Initial Review Draft

Integrating Electronic Monitoring

Outline

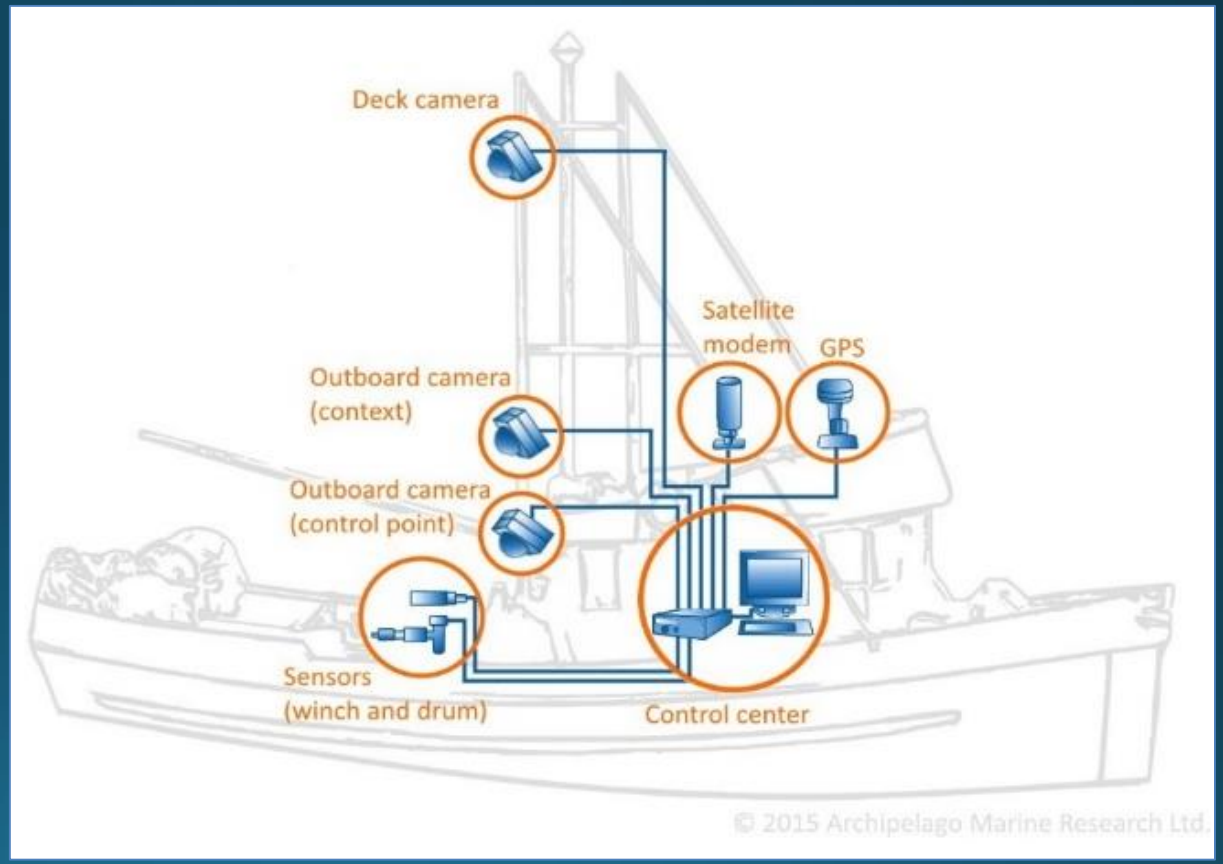
- EM Integration EA/RIR
  - Background
  - Purpose & Need and Description of alternatives
  - Implementation Issues
    - Catch estimation & data quality
    - Funding
    - Enforcement issues
  - Environmental Assessment
  - RIR
  - Council decision points
- OAC Report
- 2017 EM Pre-implementation Plan

Proposed action

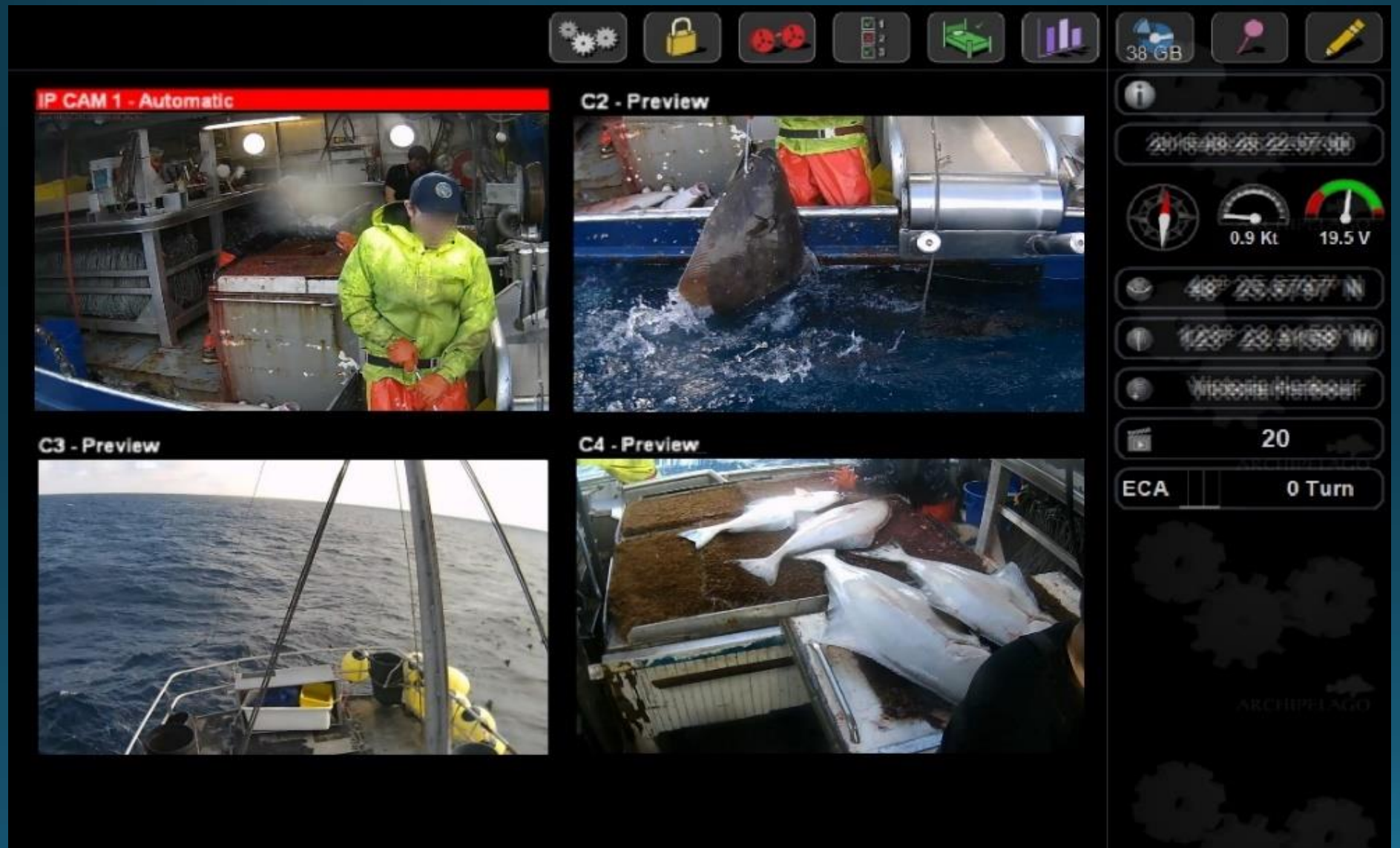
- Establish electronic monitoring (EM) as a part of the Council's "fisheries research plan"
  - Fisheries research plan is implemented by the Observer Program
  - Allows an EM system onboard vessels to monitor harvest and discard of fish and incidental catch at sea
- Proposed action would affect fixed gear groundfish and halibut fisheries that are in the partial coverage category for observer coverage
- Analysis developed with input of fixed gear EM Workgroup
  - Established by Council in 2014, has coordinated EM research in last 2 years

What is electronic monitoring?

Section 1.1, beginning page 30



EM camera views



Purpose and need Section 1.2 page 33

- Scope is fixed gear vessels in partial coverage
- Benefit of an assorted set of monitoring tools (including human observers and EM) to balance:
  - Need for high quality data
  - Costs of monitoring (economic, operational, social costs)
  - Ability of fishery participants to accommodate human observers
- May be possible to get at-sea from broader cross-section of fleet
- Recognizes that EM *supplements*, not replaces, observer coverage
- Integrates EM into the existing observer partial coverage process, including the annual deployment plan process

Alternatives

- **Alternative 1** – No action

- **Alternative 2** – Allow use of EM for catch estimation on vessels in the EM selection pool
  - Option – Require full retention of rockfish species with associated dockside monitoring

- **Alternative 3** – Allow use of EM for compliance monitoring of vessel operator logbooks used for catch estimation

EM Program Components

In section 3.1.2, beginning page 48-50

1. EM Deployment Design	***Goal:*** *Use best available information to design the EM deployment methods, including the EM selection pool, which meet policy and data collection goals.*
2. Participation	***Goal:*** *A pool of EM participants that are capable and committed to making EM work on their boats.*
3. Equipment and installation	***Goal:*** *Appropriate EM equipment (wiring/sensors, cameras, monitors, hard drives) gets properly installed on each vessel, at the right port, and in a timely fashion, with the least interruption to the fishing plan.*
4. Operation	***Goal:*** *Each vessel operator maintains a functioning EM system throughout the fishing trip and there is a good process for maintaining quality control and addressing equipment failures.*
5. Data and equipment retrieval	***Goal:*** *EM equipment with data returned to NMFS timely and in good condition.*
6. EM data and Catch Accounting	***Goal:*** *Extract information from EM system and integrate it into the Catch Accounting System in a timely manner so that data can be used in management.*
7. EM data retention and storage	***Goal:*** *Retain EM data (video and data derived from video review) in an appropriate format.*
8. Feedback mechanisms	***Goal:*** *All participants have the opportunity to provide timely feedback to address problems and improve the EM Program.*
9. Fees/ Funding/ Costs	***Goal:*** *Use Observer Program fees or other sources of funding to pay for the EM equipment, installation, and maintenance.*

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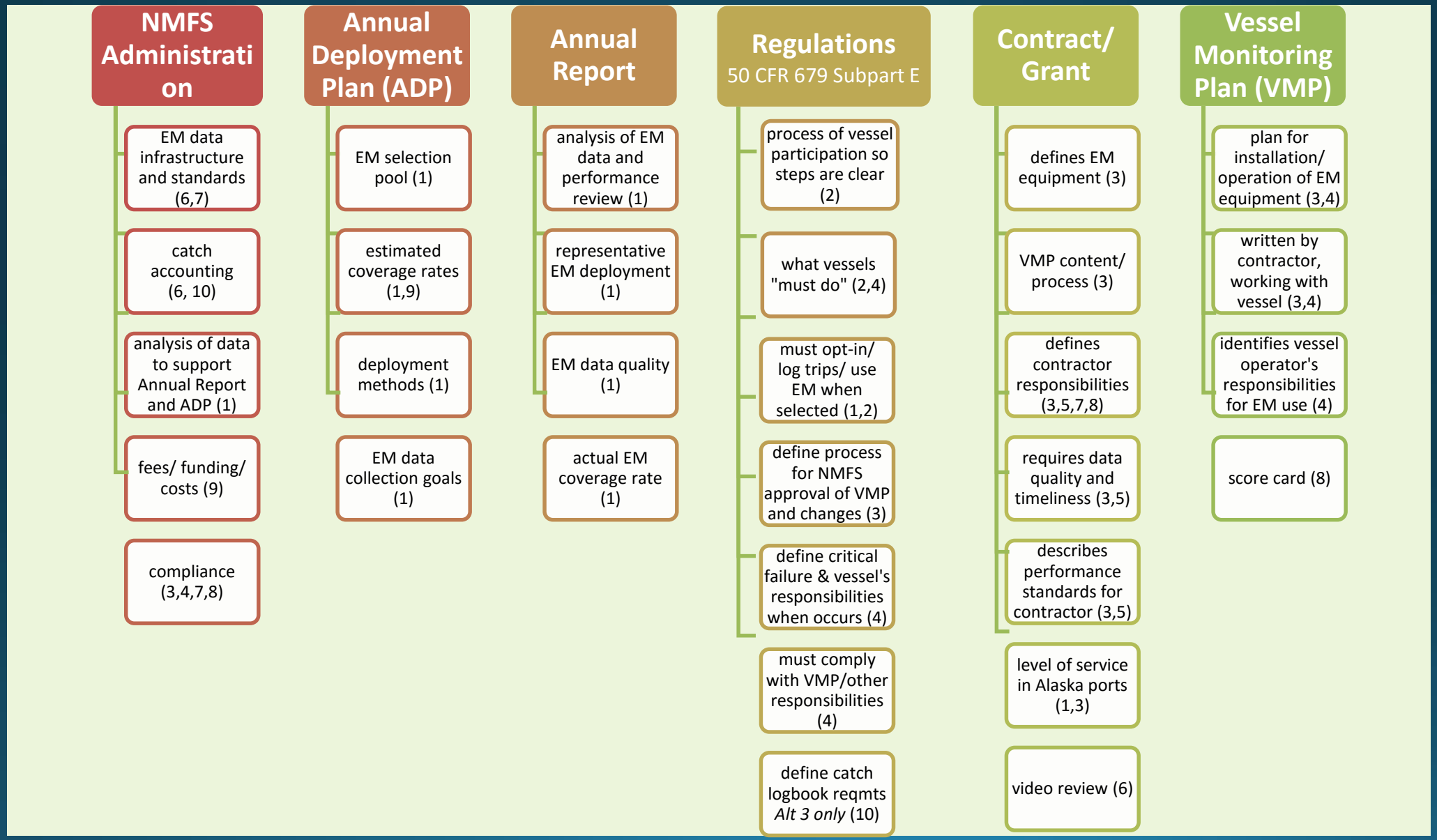
9. Fees/ Funding/ Costs	***Goal:*** *Use Observer Program fees or other sources of funding to pay for the EM equipment, installation, and maintenance.*

10. Catch logbook *Alternative 3 only*	***Goal:*** *Each vessel operator maintains an accurate logbook with discarded catch of key target and bycatch species.*

EM program component implementation

In section 3.1.3, page 52



Annual EM cycle

In section 3.1.3, page 53

EM alternatives allow for EM development

In section 3.5.1, page 66

EM Development Stages

	Fisheries	Technology
Proof of Concept	• <40 ft hook-and-line catcher vessels	• Automatic species identification through video review
Pilot Program		• Stereo cameras • E-logbooks
Operational Testing		• *Logbooks with EM audit (Alt 3)*
Pre-Implementation	• Pot catcher vessels	• Standard cameras for pot
Mature	• >40 ft hook-and-line catcher vessels	• Standard cameras for hook-and-line

Summary of alternatives – operational page 13

	Alternative 1 Human observer program only	Alternative 2 EM as tool for catch estimation	Alternative 3 Logbook as tool for catch estimation, with EM verification
Observer fee	1.25% of ex-vessel value for all landings in partial coverage fisheries	No change	No change
Coverage requirements	Determined annually in ADP (in 2016, all vessels ≥40' in gear-specific stratum)	EM selection pools determined annually in ADP; vessels may opt in/out of selection pools annually	Same
	Target coverage rates determined annually in ADP (15% in 2016)	EM target coverage rates determined annually in ADP (30% in 2016)	100% coverage of all vessels in selection pool
Retention requirements	Rockfish over the maximum retainable amount must be discarded*	Option: require rockfish retention for dockside monitoring for vessels when using EM	Require rockfish retention for dockside monitoring for all vessels in EM selection pool
EM system components	None	Sensors, control box, deck cameras, rail cameras	Same as Alt 2, plus catch logbook
Key enforcement mechanism	Vessel required to comply with observer regulations	Vessel required to comply with Vessel Monitoring Plan (VMP) and regulations	Same as Alt 2, plus vessel required to accurately report catch in logbook**

Alternatives

- **Alternative 1** – No action
- **Alternative 2** – Allow use of EM for catch estimation on vessels in the EM selection pool
  - Option – Require full retention of rockfish species with associated dockside monitoring
- **Alternative 3** – Allow use of EM for compliance monitoring of vessel operator logbooks used for catch estimation
- **EMWG recommendation: new option for IFQ multiple areas**
  - Allow vessel operators to retain IFQ or halibut CDQ exceeding the amount available in the individual area being fished if they are either carrying an observer or EM

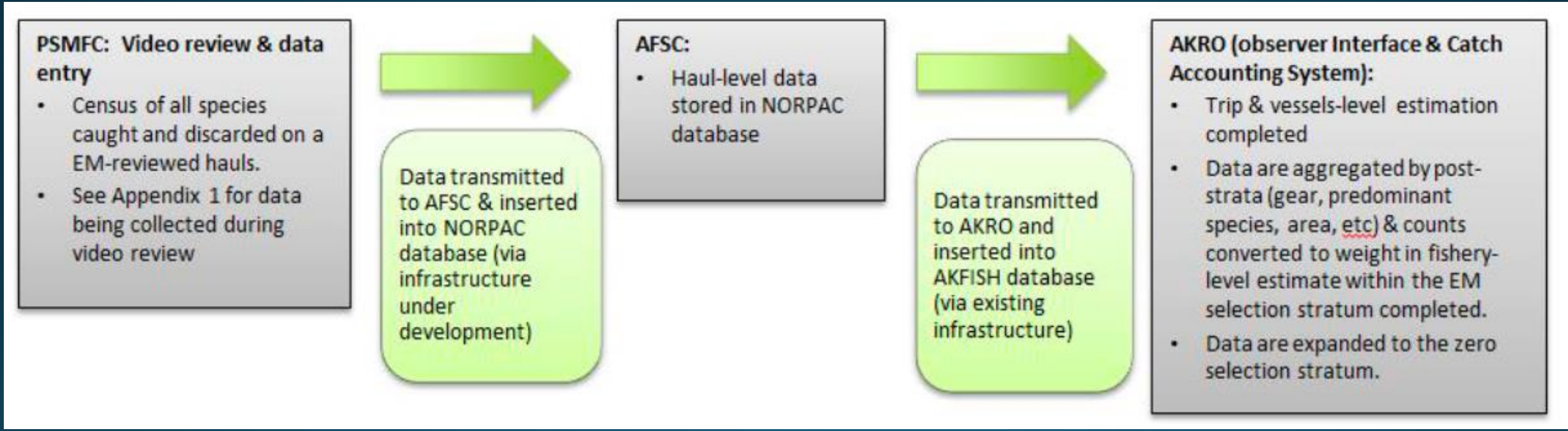
Implementation Issues

- Catch estimation & data quality

Section 3.7, beginning page 75

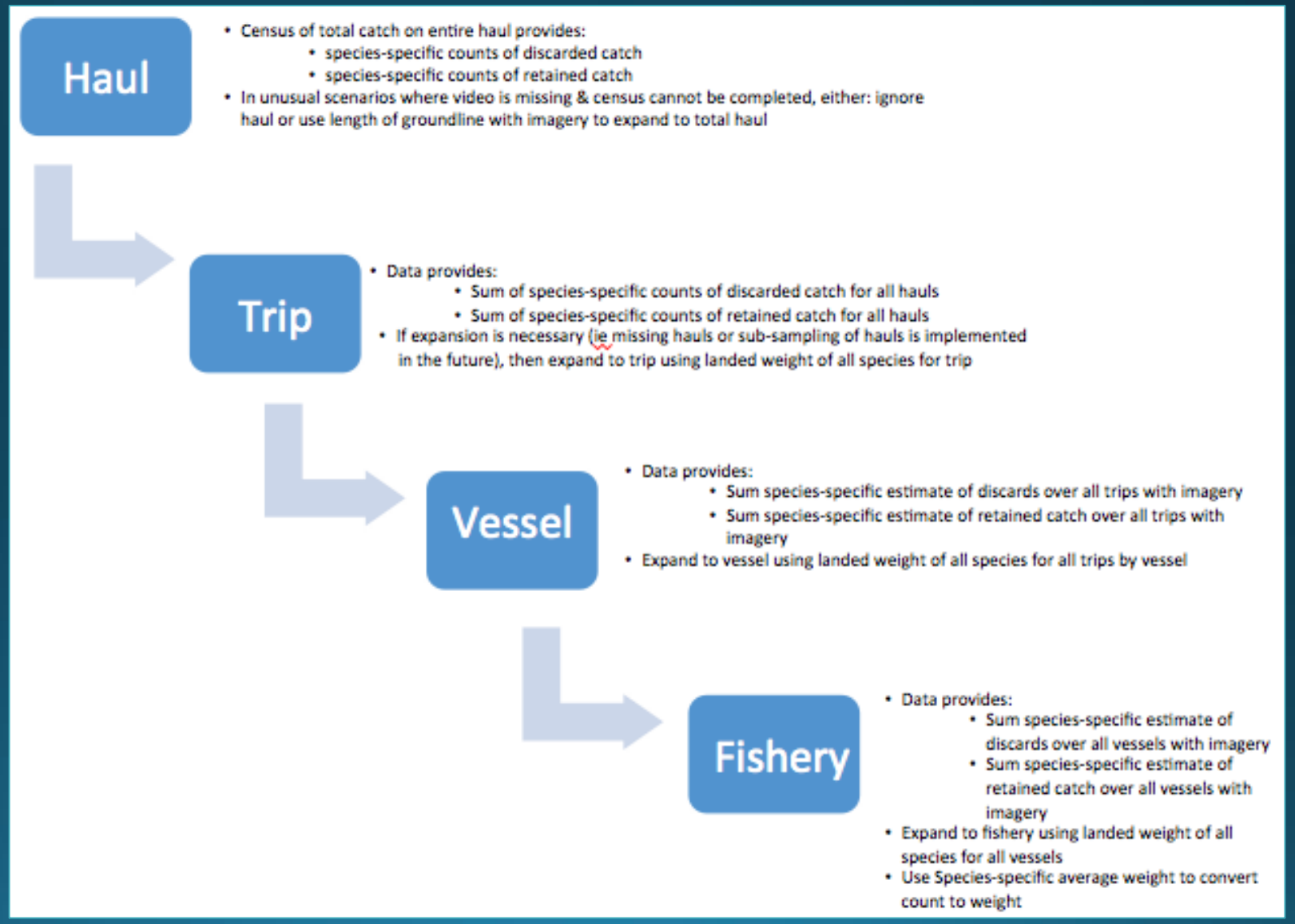
Anticipated flow of EM information

Figure 3-8, page 78



Catch Estimation

Figure 3-9, page 82



Data Quality Considerations

- Timeliness
- Video and sensor completeness
- Image quality
- Species identification

Average video review rates

Table 3-7, page 79

Number of hauls	Halibut	Pacific cod	Sablefish
Number of hauls	123	180	140
Ave minutes of sorting / haul	136	117	208
Ave minutes of review / haul	59	107	102
Average mins review/mins of sorting	0.47	0.93	0.49

Average turn-around times

Table 3-8, page 79

	Arrival Time		Review Time		
	Days from last fishing date on drive	Days from last date on drive	Days from arrival	Days from last fishing date on drive	Days from last date on drive
Average	9.28	6.05	8.80	18.08	14.85
Median	7	6	7	15	12
Mode	6	4	3	15	12
Minimum	3	2	0	4	4
Maximum	63	14	30	65	33

Video completeness

Tables 3-9 and 3-11, page 84

Video completeness	Level of impact	Halibut	Pacific cod	Sablefish	Total Percent
Video of entire event	None	98	97	120	74%
Missing before catch came onboard	Low	4		6	2%
Missing after catch onboard but before catch handling ends		19	4	11	8%
Missing during catch coming onboard		2	58	2	15% (1.5%)
No video for entire haul	High		1	1	<1%

Video & sensor completeness in relation to number of trips

Figure 3-10, page 85

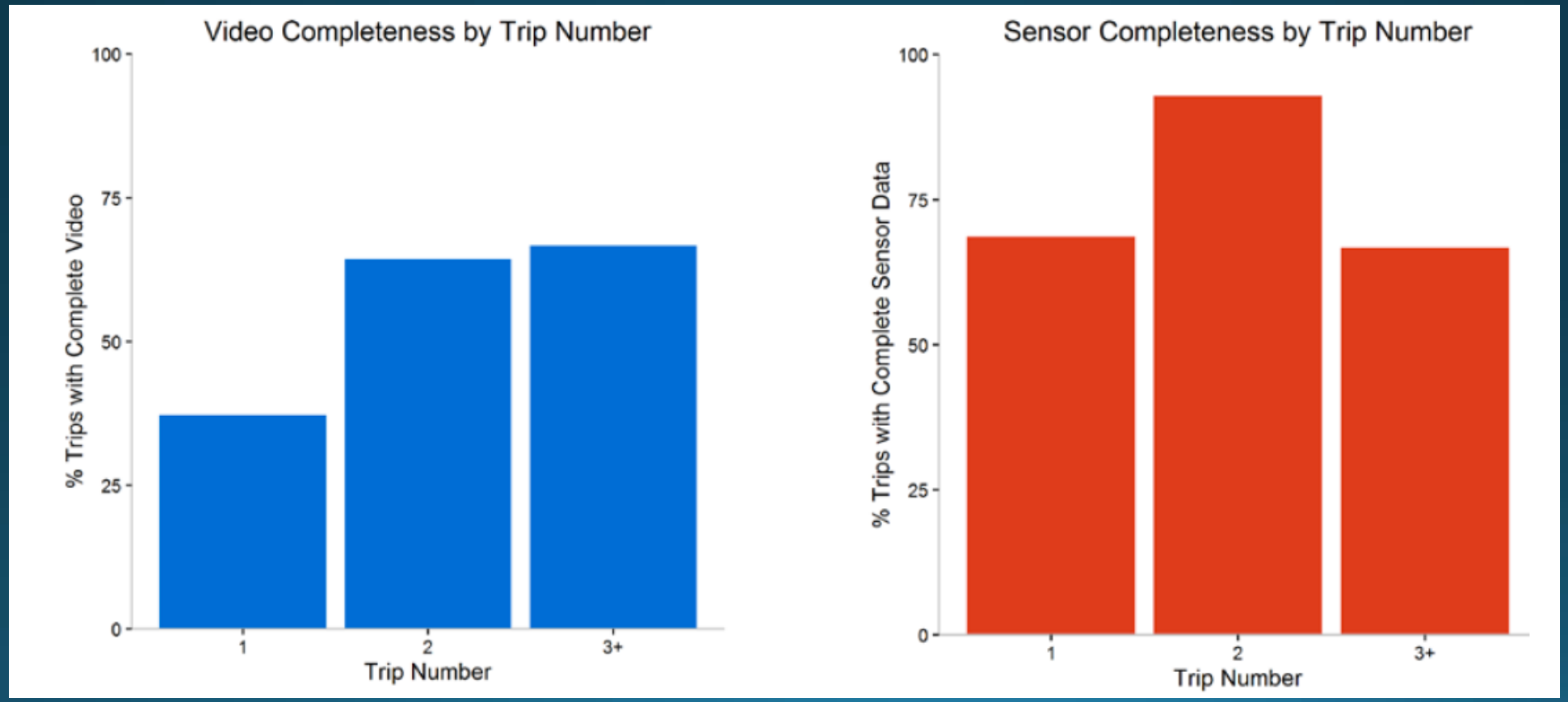
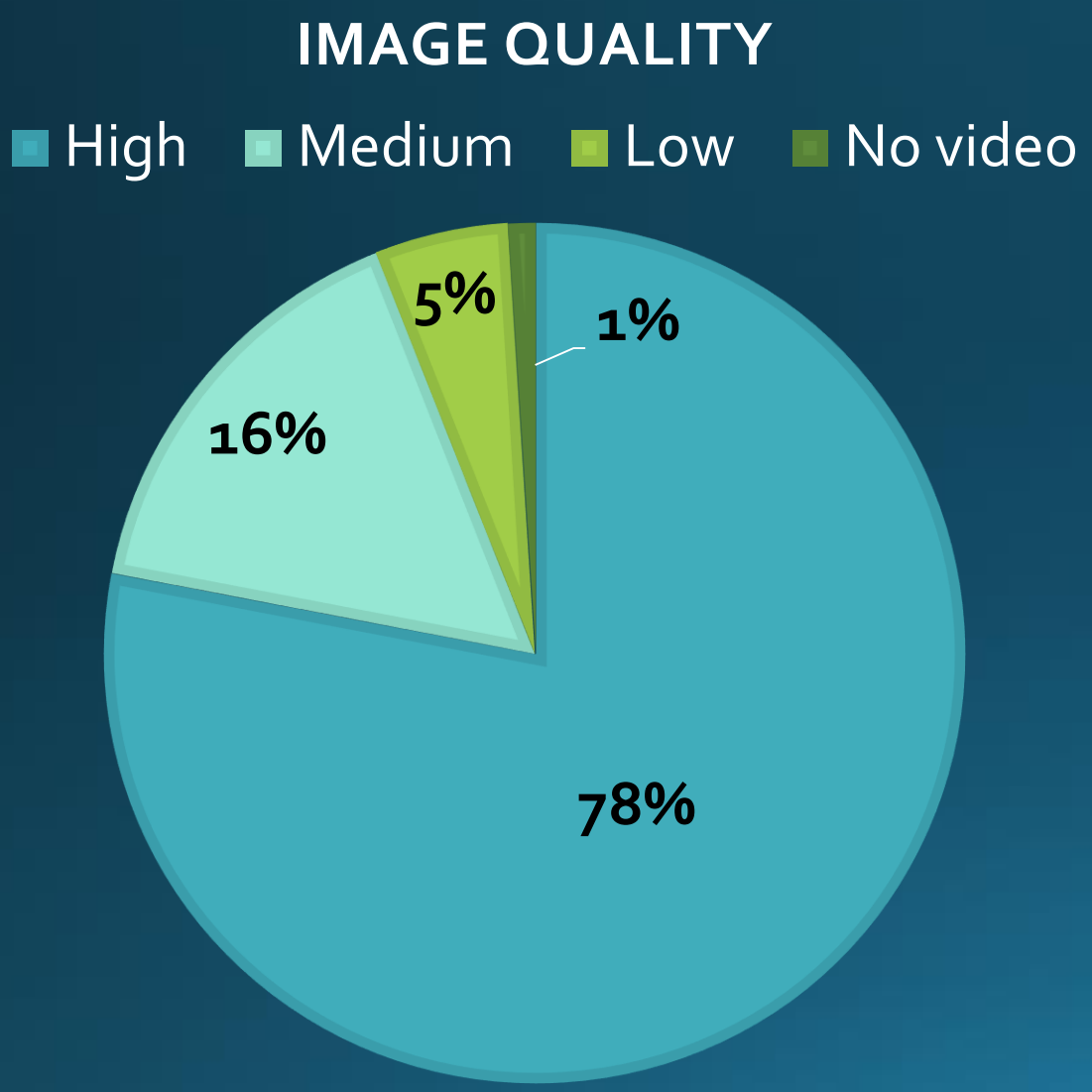


Image quality

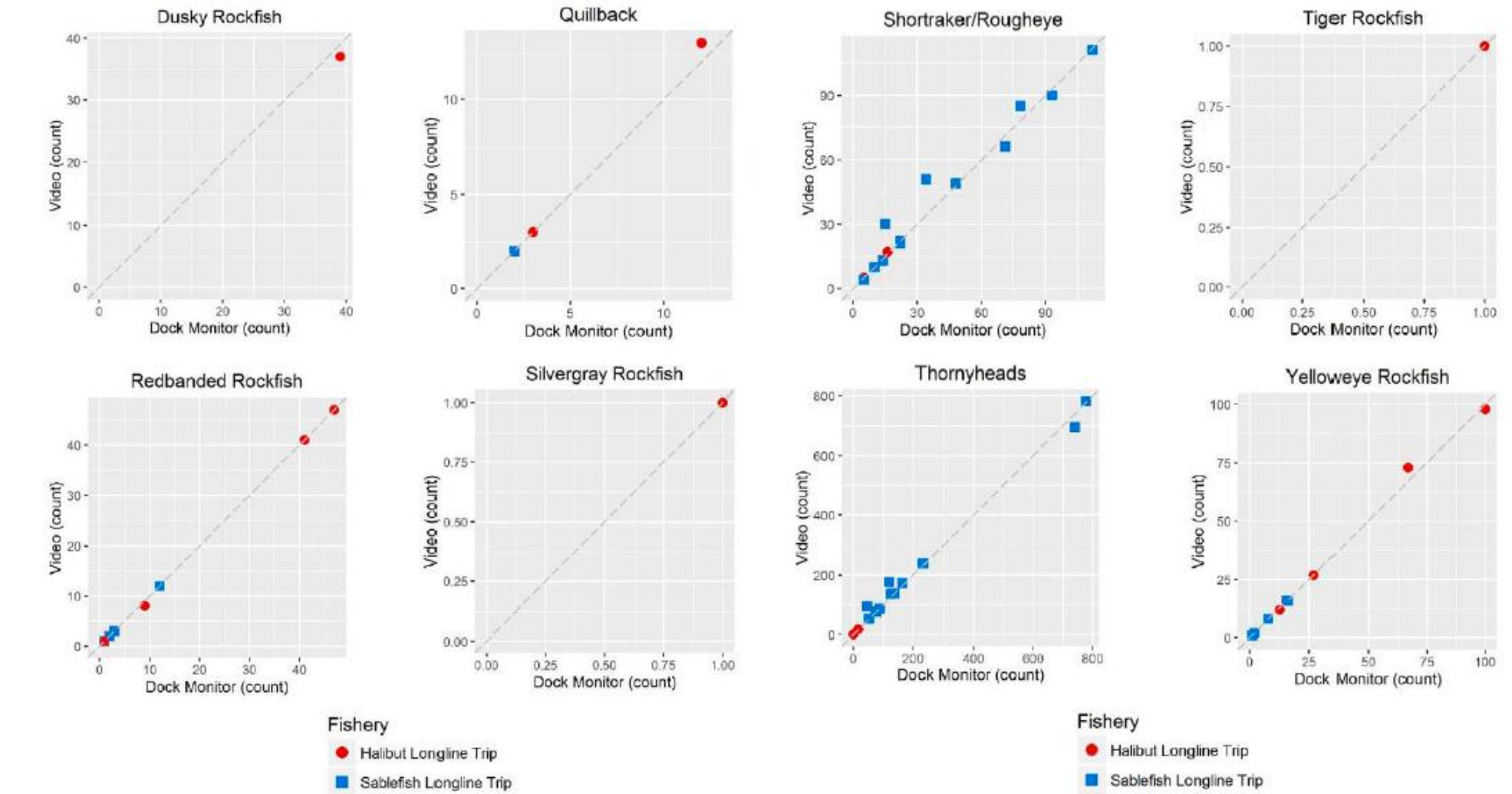
Tables 3-12 & 3-13, page 85-86



- **78% High quality**
- **16% Medium quality**
  - Glare – 3%
  - Dirty camera – 3%
  - Night lighting – 10%
  - Poor camera angle – 55%
  - Water spots – 29%
- **5% Low quality**
  - Water spot – 33%
  - One or more cameras missing video – 66%

Rockfish species identification from dockside monitoring versus EM

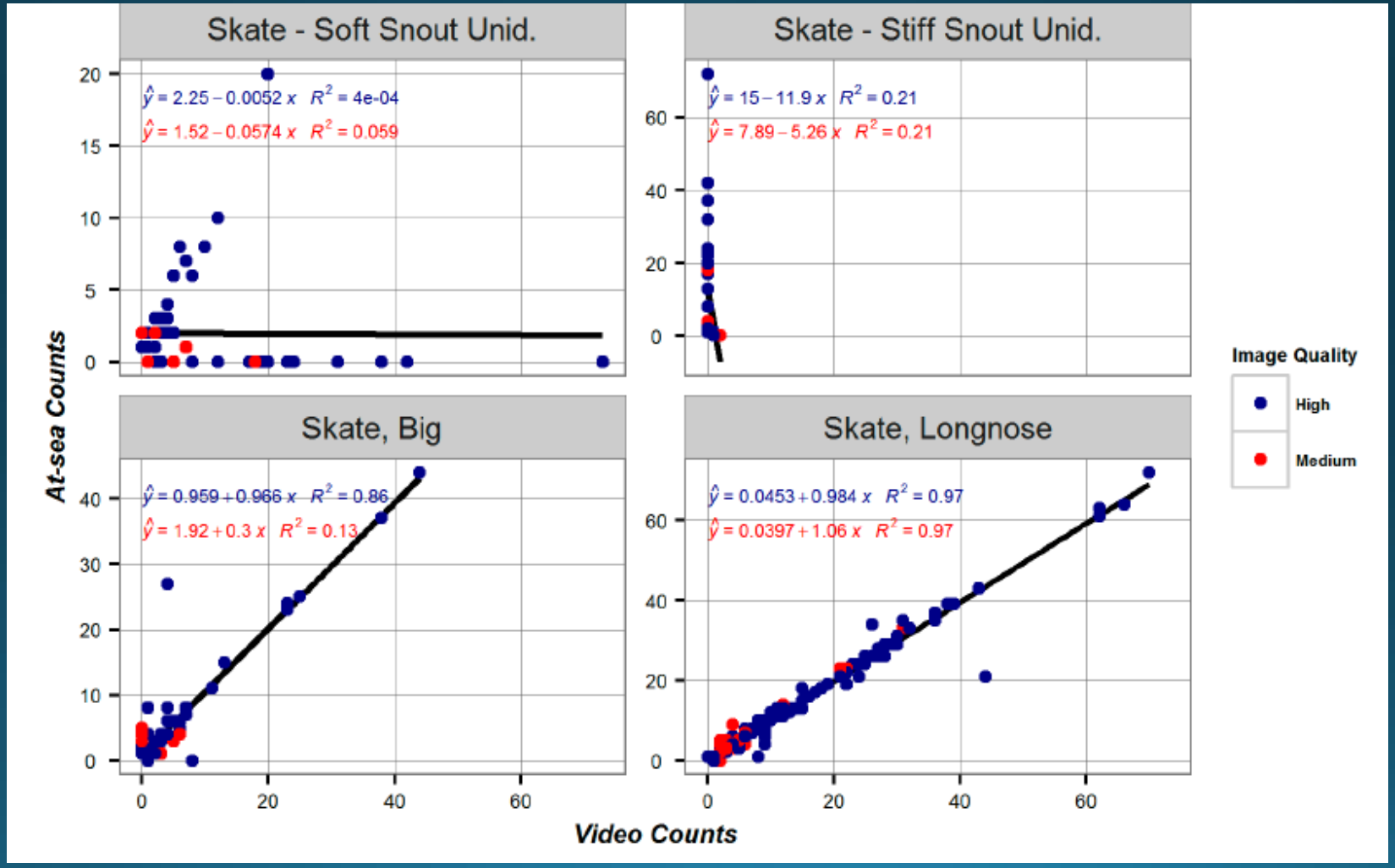
Figure 3-11, page 89



Comparison of EM & observer counts of skate species

Figure A-13

Page 267



Data elements that will continue to rely on observer data

- Biological data (weight, sex, otoliths, samples, etc.)
- Species ratios for groups that are difficult to distinguish (e.g. shortraker/rougheye)
- Conversion of counts to weight – using average weights
- Halibut mortality
- Annual evaluation through ADP process
  - Example in Appendix 1

Implementation issues – funding, enforcement

Section 3.2 (page 54), Section 3.6 (page 67)

Observer fee Section 3.2, page 54

- Magnuson-Stevens Act section 313 guides use of fees.
- Fees pay for the cost of implementing the "fisheries research plan"
- Fees cannot exceed the combined costs of:
  - stationing observers and EM systems on vessels and processors, and
  - inputting collected data
- May NOT be used for administrative overhead or other costs not directly incurred in carrying out the plan.

- NMFS will use fees and Federal funds to pay for implementing EM along with observers
- Analysis identifies EM tasks and how NMFS intends to pay for those tasks.

Using the fee for EM

Simplified from Table 3-1, page 57 and 58

Responsibility	EM task	Funding source
Provider	EM equipment	Fee
	EM field services (VMP, travel, field staff, installation, communication with vessels, training)	
	Video review	TBD
	Data storage	
	Dockside monitoring (if required)	
NMFS	ADP/AR	NMFS
	Catch Accounting/Data management	
	ODDS, EM opt-in/opt-out process	
	Contract/grant development and management	
	Video reviewer training/audit, communications	

Enforcement Considerations

Section 3.6, page 67

- **Alternative 2:**
- Catch monitoring program, not compliance monitoring
- 2 needs:
  - Enforcing the EM program
    - Compliance to ensure EM program meets goals (ie, collect catch data from selected vessels)
    - Methods to verify EM system is functioning correctly while on board
  - Compliance with other regulations
    - EM to verify seabird streamer line use
    - EM to allow vessels to fish IFQ in multiple areas

- **Alternative 3:**
- logbook compliance program
- Inaccurate reporting results in enforcement violations

Environmental Assessment

Chapter 4, beginning page 92

Environmental Assessment Summary

page 16

	Alternative 1 Human observer program only	Alternatives 2 and 3 EM alternatives
Goals achieved with restructuring	Reduce sources of bias in discard data	Yes (random deployment of EM in EM selection pool)
	Reduce data gaps	Yes (balance reducing human coverage with ability to monitor vessels that have difficulty caring an observer)
	Ability to adapt monitoring to specific needs	More flexibility for monitoring on vessels where human observers are not practicable Less human observer coverage as fee is supporting both options
Data collection		Where EM cannot duplicate an observer function, impact is a reduction in overall data not elimination of that data; observer data will be used to generate estimates, per established procedures.

Environmental Assessment Summary page 16

	Alternative 1 Human observer program only	Alternatives 2 and 3 EM alternatives
Data collection		
Fish	Species ID, count – based on sample	Yes, based on census
	Weight/ sex/ length	No
	Biological samples/ special projects	No
Marine mammals	Information on interactions (location, date/time, gear, fishing depth, catch composition)	Not unless brought onboard dead No marine mammal interactions recorded to date in pre-implementation
	Information on gear entanglements (length, tissue samples, disposition)	No
Seabirds	Species ID, count, tag recovery, specimen collection	Yes for species ID and count, if handling protocols adhered to Procedures needed if vessel operators are asked to collect specimens
	Compliance with streamer lines	Yes

Regulatory Impact Review

Chapter 5, beginning page 125

Category	Cost Factor	Trajectory	Uncertainty
Hardware	Control Center	Null or Decreasing	Start-up pool; Size of EM Pool; Depreciation/Breakage rate
	Camera/Sensor Package	Decreasing	Start-up pool; Size of EM Pool; Depreciation/Breakage rate; Undefined required peripherals
	Installation	Decreasing	Start-up pool
	Hard-Drives	Decreasing	New technologies
	Software Licensing	Null or Decreasing	Contract requirements; Competition
Field Support	Re-installation	Unknown	Demographics; Port capacity
	Control Center Rotation	Unknown	Deployment method; Port capacity
	Labor/Travel	Null or Decreasing	Demographics; Deployment method; Port capacity
	Project Mgmt.	Unknown	Contract requirements
	Training	Decreasing	Port capacity
	Data Retrieval	Decreasing	Operator responsibilities; Demographics; Automated data transmission
	Dockside Monitoring	Null or Increasing	Undefined data objectives
Data Analysis	Video Review Time	Unknown	Data objectives; Size of EM Pool
	Review Labor/Training	Null or Unknown	Data objectives; Labor turnover
	Software Licensing	Null or Decreasing	Contract requirements; "Open-source"
	Project Mgmt.	Unknown	Port capacity; Contract requirements; Competition
Administrative	Data Integration	Decreasing	Pre-Implementation work; Data objectives
	Data Auditing	Unknown	Data objectives; Contract requirements
	Data Storage	Decreasing	New technologies; Undefined requirements
	Deployment Mgmt.	Increasing	Demographics; Size of EM Pool
	Outreach	Decreasing	Size of EM Pool; Port capacity
	Project Mgmt.	Unknown	Deployment method; Port capacity; Data objectives

Table 5-26, p.181

"Hourly" method for estimating 2016 video review labor costs

Jan 1 – July 26		2016 Total (projected)	
Unit	Unit Cost	Unit	Unit Cost
$46,467 YTD		$81,938	
17 vessels	$2,733/vessel	30 vessels	$2,731/vessel
57 trips	$815/trip	114 trips	$719/trip
228 sea-days	$204/sea-day	456 sea-days	$180/sea-day

Table 5-29, p.192

Range of potential EM storage costs

# Servers	Annual server cost	Alaska cost-share	Alaska storage cost
1	$25,000	10%	$2,500
		20%	$5,000
		50%	$12,500
2	$50,000	10%	$5,000
		20%	$10,000
		50%	$25,000
3	$75,000	10%	$7,500
		20%	$15,000
		50%	$37,500

Table 5-31, p.194

Budget, assumptions, and hardware purchasing for 2016 EM cost scenarios

	Scenario			Amount of Hardware Purchased in 2016			
	Period	Assumptions	EM Service Budget	Control Centers	Cam/Sensor Packs	Hard Drives	Licensing
I	Year-to-date (7/26/16)	6 control centers were pre-paid in 2015	High ($546k)	10	17	20	1
II	Year-to-date (7/26/16)	6 control centers were pre-paid in 2015	Low ($280k)	10	17	20	1
III	2016 Year	All control centers purchased in 2016	High ($780k)	16	17	20	1
IV	2016 Year	All control centers purchased in 2016	Low ($400k)	16	17	20	1
V	2016 Year	6 control centers were pre-paid in 2015	High ($780k)	10	30	50	1
VI	2016 Year	6 control centers were pre-paid in 2015	Low ($400k)	10	30	50	1
VII	2016 Year	All control centers purchased in 2016	High ($780k)	16	30	50	1
VIII	2016 Year	All control centers purchased in 2016	Low ($400k)	16	30	50	1
IX	2016 Year	"Moderate" pre-purchase/pre-wiring for 2017; All control centers purchased in 2016	High ($780k)	30	45	160	1
X	2016 Year	"Aggressive" pre-purchase/pre-wiring for 2017; All control centers purchased in 2016	High ($780k)	30	90	160	1
XI	2016 Year	"Moderate" pre-purchase/pre-wiring for 2017; All control centers purchased in 2016; Zero depreciation on pre-purchased control centers	High ($780k)	30	45	160	1
XII	2016 Year	"Aggressive" pre-purchase/pre-wiring for 2017; All control centers purchased in 2016; Zero depreciation on pre-purchased control centers	High ($780k)	30	90	160	1

Table 5-34, p.197

Estimates of total 2016 longline EM program costs

Scenario	Service Budget	Hardware Mix (CC/C-S/HD)	Hardware Purchases	2016 Hardware Cost	2016 Other Provider Cost*	2016 Program Cost**
I	$546,298	10/17/20	$136,400	$43,380	$409,898	$453,278
II	$280,160	10/17/20	$136,400	$43,380	$143,760	$187,140
III	$780,000	16/17/20	$172,400	$50,580	$373,898	$424,478
IV	$400,000	16/17/20	$172,400	$50,580	$107,760	$158,340
V	$780,000	10/30/50	$181,000	$52,450	$599,000	$651,450
VI	$400,000	10/30/50	$181,000	$52,450	$219,000	$271,450
VII	$780,000	16/30/50	$217,000	$59,650	$563,000	$622,650
VIII	$400,000	16/30/50	$217,000	$59,650	$183,000	$242,650
IX	$780,000	30/45/160	$360,000	$88,800	$420,000	$508,800
X	$780,000	30/90/160	$504,000	$117,600	$276,000	$393,600
XI	$780,000	30/45/160	$360,000	$72,000	$420,000	$492,000
XII	$780,000	30/90/160	$504,000	$100,800	$276,000	$376,800

Table 5-38, p.201

Unit cost estimates for 2016 longline EM program

Scenario	2016 Prog. Cost	Unit Cost ($)								
		EM Contractor			Contractor + Vid. Review			Contractor + Review + Data Storage		
		Per Vessel	Per Trip	Per Day	Per Vessel	Per Trip	Per Day	Per Vessel	Per Trip	Per Day
I	$453,278	26,663	7,952	1,988	29,396	8,767	2,192	29,730	8,867	2,217
II	$187,140	11,008	3,283	821	13,741	4,098	1,025	14,075	4,198	1,050
III	$424,478	24,969	7,447	1,862	27,702	2,868	2,066	28,036	8,361	2,091
IV	$158,340	9,314	2,778	694	12,047	3,593	898	12,381	3,692	923
V	$651,450	21,715	5,714	1,429	24,446	6,433	1,609	24,779	6,521	1,631
VI	$271,450	9,048	2,381	595	11,779	3,100	775	12,113	3,188	797
VII	$622,650	20,755	5,462	1,365	23,486	6,181	1,545	23,819	6,269	1,567
VIII	$242,650	8,088	2,129	532	10,819	2,848	712	11,153	2,935	734
IX	$508,800	16,960	4,463	1,116	19,691	5,182	1,296	20,024	5,270	1,318
X	$393,600	13,120	3,453	863	15,851	4,172	1,043	16,184	4,259	1,065
XI	$492,000	16,400	4,316	1,079	19,131	5,035	1,259	19,464	5,123	1,281
XII	$376,800	12,560	3,305	826	15,291	4,024	1,006	15,624	4,112	1,028

Table 5-39, p.201

Annual Hardware cost per longline vessel

Component	Price	Life Span (yrs)	Annual Cost	Unit/Vessel Ratio	Vessel Cost
Control Center	$6,000	5	$1,200	1:1	$1,200
				2:3	$800
				1:2	$600
Software License	$667	1	$667	1:1	$667
				2:3	$445
				1:2	$334
Cam/Sensor Pack.	$3,200	5	$640	1:1	$640
Hard Drives (2)	$200	4	$50	1:1	$50
Total Vessel Cost				**1:1**	**$2,557**
				2:3	**$1,935**
				1:2	**$1,624**

Table 5-40, p.204

Annual Hardware cost per pot vessel

Component	Price	Life Span (yrs)	Annual Cost	Vessel Cost
Control Center	$6,500	5	$1,300	$1,300
Software License	$667	1	$667	$667
Cam/Sensor Pack.	$4,500	5	$900	$900
Hard Drives (2)	$200	4	$50	$50
Total Vessel Cost				**$2,917**

Table 5-41, p.204

Total annual hardware costs for fixed-gear EM

Fleet Composition		Total Annual Hardware/Software Cost		
LL	Pot	All CCs 1:1	LL CCs 2:3	LL CCs 1:2
60	**15**	$197,175	$159,832	$141,165
60	**30**	$240,930	$203,587	$184,920
90	**15**	$273,885	$217,871	$189,870
90	**30**	$317,640	$261,626	$233,625
130	**30**	$419,920	$339,011	$298,565
130	**50**	$478,260	$397,351	$356,905

Table 5-42, p.205

Range of annual field service costs for fixed-gear EM

	Two Provider Program						Single Provider	
	LL		Pot		Two-Provider Total			
	High	Low	High	Low	High	Low	High	Low
Project Mgmt.	$150,000	$75,000	$150,000	$75,000	$300,000	$150,000	$150,000	$100,000
Port Service Labor	$280,000	$210,000	$210,000	$140,000	$350,000*	$280,000	$350,000	$280,000
Travel/Fly-out Labor	$77,000	$20,000	$40,000	$15,000	$117,000	$35,000	$50,000	$20,000
Shipping & Materials	$20,000	$5,000	$12,000	$5,000	$32,000	$10,000	$25,000	$7,500
Total Service Cost	**$527,000**	**$310,000**	**$412,000**	**$235,000**	**$799,000**	**$475,000**	**$575,000**	**$407,500**

Table 5-43, p.206

Range of total annual video review costs

Vid. Review FTE	Review Labor	Project Mgmt.*		**Total Cost**	
		Low	High	**Low**	**High**
1.0	$100,000	$68,000	$100,000	**$168,000**	**$200,000**
1.5	$150,000	$68,000	$100,000	**$218,000**	**$250,000**
2.0	$200,000	$68,000	$100,000	**$268,000**	**$300,000**
2.5	$250,000	$68,000	$100,000	**$318,000**	**$350,000**
3.0	$300,000	$68,000	$100,000	**$368,000**	**$400,000**

Table 5-44, p.208

Cost estimates for example EM programs (LL & Pot)

	Hardware	Field Service	Data Analysis	Data Storage	Total Cost	Cost Excl. Data Review/Storage
1	$261,500	$600,000	$250,000	$10,000	$1,121,500	$861,500
2	$317,500	$475,000	$318,000	$10,000	$1,120,500	$792,500
3	$261,500	$415,000	$218,000	$10,000	$904,500	$676,500
4	$339,000	$550,000	$250,000	$15,000	$1,154,000	$889,000
5	$298,500	$425,000	$250,000	$15,000	$988,500	$723,500
6	$397,500	$575,000	$318,000	$25,000	$1,315,500	$972,500

Table 5-45, p.210

"Straw-man" EM Budgets

Category	Budget Approach	EM Fleet Size	EM Budget
1	*Assigned Percentage*		
1.a	10% - 25% of total fees ($3.83M)	Any	$383,000 - $957,500
1.b	10% - 25% of non-trawl fees ($2.61M)	Any	$261,000 - $652,500
2	*Non-trawl fees ($2.61M) apportioned by…*		
2.a	% of total vessels in EM stratum	90 LL, 30 pot	$287,000
2.b	% of total vessels in EM stratum	130 LL, 30 pot	$378,500
2.c	% of total trips in EM stratum	90 LL, 30 pot	$360,000
2.d	% of total trips in EM stratum	130 LL, 30 pot	$404,500
2.e	% of total sea-days in EM stratum	90 LL, 30 pot	$317,500
2.f	% of total sea-days in EM stratum	130 LL, 30 pot	$412,000
3	*Non-trawl fees ($2.47M) appportioned by…*		
3.a	Sea-Days/Vessel (all vessels)	90 LL, 30 pot	$387,000
3.b	Sea-Days/Vessel (vessels > 40')	90 LL, 30 pot	$489,000
3.c	Sea-Days/Vessel (all vessels)	130 LL, 30 pot	$515,000
3.d	Sea-Days/Vessel (vessels > 40')	130 LL, 30 pot	$662,000
3.e	Sea-Days/Vessel (all vessels)	130 LL, 50 pot	$581,500
3.f	Sea-Days/Vessel (vessels > 40')	130 LL, 50 pot	$729,000

Table 5-46, p.211

Summary of Council decision points

Council decision points

1. Whether to release for public review
2. EMWG recommendation to identify a preferred alternative
3. EMWG recommendation to include a new option for allowing EM when fishing IFQ in multiple areas
4. Reaction to EMWG discussion for a separate analysis for universal rockfish retention in fixed gear fisheries
5. Timeline for final action

Timeline Section 1.3, page 36

Year	Fieldwork / Pre-implementation (Pre-Imp)	Council process, regulations	Observer Program/ Annual Deployment Plan (ADP)
2014	*Fieldwork*	*EMWG develops 2015 Cooperative Research Plan (CRP), discusses alternatives for analysis*	*Oct – 2015 ADP places 10 vessels that are participating in EM research into the no selection pool*
2015	*Feb – SSC reviews CRP* *Jan-Jul – operational longline, stereo camera, pot cod field research*	*Feb – SSC, Council review CRP* *Oct – propose a 2016 Pre-Implementation plan to Council*	*Oct – 2016 ADP proposes all EM Pre-Imp vessels in no selection pool*
2016	Jan-Dec – Pre-implementation on 53 LL vessels 40-57.5'. *Jan-Apr – pot cod field work* *Jan-Jul – Stereo camera research on 3-5 longline and pot vessels*	Oct – initial review for EM analysis to integrate EM into observer program. Dec – final action on EM analysis	Oct – 2017 ADP proposes all EM Pre-Imp vessels in no selection pool
2017	Jan-Dec – Pre-implementation for longline and pot vessels >40'. Potential research on other technology.	Jan-Aug – Develop proposed and final regulations for integrating EM, hold MSA-required hearings in AK, WA, OR	June – Annual Report provides prelim analysis on allocating observer fee between observers and EM Oct – 2018 ADP allocates funding to observers and EM deployment
2018	**Integrated observer/EM monitoring program**		

How to get to 2018 implementation

Month	Milestone	Comments
December 2016	**Council final action**	
March 2017	Publish **proposed rule**/notice of availability of **FMP Amendment**	
April - June 2017	Public comment period and hearings	60-day comment period and hearings requirements are in MSA 313(c)
June 2017	**Annual Report** to Council presenting NMFS's recommended EM selection pool for upcoming year (2018).	The EM selection pool is the universe of vessels that can participate in EM based on, eg, vessel size, gear type, area fished, port.
June - August 2017	Write/review **Final rule** Approve **FMP Amendment**	Assumes 1 month GC review, which is less than the average review time.
August - September 2017	Write **ADP**; review by OAC, Plan Teams	
	Final rule publishes before September 1	30 day cooling-off period before it is effective. Effective October 1, at the latest
	Contract(s)/ Grant awarded	(estimate)
October 2017	Council reviews draft **ADP**	ADP includes the EM selection pool, an EM selection rate, etc., based on analysis of costs, partial coverage budget, selection pool size, etc.
	NMFS announces EM opt-in period and the defined EM selection pool	May be a challenge for Pacific cod, which opens on January 1.
	Vessel opt-in period	Opt-in using ODDS.
December 2017	Final **ADP**, with EM selection pool, rate, etc.	
	Start Vessel Monitoring Plan and installation process	
January 2018	NMFS starts selecting vessels for EM coverage	

OAC Report - EM recommendations

2017 EM Pre-implementation Plan