Impact Analysis for Drift Gillnet Hard Caps

Staff Overview

November 2022 Pacific Council Meeting

Range of Alternatives

- Alternative 1 – The No Action Alternative
- Alternative 2 – Rolling Two-Year Fishery Hard Caps (2015 Council FPA)
- Alternative 3 – In-Season Individual Vessel and Fleetwide Closures (5 options / suboptions)

Hard Cap Levels
Observed M/I

Alternative 2 cap levels

Alternative 3

Species	Individual Cap Reached	Individual Cap Exceeded and Fleetwide Cap Reached	Fleetwide Cap Exceeded
Fin whale	1	2	3
Humpback whale	1	2	3
Sperm whale	1	2	3
Leatherback sea turtle	1	2	3
Loggerhead sea turtle	1	2	3
Olive-Ridley sea turtle	1	2	3
Green sea turtle	1	2	3
Short-fin pilot whale C/O/W	3	4	5
Common bottlenose dolphin C/O/W Offshore stock	3	4	5

Alternative 3 Options/Suboptions

	Alternative 3 Options				
Cap level	**A.1**	**A.2**	**B**	**C.1**	**C.2**
Vessel cap reached	Vessel closed 30 days if 5/1-10/31, 14 days if 11/1-1/31	Vessel closed for remainder of fishing year	Vessel closed 30 days if 5/1-10/31, 14 days if 11/1-1/31	Vessel closed 30 days if 5/1-10/31, 14 days if 11/1-1/31	
Vessel cap exceeded			Vessel closed for remainder of fishing year	Vessel closed for remainder of fishing year Fleet closed for 30 days if 5/1-10/31, 14 days if 11/1-1/31	
Fleetwide cap reached	Fleet closed for remainder of fishing year			*Fleet closed for 30 days if 5/1-10/31, 14 days if 11/1-1/31**	
Fleetwide cap exceeded			Fleet closed for remainder of fishing year	Fleet closed until beginning of following fishing year	Fleet closed to following 10/31, with cap counts beginning 11/1 each year

* Note that since the exceedance values for vessel caps and the cap reached values for the fleet are the same, this provision duplicates the fleet provision described above.

Individual vessel closures apply to both the observed vessel and all unobservable vessels.

Environmental Components Evaluated

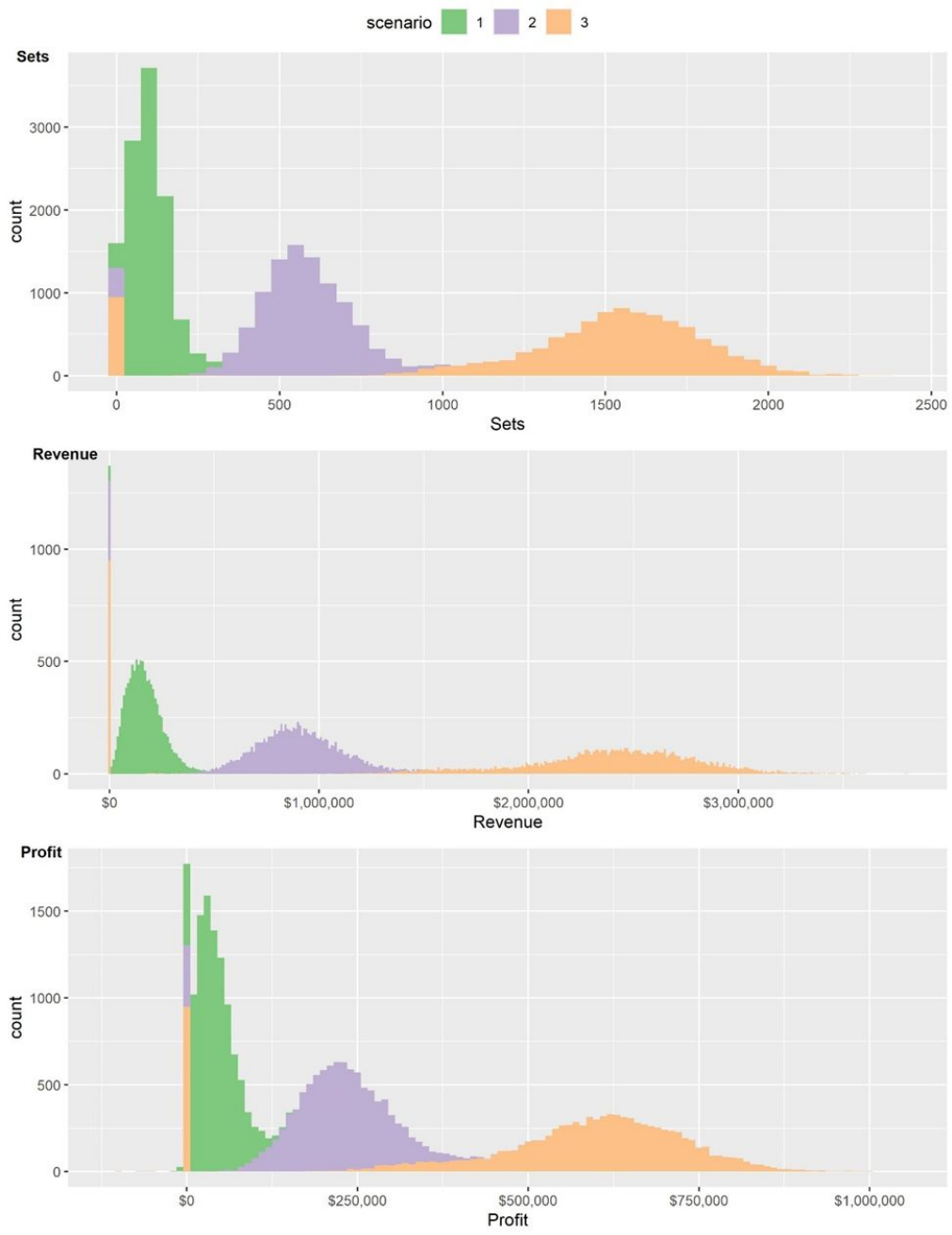
- Drift Gillnet Fishery Participants (revenue, profits)
- Fishing Communities (Morro Bay, Santa Barbara, Los Angeles & San Diego account for 90% of ex-vessel revenue)
- Protected Species, focusing on hard cap species (High Priority Protected Species) M/I
- Finfish Catch & Bycatch

Bootstrap Model

- Three participation (effort) scenarios identified by HMSMT:
  - 2 vessels (1 unobservable), 11 vessels (4 unobservable), 30 vessels (6 unobservable)
- 25% observer coverage
- Input data for 2001/02 to 2020/21 seasons: observer, logbook, landings
- Bootstrap model simulates 10,000 fishing seasons (replicates)
- Model outputs:
  - Economic: sets, revenue, profits, landings
  - Mortality/Injury for 9 hard cap species (HPPS)

Example Output (Alternative 1, Scenario 2)

Metric	Q5	Q25	Q50	Q75	Q95	Mean	SD
Sets	396	500	577	666	797	585.5534	122.454093
Total Revenue	$616,960	$782,766	$901,539	$1,030,999	$1,227,377	$910,216	$185,426
Total Profit	$136,220	$187,800	$227,256	$270,281	$335,003	$230,671	$60,833
Average Profit	$12,384	$17,073	$20,660	$24,571	$30,455	$20,970	$5,530
Landings	88.2	111.8	128.9	147.7	176.2	130.3	26.8
Fin whale	0	0	0	0	0	0.0000	0.0000
Humpback whale	0	0	0	0	1	0.2335	0.4722
Sperm whale	0	0	0	0	2	0.2992	0.7648
Leatherback	0	0	0	0	0	0.0000	0.0000
Loggerhead	0	0	0	0	0	0.0000	0.0000
Olive Ridley	0	0	0	0	0	0.0000	0.0000
Green	0	0	0	0	0	0.0000	0.0000
Shortfin Pilot Whale	0	0	0	1	2	0.5958	0.7667
Bottlenose Dolphin	0	0	0	0	1	0.1510	0.3837



Alternative 2 sets, revenue, profits

The bootstrap model produces distributions of results but the impact analysis focuses on mean values

Summary Reporting of Bootstrap Results: Socioeconomic Impacts

Table 2-10. Bootstrap model mean values for sets, total ex-vessel revenue and profits, average per-vessel profit, and landings across three participation scenarios under Alternative 2, rolling two-year fishery closure. The absolute and percent change in mean values are also shown in the second and third panels.

	Scenario 1	Scenario 2	Scenario 3
Sets	106	558	1,400
Total Revenue	164,644	$866,517	$2,167,834
Total Profits	41,736	$218,797	$543,389
Avg. Profits	20,868	$19,891	$18,113
Landings (mt)	24	124	311
Net change (absolute)			
Sets	-1	-27	-201
Total Revenue	-$1,469	-$43,699	-$318,459
Total Profits	-$408	-$11,874	-$85,052
Avg. Profits	-$204	-$1,079	-$2,835
Landings (mt)	0	-6	-45
Net change (percent)			
Sets	-0.86%	-4.68%	-12.56%
Total Revenue	-0.88%	-4.80%	-12.81%
Total Profits	-0.97%	-5.15%	-13.53%
Avg. Profits	-0.97%	-5.15%	-13.53%
Landings (mt)	-0.87%	-4.76%	-12.70%

Summary Reporting of Bootstrap Results: HPPS (mean values)

Table 2-17. Bootstrap simulation mean value of HPPS mortality/injury in a fishing season under Alternative 2. The lower panel shows the percent reduction from No Action for the four species where M/I occurs.

Mean value of mortality/serious injury expressed fractionally			
	Scenario 1	Scenario 2	Scenario 3
Fin Whale	0.000	0.000	0.000
Humpback	0.043	0.216	0.520
Sperm Whale	0.055	0.288	0.737
Leatherback	0.000	0.000	0.000
Loggerhead	0.000	0.000	0.000
Olive Ridley	0.000	0.000	0.000
Green Turtle	0.000	0.000	0.000
SF Pilot Whale	0.105	0.561	1.362
Bottlenose	0.025	0.146	0.376
Percent reduction from No Action			
Humpback	-1.16%	-7.54%	-18.77%
Sperm Whale	-0.73%	-3.68%	-10.21%
Shortfin Pilot Whale	-1.69%	-5.82%	-15.38%
Bottlenose Dolphin	-0.39%	-3.64%	-9.19%

Summary Reporting of Bootstrap Results: HPPS (frequency distribution)

Table 2-18. Frequency distribution of HPPS M/I from bootstrap simulation replicates for Alternative 2, showing reductions in frequency of M/I by number per season intervals, in percentage terms.

	Scenario 1				Scenario 2				Scenario 3			
M/I per season	Humpback	Sperm	Bottlenose	Shortfin Pilot	Humpback	Sperm	Bottlenose	Shortfin Pilot	Humpback	Sperm	Bottlenose	Shortfin Pilot
0	95.76%	97.29%	97.47%	90.05%	80.34%	86.48%	86.34%	57.41%	61.17%	69.66%	69.35%	30.57%
1	4.21%	0.00%	2.52%	9.44%	17.85%	0.00%	12.79%	31.36%	28.13%	0.00%	24.63%	29.64%
2	0.03%	2.69%	0.01%	0.49%	1.69%	12.66%	0.85%	9.20%	8.53%	24.57%	5.20%	22.05%
3	0.00%	0.00%	0.00%	0.02%	0.12%	0.00%	0.02%	1.78%	1.93%	0.00%	0.76%	11.21%
4	0.00%	0.02%	0.00%	0.00%	0.00%	0.83%	0.00%	0.24%	0.20%	5.10%	0.04%	4.48%
5	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.01%	0.04%	0.00%	0.02%	1.55%
6	0.00%	0.00%	0.00%	0.00%	0.00%	0.03%	0.00%	0.00%	0.00%	0.61%	0.00%	0.37%
7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.12%
8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.06%	0.00%	0.01%
Total	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%	100.00%

Summary Reporting of Bootstrap Results: HPPS (reductions in frequency)

Table 2-18 …change in frequency of M/I by number per season intervals, in percentage terms.

0	*0.05%*	*0.02%*	*0.01%*	*0.17%*	*1.62%*	*0.52%*	*0.51%*	*2.43%*	*9.14%*	*3.51%*	*3.13%*	*10.73%*
1	-0.05%	0.00%	-0.01%	-0.16%	-1.49%	0.00%	-0.47%	-1.57%	-6.76%	0.00%	-2.50%	-2.83%
2	0.00%	-0.02%	0.00%	-0.01%	-0.12%	-0.49%	-0.04%	-0.72%	-1.94%	-2.93%	-0.60%	-3.84%
3	0.00%	0.00%	0.00%	0.00%	-0.01%	0.00%	0.00%	-0.11%	-0.40%	0.00%	-0.02%	-2.62%
4	0.00%	0.00%	0.00%	0.00%	0.00%	-0.03%	0.00%	-0.02%	-0.03%	-0.49%	-0.01%	-0.97%
5	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	-0.01%	0.00%	0.00%	-0.34%
6	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.08%	0.00%	-0.11%
7	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.02%
8	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	0.00%	-0.01%	0.00%	0.00%

Example of a Bottomline Approach to Bootstrap Model Results

Percent reduction from No Action under Participation Scenario 2 (11 vessels)

	Revenue	Humpback	Sperm Whale	Shortfin Pilot Whale	Bottlenose Dolphin
Alternative 2	-4.80%	-7.54%	-3.68%	-5.82%	-3.64%
Alternative 3 A	-1.31%	-3.77%	0.00%	-2.43%	0.00%
Alternative 3B	-0.65%	-1.93%	0.00%	-1.01%	0.00%
Alternative 3CI	-0.95%	-2.48%	0.00%	-1.14%	0.00%
Alternative 3CII	-1.55%	-2.40%	0.00%	-1.93%	0.00%

Other Environmental Components

- Fishing communities
  - Impacts correlated with change in ex-vessel revenue
  - Morro Bay most dependent (DGN 15% of total revenue to port); San Diego most engaged (52% of coastwide DGN revenue)
- Protected species other than HPPS and finfish: Impacts correlated in change in fishing effort (sets)

Additional Considerations: NMFS's 2017 "negative determination" (Agenda Item H.1.a, Supplemental Report 2, June 2017)

NMFS' final analyses demonstrate that DGN participants are highly dependent on the fishery for their annual landings and revenue and they have little opportunity to offset economic losses by participating in other fisheries during a DGN closure.

…little additional benefit to protected species beyond what has been achieved by implementing regulations based on recommendations developed through ESA Section 7 and MMPA TRT processes

Conclusion based on MSA National Standard 7: *Conservation and management measures shall, where practicable, minimize costs and avoid unnecessary duplication*

> Guidelines: *"management measures should not impose unnecessary burdens on the economy, on individuals, on private or public organizations, or on Federal, state, or local governments." Supporting analysis should "demonstrate that the benefits of fishery regulation are real and substantial relative to the added research, administrative, and enforcement costs, as well as costs to the industry of compliance."*

Summary: Change in Effort (Sets) and Revenue

	Scenario 1		Scenario 2		Scenario 3	
	Sets	Revenue	Sets	Revenue	Sets	Revenue
Alternative 2	-0.86%	-0.88%	-4.68%	-4.80%	-12.56%	-12.81%
Alternative 3 A	-0.25%	-0.28%	-1.21%	-1.31%	-3.20%	-3.46%
Alternative 3 B	-0.25%	-0.28%	-0.60%	-0.65%	-0.96%	-1.03%
Alternative 3 CI	-0.25%	-0.28%	-0.89%	-0.95%	-1.74%	-1.85%
Alternative 3 CII	-0.54%	-0.49%	-1.70%	-1.55%	-2.74%	-2.58%