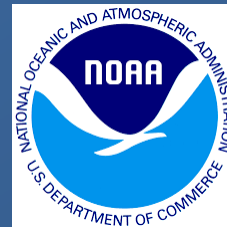


Halibut DMRs



NORTH PACIFIC
Fishery Management Council



INTERNATIONAL PACIFIC



HALIBUT COMMISSION



PT Action

- Recommend Halibut DMRs for 2017-2018

Current Approach

BSAI

Non-CDQ			CDQ		
Gear	Fishery	DMR (%)	Gear	Fishery	DMR (%)
Trawl	Alaska plaice	66	Trawl		
	Arrowtooth flounder	84			
	Atka mackerel	82		Atka mackerel	82
	Flathead sole	72		Flathead sole	79
	Greenland turbot	82		Greenland turbot	89
	Non-pelagic pollock	84		Non-pelagic pollock	86
	Pelagic pollock	81		Pelagic pollock	90
	Other flatfish	88			
	Other species	63			
	Pacific cod	66		Pacific cod	87
	Rockfish	66		Rockfish	70
	Rock sole	86		Rock sole	86
	Sablefish	66			
	Yellowfin sole	84		Yellowfin sole	85
Hook and line	Greenland turbot	11	Hook and line	Greenland turbot	10
	Other species	9			
	Pacific cod	9		Pacific cod	10
	Rockfish	9			
Pot	Other species	9	Pot		
	Pacific cod	9		Pacific cod	1
				Sablefish	41

Gear	Fishery	DMR (%)	Gear	Fishery	DMR (%)
Trawl	Arrowtooth flounder	76	Hook and line	Other fisheries ¹	10
	Deepwater flatfish	62		Pacific cod	10
	Flathead sole	67		Rockfish	10
	Non-pelagic pollock	58	Pot		
	Other fisheries ¹	62		Other fisheries ¹	15
	Pacific cod	62		Pacific cod	15
	Pelagic pollock	65			
	Rex sole	72			
	Rockfish	65			
	Sablefish	59			
	Shallow-water flatfish	66			

GOA

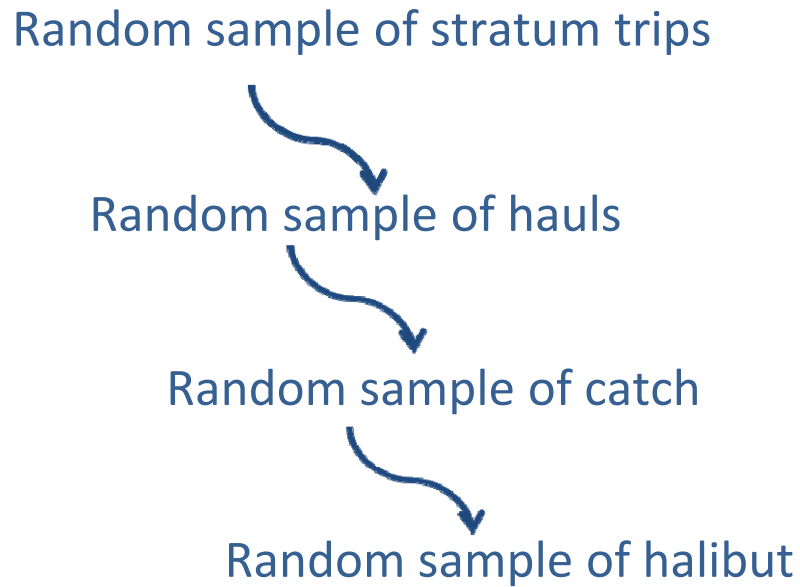
¹"Other fisheries" includes all gear types for skates, sculpins, squids, octopuses, and hook-and-line sablefish.

General Approach

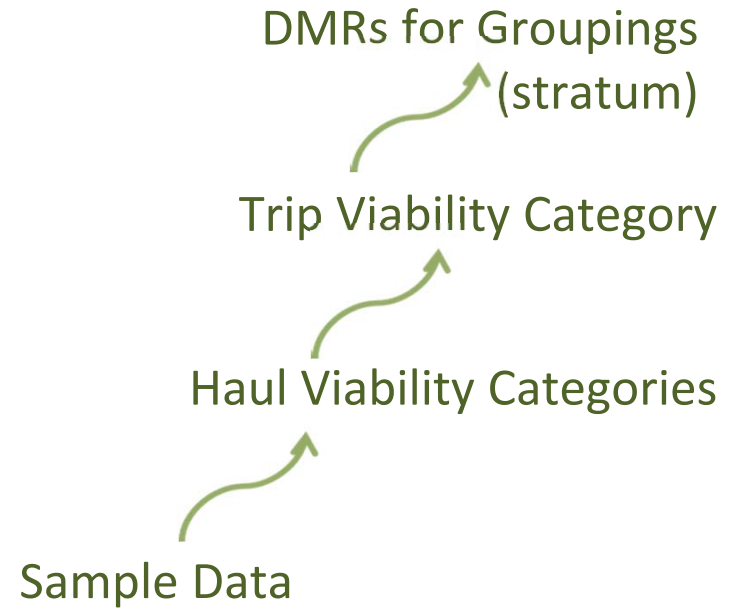
- Consistency with Observer Program sampling design
- Consistency with the operational causes of variation in DMRs

Hierarchical Design

Sampling



Estimation



Viabilities

Assumed gear/condition-specific mortality probabilities for halibut in calculating DMRs.

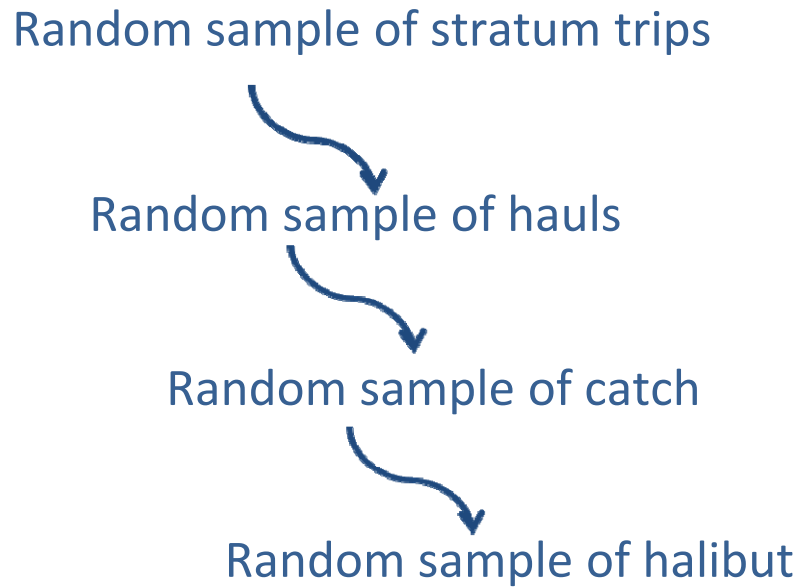
Gear	Condition			
	Excellent	Poor	Dead	
Trawl ^a	0.20	0.55	0.90	
Pot ^b	0.00	1.00	1.00	
	Minor	Moderate	Serious	Dead
Longline ^c	0.035	0.363	0.662	1.000

From ^a Clark et al. (1992), ^b Williams (1996), and ^c Kaimmer and Trumble (1998)

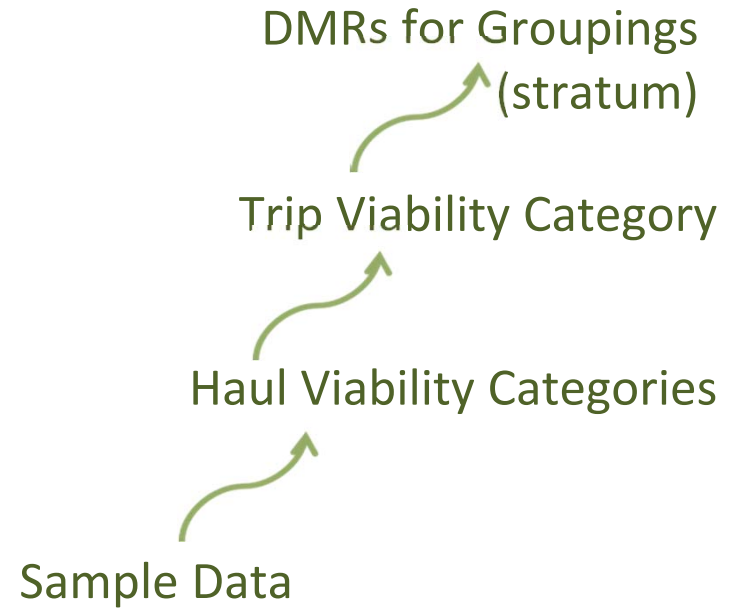
**IPHC Review – Report
expected in 2016 RARA (Dec)**

Hierarchical Design

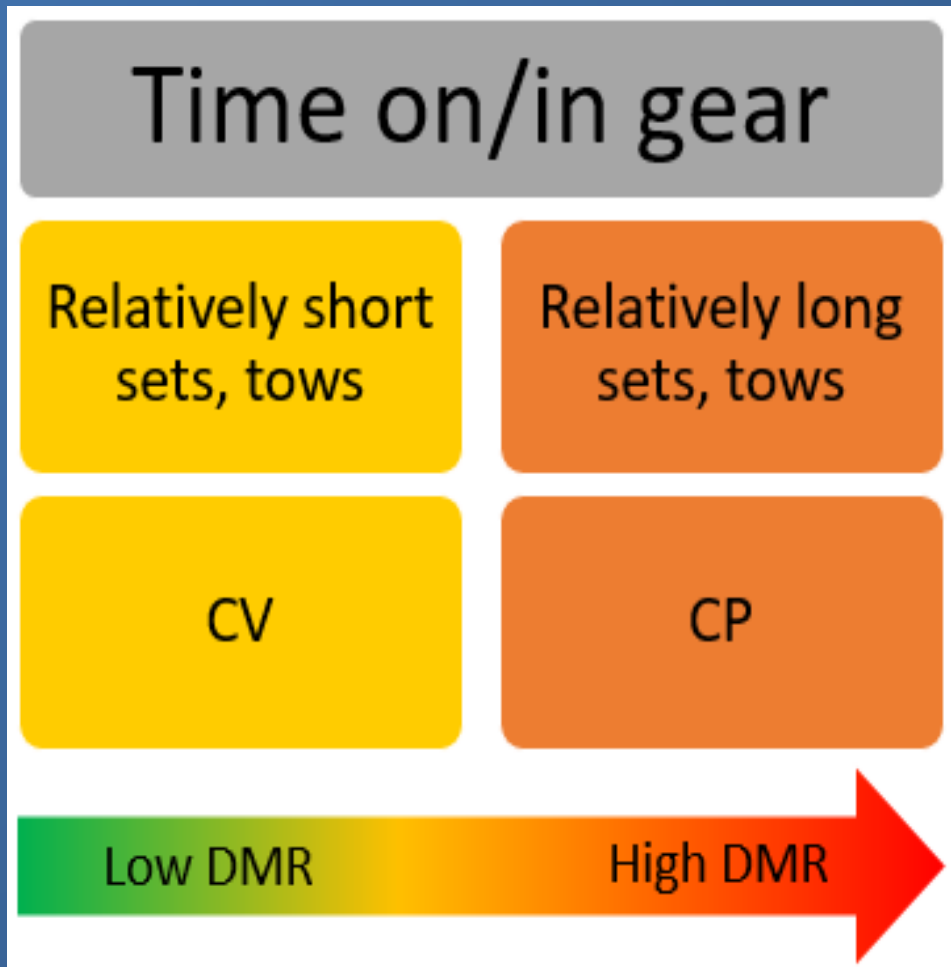
Sampling



Estimation

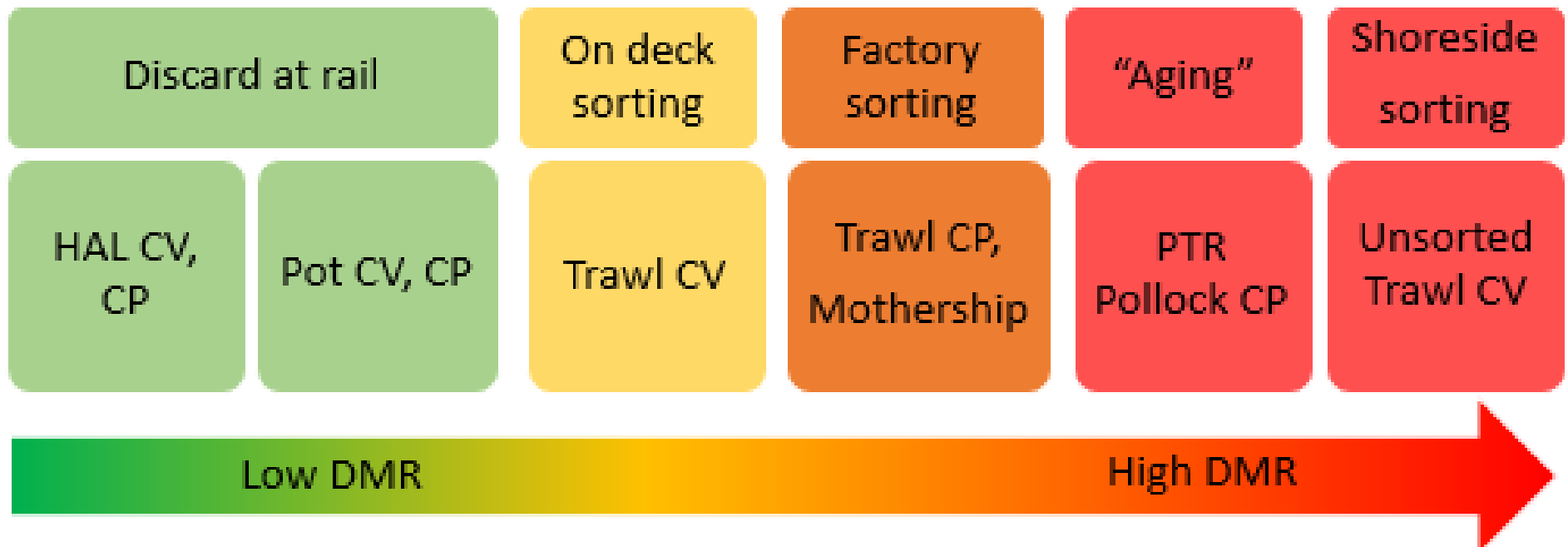


Operational Causes of DMR variation



Operational Causes of DMR variation

Time out of water



Operational Causes of DMR variation

Occurrence of physical injury

Gear

Vessel

Hook injury,
"sand fleas"

Puncture by
fish spines

Compression,
abrasion

Dehooking
injury

Injury in
factory

Injury,
asphyxiation
in hold

HAL CV,CP

Trawl, esp.
RPP

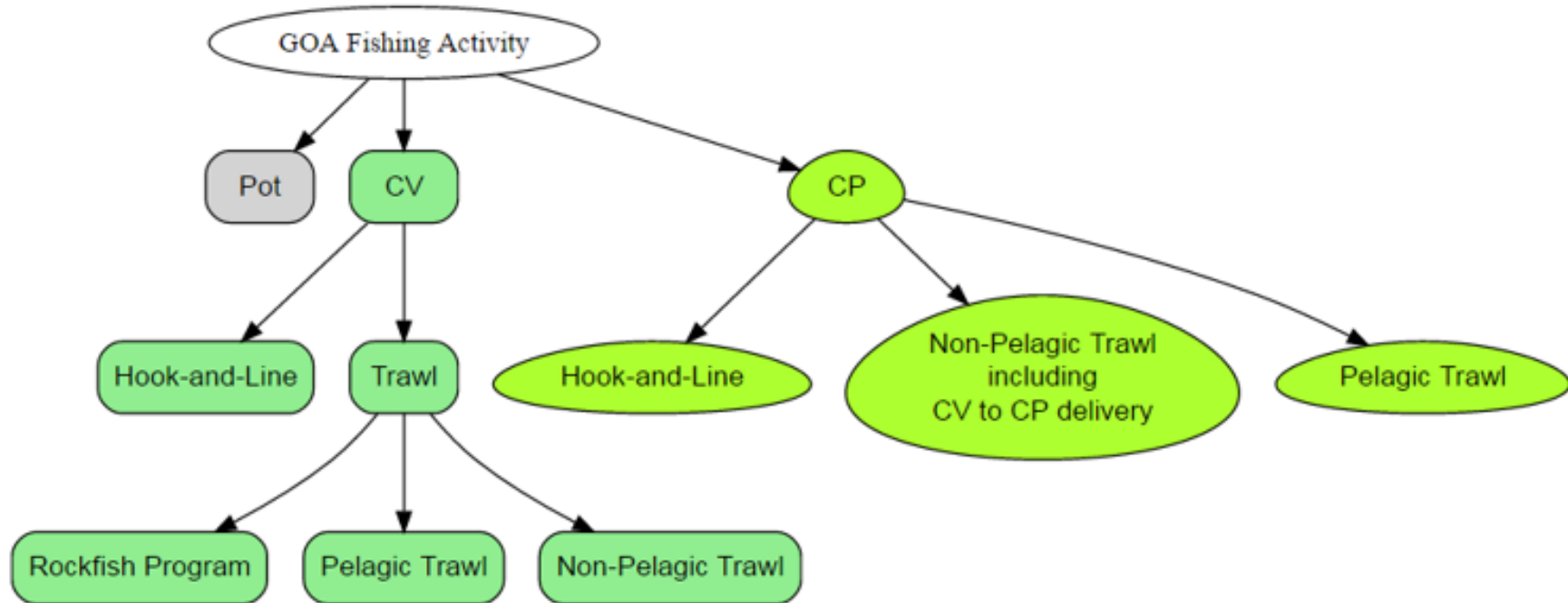
Trawl CV, CP

HAL CV, CP

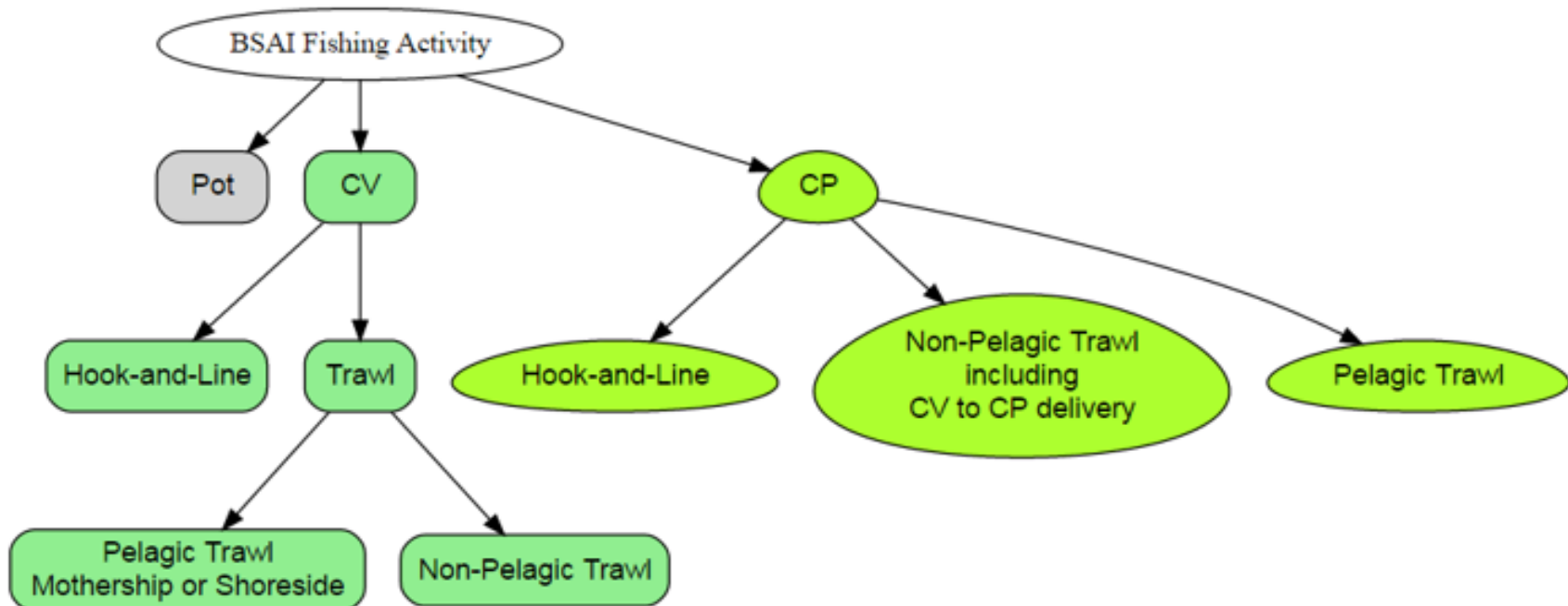
Trawl CP

RPP,
PTR CP

Operational Groupings



Operational Groupings



Data Limitations

Trawl

	VIABILITIES							
	2009	2010	2011	2012	2013	2014	2015	2016
CP	22236	13797	12189	8614	9310	6139	2863	11659
BSAI	21066	13228	11286	8023	8886	5975	2862	11637
NPT	0967	7375	2363	1410	2080	1920	463	9074
FTR	12090	5053	8923	6613	6000	4047	2309	2463
GQA	1171	569	903	591	424	164	1	122
NPT	1170	569	903	591	424	164	1	122
FTR	1	3	0	0	0	0	0	0
CV	3724	4826	6999	5803	3067	3547	2552	3984
BSAI	1937	2428	4234	2921	2406	3002	2112	2503
NPT	765	2151	2972	2228	2090	2780	1977	2431
FTR	1172	277	1262	693	308	222	135	72
GQA								
NPT	1291	2197	1521	2582	501	477	319	1218
ROCK_GT	53	79	99	130	81	39	69	275
FTR	4	28	1		4	0	0	0
Grand Total	25960	18622	18088	14417	12377	9686	5405	15543

	DMRs							longterm average	2013-2015 average
	2009	2010	2011	2012	2013	2014	2015		
CP									
BSAI									
NPT	87.76%	85.87%	83.17%	81.60%	86.53%	87.14%	81.59%	85%	85%
FTR	90.0%	90.0%	89.9%	89.9%	90.0%	90.0%	90.0%	90%	90%
GQA									
NPT	70.54%	84.00%	73.00%	84.20%	82.34%	81.34%	90.00%	81%	82%
FTR	20.0%							20%	NA
CV									
BSAI									
NPT	42.03%	67.41%	62.31%	68.33%	43.55%	51.73%	59.61%	58%	52%
FTR	90.0%	85.8%	87.0%	89.9%	88.0%	81.4%	81.2%	86%	84%
GQA									
NPT	52.51%	62.41%	52.74%	58.12%	66.35%	65.62%	34.38%	60%	65%
ROCK_GT	77.05%	53.60%	52.34%	56.22%	59.29%	65.24%	76.96%	63%	67%
FTR		20.0%			20.0%			20%	20%

Data Limitations

HAL

VESSELS								
	2009	2010	2011	2012	2013	2014	2015	2016
CP	53	48	38	35	38	38	37	33
BSAI	36	33	29	30	30	29	29	27
GOA	17	15	9	5	8	9	8	6
CV	3	2	1	2	31	81	72	44
BSAI					2	11	11	2
GOA	3	2	1	2	29	70	61	42
Grand Total	56	50	39	37	69	119	109	77

HAULS								
	2009	2010	2011	2012	2013	2014	2015	2016
CP	2697	2376	2766	2747	3569	3306	3325	1314
BSAI	2380	2101	2412	2667	3449	2986	2894	1202
GOA	217	275	354	80	120	320	431	112
CV	22	27	9	42	205	332	253	128
BSAI					2	26	21	2
GOA	22	27	9	42	203	306	232	126
Grand Total	2619	2403	2775	2789	3774	3638	3578	1442

VIABILITIES								
	2009	2010	2011	2012	2013	2014	2015	2016
CP	11551	10704	13373	13156	15994	11781	10977	4465
BSAI	10323	9015	11261	12637	15348	10332	9356	3658
GOA	1228	1689	2112	319	646	1449	1621	807
CV	90	163	18	127	933	1236	1048	619
BSAI					11	82	94	5
GOA	90	163	18	127	922	1154	954	514
Grand Total	11641	10867	13391	13283	16927	13017	12025	4984

DMRs									long term average	2013-2015 average	
	2009	2010	2011	2012	2013	2014	2015	2016			
CP											
BSAI	9.71%	8.42%	9.58%	8.97%	8.97%	8.47%	7.85%			8.85%	8.43%
GOA	10.0%	8.9%	9.1%	12.3%	12.2%	9.5%	10.5%			10.34%	10.73%
CV											
BSAI	NA	NA	NA	NA	NA	23.74%	3.50%			13.62%	13.62%
GOA	6.93%	9.52%	5.32%	39.00%	13.44%	8.62%	13.93%			13.82%	11.99%

Data Limitations

Pot

	VESSELS						
	2009	2010	2011	2012	2013	2014	2015
BSAI	16	25	32	26	21	20	24
GOA	9	11	16	15	26	17	32
Grand	25	36	48	41	47	37	56

	HAULS						
	2009	2010	2011	2012	2013	2014	2015
BSAI	129	236	348	428	259	264	310
GOA	42	40	200	228	163	68	208
Grand	171	276	548	656	422	332	518

	VIABILITIES						
	2009	2010	2011	2012	2013	2014	2015
BSAI	231	616	1259	1502	491	498	723
GOA	78	179	1067	1070	363	179	891
Grand	309	795	2326	2572	854	677	1614

	DMRs							long term	2013-2015
	2009	2010	2011	2012	2013	2014	2015	average	average
BSAI	8.80%	23.68%	15.28%	12.72%	7.25%	5.30%	6.02%	11.29%	6.19%
GOA	0.00%	7.53%	4.31%	15.56%	16.86%	10.27%	1.61%	8.02%	9.58%

Results

Operational Group				Sample Size (Mean Annual N _{Viabilities})	Estimate DMR?	DMR
Sector	Region	Gear	Target			
CP	BSAI	PTR	pollock	6,051	N	100%
			non-pollock	1	N	100%
		NPT	all	4,306	Y	85%
		HAL	all	11,210	Y	8%
		POT	all	686 ^b	Y	6%
	GOA	PTR	pollock	0	N	100%
			non-pollock	0	N	100%
		NPT ^a	all	493	N	85%
		HAL	all	1,295	Y	11%
		POT	all	523 ^c	Y	10%
CV	BSAI	PTR	pollock	569	N	100%
			non-pollock	14	N	100%
		NPT	all	2,174	Y	52%
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	GOA	PTR	pollock	2	N	100%
			non-pollock	4	N	100%
		NPT	RPP ^e	103	Y	67%
			non-RPP	1,265	Y	65%
		HAL	all	490	Y	12%
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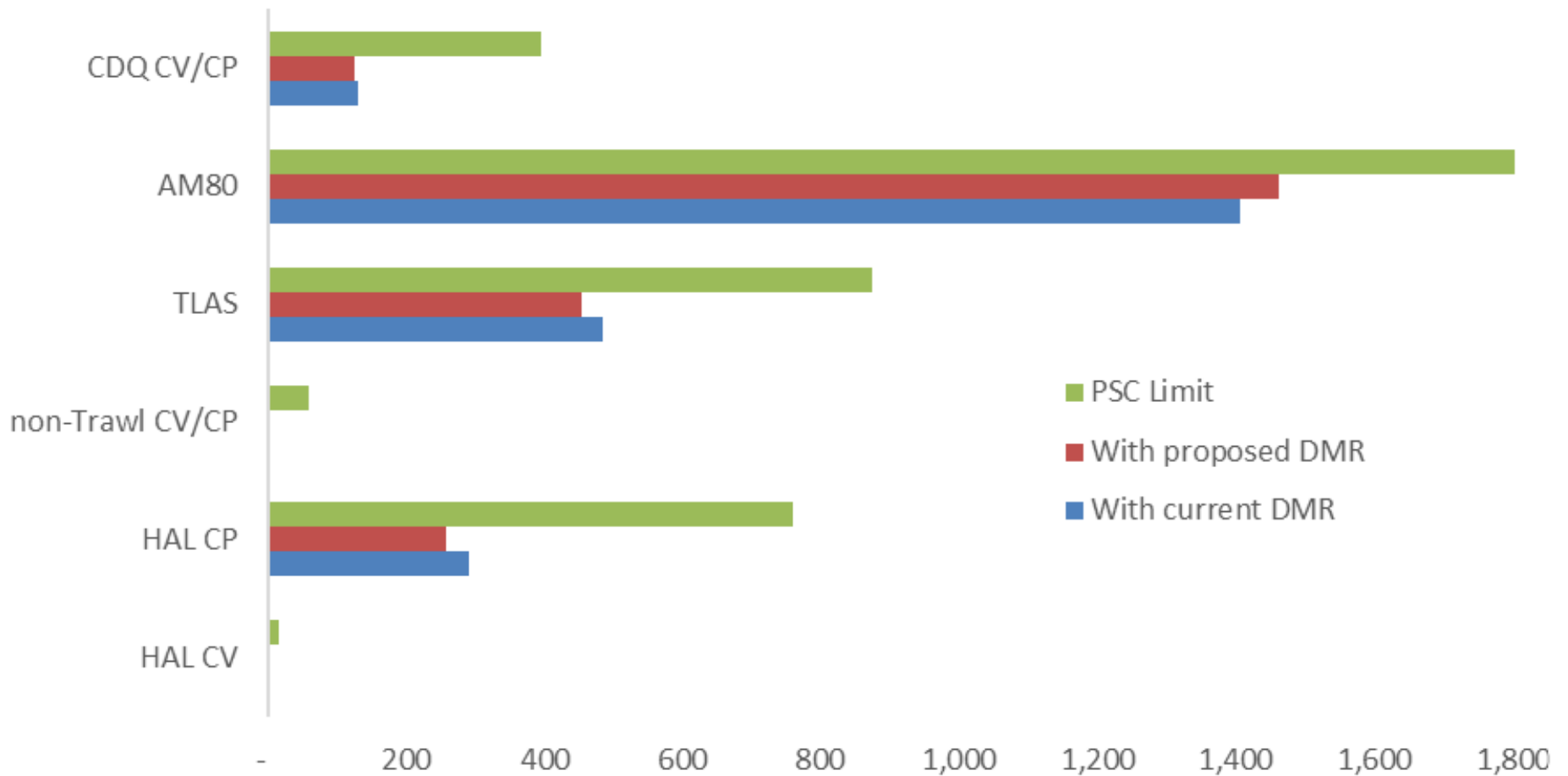
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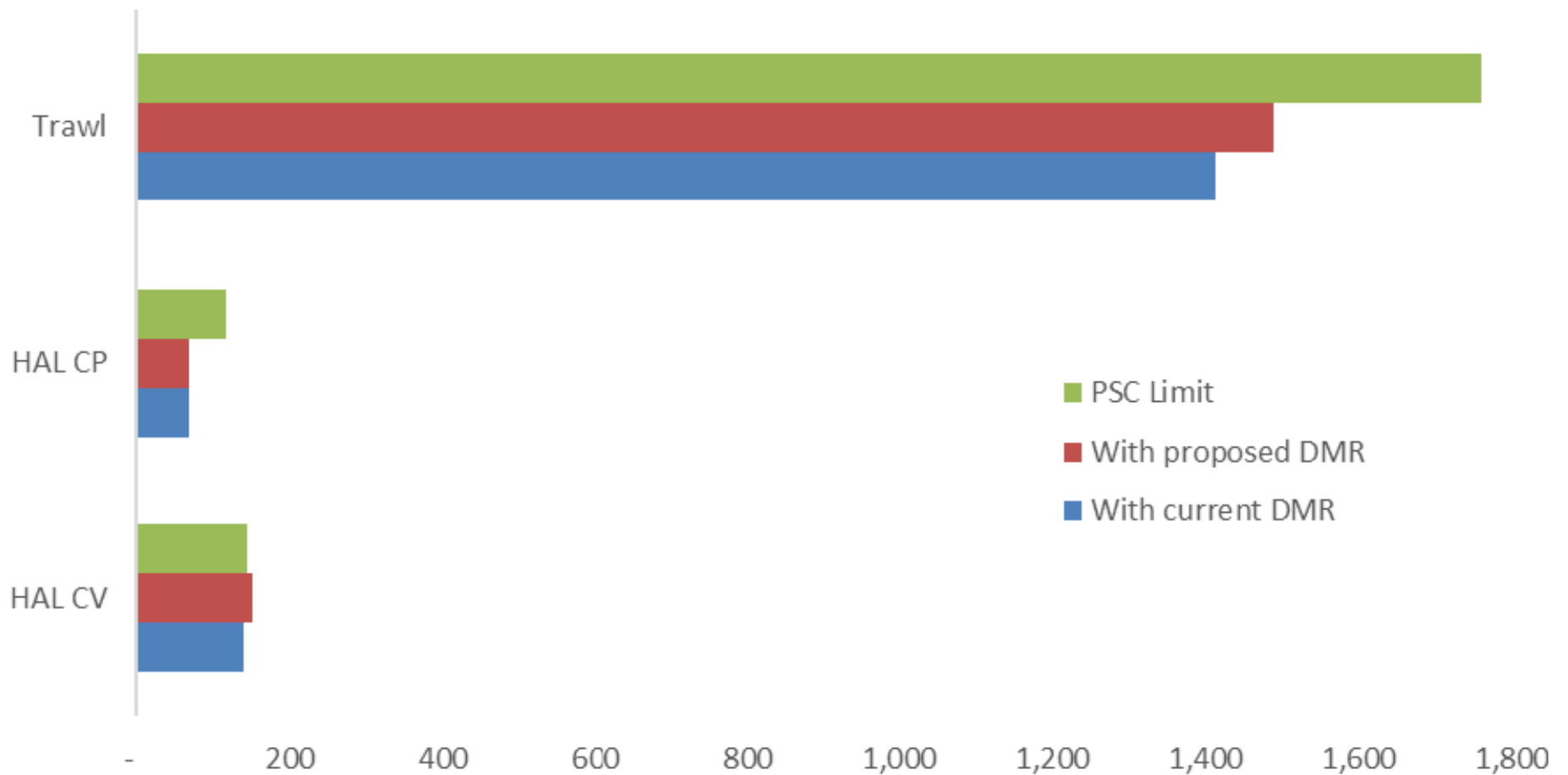
Changes Relative to Current DMRs and PSC Limits

BSAI Halibut Mortalities



Changes Relative to Current DMRs and PSC Limits

GOA Halibut Mortalities



Changes Relative to Current DMRs and PSC Limits

BSAI

BSAI Sector		2016 Halibut mortality			2016 Halibut PSC Limit	2015 Halibut mortality			2015 Halibut PSC Limit
		With current DMR	With proposed DMR	Current minus Proposed		With current DMR	With proposed DMR	Current minus Proposed	
	CV	0	0	(0)	13	2	2	(1)	15
Hook-and-line Pacific cod	CP	134	119	15	648	289	257	32	760
Non-trawl	CV/CP	2	1	0	49	3	2	1	58
BSAI trawl limited access	CV/CP	537	502	35	745	484	453	31	875
Amendment 80	CP	918	934	(16)	1,745	1,404	1,461	(57)	2,325
CDQ	CV/CP	110	107	4	315	130	124	5	393
Total		1,701	1,663	38	3,515	2,312	2,300	12	4,426

Does not include the 2016 trawl deck sorting Experimental Fishing Permit (EFP) halibut mortality.

Does not include the 2015 Amendment 80 deck sorting EFP halibut mortality of 232 mt.

GOA

GOA Sector		2016 Halibut mortality			2016 Halibut PSC Limit	2015 Halibut mortality			2015 Halibut PSC Limit
		With current DMR	With proposed DMR	Current minus Proposed		With current DMR	With proposed DMR	Current minus Proposed	
	CV	151	181	(30)	129	139	151	(13)	145
Hook-and-line Pacific cod	CP	46	50	(5)	128	69	69	(0)	116
Trawl	CV/CP	1,047	1,042	5	1,706	1,413	1,487	(75)	1,759
Total		1,243	1,273	(30)	1,963	1,620	1,708	(87)	2,020

Summary Points

- New process
 - Consistent with sampling design
 - Operationally based
 - Abbreviated reference timeframe
 - Inter-agency
 - Review at all levels
 - Transparency/Transferability
 - Feedback to Observer Program
 - Ongoing Improvements

Next Steps (Short Term)

- ~~1. Revisions, improvements to supporting document~~
2. Final review by PT in November
3. Final review by SSC, AP, Council in December
4. Specification for 2017, 2018

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Next Steps (Long Term)

1. Resolve database issues with GOA RPP CVs
2. Seasonal variation in DMRs
3. Variance estimation
4. Respond to IPHC basis review