



# Oil Production Forecast



*Bruce Tangeman, Department of Revenue*

*William C. Barron, Division of Oil and Gas*

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## Statutory Concerns

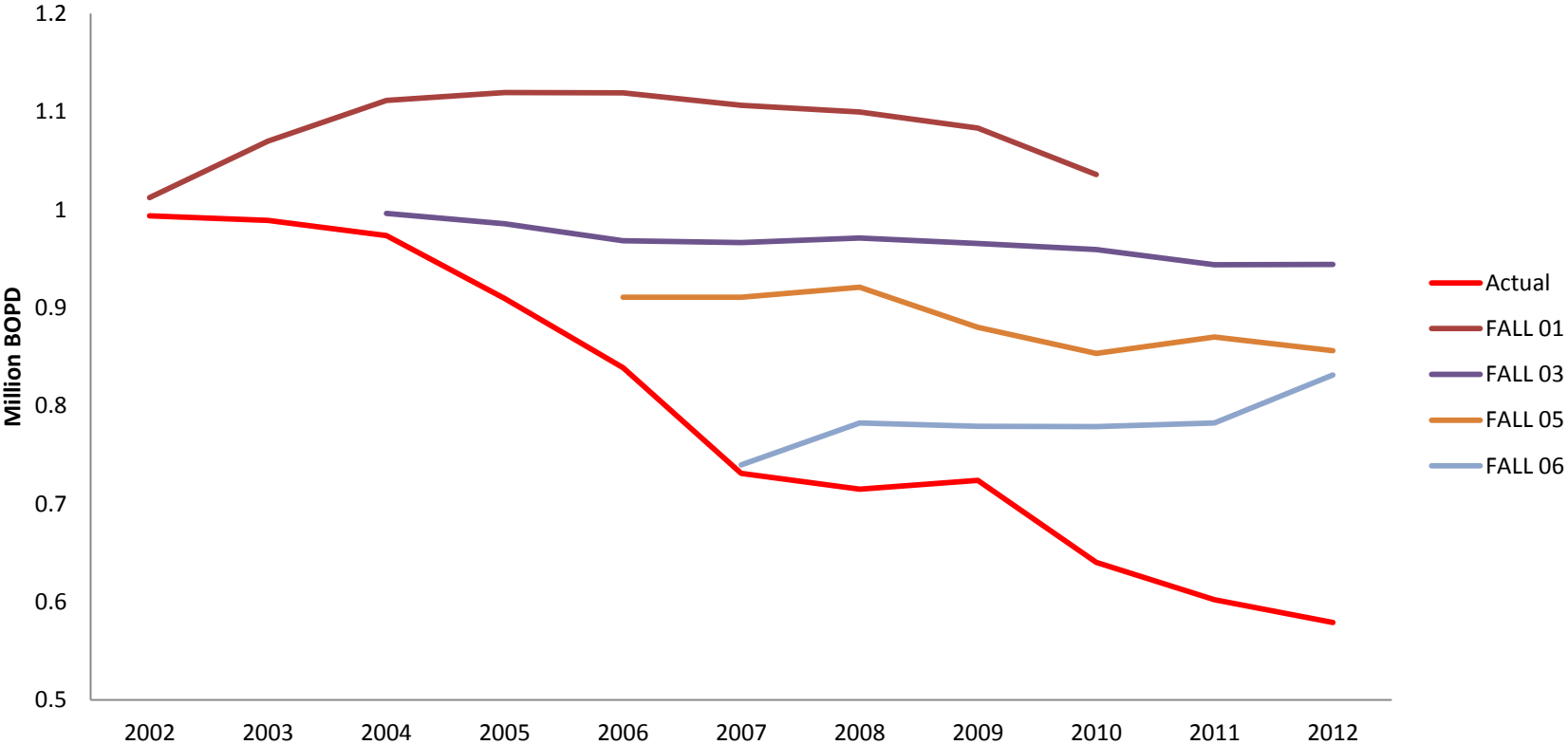
- AS 37.07.020 (b) – *Ten Year Fiscal Plan*.
  - Declares that OMB “must set out **significant assumptions used in the projection with sufficient detail to enable the legislature to rely on the fiscal plan** in understanding, evaluating, and resolving issues of state budgeting,”



# Comparing the Production Forecasts Over Time



**DOR Forecast Examples**



Source: Alaska Department of Revenue Fall Revenue Forecasts ; <http://www.tax.alaska.gov/programs/sourcebook/index.aspx>



# Legislative Direction

*Request for improved production forecast that better incorporates variables:*

- “Is it possible for the department to come forward with a plan for providing more accountability to the productions forecasts?” ... “I’m looking at a graph, from your department, that shows the forecast, starting in 2001 to 2010, and it seems that the trend is that the department is optimistic in its forecast of the production. I’m wondering if you take into account, relooking at how you are assessing, how you’re figuring out what the forecast will be.”

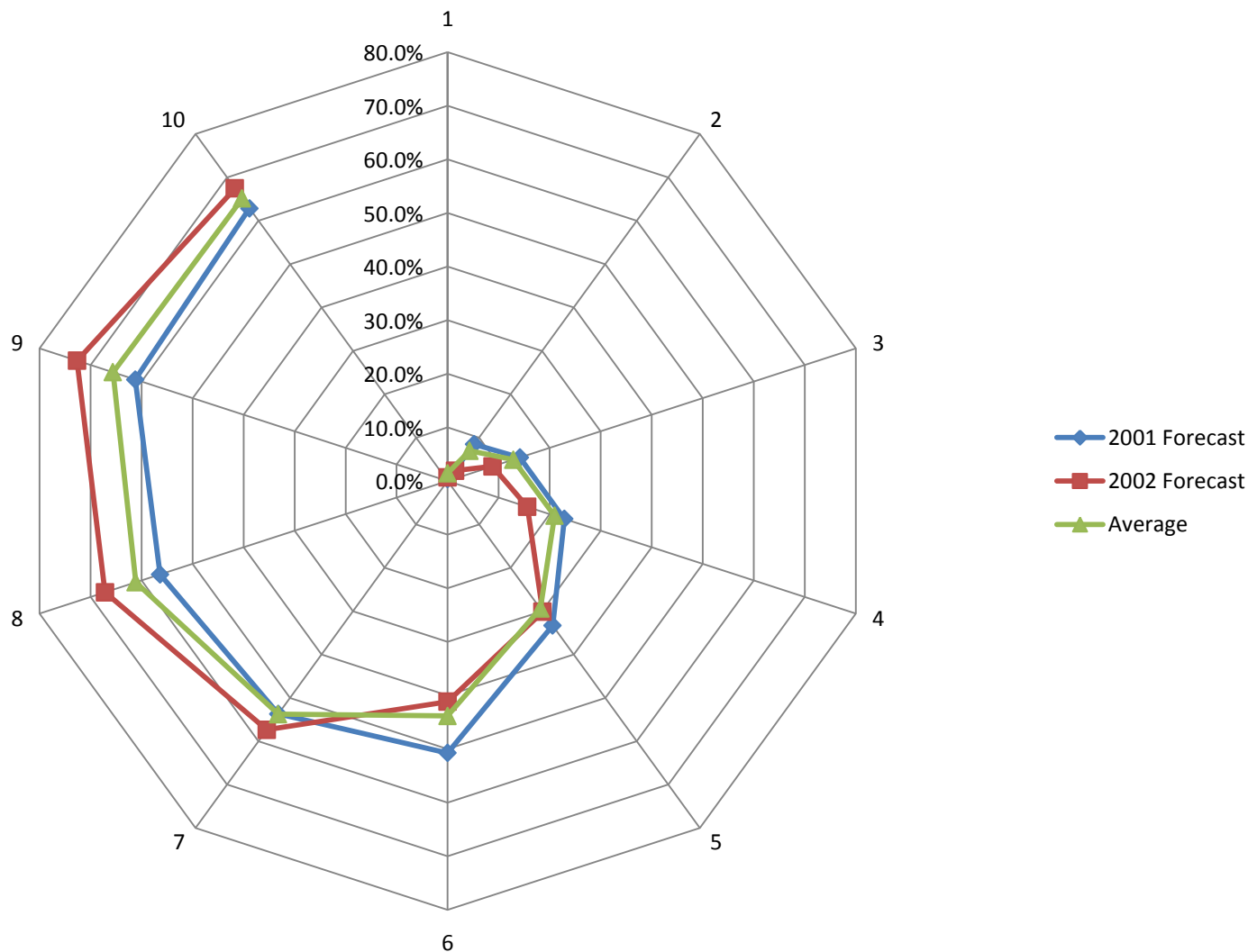
*Rep. Costello, House Finance Committee, February 18, 2011*

- “What I am asking is that I be given something that will give me more confidence that the projections that we see are, not necessarily 100% accurate, but that they have taken into account everything that they can, and we’ve got the best shot we can get.”

*Rep. Doogan, House Finance Committee, February 18, 2011*



# Forecast Errors by Years in Advance being Forecast





# Department of Revenue Response

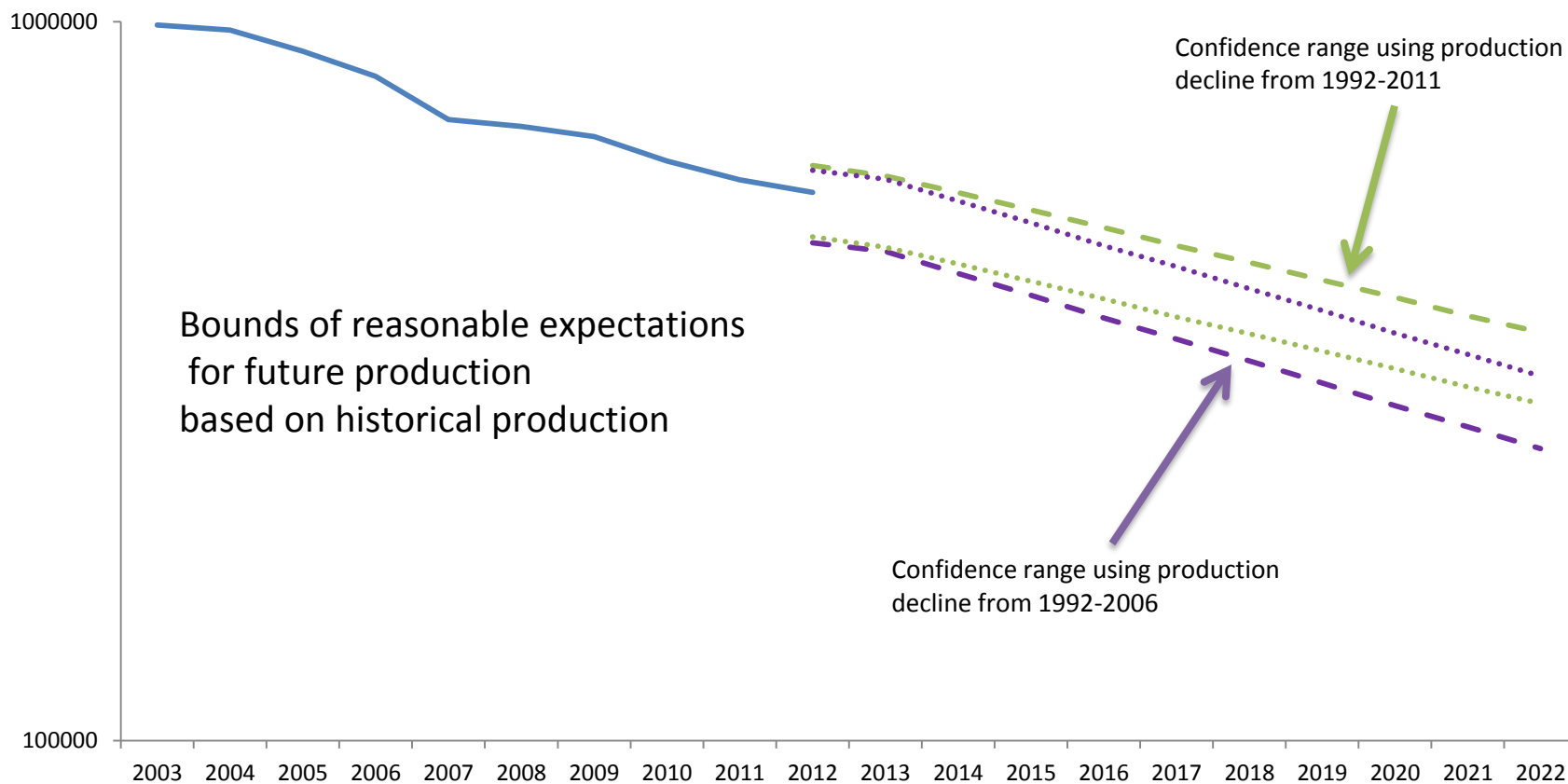


- Addressing consistent over-estimation of production began in 2009.
- In 2012, a DOR team analyzed past forecasts comparing them to actual production.
  - This developed a reasonable range of “confidence bands” for future production.



# Historical Production

## ANS Production





# Components of the Production Forecast

- **Currently Producing (“Old Oil”):**
  - Oil from wells that are in production and following typical reservoir engineering optimization without major investment.
- **Under Development (UD):**
  - Oil from projects that will add incremental oil to existing fields or will bring new fields into production.
  - Project must have senior management approval and be allocated funds in the company’s 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.
  - Requires that oil reserves are known and recovery is technically possible with current technology.
- ***Under Development + Under Evaluation = “New Oil”***

*\*\*\*These definitions are not equivalent to those used by the Society of Petroleum Engineers (SPE) or Securities & Exchange Commission (SEC) and should not be used as such\*\*\**





# The concept of risk

**“Risk is the probability of an event occurring and the potential impact of that occurrence”**

*Cost Control and Risk Mitigation in Major Projects, Caddy, Fluor Daniel Inc., SPE 1993*

**“Good E&P business decisions require assessment of both technical and non-technical risk”**

*Assessing Non-Technical Risks in Oil and Gas Exploration and Production, Barker, Steele, Heaton, SPE, 1998.*

**“The ability to convey the relative riskiness of various O&G projects in a consistent manner is an elusive and desirable goal.”**

*Development and Implementation of an Integrated Risk Assessment Methodology. Cutten, Evoy, Grecu. SPE conference paper 1993*



# Accounting for the Risks Appropriately

- **“Currently Producing”** oil **was not** risked in this forecast
- The **“New Oil”** portion of the forecast was adjusted for these risks starting in FY2015
- The **“Under Evaluation”** portion of the forecast was risked at a greater rate than **“Under Development”**
- **Technical and Non-Technical** risk must be considered



# Risk Factor 1: Delays



Historical predictions of new fields coming on line.

*"Over 35% of projects are over budget and exceed cycle time by over 10%"*

Booze Allen & Hamilton

Years Forward	Number of Predictions	Number Correct	Percent Correct
1 Year	12	12	100%
2 Year	13	10	77%
3 Year	14	4	29%
4 Year	13	3	23%
5 Year	17	4	24%
6 Year	16	0	0%
7 Year	6	1	17%
8 Year	2	0	0%
9 Year	3	0	0%



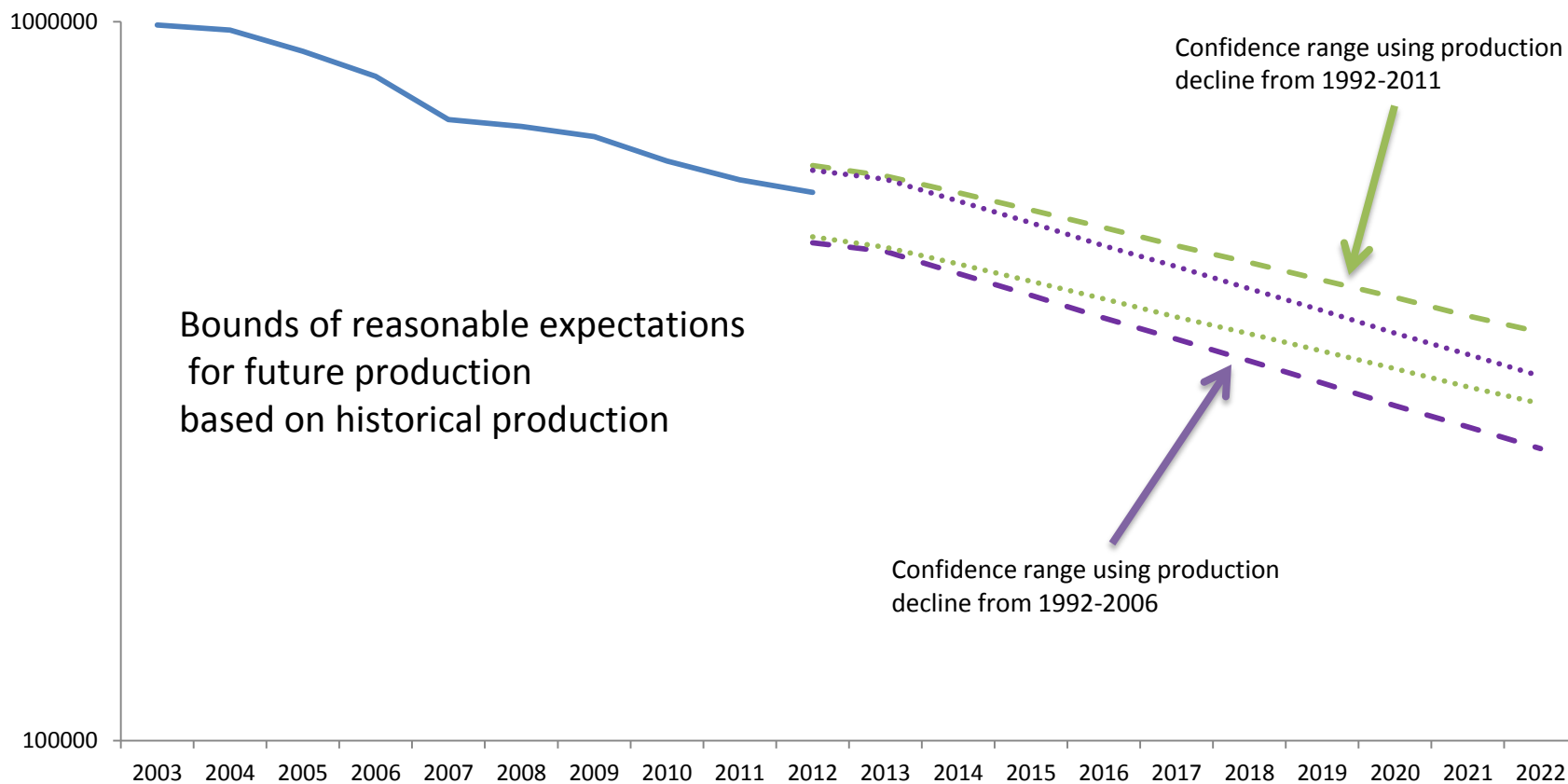
## Risk Factor 2: Performance Deviates from Expectations

Field	Predicted peak production	Reality	Comment
Badami	~30-35K bpd	Peaked at 18K bpd, rapidly declined to ~1,400 bpd	BP shut down production, Savant currently reviving
Aurora	~15-20K bpd	Peaked at ~10,500 bpd	
Polaris Waterflood	~12-15K bpd	Peaked at ~4,750 bpd	
Prudhoe Bay Satellites	~40K bpd	Peaked at ~50 bpd	



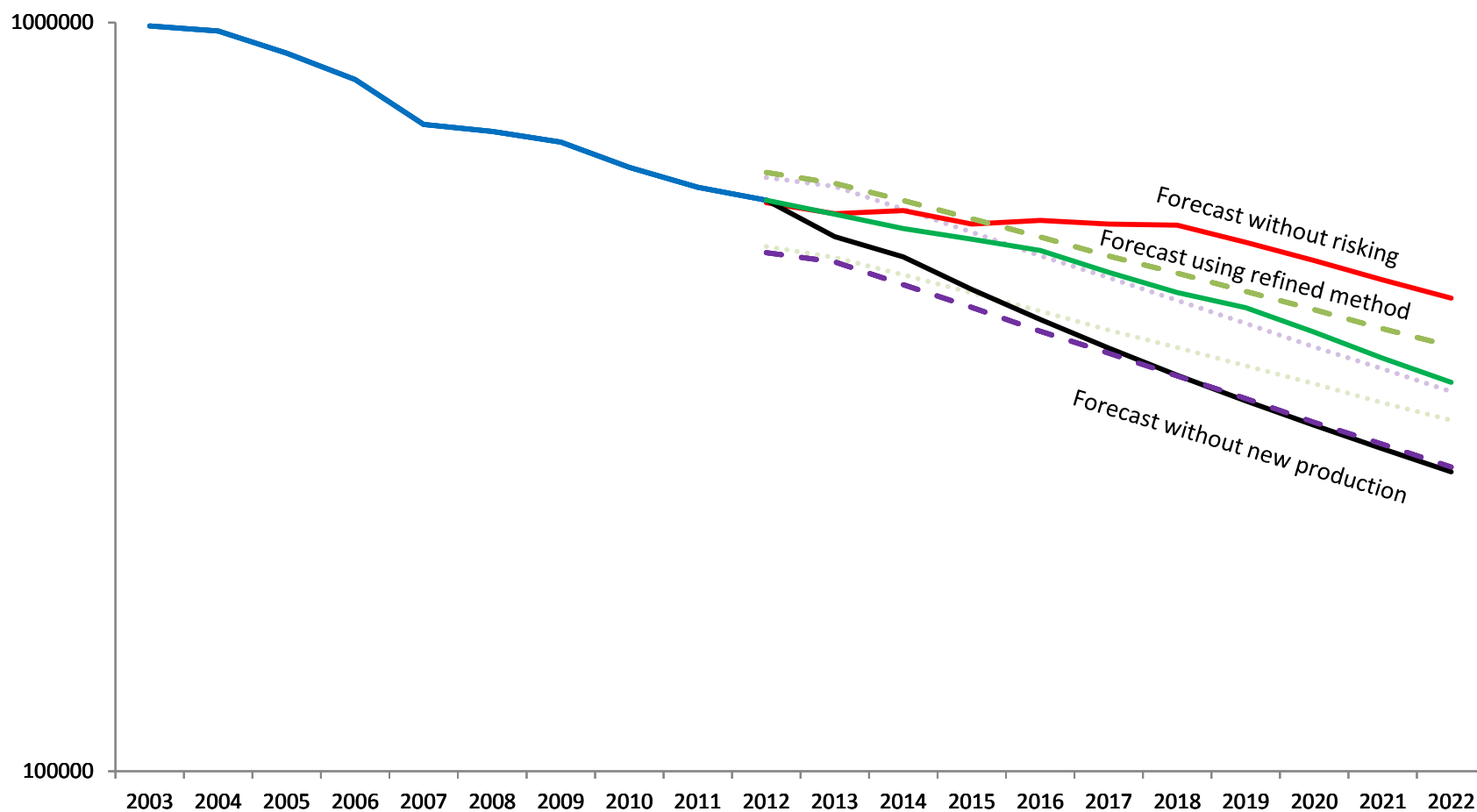
# Historical Production

## ANS Production



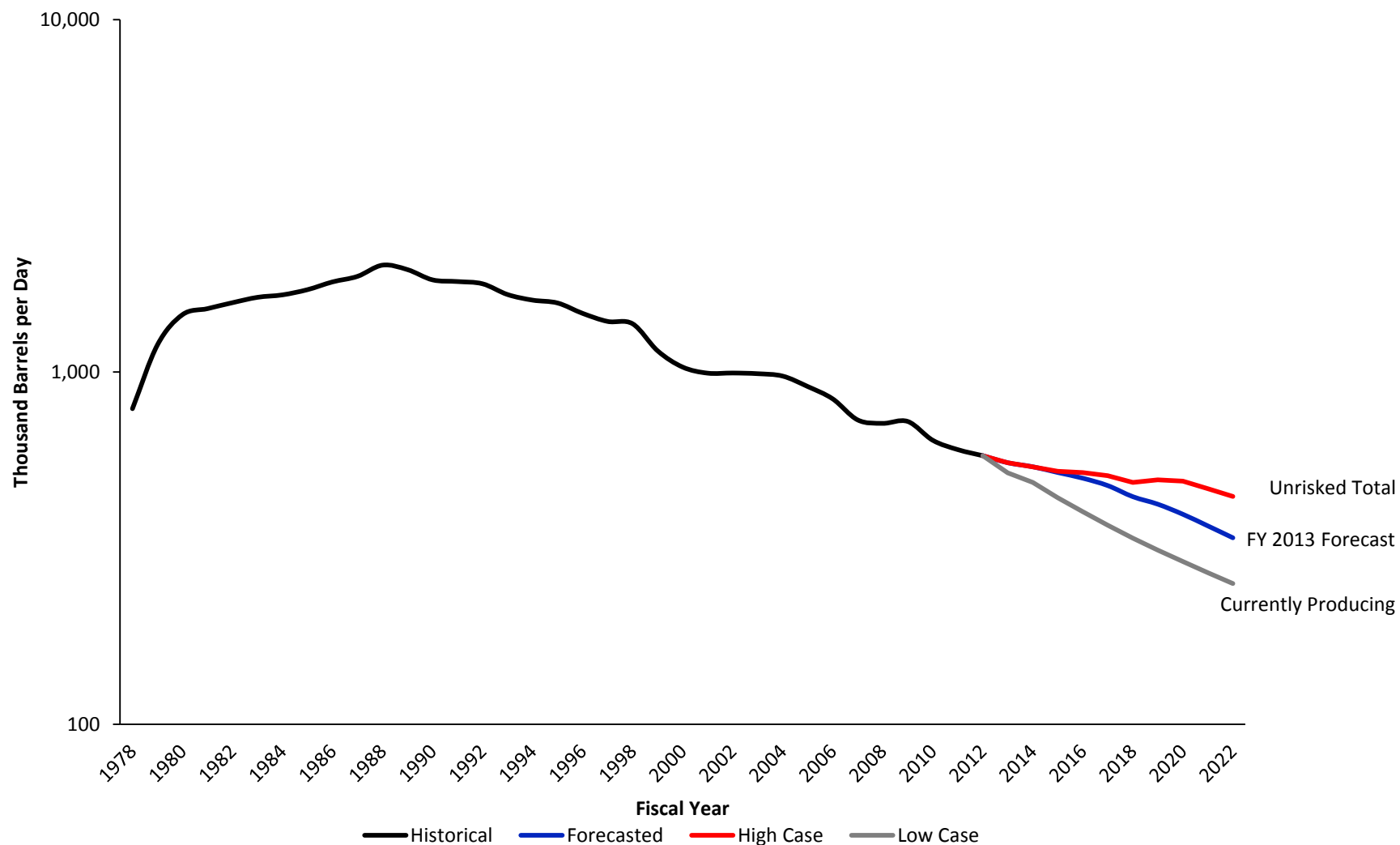


# Applying the refined method



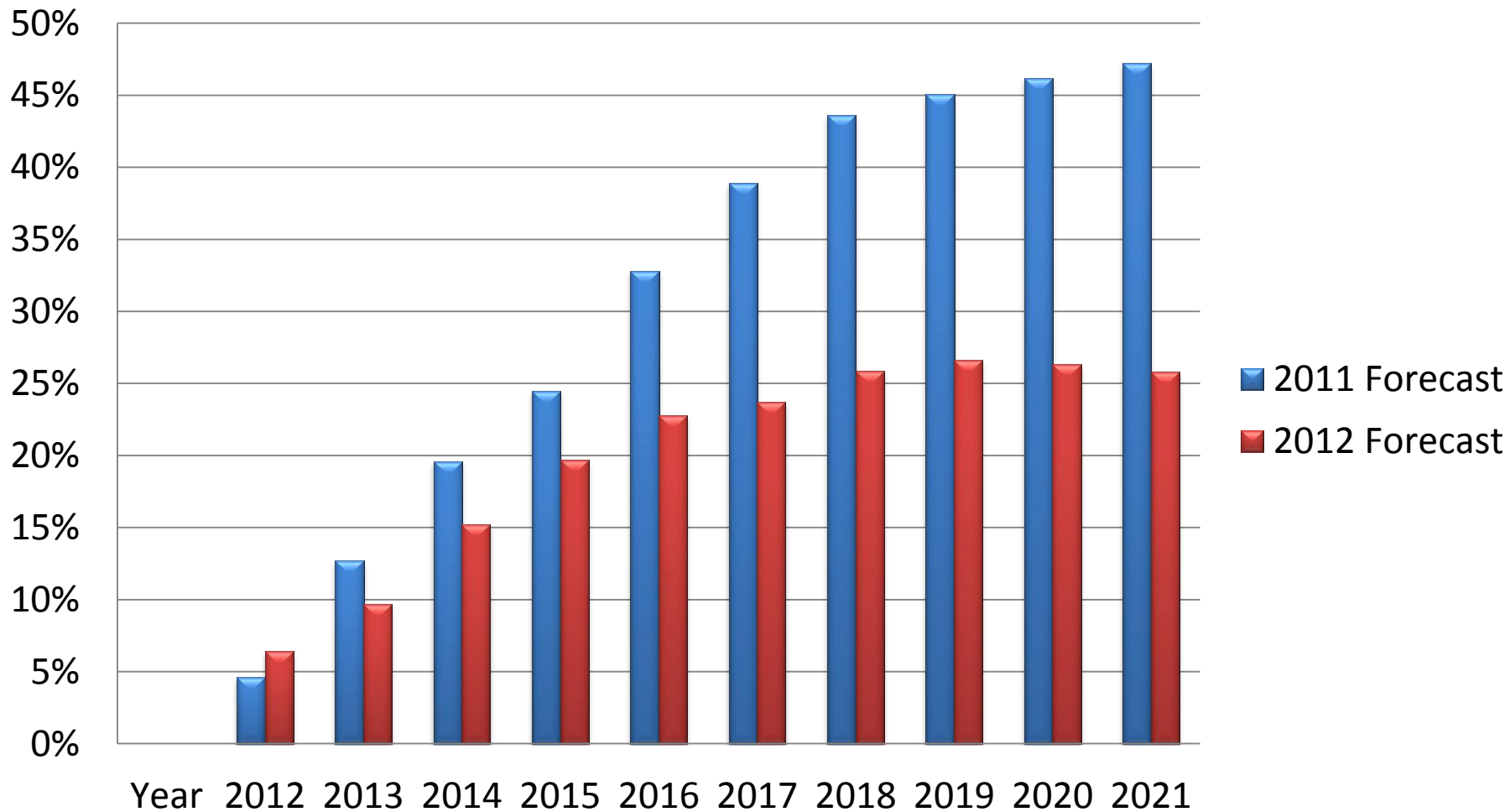


# Applying the refined method





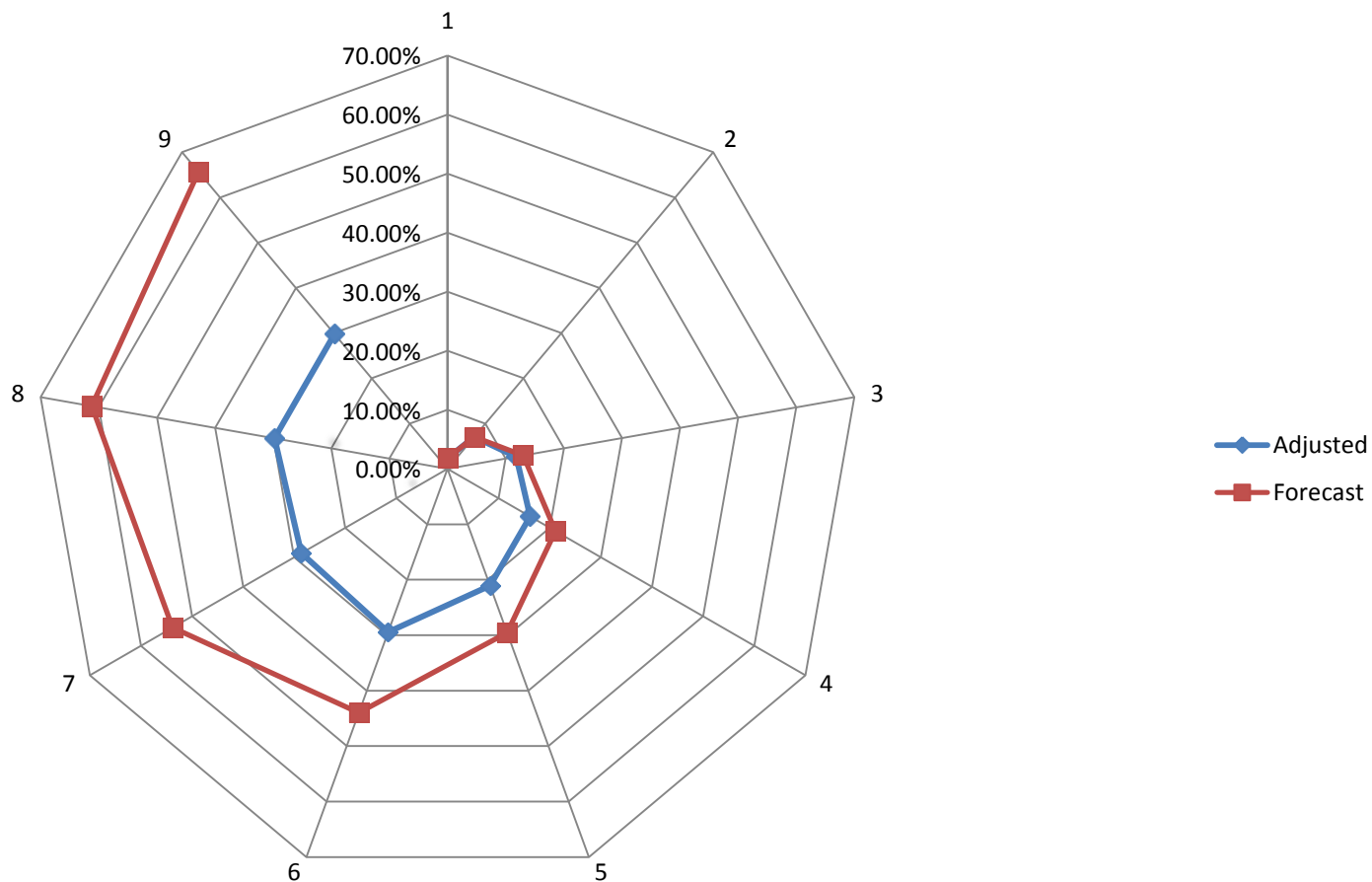
# New Oil share of Total Production







# Testing the refined method





This will be an ongoing process...

...of assessing the risk associated with Under Development and Under Evaluation.

“The ability to convey the relative riskiness of various O&G projects in a consistent manner is an elusive and desirable goal.”

*Development and Implementation of an Integrated Risk Assessment Methodology.* Cutten, Evoy, Grecu. SPE conference paper 1993