

# North Dakota Industrial Commission

**Justin J Kringstad**

*Geological Engineer*

*Director*

*North Dakota Pipeline Authority*

**October 24, 2017**

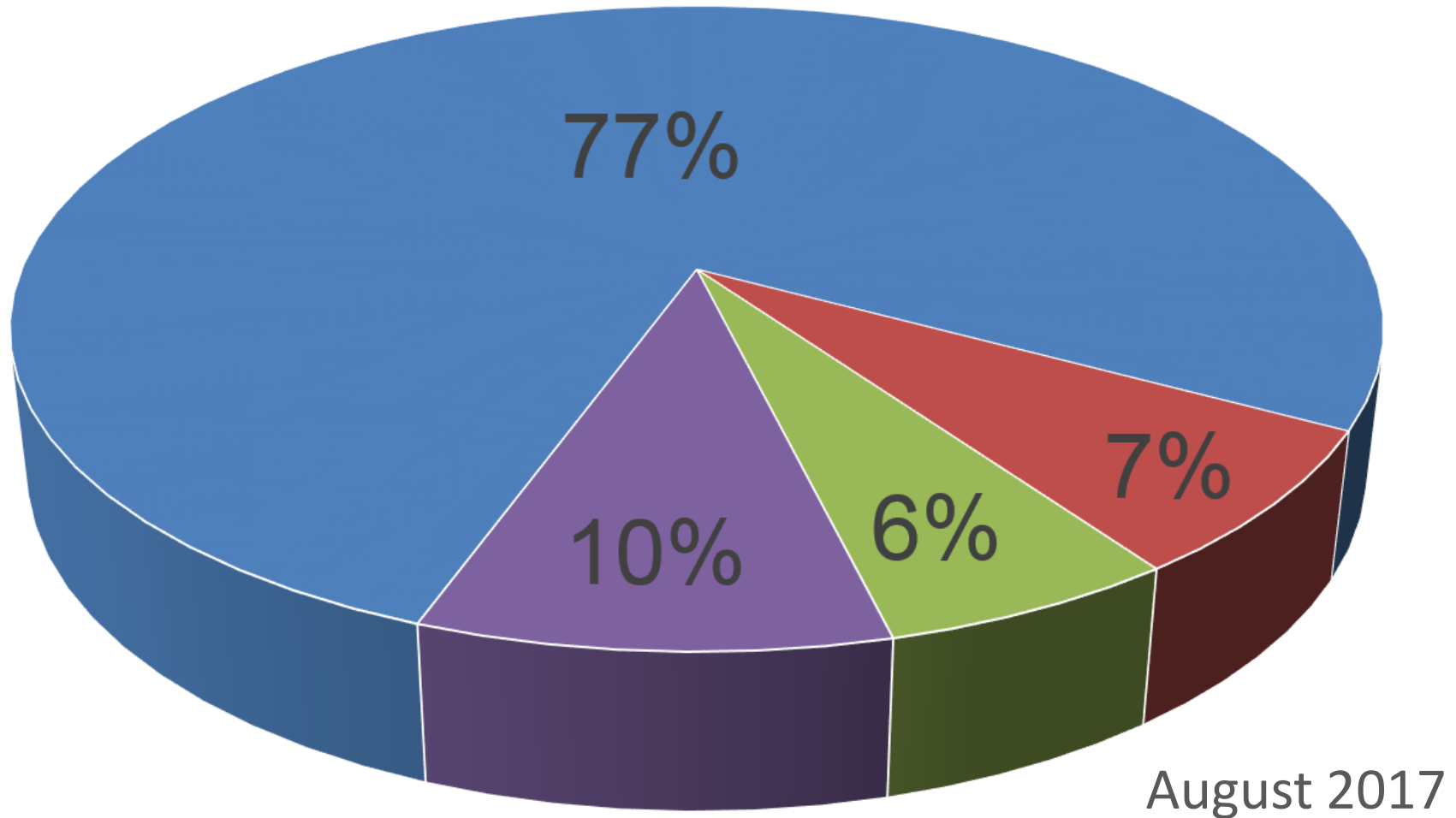


# Presentation Outline

- **Current oil transportation dynamics**
- Understanding current and future oil production
  - Pricing update
  - Activity
  - Oil forecasts
- North Dakota natural gas production
  - Flaring and gas capture
  - Natural gas liquids
- Pipeline construction update
- Refrac economics



# Estimated Williston Basin Oil Transportation



■ Pipeline Export

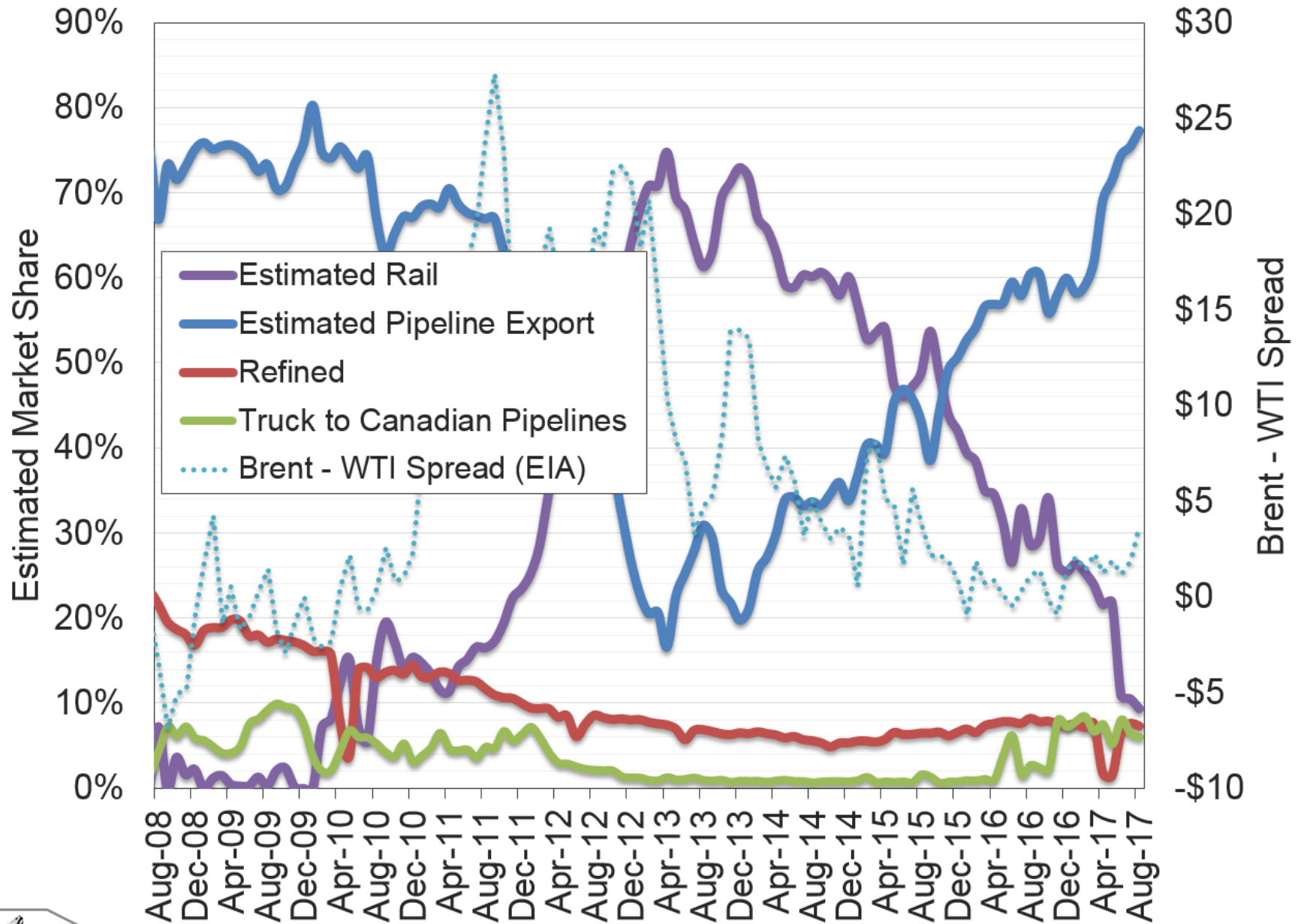
■ Refined

■ Truck to Canadian Pipelines

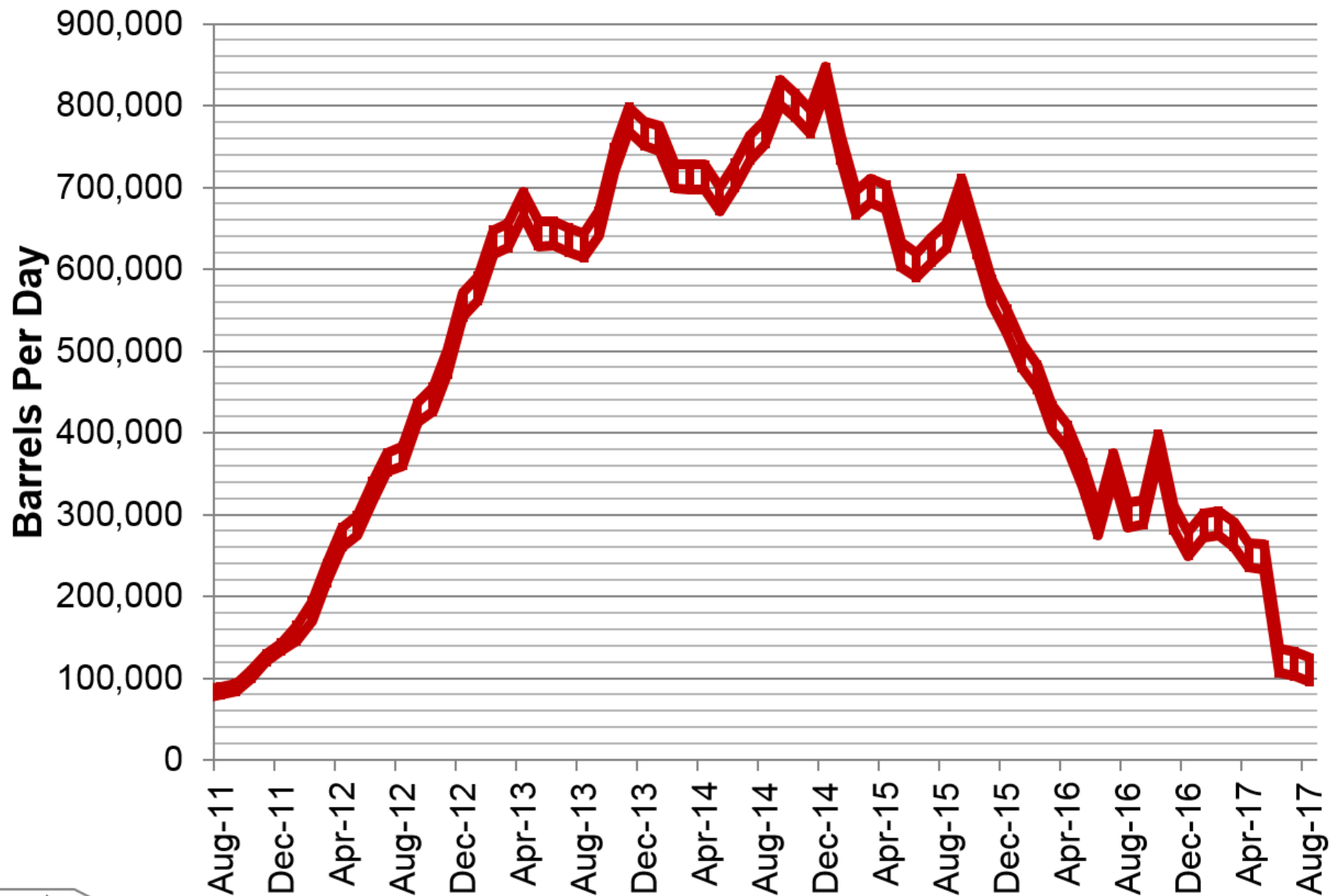
■ Estimated Rail



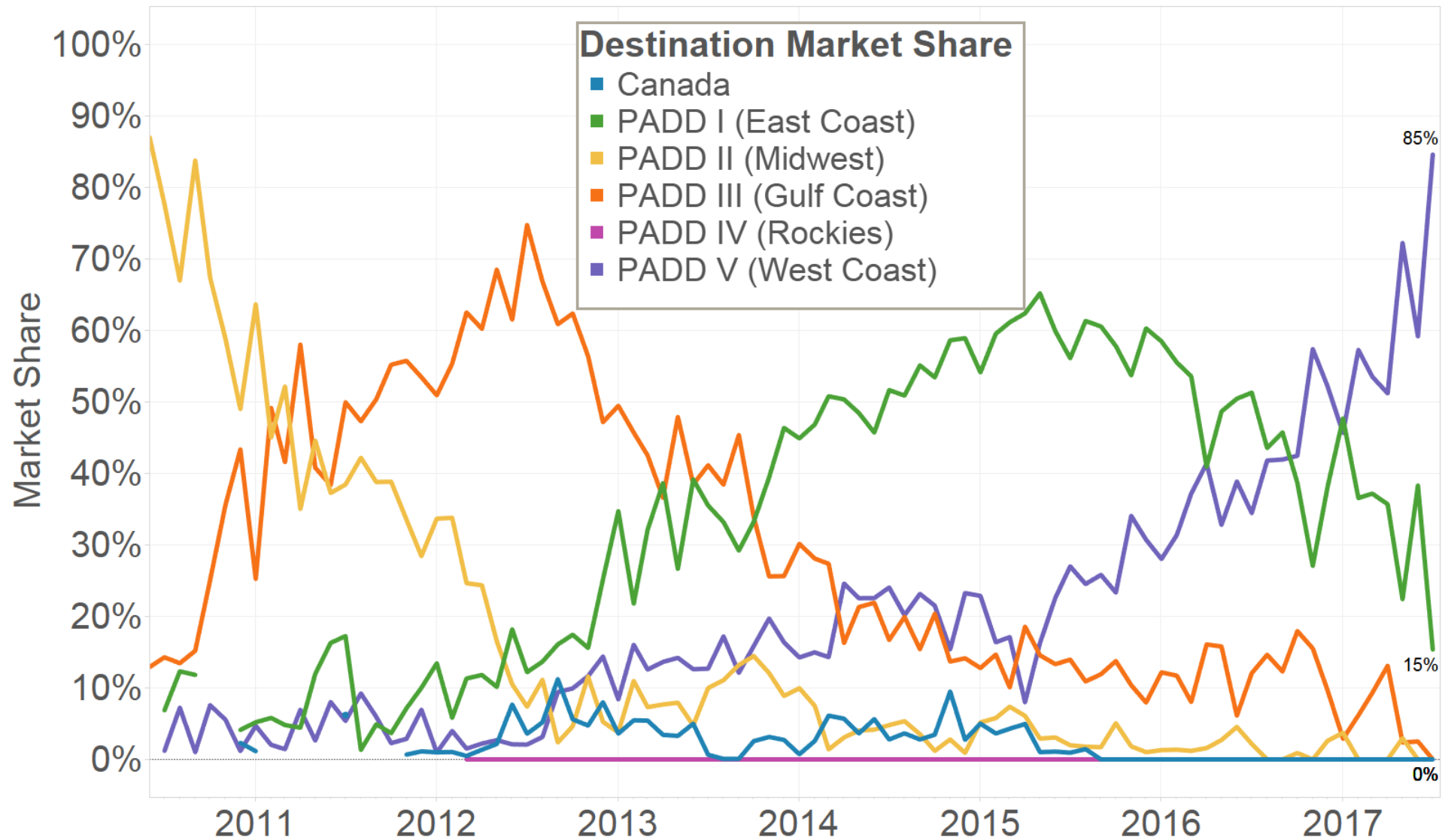
# Estimated Williston Basin Oil Transportation



# Estimated ND Rail Export Volumes



# Rail Destinations Market Share (July 2017)



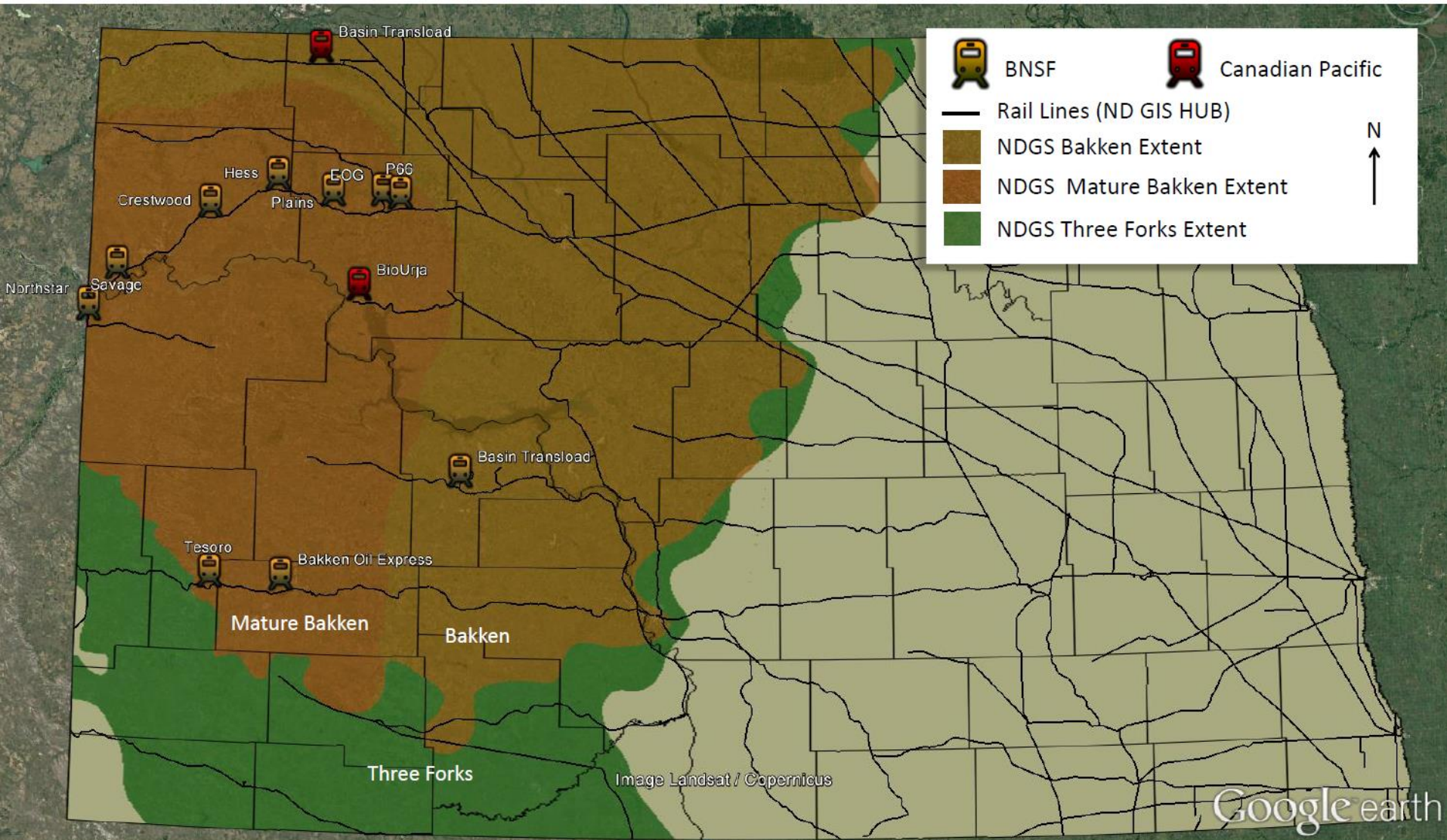
*Data for Rail Destination Market Share Provided by the US Energy Information Administration*





# North Dakota Crude Oil Rail Loading Facilities In Service

North Dakota Pipeline Authority – July 2017



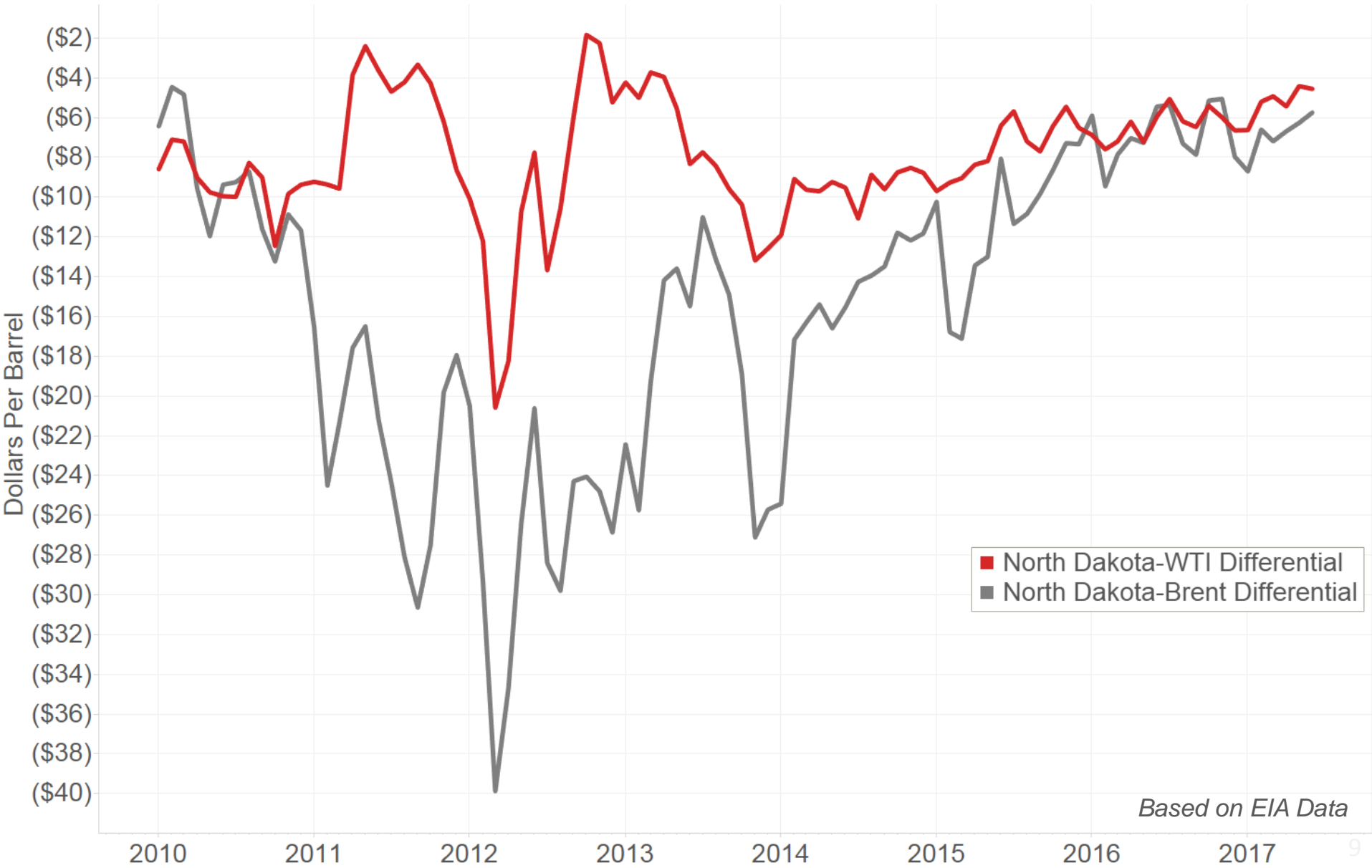
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# North Dakota Oil Differential



*Based on EIA Data*



# North Dakota Impact of Smaller Discount

- 2016 Weighted Average Discount: \$7.71
- June/July/August 2017 Wt. Average Discount: \$5.61
- \$2.10/BBL Improvement Post DAPL Commercial In-Service
- 96,148,772 Taxable Barrels In June/July/August 2017
- Wt. Avg. Tax Rate in June/July/August 2017: 9.74%

## **Three Month Revenue Impact**

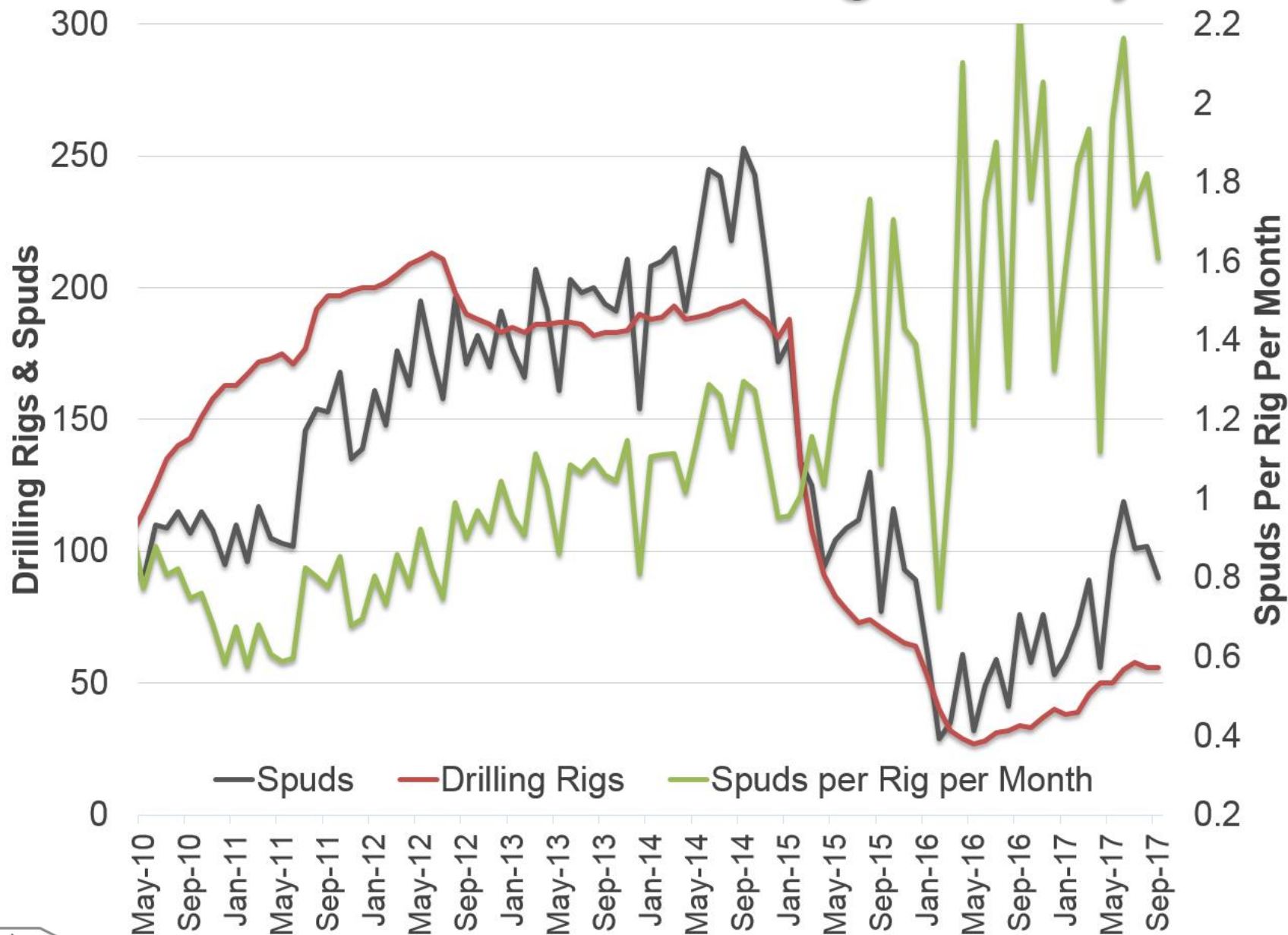
$$9.74\% \times 96,148,772 \times \$2.10 =$$

**\$19,666,269 Additional State Revenue  
When Compared to Avg. 2016 Discount  
(~\$6+ Million Per Month)**

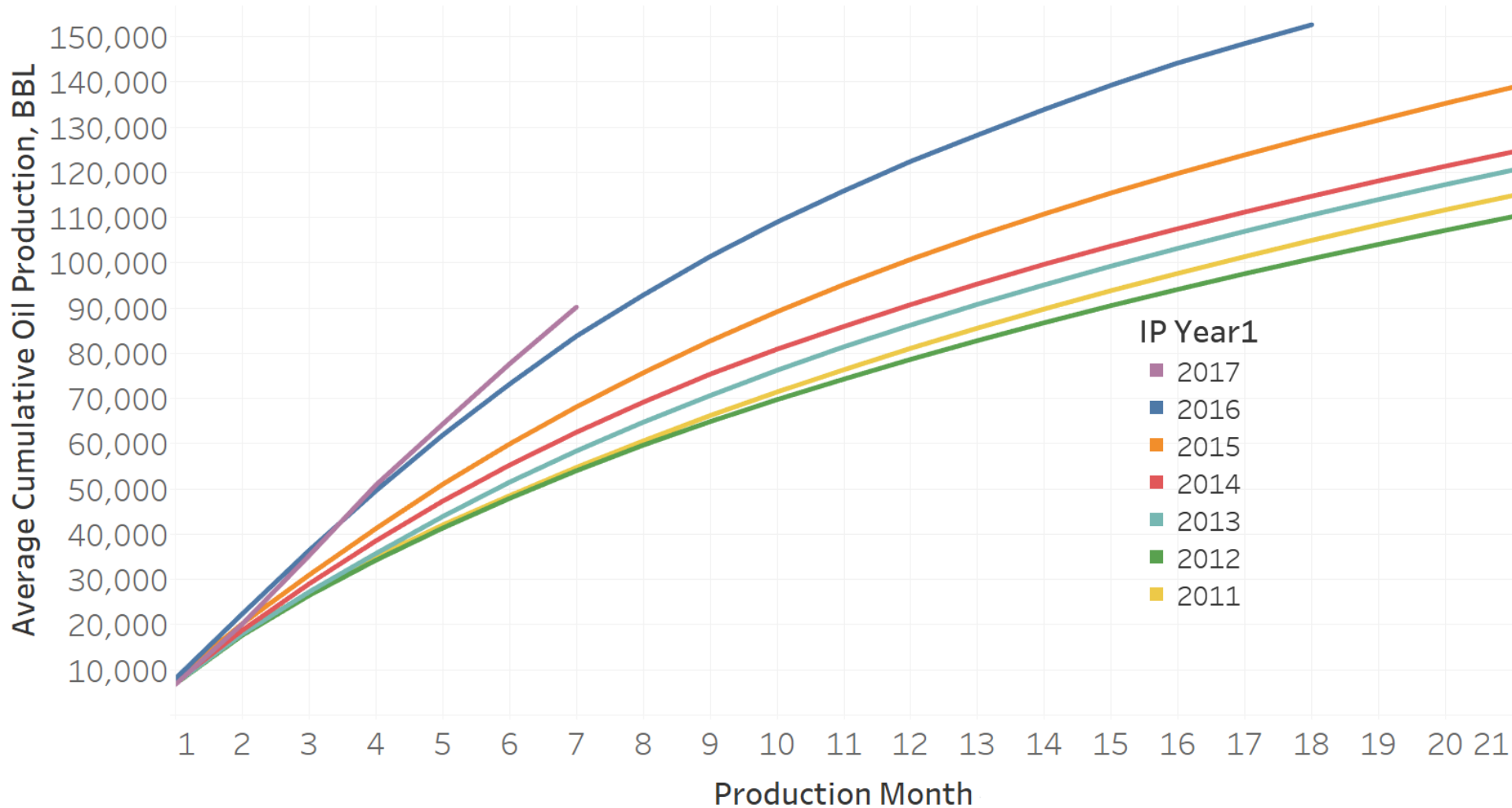
**Does Not Include Royalty Owner  
and Industry Revenue Impact**



# North Dakota Drilling Activity



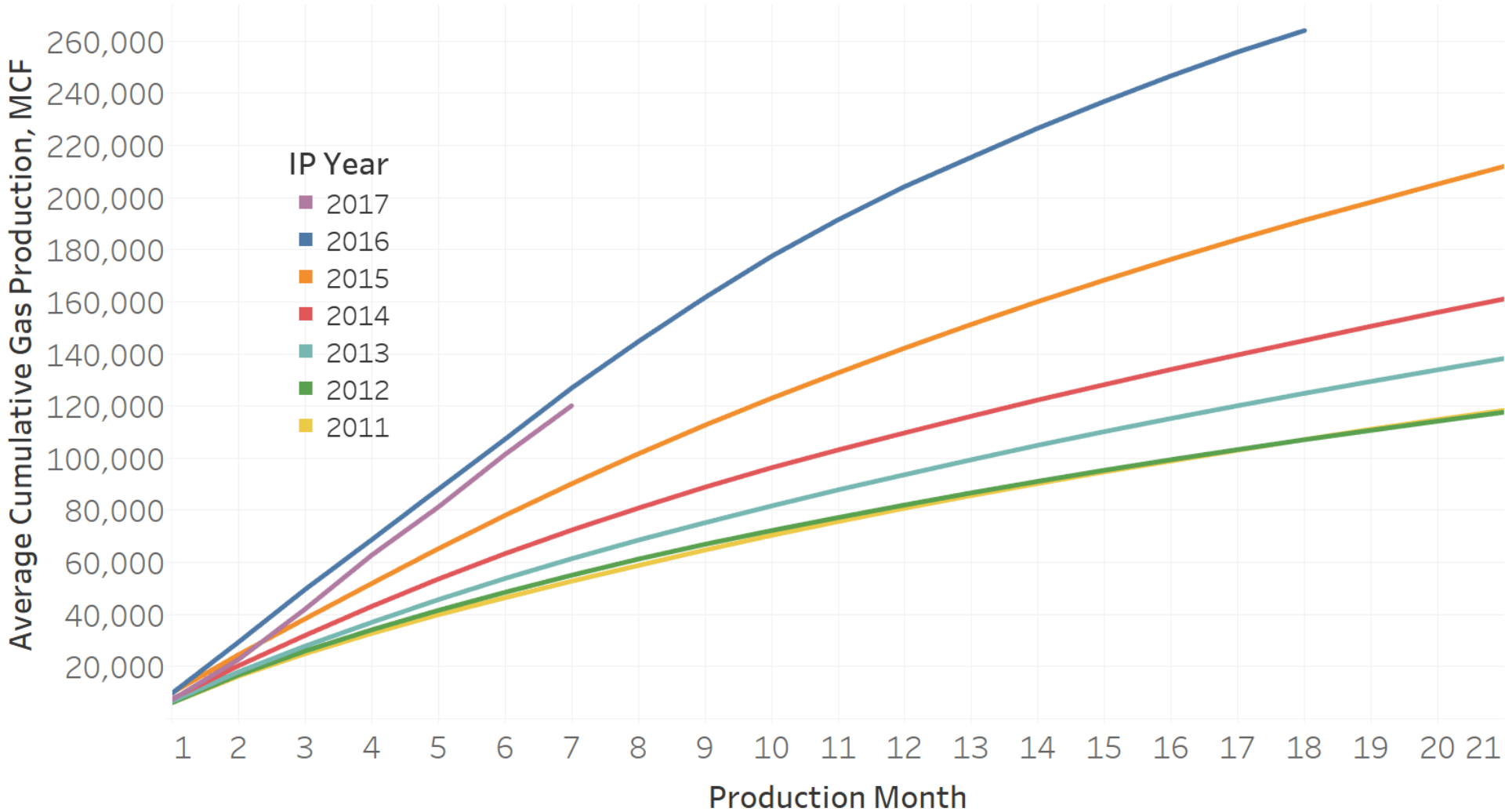
# Statewide Oil Performance



Average BKN/TF Well Performance Statewide (Minimum 1 bopd)



# Statewide Gas Performance

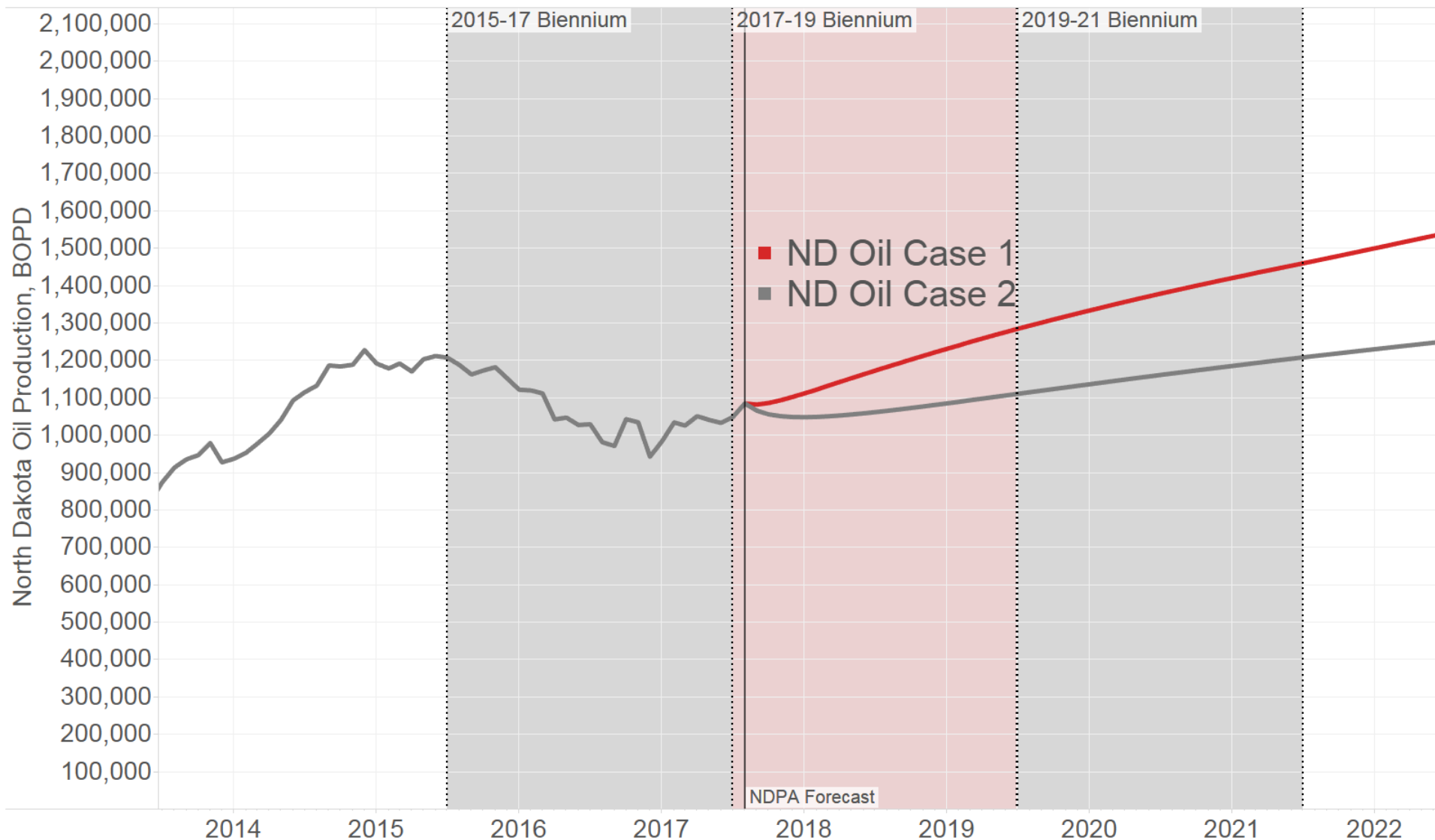


Average BKN/TF Well Performance Statewide (Minimum 1 bopd)

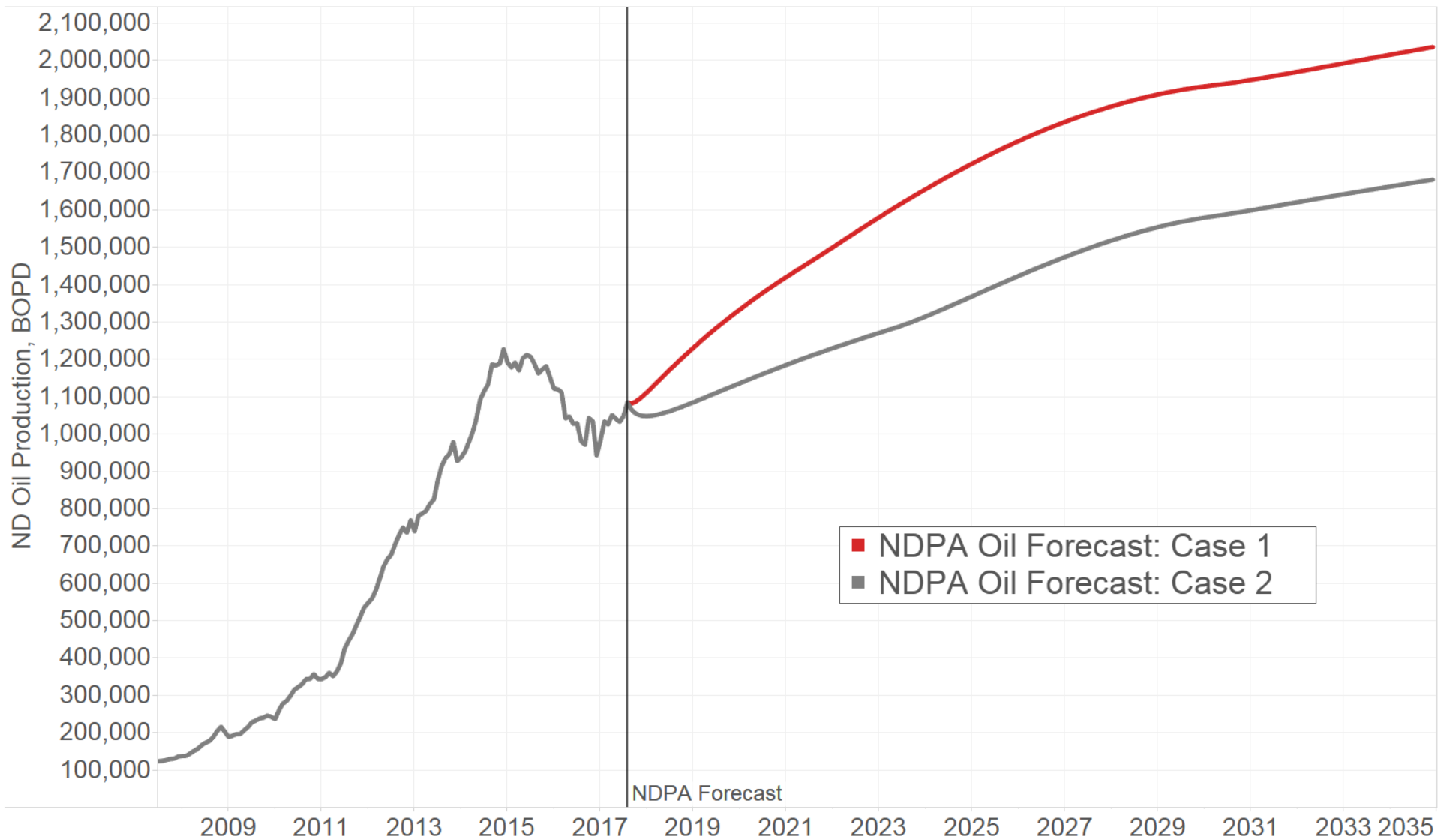




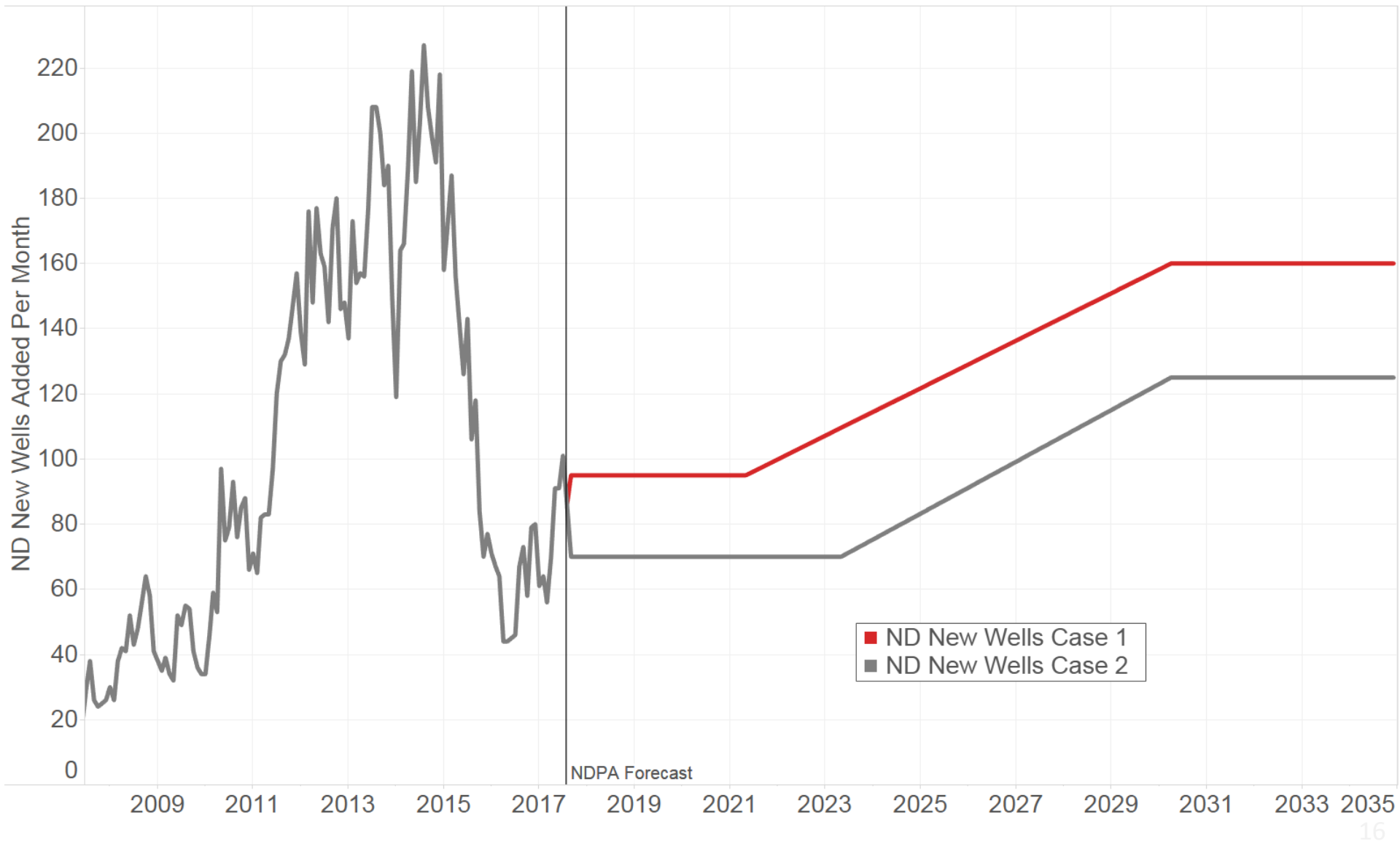
# North Dakota Oil Production Forecast



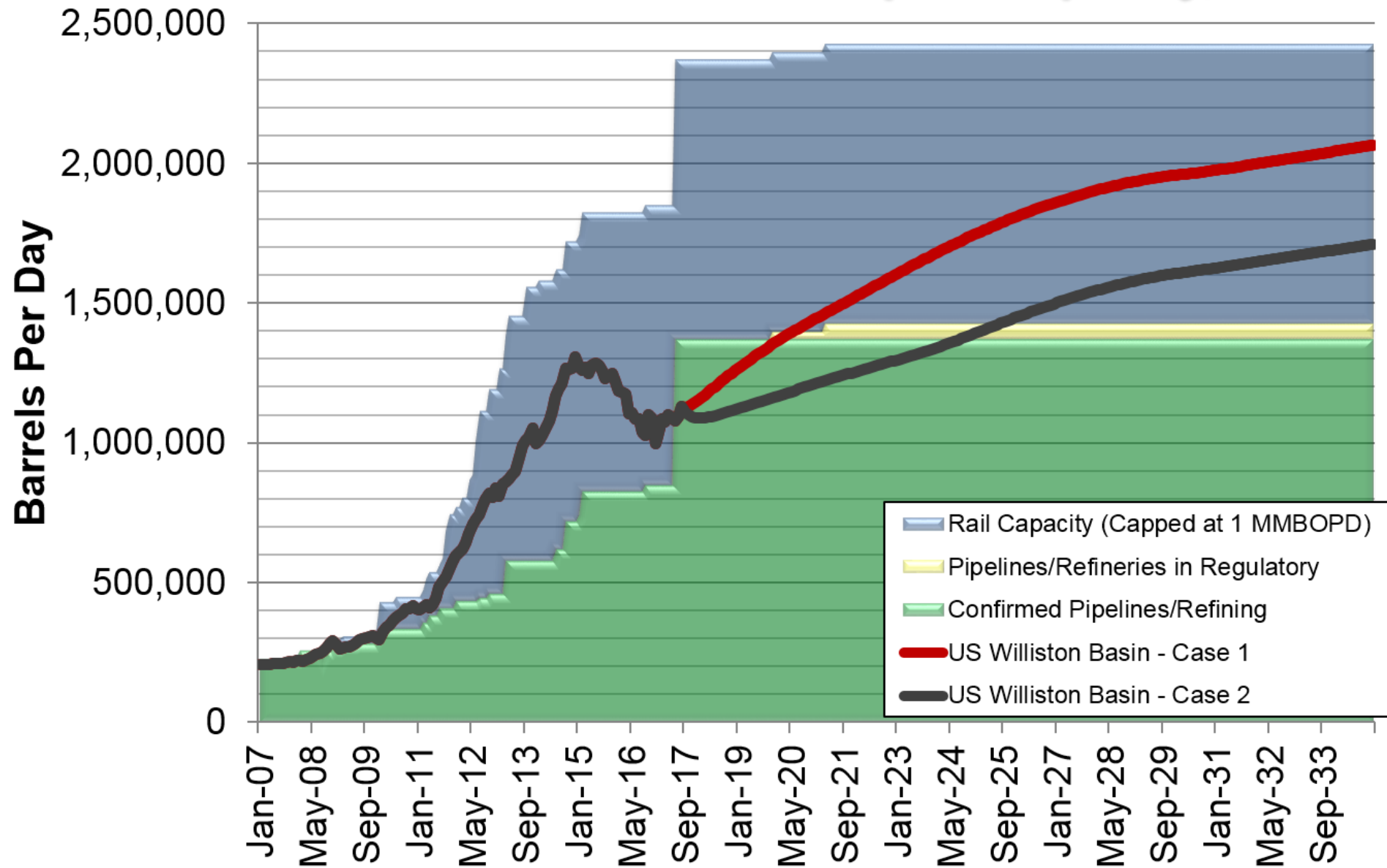
# North Dakota Oil Production Forecast



# North Dakota Forecast Activity Assumptions



# Williston Basin Oil Production & Export Capacity, BOPD

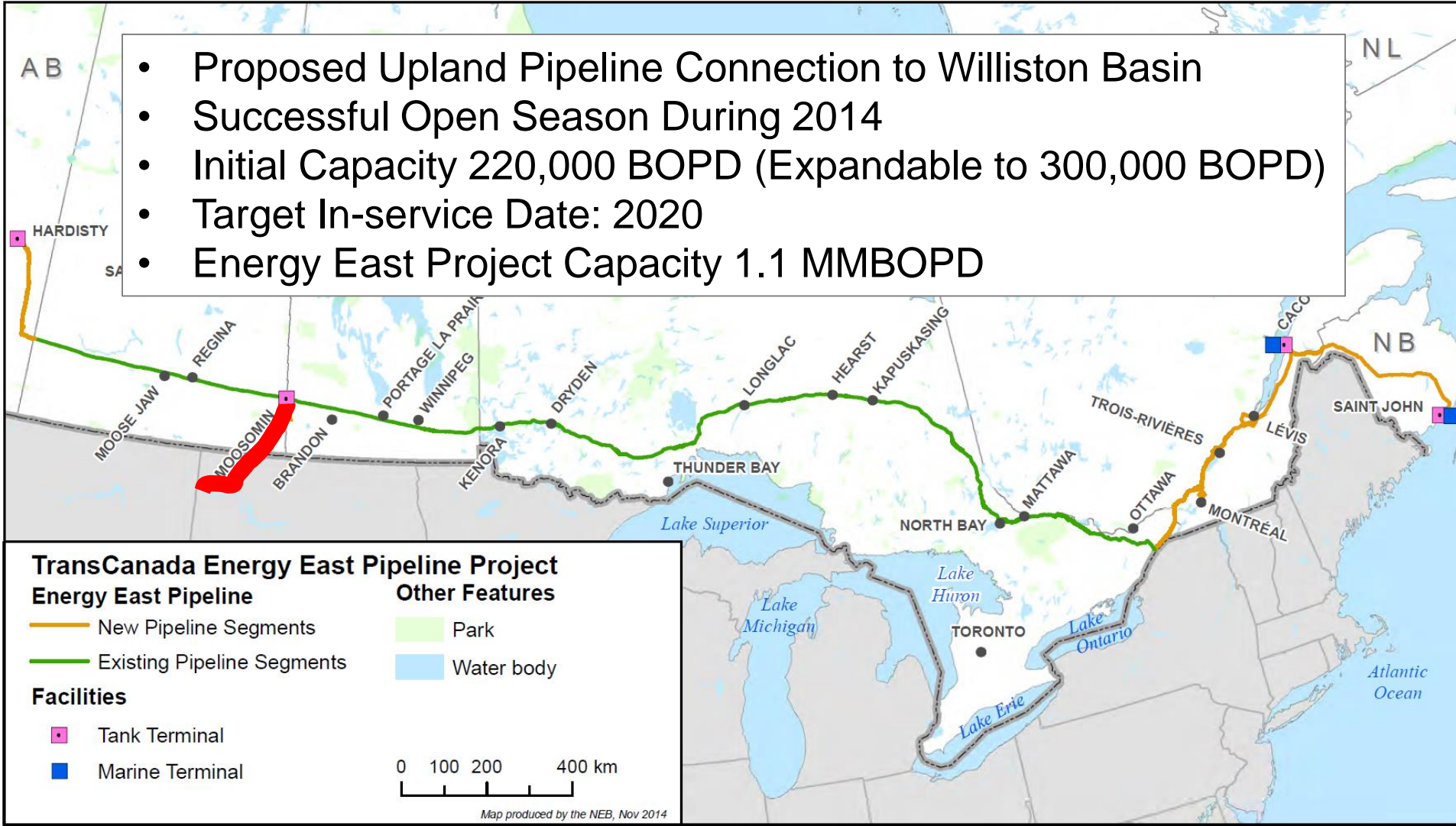


*Production forecast is for visual demonstration purposes only and should not be considered accurate for any near or long term planning.*



# TransCanada: Energy East Canceled

- Proposed Upland Pipeline Connection to Williston Basin
- Successful Open Season During 2014
- Initial Capacity 220,000 BOPD (Expandable to 300,000 BOPD)
- Target In-service Date: 2020
- Energy East Project Capacity 1.1 MMBOPD



Map: NEB – NDPA Upland Addition



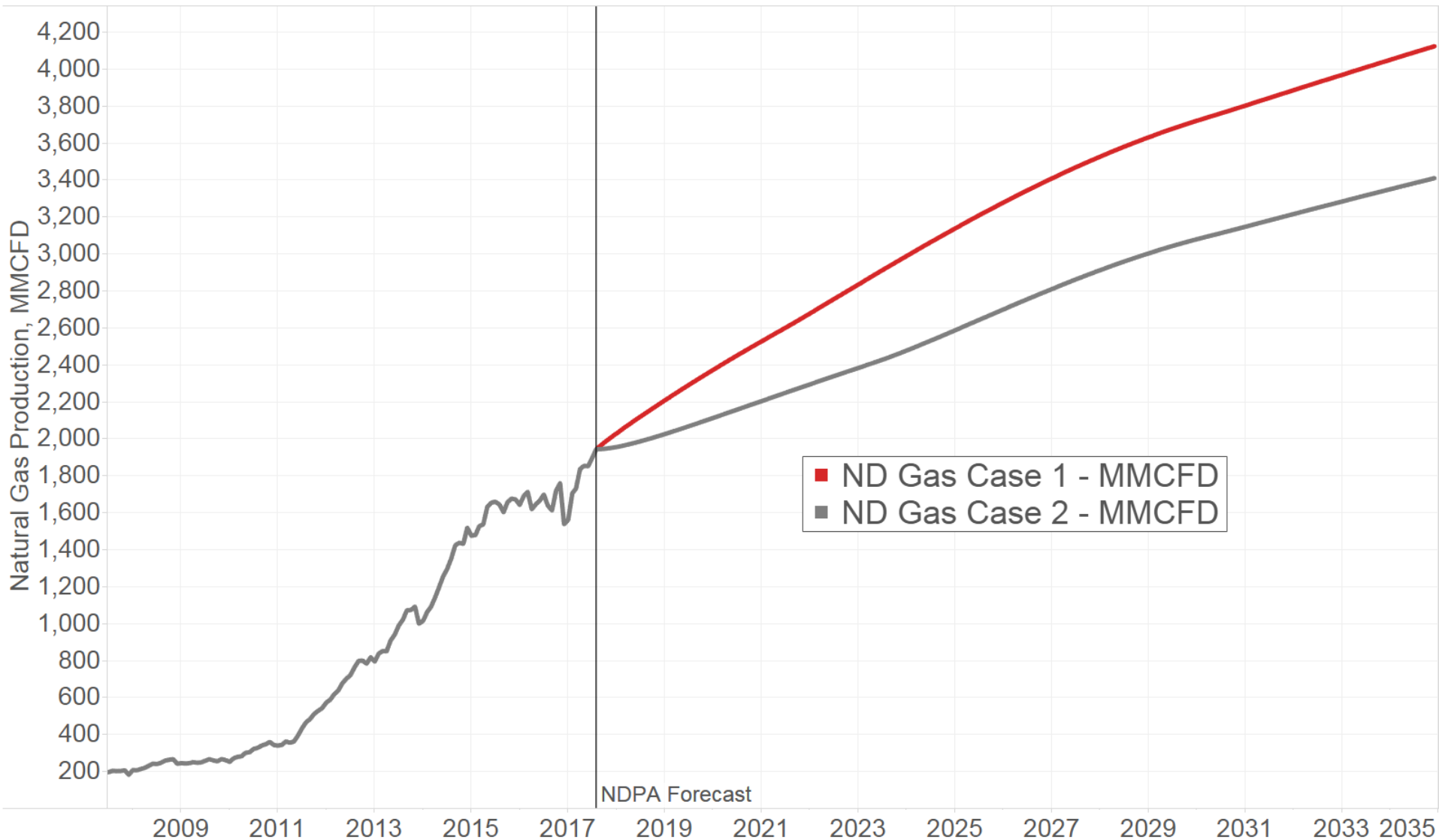


# Presentation Outline

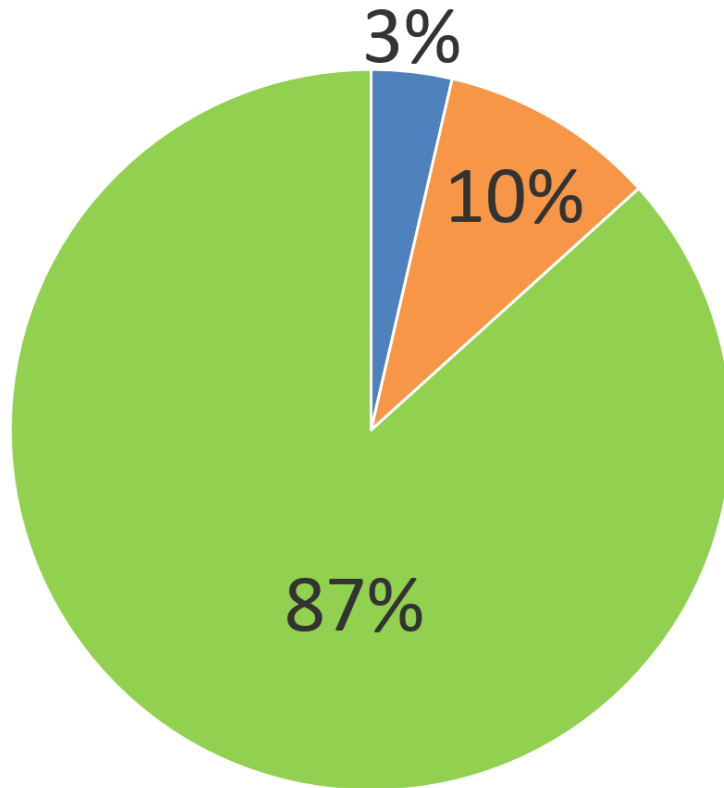
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# NDPA ND Gas Production Forecast



# 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.

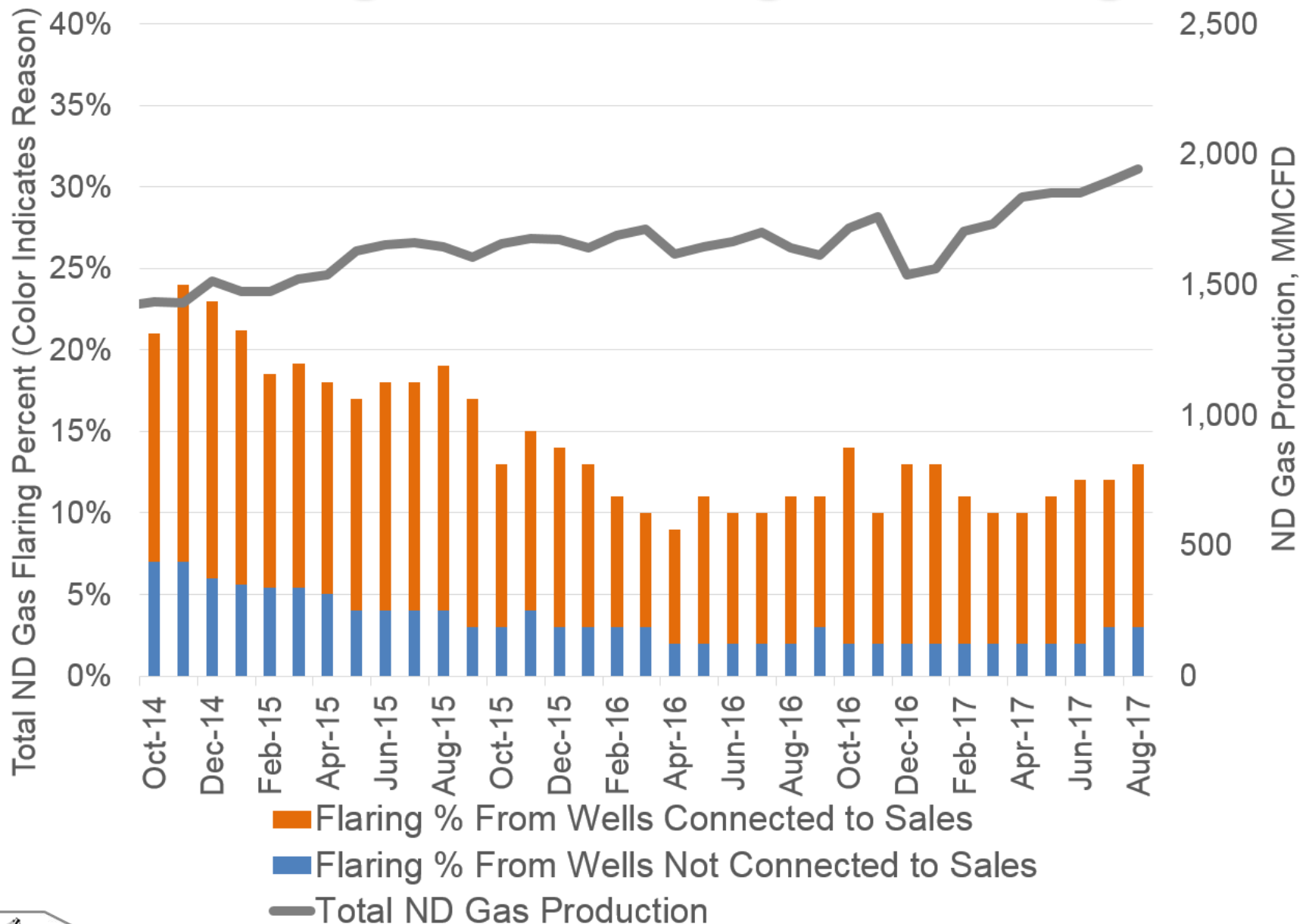
## Simple Terms

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

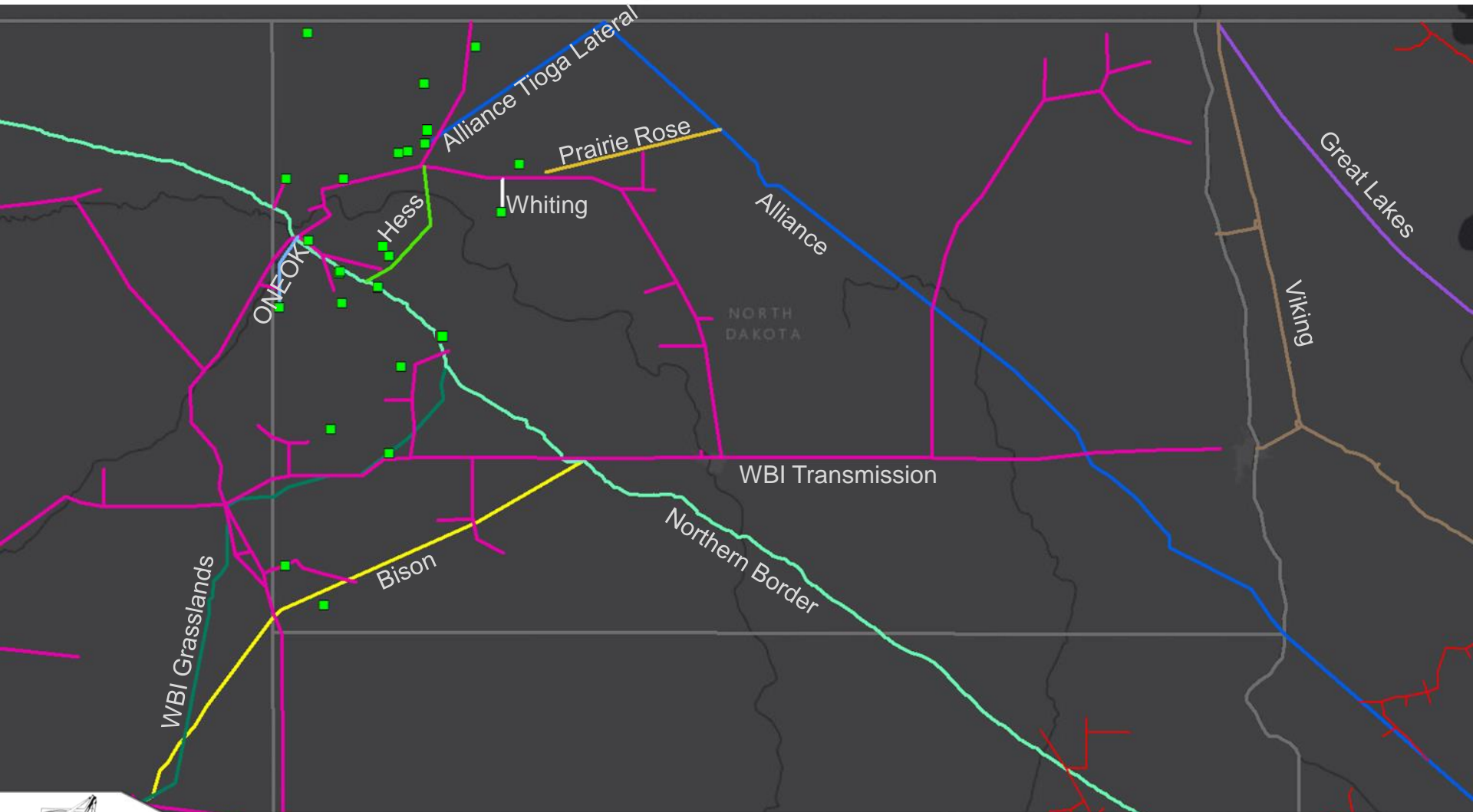
Aug 2017 Data – Non-Confidential Wells



# Solving the Flaring Challenge



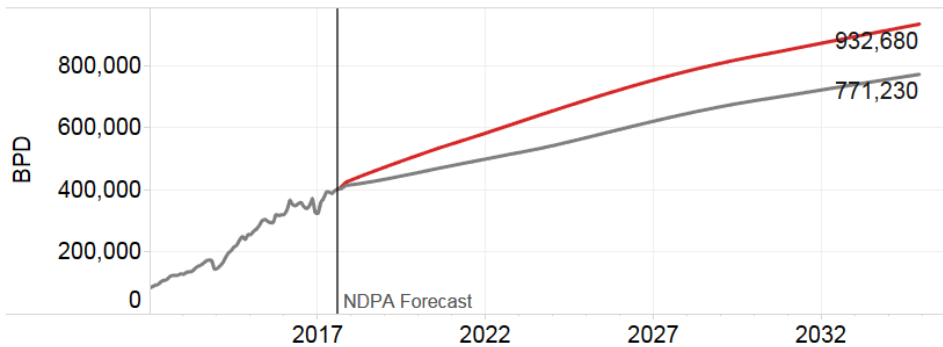
# Major Gas Pipeline and Processing Infrastructure



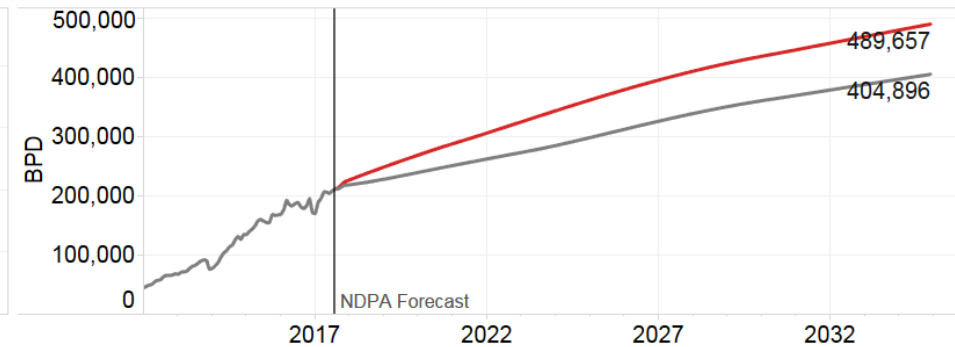


# North Dakota Captured\* NGL's

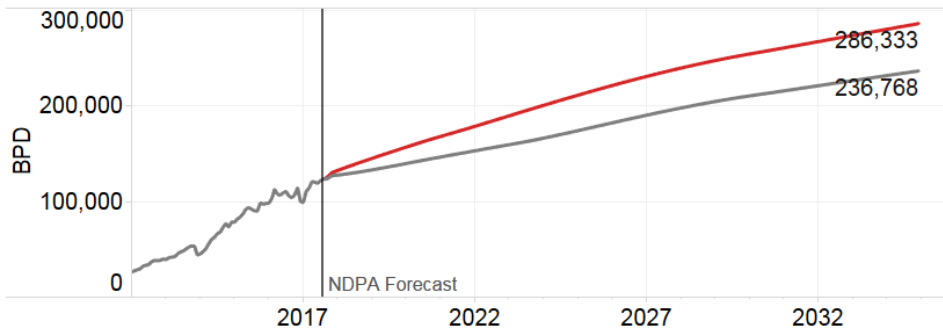
All Natural Gas Liquids



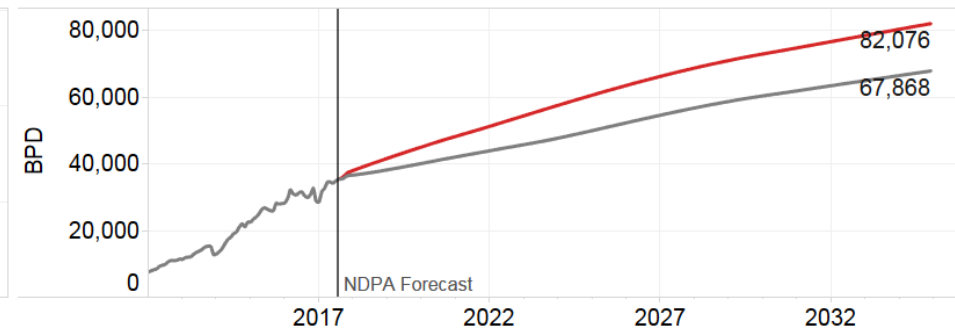
Ethane



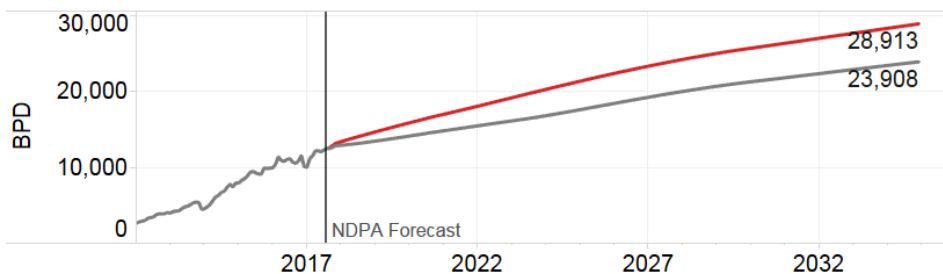
Propane



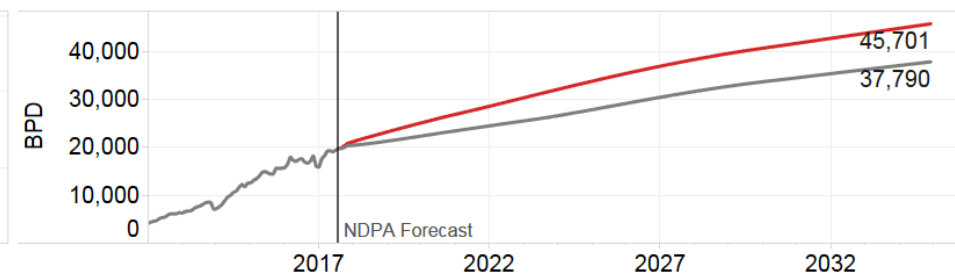
Butane



Isobutane



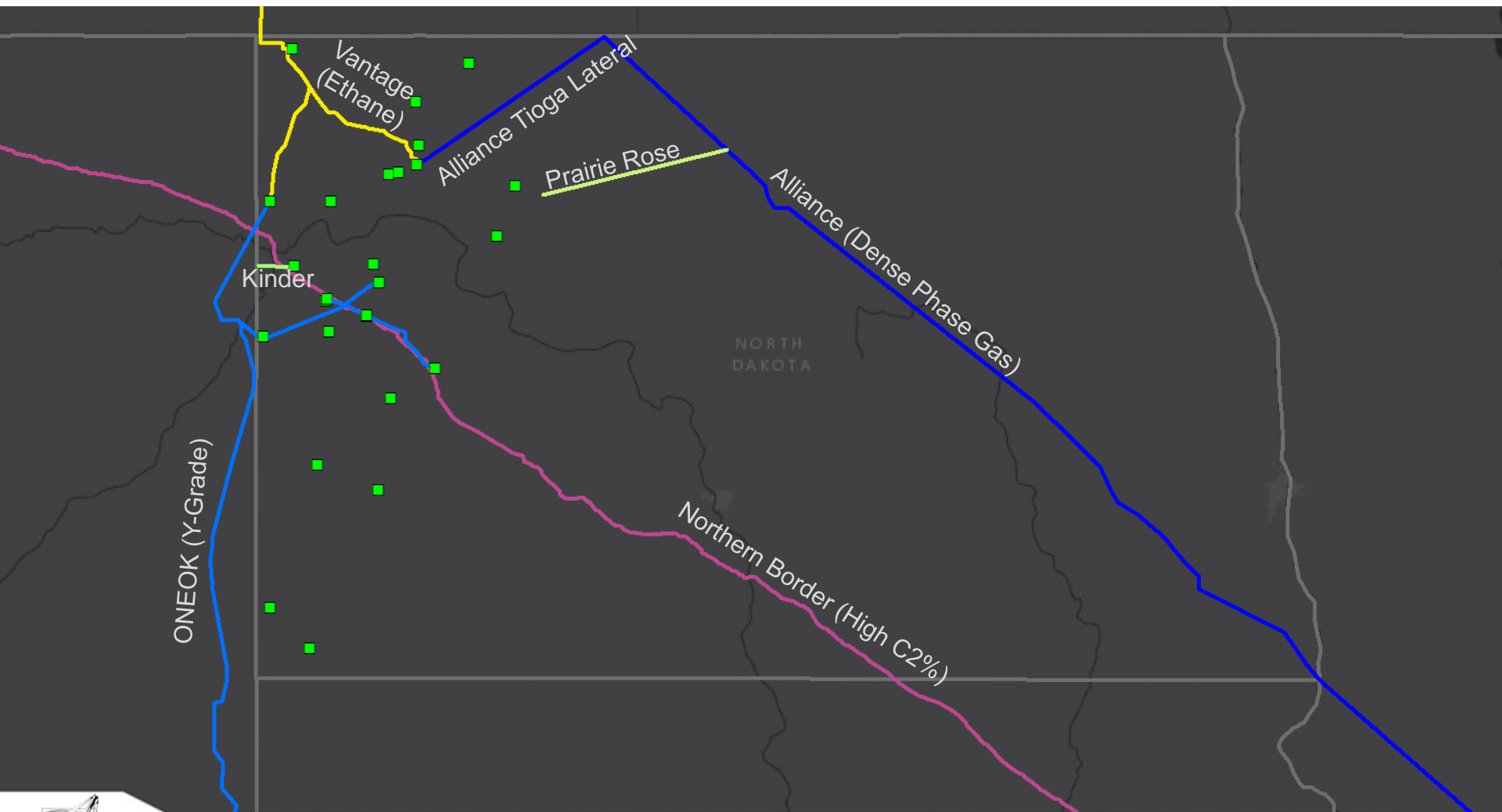
Natural Gasoline



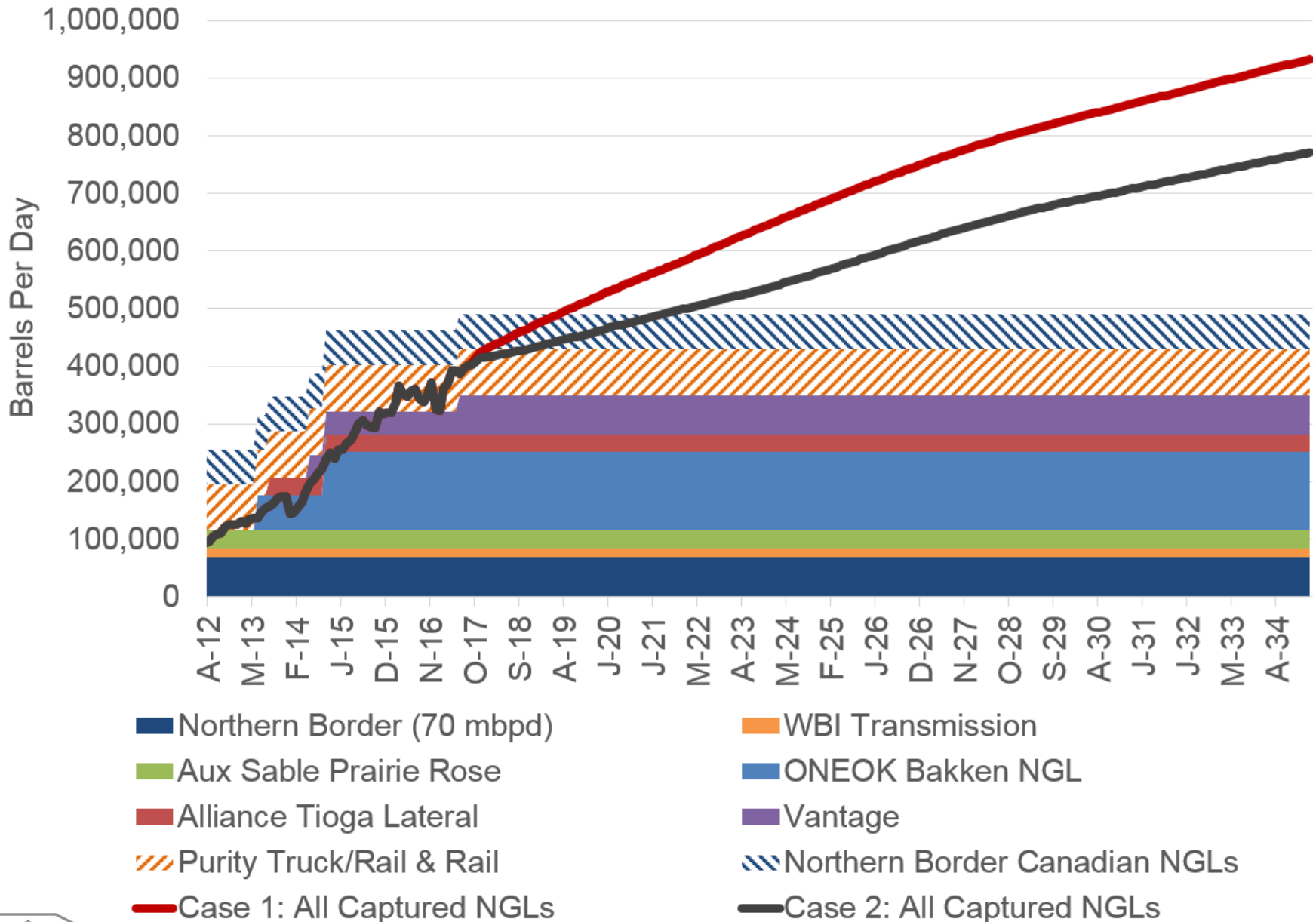
*\*Non-flared NGL's & Assumes 10 GPM*



# Major NGL Pipeline and Processing Infrastructure



# NGL Takeaway Options Are Limited

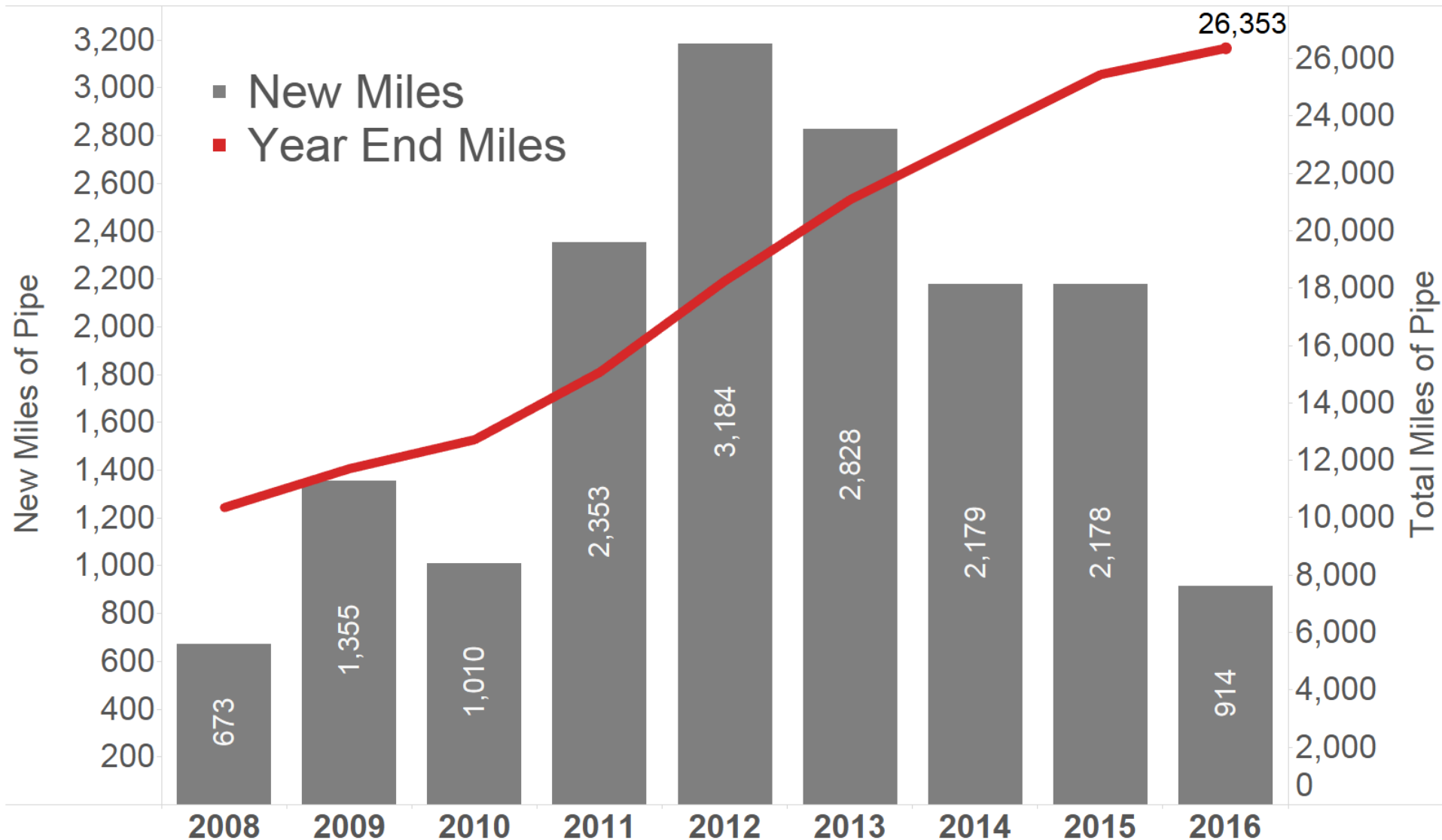


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# North Dakota Pipeline Construction

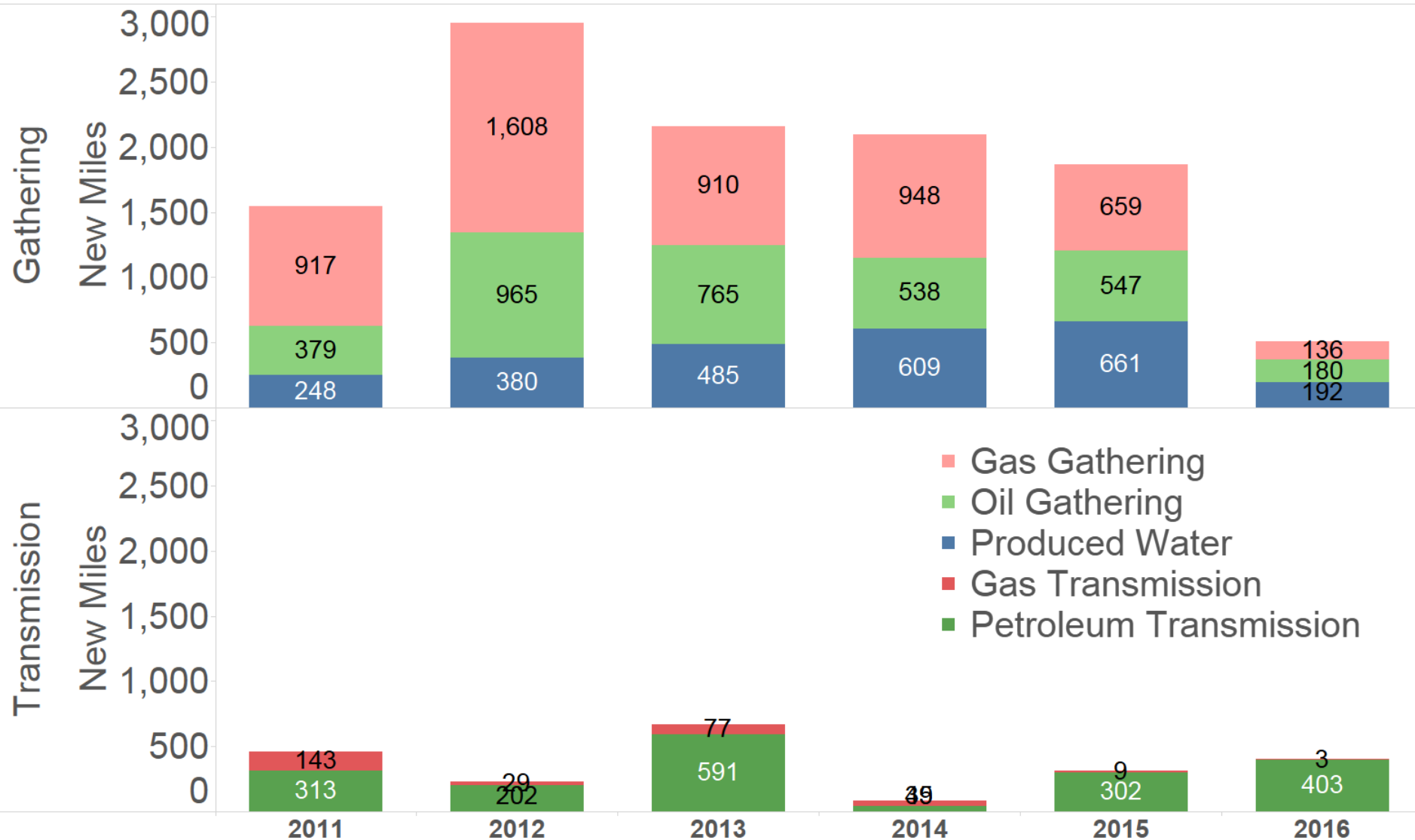


Sources: NDIC & PHMSA





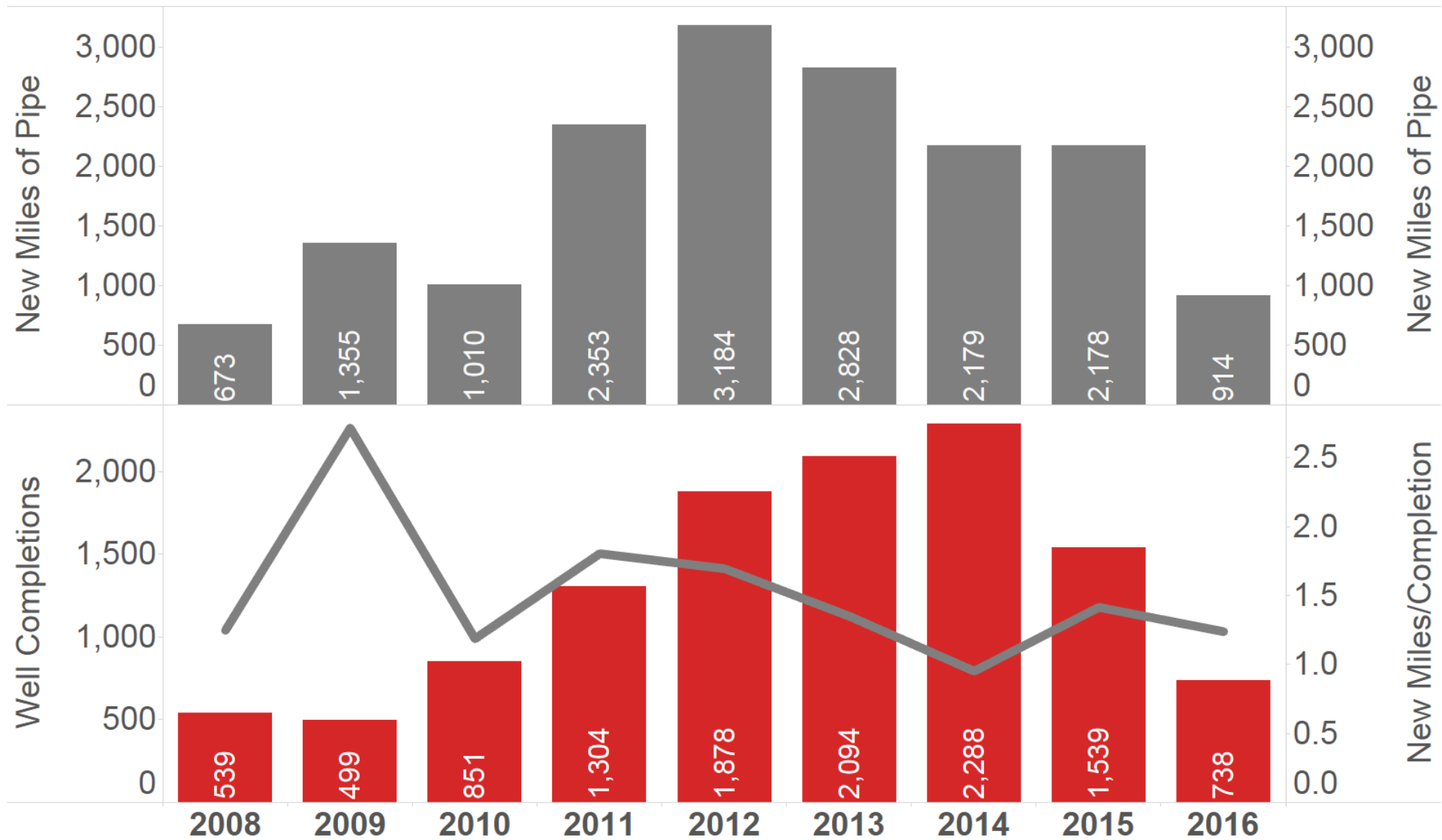
# North Dakota Pipeline Construction

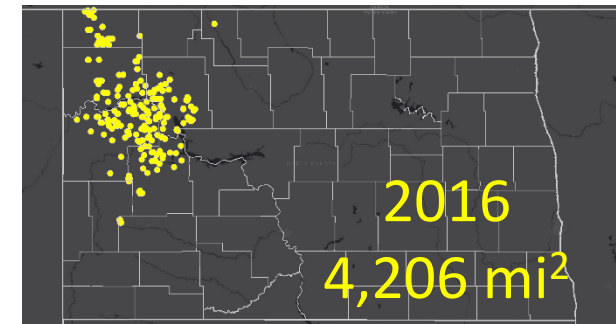
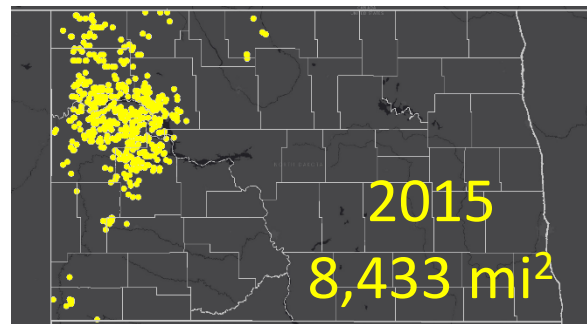
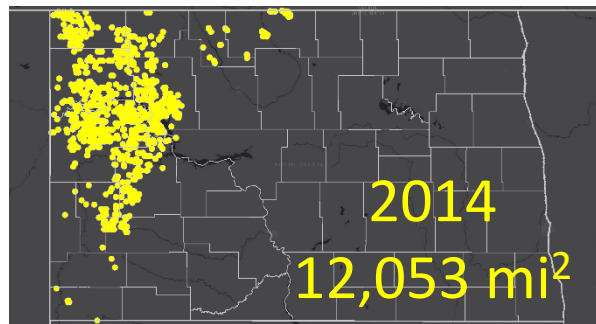
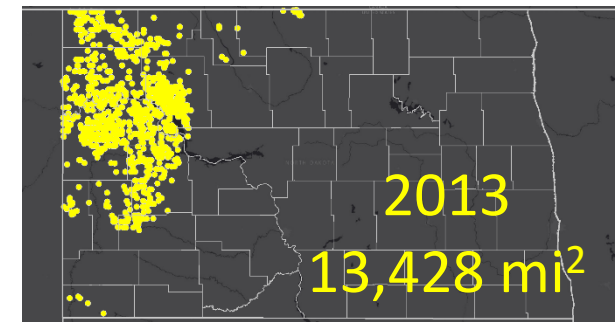
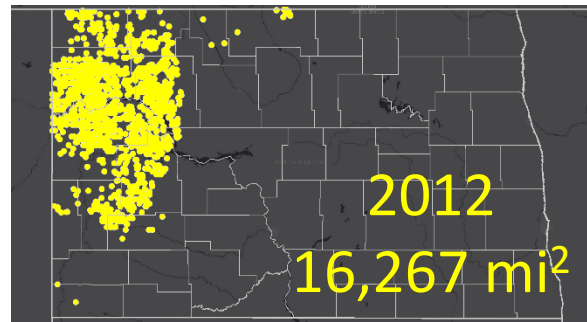
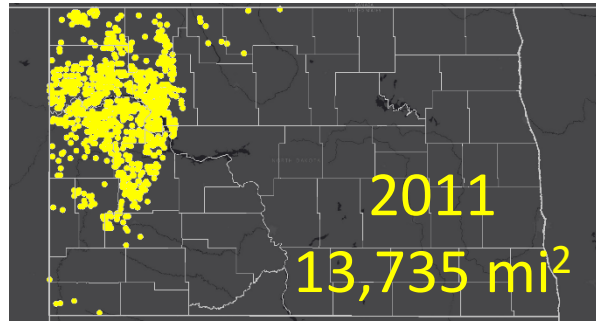
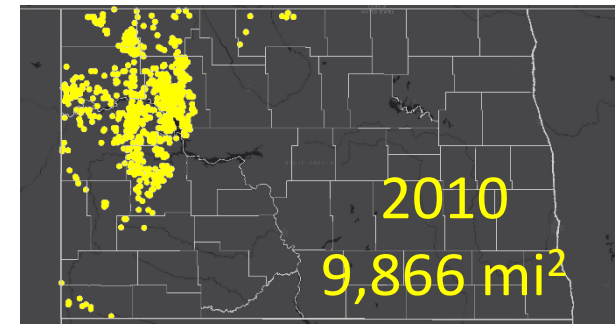
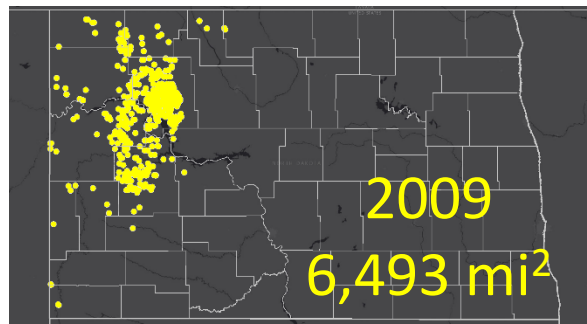
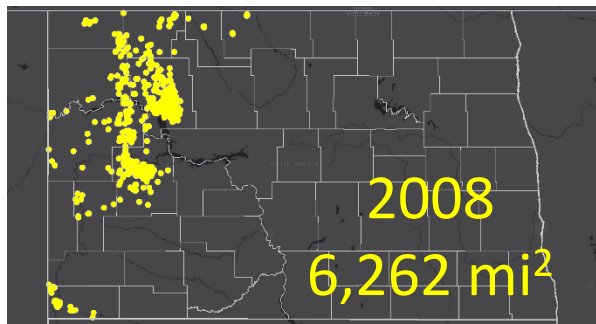


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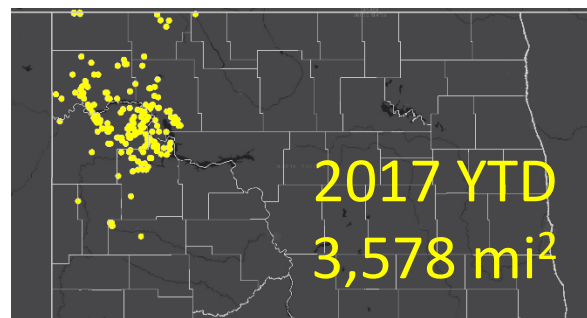


# New Miles and Well Completions

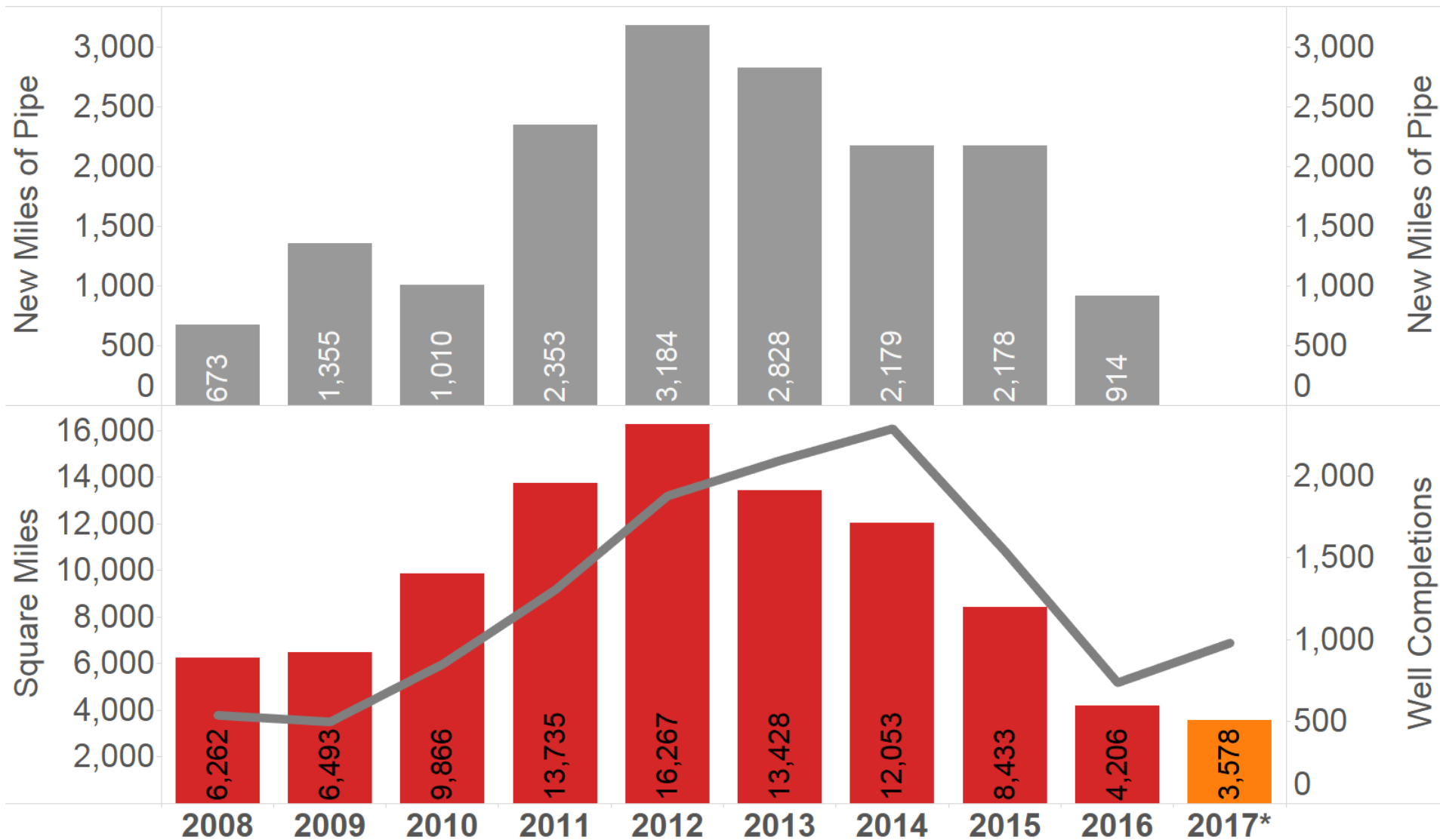




## 2 Mile Buffer Around New Wells By Year



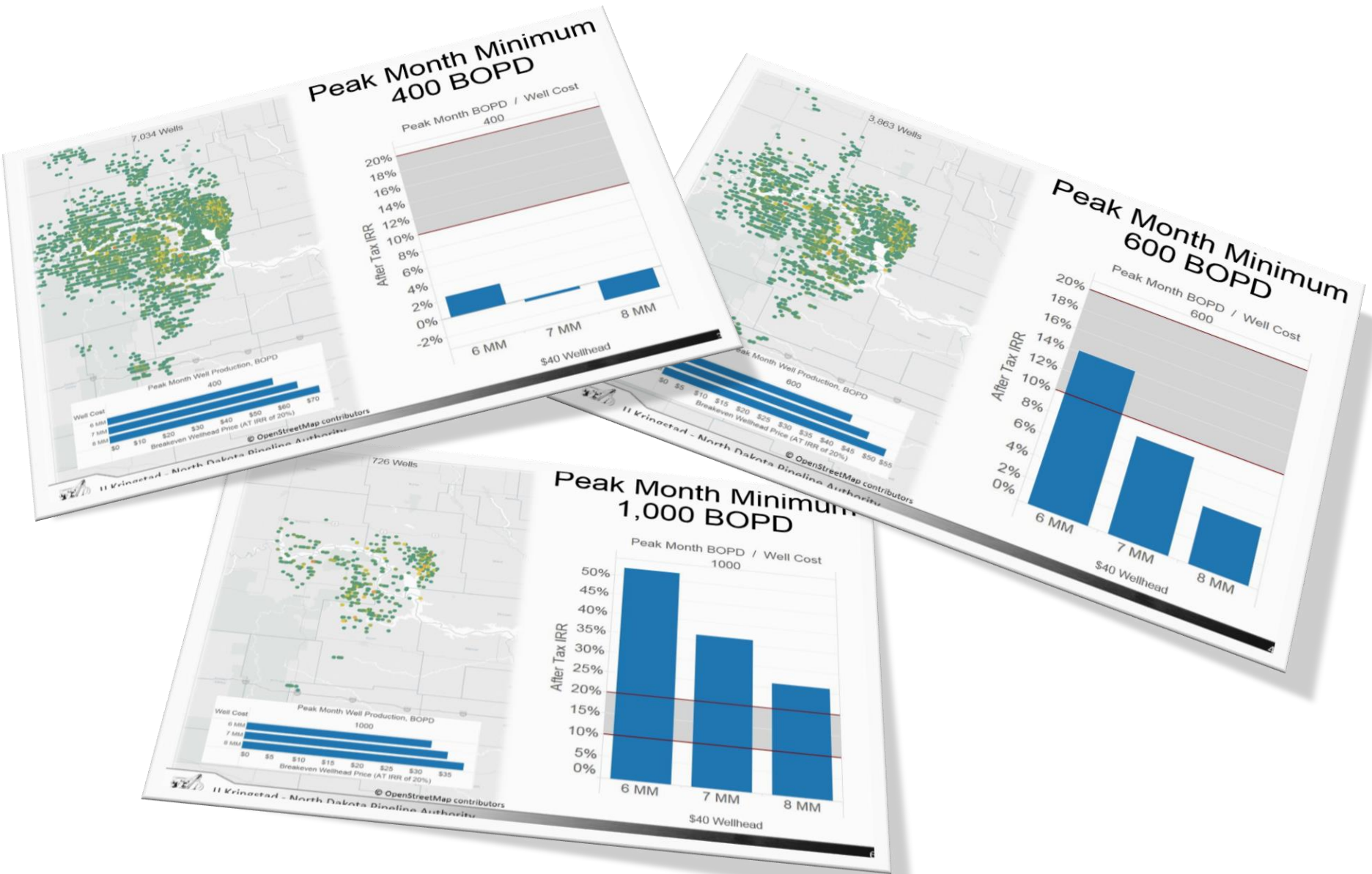
# New Miles and Activity Footprint



\*2017 Forecasted

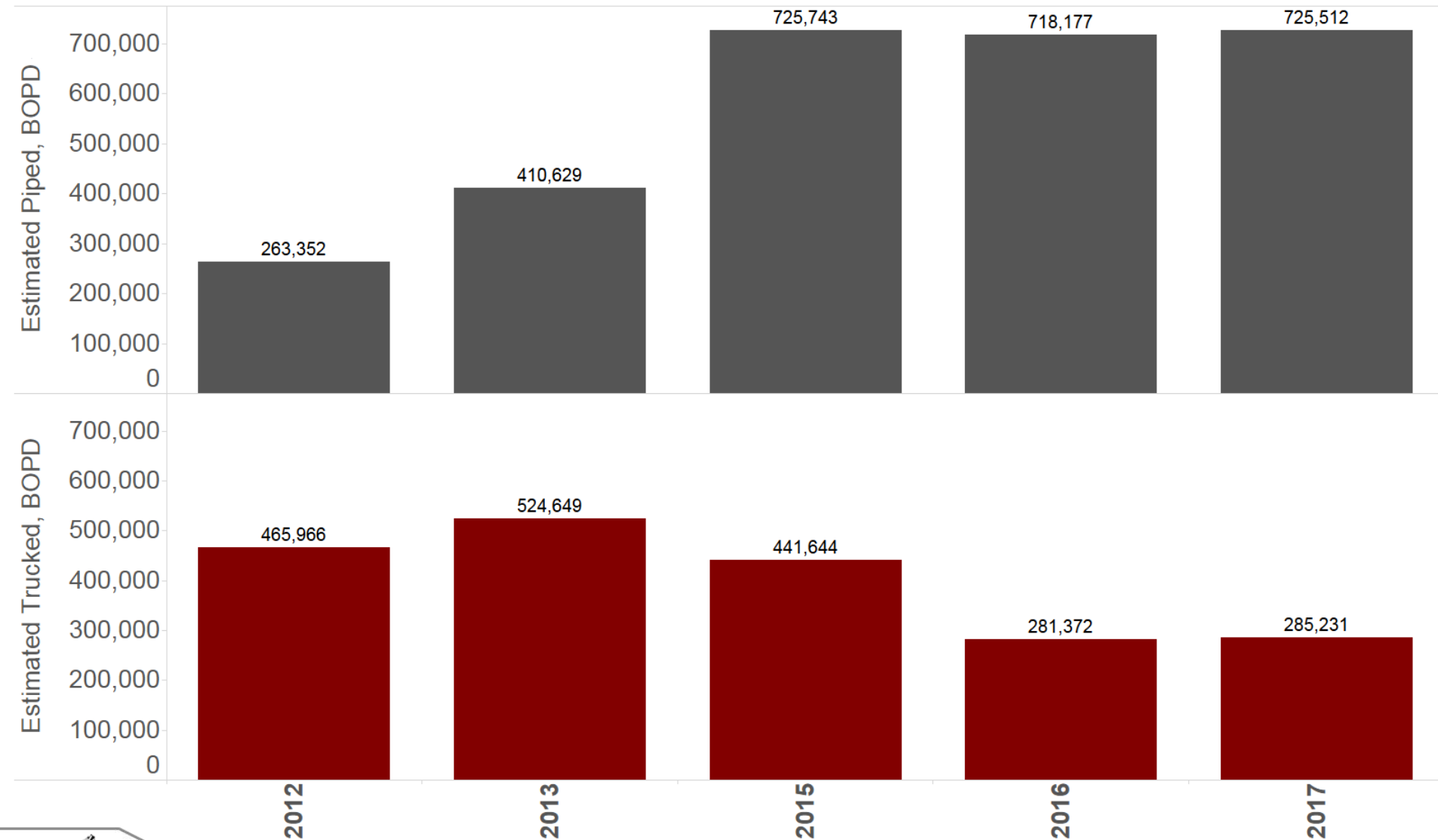


# Predicting New Miles With Activity Footprint



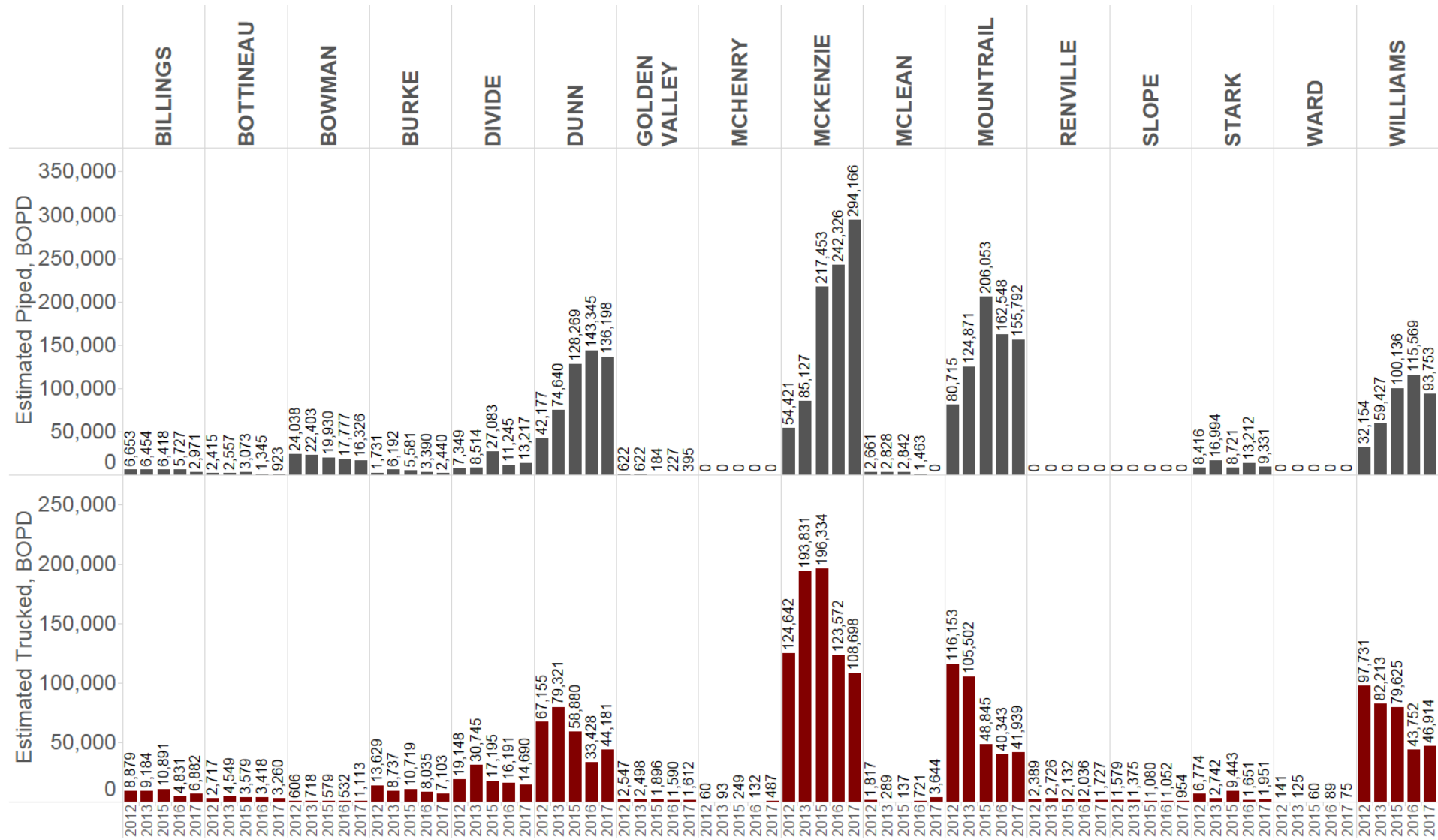
# Evolution of Oil Gathering in ND

## Statewide Totals

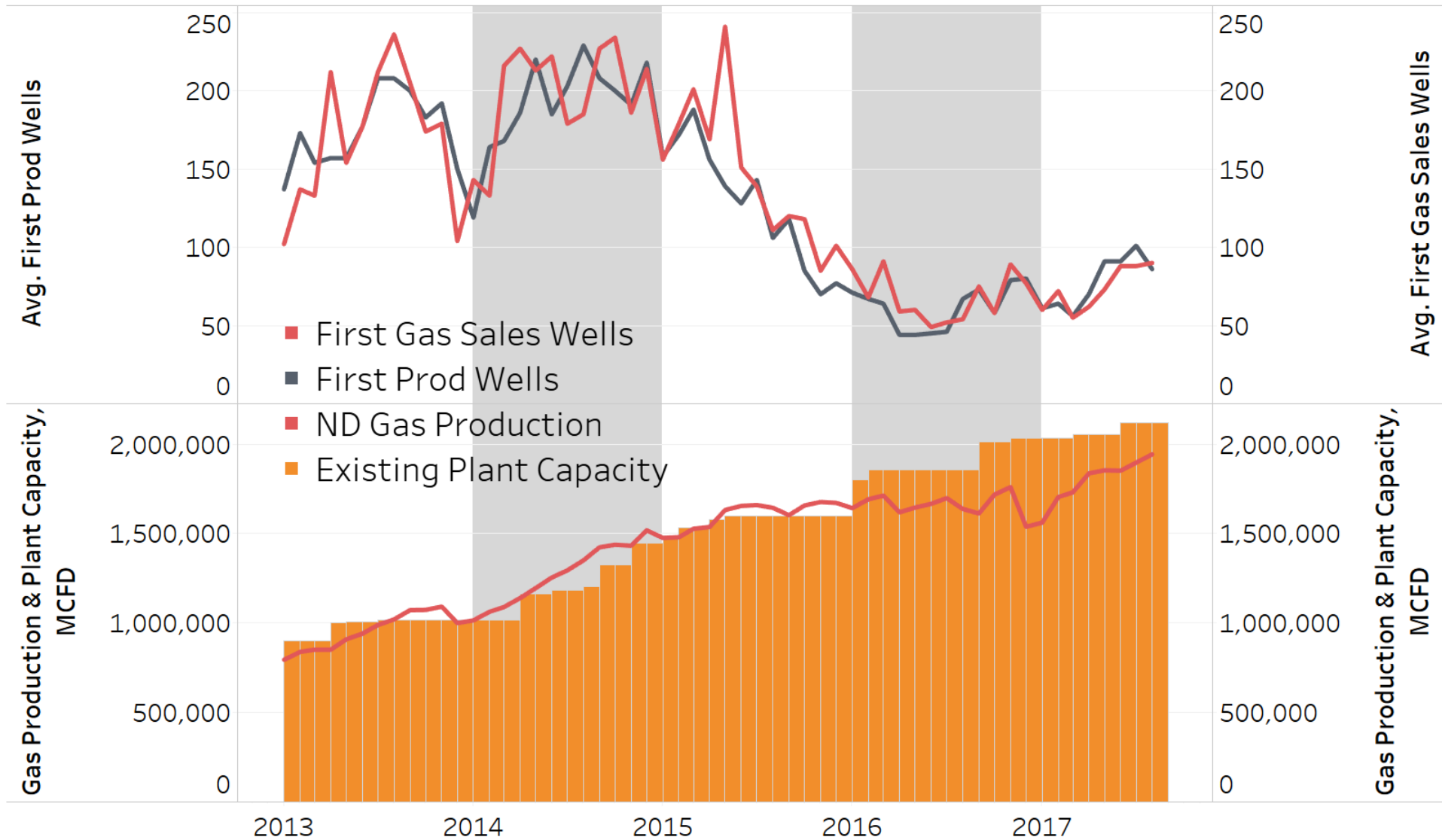




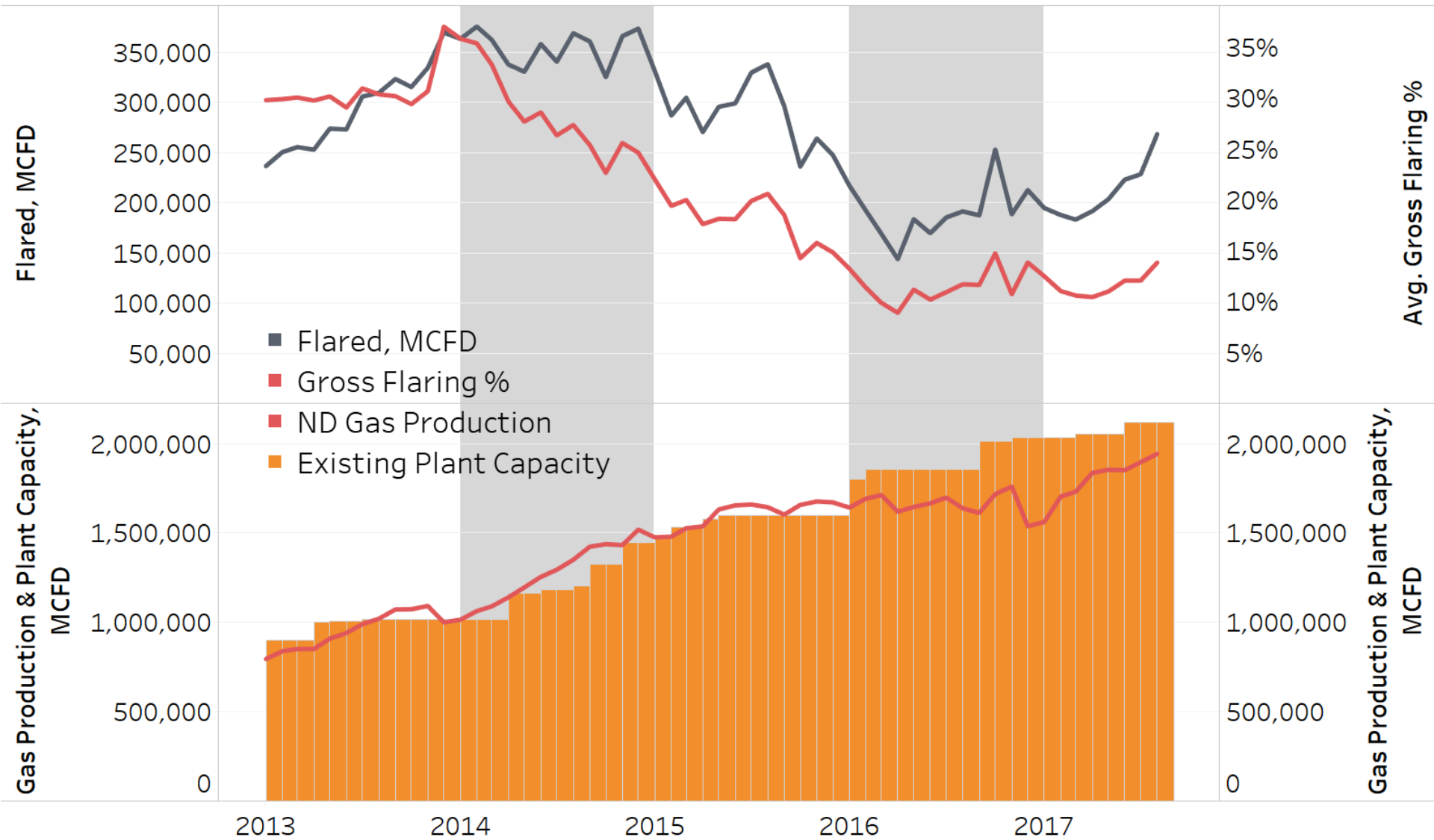
# Evolution of Oil Gathering in ND



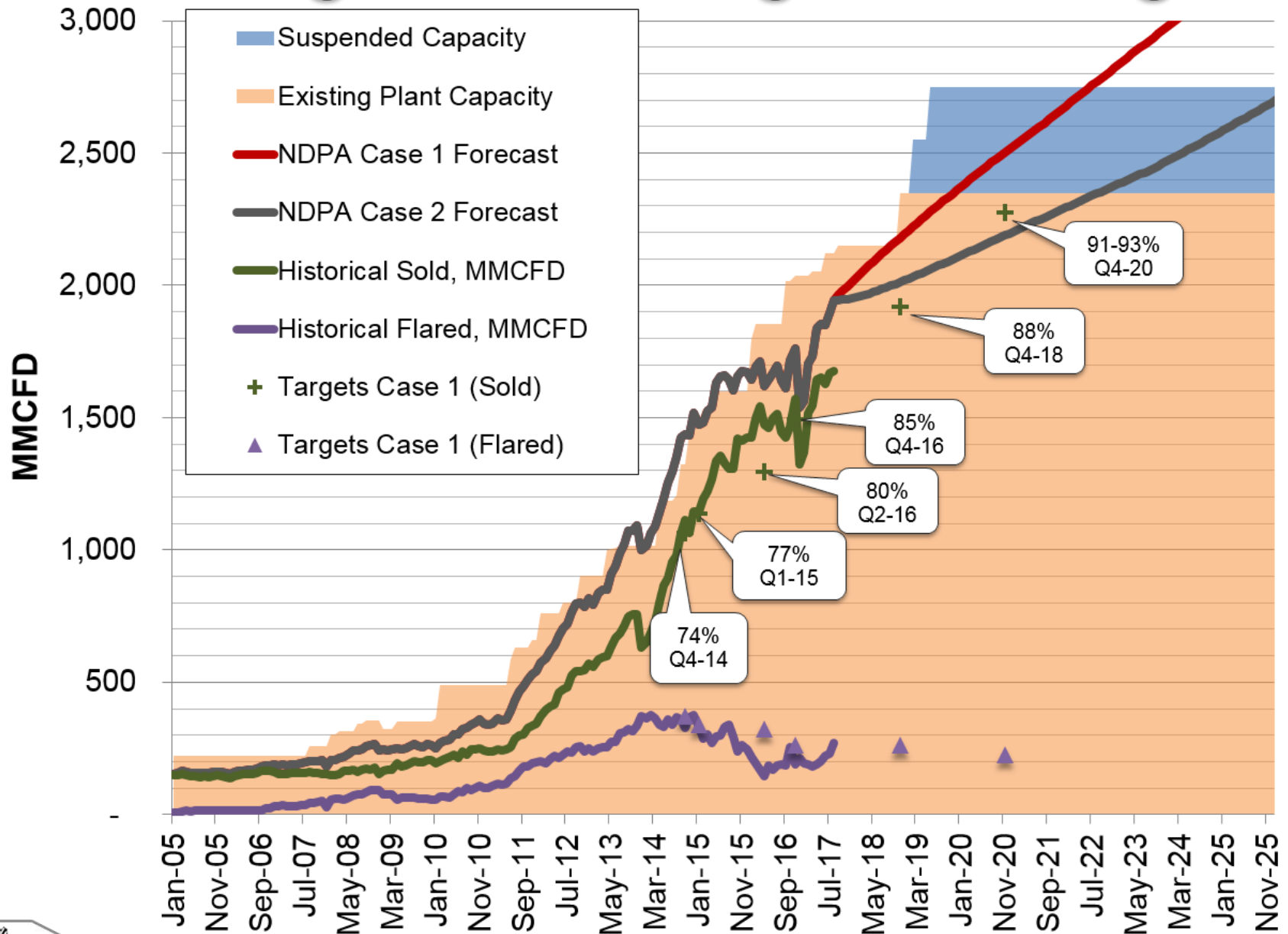
# Gas Gathering & Processing



# Gas Gathering & Processing



# Solving the Flaring Challenge



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# Bakken Refracs

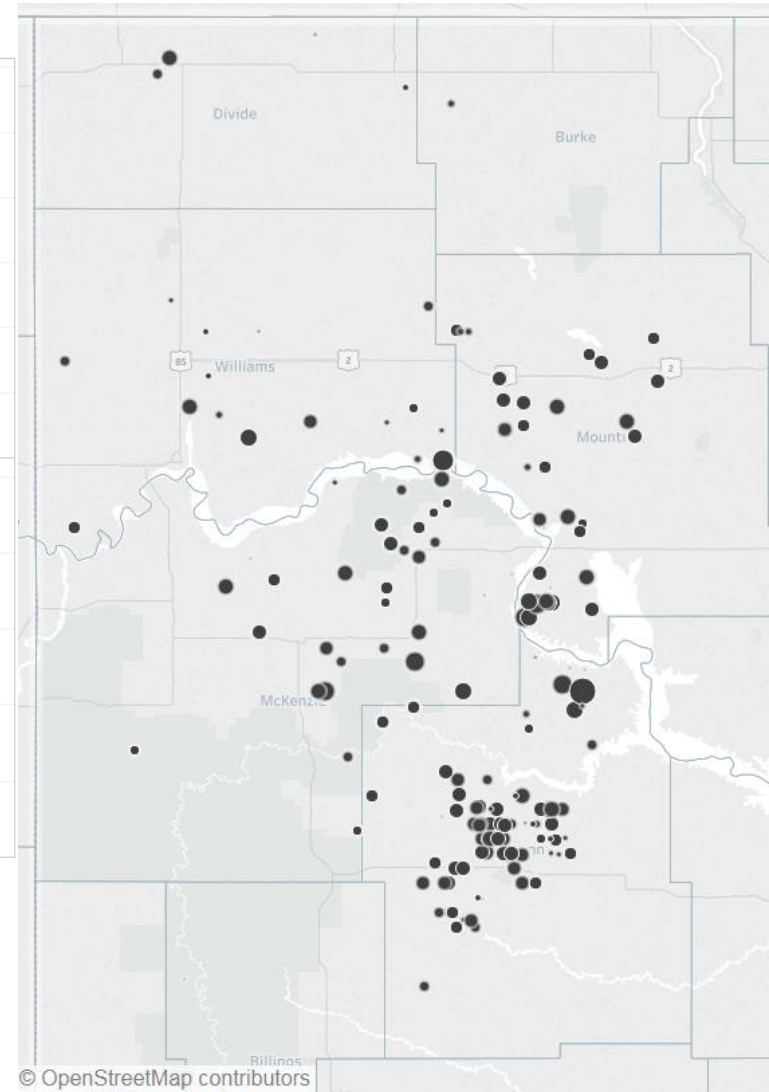
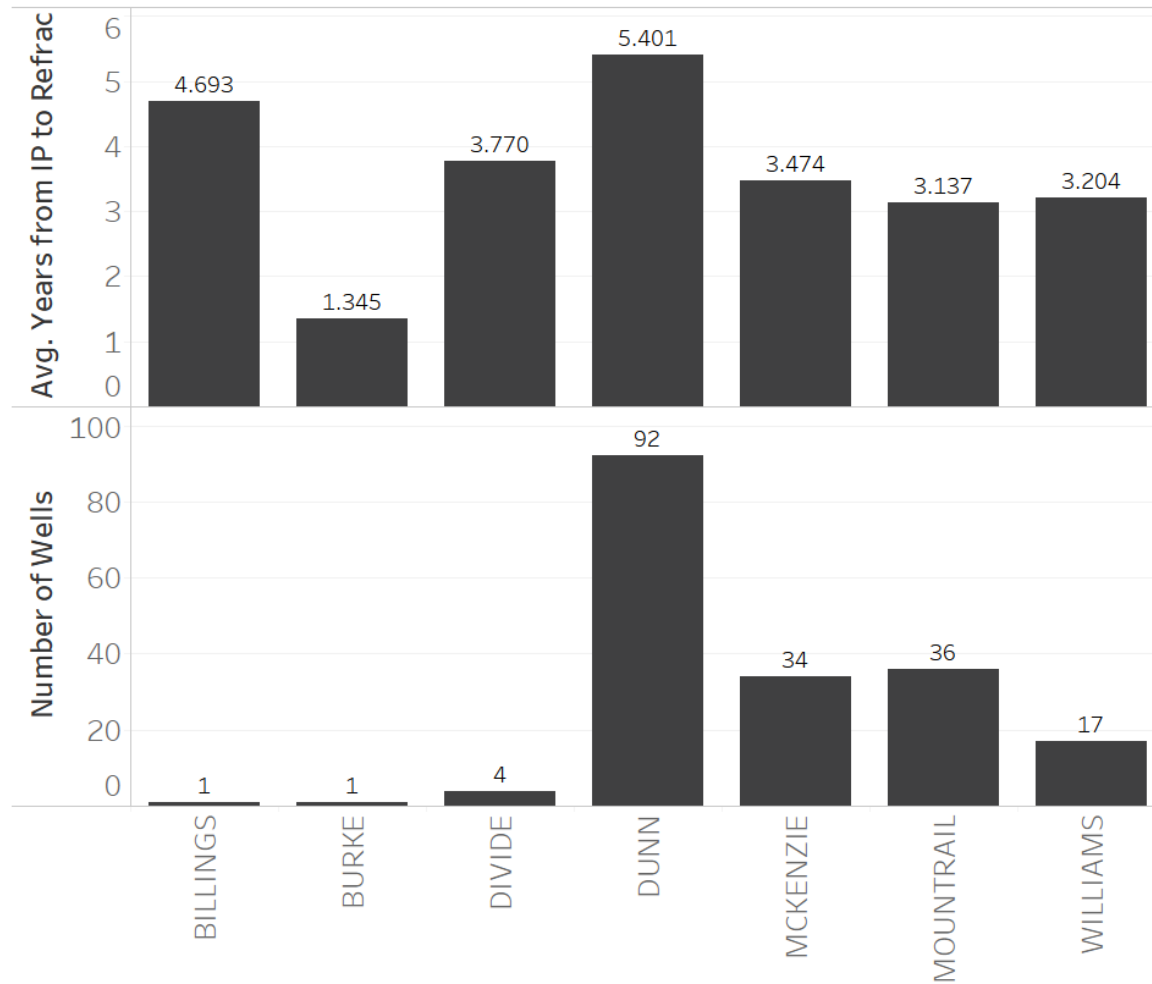
*Updated From Previous Refrac Work*

*185 Wells, Up From 142*

*List Cleaned Up With DMR Assistance*



# Refracs In the Bakken\*

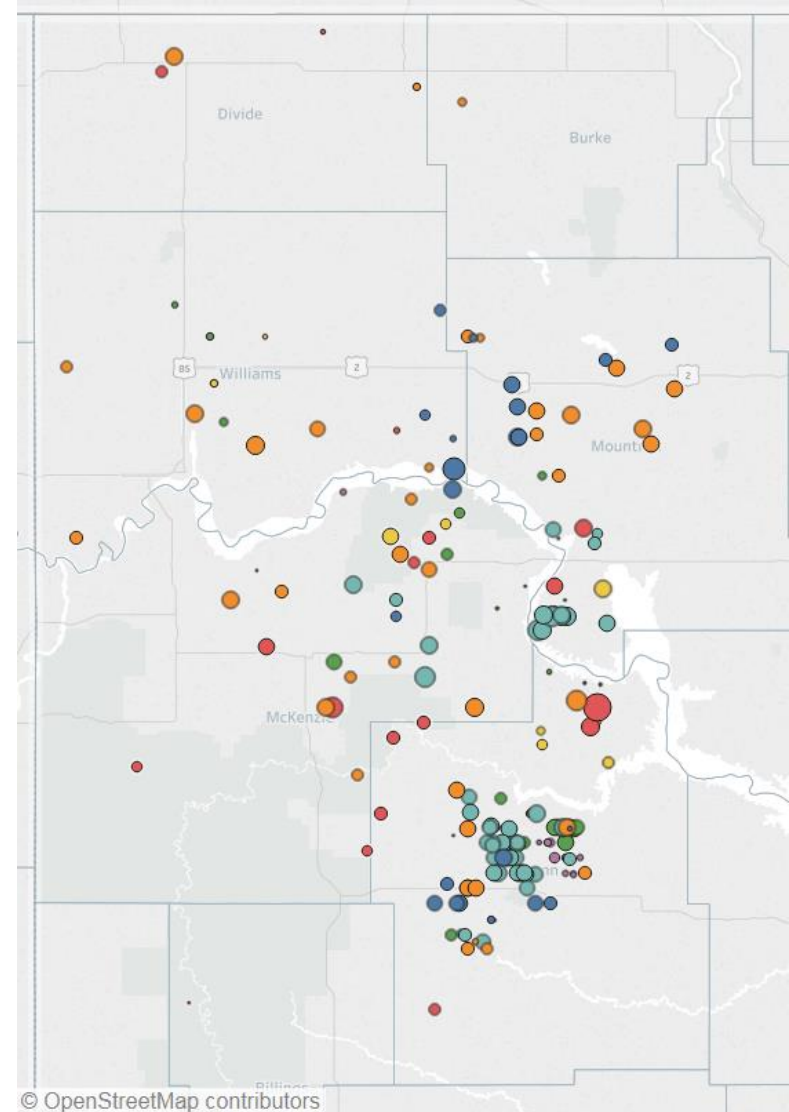
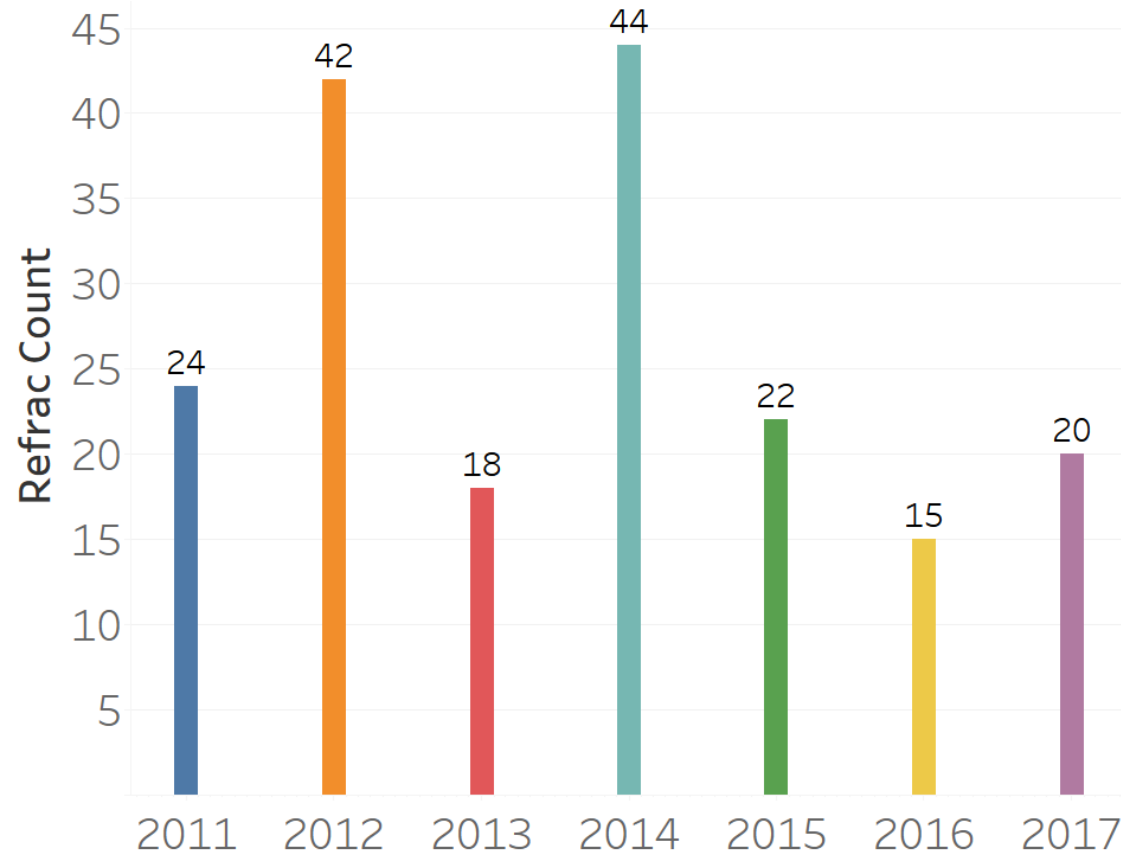


*\*While careful work was performed to discover as many non-confidential, modern refracs as possible, this data set is likely not all inclusive.*





# Refrac Completion Year\*

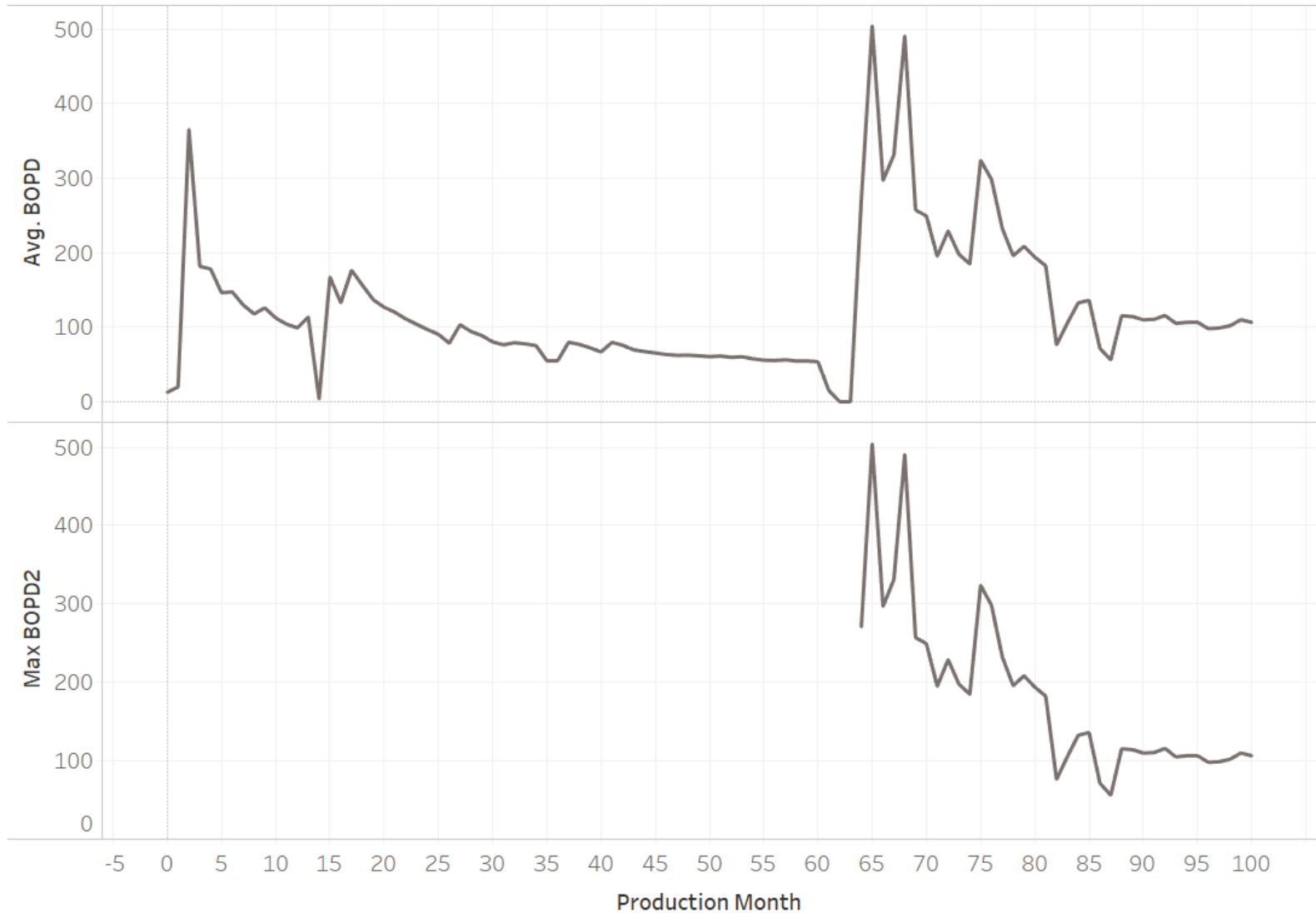


*\*While careful work was performed to discover as many non-confidential, modern refracs as possible, this data set is likely not all inclusive.*



# Example: Pre/Post Refrac Oil

BOPD

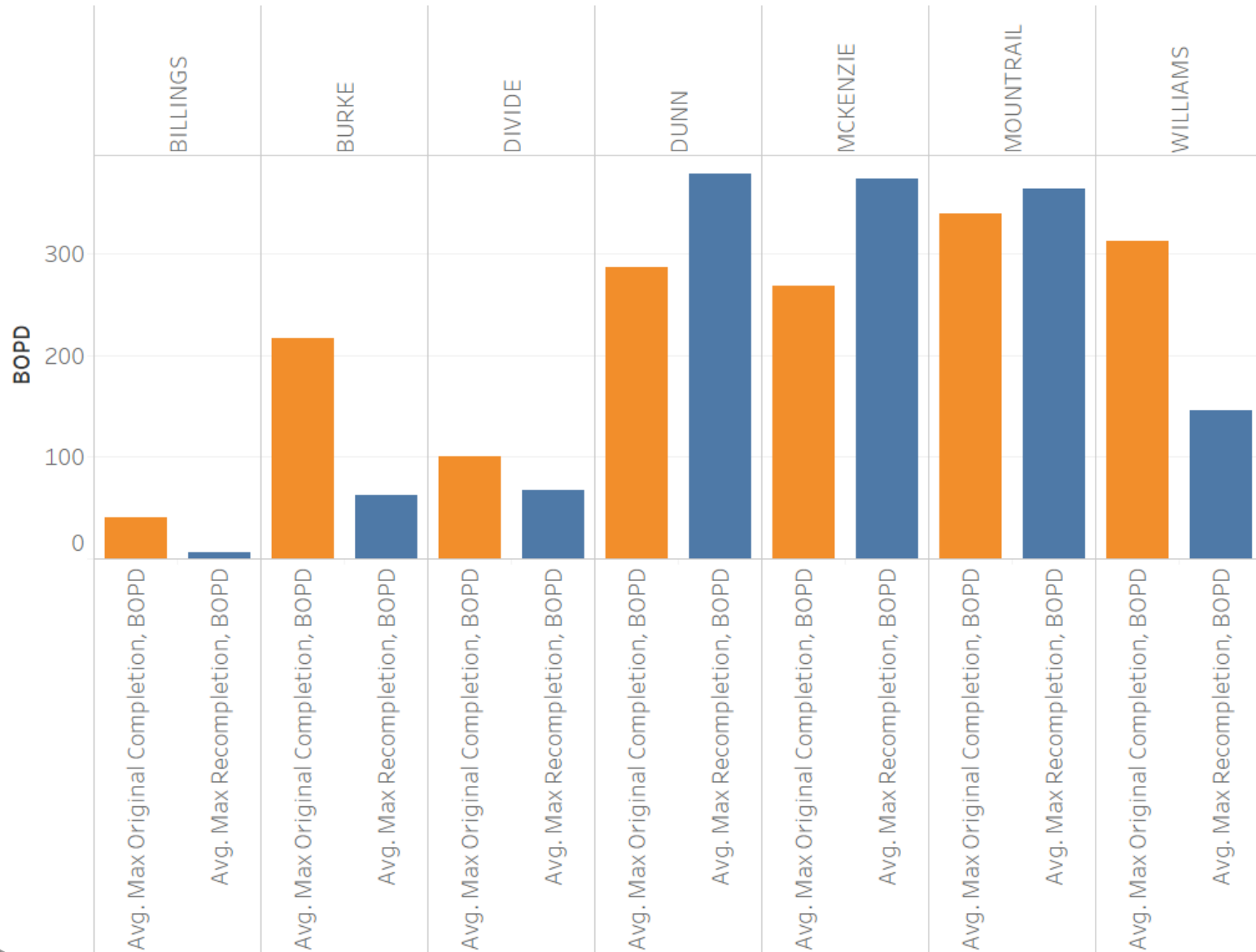


# Example: Pre/Post Refrac Oil

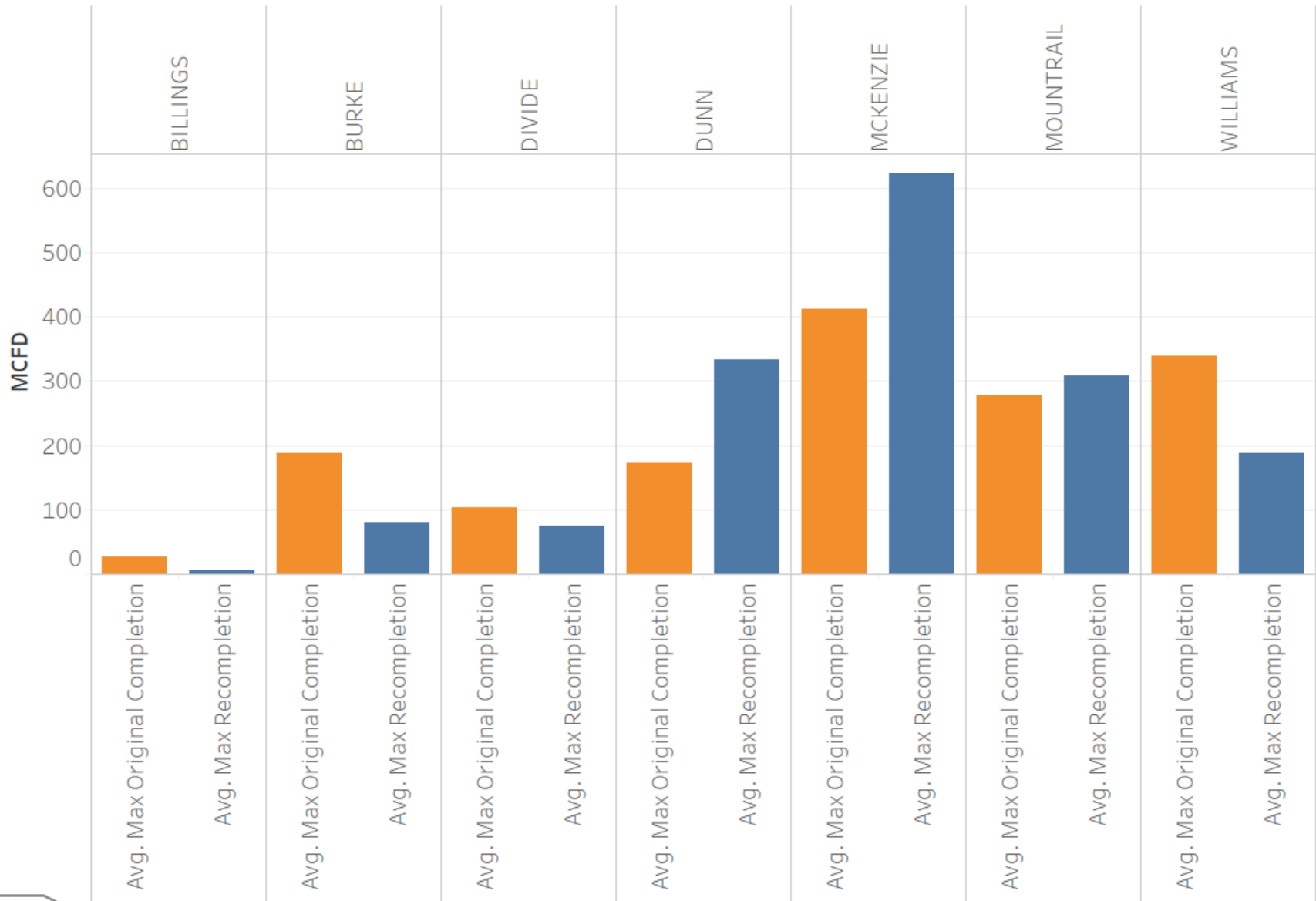
BOPD



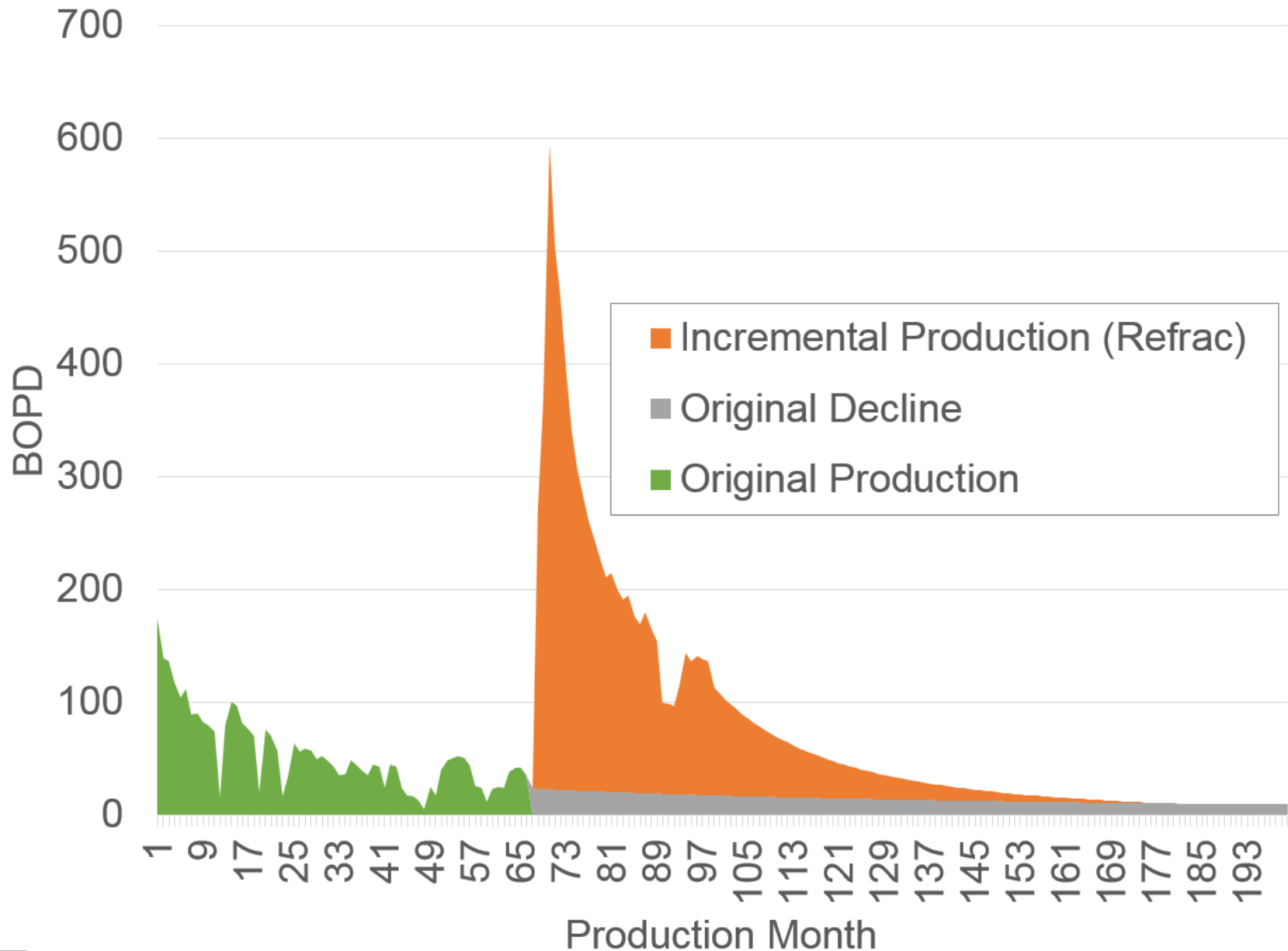
# Performance Pre/Post Refrac



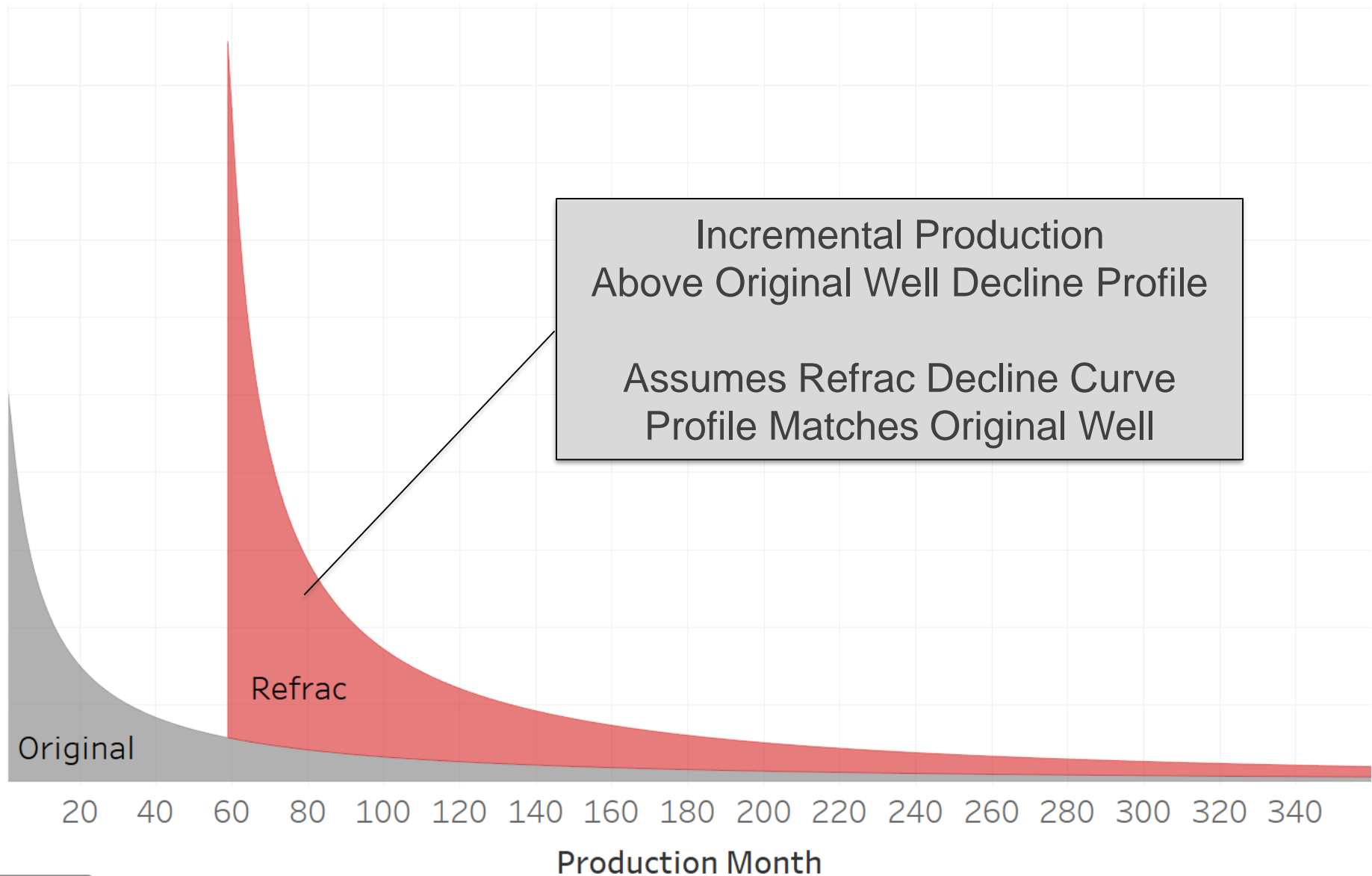
# Performance Pre/Post Refrac



# Example: 257,000 BBLS of Incremental Production

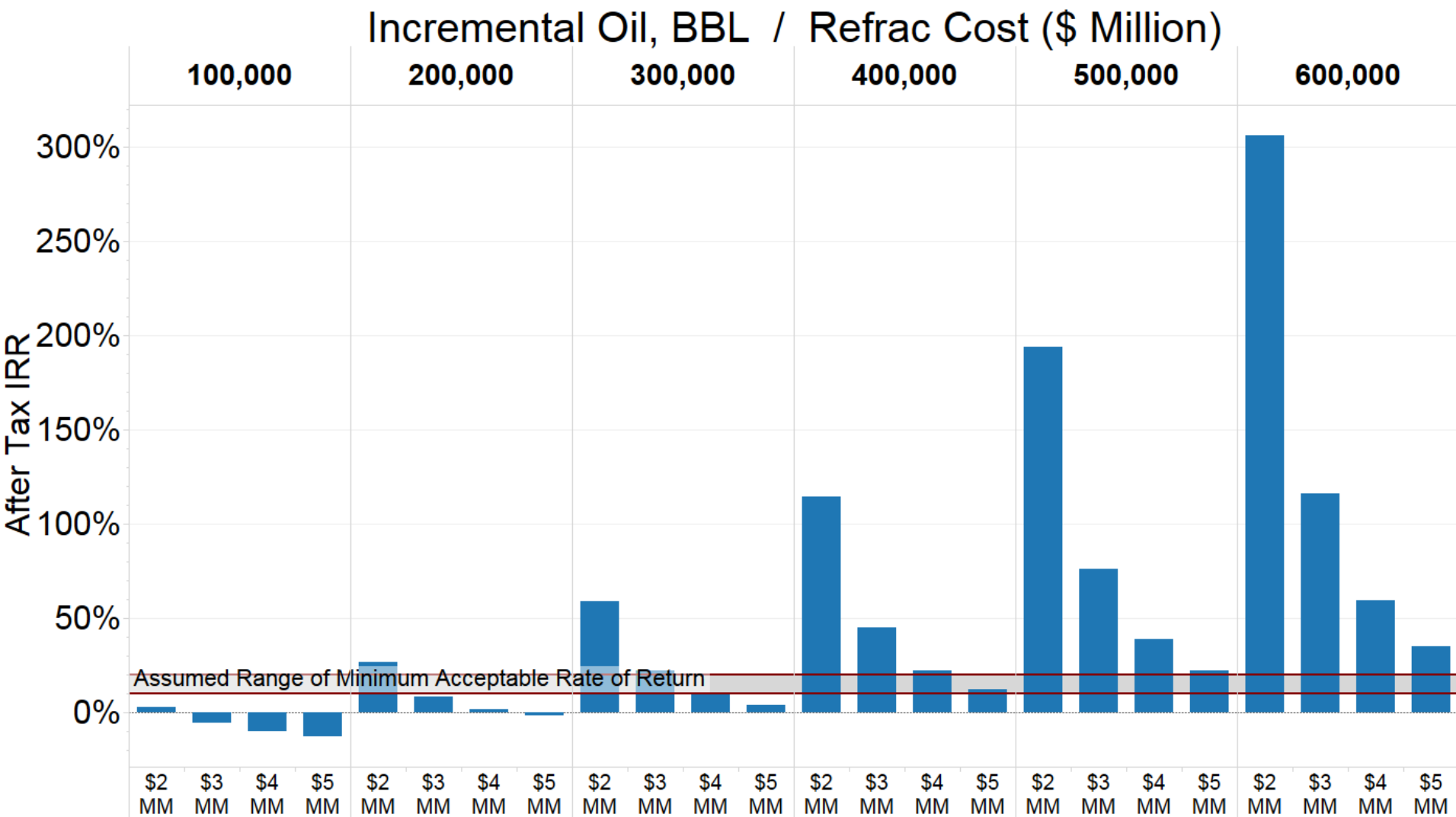


# Refrac Economics Methodology

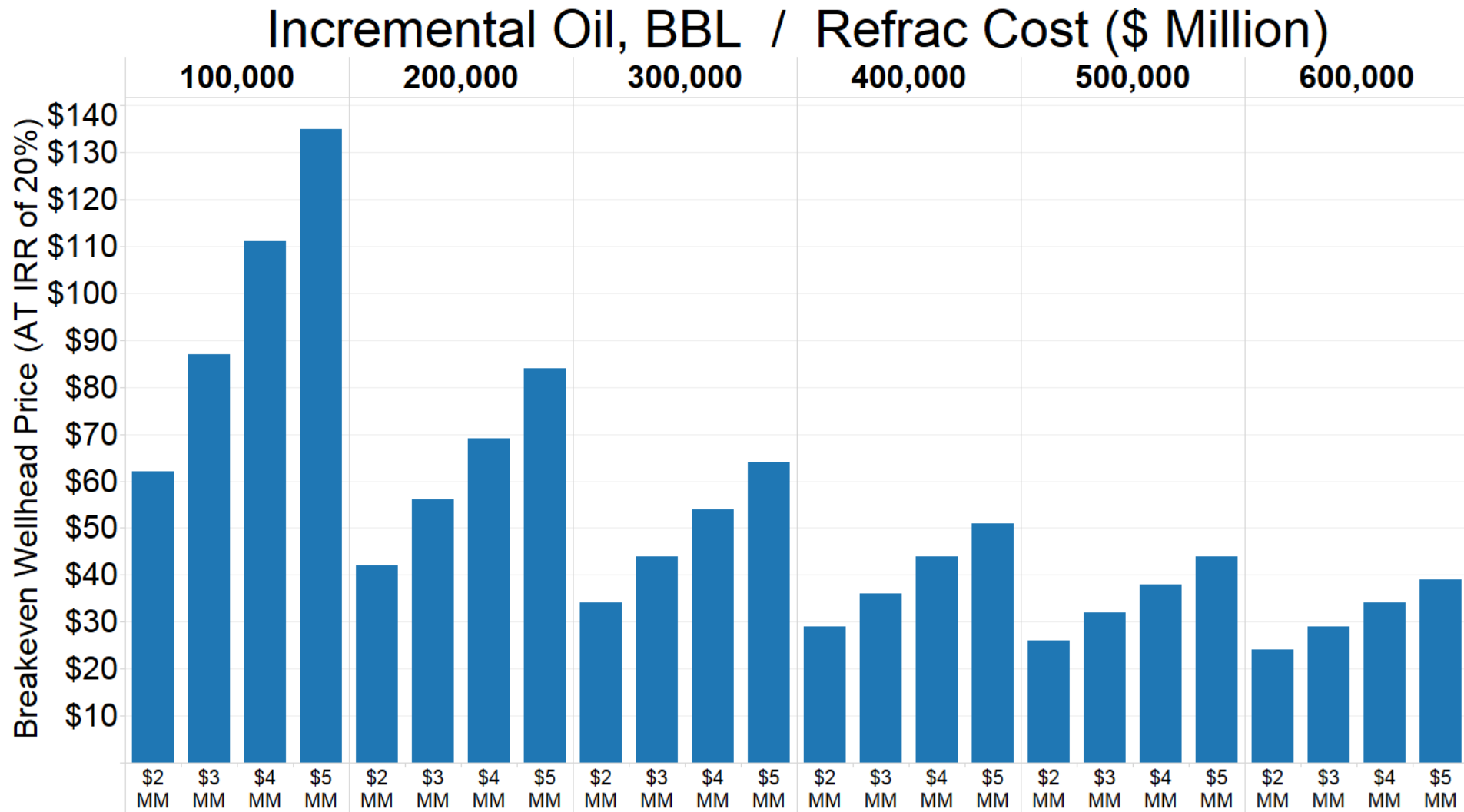




# Refrac Summary of \$45 Wellhead Oil



# Refrac Breakeven Summary



# Contact Information

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[www.northdakotapipelines.com](http://www.northdakotapipelines.com)



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