

Science, Service, Stewardship



*Discussion Paper: AFA Pollock
Fishery Data Collection and Salmon
Bycatch Quota Program Analysis*

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Outline of Talk

- Key Questions for Analysis
- Types of Analysis
- Data Collection Options
- Key Findings and Discussion



Key Questions for Analysis

1. How effective are the IPA incentives, the hard cap, and the Performance Standard in terms of reducing salmon bycatch?
2. How does the Council's action change where, when, and how pollock fishing and salmon bycatch occur?
3. How costly are the IPA(s), the hard cap, and the Performance Standard on all sectors of the pollock fishery (including CDQ)?
4. To what extent can vessels in the pollock fishery avoid salmon bycatch and what factors explain observed variation (e.g., heterogeneity of avoidance costs, skill in salmon avoidance, less avoidance effort exerted)?
5. What are the social and distributional implications of Amendment 91?
6. Is there any evidence of market power being exercised in the salmon quota market?

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Types of Analysis

- Mechanism design analysis – analysis of the IPA agreements and how these agreements work in conjunction with the hard cap and Performance Standard.
- Fishing choice and economic performance analysis – analysis of how fishing choices, costs, and benefits change after the implementation of Amendment 91.
- Market analysis – analysis of the transfers (and options for transfers) and prices of salmon and/or pollock allocations.

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*Data Collection Options:
How the options will be presented*

1. What data would be collected under this option?
2. What will these data allow analysts to evaluate?
3. What are the limitations of these data?

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Option 1: Status quo data collection + 100%
observer program

What data will be collected under
this option?

Key data that are currently available for analysis include:

- Observer & VMS data characterizing spatial behavior and catch and bycatch per haul (CP/MS) and catch and bycatch per trip (CV)
- Price data from Commercial Operators Annual Report (COAR) and Commercial Fisheries Entry Commission (CFEC) fish tickets
- Daily production data for all processors (weekly prior to 2009).

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Option 1: Status quo data collection + 100% observer program

What data will be collected under this option? (part 2)

New data that will be available under Amendment 91 action:

- Sector-level salmon bycatch quota transactions from NMFS
- Any IPAs submitted to NMFS
- Annual reports to the Council, which according to the April 2009 Council motion must include:
 - a comprehensive explanation of incentive measures in effect in the previous year,
 - how incentive measures affected individual vessels, and
 - evaluation of whether incentive measures were effective in achieving salmon savings beyond levels that would have been achieved in absence of the measures.



Option 1: Status Quo

Data collection option	Analysis Goal					
	1. How effective is the Action?	2. How does pollock fishing change?	3. How costly is the action?	4. What explains bycatch variation among fleet?	5. What are social and distributional impacts?	6. Is there market power in the bycatch market?
1. Status Quo	FAIR	FAIR	POOR	FAIR	POOR	POOR

- Key Analyses: Mechanism design analysis, some behavioral analysis of fishery (e.g., Do bycatch rates narrow? Do vessels react more to high bycatch events? Does less fishing occur in October?), analysis of net movement of salmon transactions.
- Limitations: Do not observe product-specific revenues, within-season price variation (especially for CVs), or costs that may drive observed behavior; no salmon market trades.



What data will be collected under this option?

In addition to data available in status quo, the following data on vessel-level quota transactions would be collected under this option:

- Date of salmon quota transaction
- Price & quantity of salmon quota transaction
- Parties of salmon quota transaction
- Nature of transaction (in kind or not).

Option 2a: Record all salmon transaction data



	Analysis Goal					
Data collection option	1. How effective is the Action?	2. How does pollock fishing change?	3. How costly is the action?	4. What explains bycatch variation among fleet?	5. What are social and distributional impacts?	6. Is there market power in the bycatch market?
2a. Salmon transaction	FAIR/GOOD*	FAIR*	FAIR/GOOD*	FAIR*	FAIR*	FAIR*

- **Key Analyses:** Estimate the value of salmon bycatch in the market. May also analyze bycatch market transactions to examine how actively or well it functions (related to market power).
- **Limitations:** There is uncertainty about salmon market data quality, especially without paired pollock transfer data. Do not observe when vessels are selling pollock in response to bycatch program.
 - Will rely on reported prices for transactions deemed not to include in-kind considerations.



Option 2b: Record all salmon and pollock transaction data

What data will be collected under this option?

In addition to data available under Option 2a, the following data would be collected under this option:

- Date of pollock quota transaction
- Price & quantity of pollock quota transaction
- Parties of pollock quota transaction
- Nature of transaction (in kind or not).



Option 2b: Record all salmon and pollock transactions

	Analysis Goal					
Data collection option	1. How effective is the Action?	2. How does pollock fishing change?	3. How costly is the action?	4. What explains bycatch variation among fleet?	5. What are social and distributional impacts?	6. Is there market power in the bycatch market?
2b.Salmon & pollock transaction	FAIR/GOOD	GOOD	FAIR/GOOD	FAIR	FAIR	GOOD

- Key Analyses: Estimate the value of salmon bycatch in the market. May also analyze bycatch market transactions to examine how actively or well it functions, considering market power.
- Limitations: Will rely on reported prices for transactions deemed not to include in-kind considerations.



3. Collect trip- or haul-level revenue data for all vessels

What data will be collected under this option?

For Inshore Catcher Vessels:

- Trip-level revenue reporting
- Trip-level roe recovery & other trip-level revenue designations (as available)

For Catcher Processors / Motherships:

- Trip-level revenue reporting
- Haul-level roe recovery & other haul-level product/ quality-specific designations (as available)



What are the Limits of Current Revenue Data for Offshore Roe?

Example of roe price variation

- March 2003 roe auction data from one offshore processor
- Data from publicly available *Bill Atkinson's News Report*
- Price/lb varies from \$1.89 to \$7.40 for this processor at this option.
- Similar variation common among many processors.
- NMFS observes one annual price for roe per processor.

Grade	LOT	TONS	¥/KG	\$/LB
Standard	1	58.3	1,850	\$7.13
Standard	2	53.8	1,920	\$7.40
Standard	3	51.6	1,840	\$7.09
Standard	4	31.4	1,840	\$7.09
Standard	5	46	1,720	\$6.63
Standard	6	47.1	1,740	\$6.70
Standard	7A	7.8	1,000	\$3.85
Standard	7B	10.1	920	\$3.54
Standard	8A	35.9	490	\$1.89
Standard	8B	8.9	490	\$1.89
Standard	9A	15.7	1,333	\$5.13
Standard	9B	15.7	1,333	\$5.13



Option 3: Collect trip- or haul-level revenue data for all vessels

Data collection option	Analysis Goal					
	1. How effective is the Action?	2. How does pollock fishing change?	3. How costly is the action?	4. What explains bycatch variation among fleet?	5. What are social and distributional impacts?	6. Is there market power in the bycatch market?
3. Trip/Haul-level revenues	FAIR/GOOD	FAIR/GOOD	FAIR	FAIR/GOOD	POOR	POOR

- **Key Analyses:** Greater detail in revenue data allows analysts to calculate the revenue differences in fishing in different areas (and thus the forgone revenue from avoiding salmon bycatch). Currently no vessel-specific roe bonus data for inshore sector; no quality differentiation and only annual prices in offshore sectors.
- **Limitations:** Because different vessels have different costs, this tells us gross rather than net revenues, though modeling repeated choices can be informative in this respect.



Option 4. Collect annual (4a) or Trip-level (4b) cost data for all vessels

What data will be collected under this option?

Data can be collected at the annual or trip level, depending on efficiency & probable accuracy (discussed by Socioeconomic Data Collection Committee).

Data on the following expenses would be most relevant:

- Fuel and lube
- Salmon bycatch quota purchases
- Salmon excluders or other equipment directly designed to limit bycatch.

To the extent that fishing days increase, other costs could increase:

- Observer fees
- Labor costs (compensation and food and provisions)
- Insurance, repair and maintenance, gear expenses .



Option 4a/4b: Collect annual or trip-level cost data for all vessels

Data collection option	Analysis Goal					
	1. How effective is the Action?	2. How does pollock fishing change?	3. How costly is the action?	4. What explains bycatch variation among fleet?	5. What are social and distributional impacts?	6. Is there market power in the bycatch market?
4a. Annual costs	FAIR	GOOD	GOOD	GOOD	GOOD	POOR
4b. Trip/haul costs	GOOD	GOOD	GOOD	GOOD	GOOD	POOR

- **Key Analyses:** Compare costs of relocating and spending more time at sea after high-bycatch events with incentives in IPAs; examine changing travel costs for the fleet after salmon bycatch action; how do variation in vessel costs affect bycatch levels & behavior?
- **Limitations:** Apportioning annual costs if vessels fish more than pollock. Companies may keep records differently than requested in surveys. Other data required for comprehensive analysis of net revenues.



Option 5: Collect Improved Ownership data

What data will be collected under this option?

- Ownership data would be obtained from MARAD and supplemented or updated by vessel owners to evaluate potential changes in vessel ownership.



Option 5: Collect Improved Ownership data

Data collection option	Analysis Goal					
	1. How effective is the Action?	2. How does pollock fishing change?	3. How costly is the action?	4. What explains bycatch variation among fleet?	5. What are social and distributional impacts?	6. Is there market power in the bycatch market?
5. Ownership	FAIR	FAIR	FAIR	FAIR	FAIR	GOOD

- **Key Analyses:** Changes in ownership can be evaluated to examine if small operators or processors are disproportionately impacted or if market power exists in the pollock or salmon markets. Market data can be integrated with ownership data to better characterize salmon bycatch market.
- **Limitations:** Ownership data can be complimentary and help provide context for data collected under other Options, but on its own will not help to answer key questions about the salmon bycatch program.



Combined market, revenue, & cost data collection options

Data collection option	Analysis Goal					
	1. How effective is the Action?	2. How does pollock fishing change?	3. How costly is the action?	4. What explains bycatch variation among fleet?	5. What are social and distributional impacts?	6. Is there market power in the bycatch market?
2a + 3 + 4	GOOD*	EXCELLENT*	GOOD*	EXCELLENT*	EXCELLENT*	GOOD*
2b + 3 + 4	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT	GOOD

- **Key Analyses:** Thorough analyses of mechanism design, fishery behavior, and quota markets.
- **Limitations:** Data quality issues expressed about each piece of data, although having three sources of information may allow one to corroborate or cross-check reported data.



Market + revenue data collection options

Data collection option	Analysis Goal					
	1. How effective is the Action?	2. How does pollock fishing change?	3. How costly is the action?	4. What explains bycatch variation among fleet?	5. What are social and distributional impacts?	6. Is there market power in the bycatch market?
2a + 3	FAIR*	GOOD*	GOOD*	GOOD*	GOOD*	FAIR*
2b + 3	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD

- **Key Analyses:** Greater detail in revenue data allows analysts to calculate the revenue differences in fishing in different areas; implied salmon bycatch values from behavioral site-choice models can be compared to salmon bycatch market values
- **Limitations:** Costs unknown so net revenues can only be estimated based on travel distances; potential data quality limitations in market data.

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Market + cost data collection options

Data collection option	Analysis Goal					
	1. How effective is the Action?	2. How does pollock fishing change?	3. How costly is the action?	4. What explains bycatch variation among fleet?	5. What are social and distributional impacts?	6. Is there market power in the bycatch market?
2a + 4	FAIR*	GOOD*	GOOD*	GOOD*	GOOD*	FAIR*
2b + 4	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD

- **Key Analyses:** Market and cost data comparisons; variable fishing costs can be examined; how do relocation costs compare to incentives and affect bycatch & market behavior?
- **Limitations:** Without trip-specific revenue data, net revenues from spatial choices are inaccurate.

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Collect revenue + cost data (without market data)

Data collection option	Analysis Goal					
	1. How effective is the Action?	2. How does pollock fishing change?	3. How costly is the action?	4. What explains bycatch variation among fleet?	5. What are social and distributional impacts?	6. Is there market power in the bycatch market?
3 + 4	GOOD	EXCELLENT	GOOD	EXCELLENT	EXCELLENT	FAIR

- **Key Analyses:** Thorough analysis of the net revenues across space and vessels. Examination of vessel heterogeneity in bycatch avoidance costs and incentives.
- **Limitations:** No market data information from which to observe salmon bycatch values.

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Summary / Paper Conclusions

- Status quo data collection provides limited information to analyze the impacts of future IPAs that may be submitted.
- Data on salmon and pollock markets will substantially inform the Council on the value of salmon bycatch to the pollock fishery.
- Trip-level revenues & roe bonuses are essential for characterizing the spatial trade-offs between pollock fishing and salmon bycatch avoidance during the season.
- Cost data will allow analysts to examine how differences in vessel net revenues affect participation in salmon bycatch markets and avoidance behavior. Data quality concerns exist.
- Revenue, cost, and trade data together allow for the most thorough analysis of the Council's actions.
- Ownership and employment data would allow further evaluation of distributional impacts of Amendment 91 (if this information is deemed relevant).

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Comparison of Committee Proposed Option Components

Committee Option	Salmon market Data	Pollock Market Data	Improved Revenue data	Fuel Cost data	Daily operations cost data	Annual operator Survey
1						
2A	x			x		x
2B	x	x		x		x
3	x	x	x	x		x
4	x	x	x	x	x	x

- Other than Status Quo (1), all options include salmon market data, fuel cost data, and an annual operator survey
- Option 2B also includes pollock market data (plus above items)
- Option 3 also includes improved revenue data (plus above items)
- Option 4 also includes daily operations cost data (plus above items).



Summary of Individual Data Collection Options from Discussion Paper

Data collection option	Analysis Goal					
	1. How effective is the Action?	2. How does pollock fishing change?	3. How costly is the action?	4. What explains bycatch variation among fleet?	5. What are social and distributional impacts?	6. Is there market power in the bycatch market?
1. Status Quo	FAIR	FAIR	POOR	FAIR	POOR	POOR
2a. Salmon transaction	FAIR/GOOD*	FAIR*	FAIR/GOOD*	FAIR*	FAIR*	FAIR*
2b. Salmon & pollock transaction	FAIR/GOOD	GOOD	FAIR/GOOD	FAIR	FAIR	GOOD
3. Haul-level revenues	FAIR/GOOD	FAIR/GOOD	FAIR	FAIR/GOOD	POOR	POOR
4a. Annual costs	FAIR	GOOD	GOOD	GOOD	GOOD	POOR
4b. Trip/haul costs	GOOD	GOOD	GOOD	GOOD	GOOD	POOR
5. Ownership	FAIR	FAIR	FAIR	FAIR	FAIR	GOOD



Summary of Combination Data Collection
Options from Discussion Paper

Data collection option	Analysis Goal					
	1. How effective is the Action?	2. How does pollock fishing change?	3. How costly is the action?	4. What explains bycatch variation among fleet?	5. What are social and distributional impacts?	6. Is there market power in the bycatch market?
Market, revenue, & cost options						
2a + 3 + 4	GOOD*	EXCELLENT*	GOOD*	EXCELLENT*	EXCELLENT*	GOOD*
2b + 3 + 4	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT	EXCELLENT	GOOD
Market + revenue options						
2a + 3	FAIR*	GOOD*	GOOD*	GOOD*	GOOD*	FAIR*
2b + 3	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD
Market + cost options						
2a + 4	FAIR*	GOOD*	GOOD*	GOOD*	GOOD*	FAIR*
2b + 4	GOOD	GOOD	GOOD	GOOD	GOOD	GOOD
Revenue, & cost options						
3 + 4	GOOD	EXCELLENT	GOOD	EXCELLENT	EXCELLENT	FAIR

* The data quality of 2a and the options involving 2a is unknown. The ratings here assume that the data collected are not systematically biased or severely limited.