

Alaska's Oil Production Outlook-Forecasting Approach



January 25, 2019

Commonwealth North

Pascal Umekwe

Division of Oil and Gas, DNR

Overview

- Introduction and Background
 - From Oil Forecast to Revenue Forecast: A DOR-DNR Process
 - Past and Current Forecast Methods
- Potential Future Production
 - Production categories
 - Approach to uncertainty
- Summary

Production Forecast Process

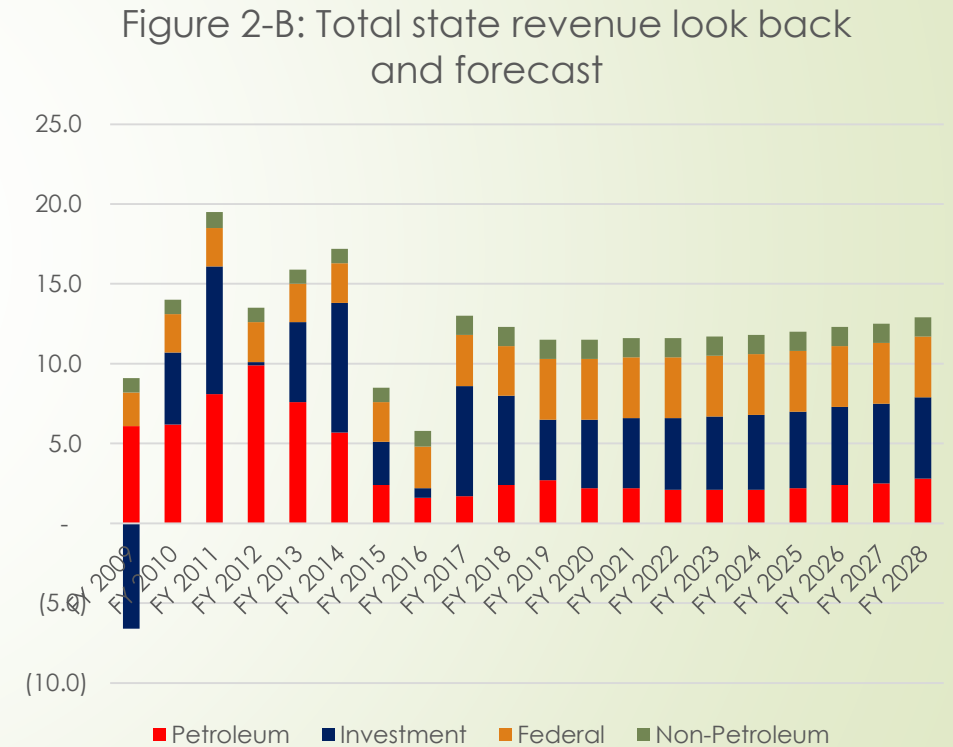
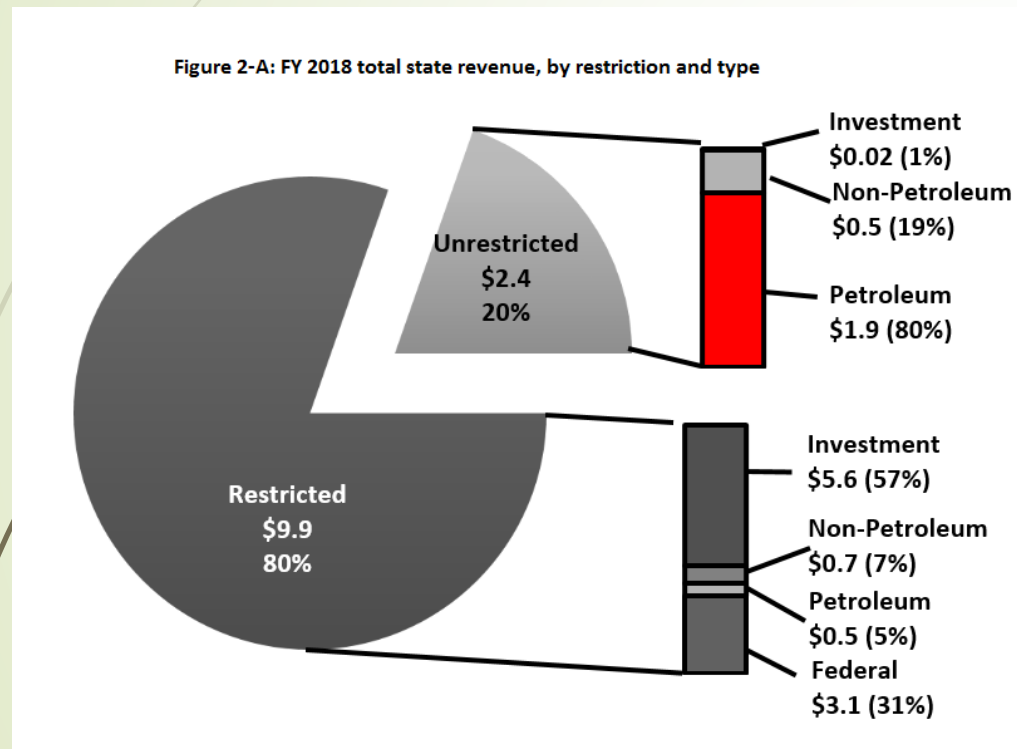
Department of Revenue (DOR)

- Per Statute, have the authority to ask the oil and gas taxpayers for information needed to complete the State's Revenue Forecast
 - This includes annual production forecast
 - This includes biannual cost forecast
- Information is held as confidential but can be shared with DNR and they have to keep confidential as well.

Department of Natural Resources (DNR)

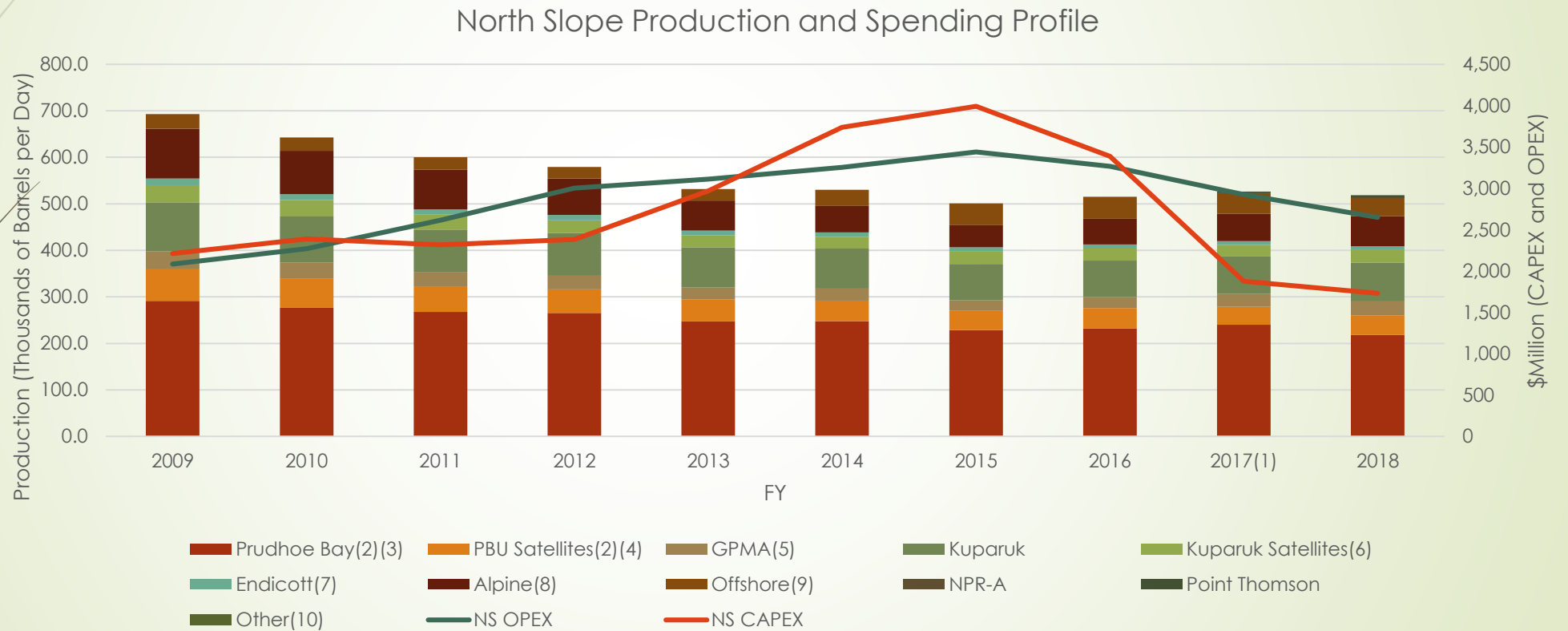
- Develops forecast roll-up from individual projects and pools
- Uses the confidential production information only as a check.
- The production forecast that DNR completes is used to derive the DOR Revenue Forecast.

Oil Production in State Revenue Forecast

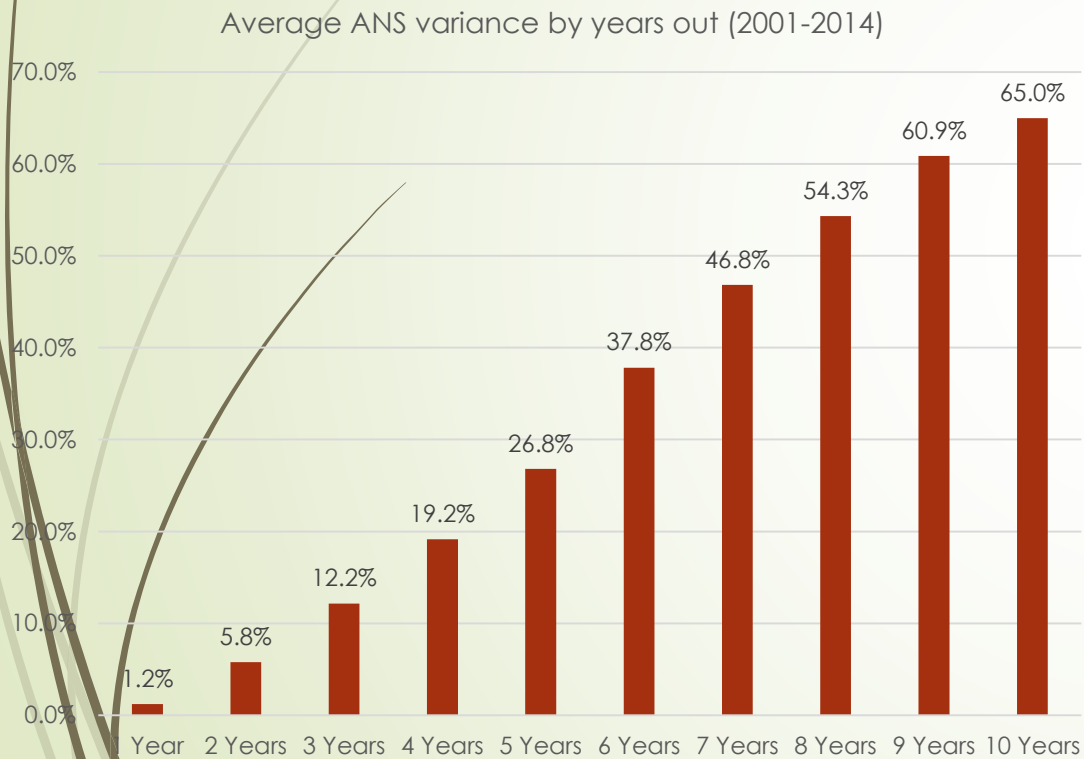


- Oil Continues to play a significant role
- Share of oil revenues highly dependent on oil price forecast outlook

Spending and Production Trends



Lookback on previous methodology and Motivation for refinements



- Previously, a ten-year window was used for projects in the under development (UD) and under evaluation (UE) portions of the forecast.
 - Leading to more uncertainty in the forecast
- More projects (expected production) were included that didn't go into production within the expected time frame.
 - For example: Mustang, Liberty, OCS production
- All expected production was added to the forecast as UD and UE.
 - No price dependency, or risk of occurrence applied until recently

Differences Between Forecast Methods

	Previously (1990-2015)	2016 - Present
Forecast Level	Pool Level, Well – by–Well Forecast	Pool Level forecast
Uncertainty Handling	Deterministic	Probabilistic
Risking	Deterministic Current Production Forecasts. Deterministic projections of production from Projects Under Development/Evaluation. First UD/UE risking in 2013 Fall forecast	Probabilistic technical and Non-technical risk
Oil Price dependency	None	Dependence on oil price
UD Production	10 year outlook	1 year outlook
UE Production	10 year outlook	10 year outlook

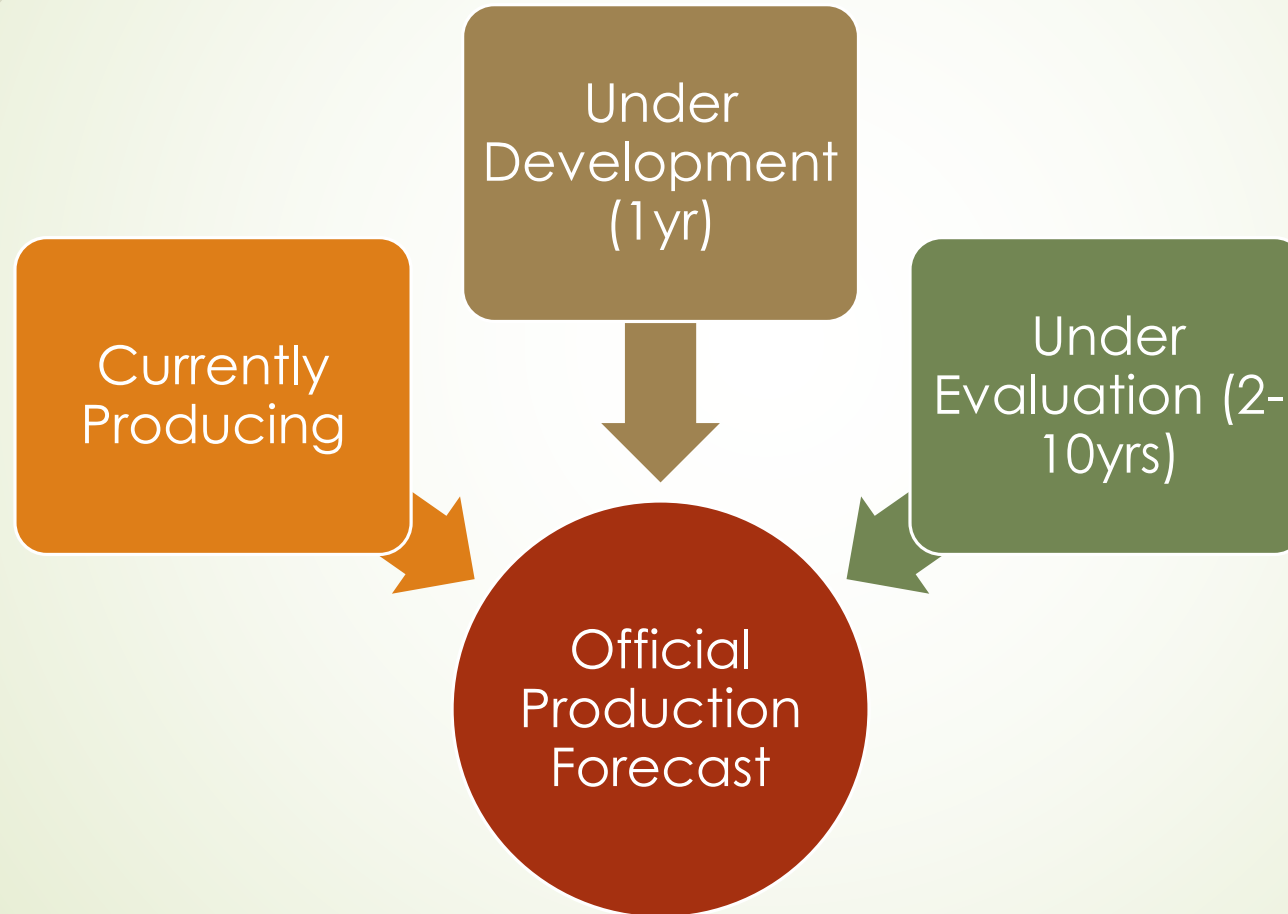
Current Production Forecasting Methodology

8

Fall 2018 Forecast Objectives

- ▶ Provide a 10-year official production forecast for the State's Revenue Sources Book
- ▶ Maintain focus on near-term accuracy
 - ▶ More emphasis on most recent history in projections for the near future
 - ▶ Include seasonal changes in production to improve near-term view
- ▶ Increase focus on longer-term accuracy
 - ▶ Ensure product is valid for longer-term projections, based on individual field characteristics and operator plans
 - ▶ Apply engineering constraints to ensure realistic projection of near-term production characteristics into the out years

Production Categories



Production categories: Addressing Uncertainty

- ▶ Currently Producing (CP) fields:
 - ▶ Relatively small uncertainty range due to established behavior of producing pools
 - ▶ Probabilistic Decline Curve Analysis projections
- ▶ 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 CP and UD
 - ▶ Financial risk: using project breakeven price and State official price forecast
 - ▶ Other uncertainties include
 - ▶ Chance of occurrence in the 10-year forecast window
 - ▶ Timing; start of sustained production
 - ▶ Production profile/reservoir performance (probabilistic type wells)

Production Category: Currently Producing (CP) Tranche.

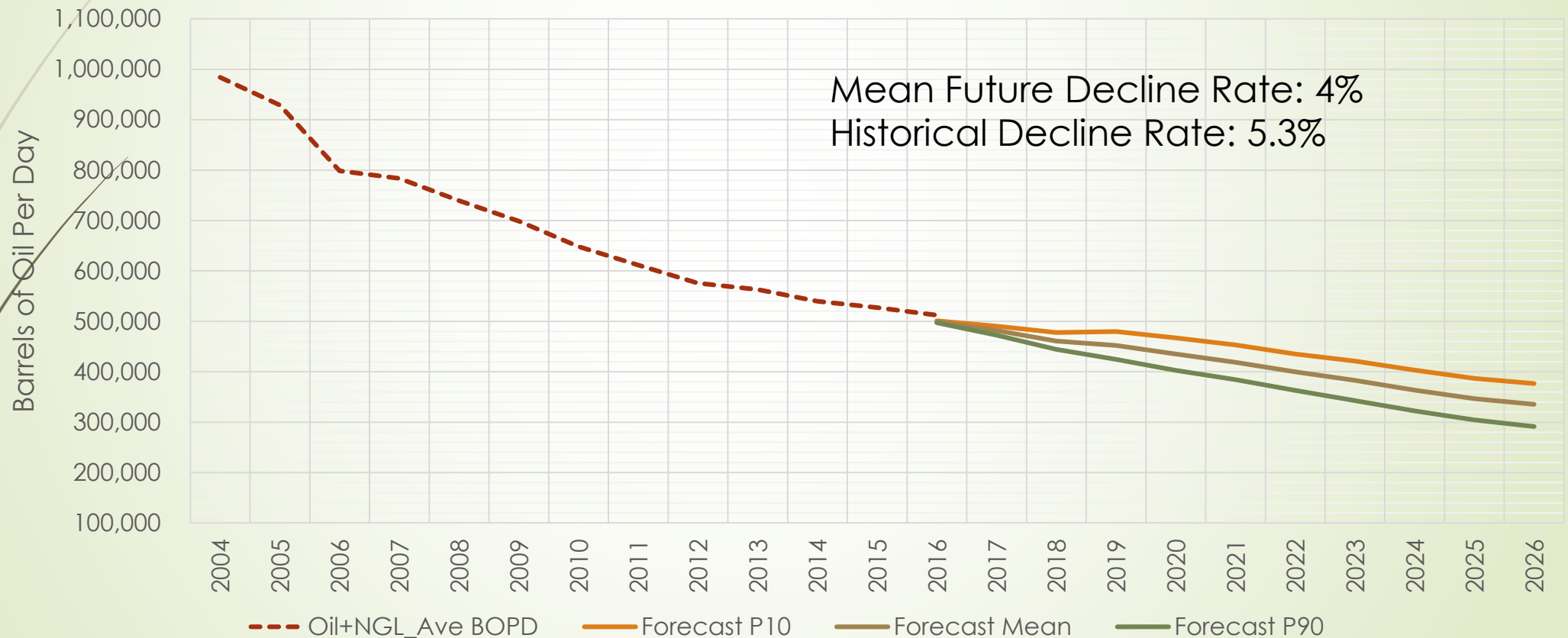
Characteristics:

- ▶ All currently producing pools in ANS and Cook Inlet
 - ▶ Examples: Legacy fields and other fields in production
- ▶ Decline Curve Analysis (DCA) forecast at pool level projects historical performance of producing pools into the future.
 - ▶ Probabilistic DCA projects different potential future outcomes of historical production into the future.

Probabilistic Decline Curve Analysis

- Decline Curve Analysis (DCA) develops trends based on historical production data to forecast future production. It incorporates an understanding of reservoir and operational performance of producing fields/wells.
- Probabilistic DCA includes uncertainty analysis to produce a range of future production rather than a single deterministic forecast profile.
- Software used:
 - Schlumberger's Oil Field Manager (OFM) alongside a probabilistic suite.
 - Uncertainty analysis in excel used @Risk by Palisade

Example Statewide Production Forecast Range



Production Category: Future Production (UD/UE): 10-Year Outlook Window

Present

Year 1

Year 10

Under Development

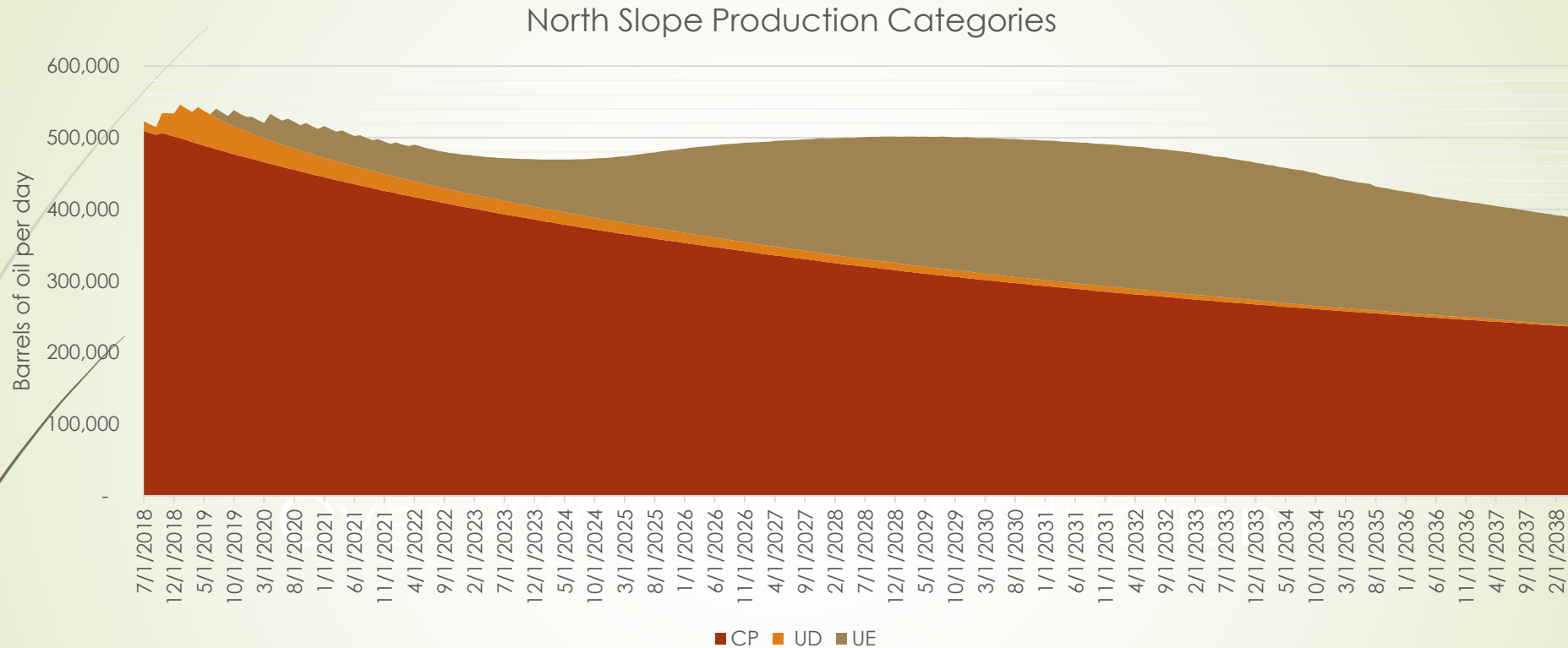
- +New fields 1 yr out.
- +Wells in fields undergoing development.

Under Evaluation

- +Facilities (access) in Place
- +Significant Sunk Cost.
- +Funding secured.
- +Permitting completed/in progress.
- +Unknown first-oil date/estimated greater than 1 year out
- +Discovery (contingent resource) or just prospects (prospective resource)
- +Uncertain finances
- +Facilities incomplete or nonexistent

Fall 2018 Forecast: Production Outlook

16



- Currently producing (CP) fields remain backbone of state oil production in near and medium term. Near-term projects under development (UD), often within existing fields, impact 12-month outlook.
- Future fields (UE), which are currently being evaluated by operators, begin to play a more significant role in production in the next 5-6 years

A Balanced focus on the near and far term

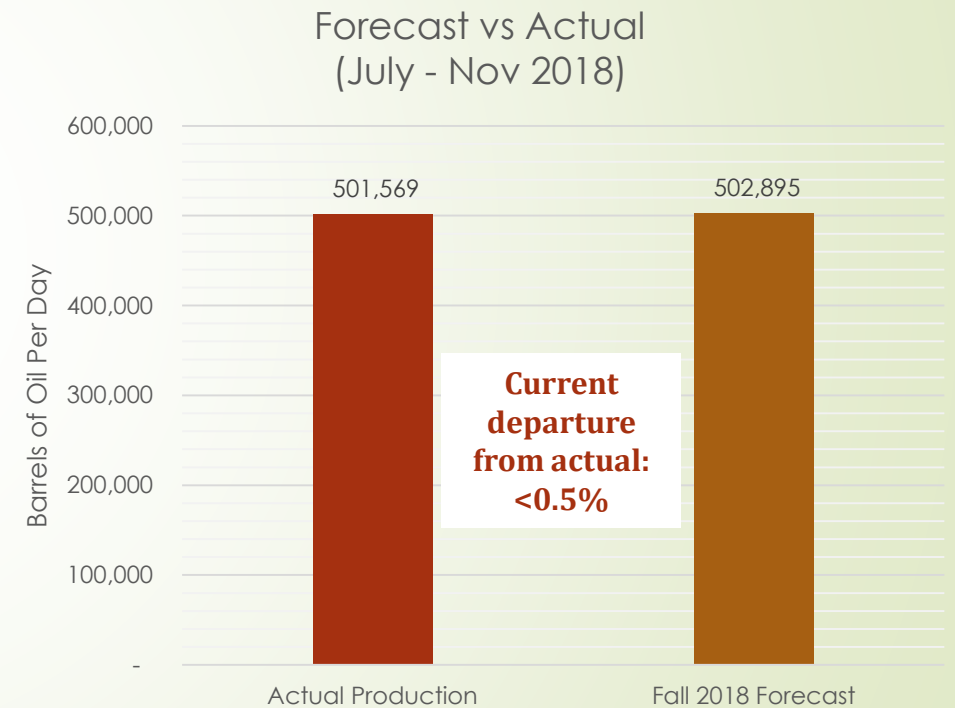
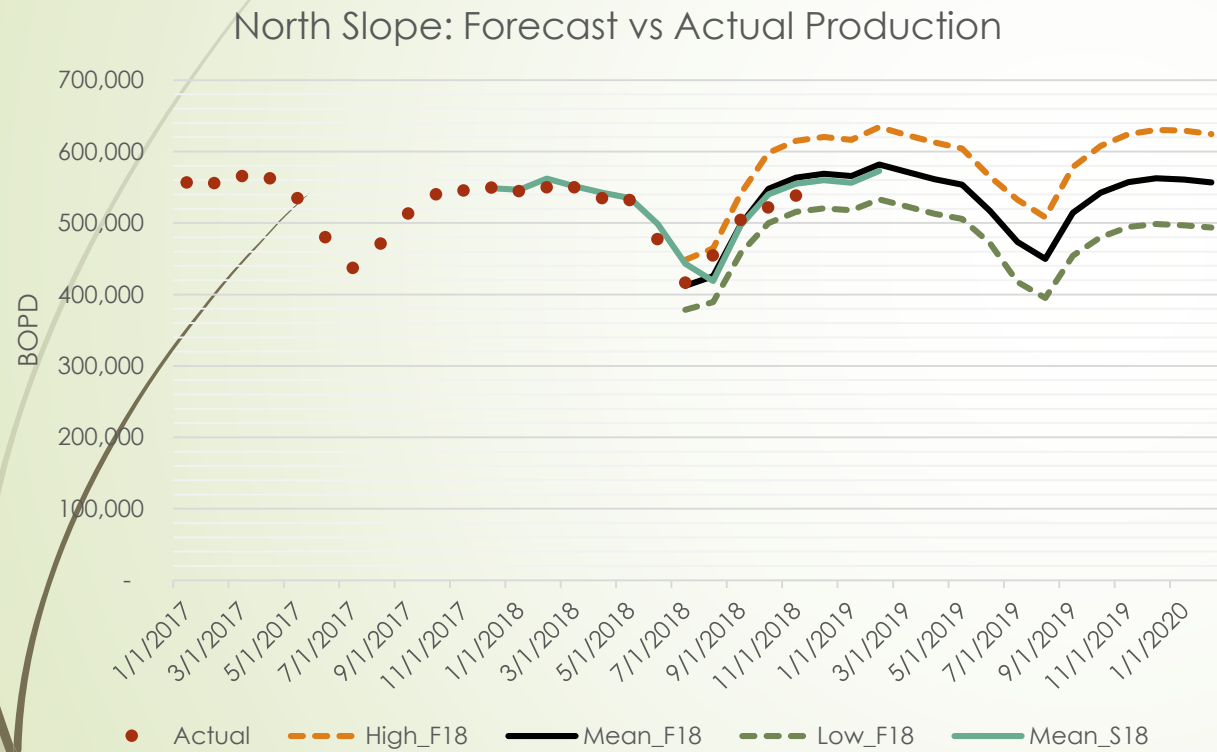
Near Term Focus:

- Near term guidance is based on the most recent pool information, operational practices and performance
- Emphasis is placed on near-term production to capture impacts of scheduled maintenance/turn-around events
- Probabilistic Decline Curve Analysis weighted toward recent production history

Long Term:

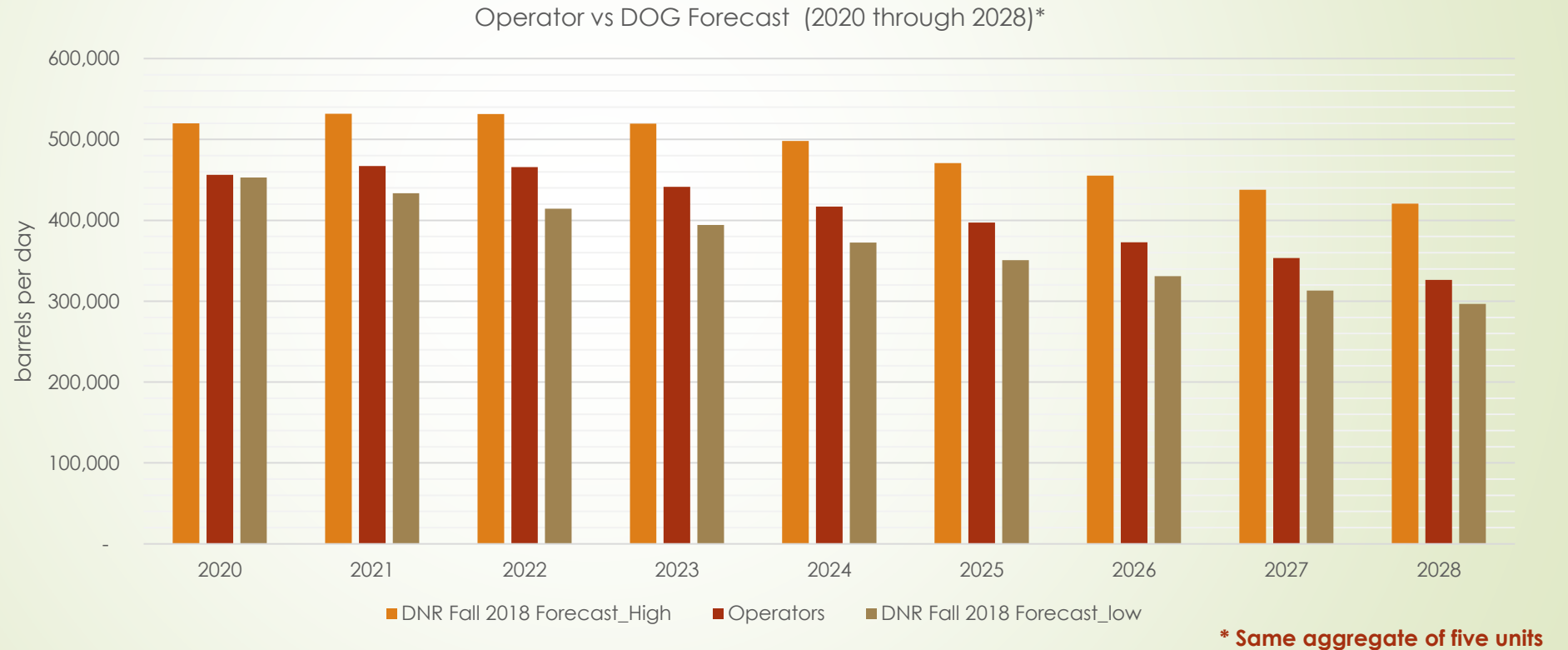
- Attention to realistic long-range outlook for the fields reflecting field development plans
- Engineering judgement is applied to honor field development and reservoir engineering constraints
- Future projects that add to production in out years are based on current project definition, project characteristics and uncertainty analysis

Near-term focus: North Slope



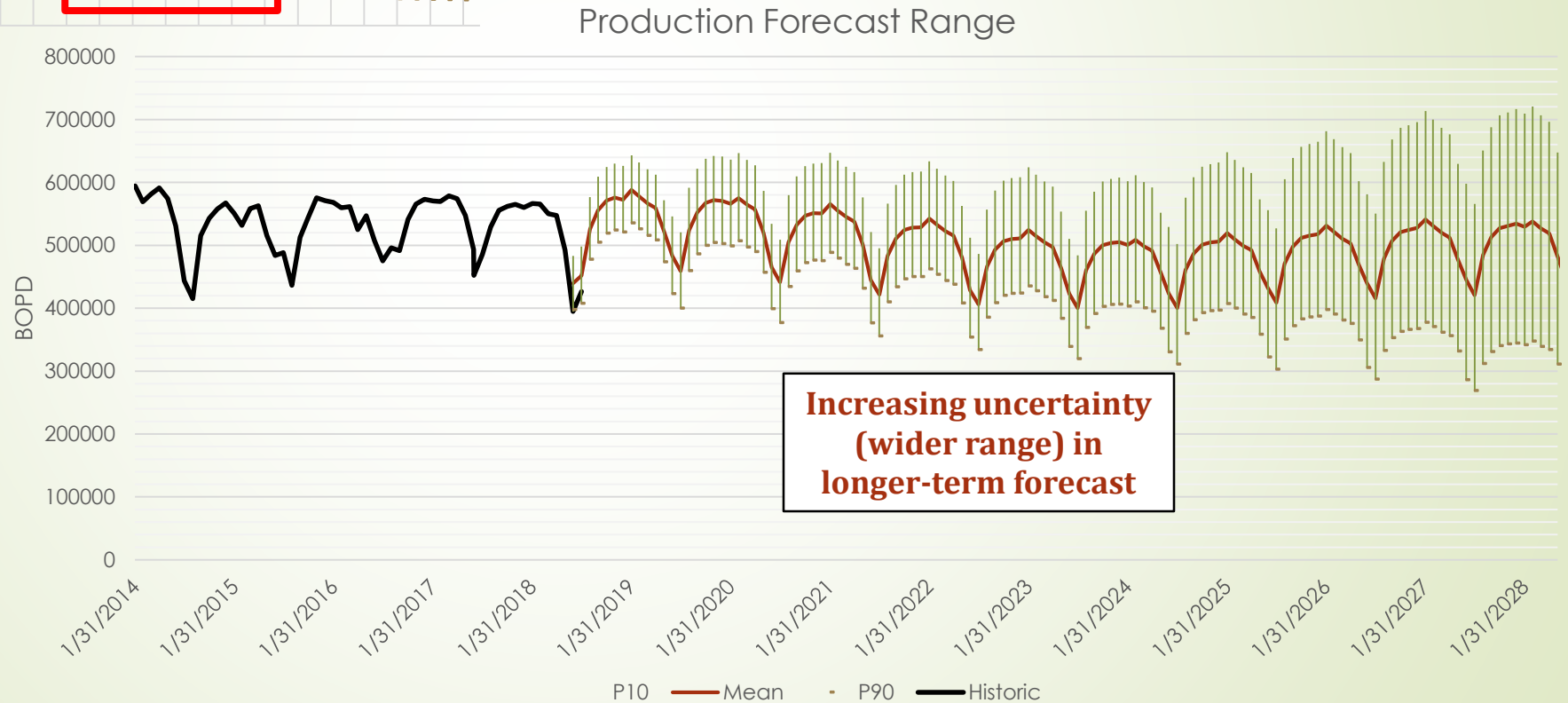
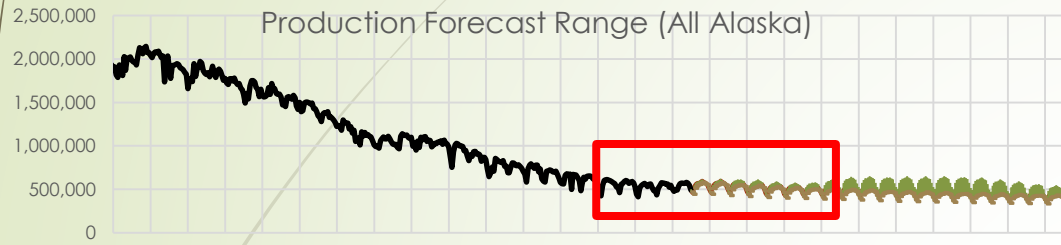
Ensuring accurate forecasts in the near term to support revenue planning in the next fiscal year
Also, tracking observed monthly production variations

Comparing long-term projections



Fall 2018 Forecast: Producers' outlook/forecast falls within DOG production forecast range

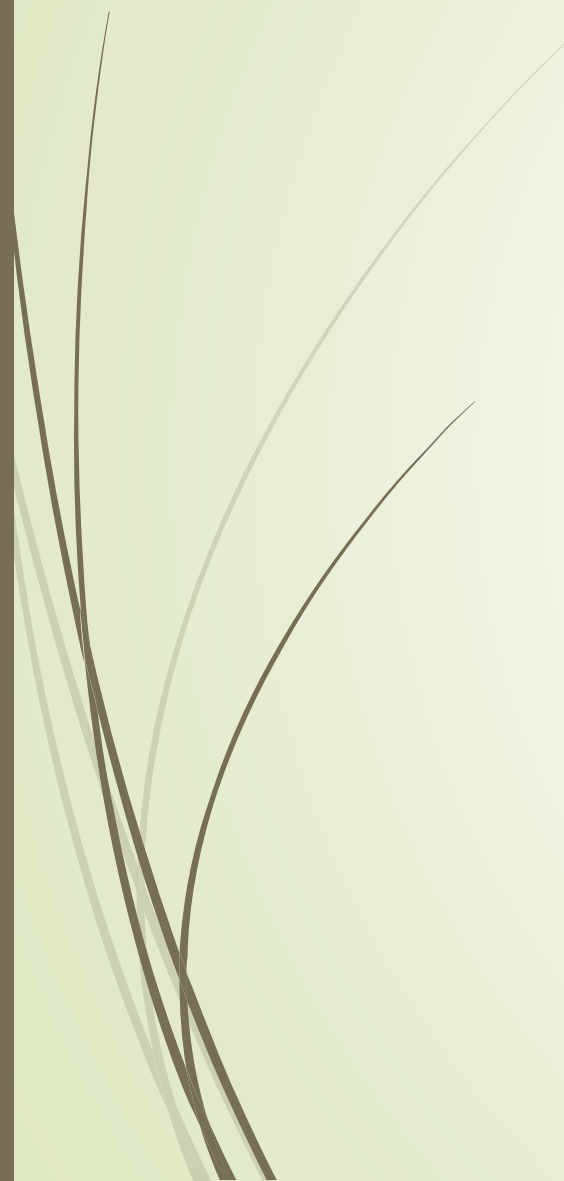
Increasing uncertainty as new fields/projects come online



Summary

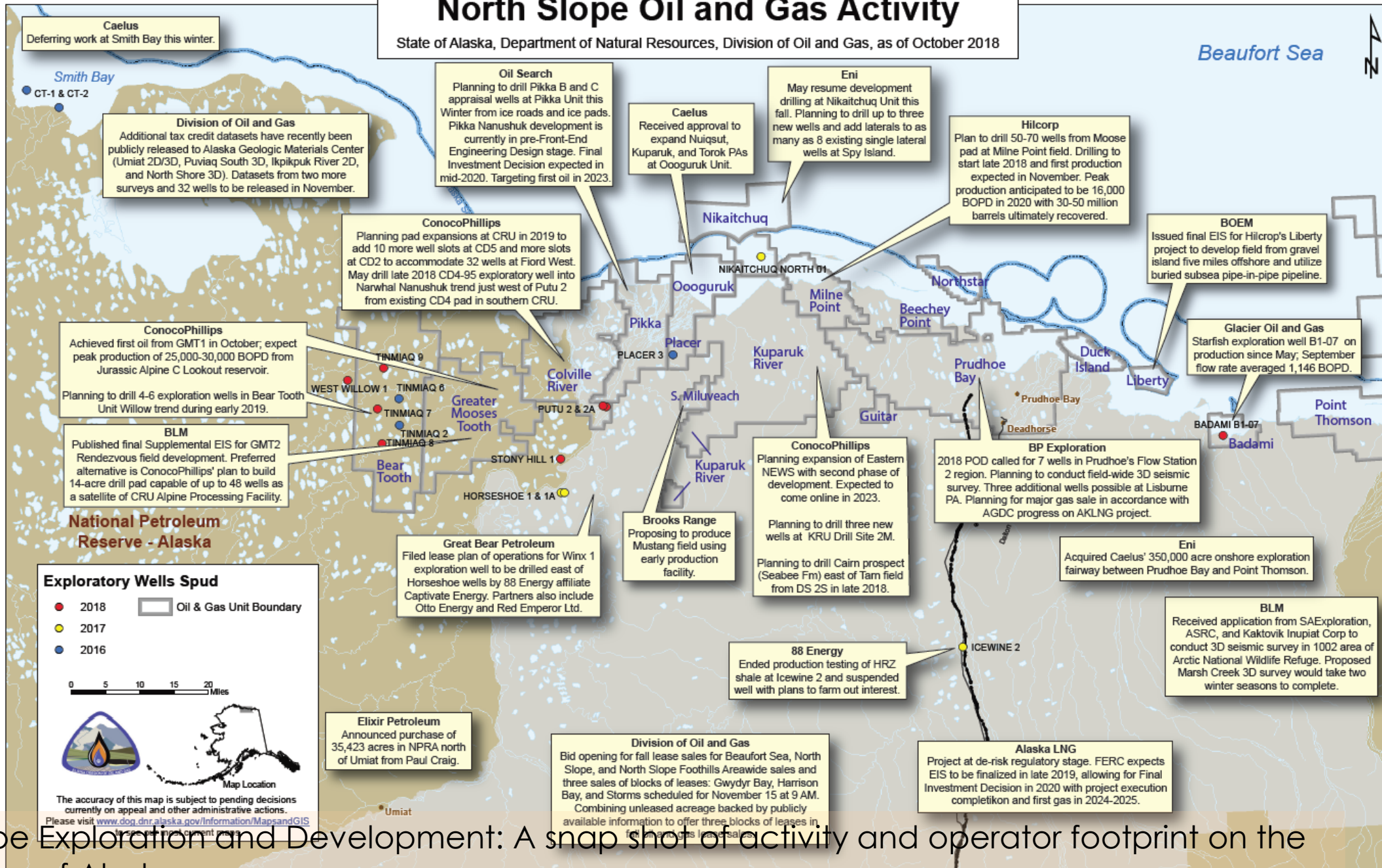
- ▶ Official state production forecast applies standard accepted engineering and production risk assessment techniques in determining future production.
- ▶ Recent new discoveries show that there is still a strong future for oil production in Alaska.
- ▶ Oil prices play a vital role in what resources are ultimately produced.

Back Up



North Slope Oil and Gas Activity

State of Alaska, Department of Natural Resources, Division of Oil and Gas, as of October 2018



North Slope Exploration and Development: A snap shot of activity and operator footprint on the North Slope of Alaska.