Discussion Paper: Economic Data Reports

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Outline: EDR Discussion

1. Executive Summary
2. Introduction
3. Scientific and Analytical Standards
4. Description and History of Economic Data Collection
5. EDR Program Operations, Costs, and Limitations
6. EDR Program Assessment and Recommendations

2. Introduction

- The Council discussed the EDRs in several meetings during 2018, with public testimony noting that the EDR programs had been in effect for some time and questioning whether the EDR requirements for some fisheries had met the Council's purpose and need.

- At the April 2018 meeting, the Council reviewed a discussion paper prepared by NMFS reviewing its regulations, and included a reference to the Council's prior discussion of the EDR requirements, and the Council requested that NMFS prepare a discussion paper on this topic.

2. Introduction

- NPFMC motion 4/9/18:

  The Council requests that NMFS prepare a discussion paper that describes the Economic Data Report requirements for all programs, explains how the data are used, and provides estimates of the costs of complying with the EDR requirements. The Council can then use the information in the discussion paper to determine if revisions to EDR requirements are needed and the priority and process for analysis of proposed revisions.

2. Introduction

- ***Crab EDR:*** BSAI Crab EDR, implemented in 2005
- ***A80 EDR:*** Trawl Catcher/Processor (CP) EDR implemented in 2007 for Amendment 80, and in 2015 for CPs operating in the GOA groundfish fisheries
- ***A91 EDR:*** BS Chinook salmon bycatch management program EDR for participants in the BS pollock fishery, implemented in 2012
- ***GOA Trawl EDR:*** GOA trawl EDRs for trawl catcher vessels operating in the GOA and processors taking deliveries from these vessels, implemented in 2015.

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2. Introduction
3. Scientific and Analytical Standards
3.1 Requirements and Guidance for Economic Analyses
3.2 Business data collection design and evaluation
3.2.1 Measurement objectives and data applications
3.2.2 Data quality principles and guidance
4. Description and History of Economic Data Collection
5. EDR Program Operations, Costs, and Limitations
6. EDR Program Assessment and Recommendations

3.1 Requirements and Guidance for Economic Analyses

Federal regulatory review

- EO 12866, RIR, NMFS RIR Guidelines
- NEPA
- RFA
- EO 13771

Fishery management policy

- MSA
- National Standards
- BSAI/GOA FMPs

3.1 Requirements and Guidance for Economic Analyses

Crab FMP – 7.2.2. Maximize economic and social benefits to the nation over time.

…profits, income, employment, benefits to consumers, and less tangible or less quantifiable social benefits such as the economic stability of coastal communities. …

…considering, to the extent that data allow, …prices, harvesting costs, processing costs, employment, the distribution of benefits among members of the harvesting, processing and consumer communities, management costs, and other factors affecting the ability to maximize the economic and social benefits…

3.1 Requirements and Guidance for Economic Analyses

Why does the Council need economic data?

To achieve MSY…?

To satisfy regulatory review guidelines…?

To publish economic research…?

To manage fisheries for better social and economic outcomes…?

…How?

3.1 Requirements and Guidance for Economic Analyses

Contrast economic objectives and analyses to MSY & NS1 framework

- Reference points/proxies/tiers
- Depth/breadth of expertise
- Data quality and utility of better data
- Incentives for transparency

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Section 3.2: Data collection design and evaluation

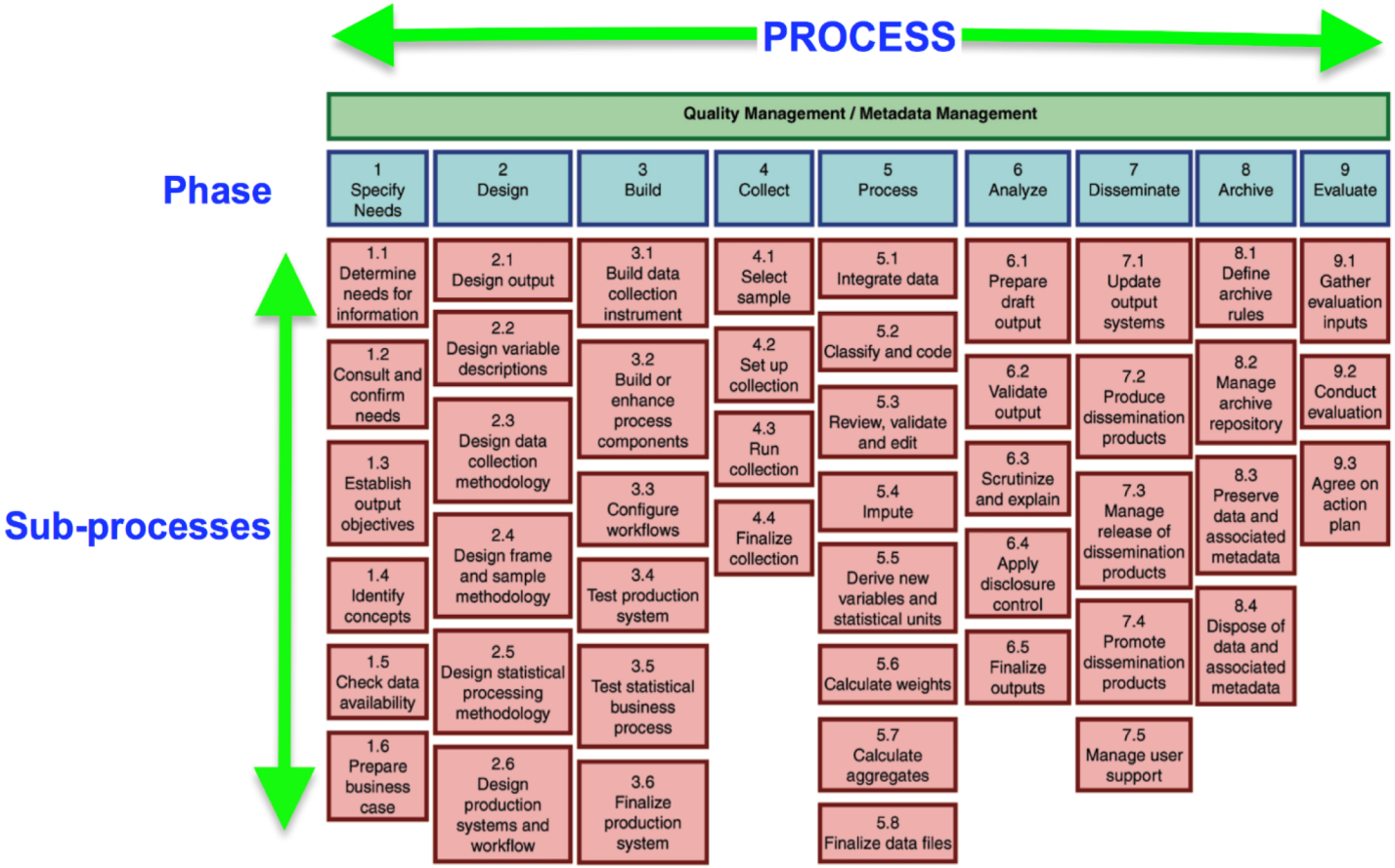

Figure 1: Generic statistical business process model
(Vale 2009; Snijkers, et al, 2015)

3.2 Measurement objectives and data applications

- EDR data are collected for distinct purpose compared to most other data used by Council analytical staff
- EDR objectives and methods have changed over time without consideration of system effects and practical utility
- Applications of EDR data are infrequent by design and unique to EDR program
- EDRs are not administrative data, but have many features of R&R requirements that confuse expectations

3.2.2. Data quality principles and guidance

- PRA guidelines for statistical surveys
- NS 2 Requirements
- Accuracy ≠ Data Quality
- Data quality is only definable in context of intended data use

3.2.2. Data quality principles and guidance

PRA guidelines for statistical surveys

Survey Planning

Standard 1.1: Agencies initiating a new survey or major revision of an existing survey must develop a written plan that sets forth a justification, including: goals and objectives; potential users; the decisions the survey is designed to inform; key survey estimates; the precision required of the estimates (e.g., the size of differences that need to be detected); the tabulations and analytic results that will inform decisions and other uses; related and previous surveys; steps taken to prevent unnecessary duplication with other sources of information; when and how frequently users need the data; and the level of detail needed in tabulations, confidential microdata, and public-use data files.

Data Collection Methodology

Standard 2.3: Agencies must design and administer their data collection instruments and methods in a manner that achieves the best balance between maximizing data quality and controlling measurement error while minimizing respondent burden and cost.

OMB Statistical Policy Directive Number 2 *Standards and Guidelines for Statistical Surveys* (2006). https://obamawhitehouse.archives.gov/sites/default/files/omb/assets/omb/inforeg/statpolicy/standards_stat_surveys.p df

National Standards

NS 2—Scientific Information

- (a) BSI: (6) Criteria to consider when evaluating best scientific information are relevance, inclusiveness, objectivity, transparency and openness, timeliness, verification and validation, and peer review, as appropriate…
  - (iii) Objectivity. Scientific information should be accurate, with a known degree of precision, without addressable bias, and presented in an accurate, clear, complete, and balanced manner. Scientific processes should be free of undue nonscientific influences and considerations.

From (Biemer 2010)

3.2.2. Data quality principles and guidance

Data Quality Dimensions and Objectives in Survey Data	
Accuracy	Total survey error is minimized
Credibility	Data are considered trustworthy by the survey community
Comparability	Demographic, spatial, and temporal comparisons are valid
Usability/Interpretability	Documentation is clear and metadata are well-managed
Relevance	Data satisfy users needs
Accessibility	Access to the data is user friendly
Timeliness/Punctuality	Data deliveries adhere to schedules
Completeness	Data are rich enough to satisfy the analysis objectives without undue burden on respondents
Coherence	Estimates from different sources can be reliably combined

From (Biemer 2010)

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1. Executive Summary
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4. Description and History of Economic Data Collection

4.1 Overview of national fisheries economic data collections

4.2 Review of North Pacific economic data collections

4.3 Historical overview of EDR development process

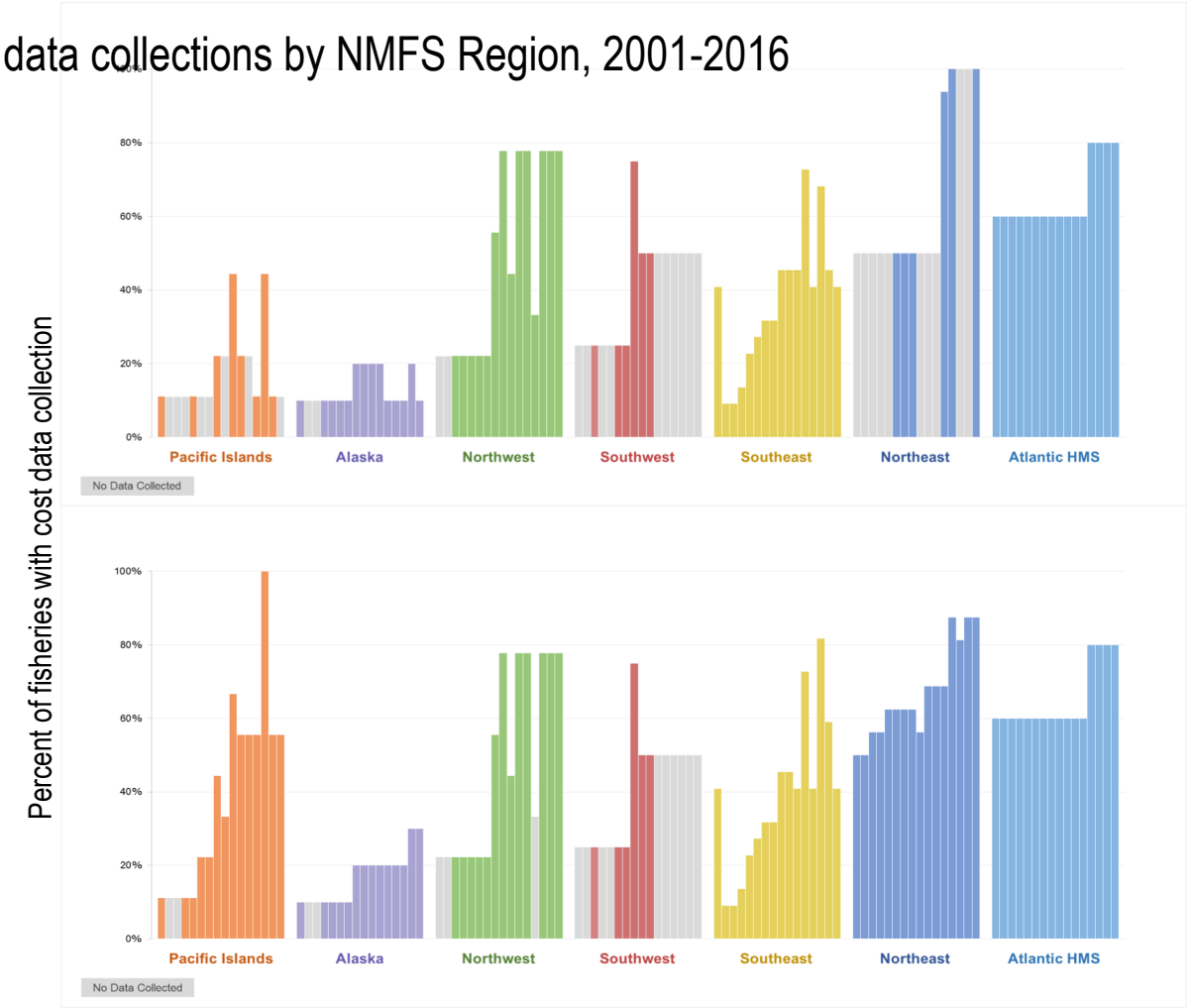
5. EDR Program Operations, Costs, and Limitations
6. EDR Program Assessment and Recommendations

4.1 National fisheries economic data collections

Fishing vessel cost data collections by NMFS Region, 2001-2016

Variable costs

Fixed costs



Source: https://www.st.nmfs.noaa.gov/Assets/economics/images/collectionUSCommercialFisheriesCosts.jpg

4.2 Overview of current EDR program framework

- Purpose and needs
- Framework of EDR system
- Content of forms and reporting requirements
  - Crab EDR
  - A80 EDR
  - A91 EDR
  - GOA Trawl EDR

Summary overview of EDR variables by EDR form

EDR Variables, by general group	BSAI crab			GOA trawl / Amendment 80			Amendment 91	
	Catcher vessel	Catcher Processor	Shoreside & floating processor	Catcher vessel	Catcher processor	Shoreside & floating processor	Vessel Fuel Survey	Compensated Transfer Report
Operating costs, non-labor (annual expenses)								
Labor cost and employment								
Labor cost - harvesting (4)	Final settlement paid, total by crew-type (fishing crew; captains) and CR fishery	Final settlement paid, total by crew-type (fishing/processing crew; captains) and CR fishery		Final settlement paid, total by crew-type (fishing crew, captains); GOA trawl	Gross wages, total by crew-type (deck crew; other non-processing crew); Annual			
Labor cost - processing (5)		Combined with harvesting labor cost	Gross wages and hours; by CR fishery		Gross wages; Annual	Gross wages and hours, by month and housing-status (housed, non-housed); Groundfish only		
Labor cost - Other personnel(6)			Total wages and salaries, non-processing personnel; Annual			Total wages and salaries, non-processing personnel; Annual		
Labor cost - total vessel labor	Total direct payment to crew (inclusive of settlements); Annual	Total direct payment to crew (inclusive of settlements); Annual						
Labor cost - non-wage expenses	Benefits provided (Y/N), by crew-type (fishing crew; captains); CR Crab	Benefits provided (Y/N), by crew-type (fishing crew; captains); CR Crab			Total benefits, recruitment, travel, and non-wage employment costs; Annual			
Employment - harvesting				Count of paid crew (excluding captains); GOA trawl	Employee count and average positions, by crew-type (deck crew; other non-processing crew); Annual			
Employment - processing			Employee count, by location of residence; CR Crab and Annual		Employee count, average positions, and average hours per employee-day; Annual	Employee count, by month; Groundfish fisheries		
Employment - other non-processing			Employee count; Annual			Employee count; Annual		
Employment - Crew licenses and permits	License/permit number, by crew member; CR Crab	License/permit number, by crew member; CR Crab		License/permit number, by crew member; GOA groundfish	License/permit number, by crew member; Annual			
Crew share system in use					Y/N, by some/all, processing/non-processing; Annual			

4.3 Historical overview – EDR Program Development

- Comparison of Crab EDR and A80 EDR development and design process
  - Crab EDR - original design
  - A80 design
  - Crab revision
- Northwest Groundfish Trawl Rationalization EDC Program
- A91 objectives and design process
- GOA Trawl objectives and design process

4.3 Historical overview – Lessons Learned

- General state of confusion about roles and purpose of EDR data
- Framework of standardized social and economic indicators needed for consistent, coherent EDR data system and utility to managers
- Full scope of data process should be in place, tested, and functioning to standards before data collection is
- “Variables” should not be the objective
- Need continuity and clear roles for technical and industry input

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5. EDR Program Operations, Costs, and Limitations
5.1 Summary of EDR program operations
5.2 Limitations of EDR data
5.3 Applications of EDR data in analyses
6. EDR Program Assessment and Recommendations

5.1.1 EDR data collection to-date

	CRAB EDR			A80/GOA TRAWL EDR			A91 CHINOOK SALMON EDR			
EDR Reporting Year	CV	CP	Processors	A80/GOA CP	CV	GOA SP	CTR	Fuel Survey	Vessel Master Survey	All EDR Forms
1998	218	8	25							251
2001	218	7	23							248
2004	237	10	20							267
Total 1998-2004	673	25	68							766
2005	166	8	17							191
2006	96	5	13							114
2007	82	5	14							101
2008	91	5	15	24						135
2009	84	5	18	23						130
2010	76	3	18	24						121
2011	74	3	19	24						120
2012	80	3	20	20			0	86	135	344
2013	79	2	24	18			0	86	133	342
2014	74	2	19	18			0	75	126	314
2015	80	2	19	19	69	12	0	64	121	386
2016	80	2	18	18	70	6	0	65	117	376
2017	70	2	18	20	66	13	0	61	116	366
Total To-date	1805	72	300	208	205	31	0	437	748	3806

5.1.1.2 Data verification/audit administration

- Primary validation
- Secondary validation
- Audit review
  - Audit protocol development – 2005-2012
  - Random audit selection and data analysis
  - Redesign - 2015

5.2 Limitations of EDR data

5.2.1 Data quality limitations in current EDR data collection

- Questionnaire design issues
- EDR design issues

5.2.1.5 Usability

- Data management
- Fragmentation

5.1.1.3 Program expenditures and cost recovery

- This section focuses on the cost recovery amounts
- Three of the four EDRs have some portion funded through cost recovery.
  - Partial A91 (inshore only)
  - No cost recovery for GOA Trawl

5.1.1.3 Program expenditures and cost recovery

Table 6 Cost Recovery and PSMFC Administrative costs of the EDR Programs

Program/ Year	Crab[1]	A80	AFA[2]	Cost Recovery Total	GOA Trawl[3]	Total EDR Cost
2005	$ 150,000			$150,000		$150,000
2006	$ 150,000			$150,000		$150,000
2007	$ 259,938			$259,938		$259,938
2008	$ 338,276			$338,276		$338,276
2009	$ 314,303			$314,303		$314,303
2010	$ 352,508			$352,508		$352,508
2011	$ 323,588			$323,588		$323,588
2012	$ 373,316			$373,316		$373,316
2013	$ 318,278			$318,278		$318,278
2014	$ 342,703			$342,703		$342,703
2015	$ 269,583			$269,583	$ 53,771	$323,354
2016	$ 345,509	$ 88,254	$62,859	$496,622	$ 73,221	$569,843
2017	$ 180,168	$ 91,482	$69,369	$341,019	$ 91,879	$432,898
2018		$ 92,462	$40,631		$ 61,765	

[1] The year listed in this table reflects the first year of the crab fishing season.

[2] Only includes costs associated with the inshore sector.

[3] Only includes PSMFC administrative costs.

5.1.1.3 Program expenditures and cost recovery

- EDR-related costs average less than 0.25% of fishery ex-vessel value per year

Table 7 EDR Program costs as share of fishery ex-vessel value

Program/Year	Crab[1]	A80	AFA[2]	GOA Trawl[3]
2005	0.11%			
2006	0.13%			
2007	0.13%			
2008	0.16%			
2009	0.21%			
2010	0.13%			
2011	0.11%			
2012	0.16%			
2013	0.15%			
2014	0.15%			
2015	0.12%			0.08%
2016	0.18%	0.10%	0.04%	0.11%
2017		0.08%	0.04%	0.13%

[1] The year listed in this table reflects the first year of the crab fishing season.

[2] Only includes the inshore sector.

[3] Only includes PSMFC administrative costs.

5.1.1.4 Estimated costs to industry of preparing and submitting EDRs

- Under the PRA, NMFS is required to obtain approval for new information collections
- For each of the four EDRs, NMFS provides:
  - The estimated number of respondents for each form
  - The estimated hours it takes to submit the required information,
  - The estimated cost per hour for preparing and submitting each response.

5.1.1.4 Estimated costs to industry of preparing and submitting EDRs

Table 9 Estimated Number of Respondents and Costs to Prepare and Submit Alaska Economic Data Reports.

Name of EDR Program or Submission	Number of respondents per year	Hours per response	Estimated Cost Per Submission and in Total		
			Cost per hour for respondent	Cost per respondent	Total labor costs of submission
Crab EDR					
Catcher vessels	70 – full EDR	20	$165[1/]	$3,300	$231,000
	1 – cert. only[2/]	1	$165	$165	$165
Catcher/processors	2 – full EDR	20	$165	$3,300	$6,600
Processors	18 – full EDR	16	$165	$2,640	$47,520
	4 – cert. only	1	$165	$165	$660
Verification/audit	16 CVs 0 CPs 4 processors	8	$165	$1,320	$21,120 $0 $5,280
Total for Collection	95				**$312,345**
Amendment 80 and GOA Trawl Catcher/Processors					
Annual EDR	21 – full EDR	22	$37[3/]	$814	$17,094
	6 – cert. only	1	$37	$37	$222
Verification/audit	8	5	$37	$185	$1,480
Total for Collection	27				**$18,796**
Gulf of Alaska Trawl EDR for Trawl Catcher Vessels and Shoreside Processors Taking Deliveries from Trawl CVs					
Catcher vessels	67 – full EDR	15	$37	$555	$37,185
	34 – cert. only	1	$37	$37	$1,258
Processors	13 – full EDR	15	$37	$555	$7,215
Verification/audit	10 CVs 5 processors	4 5	$37 $37	$148 $185	$1,480 $925
Total for Collection	114				**$48,063**
BS Chinook Salmon EDR					
Annual Compensated Transfer Report	0 – transfer rpt	40	$75[4/]	$3,000	$0
	96 – cert. only	1	$75	$75	$7,200
	0 – verification/audit	4	$75	$300	$0
Vessel Fuel Survey	61	4	$75	$300	$18,300
Vessel Master Survey	116	4	$75	$300	$34,800
Total for Collection					**$60,300**
TOTAL for all EDRs					**$439,504**

5.1.1.4 Estimated costs to industry of preparing and submitting EDRs

- Estimated cost of submitter burden per year
  - Crab EDR: $312,345
  - A80 EDR: $18,976
  - GOA Trawl EDR: $48,063
  - A91 EDR: $60,300

5.1.1.4 Estimated costs to industry of preparing and submitting EDRs

- Estimated hours of submitter burden by form
  - Crab CV and CP: 20 hours
  - Crab processor: 16 hours
  - A80 EDR: 22 hours
  - GOA Trawl CV and processor: 15 hours
  - A91 vessel fuel and vessel master survey: 4 hours

5.3 Applications of EDR data in analyses

- EDR data annual reporting in SAFEs
- Council program reviews
- Use of data in analyses
- Analyst feedback

5.3.1 EDR Data Annual Reporting

- The Groundfish Economic SAFE includes an annual summary of the A80 EDR
  - Allows the calculation of net operating returns (operating profit) and nearly a complete financial income statement

- The Crab Economic SAFE provides an annual summary of Crab EDR data
  - Allows the calculation of revenue residuals (revenue minus some operating costs) with no fixed costs

5.3.2 Council program reviews

- 5-and 10-year Crab Ratz. program reviews relied on EDR data to document fleet performance with regard to quota usage and leasing, effort levels, vessel operating costs, gross and net earnings, crew participation and crew earnings.
- The 2017 Central GOA Rockfish Program included an SIA that made extensive use of EDR data by developing cross-walk tables for catcher vessel ownership address community and community of residence of crew on those vessels.
- The Amendment 80 program 5-year review provides an overview of the EDR data collected and uses the data to summarize expenses and revenues fleet wide.

5.3.3 Use of EDR Data in Analyses

- EDR data have been used in several regulatory action analyses:
  - Analyzing crew employment in the 2014 Final SSL EIS,
  - RIR of allowing Halibut Deck sorting, and
  - Utilized in projects related to groundfish and crab stock assessments, particularly through bioeconomic models.
- EDR data have also been used in several journal articles and/or technical memos that evaluate:
  - Impacts on crew employment and remuneration,
  - Fishery productivity and efficiency changes, and
  - Analyses of the economic contribution of Alaska fishing fleets to different regional economies, including Alaska.

5.3.3 Use of EDR Data in Analyses

- Several recent Council action analyses have used EDR data:
  - The 2016 GOA trawl bycatch management analysis included an SIA that made extensive use of EDR data.
  - EDR data was used in the recently completed analysis C3 BSAI P.cod Trawl,
    - However, in this case inconsistent EDR data coverage across sectors limited the use of EDR data so that consistent information is provided about each sector.

5.3.4 Analyst Feedback

- In cases where EDR data was not used in analyses, where it may have been helpful:
  - Analysts may not have full access to the data or feel that they did not have the familiarity and/or technical skills to access the data without assistance
  - It has been reported by analysts that the technical aspects of using EDR data necessitates advanced planning to obtain assistance with data access and management tasks and the economic analysis skills needed to use the EDR data.
  - Analysts have also indicated in some cases the alternatives to be analyzed in a council action are not always directly informed by the EDR data currently collected.

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6.1 Short(er) term, practical recommendations to:

6.2 Long(er) term, recommendations to improve economic data collection processes

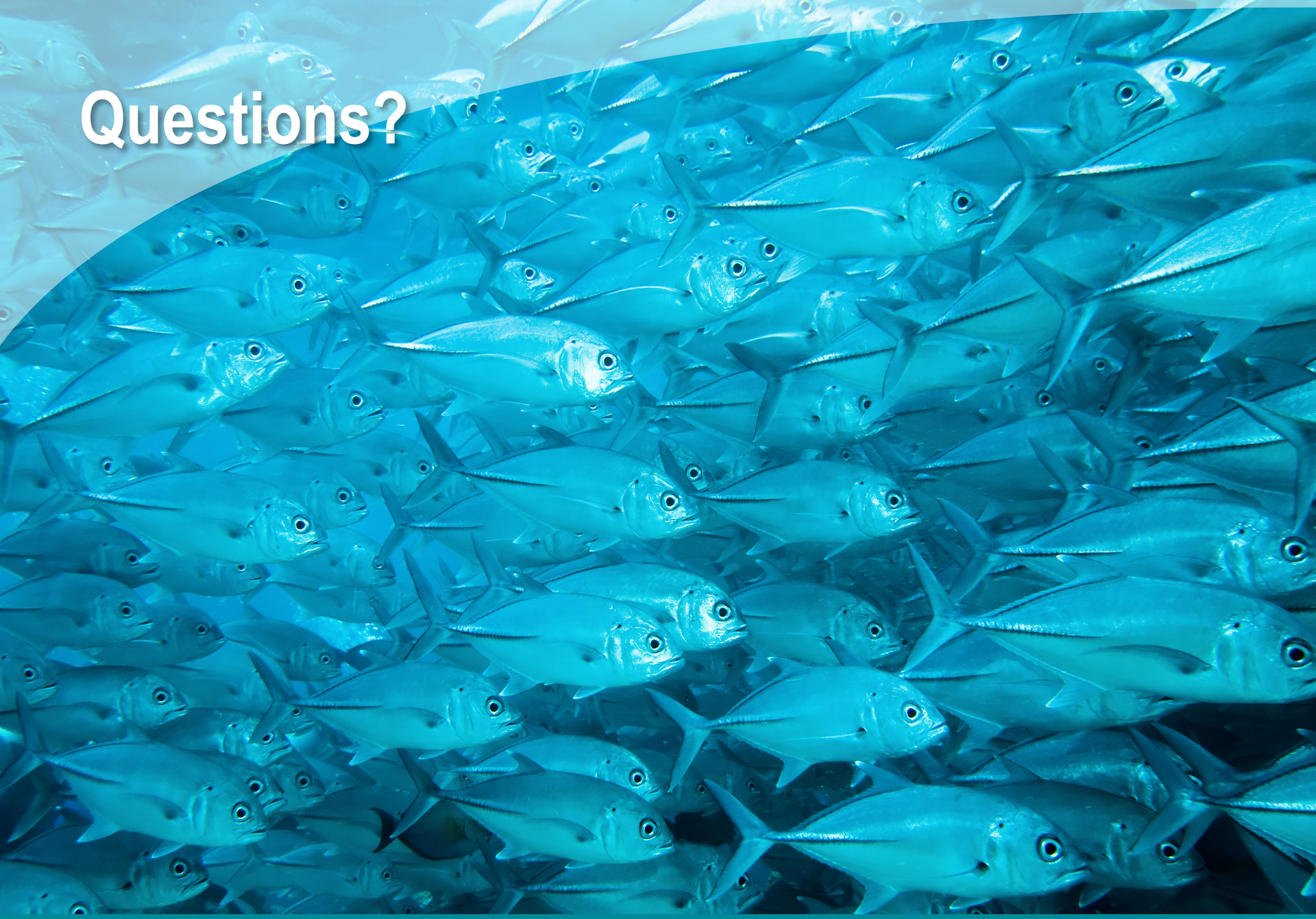
6. Short(er) term, practical recommendations to:

- Reduce costs and burden
  - Eliminate routine third-party data verification audits and limit the audit requirement to instances of gross noncompliance with EDR submission requirements or where intentional strategic misreporting is indicated or suspected.
  - Review duplication of reporting requirements in EDR Program.
- Improve data utility by streamlining data access
  - Re-assess EDR-specific data protocols to improve utility and efficiency while maintaining confidential data protections: specify blind-data rule on the basis of a) analytical users, and b) EDR administration users, and reconsider rule-of-5 aggregation standard.

6. Long(er) term, recommendations to improve economic data collection processes:

- Develop a systematic approach to identifying and prioritizing the Council's needs for economic and social science information. This includes identifying relevant analytical and performance metrics, minimum requirements for accuracy and precision of information outputs, and a framework for balancing tradeoffs between all relevant dimensions of information quality and system costs.
  - Review survey population and survey frequency for EDR variables and consider survey administration alternatives, including changes in the method, frequency, and respondent population of data collections to achieve the Council's analytical objectives.
  - Improve application of National Standard 2 Guidelines to information *processes* in EDR program oversight and ensure clearer distinctions between *scientific information* from other information content.
- Minimize disincentives for voluntary industry cooperation with data collection efforts and address concerns regarding confidentiality, cumulative reporting burden, and negative consequences of revealing profitability and other financial information to the federal government.

Questions?



A80 RIR (2006): EDR Element

Measures and Models, and the Use of Data to Assess Program Effects and Amendments

1) Improved utilization. Improved utilization may be achieved through increases in production from the resource. At the most basic level, these production improvements could be realized through increased output from each unit of harvested resource. Similarly, improved utilization can be achieved by more fully utilizing the vessels that participate in this fishery; this is likely to come about as harvests consolidate to a smaller number of (more highly utilized) vessels. A deeper analysis, however, is required to examine the variety of targeting and production choices. Since participants can choose to serve different markets with different species and products, or to idle various vessels, an examination of utilization must include an assessment of product prices and quantities by species to determine whether utilization levels (and targeting and production choices) are responses to market forces, and the extent to which increased vessel utilization has reduced total average costs.

2) Cost of bycatch reduction. Determining whether costs of achieving bycatch reductions are excessive requires an examination of the extent to which targeting and production choices affect profitability and economic performance of participants. Reasonable assessments of costs of bycatch reductions must examine the extent to which participants are able to cost effectively avoid discards, through improvements in targeting and improvements in retention of catch. In both cases, the ability of participants to operate efficiently and profitably must be assessed.

A80 RIR (2006): EDR Element

Measures and Models, and the Use of Data to Assess Program Effects and Amendments

Specific Measures and Necessary Data:

1) Sector capacity and capacity utilization
2) Sector profit (total revenue minus total cost)
3) Sector quasi rent (total revenue minus total variable cost)
4) Sector quasi rent (total revenue minus total variable cost)
5) Efficiency (Technical/Allocative)
6) Concentration of ownership
7) Level and distribution of harvesting and processing employment and payments to labor (number of individuals, hours/days worked, and income)
8) Degree of involvement of participants in other Alaska fisheries
9) Value of harvest privileges

Crab RIR (2004): EDR Element

Crab rationalization problem statement, June, 2002:

Problems facing the fishery include:…

iii. Excess harvesting and processing capacity, as well as low economic returns;

iv. Lack of economic stability for harvesters, processors, and coastal communities

EDR Motion (June, 2002)

…provide the information necessary to study the impacts of the crab rationalization program as well as collecting data that could be used to analyze the economic and social impacts of future FMP amendments on industry, regions, and localities. …also required to fulfill the Council problem statement requiring a crab rationalization program that would achieve “equity between the harvesting and processing sectors” and to monitor the “...economic stability for harvesters, processors and coastal communities”

Crab RIR (2004): EDR Element

Table 3.17-4 Objective measures and confidence of estimates under each alternative[20]

Measures	Confidence in Estimate Under Alternative 1	Confidence in Estimate Under Alternative 2	Confidence in Estimate Under Alternative 3
Issue: Excess Harvesting and Processing Capacity and Low Economic Returns			
Harvesting capacity and capacity utilization (CU)	Good estimates can be made.	Standard CU measures cannot be adequately constructed.	Good estimates can be made.
Processing capacity and capacity utilization	Good estimates can be made.	Standard CU measures cannot be adequately constructed.	Good estimates can be made.
Harvesting sector profit for BSAI crab only (total revenue - total cost	Estimates can be made; confidence depends on the number of fixed costs prorated between crab and other activities.	No estimates can be made.	No estimates can be made.
Harvesting sector quasi rent for BSAI crab only (total revenue - total variable cost)	Good estimates can be made.	Estimates can be made, but the source of changes cannot be adequately explained.	Good estimates can be made.
Processing sector profit for BSAI crab only	Estimates can be made; confidence depends on the number of fixed costs prorated between crab and other activities.	No estimates can be made.	No estimates can be made.
Processing sector quasi rent for BSAI crab only	Good estimates can be made.	Estimates can be made, but the source of changes cannot be adequately explained.	Good estimates can be made.
Harvesting sector productivity and efficiency	Good estimates can be made.	Estimates will be biased without data on capital inputs and salaried employees (when applicable).	Good estimates can be made.
Processing sector productivity and efficiency	Good estimates can be made.	Estimates will be biased without data on capital inputs and salaried employees.	Good estimates can be made.
Management costs	Good estimates can be provided by agencies.	Good estimates can be provided by agencies.	Good estimates can be provided by agencies.

Crab RIR (2004): EDR Element

Issue: Lack of Economic Stability for Harvesters, Processors and Coastal Communities			
Measures	**Confidence in Estimate Under Alternative 1**	**Confidence in Estimate Under Alternative 2**	**Confidence in Estimate Under Alternative 3**
Distribution of catch and ex-vessel revenue by vessel class (e.g., length class and type), port of landing, and residence	Good estimates can be made.	Good estimates can be made.	Good estimates can be made.
Distribution of processed product revenue by community and processor or processor category (size, ownership, location)	Good estimates can be made.	Good estimates can be made.	Good estimates can be made.
Distribution of profits and quasi rents within and between the harvesting and processing sectors	Confidence of profit estimates (for BSAI crab *only*) depends on the number of fixed costs prorated between crab and other activities. Good estimates of quasi rents (for BSAI crab only) can be made.	Estimates of profit cannot be made. Estimates of quasi rents (for BSAI crab *only*) can be made, but the source of changes cannot be adequately explained.	Estimates of profits cannot be made. Good estimates of quasi rents (for BSAI crab *only*) can be made.
Distribution of harvester use rights by vessel class	Good estimates can be made.	Good estimates can be made.	Good estimates can be made.
Distributions of harvester and processor use rights by processor or processor category	Good estimates can be made.	Good estimates can be made.	Good estimates can be made.
Seasonality of catch and ex-vessel revenue by vessel class, port of landing, and residence	Good estimates can be made.	Good estimates can be made.	Good estimates can be made.
Processor ownership interest in BSAI crab catcher vessels and harvester QS/catch history	Good estimates can be made.	Good estimates can be made.	Good estimates can be made.
Catcher vessel ownership interest in BSAI crab processors and processing QS/catch history	Good estimates can be made.	Good estimates can be made.	Good estimates can be made
Concentration of domestic and foreign ownership in the BSAI crab harvesting and processing sectors	Good estimates can be made if sufficient ownership data is collected (which is not affected by the choice of alternatives).	Good estimates can be made if sufficient ownership data is collected (which is not affected by the choice of alternatives).	Good estimates can be made if sufficient ownership data is collected (which is not affected by the choice of alternatives).

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Measures	Confidence in Estimate Under Alternative 1	Confidence in Estimate Under Alternative 2	Confidence in Estimate Under Alternative 3
Level and distribution of harvesting and processing sector employment and payments to labor (number of individuals, hours/days worked, and income)	Good estimates can be made.	Partial estimates can be made, but employees other than crew and direct processing labor (e.g., salaried employees, foremen, managers, other plant employees) would not be accounted for.	Good estimates can be made.
Degree of involvement of BSAI crab harvesters and processors in other AK fisheries	Good estimates can be made.	Good estimates can be made.	Good estimates can be made.
Value of use right	Reasonable estimates could be made if RAM tracks the value of transfers.	Reasonable estimates could be made if RAM tracks the value of transfers.	Reasonable estimates could be made if RAM tracks the value of transfers.
Regional economic impacts (employment and income) of the BSAI crab fisheries	Under sub-option 1, good estimates can be made. Under sub-option 2, the necessary data is unlikely to be available.	Under sub-option 1, rough estimates can be made (as none of the "fixed" expenditures would be accounted for). Under sub-option 2, the necessary data is unlikely to be available.	Under sub-option 1, estimates can be made (as some "fixed" expenditures would be accounted for). Under sub-option 2, the necessary data is unlikely to be available.

Analytical Framework

Table 6. Comparison of Income, Cash Flow, and Economic Profit Statements from Vessel Owner Perspective Only

INCOME STATEMENT	CASH FLOW STATEMENT	ECONOMIC PROFIT
(+) Revenues:	**(+) Additions to cash:**	**(+) Revenues:**
Ex-vessel revenue	Ex-vessel revenue	Ex-vessel revenue
For-hire/charter revenue	For-hire/charter revenue	For-hire/charter revenue
Direct subsidies	Direct subsidies	Direct subsidies
	Non-operating revenue	Non-operating revenue
	Cash receipts from loans	
(-) Fishing costs:	**(-) Subtractions from cash:**	**(-) Explicit Costs:**
Crew payment	Crew payment	Crew payment
Owner-operator pay	Owner-operator pay	
Non-labor trip expenses paid by vessel owner	Non-labor trip expenses paid by vessel owner	Non-labor trip expenses paid by vessel owner
Vessel expense	Vessel expense	Vessel expense
Quota pound/access privilege cost	Quota pound/access privilege cost	Quota pound/access privilege costs
Depreciation		
Landings/ad valorem taxes	Landings/ad valorem taxes	Landings/ad valorem taxes
(=) Gross Income		
(-) Overhead	Overhead	Overhead
(=) Operating Income		
(+/-) Non-operating revenue and expenses:		
(+) Non-operating revenue		
(-) Interest expense	Interest expense	
(-) Non-operating expenses	Non-operating expenses	Non-operating expenses
(=) Pre-tax Income		
(-) Income taxes	Income taxes	
	Principal expense	
	Physical capital expenditures	
	Intangible asset expenditures	
		(-) Implicit Costs:
		Value of owner time as captain
		Value of owner time as entrepreneur
		Physical capital cost
(=) Income (after tax)	**(=) Net Cash Flow**	**(=) Economic Profit**

Analytical Framework

Table 4. Cash Flow Statement for a Fishing Business

CASH FLOW STATEMENT (cash inflows = "+" cash outflows = "-")	Vessel Owner	QS/QP/ Permit Holder
Ex-vessel revenue	+	
For-hire/charter revenue	+	
Quota pound/access privilege revenue		+
Non-operating revenue	+	+
Direct subsidies	+	+
Cash receipts from loans	+	+
Crew payment	-	
Owner-operator pay (or other owner draws)	-	
Non-labor trip expenses paid by vessel owner	-	
Vessel expense	-	
Overhead	-	-
Interest expense	-	-
Principal expense	-	-
Physical capital expenditures	-	
Intangible asset expenditures		-
Income taxes	-	-
Quota pound/access privilege cost	-	-
Non-operating expenses	-	-
Landings/ad valorem taxes	-	
Net Cash Flow	=	=

Analytical Framework

Table 7. Financial and Economic Statements for Self-employed Crew

INCOME STATEMENT	CASH FLOW STATEMENT	ECONOMIC PROFIT
(+) Revenues:	**(+) Additions to cash:**	**(+) Revenues:**
Receipt of crew payment	Receipt of crew payment	Receipt of crew payment
Direct subsidies	Direct subsidies	Direct subsidies
	Non-operating revenue	Non-operating revenue
	Cash receipts from loans	
(-) Fishing costs:	**(-) Subtractions from cash:**	**(-) Explicit Costs:**
Trip expenses paid by crew	Trip expenses paid by crew	Trip expenses paid by crew
(=) Gross Income		
(-) Overhead	Overhead	Overhead
(=) Operating Income		
(+/-) Non-operating revenue and expenses:		
(+) Non-operating revenue		
(-) Interest expense	Interest expense	Interest expense
(-) Non-operating expenses	Non-operating expenses	Non-operating expenses
(=) Pre-tax Income		
(-) Income taxes	Income taxes	
	Principal expense	
		Implicit Costs:
		Value of crew time
(=) Income (after tax)	**(=) Net Cash Flow**	**(=) Economic Profit**