Maine Marine Patrol Compliance Survey Results

Conducted October 2009 and March 2010

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Introduction

In the summer of 2009, the Maine Department of Marine Resources' (DMR) Marine Patrol (MP), was tasked by NOAA Fisheries (NMFS) with conducting a pilot survey in Maine waters to determine the compliance rates of lobster fishermen with the regulations put in place by the Atlantic Large Whale Take Reduction Plan (ALWTRP). Regulations included in the survey consisted of the presence of an appropriate weak link or breakaway on the vertical line or endline, the presence of a red marker half way up the endline, and the utilization of sinking groundlines. The surveys were designed as a collaboration between MP, DMR's Large Whale Conservation Program, NMFS Northeast Region and NMFS' Northeast Regional Fishery Science Center.

Methods

A survey grid of 1 mile by 1 mile squares was overlaid on the study area, which consisted of all non-exempt state waters and federal waters out to the 12 mile line (Figure 1). A series of cells were selected at random for each of the six MP Sections (Figure 1). Two surveys took place, one in October and one in March. Each of these two time periods corresponds to an increase in fishing in these areas and was selected to try and capture the peak amount of gear in this area.

October Survey

During the surveys that occurred in October, the vessels in each Section navigated to the center of a randomly selected grid cell. In many cases, grid cells were pre-screened for the presence of gear by the MP pilot. Once on site, the vessel would begin an expanding square search pattern until the entire grid cell had been searched. Every piece of gear within the cell was hauled and checked for compliance with the above regulations.

March Survey

After the completion of the survey in October, there was concern about having to stay within the boundaries of the grid cell. Many fishermen were having multiple pieces of gear hauled to check for compliance. While this ensures that all gear is checked, it can limit the number of unique fishermen that are surveyed. Based on the data from the October survey, 74% of all fishermen who had multiple pieces of gear hauled had their gear rigged the exact same way with regard to compliance. It was determined that more individual fishermen could be checked for compliance with the regulations if the grid cells served as random starts and the search patterns were allowed to deviate outside of the grid cell boundaries. Therefore, the March survey reflects this change in method. Vessels proceeded to the center of randomly selected cells and then commenced a search pattern, hauling gear as long as time permitted.

Data Collection

All vessels had a designated data collector on board who took data while MP officers hauled and checked gear. The data that was collected included the fishermen's license number, number of traps and endlines per configuration, as well as, compliance with the weak link, line marking, and sink rope regulations. Data was generally either collected straight onto a database on a laptop while on board the vessel, on to paper sheets that were entered later, or, in one case, on a digital voice recorder that was later transcribed.

There were some issues with the data that was taken off of the digital voice recorder. Because the data collector in this instance did not have a datasheet in front of him, a note of "compliant" gear was assumed to be compliant in all three sub-categories when entered into the database later. Since this can be open to interpretation while in the field, these numbers may be higher than other parts of the survey. These data can be seen in the Tables 2 and 3 below. Only the Dirigo surveys that took place in March utilized this data collection method.

Results/Conclusions

In total, the two survey efforts combined checked 1,090 pieces of gear, which included 243 individual fishermen, 1,306 endlines and 3,102 traps. The tracklines for the vessels during each of the two surveys can be seen in Figure 2. Not all tracklines were available to be mapped. There was additional effort in Sections 3 and 5 that are not recorded on the figure.

The overall compliance rate recorded by this survey in all areas for both survey months was 58% (Table 1). Total compliance was calculated as gear that was compliant with each of three criteria, presence of weak links, presence of a red marker on the endline and sinking rope on the groundline. However, it quickly became apparent that the presence of the red marker on the endline was the portion of the compliance criteria that was lower than the others. Overall compliance calculated with just the weak link and sinking groundline requirements changed the rate to 86% total compliance. Consistent enforcement of this particular regulation proved difficult as the marker can wear off, become fouled, etc. after the gear is set. Table 1 also shows each of the three criteria with their own compliance levels. The highest rate of compliance was with the utilization of sinking groundline at 93% overall. The presence of weak links on the endlines was a close second at a 92% compliance rate and the line marking component was substantially less at 61% compliance.

Tables 2 and 3 break the numbers down by survey effort (October and March), as well as, regionally by Section (Table 2) and distance from shore by state or federal waters (Table 3). In Table 2, total compliance rates for October range from 23% in Section 3 to 100% in Section 5. When the line marking criteria is removed, the lowest compliance rate recorded is 78%. The March surveys shows lower rates of 7% in Section 1 and 14% in Sections 2 and 4, mostly due to the line marking component. When this is removed, the lowest rate increases to 40%. While compliance rates for weak links and sinking groundlines remain in the same general ranges for different sections, there is a marked difference in compliance with the line marking portion of the survey. The rates in the Downeast portion of surveys, namely Sections 5 and 6, are consistently higher than any sections in the Mid-coast or Southern parts of the state. This may be due to absolute compliance with the regulation in these areas or it could be differences in perceived compliance by individual officers. Since the surveys were done by different officers in each section, this question is hard to tease apart.

Table 3 looks at any differences that might have occurred between gear sampled in state versus federal waters. The October survey, because it was random, has different vessels in different Sections focusing on either state or federal waters. Due to the potential

differences in officer definition of compliance, the two can't be compared within this survey. However, the March survey has better coverage of Sections sampling both state and federal waters. In general, state waters have higher compliance rates for all criteria than gear sampled in federal waters.

Discussion

These surveys served as pilot projects that not only yielded compliance rates with different ALWTRP regulations, but taught many lessons on project design to fit both scientific and enforcement needs. Additionally, the results will undoubtedly spur conversation not only on officer definition and enforcement of compliance with regulations on the water but also on the regulations themselves and if they are both working and enforceable. More analysis on the data can be done to determine the statistical significance of the surveys as well as utilize the effort data collected to look more closely at the amount of coverage obtained through the survey design. These data along with conversations about ways to remove observer and officer bias in the data will aid in the design and/or implementation of surveys in the future.

Figures and Tables

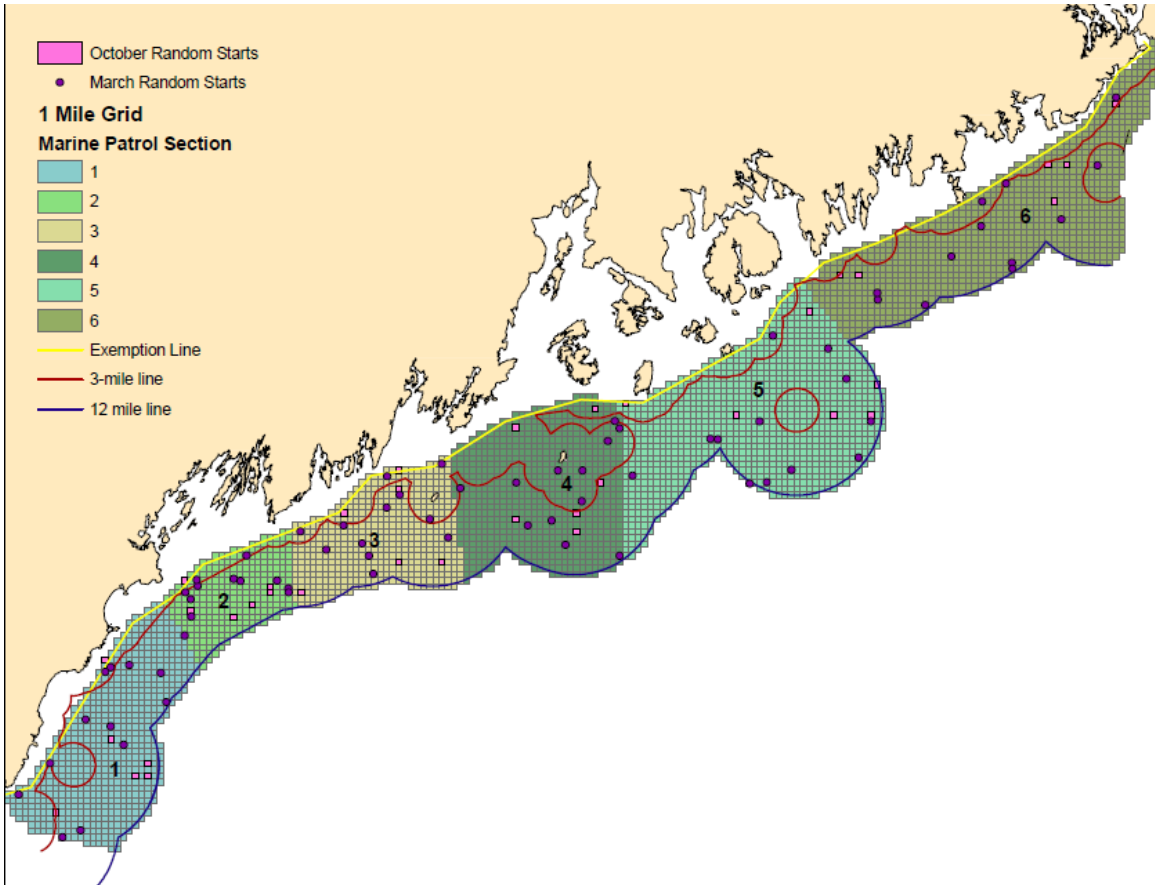

Figure 1. A 1 mile x 1 mile grid was used to randomly select points to survey in each of the 6 labeled Marine Patrol Sections. The squares marked in pink were those selected in October and those marked in purple were selected in March. These do not represent the actual locations sampled.

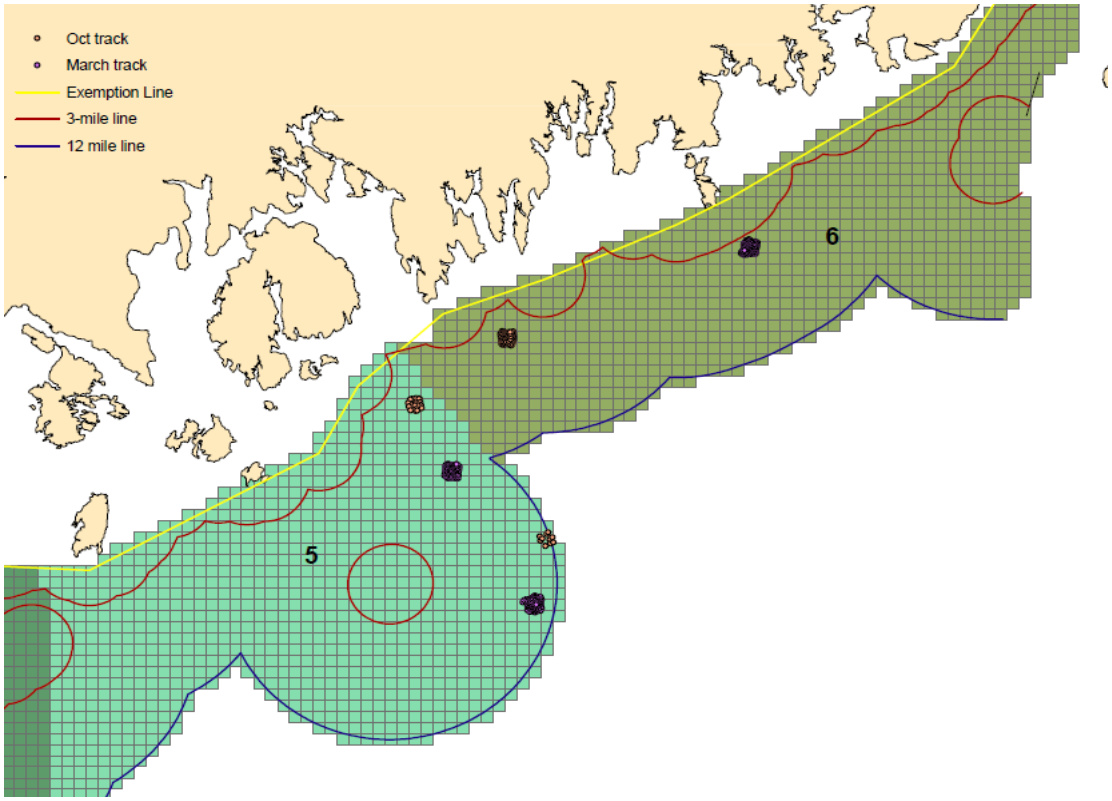

Figure 2. The tracklines for areas sampled in both October (peach) and March (purple) for Sections 5 and 6 are represented here. There was additional effort in March in Section 5, but the effort data was not available to be mapped.

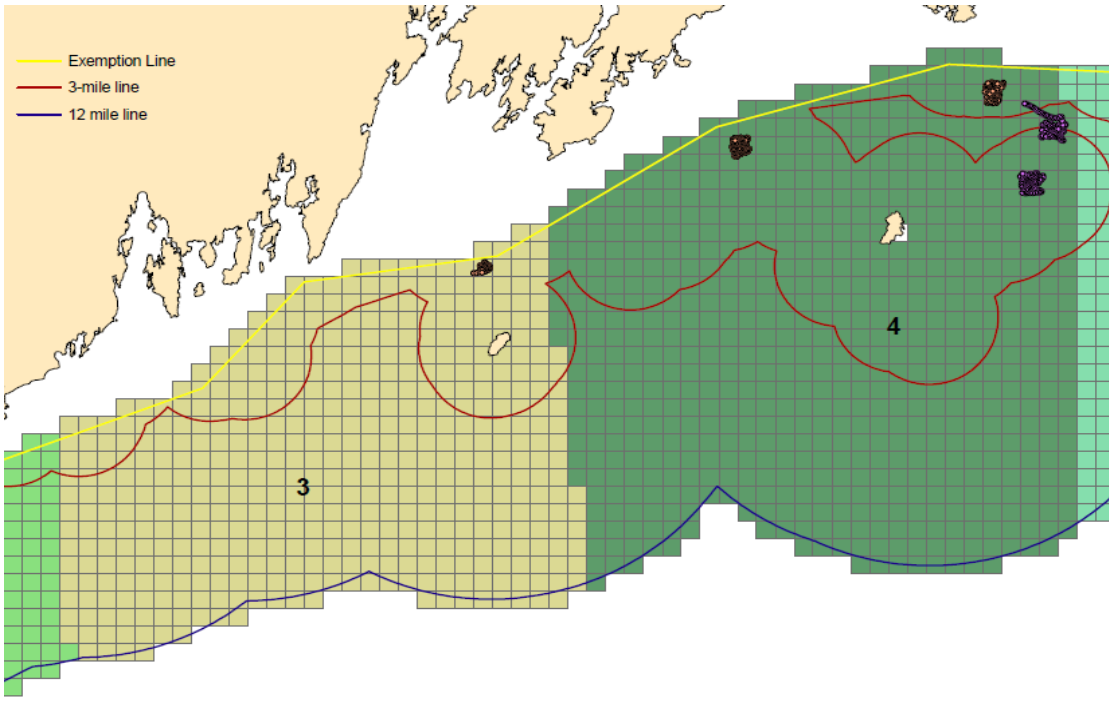

Figure 3. The tracklines for areas sampled in both October (peach) and March (purple) for Sections 3 and 4 are represented here. There was additional effort in both October and March in Section 3, but the effort data was not available to be mapped.

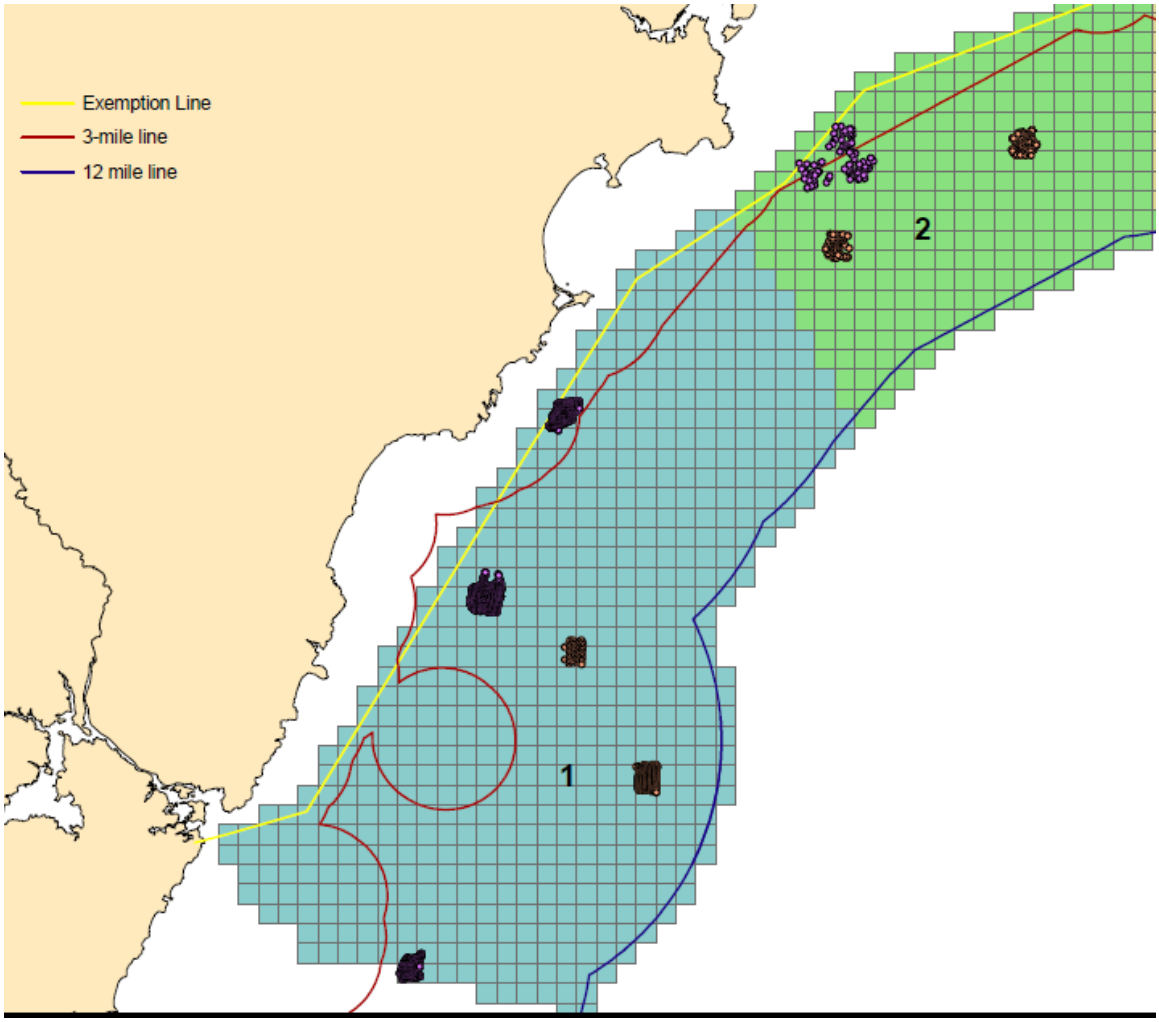

Figure 4. The tracklines for areas sampled in both October (peach) and March (purple) for Sections 1 and 2 are represented here.

Total Survey Results (Oct and March combined)

amt. gear	# diff fishermen sampled	avg. gear per fisherman	# endlines	# traps	avg traps per trawl	% weak links	% line marked	% sink line	% total compl	% compl w/o line marking
1090	243	4.5	1306	3102	2.8	92%	61%	93%	58%	86%

Table 1. Total results from both the October and March surveys combined.

Sec	Vessel	Date	amt. gear	# diff fishermen sampled	avg. gear per fishermen	# endlines	# traps	avg traps per trawl	% weak links	% line marked	% sink line	% total compl	% compl w/o line marking
1	Vigilant	Oct	3	2	1.5	6	44	14.7	100%	33%	100%	33%	100%
2	Challenge	Oct	14	9	1.6	27	164	11.7	79%	36%	100%	36%	79%
3	Monitor	Oct	106	55	1.9	125	278	2.6	98%	23%	98%	23%	96%
4	Guardian	Oct	243	25	9.7	243	409	1.7	93%	42%	84%	41%	78%
5	Dirigo	Oct	59	11	5.4	59	133	2.3	100%	100%	100%	100%	100%
6	Maine	Oct	251	34	7.4	251	539	2.1	90%	85%	98%	76%	88%
		Totals	676	136	5.0	711	1567	5.9	93%	60%	93%	56%	87%
1	Vigilant	March	15	7	2.1	15	27	1.8	53%	7%	87%	7%	40%
2	Challenge	March	43	16	2.7	85	347	8.1	77%	14%	93%	14%	77%
3	Monitor	March	38	37	1.0	48	136	3.6	89%	24%	100%	21%	89%
4	Guardian	March	76	12	6.3	76	166	2.2	72%	16%	84%	14%	66%
5	Dirigo	March	126	22	5.7	246	364	2.9	99%	91%	89%	89%	89%
6	Maine	March	116	23	5.0	125	495	4.3	100%	100%	97%	97%	97%
		Totals	414	117	3.5	595	1535	3.8	90%	63%	92%	61%	85%

Table 2. Results by Section and survey month. Note that in Section 1 there was very little gear hauled in October, which may inflate numbers.

Sec	Vessel	Date	Location	amt. gear	# diff fishermen sampled	avg. gear per fishermen	# endlines	# traps	avg traps per trawl	% weak links	% line marked	% sink line	% total compl	% compl w/o line marking
1	Vigilant	Oct	State	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
2	Challenge	Oct	State	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
3	Monitor	Oct	State	106	55	1.9	125	278	2.6	98%	23%	98%		
4	Guardian	Oct	State	243	25	9.7	243	409	1.7	93%	42%	84%		
5	Dirigo	Oct	State	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
6	Maine	Oct	State	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
		Totals		349	80	4.4	368	687	2.2	95%	36%	89%	36%	83%
1	Vigilant	Oct	Federal	3	2	1.5	6	44	14.7	100%	33%	100%		
2	Challenge	Oct	Federal	14	9	1.6	27	164	11.7	79%	36%	100%		
3	Monitor	Oct	Federal	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
4	Guardian	Oct	Federal	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
5	Dirigo	Oct	Federal	59	11	5.4	59	133	2.3	100%	100%	100%		
6	Maine	Oct	Federal	251	34	7.4	251	539	2.1	90%	85%	98%		
		Totals		327	56	5.8	343	880	7.7	91%	85%	99%	78%	91%
1	Vigilant	March	State	15	7	2.1	15	27	1.8	53%	7%	87%		
2	Challenge	March	State	25	14	1.8	49	210	8.4	64%	12%	92%		
3	Monitor	March	State	11	11	1.0	14	39	3.5	82%	18%	100%		
4	Guardian	March	State	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
5	Dirigo	March	State	58	8	7.3	111	128	2.2	98%	93%	93%		
6	Maine	March	State	88	15	5.9	96	378	4.3	100%	100%	100%		
		Totals		197	55	3.6	285	782	4.0	90%	75%	96%	75%	90%
1	Vigilant	March	Federal	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a	n/a		
2	Challenge	March	Federal	18	8	2.3	36	137	7.6	94%	17%	94%		
3	Monitor	March	Federal	27	26	1.0	34	97	3.6	93%	26%	100%		
4	Guardian	March	Federal	76	12	6.3	76	166	2.2	72%	16%	84%		
5	Dirigo	March	Federal	68	14	4.9	135	236	3.5	100%	90%	85%		
6	Maine	March	Federal	28	8	3.5	29	117	4.2	100%	100%	89%		
		Totals		217	68	3.2	310	753	4.2	89%	51%	88%	47%	81%

Table 3. Survey results for both October and March broken down by State and Federal waters. Note that in Oct. the same boats did not sample both state and federal waters, making comparisons here difficult due to regional and officer differences.