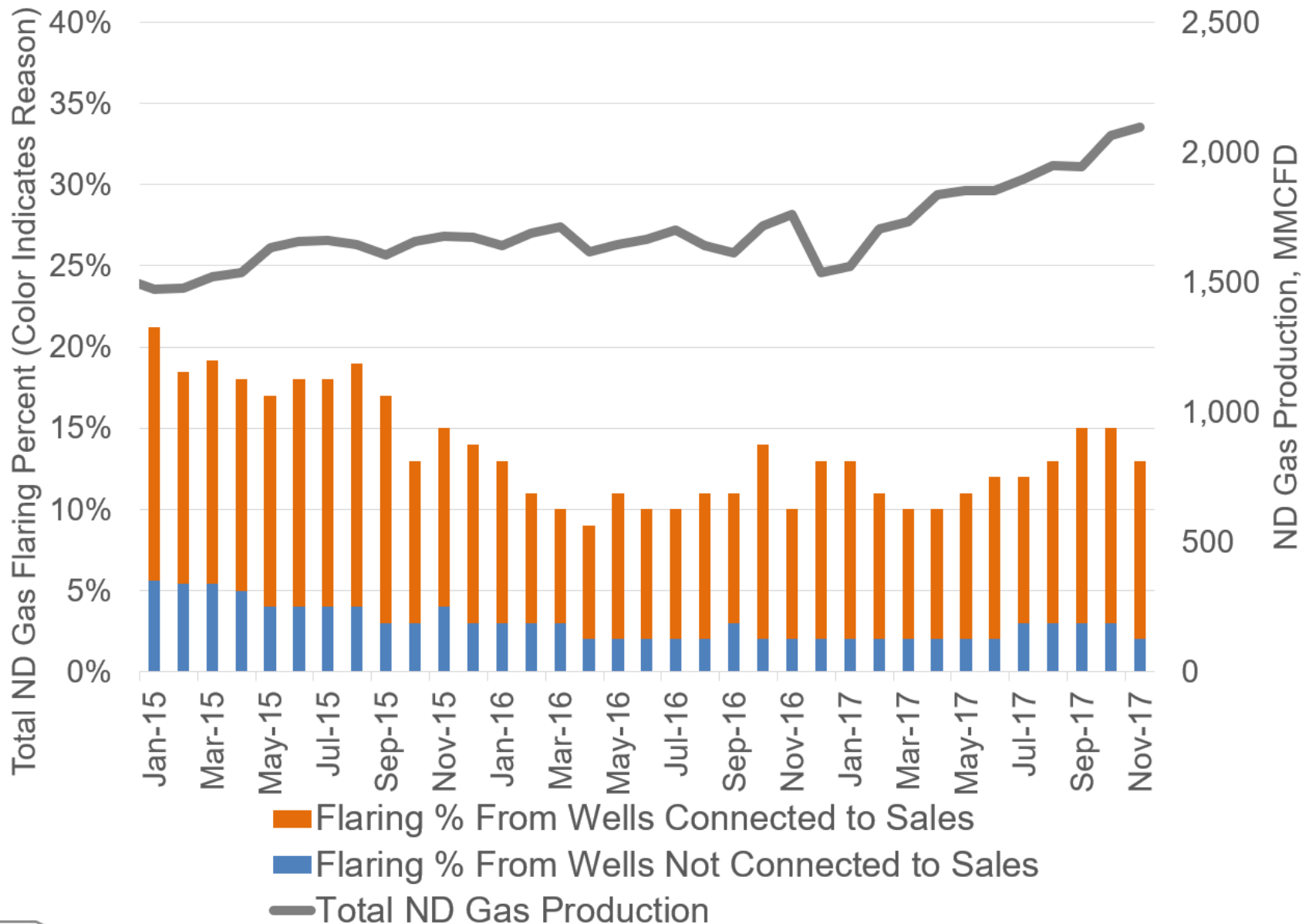
## Simple Terms

**Blue** – Lack of pipelines  
**Orange** – Challenges on existing infrastructure

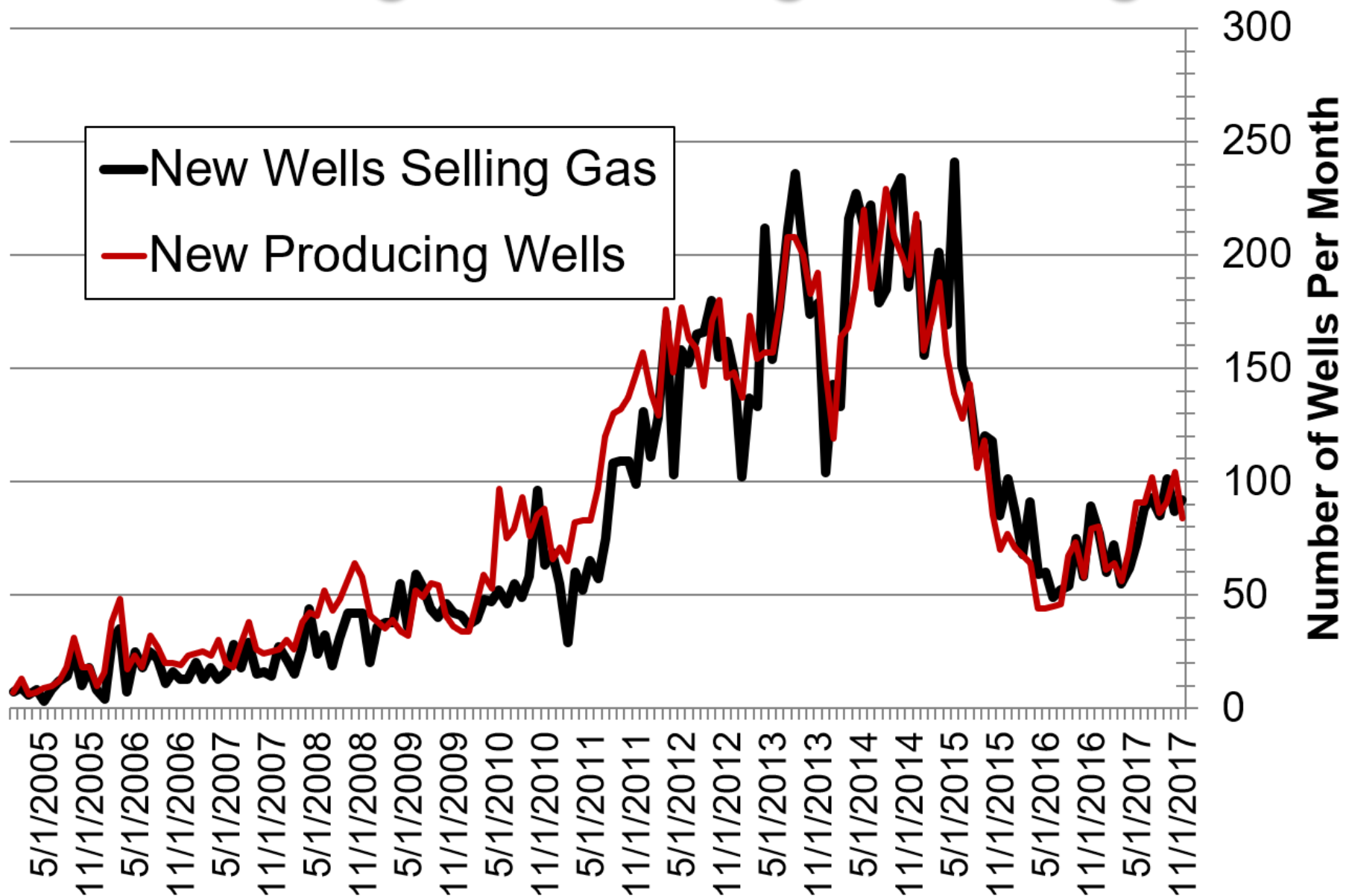
Nov 2017 Data – Non-Confidential Wells



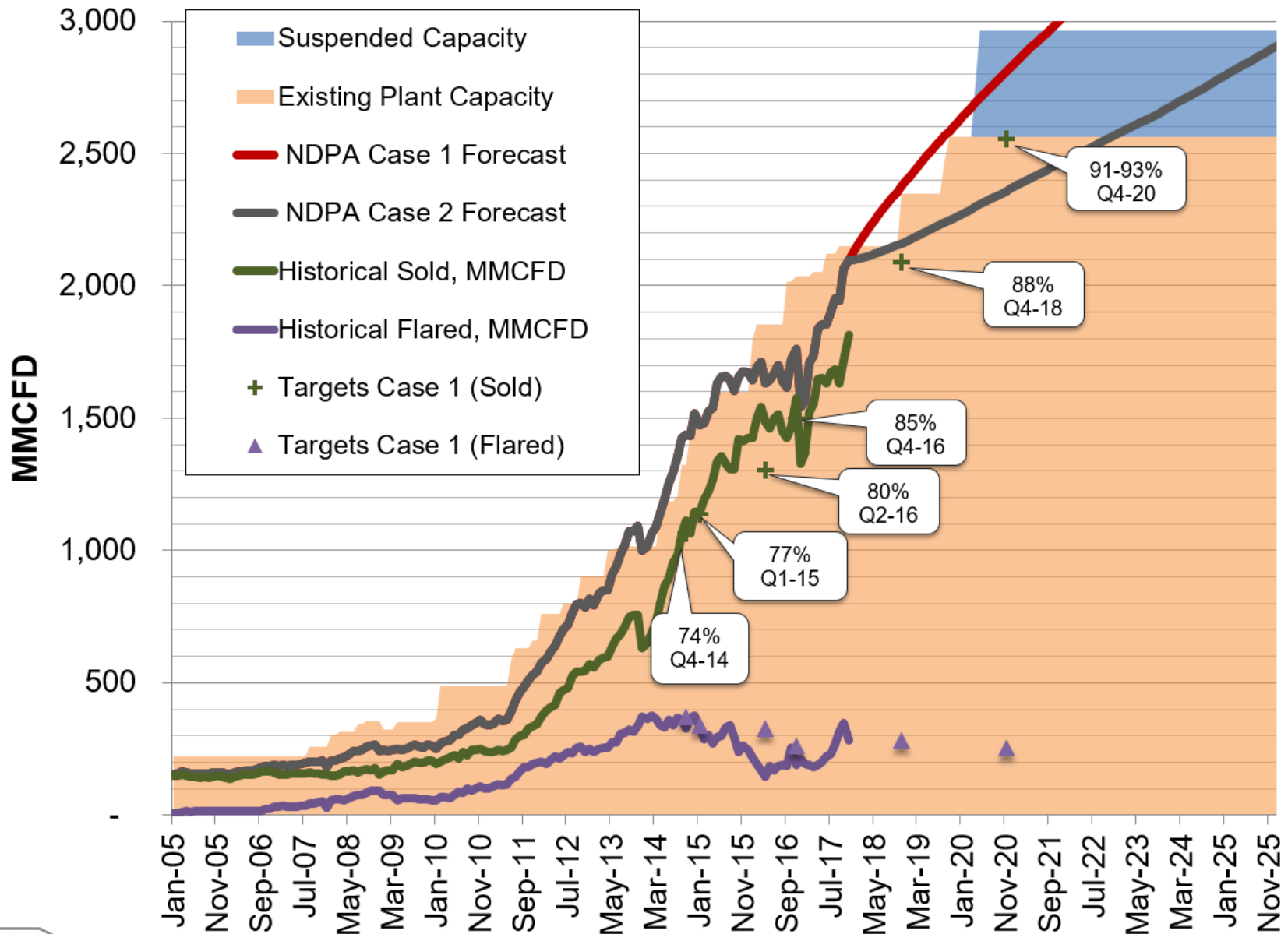
# Solving the Flaring Challenge



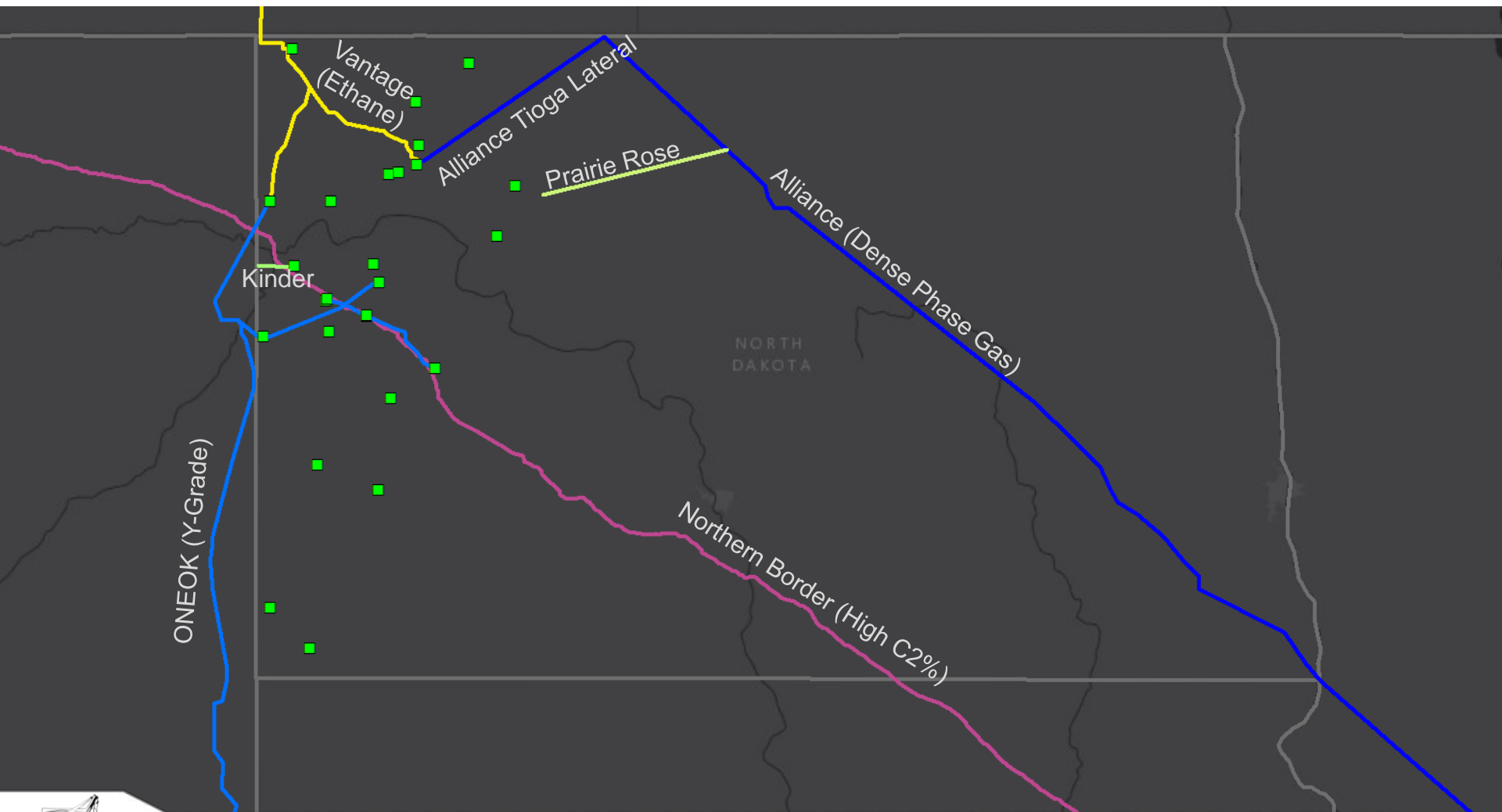
# Solving the Flaring Challenge



# Solving the Flaring Challenge

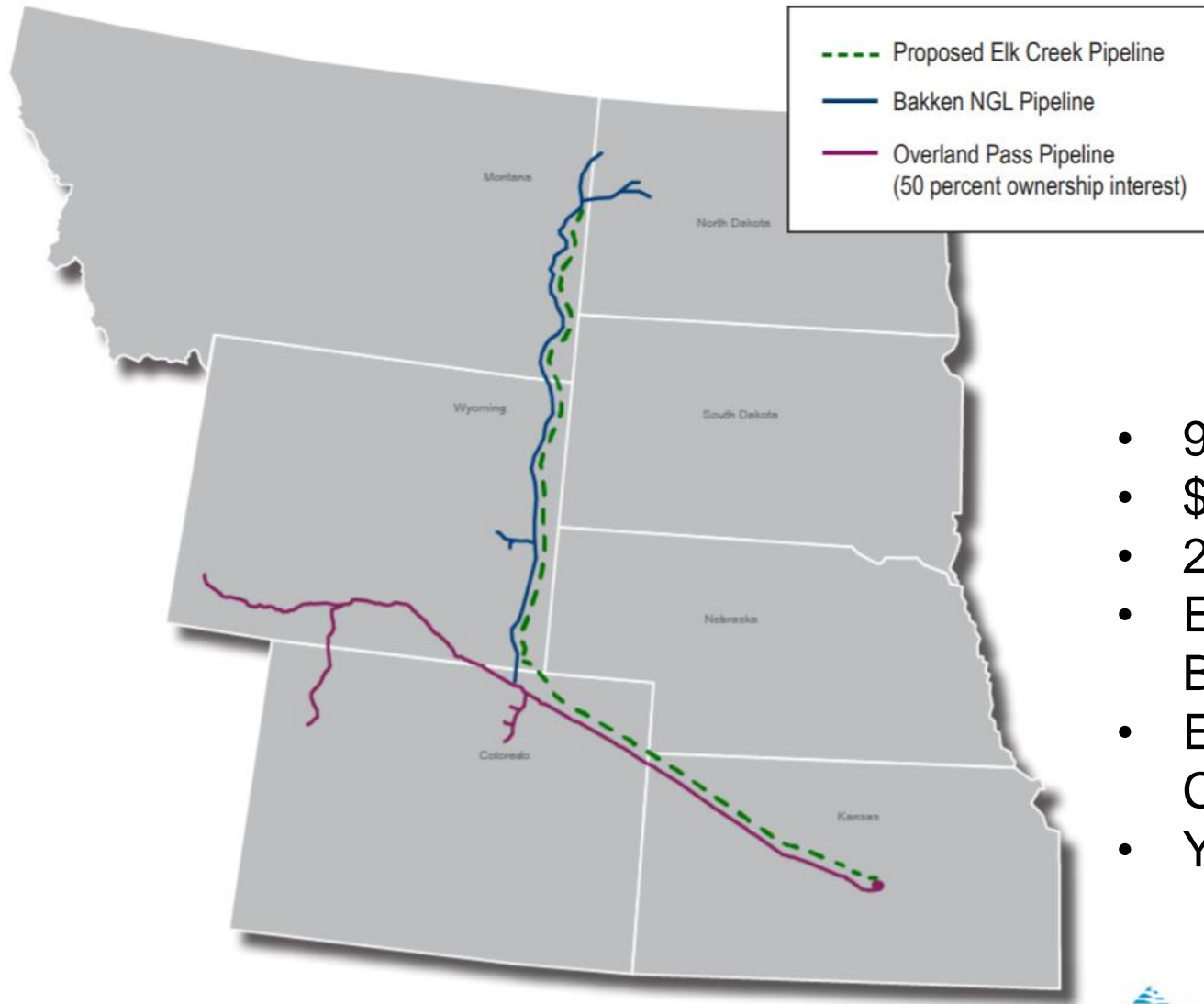


# Major NGL Pipeline and Processing Infrastructure





# ONEOK Elk Creek NGL Pipeline

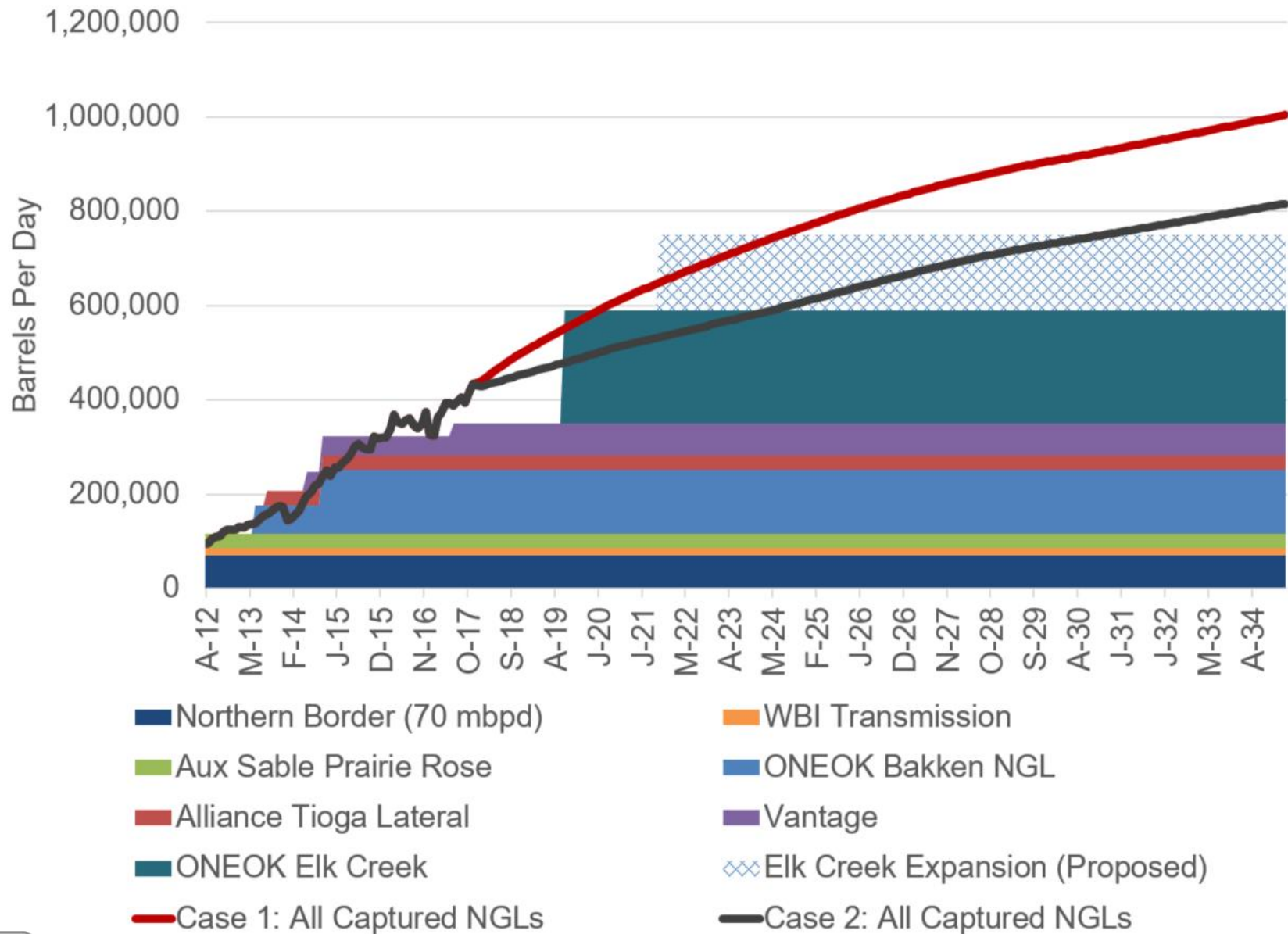


## Project Highlights

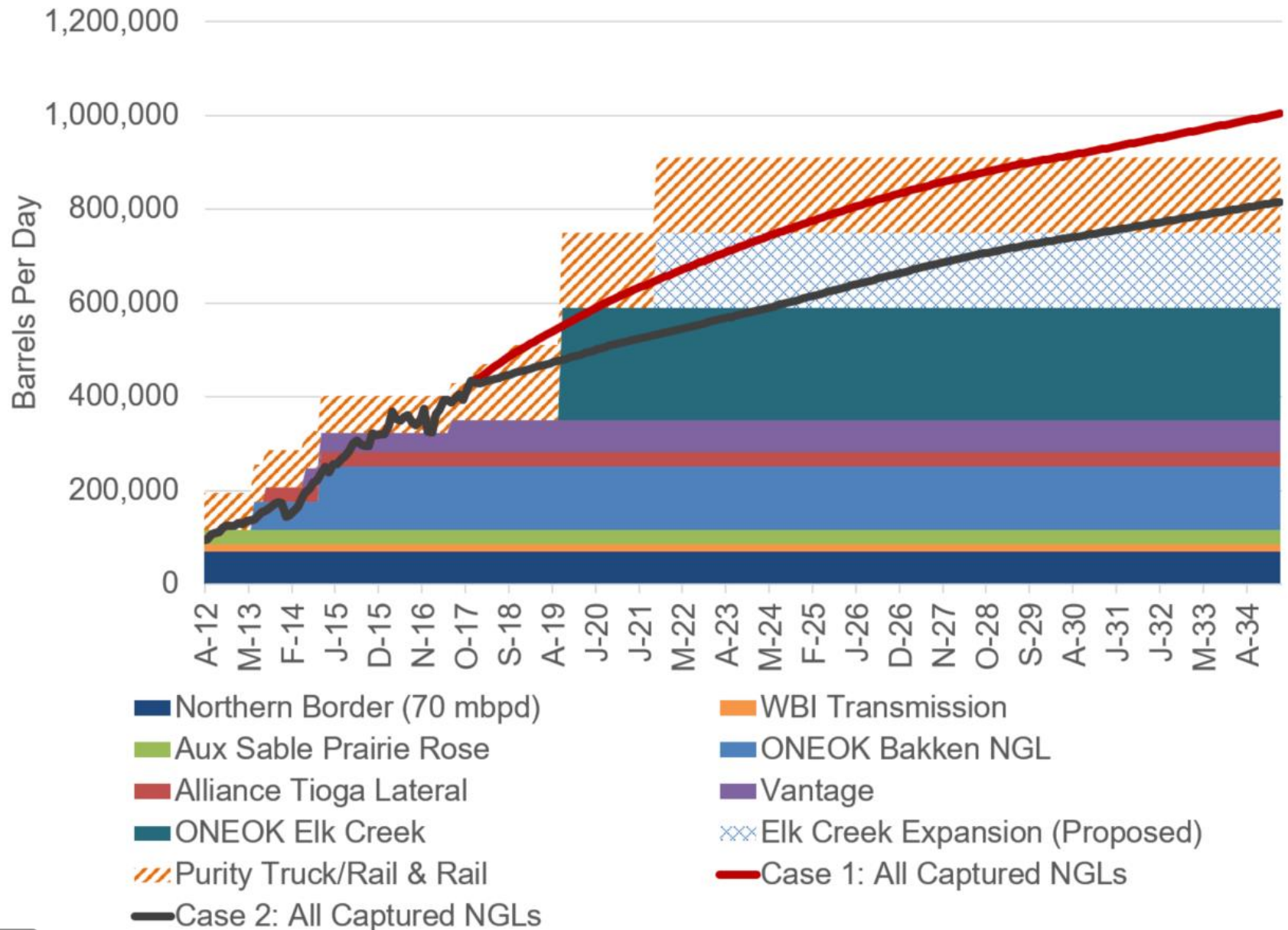
- 900 Miles - 20" Pipeline
- \$1.4 Billion
- 240,000 BPD Capacity
- Expandable to 400,000 BPD
- End of 2019 Proposed Completion
- Y-Grade Transportation



# NGL Pipeline Takeaway Options



# NGL Takeaway Options With Truck & Rail



# ***Bakken Economics***

## **Breakeven Analysis**

**Justin J Kringstad**

*Geological Engineer*

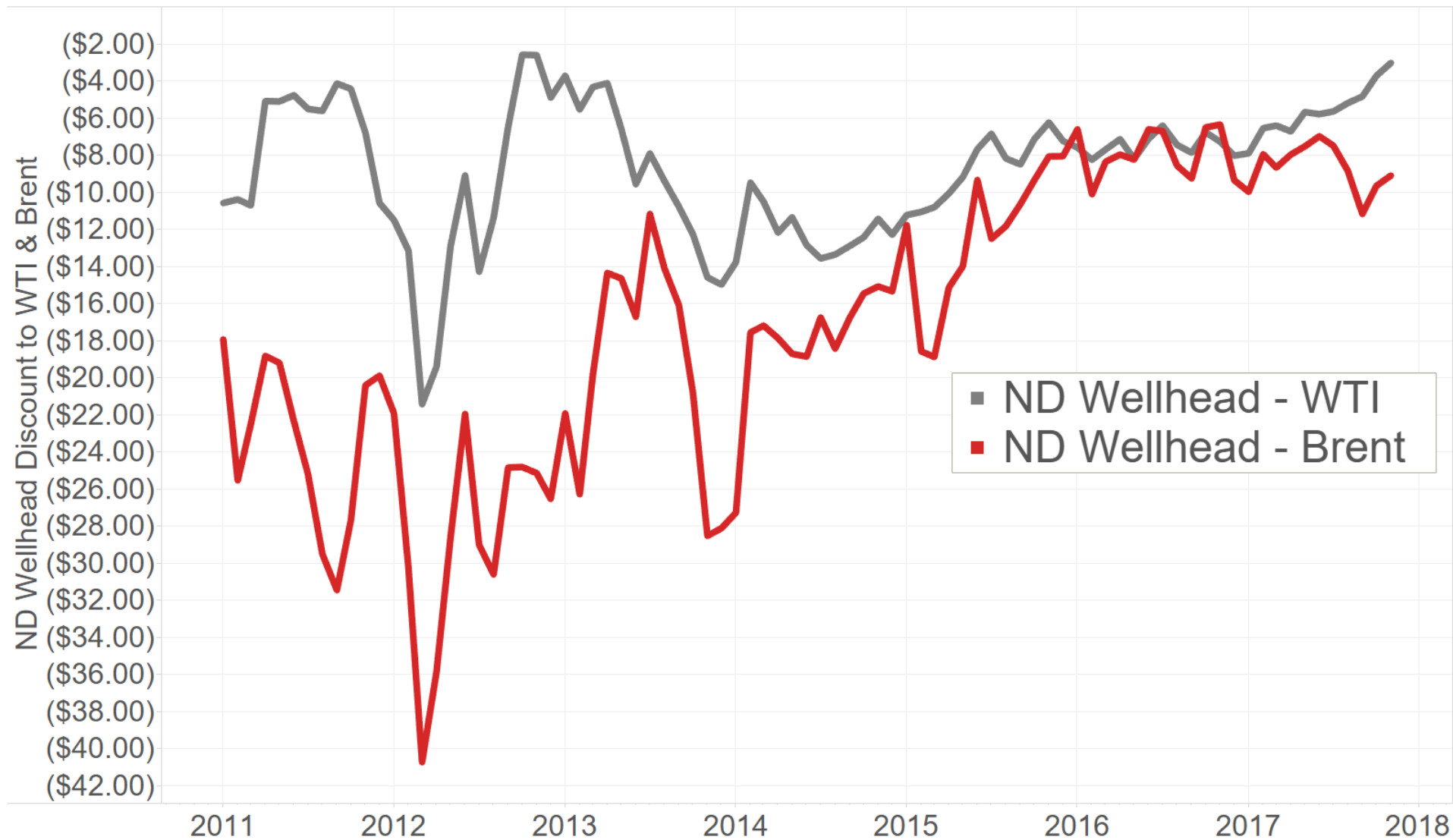
*Director*

*North Dakota Pipeline Authority*

**January 24, 2018**



# North Dakota Oil Differential





# North Dakota Impact of Smaller Discount

- 2016 Weighted Average Discount: \$7.71
- June-November 2017 Wt. Average Discount: \$4.67
- \$3.04/BBL Improvement Post DAPL Commercial In-Service
- 200,408,597 Taxable Barrels In June-November 2017
- Wt. Avg. Tax Rate in June-November 2017: 9.74%

## Six Month Revenue Impact

- $9.74\% \times 200,408,597 \times \$3.04 =$

**\$59.2 Million Additional State Revenue  
When Compared to Avg. 2016 Discount**

**Does Not Include Royalty Owner  
and Industry Revenue Impact**



## **Objective**

Define where the Bakken/Three Forks system may be economic in various price scenarios.

## **Method**

Analyze past well performance across the region and estimate well economics for various production levels.

## **Disclaimer**

The goal of this work is not to imply individual company actions or intentions. All view expressed are strictly that of Justin J. Kringstad.

Neither the State of North Dakota, nor any agency, officer, or employee of the State of North Dakota warrants the accuracy or reliability of this product and shall not be held responsible for any losses related to its use.



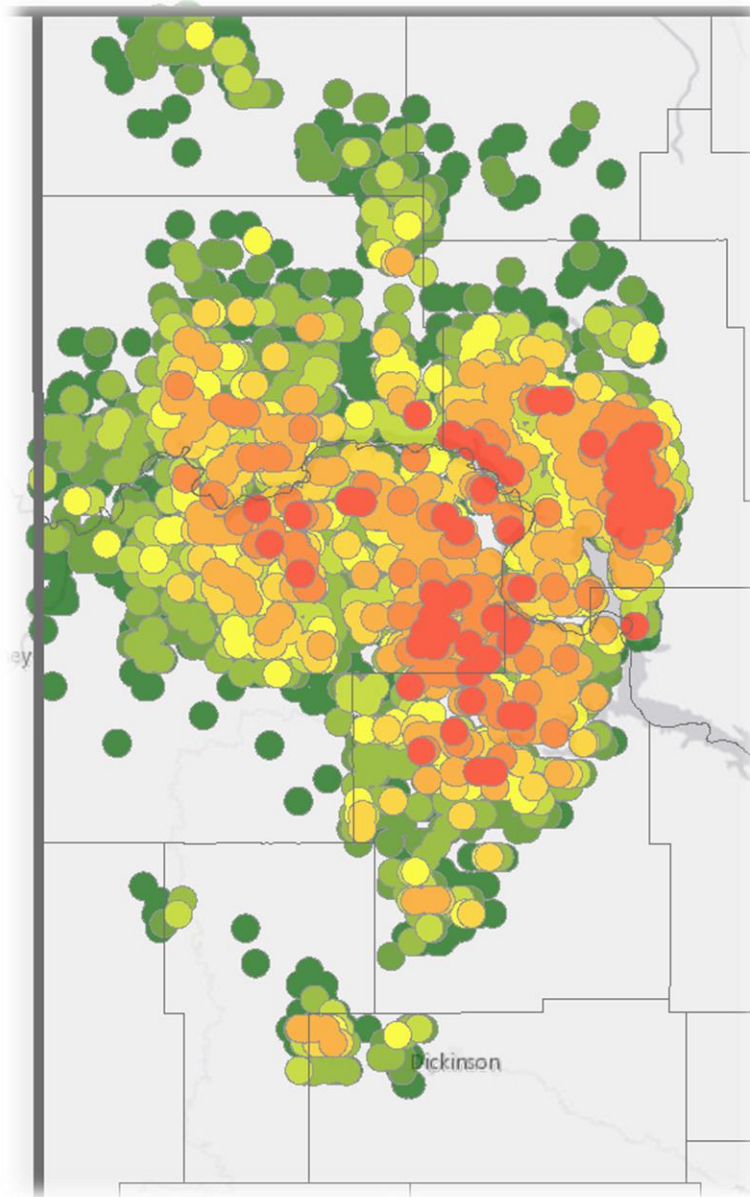
# Bakken Breakeven Analysis

## Important Considerations

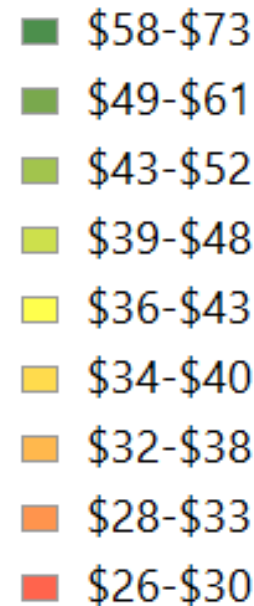
- Breakeven areas were determined by neighboring well performance and are expected to expand as new completion technology is applied in areas outside “the core.”
- Just because an area is considered “economic” **does not mean that it is the most economic** option for the industry participant(s). Competition for capital continues to exist inside and outside the region.



# Bakken Breakeven Price Range (20% ATIRR)

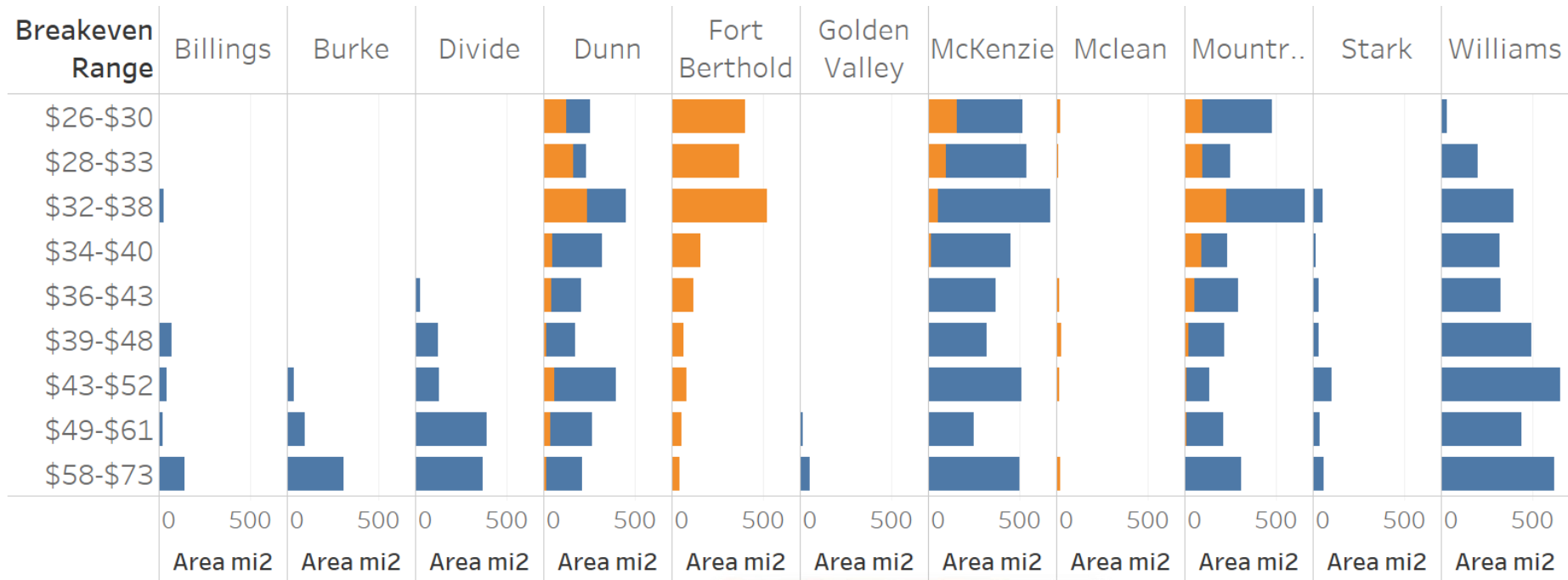


Bakken Breakeven Prices  
\$6 - \$8 Million  
Completed Wells Cost

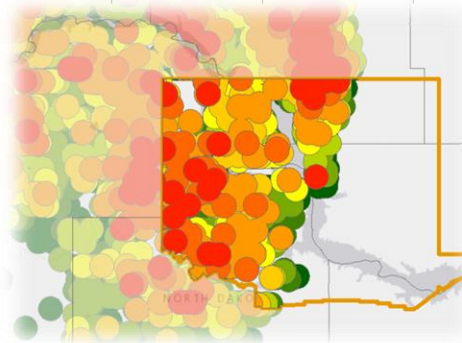


# Bakken Breakeven Economics

## County/Regional Analysis



Ft. Berthold  
 ■ Yes ■ No

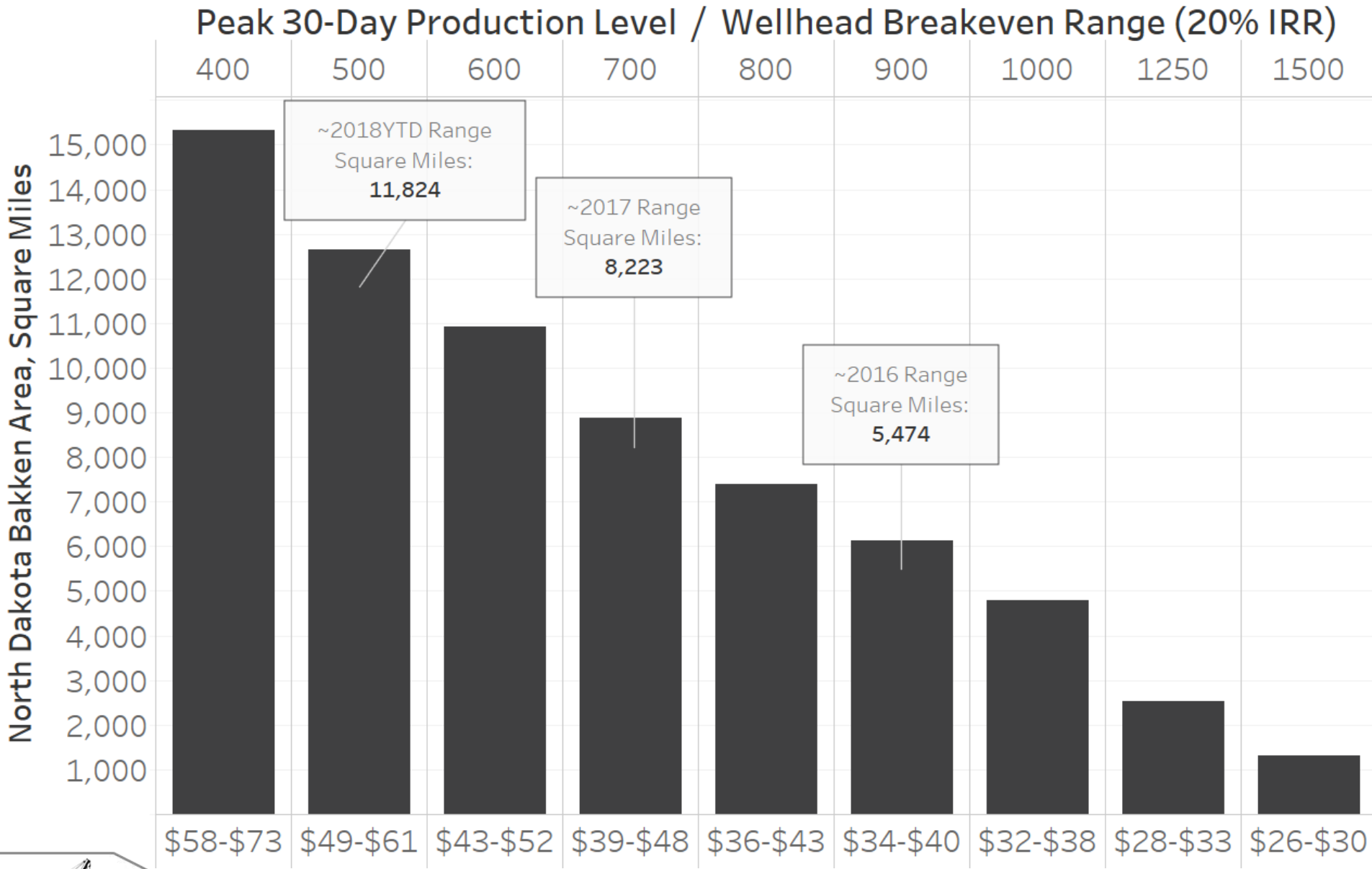


Breakeven Range Included: \$6mm, \$7mm, \$8mm Well Costs





# 44% Economic Area Increase 2017 to 2018

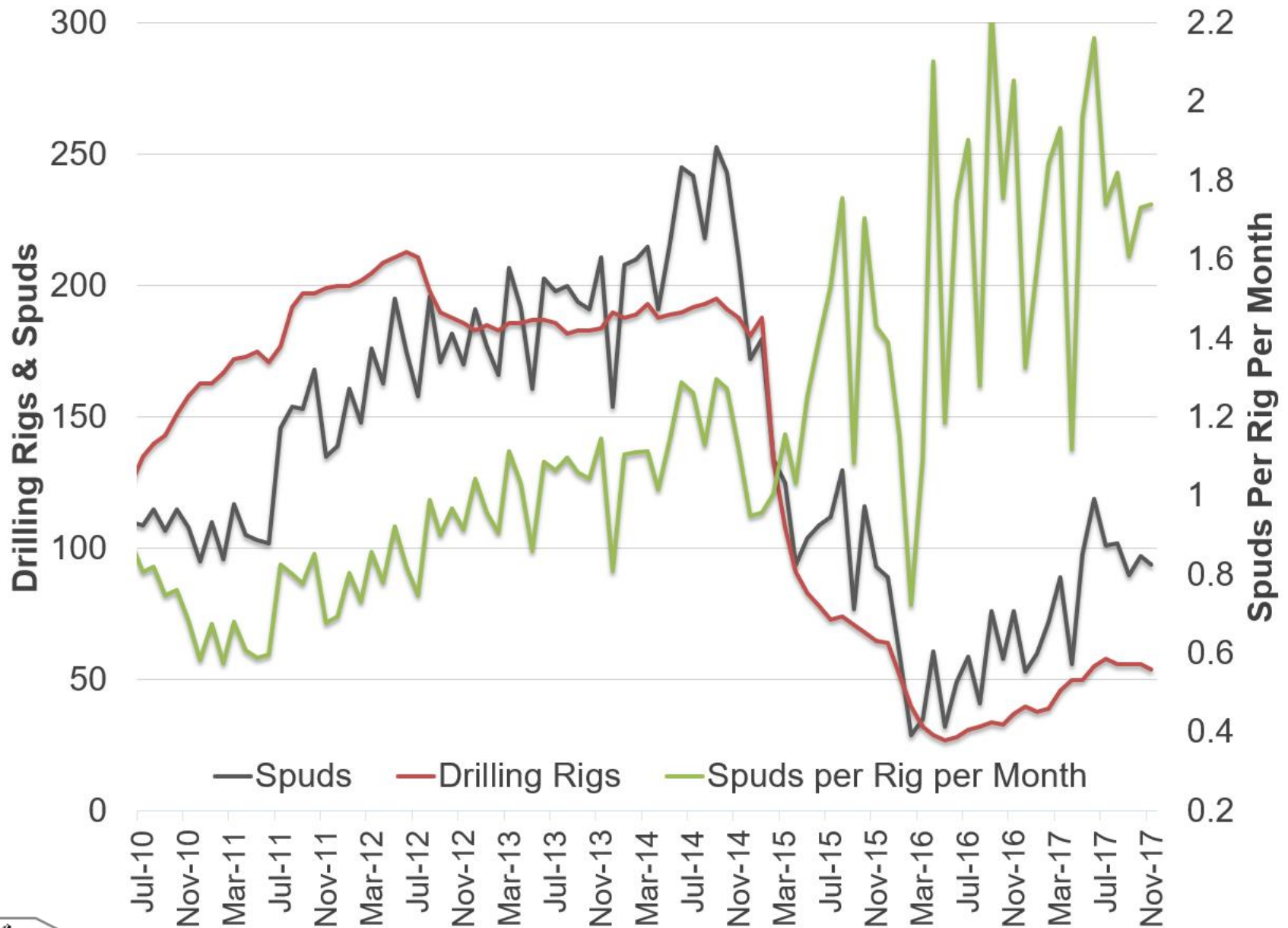


# Key Economic Assumptions

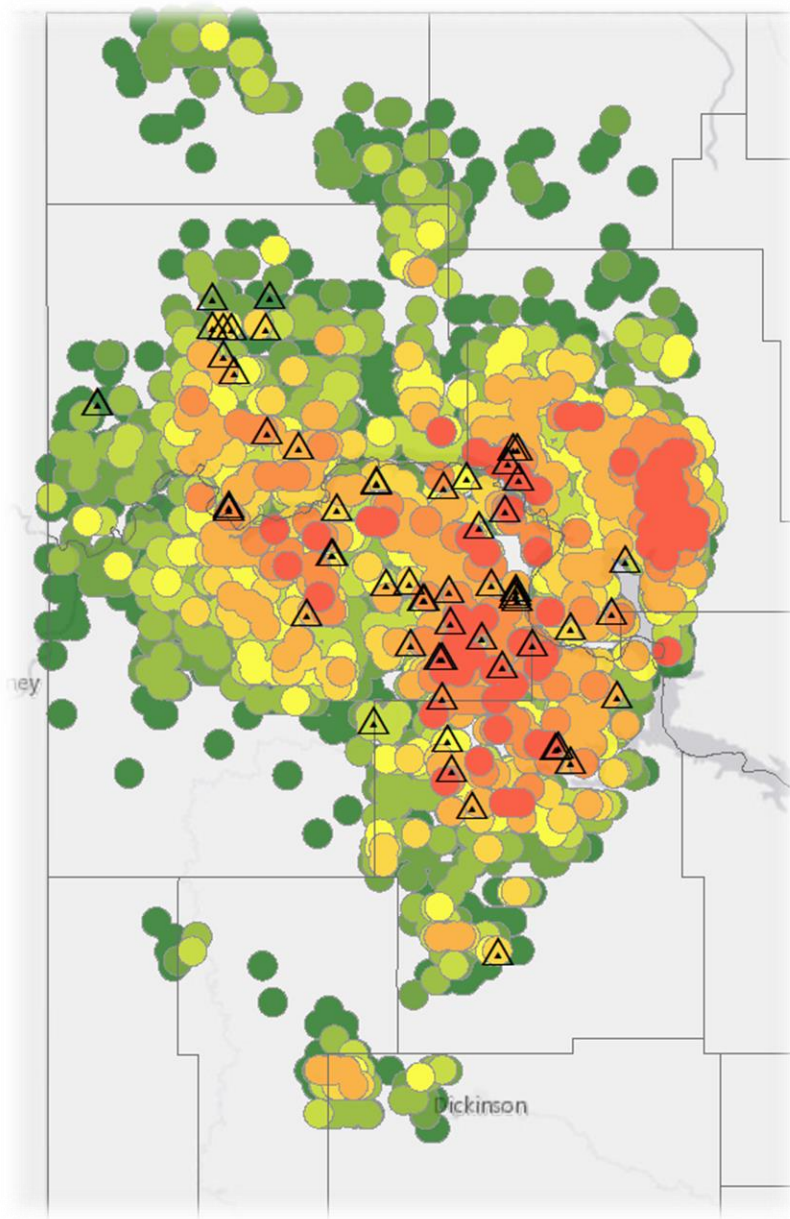
- \$6-\$8 Million Well Costs
- \$59/BBL & \$5.00/MCF Wellhead Pricing
- 1/6 Royalty
- Zero Flaring
- Assumed 10-20% IRR to drill (calculated after production taxes and royalties)
- No Tax Incentives Included
- Production rate is 30-day average
- All Bakken/Three Forks wells drilled in 2008+



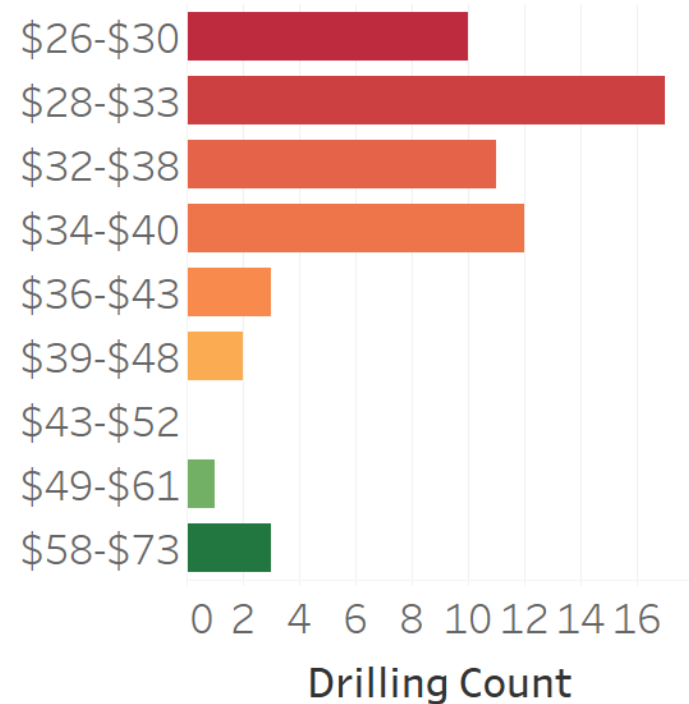
# North Dakota Drilling Activity



# Drilling Locations\* – January 22, 2018



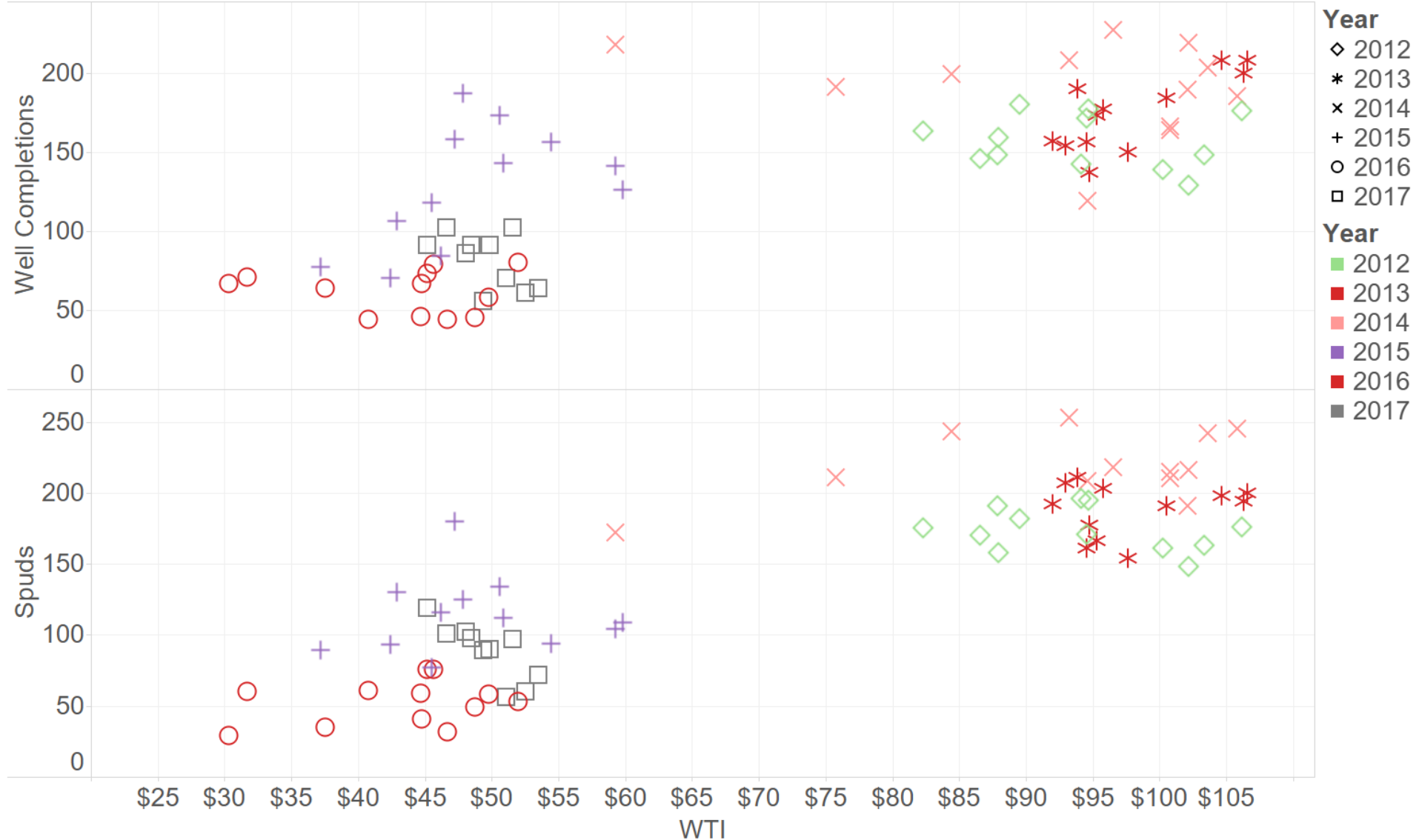
## Bakken Breakeven Prices \$6 - \$8 Million



\*Due to confidential status, the target production zone for many wells is unknown.



# Forecasting Challenges: Activity vs. Price

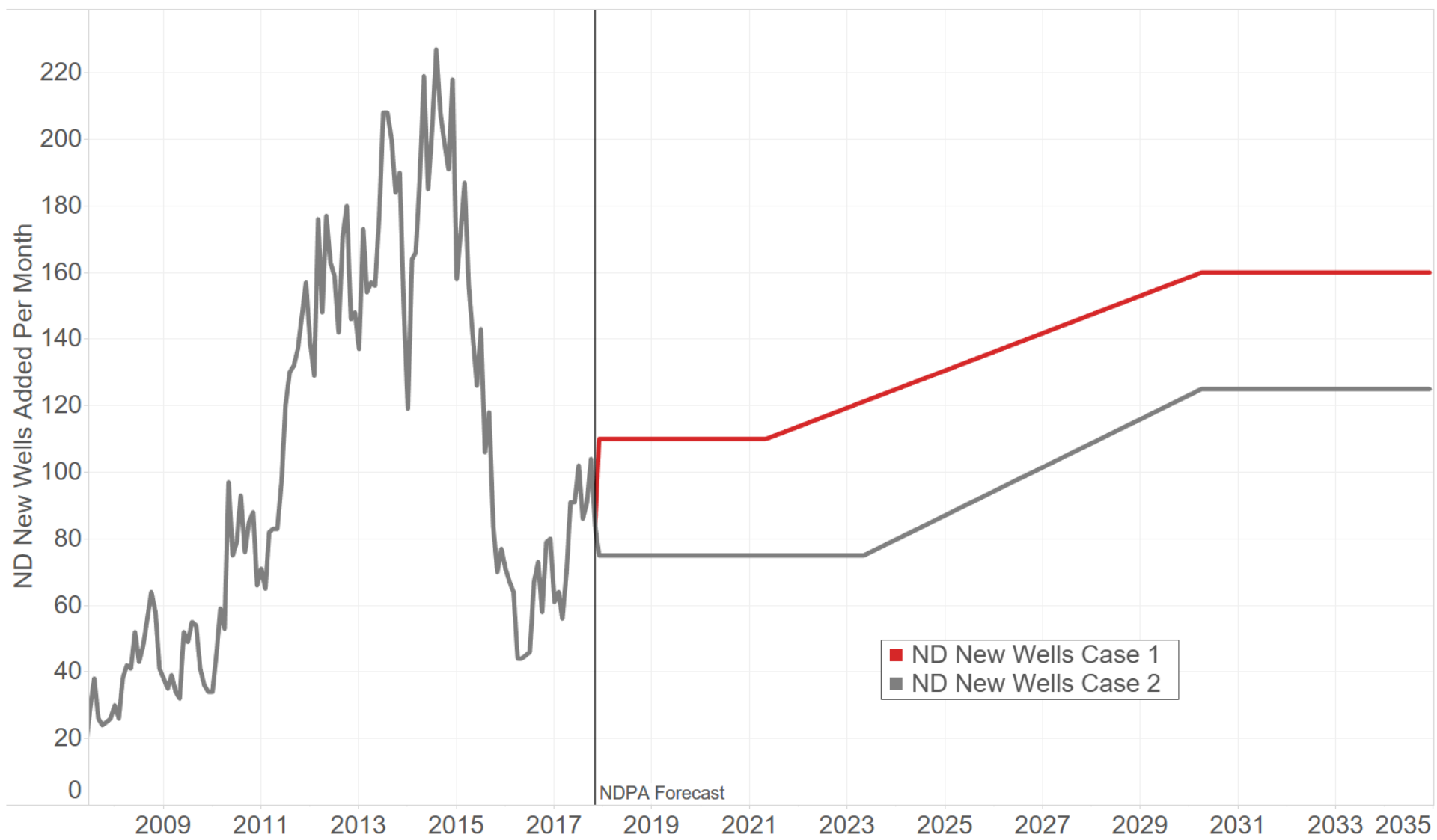




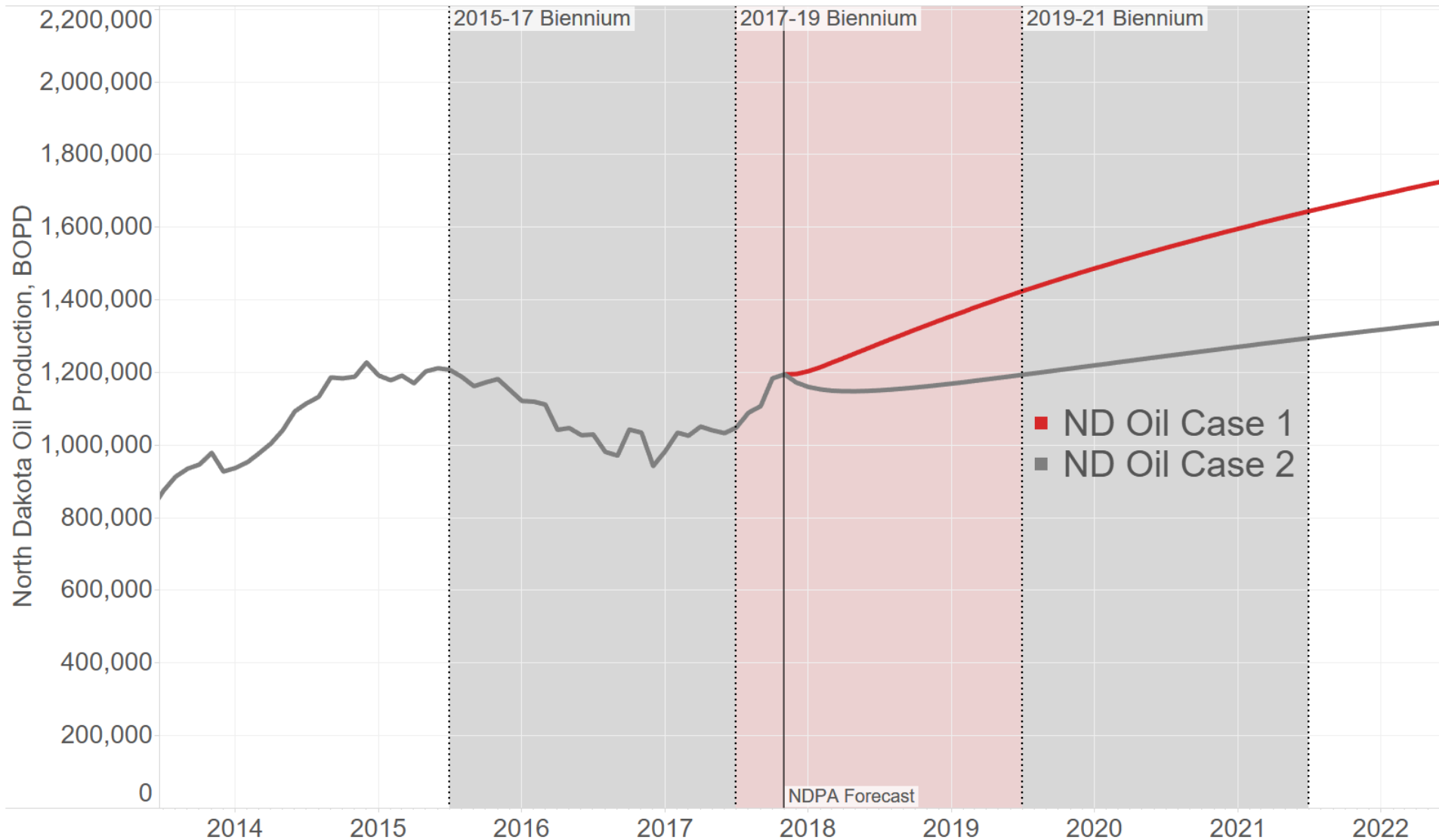
# Forecasting Challenges: Activity vs. Price



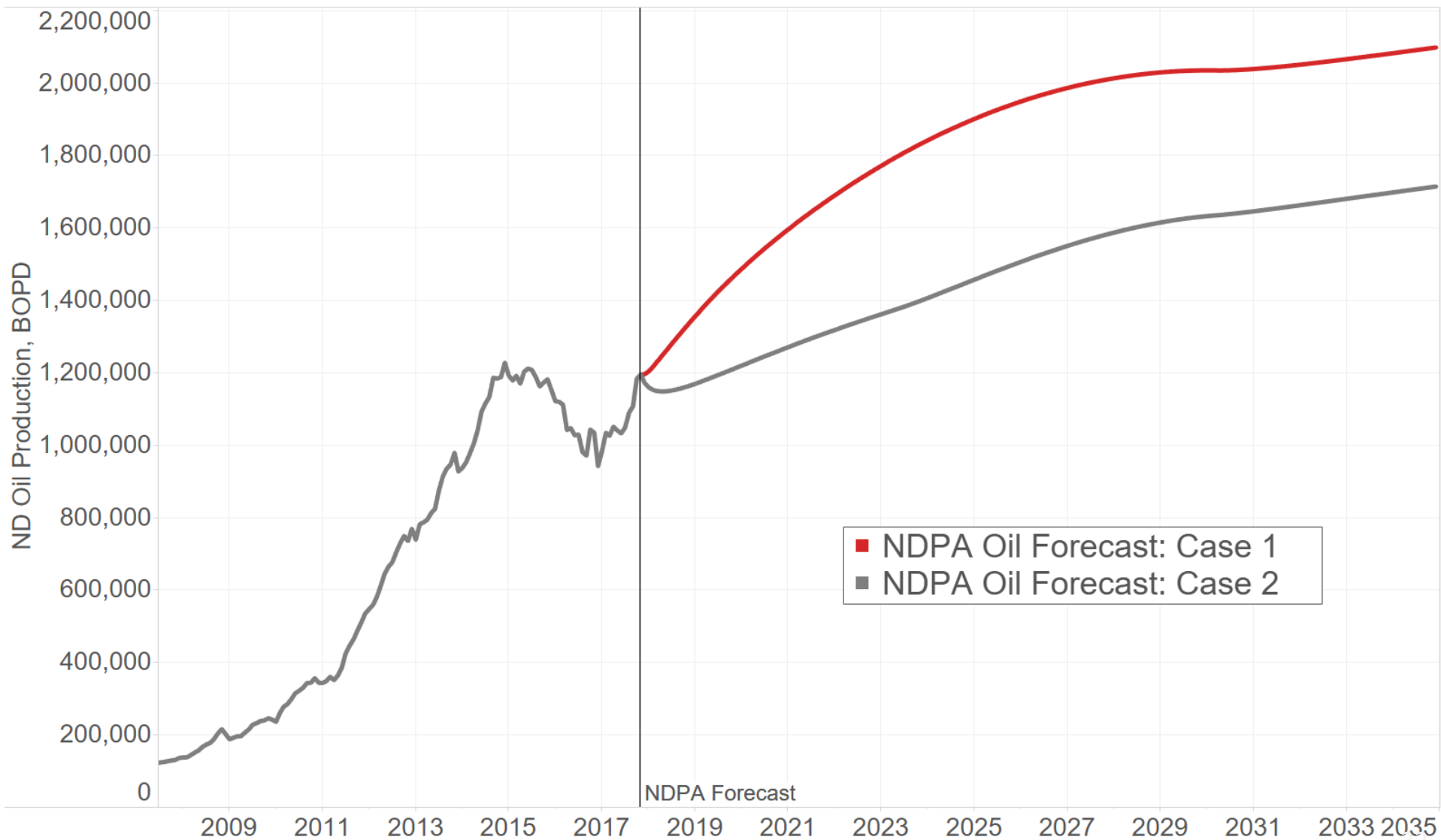
# North Dakota Forecast Activity Assumptions



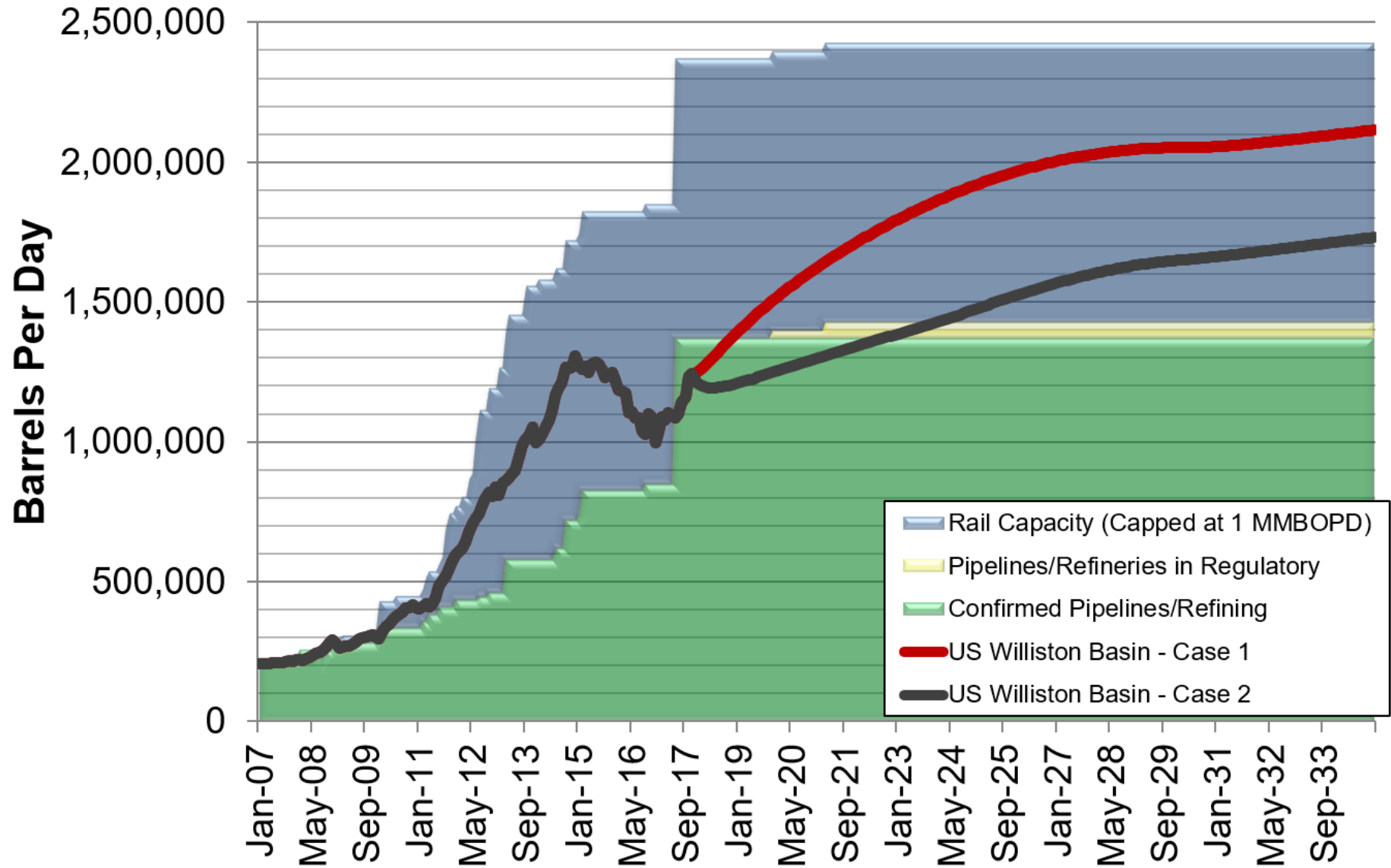
# North Dakota Oil Production Forecast



# North Dakota Oil Production Forecast



# Williston Basin Oil Production & Export Capacity, BOPD



# Contact Information

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