Commonwealth North
Fiscal Policy Study Group

State of Alaska Revenue Forecasting Recommendations

The genesis for the State of Alaska's "Revenue Sources Book" (RSB) dates back to the early 1970s when the State compiled a series of simple spreadsheets detailing current and estimated future revenues. By the mid-to-late '70s and into the early '80s the appearance of commentary, charts, and graphs started to become commonplace. The 1989 publication was the first to formally carry the title "Revenue Sources Book".

The RSB has been published on a fall schedule each year since 1989 with a scaled-down update released each spring. The contemporary RSB contains an abundance of useful data along with helpful charts, graphs, and topical discussion. It holds considerable value as a comprehensive resource for all things revenue-related vis-à-vis the State of Alaska (SOA). The Department of Revenue (DOR) is to be commended for its efforts in compiling this wealth of information each year.

The study group's focus was on the forecasting of ANS oil production as presented in the RSB. The following are the recommendations that evolved from its discussion.

Recommendation #1:
The RSB should include a robust discussion of Permanent Fund revenue, including a five-year forecast of revenue to the State pursuant to Percent of Market Value formula.

The enactment of Senate Bill 26 in 2018 established a "Percent of Market Value" (POMV) formula by which Permanent Fund earnings are made available to fund state services and pay dividends. In light of reduced oil-related revenues, the Permanent Fund has now emerged as the most significant source of revenue to the State. For Fiscal Year 2020, Permanent Fund revenue *exceeds* petroleum revenue *by 173%* and this magnitude is expected to continue for the foreseeable future. The State is in a new era in terms of the sources of revenue that support state services.

Over the last four decades the RSB has consistently evolved presentation of information about revenues from petroleum. As an example, Chapter 4 of the 2018 RSB includes 20 pages on this subject (plus multiple appendices). A plethora of informative charts, graphs and tables are presented all in support of a broad, yet detailed, discussion of the State's petroleum revenue streams.

By contrast, Chapter 7 discusses "Investment Revenue," is ten pages of which the last two are about the Permanent Fund.

The importance of Permanent Fund-generated revenue now requires that the RSB broaden its discussion of the Fund and include a five-year forecast of projected revenue to the State under the POMV formula.

Recommendation #2:
The Revenue Source Book should include multi-case projections for unrestricted revenue.

Oil production is a source of significant State revenue and along with that comes uncertainty regarding oil price and, to some extent, production. The result is a challenge to financial planning. The RSB acknowledges this uncertainty by presenting oil production forecasts in a multi-case format (low, high, and "official" forecasts), which effectively illustrates the inherent uncertainty attached to forecasting—and financial planning.

To communicate the challenge in forecasting to users of the RSB, it is recommended that the RSB use similar multi-case format (low, high, and "official") to forecast unrestricted general fund revenue, including Permanent Fund earnings.

Recommendation #3:
The RSB include a comparison of its oil price/production forecasts with actuals for each of the last five years.

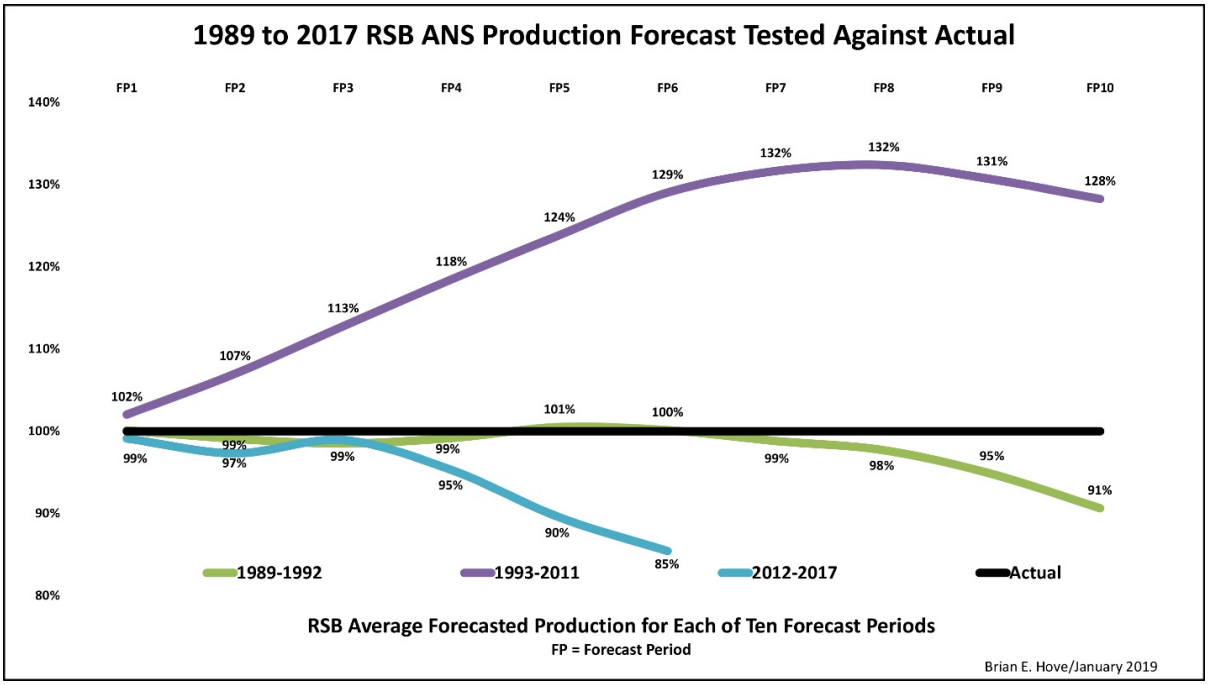
To validate the usefulness of oil production forecasts, CWN recommends that the annual RSB include a comparison between prior year forecasts to what actually occurred for reasons that follow. We believe including this type of "look back" will ensure attention is paid to the quality of the assumptions used and the usefulness to decision-makers.

For decades, the RSB has presented price and production forecasts for petroleum-sourced revenue. Over the years these forecasts have varied by going out eight- to 24-years; recent RSBs have included a ten-year outlook. The study group appreciates that forecasting is a challenging endeavor and that price forecasting, in particular, is nearly impossible to nail given the variety of complex market forces in play which are, inevitably, impacted by randomly-timed political and other events.

By contrast, oil production forecasting affords an opportunity for superior reliability given copious data provided by producers as well as the State's ability to devise and control its own predictive models. We appreciate that forecasting the outcome of events occurring at certain points in the future is, by nature, a challenging endeavor. Much effort can be expended developing sophisticated forecasting methodologies which, in essence, are best-guesses driven by a set of assumptions.

Ultimately, quality can only be determined in hindsight—by looking back and comparing past forecasts against observed results—which is what we did in this review.

The above chart highlights the SOA's ANS oil production forecasting proficiency over the course of three discrete time periods: (1) 1989 through 1992, Group Green; (2) 1993 through 2011,



Group Purple and; (3) 2012 through 2017, Group Blue.[1] The data line for each period indicates an averaged set of outlooks presented as a percentage of actual production (black line) for a given forecasting period (FP) in one year increments.

For instance, Group Green consists of four outlook sets—one set from each of the four (Fall) RSBs for this period. Each outlook set forecasts a ten-year period. The Group Green data line is derived by averaging the set of one-year outlooks, two-year outlooks, three-year outlooks, and so on to ten-years. In this case, the green data line suggests the assumptions used to determine ANS production forecasts during the Group Green period produced relatively reliable results, even in the most challenging out-years.

In contrast, Group Purple over the course of 19 years, demonstrates a period for which SOA forecasting assumptions proved to be optimistic when subsequently tested against actual production. Even the early years, when forecasts might expect to be relatively reliable, the purple data line demonstrates an immediate and substantial divergence from actual. For instance, the set of 19 year-three (FP3) forecasts averaged 113% of actual production.

[1] SOA fiscal years (ending June 30).

Furthermore, it's interesting to note the linear nature of this data line all the way out to FP7 where this set of 19 forecasts averaged 132% of actual production.

Group Blue presents the time-frame 2012 through 2017. This period suggests the SOA adopted a more conservative approach to production forecasting, as FP1 through FP3 indicate. The latter years in this group (FP4 to FP6) do not, yet, provide meaningful insight due to insufficient data points. In fact, given the limited number of data points overall, the jury may still be out as to whether Group Blue, as a whole, represents a more effective approach to production forecasting. Time will tell. But, at this point, forecasting methodologies represented by Group Blue appear to be superior to Group Purple.

A couple of additional notes regarding this review:

> (1) 1989 was the first year in which the RSB presented production forecasting data in a format conducive to long-term analysis;
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> (2) In this regard, Group Green may possess shortcomings similar to Group Blue vis-à-vis available data points. Nonetheless, Group Green's raw data indicates the presence of a clear demarcation between 1992 and 1993, hence use of this split. The 2011-2012 split was determined as a result of DOR's implementation of a new forecasting methodology.

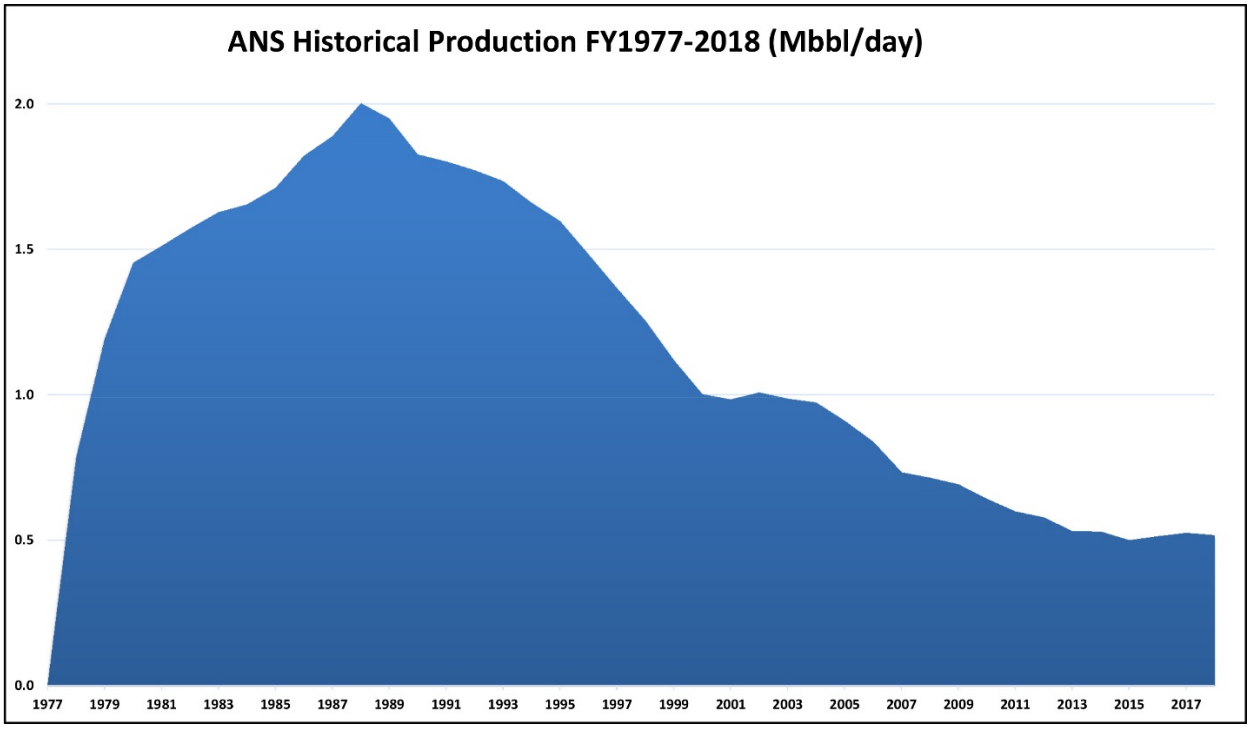
And finally, regarding forecasting in general and Group Purple in particular, it might be reasonable to expect a group of forecasts, over the long-run, to be uniformly distributed above and below a line representing actual production. In other words, some forecasts when tested against actuals, would prove to exceed actual production while an equal number of forecasts (more or less) would come in below actual. A few forecasts could even be expected to hit the mark exactly.

In this regard, Group Purple is particularly remarkable. Of 181 forecasts made over a 19 year period, 96% (174) *exceeded* actual production.[2] Many of these forecasts proved to be wildly optimistic. Some exceeded actual results by as much as 175%. Only seven of 181 proved to be equal to, or below, actual.

Group Purple's wide divergence was a topic of extended discussion among members of CWN's Fiscal Policy Study Group (discussion benefited from insight provided by former DOR Commissioner Galvin). One theory focused on the precipitous decline in production occurring between 1994 and 2000 (as depicted in the following chart). It was postulated the SOA expected to see a "tail" develop much sooner than what actually occurred. These expectations were – evidently - baked into modeling assumptions and methodologies, year-after-year.

[2] A few RSBs during this period do not provide a full ten-year run of forecasts while others, toward the end of the period, will not see the latter Forecast Periods (FP) come into play until future production numbers are determined.

Even so, Group Green's forecasts appear extraordinarily prescient compared to Group Purple's. In fact, a substantial number of Group Green's out-year projections are for periods coincident with the steepest year-over-year declines in production (1994-2000). Many of these forecasts are nearly spot-on. In any event, further study may be required to better understand Group Purple's pervasive optimism.



In Appreciation . . .

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