

DI Consulting

US Production Key Metrics

DrillingInfo Consulting | November 2017

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Executive Summary and Key Takeaways

1) Did the chicken or egg come first?

Currently, we see the largest bottleneck of getting wells online is completion crew shortages. This is not always in terms of raw HP and personnel but on experienced crews and the right job. Many who left the industry in the downturn will not come back and veteran crews are in high demand. Completion designs are getting more complex and require the knowledge and understanding that comes with years of experience. Zipper fracs can also place pressure on regional resources.

2) How has production changed over time and WHY?

Productivity has increased year-over-year (YOY) for unconventional wells, the question is WHY? Many basins have gone to 8-10k'+ lateral lengths with treated intervals being of similar magnitude. Completion designs are being dialed in on first wells reducing learning curve. Interaction between parent and child wells is being better understood and used to more effectively drain the DSU.

3) Does the geology stack up?

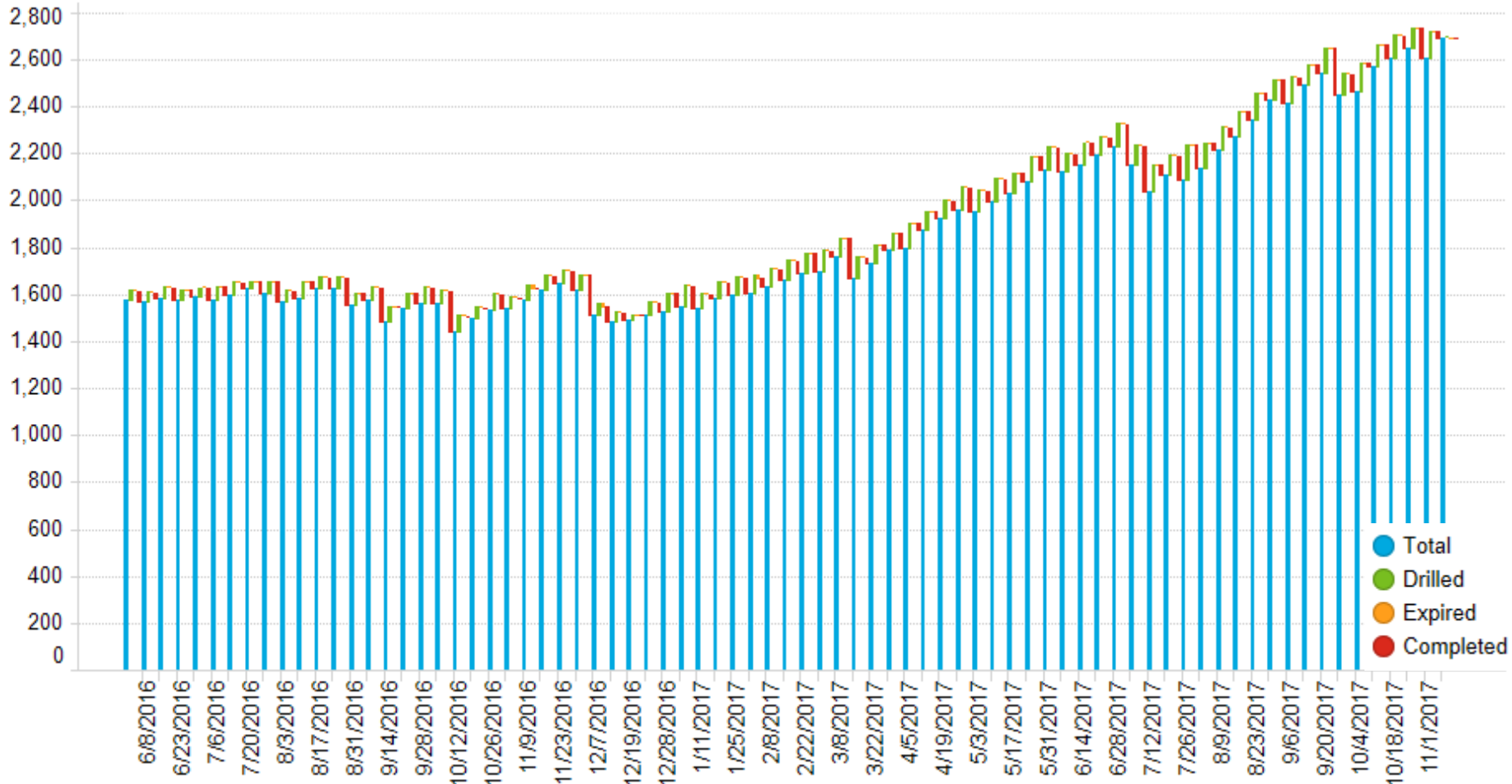
Consolidation in the hottest areas with companies buying up smaller private entities is forcing funded teams to go to the margins and push boundaries. We are starting to see more and more activity towards the fringe areas. More and more PE money in the market is driving lower margins and increasing activity to prove up areas. Land and permit rushes across the US.

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Chicken or Egg?

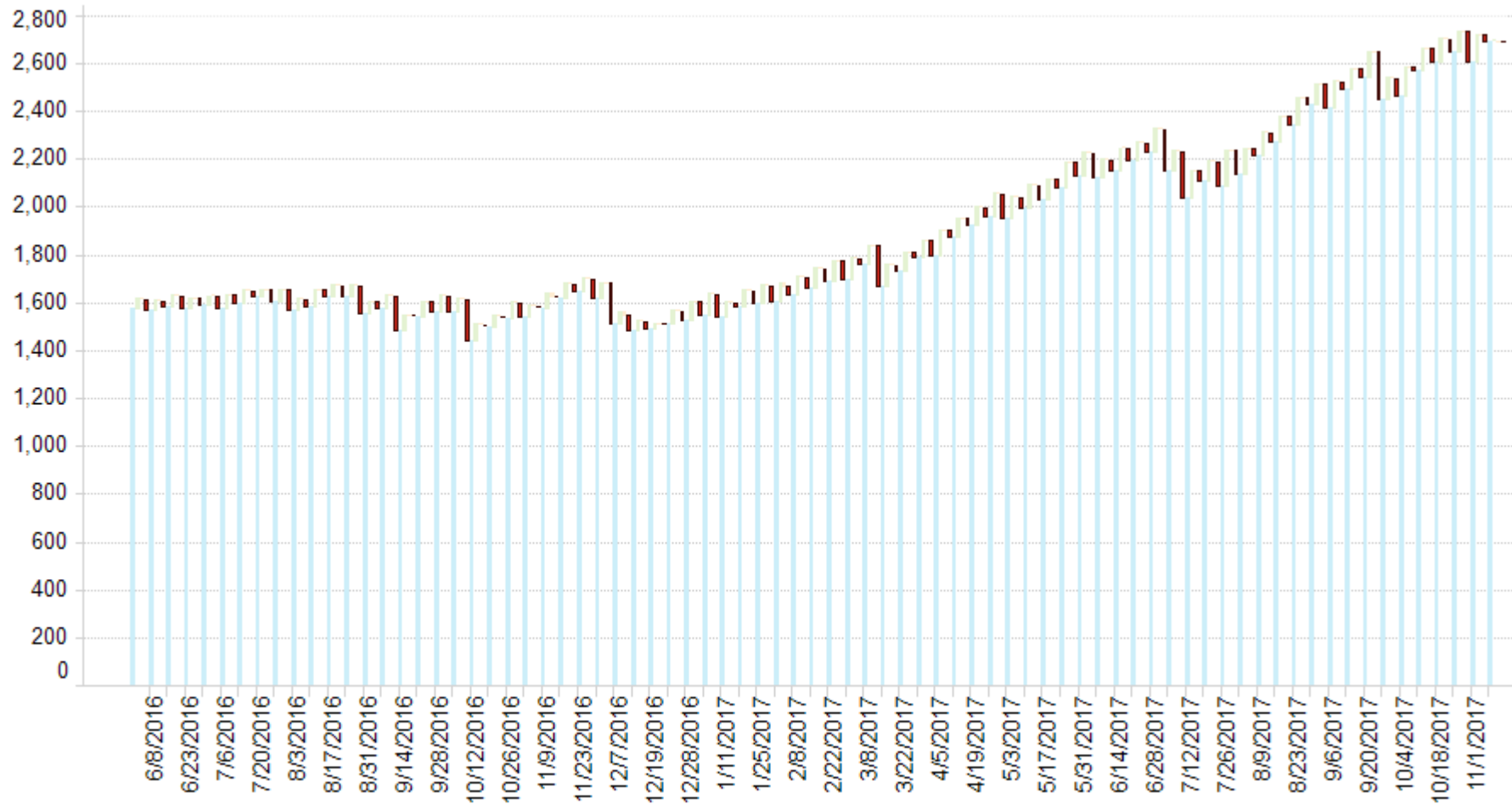
Permian - Growth of Inventory Over Time

Weekly DUC Count, New Wells, Expiring Wells (>2 years) and Completed Wells



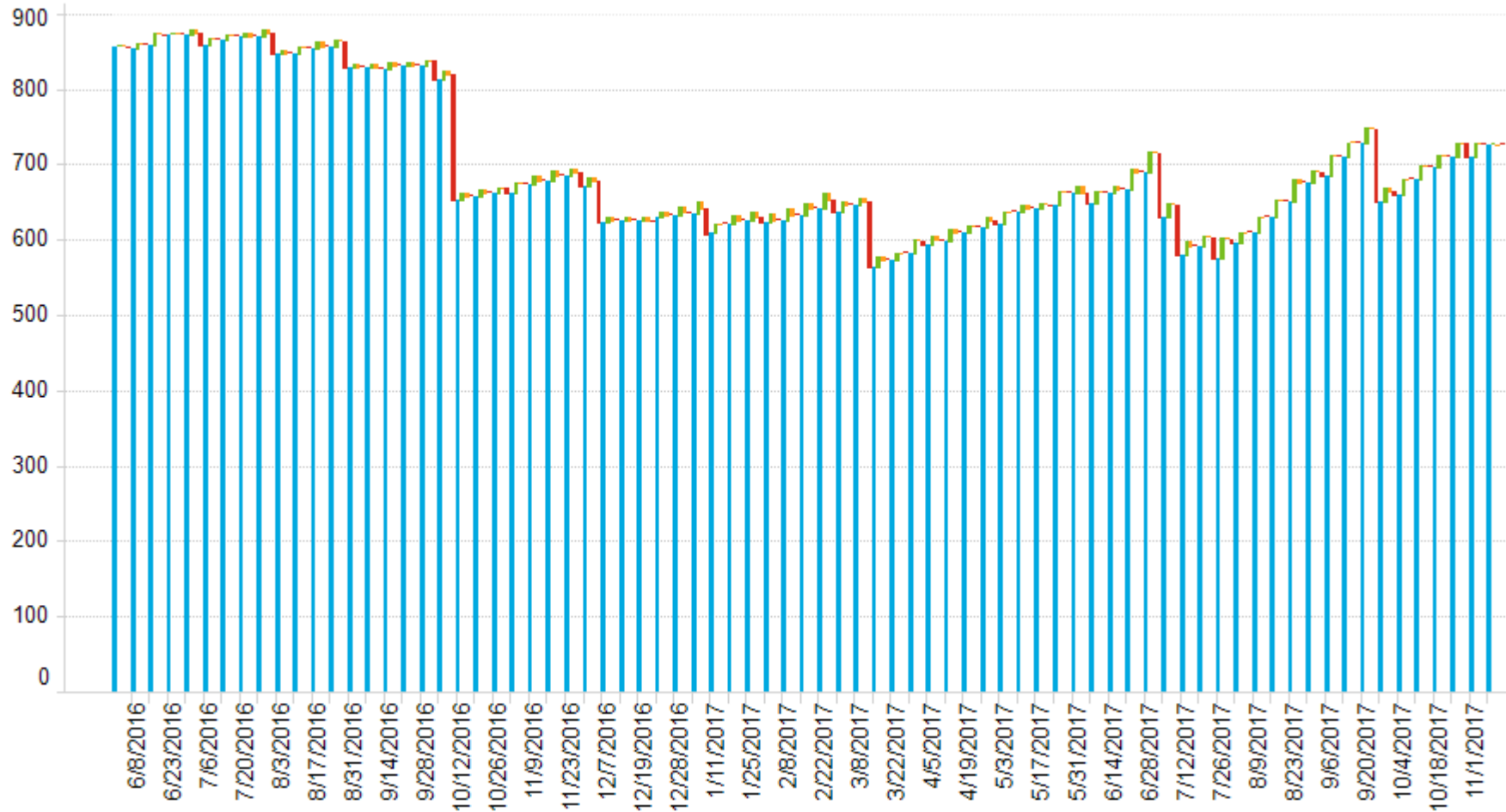
Permian - Completed Wells Over Time

Weekly DUC Count, New Wells, Expiring Wells (>2 years) and Completed Wells

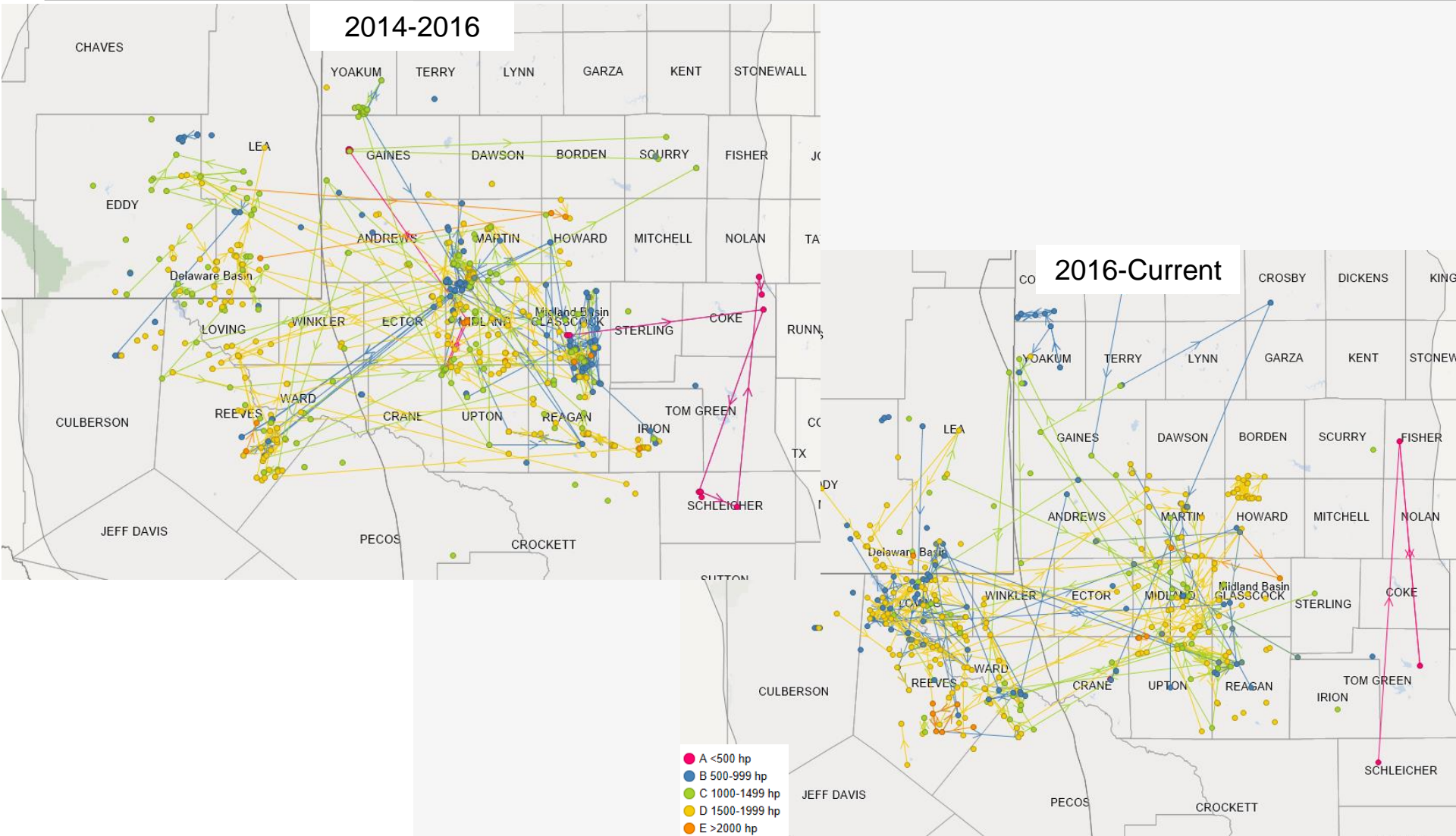


Other Basins: Appalachian Basin

Weekly DUC Count, New Wells, Expiring Wells (>2 years) and Completed Wells



Rig Movements

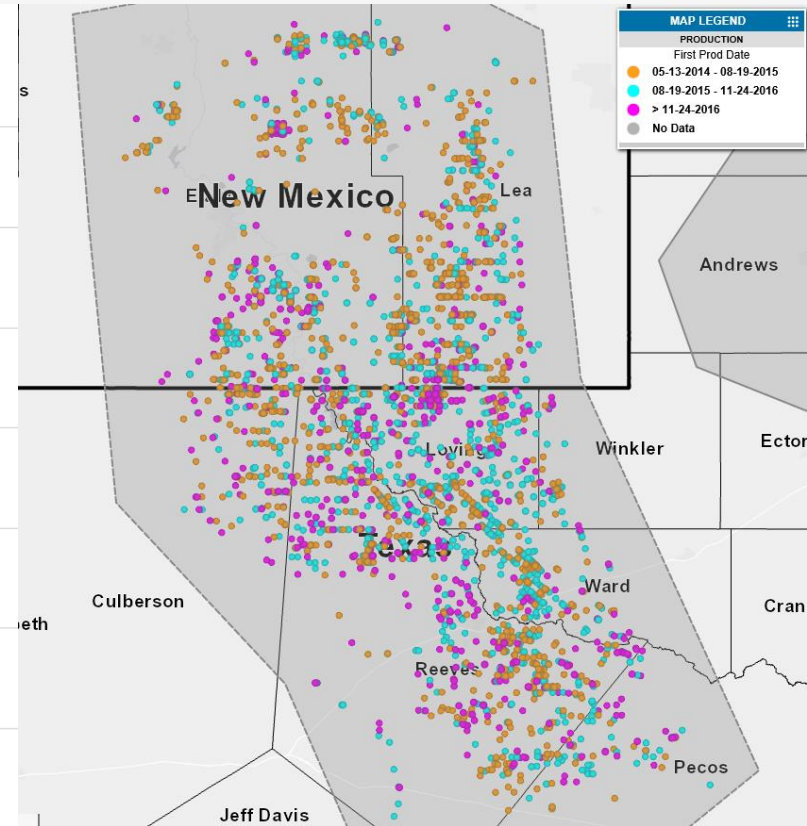
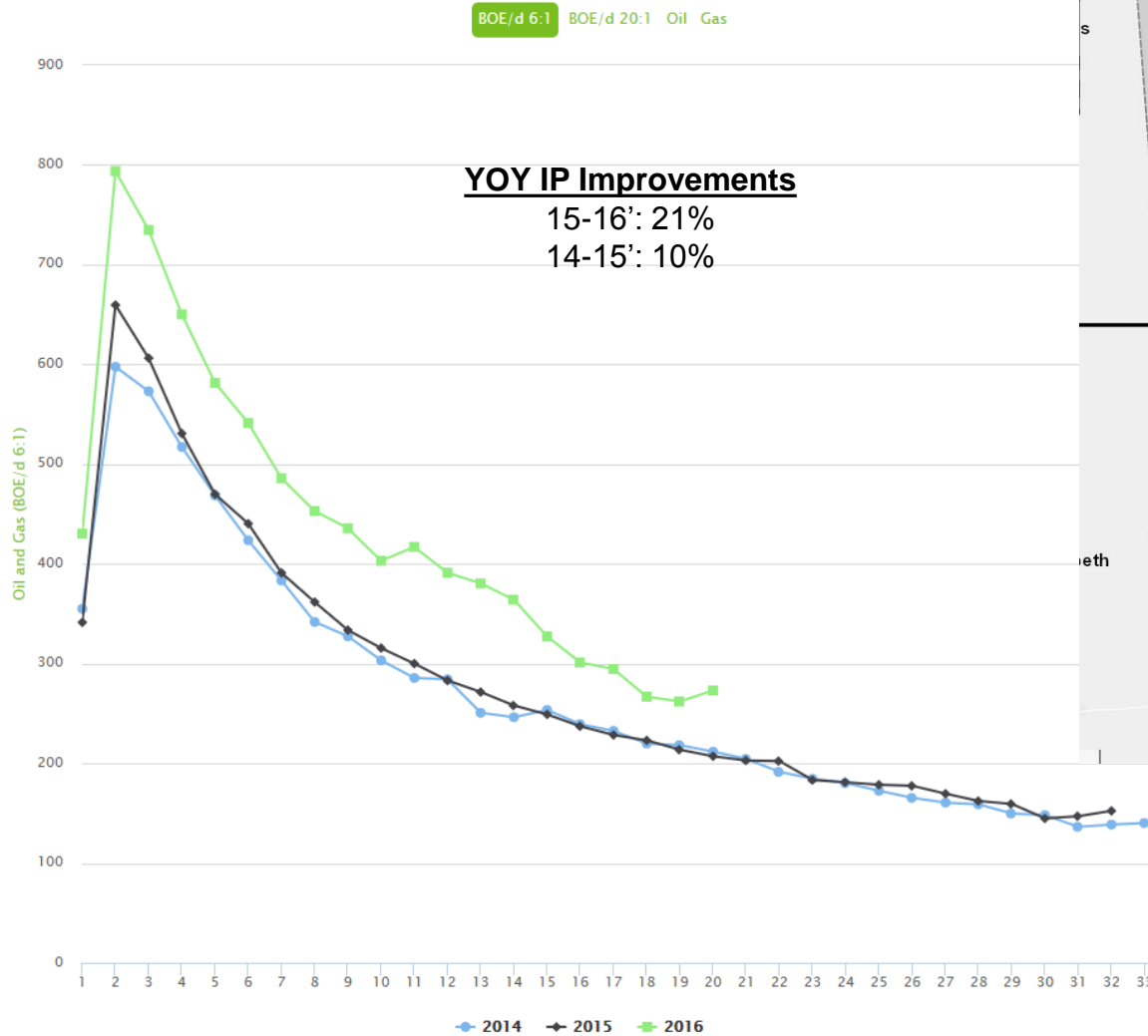


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Production Analysis

Delaware Vintage Decline Curve

Delaware Vintage Type Curve



Delaware Vintage Decline Curve – 7k' + Perf Intervals

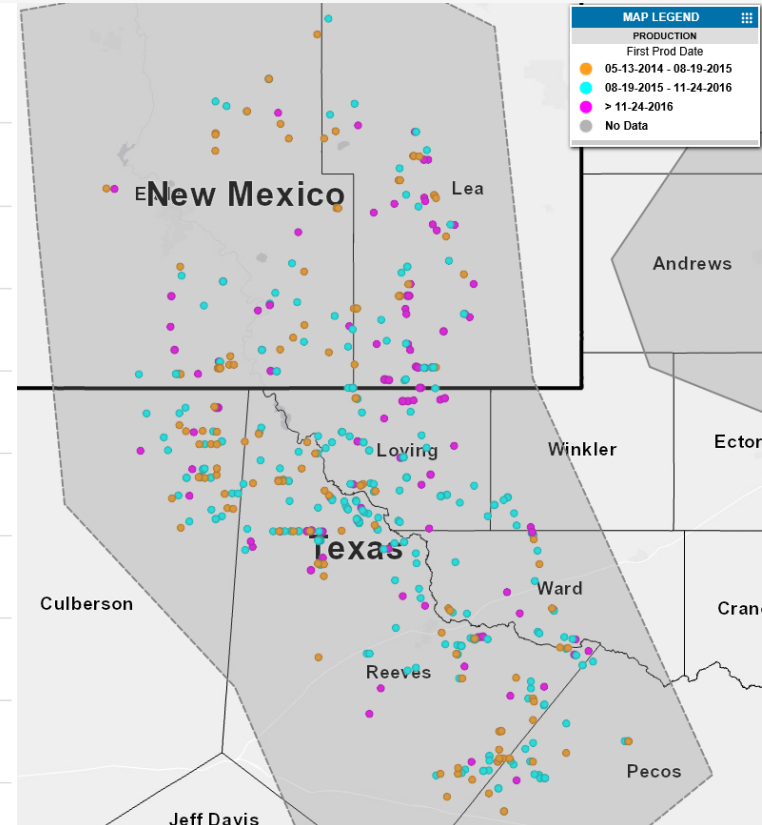
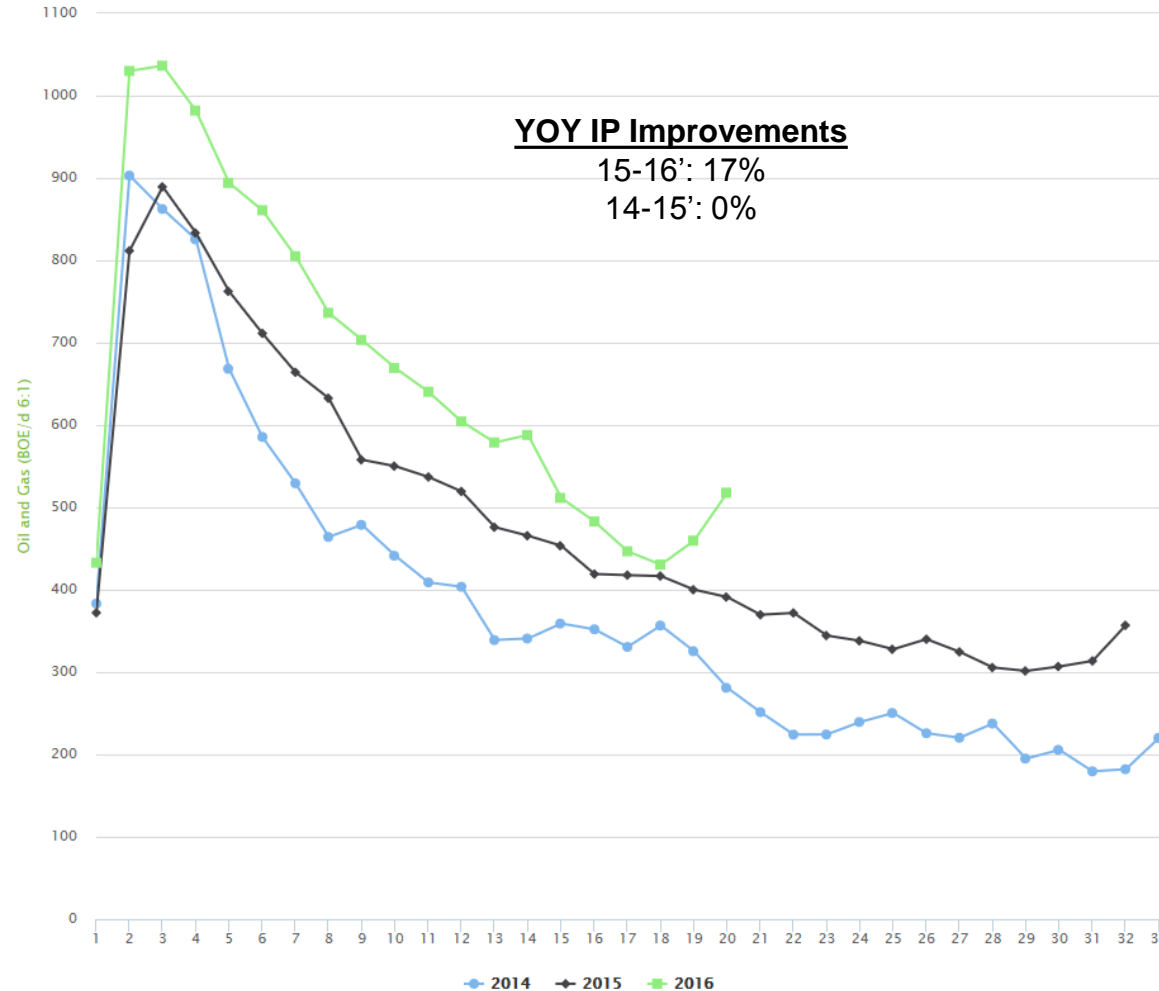
Delaware Vintage Type Curve

BOE/d 6:1 BOE/d 20:1 Oil Gas

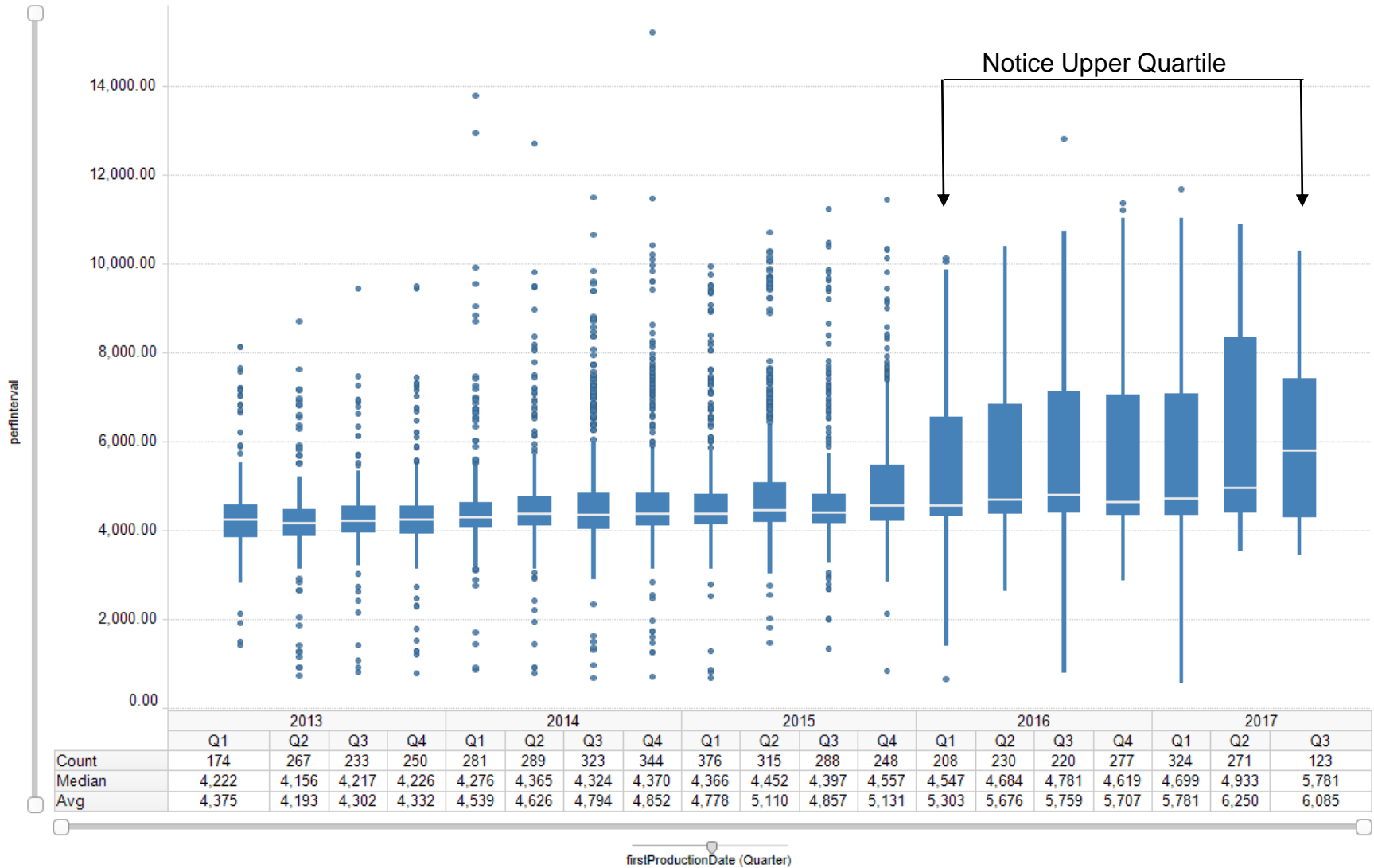
YOY IP Improvements

15-16': 17%

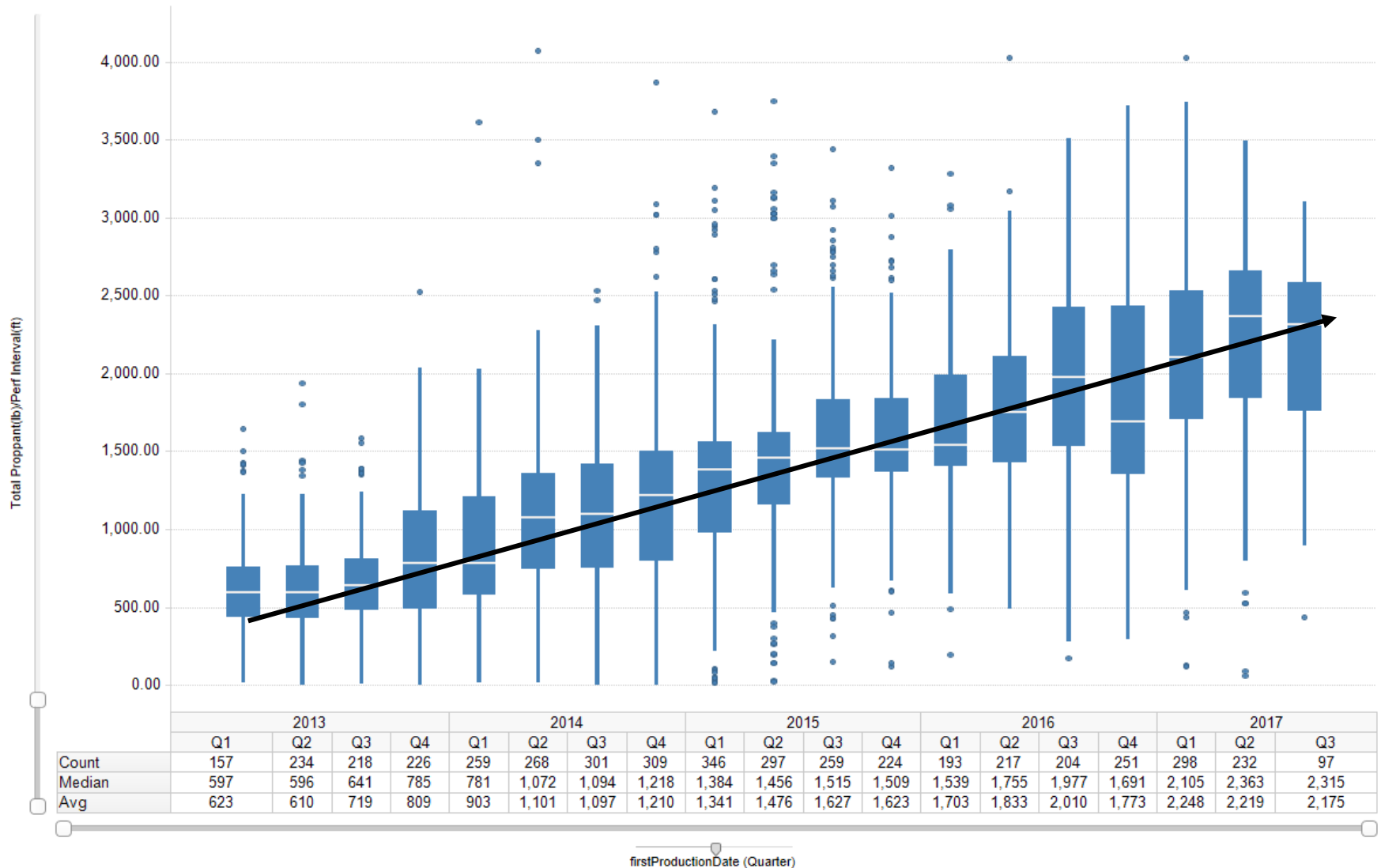
14-15': 0%



Delaware – Perf Interval Over Time

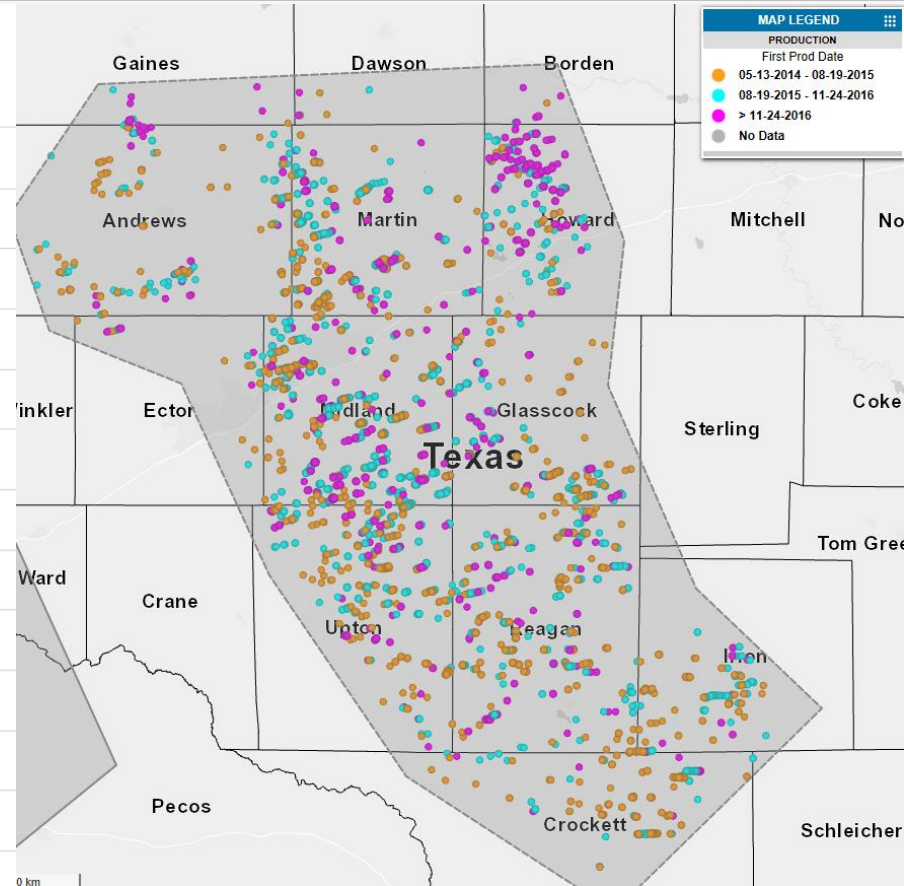
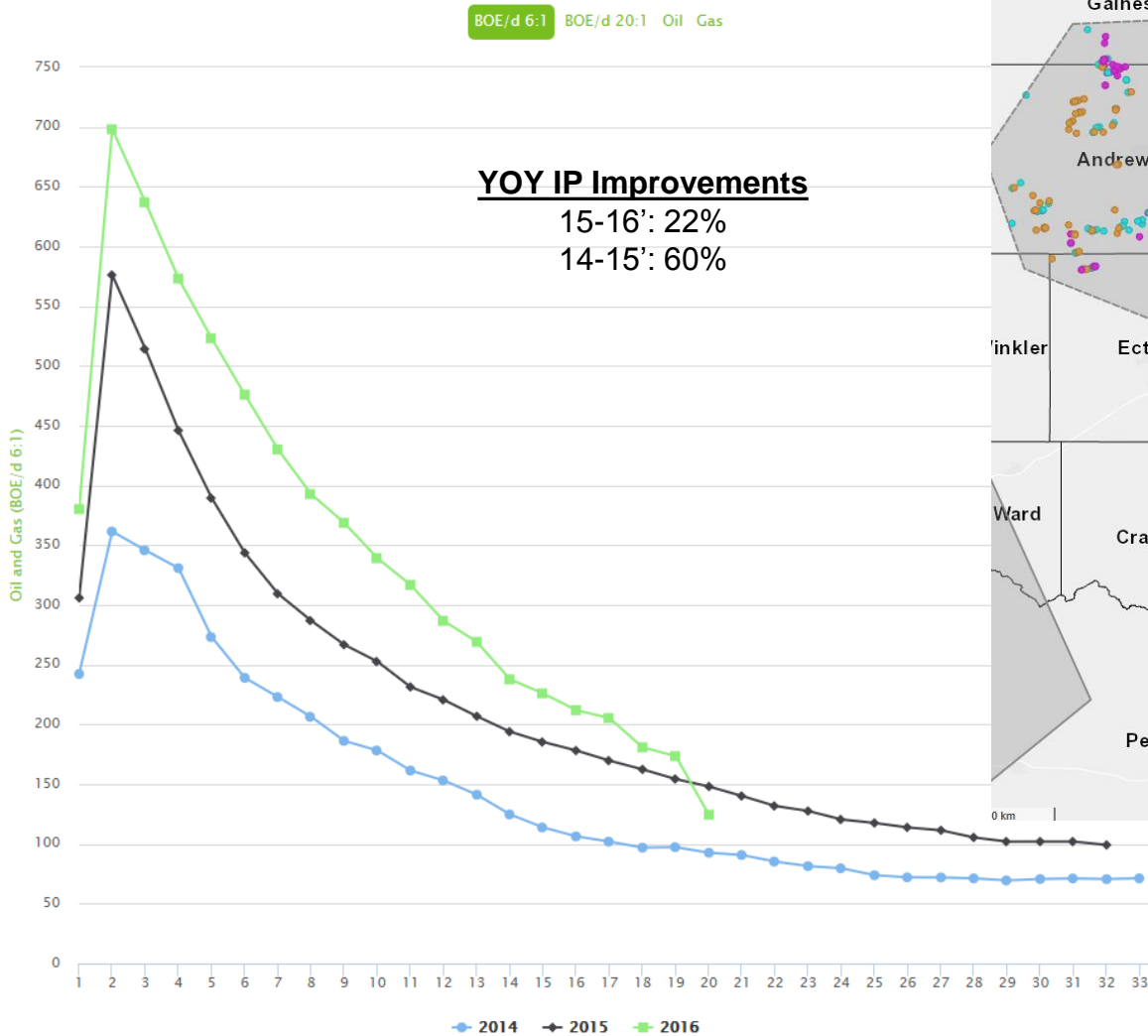


Delaware – Proppant Intensity Over Time

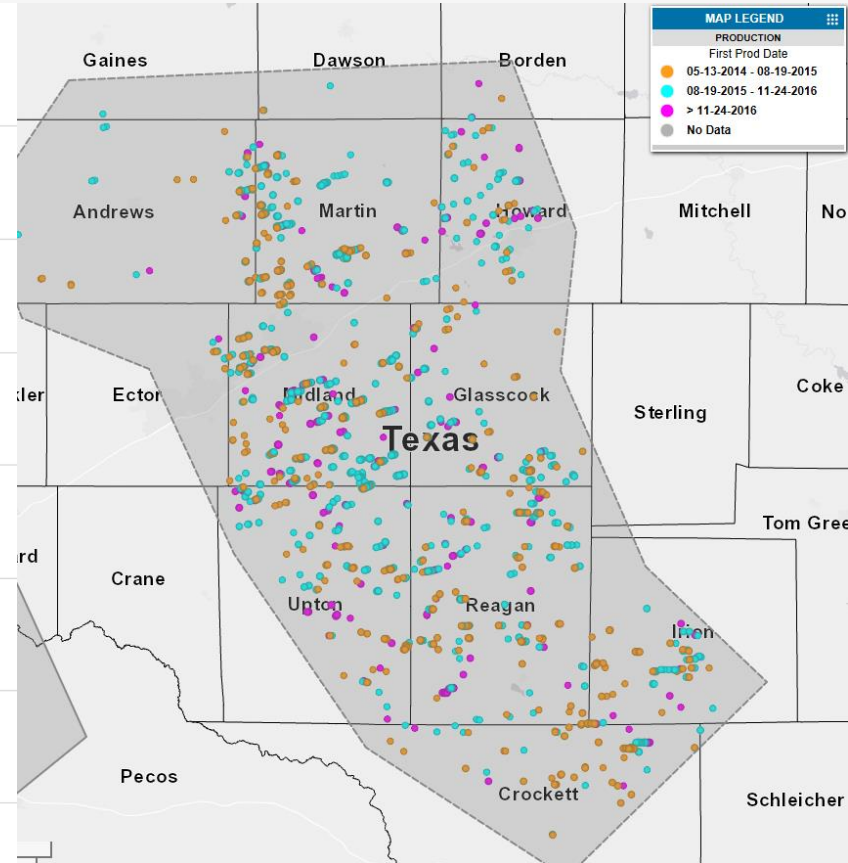
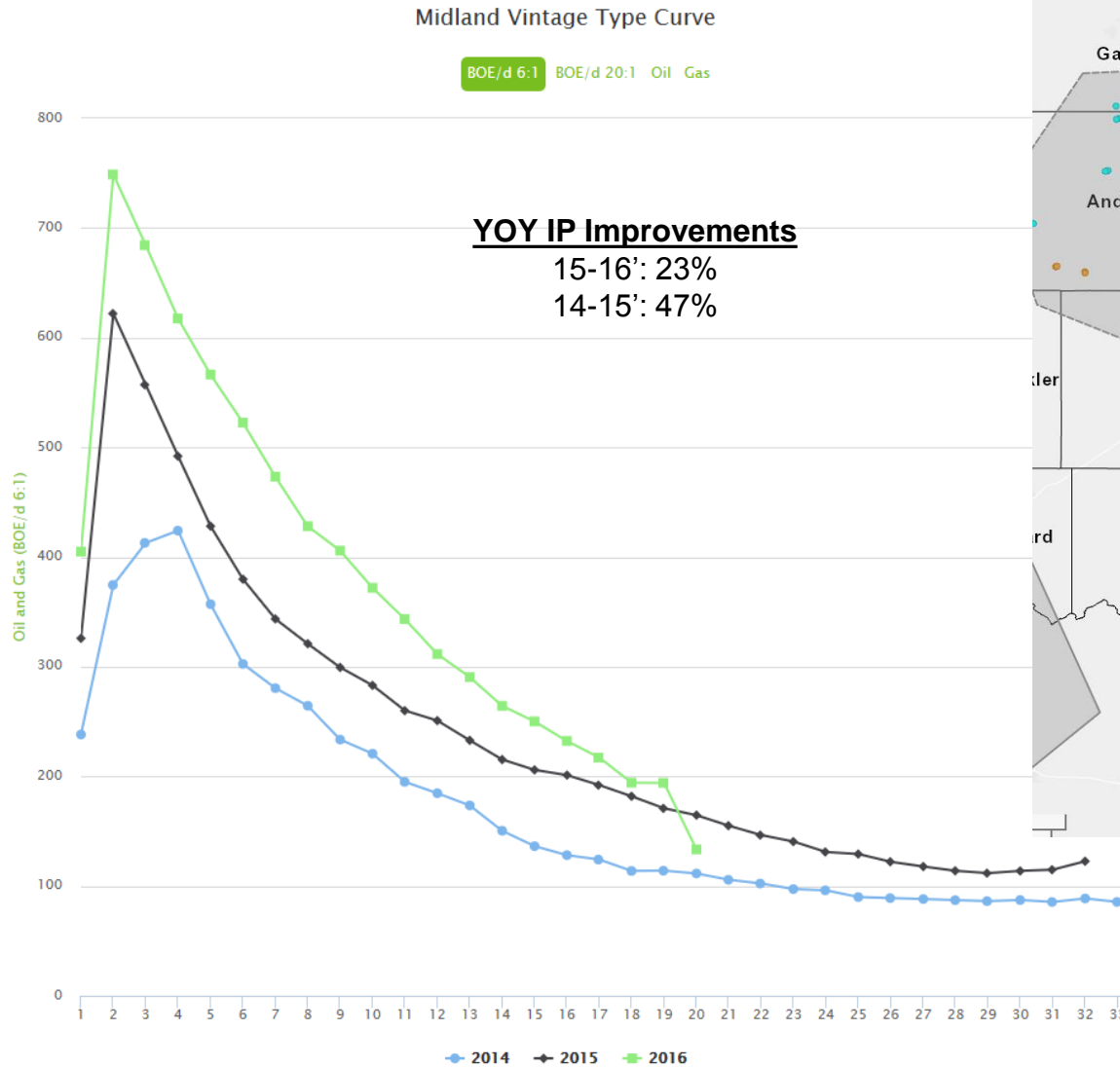


Midland Vintage Decline Curve

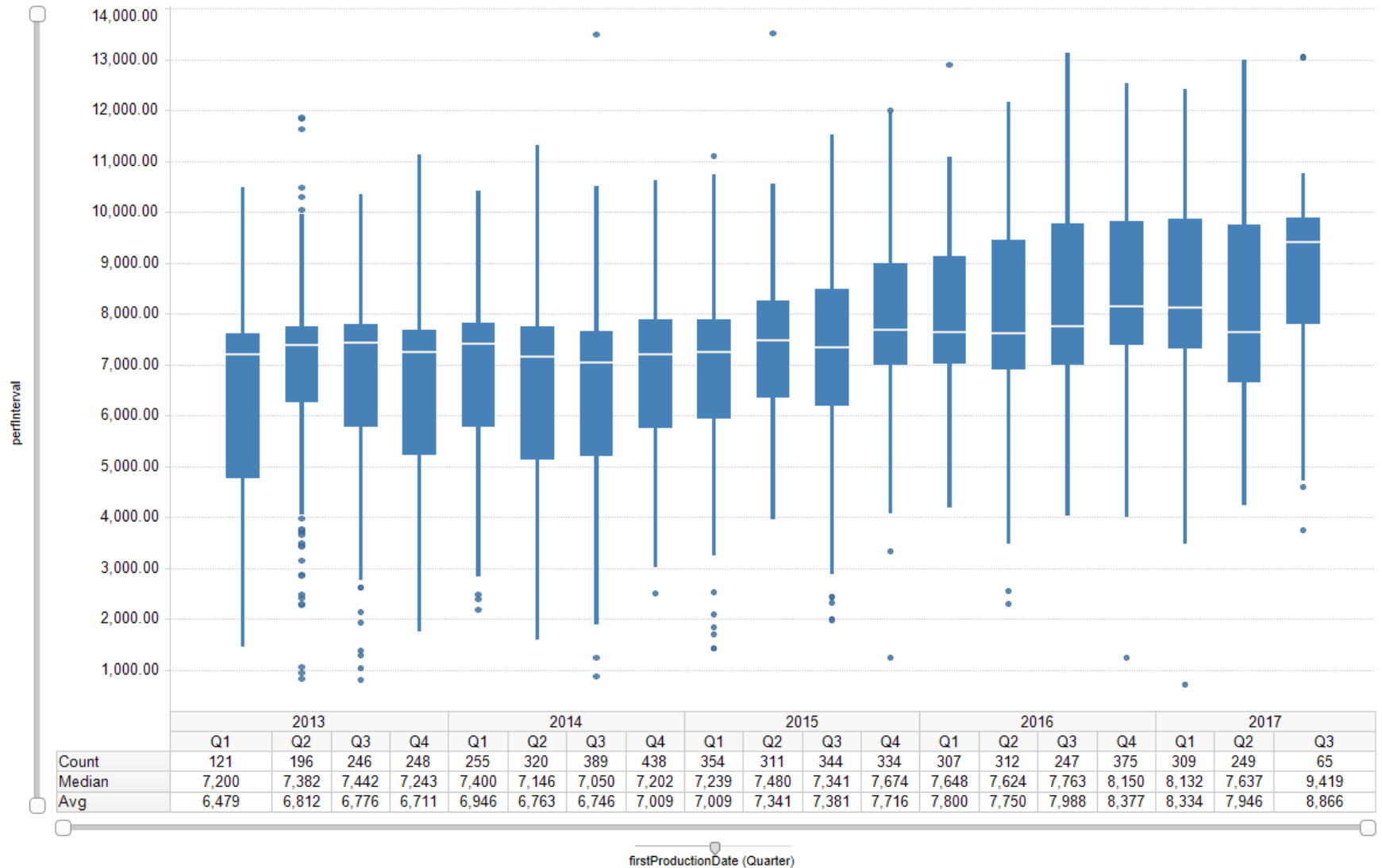
Midland Vintage Type Curve



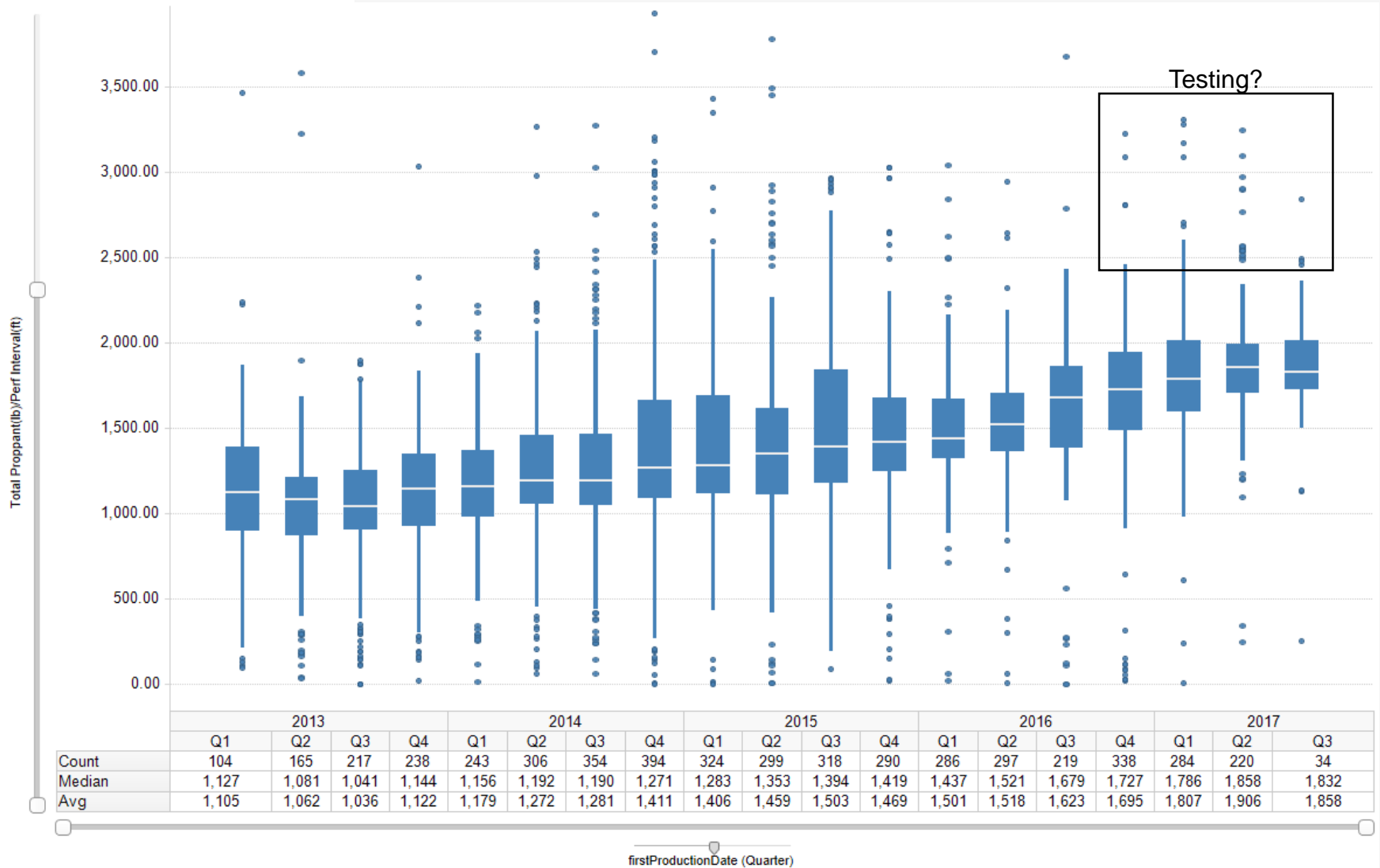
Midland Vintage Decline Curve – 7k' + Perf Interval



Midland – Perf Interval Over Time



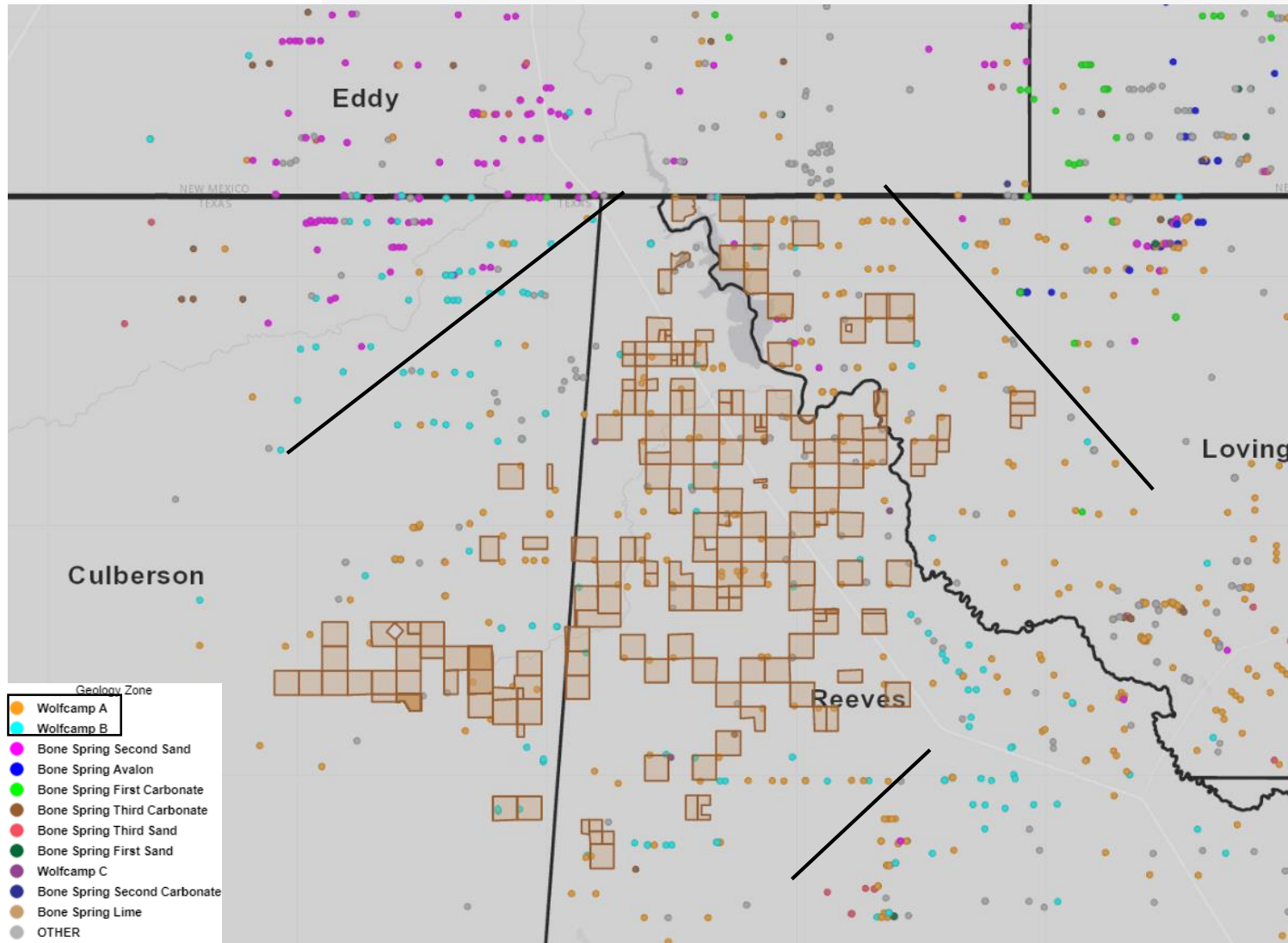
Midland – Proppant Intensity Over Time



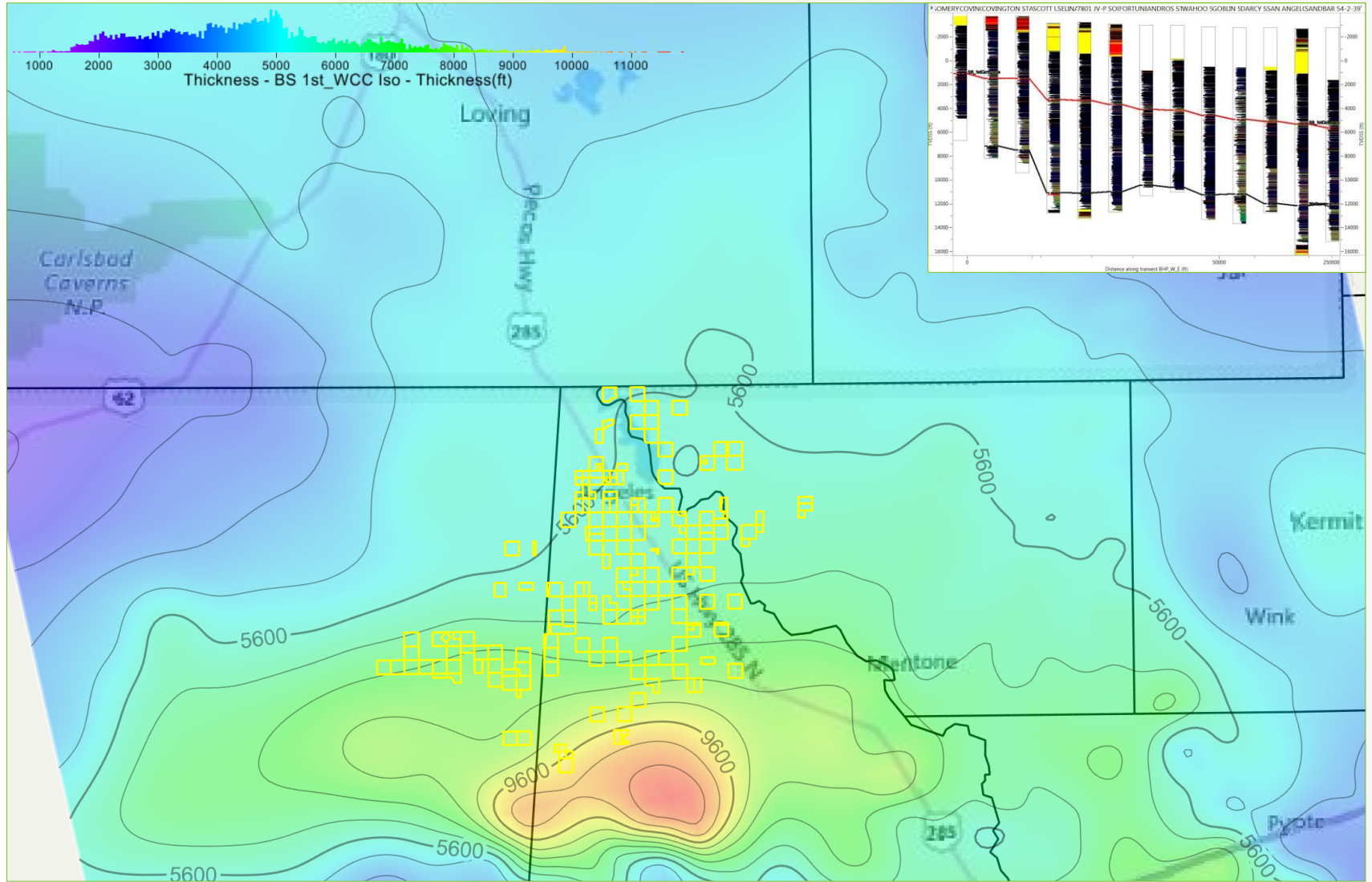
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Does the geology stack up?

Proving Zones = Proving Valuations

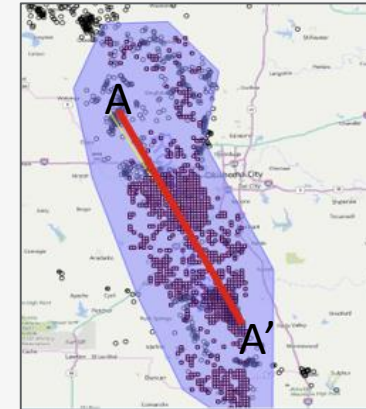
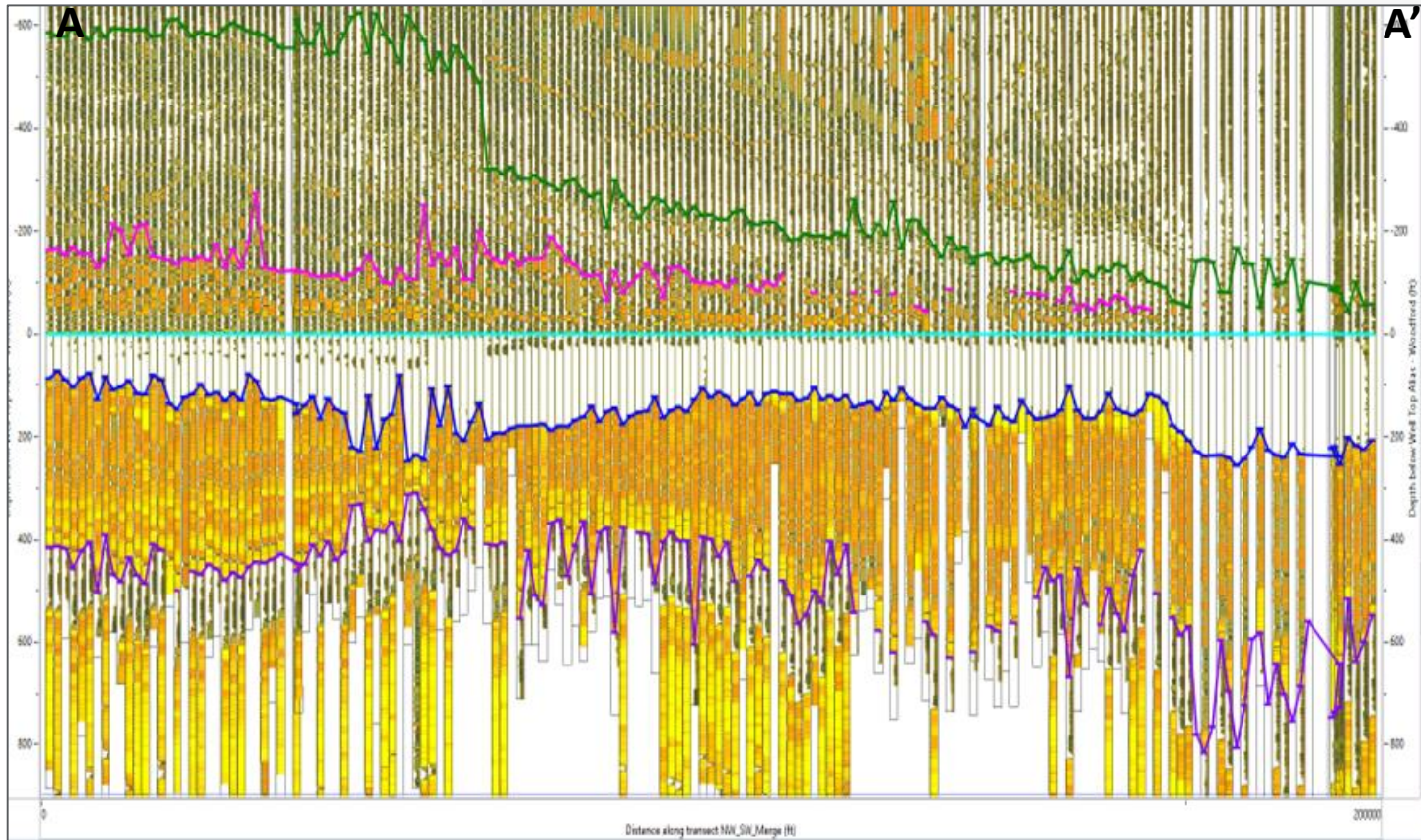


Bone Springs to Wolfcamp Base Thickness



Cross Section from STACK down to the SCOOP

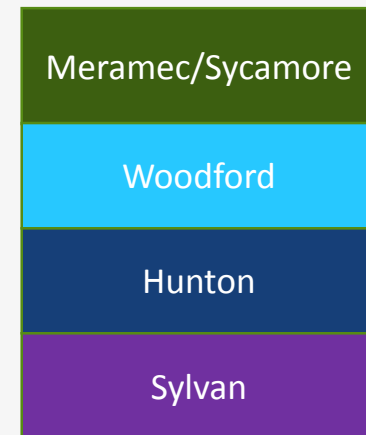
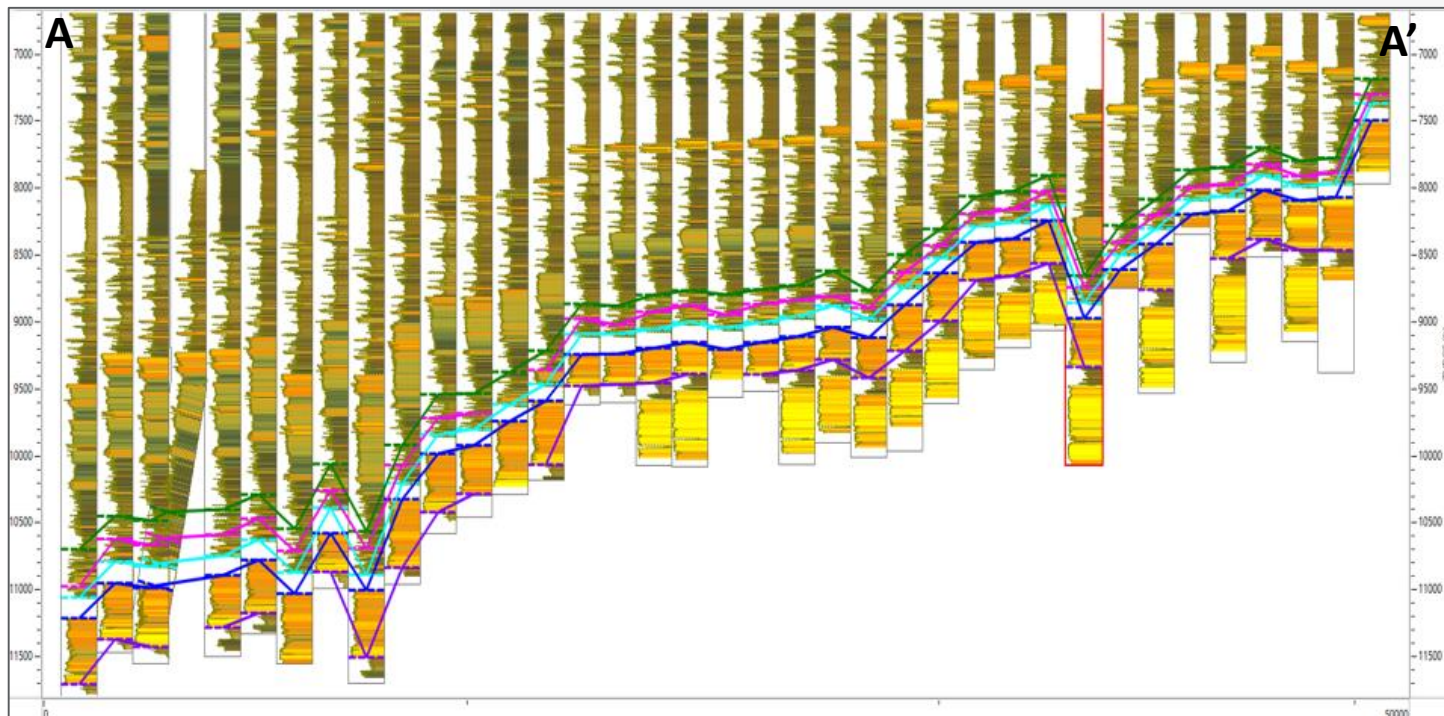
- *Mississippian aged formations including Meramec (Green) and Osage (Pink) thin as we enter the merge from the STACK and transition into Sycamore rock*
- *The thickness of the Woodford is consistently around 100-150'*
- *The Hunton gets thicker from STACK to Merge to SCOOP*



**Flattened on the Woodford*

Cross Section in Northern Area from West to East

- ~ 5,000' structural rise onto shelf
- Formations thin as we move updip onto shelf
- Production more oily as we shallow onto shelf



Key Takeaways

- Geology plays an important role in understanding to what extents current assumptions can be used. Understanding how large your cube is allows for a more accurate prediction of producible hydrocarbons
- Understanding where benches are being proven up provides validity to price valuations
- All basins are not created equal and one needs to be looked at individually
- Production is increasing YOY for all basins. This is due to longer laterals and dialing in completions.
- Some basins have a larger learning curve than others due to age of first wells
- Drilling wells is half the battle, having dedicated completion crews and availability to materials is the other. Supply chain management is just as important as casing design.

The background of the slide is a photograph of several oil pumpjacks (jackhammers) in an oil field. The scene is captured during sunset or sunrise, with the sky showing a mix of blue and orange hues. The pumpjacks are silhouetted against the sky, with their long walking beams and counterweights clearly visible. A bright green horizontal bar is positioned at the top of the slide.

Contact

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