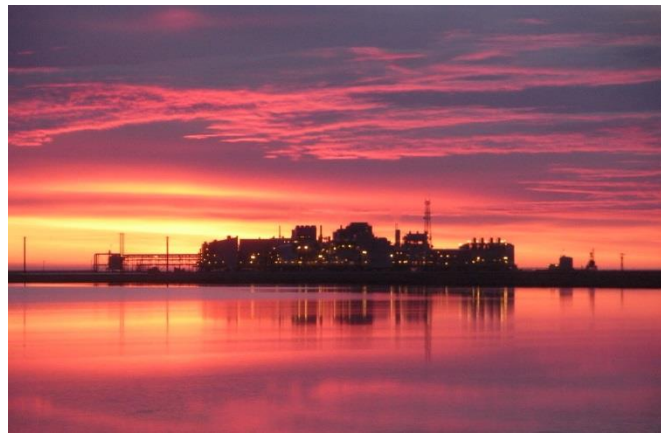# Fall 2017 Production Forecast

Senate Resources Committee

Presentation by Paul Decker, Ph.D.
Alaska Department of Natural Resources, Division of Oil and Gas

January 26, 2018

OUTLINE

- Overview and Highlights on Production
  - Compare Fall 2017 forecast to recent actual production
  - Reasons for production growth FY 2015-2017
  - Comparison to Fall 2016 forecast

- 2017 Production Forecast
  - Objectives
  - Review of Methodology
    - Current Production, Under Development, Under Evaluation
  - Adjustments in Methodology
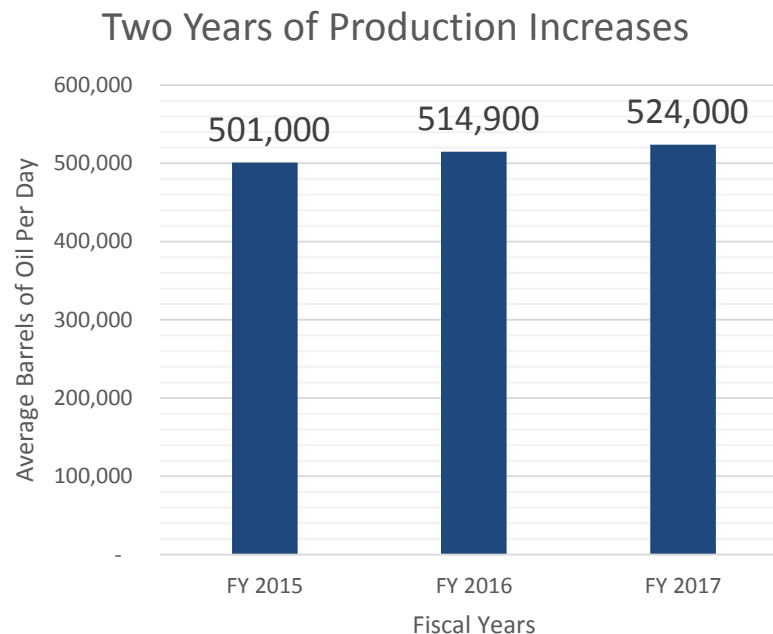 - Near-term and longer-term results

FALL 2017 FORECAST VS ACTUAL

All Alaska

FY2018 Forecast: 550,100 BOPD
(533,400 from North Slope)
Current departure from actual: <0.6%
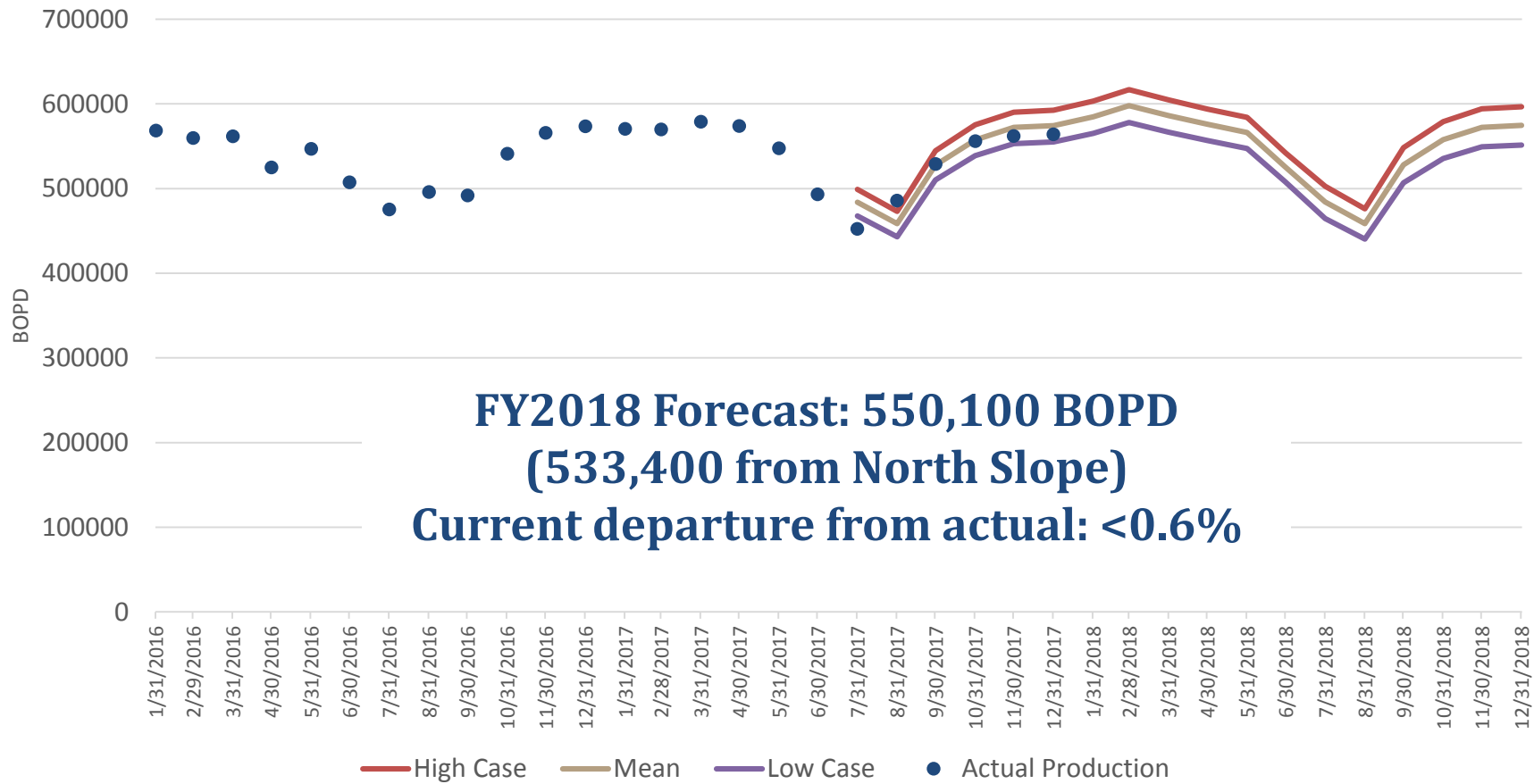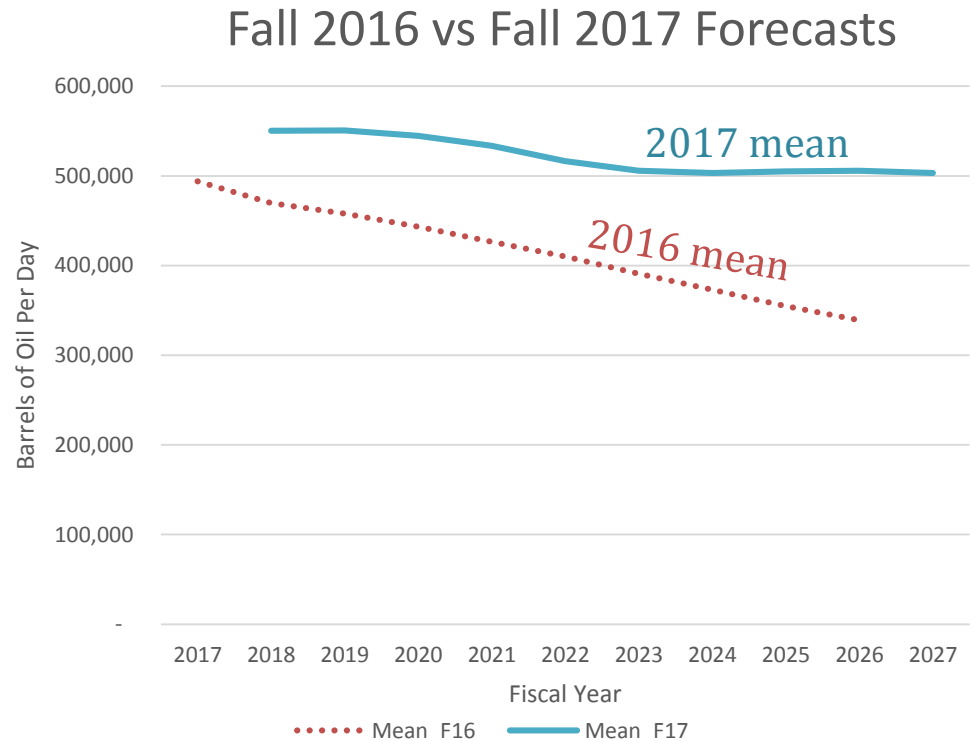
RECENT GROWTH, POSITIVE OUTLOOK

- Production increase FY2015 through FY2017 (~2-3% per year)

- Recent production growth
  - Kuparuk Unit DS-2S (Sharks Tooth)
  - Colville River Unit CD-5
  - Prudhoe Bay Unit
    - Non-rig workovers → increase active well count
    - Reservoir modeling → identifying targets
    - Facilities modeling → planning maintenance
    - More with less: Operational efficiency increased from 80 to 85% *(D. Bilbao, BP)*

- Future Projects coming in:
  - Near Future:
    - 1H-NEWS, GMT-1, Milne Point Moose Pad, …
  - Farther out:
    - Exciting discoveries moving forward (Pikka, GMT-2, Willow)
    - Old discoveries now moving forward (Liberty)

Two Years of Production Increases

Bar chart showing Average Barrels of Oil Per Day by Fiscal Years:
- FY 2015: 501,000
- FY 2016: 514,900
- FY 2017: 524,000

FALL 2016 VS FALL 2017
- WHY THE DIFFERENCE IN FORECAST OUTLOOK?-

- Changes in industry perspective
  - Gloomy 2016 outlook in the wake of continued price plunge
  - Decreased 2016 CAPEX
  - 80%+ of pools saw no plans for new drilling in FY 2017

- Adjustments in Forecast Method:
  - DNR's first forecast in 2016 focused on correcting pattern of long-term overprediction
  - 2017 process recognized need for seasonally adjusted monthly predictions and near-term accuracy

Fall 2016 vs Fall 2017 Forecasts

2017 mean

2016 mean

Barrels of Oil Per Day

600,000
500,000
400,000
300,000
200,000
100,000
-

2017 2018 2019 2020 2021 2022 2023 2024 2025 2026 2027

Fiscal Year

······ Mean_F16   —— Mean_F17

FALL 2017 PRODUCTION FORECAST

FALL 2017 FORECAST OBJECTIVES

- Provide a ten-year official production forecast for the Revenue Sources Book

- Longer range outlook of potential future projects to include in official forecast

- Increase focus on near-term accuracy
  - Apply seasonality to forecast on a monthly basis vs previous straight-line annual trends
  - More emphasis on most recent history in near future projections

FORECAST CATEGORIES – RECAP

Forecast duration: Ten year official forecast

- **Currently Producing (CP):**
  - Oil from existing wells in currently producing pools.

- **Under Development (UD):**
  - Oil from projects that will add incremental oil to existing fields, or fields with first oil within one year.
  - Project is scheduled and part of operator's annual budget.

- **Under Evaluation (UE):**
  - Oil from projects that are likely to occur in the future, but have not met the requirements of the previous category.

	Production Category	First Oil Time Range			
		Forecast Year	Start July 1	End June 30	Fiscal Year
CP	Production online by data cutoff date				
UD	Production expected to be online within 1 year	1	2017	2018	*FY2018*
UE1	Production expected to be online 2 to 5 years out from forecast start date	2	2018	2019	*FY2019*
		3	2019	2020	*FY2020*
		4	2020	2021	*FY2021*
		5	2021	2022	*FY2022*
UE2	Production expected to be online 6 to 10 years out from forecast start date	6	2022	2023	*FY2023*
		7	2023	2024	*FY2024*
		8	2024	2025	*FY2025*
		9	2025	2026	*FY2026*
		10	2026	2027	*FY2027*

ADJUSTMENTS TO FORECASTING PROCESS
- FALL 2016 TO FALL 2017 -

Fall 2016

- 5-year future projects outlook
  - Beyond 5 years was treated as "Pot of Gold" (outside official forecast, excluded from Revenue Sources Book)

- Annualized rates without seasonal fluctuations

- Emphasized correcting pattern of overpredicting in the long-term

- Under Development and Under Evaluation projects were risked for chance of occurrence. Projects under evaluation not risked for first oil start date.

Fall 2017

- 10-year future projects outlook
  - Beyond 5 years considered "Under Evaluation 2" (part of official forecast, included in Revenue Sources Book)

- Monthly rates with seasonal fluctuations

- Near-term emphasis with attention to realistic long-range outlook

- Under Evaluation projects risked for chance of occurrence within ten-year forecast window, first oil start date, and probabilistic range in production profiles

ADDRESSING UNCERTAINTY

- **Currently Producing (CP):**
  - Relatively small uncertainty range due to established behavior of producing pools
  - Decline Curve Analysis projections with a probabilistic range

- **Projects Under Development (UD):**
  - More uncertainty than CP
  - Uncertainties include financial and reservoir performance risks
  - Probabilistic type wells

- **Projects under Evaluation (UE):**
  - More uncertain than previous categories
  - Financial risk using project breakeven price and DOR oil price forecast
  - Other uncertainties include
    - Chance of occurrence in the 10-year forecast window
    - Timing of sustained production
    - Production profile/reservoir performance (probabilistic type wells)

Near-term Focus in 2017

- Decline Curve Analysis weighted toward recent production history (2 to 5 years)

- Full credit to planned UD production (previously we discounted nearly all UD as within background)
  - Makes for more accurate near term production
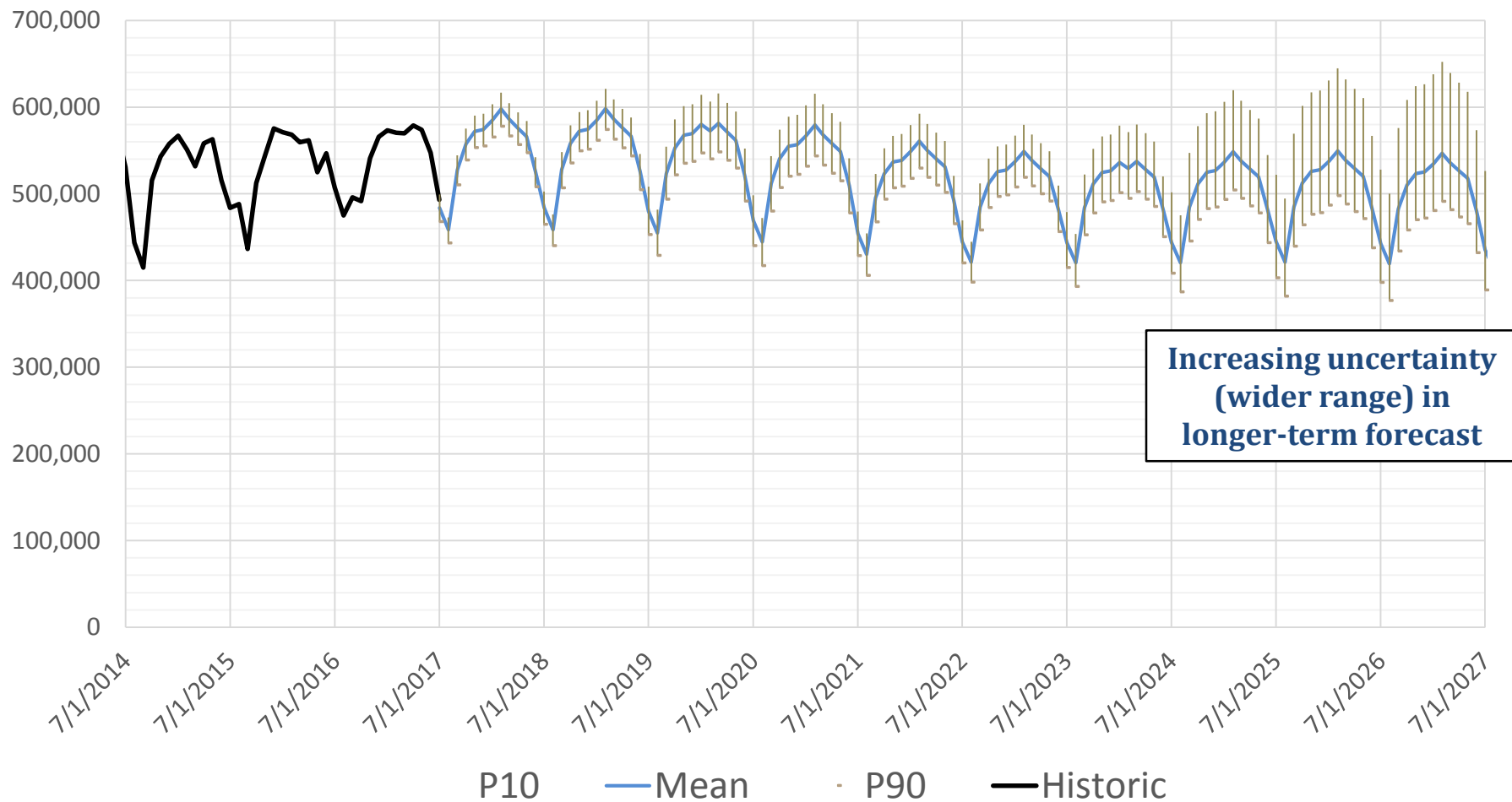 - Makes up for rate increases from non-drilling rate additions

FALL 2017 FORECAST RESULTS
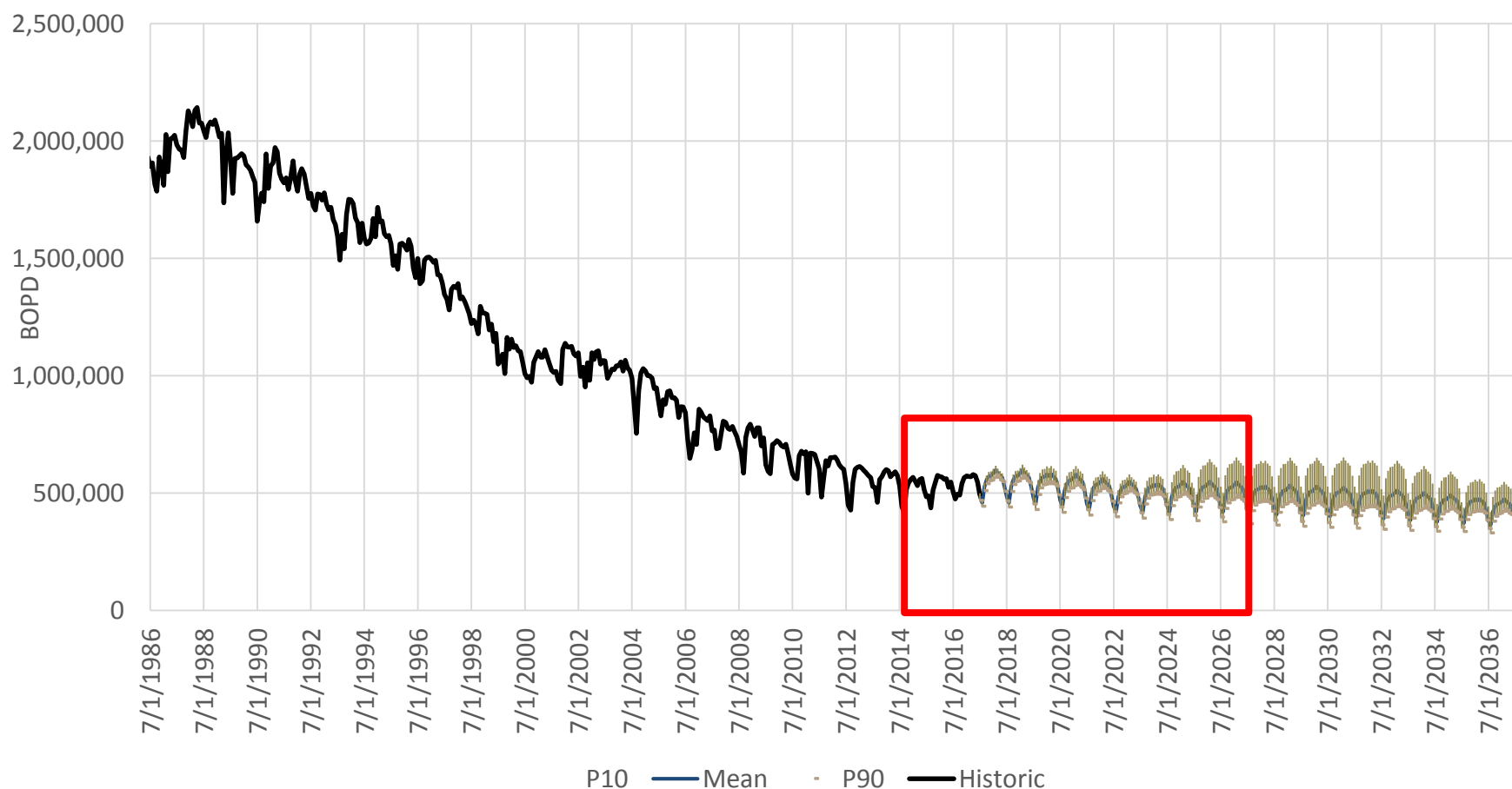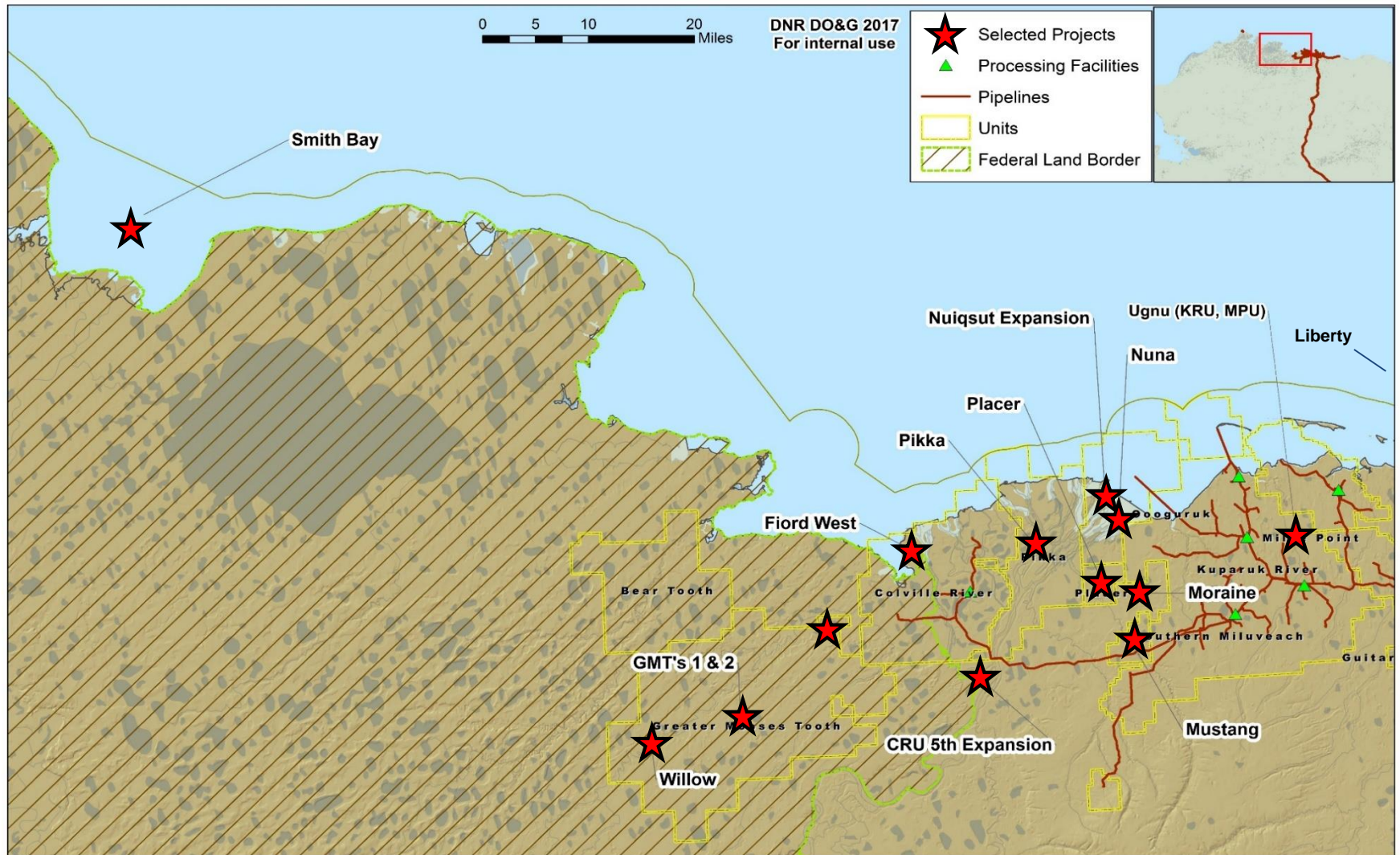

Production Forecast Range (All Alaska)

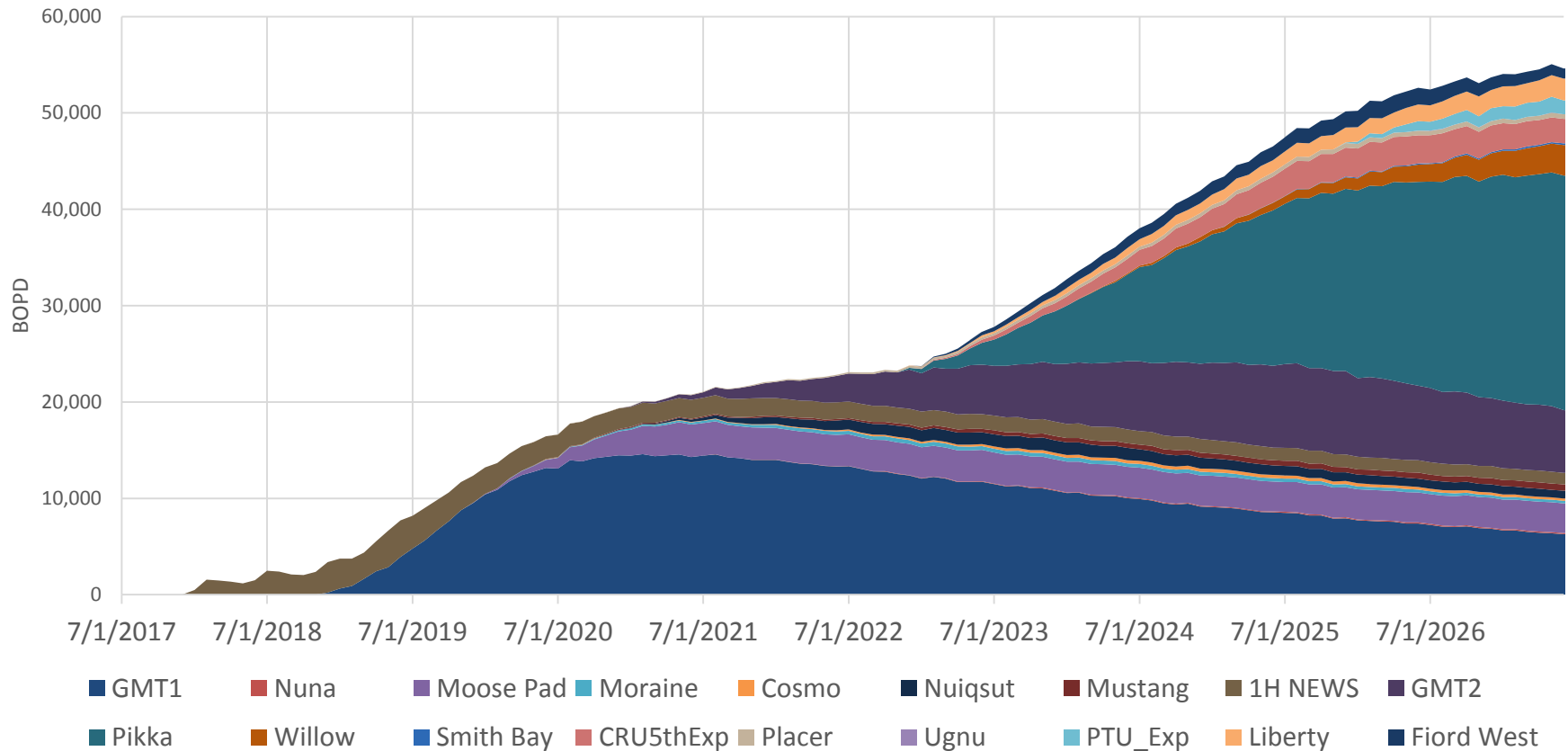# FALL 2017 FORECAST RESULTS

Production Forecast Range (All Alaska)

Increasing uncertainty (wider range) in longer-term forecast

Legend: P10 — Mean · P90 — Historic

Division of Oil and Gas (after E. Anderson, 2017)

RISKED UNDER EVALUATION PROJECTS

Portfolio-scale rollup of all projects anticipated to begin production in years 2-10 of the forecast. While this is the best risk-weighted prediction of how the entire portfolio will perform, it does not necessarily reflect how any individual field would perform if it comes online in the forecast period.

QUESTIONS?

Thank you on behalf of the DOG 2017 Production Forecasting Core Team:

Pascal Umekwe, Chirag Raisharma, John Burdick, Steve Moothart