Maximum Sustainable Yield: Wealth Management for the “Owner State”

by

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Commonwealth North
Fiscal Action Coalition
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Popular Alaska Bumper Sticker (and Fiscal Strategy)

"Please God, give us another oil boom, we promise not to piss it away this time"
The Second Oil Boom: God Answers Our Prayers

First huge oil-revenue boom, 1980-1986: $46 billion
- Iran/Iraq war: $67/barrel
- Windfall: Revenues from North Slope oil lease sales: $4.3 billion

Second huge oil-revenue boom, 2005-2011: $45 billion
- Oil glut, Alaska recession: $23/barrel
- Invasion of Iraq
- Settlements of tax disputes
- Oil price sinks to $14/barrel

Sources: Alaska Department of Revenue, U.S. Energy Information Administration, crude oil first domestic purchase price

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Understanding Alaska: Special Economic Studies
Three Topics

• Maximum Sustainable Yield Concept
• Valuing Petroleum in the Ground
• Compare MSY to Current Fiscal Path
Petroleum: State Revenues

Lighter Tax Burden
$50 Billion

SPEND
$125 Billion

Greater Public Spending
$75 Billion

SAVE
$45 Billion

59-12 in 2011 $
Monetizing the Non Sustainable Petroleum Wealth
Petroleum Wealth in our Infrastructure

Physical Capital

Human Capital

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# Petroleum Wealth in the Bank (Billion $)

<table>
<thead>
<tr>
<th>Fund Description</th>
<th>Amount</th>
</tr>
</thead>
<tbody>
<tr>
<td>Permanent Fund</td>
<td>$42</td>
</tr>
<tr>
<td>CBR (Constitutional Budget Reserve), SBR (Statutory Budget Reserve), GF (General Fund)</td>
<td>$18</td>
</tr>
</tbody>
</table>

Total: $60
# Petroleum Wealth in the Ground (Billion $)

<table>
<thead>
<tr>
<th>In the Ground</th>
<th>$100</th>
</tr>
</thead>
<tbody>
<tr>
<td>Conventional State Land</td>
<td>$80</td>
</tr>
<tr>
<td>Other Oil</td>
<td>$7</td>
</tr>
<tr>
<td>Natural Gas</td>
<td>$13</td>
</tr>
</tbody>
</table>
Total Petroleum Wealth of the “Owner State”

$160 Billion

$222,222 for each current resident
HOW SHOULD WE MANAGE THIS ASSET (ENDOWMENT)?

MAXIMUM SUSTAINABLE YIELD
Invest for the highest possible return.

Consume to conserve the value of the endowment.
Maximum Sustainable Yield

EXAMPLE

Investment Return 5%
Population Growth 1%
Consumption Rate 4%

\[ \$160 \times (5\% - 1\%) = \$6.4 \]

Asset Value (Billion Real $)

Consumption (Real Per Capita)

Asset Value (Real Per Capita)
No new taxes so GF spending grows with population & inflation.
Financial Balances, excluding the Permanent Fund.
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PF EXAMPLE

PFD constant real per capita.

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Alaska State Budget
$13.56 Billion in FY2013

Excludes Transfer to SBR ($0.5) and retained earnings in PF ($1.5) and CBR ($0.5)
### FY 2013 General Fund Spending (Billion $)

<table>
<thead>
<tr>
<th>GF Actual Spend (Billion $)</th>
<th>$7.6</th>
</tr>
</thead>
<tbody>
<tr>
<td>GF Maximum Sustainable Spend*</td>
<td>$6.4</td>
</tr>
<tr>
<td>GF Over Spend</td>
<td>$1.2</td>
</tr>
<tr>
<td>Fiscal Burden &amp; Asset Erosion</td>
<td></td>
</tr>
</tbody>
</table>

- After subtracting endowment spending on the PFD and adding in non-petroleum revenues.
- To get on a MSY path, save all revenues above this amount.
State Fiscal Plan?

Not on a sustainable path.

Not seeing the approaching cliff.
Value of Future Oil Revenues: Conventional Oil in Known Fields: 1

DOR Projected Oil Production (Extended by Author)

DOR Projected Oil Revenues (Million $ Nominal)

Alaska Department of Revenue, Spring 2012 and ISER.
Value of Future Oil Revenues:  
Conventional Oil in Known Fields: 2

DOR Projected Oil Revenues
Discounted Value of Revenue Stream

Alaska Department of Revenue, Spring 2012 and ISER.
## Value of Future Oil Revenues: Conventional Oil in Known Fields: 3

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACCEPT DOR FORECAST (1) OR ADJUST UP (1+X%) OR DOWN (1-X%)</td>
<td>1</td>
</tr>
<tr>
<td>PRODUCTION DECLINE RATE PER YEAR AFTER END OF DOR PROJECTION</td>
<td>6.0%</td>
</tr>
<tr>
<td>REVENUE PER BARREL GROWTH RATE AFTER END OF DOR PROJECTION</td>
<td>1.0%</td>
</tr>
<tr>
<td>REVENUES FOR 50 YEARS (Billion $)</td>
<td>$ 202.6</td>
</tr>
<tr>
<td>PRODUCTION FOR 50 YEARS (Billion Barrels)</td>
<td>4.25</td>
</tr>
</tbody>
</table>
Value of Future Oil Revenues:
Other Oil: 1
Value of Future Oil Revenues: Other Oil: 2
Value of Future Oil Revenues:
Other Oil: 3

Projected Petroleum Revenues
(Million 2013 $)

- TOTAL GAS
- ANWR
- NPRA
- OCS
- Shale Oil
- Viscous & Heavy Oil
- New Central NS Conventional
- KNOWN CONVENTIONAL

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## Value of Future Oil Revenues: Other Oil: 4

<table>
<thead>
<tr>
<th>OCS</th>
<th>Viscous &amp; Heavy Oil</th>
<th>ANWR</th>
<th>NPRA</th>
<th>Shale Oil</th>
<th>New Central NS</th>
<th>Conventional</th>
<th>TOTAL</th>
</tr>
</thead>
<tbody>
<tr>
<td>$12.4</td>
<td>$8.7</td>
<td></td>
<td></td>
<td>$6.6</td>
<td>$12.5</td>
<td>$40.1</td>
<td></td>
</tr>
<tr>
<td>3.43</td>
<td>0.52</td>
<td></td>
<td></td>
<td>0.43</td>
<td>0.38</td>
<td>4.77</td>
<td></td>
</tr>
</tbody>
</table>

Nominal revenues are $40 billion but net present value is $7 billion. Production is 4.8 billion barrels.
## Value of Future Oil Revenues: Other Oil: 5

<table>
<thead>
<tr>
<th></th>
<th>OCS</th>
<th>Viscous &amp; Heavy Oil</th>
<th>ANWR</th>
<th>NPRA</th>
<th>Shale Oil</th>
<th>New Central NS Conventional</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>START OF PRODUCTION</strong></td>
<td>2026</td>
<td>2018</td>
<td>2200</td>
<td>2200</td>
<td>2016</td>
<td>2022</td>
</tr>
<tr>
<td><strong>PEAK PRODUCTION IN BARRELS PER DAY (000)</strong></td>
<td>400</td>
<td>50</td>
<td>0</td>
<td>0</td>
<td>50</td>
<td>50</td>
</tr>
<tr>
<td><strong>ANNUAL DECLINE RATE</strong></td>
<td>4.0%</td>
<td>3.0%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>5.0%</td>
<td>6.0%</td>
</tr>
<tr>
<td><strong>REVENUE PER BARREL IN 2013</strong></td>
<td>$2</td>
<td>$10</td>
<td>$25</td>
<td>$30</td>
<td>$10</td>
<td>$20</td>
</tr>
<tr>
<td><strong>REVENUE PER BARREL ANNUAL GROWTH RATE</strong></td>
<td>2.0%</td>
<td>2.0%</td>
<td>2.0%</td>
<td>2.0%</td>
<td>2.0%</td>
<td>2.0%</td>
</tr>
</tbody>
</table>

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### Value of Revenues: Gas in the Ground

<table>
<thead>
<tr>
<th>Description</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Start of Production (insert 2100 if never)</td>
<td>2023</td>
</tr>
<tr>
<td>Peak Production in BCF per day</td>
<td>4.5</td>
</tr>
<tr>
<td>Production Decline Rate</td>
<td>0.0%</td>
</tr>
<tr>
<td>Revenue per MCF in 2013</td>
<td>$1.00</td>
</tr>
<tr>
<td>Revenue Growth Rate</td>
<td>2.0%</td>
</tr>
<tr>
<td>Revenues for 50 years (Billion $)</td>
<td>$117.9</td>
</tr>
<tr>
<td>Production for 50 years (TCF)</td>
<td>63.2</td>
</tr>
</tbody>
</table>
REVIEW
MSY With “Official” Assumptions

OVERSPEND GF MSY = $0 BILLION
More “Cautious” Assumptions or Where We May be Going: Part 1

Lower return on investment: 4%

OVERSPEND GF MSY = $2.4 BILLION
More “Cautious” Assumptions or Where We May be Going: Part 2

Lower revenue from conventional oil: 90% of DOR

OVERSPEND GF MSY = $2.7 BILLION
More “Cautious” Assumptions or Where We May be Going: Part 3

Per Capita GF Expenditure Growth: 2%

OVERSPEND GF MSY = $6.0 BILLION
Fiscal Fixes

New Taxes
Eliminate Dividend
Cut 2013 Spending 10%

OVERSPENDING GF MSY = $4.1 BILLION

PF GONE IN 2046
Challenges

- Understanding
- Assumptions
- Wealth Sharing Preferences
- Investment Strategies
- Managing Big Pots of $
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