Agenda Item F.7.a
Supplemental WDFW PowerPoint
September 2016

Highlights of WDFW's *Assessment of Managing Darkblotched Rockfish and Pacific Ocean Perch as Set Asides in the At-Sea Sectors*

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September 2016

Proposed Action

No Action = “hard caps”

Alternative 1 = “soft(er) caps”

*Note: Figure and Table references are to the WDFW Report included under this agenda item.

Suggested Framework for Consideration

How do the options differ in terms of?:

1. How well they achieve the conservation and management purposes for identifying specific amounts of darkblotched and POP for the at-sea sectors.

2. Costs, burdens, and adverse economic impacts.

Costs and Adverse Impacts

They would be expected to be lower for two reasons:

1. Much reduced chance of being closed for hitting darkblotched and POP caps and forgoing marketable yield of whiting.

2. Some relief bycatch avoidance measure (e.g., they may not need to move as much).

What are the conservation and management purposes?

- Control catch to the ACL.
- Reduce changes that one sector is affected by high catch in another.
- Provide sectors with some level of certainty for business planning.
- Insert yours here (e.g., National Standard 9, fairness, etc. etc.).

How do hard caps work?

Two basic effects:

1. They create a strong incentive to avoid bycatch.
2. They limit the impact if the incentive doesn't work by stopping the fishery.

How would proposed action change this?

Bycatch could increase because:

1. The incentive to avoid bycatch is reduced and the co-ops change fishing behavior.*
2. The impact is no longer stopped when overages occur.*

*Yet…

INCENTIVES AND FISHING BEHAVIOR

How much does the incentive relax?

- Some relaxation is desired and would be expected, but how much will co-ops really change their practices?

Incentives only work to the degree that the outcome is under the control of the co-ops.

- How much of the risk is due to randomness?

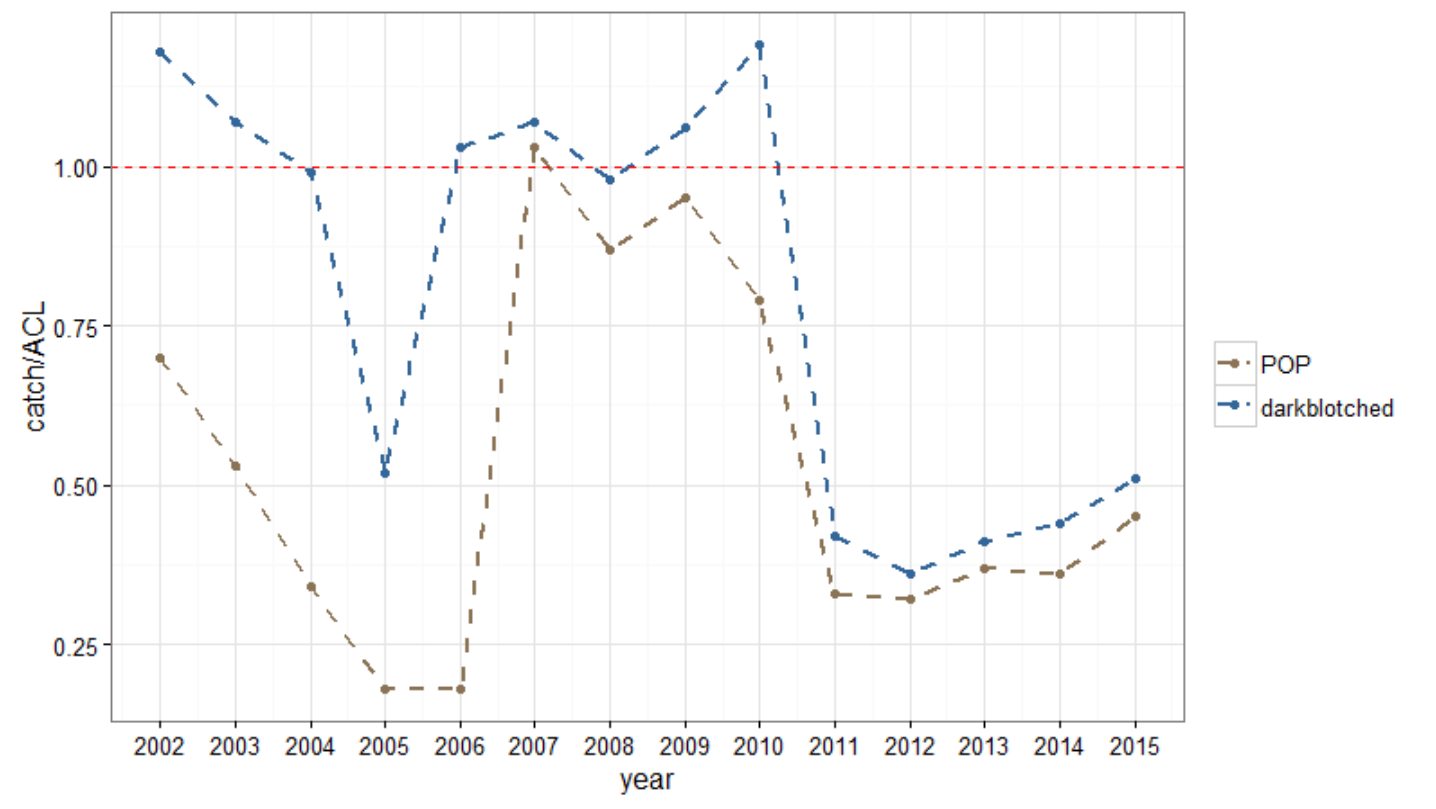
REGULATIONS ON SET ASIDES

"inseason action may be taken" if "there is":

1. a risk of a harvest specification being exceeded,
2. unforeseen impact on another fisheries, or
3. conservation concerns.

50 CFR §§ 660.150(c) and 660.160(c)

ACL RISK


1.00
0.75
0.50
0.25
catch/ACL
2002
2003
2004
2005
2006
2007
2008
2009
2010
2011
2012
2013
2014
2015
year
POP
darkblotched

THE RECOMMENDED ACL BUFFERS

Table 1: Harvest Specifications for Darkblotched Rockfish and POP in 2017 and 2018

Harvest Specification	Darkblotched Rockfish		POP	
	2017	2018	2017	2018
Buffer	50	50	25	25

HOW OFTEN WOULD OVERAGES BE EXPECTED?

Table 5. Quantiles at Which Simulated Seasons Reach the Darkblotched Allocations

Sector	Allocation/ Set Aside (mt)	Scenario	Quantile at which amount is reached	1 - quantile
CP	16.4	1	0.97	0.03
		2	0.92	0.08
		3	0.97	0.03
		4	0.92	0.08
MS	11.6	1	0.97	0.03
		2	0.95	0.05
		3	0.97	0.03
		4	0.95	0.05

Table 7. Quantile at Which Simulated Seasons Reach POP Allocations

Sector	Allocation/ Set Aside (mt)	Scenario	Quantile at which amount is reached	1 - quantile
CP	12.7	1	0.87	0.13
		2	0.87	0.13
		3	0.87	0.13
		4	0.87	0.13
MS	9.0	1	0.94	0.06
		2	0.94	0.06
		3	0.94	0.06
		4	0.94	0.06

Table 8. Quantile at which Combined Catch from Both Sectors Exceeds Combined Sector Allocations

Stock	Sum of CP and MS Allocation/Set Asides (mt)	Scenario	Quantile at which amount is reached
Darkblotched	28.0	1	0.9987
		2	0.9948
		3	0.9951
		4	0.9783
POP	21.7	1	0.9905
		2	0.8826
		3	0.9904
		4	0.8765

HOW LARGE WOULD WE EXPECT OVERAGES TO BE?

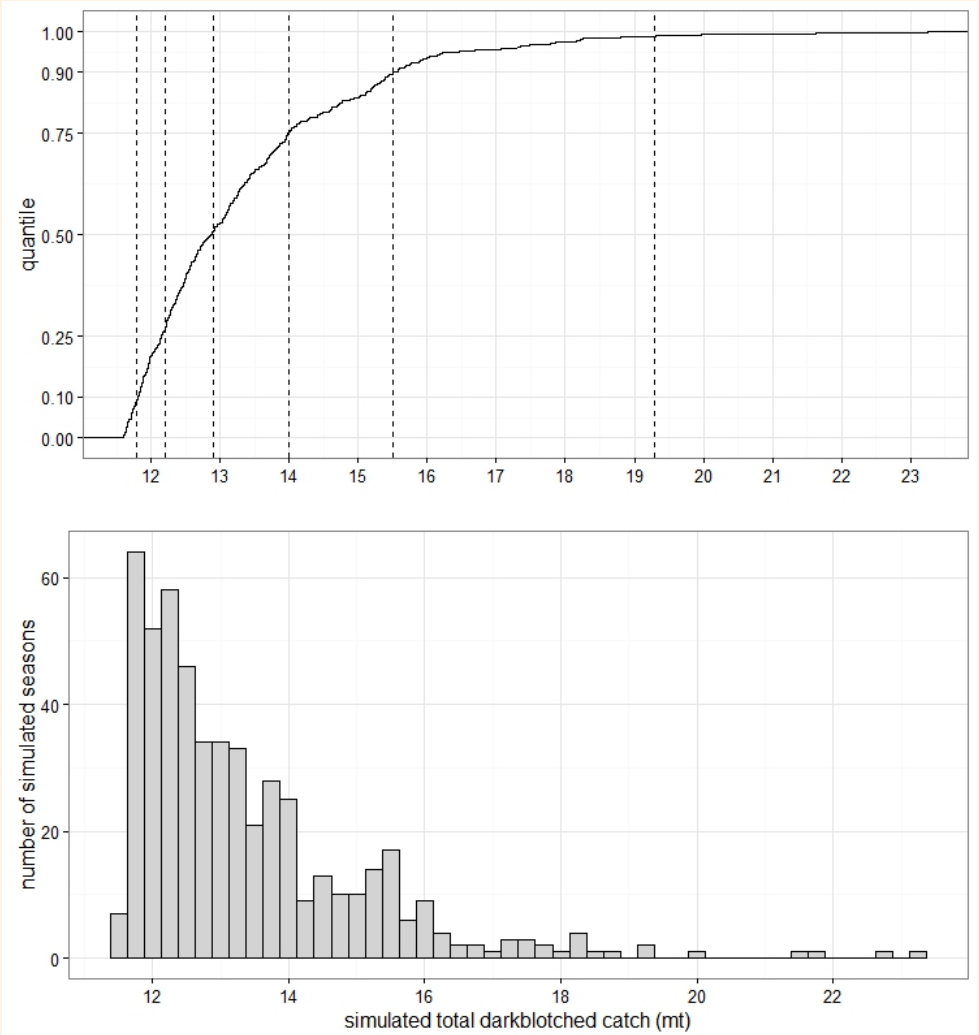
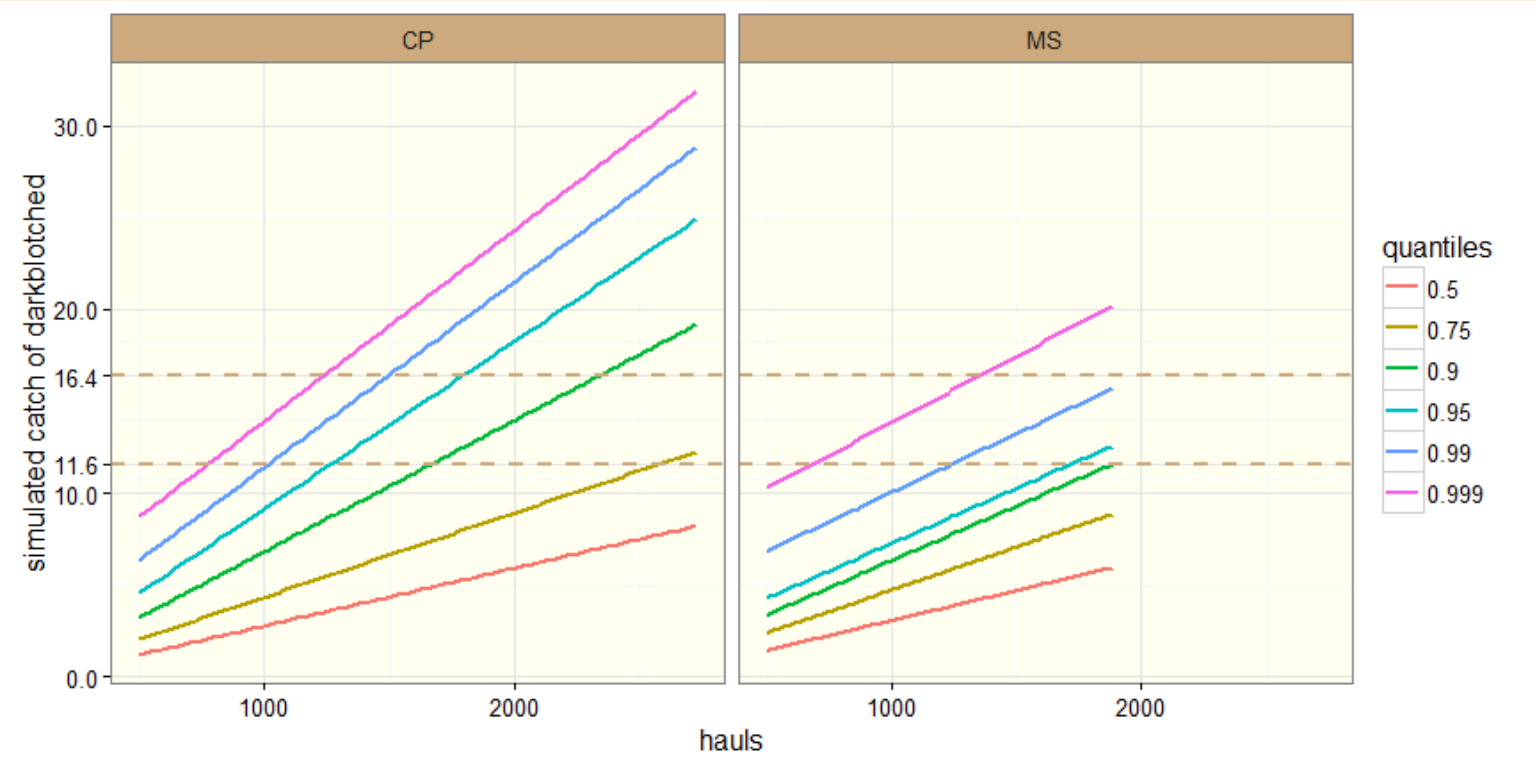


Figure 2. MS sector cumulative distribution graph (top-panel) and histogram (bottom-panel) of simulated total darkblotched catch from scenario 4 in overage seasons only. The vertical dashed lines in the top panel mark the overages corresponding to the 0.10, 0.25, 0.50, 0.75, 0.90, and 0.99 quantiles, moving left to right (actual values are not displayed because of visual overlap).

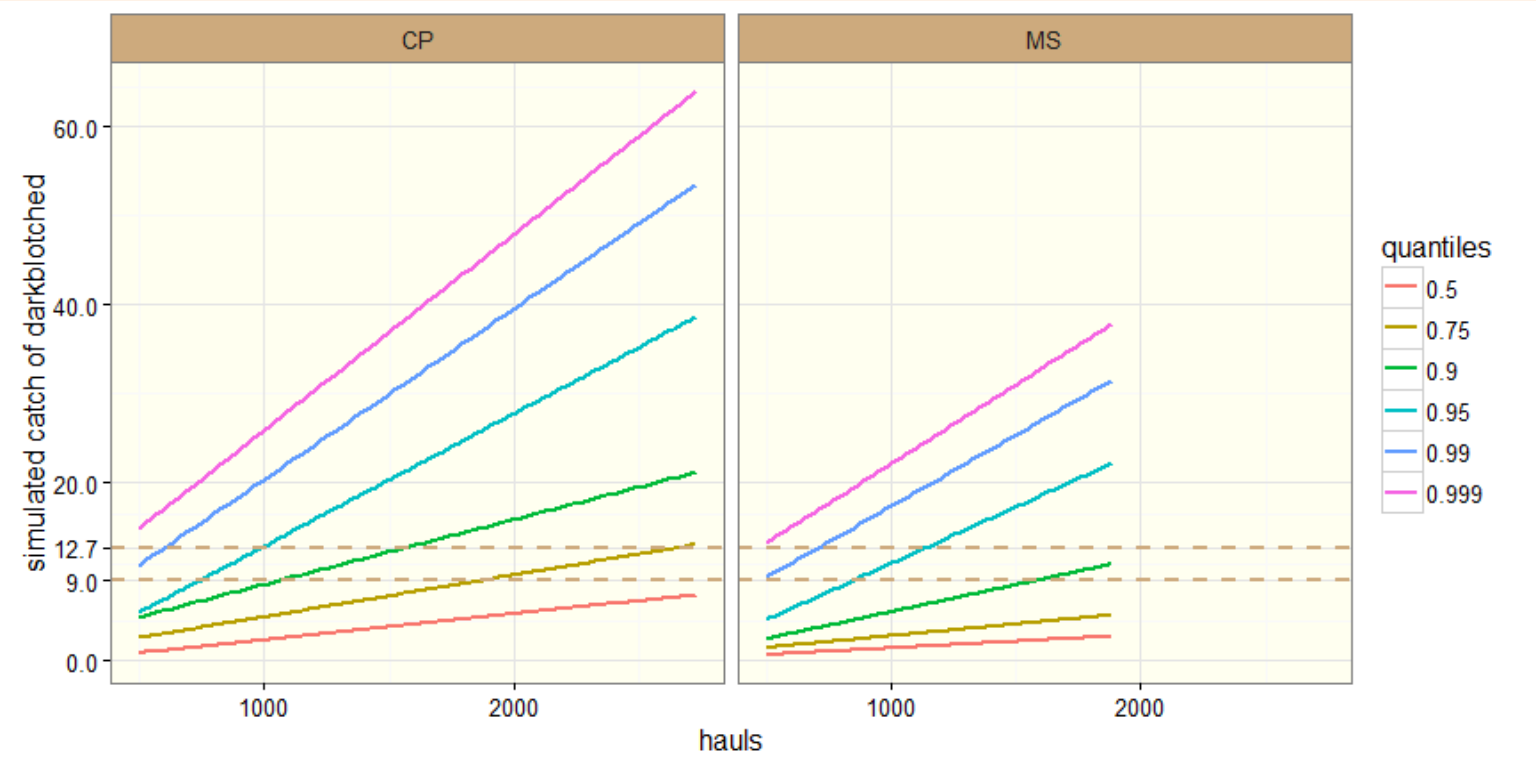
Table 9: Bootstrap Simulation Results for Difference of Combined Catch and Allocation of Darkblotched and POP (Positive values indicate an overage).

Stock	Scenario	Percentage of Simulated Seasons					
		0.01	0.25	0.5	0.75	0.95	0.9999
Darkblotched	1	-25.7	-20.2	-17.1	-14	-8	1.5
	2	-25.6	-19.8	-16.2	-12	-5.6	2.2
	3	-25.7	-20.2	-17.1	-14	-7.6	8.6
	4	-25.6	-19.8	-16.2	-12	-3.5	9.5
POP	1	-21.2	-17.4	-13.3	-8.7	-4.1	4.8
	2	-21.2	-17.4	-13.3	-7.9	9.8	42.1
	3	-21.2	-17.4	-13.3	-8.6	-4.1	4.8
	4	-21.2	-17.4	-13.3	-7.7	13.9	50.7

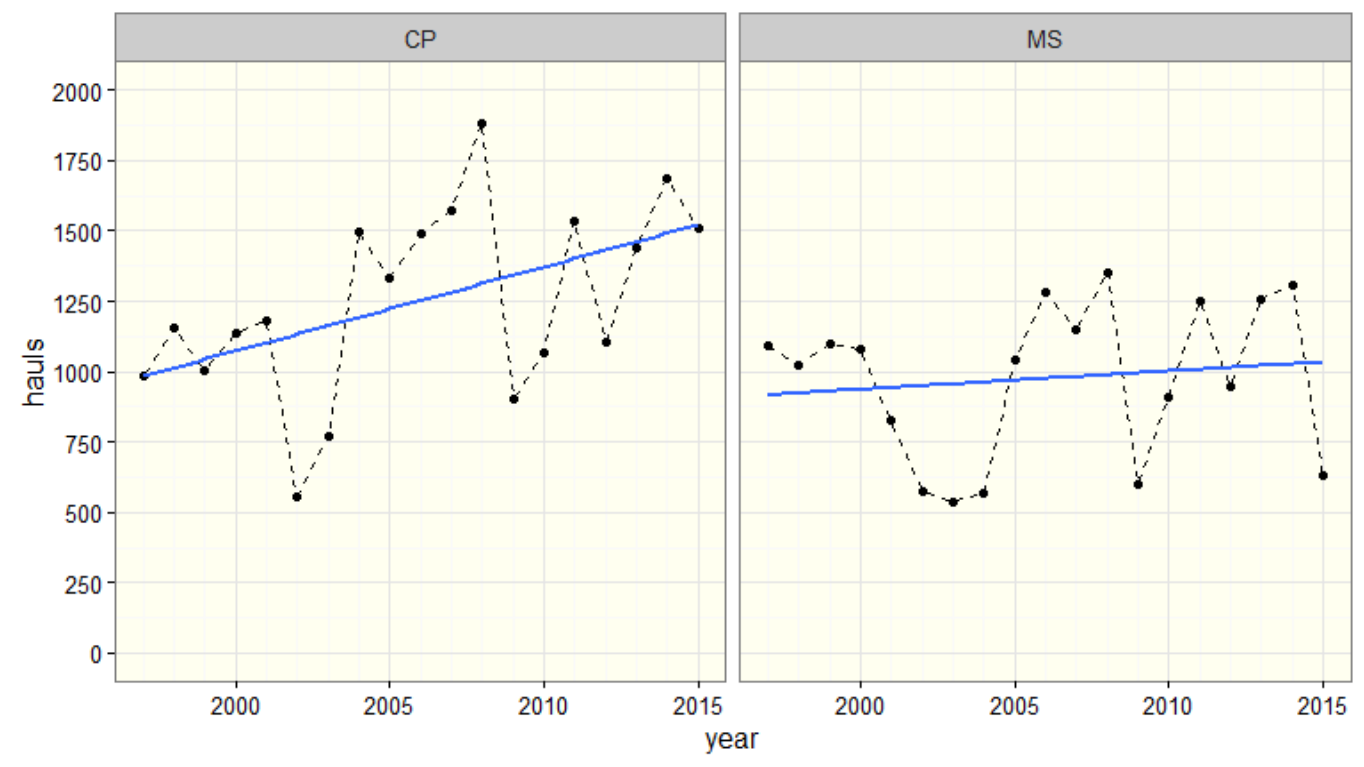
CATCH = **EFFORT** x CATCH PER UNIT EFFORT



Simulated darkblotched catch as function of the number of hauls per season (dashed horizontal lines show recommended 2017 allocation amounts).



Simulated POP catch as function of the number of hauls per season (dashed horizontal lines show recommended 2017 allocation amounts).



Number of hauls conducted per year, 1997-2015. Blue line shows linear trend line.

Catch As a Percentage of Initial Allocations and Final Allocations After Reapportionment, 2011-2015

	CP					MS				
Year	Total Catch (mt)	Initial Alloc. (mt)	%	After Reappor. (mt)	%	Total Catch (mt)	Initial Alloc. (mt)	%	After Reappor. (mt)	%
2011	71,679	75,138	95.4%	75,138	95.4%	50,051	53,039	94.4%	53,039	94.4%
2012	55,263	46,064	120.0%	55,584	99.4%	38,480	32,515	118.3%	39,235	98.1%
2013	77,950	69,374	112.4%	79,574	98.0%	52,450	48,970	107.1%	56,170	93.4%
2014	103,203	88,186	117.0%	103,486	99.7%	62,098	62,249	99.8%	73,049	85.0%
2015	68,484	90,673	75.5%	100,873	67.9%	27,660	64,004	43.2%	71,204	38.8%

CATCH = EFFORT x **CATCH PER UNIT EFFORT**

“LIGHTNING STRIKES”/ “DISASTER TOWS”

One, two, a few fish

⬇

A handful of fish

⬇

Tens of fish

⬇

Hundreds of fish

⬇

Thousands of fish

Table 10: Haul Bin Sizes with Average Number of Fish per Bin

Bin Number	1	2	3	4	5	6
Catch of per Haul (mt)	0	0-.005	0.005-0.03	0.03-0.01	0.1-0.4	> 0.4
Average Number of Darkblotched	--	3.2	17.5	79.9	263.5	1,150.2
Average Number of POP	--	2.8	14.2	61.3	217.5	1,025.4

How do different types of catch events contribute to the risk of overages?

Catch Per Unit Effort

Risk = Frequency x Impact (i.e. size)

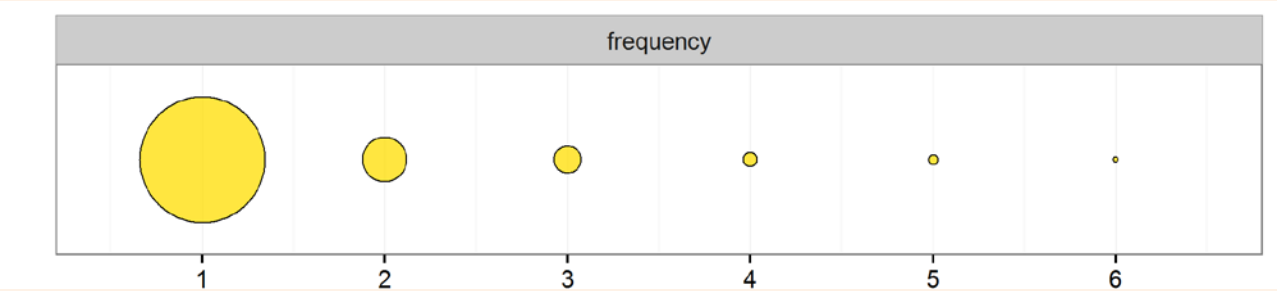
frequency

×

impact

=

risk



Darkblotched, 2011-2015. The total across all bins is 3.4 mt per 1,000 hauls

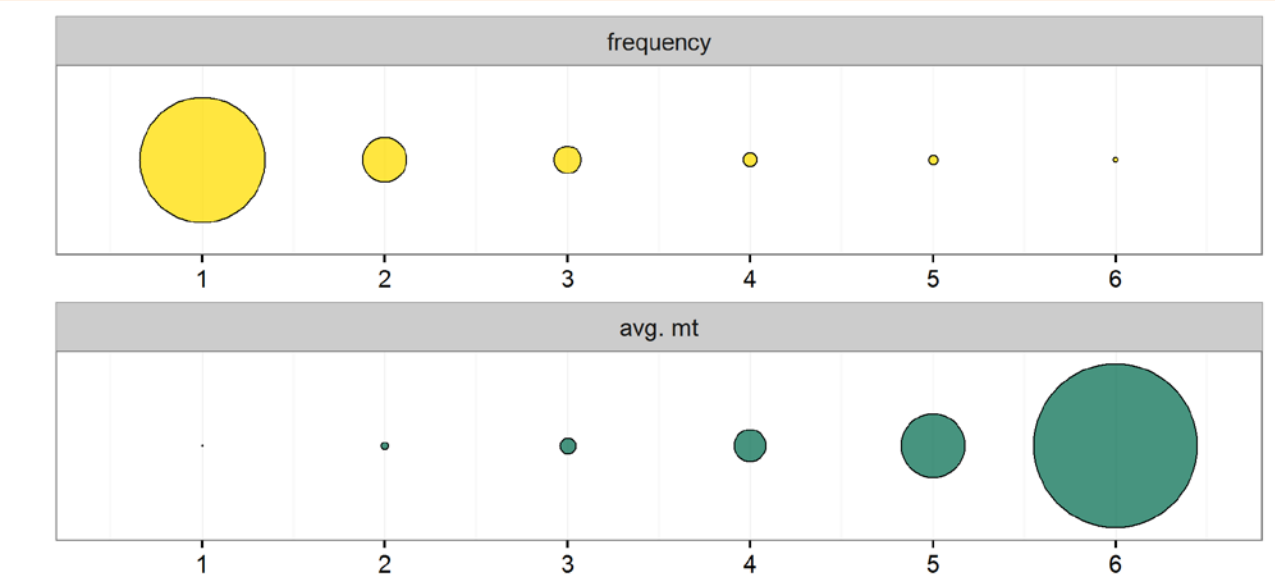
frequency

×

impact

=

risk



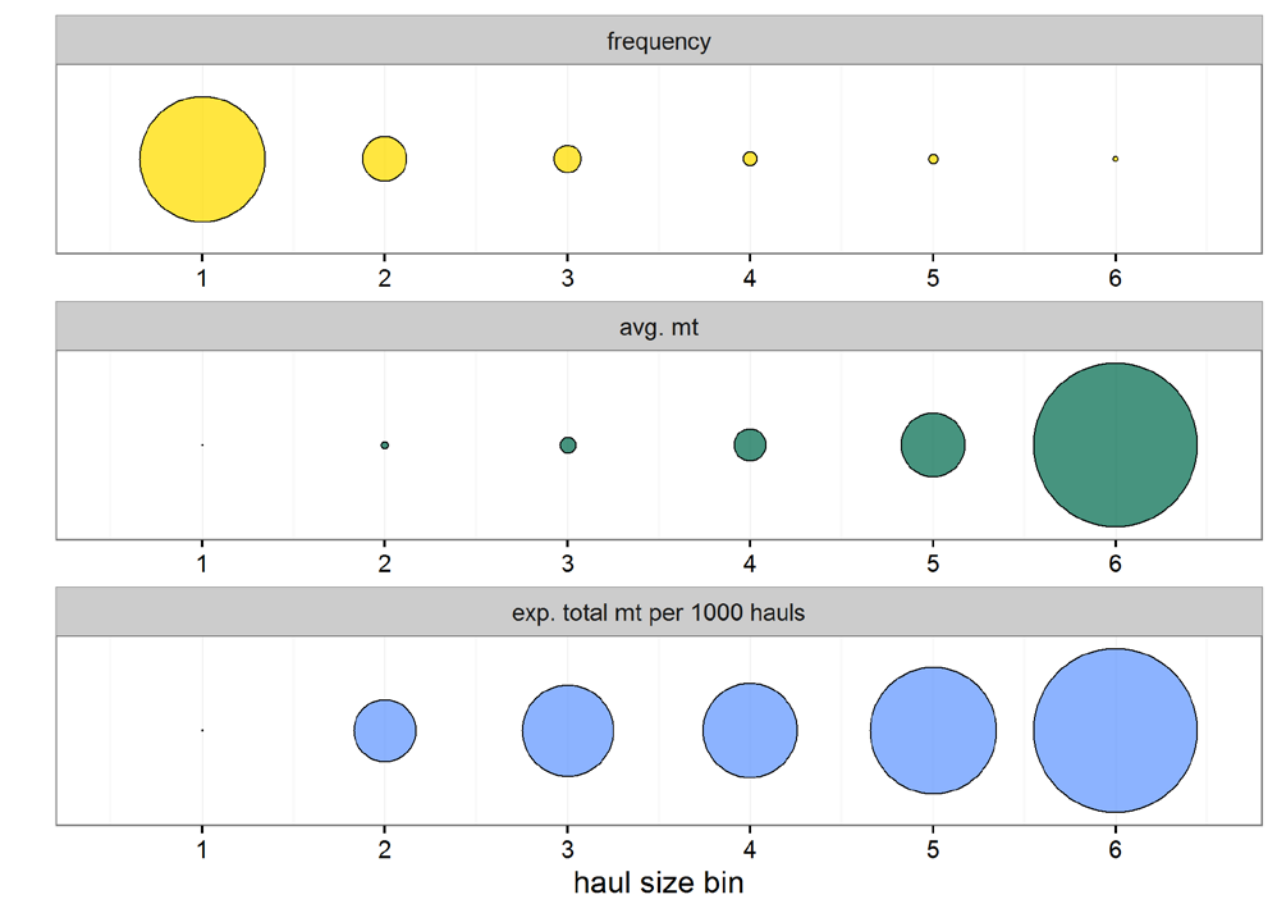
frequency

×

impact

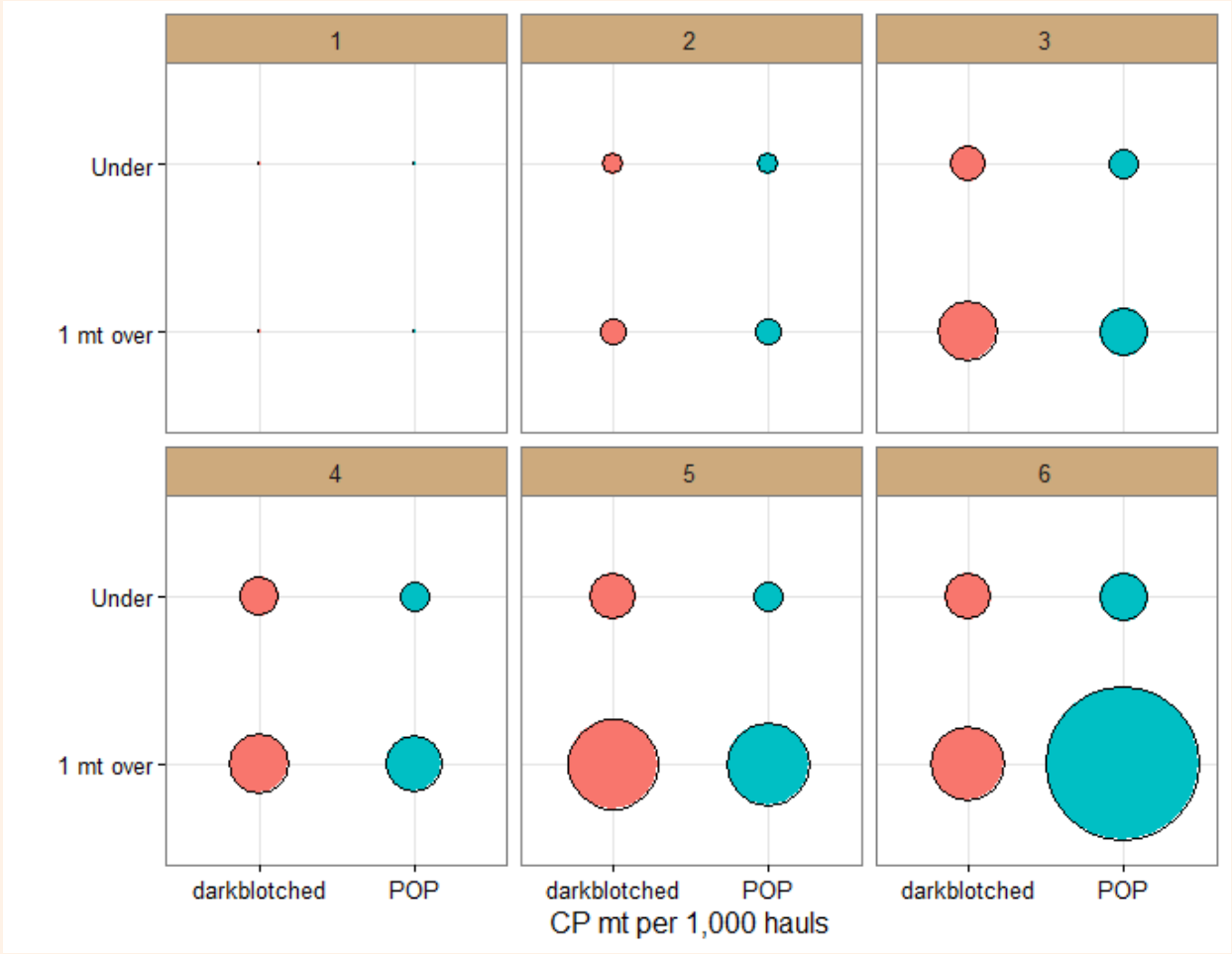
=

risk

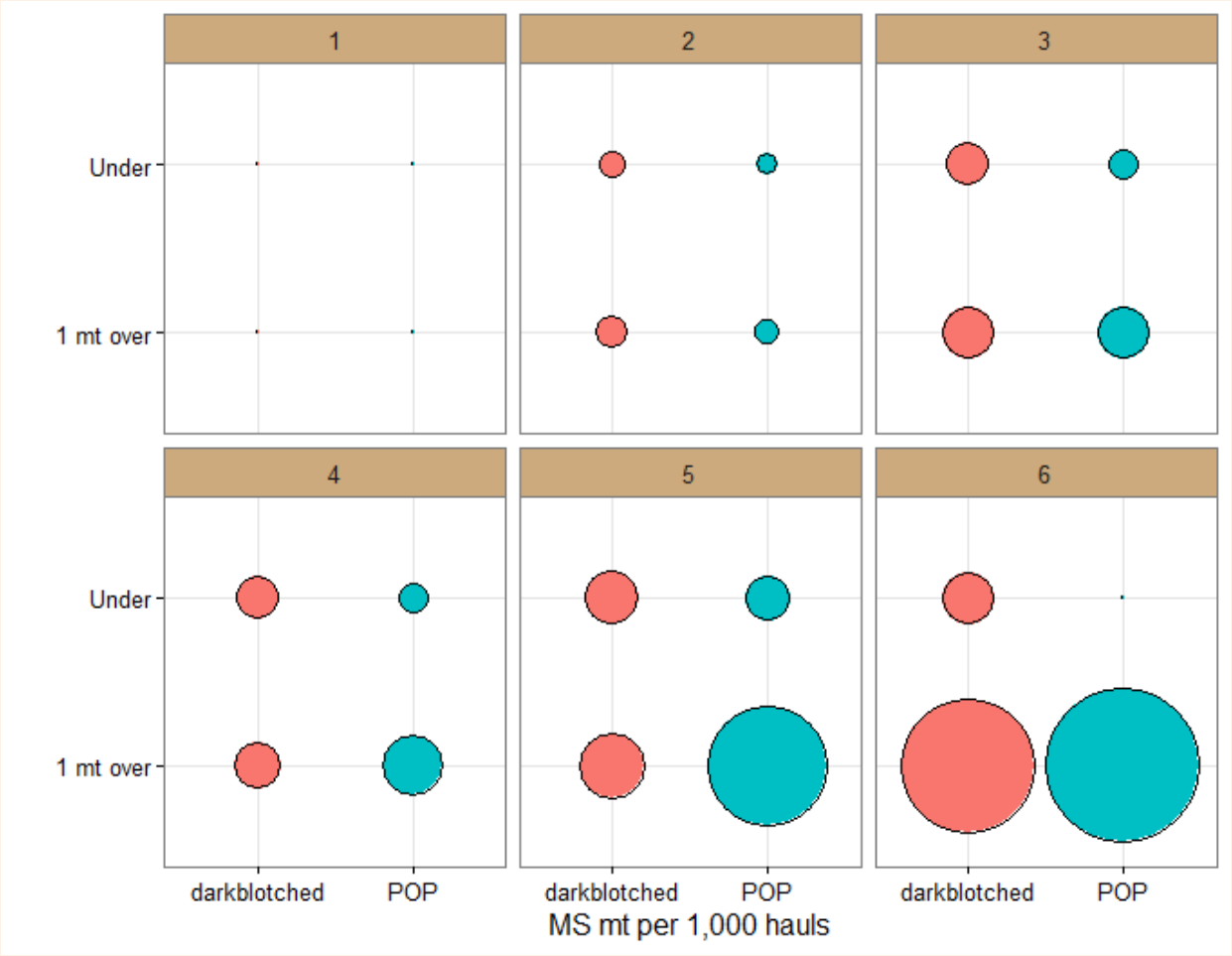


CP Darkblotched, 2011-2015. The total across all bins is 3.4 mt per 1,000 hauls

HOW DO BINS COMPARE BETWEEN OVERAGES AND "UNDERAGES"?

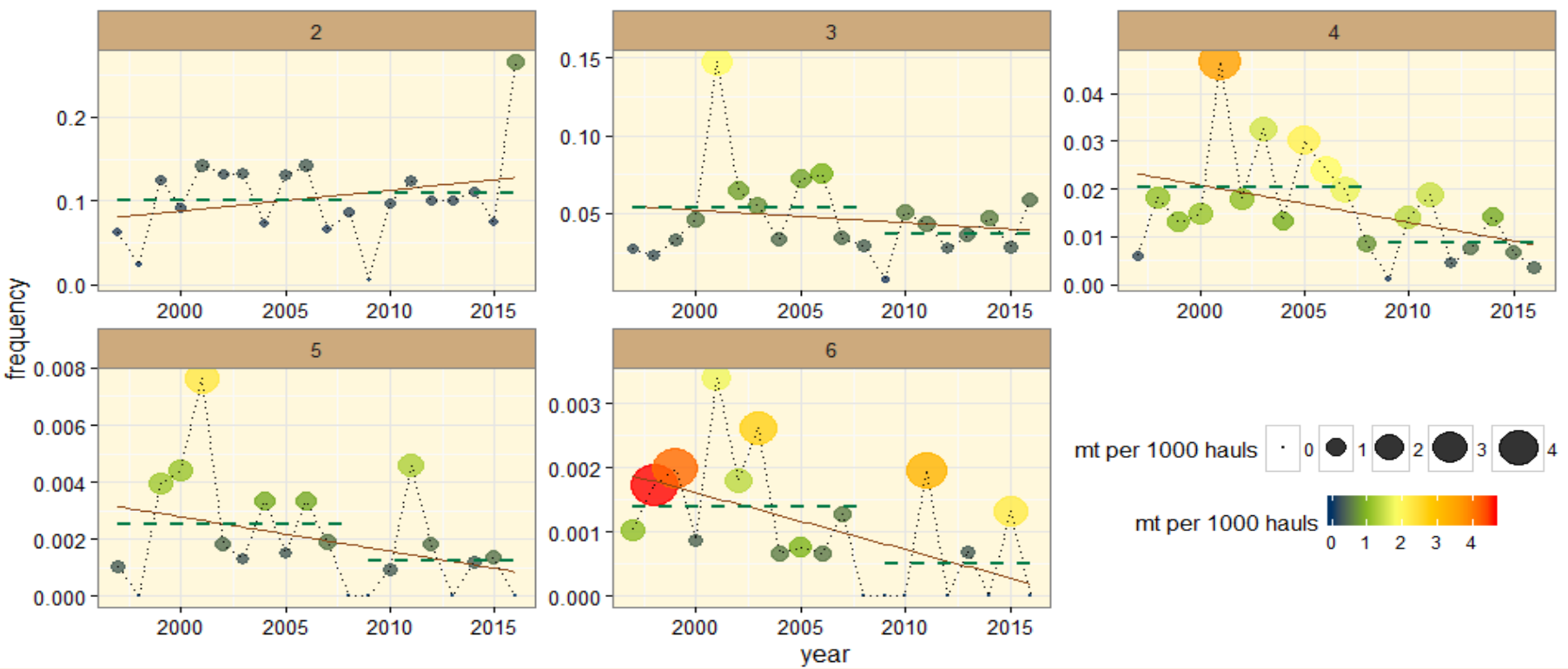


Change in “Risk” between simulated seasons (scenario 4) that are under and those that are over the allocations by more than 1 mt. Based on average results displayed in Tables 11 and 12 of the WDFW Report.

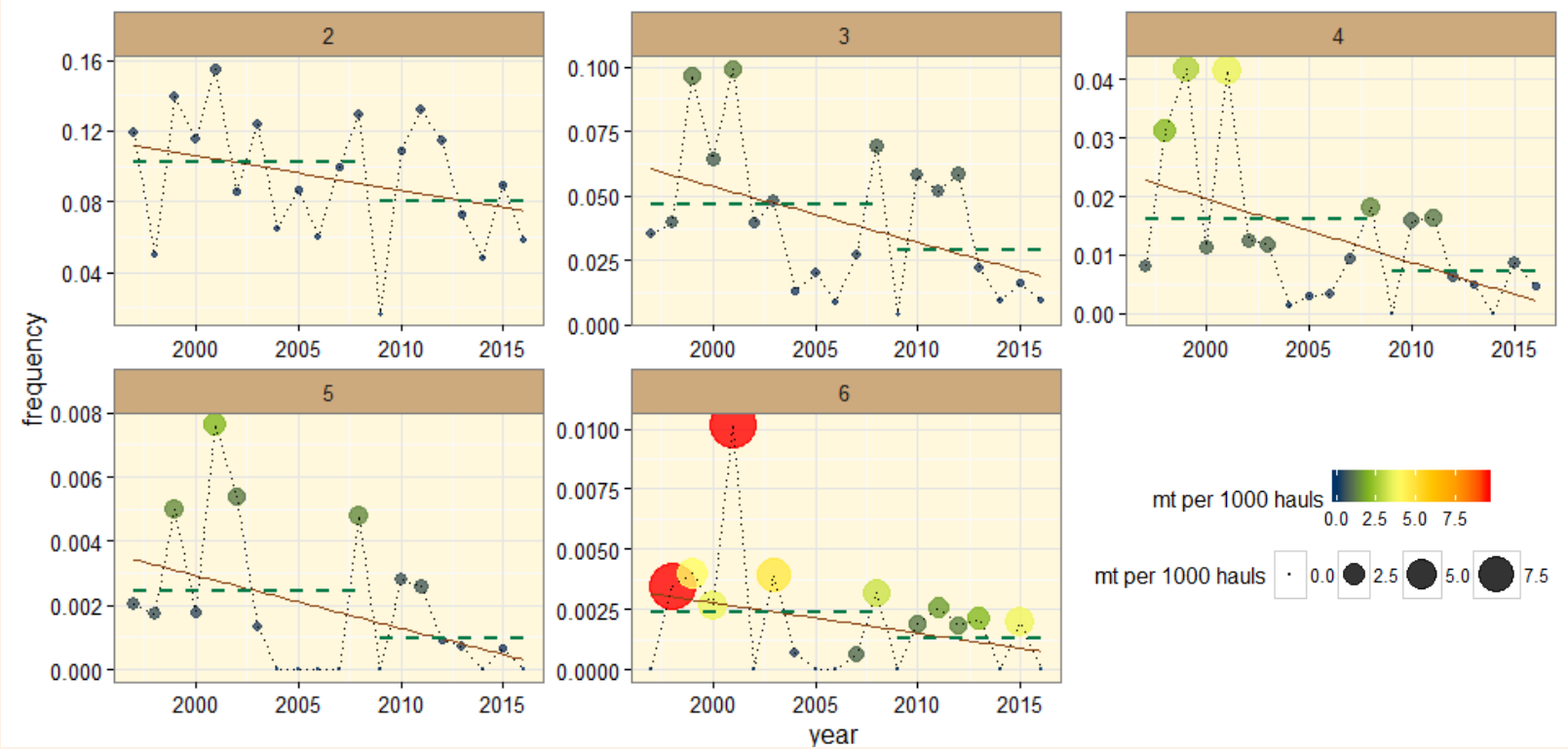


Change in “Risk” between simulated seasons (scenario 4) that are under and those that are over the allocations by more than 1 mt. Based on average results displayed in Tables 13 and 14 of the WDFW Report.

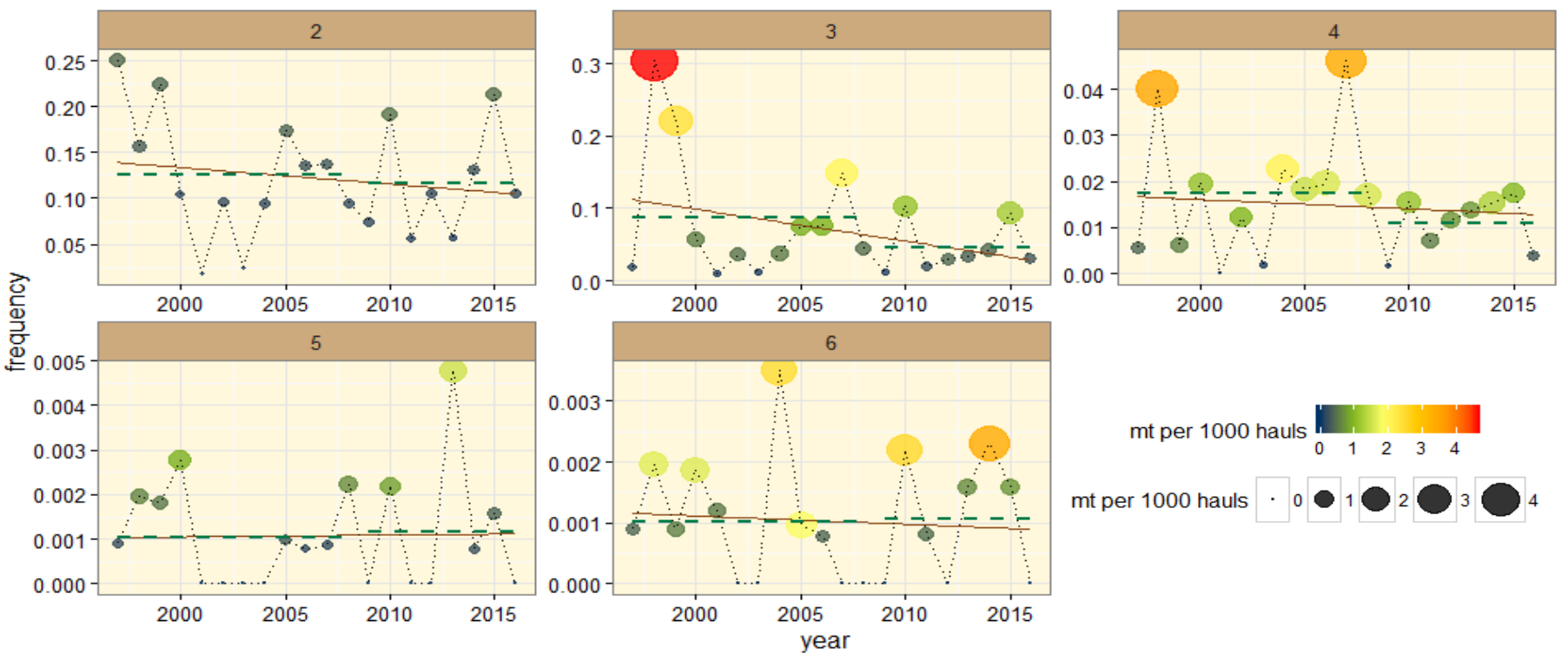
WHAT DO THE BINS LOOK LIKE IN THE REAL CATCHES?



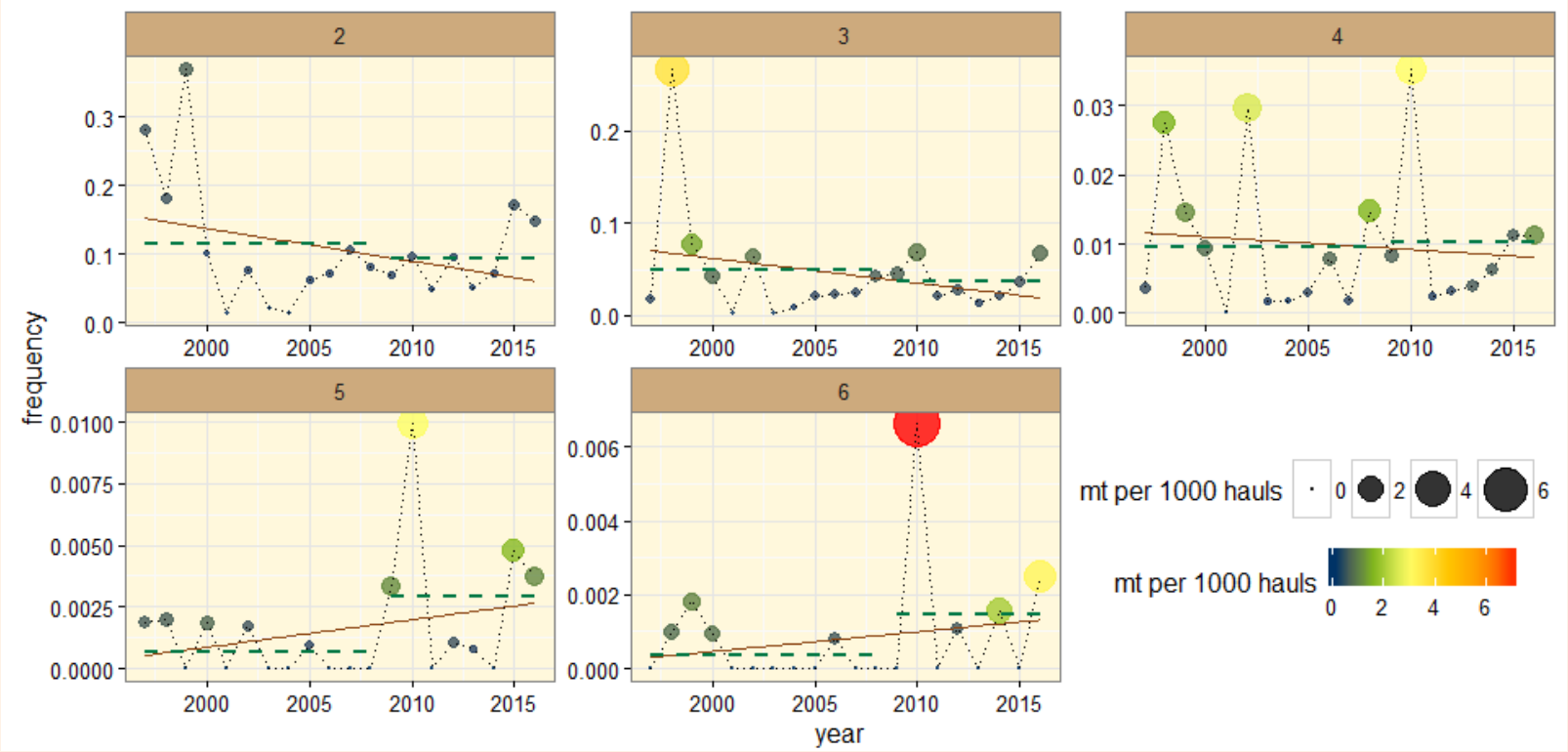
Frequency and per-1000 haul impact of CP darkblotched catch by size bin, 1997-2016 (through July 25). Dashed horizontal lines identify average bin frequency over 1997-2008 and 2009-2016. with solid brown lines showing the linear trend over 1997-2016.



Frequency and per-1000 haul impact of CP POP catch by size bin, 1997-2016 (through July 25). Dashed horizontal lines identify average bin frequency over 1997-2008 and 2009-2016. with solid brown lines showing the linear trend over 1997-2016.



Frequency and per-1000 haul impact of MS darkblotched catch by size bin, 1997-2016 (through July 25). Dashed horizontal lines identify average bin frequency over 1997-2008 and 2009-2016. with solid brown lines showing the linear trend over 1997-2016.



Frequency and per-1000 haul impact of MS POP catch by size bin, 1997-2016 (through July 25). Dashed horizontal lines identify average bin frequency over 1997-2008 and 2009-2016. with solid brown lines showing the linear trend over 1997-2016.

Table 23 (excerpt): Demonstration of range of outcomes possible under a range of fixed probabilities of occurrences (based on binomial probability).

Events Per 1000 Hauls	Probability of Occurrence					
	0.0005	0.001	0.002	0.003	0.004	0.005
0	60.6%	36.8%	13.5%	5.0%	1.8%	0.7%
1	30.3%	36.8%	27.1%	14.9%	7.3%	3.3%
2	7.6%	18.4%	27.1%	22.4%	14.6%	8.4%
3	1.3%	6.1%	18.1%	22.4%	19.6%	14.0%
4	0.2%	1.5%	9.0%	16.8%	19.6%	17.6%
5	0.0%	0.3%	3.6%	10.1%	15.7%	17.6%
6	0.0%	0.1%	1.2%	5.0%	10.4%	14.7%
7	0.0%	0.0%	0.3%	2.2%	5.9%	10.5%
8	0.0%	0.0%	0.1%	0.8%	3.0%	6.5%
9	0.0%	0.0%	0.0%	0.3%	1.3%	3.6%
10	0.0%	0.0%	0.0%	0.1%	0.5%	1.8%
11	0.0%	0.0%	0.0%	0.0%	0.2%	0.8%
12	0.0%	0.0%	0.0%	0.0%	0.1%	0.3%

E.g. Under a fixed probability of 0.001, if 1000 hauls are conducted then the chance of seeing zero and one hauls is equal (36.8%), two hauls would be expected 18.4% of the time, etc.

THANKS TO

Observers and staff of the NMFS At-sea Hake Observer Program.

PSMFC PacFIN program and staff for making the data easily accessible.