

HIGHLY MIGRATORY SPECIES MANAGEMENT TEAM  
REPORT ON VESSEL MOVEMENT MONITORING

Dayna Matthews of NOAA OLE and Council staff officer Brett Wiedoff attended a joint session of the Highly Migratory Species Management Team (HMSMT) and Highly Migratory Species Advisory Subpanel (HMSAS) at the March 2016 Council meeting to discuss the Vessel Movement Monitoring Public Scoping Document (Council Agenda Item D.2 Attachment 1 April 2016). Mr. Matthews indicated that while VMS can establish vessel position at a point in time when the vessel is pinged, as presently utilized it cannot determine whether a vessel is engaged in HMS drift gillnet (DGN) fishing activity; this is the case for both the currently required ping rate of once per hour and for the proposed four pings per hour requirement under the Council preliminary preferred alternative (PPA). The PPA would also establish a continuous transit requirement for DGN vessels while in an area closed to DGN fishing.

To assist the Council with consideration of ping rate alternatives, the HMSMT conducted an analysis of DGN fishing speeds in observer records. The results document that over 99 percent of historically observed sets of DGN fishing occurred at an average vessel speed of under 1.25 knots between when the gear was set and when it was pulled (see Appendix). The alternatives for VMS were initially developed in relationship to a groundfish fishery closure, for vessels which move at higher speeds while fishing than DGN vessels. Given the slow speed of actively fishing DGN vessels, the lengthy time periods needed to deploy and to retrieve the gear, and the random timing of VMS pings under current regulation, there is little apparent risk of DGN vessels moving inside a Drift Gillnet Protected Resource Conservation Area (PRCA) to fish between pings that are observed outside PRCAs, which is a scenario which could be a concern for faster-moving vessels in the groundfish fishery.

The No Action alternative for the DGN fishery would maintain the current ping rate of once per hour, with random intervals between pings. Uncertainty about the time interval between pings creates a disincentive for vessel operators to risk entering restricted space while fishing. A once-per-hour ping rate is likely sufficient for detecting a potential set of DGN fishing, which involves a vessel moving very slowly and requires several hours to undertake including deploying and retrieving the net, versus other possible activities.

Due to the continuous transit requirement, the PPA precludes other HMS fisheries which DGN vessel operators prosecute on the same trips while DGN fishing, eliminating the option to utilize these other methods while transiting through closed areas with DGN gear on board. The inability to prosecute albacore troll, harpoon or other fisheries could result in a loss of fishing opportunity and income for DGN fishermen at times swordfish are unavailable.

One hundred percent monitoring of DGN vessels, through the use of on-board observers or electronic monitoring (EM), is scheduled to take effect in 2018, one season after any new VMS requirements would likely go into effect; this raises a question about the need to impose changes in fishing practices in response to continuous transit provisions and a new cost of increased pings for a single season. During 2017, observer coverage is anticipated to be similar to current rates of about 30% of the trips for the DGN fishery, pending the availability of funding. New monitoring requirements beginning in 2018 could render the use of VMS redundant for monitoring DGN fishing in the PRCAs.

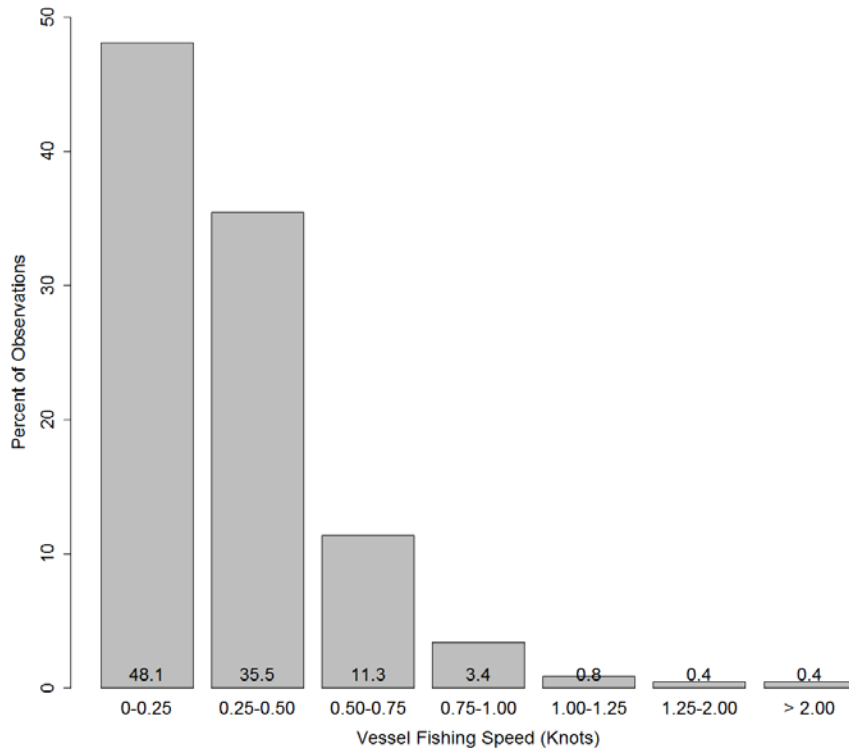
The No Action alternative avoids a continuous transit requirement and increase in DGN vessel ping rates, providing potential cost savings for both vessel owners and fishery managers, while maintaining a ping frequency which appears adequate for monitoring DGN fishing activity by vessels which typically move at under 1.25 knots while fishing. Further, upcoming observer/EM requirements offer an alternative method

for monitoring DGN fishing locations. Based on the above considerations, the HMSMT recommends the Council adopt the No Action alternative.

Appendix: Analysis of DGN Vessel Fishing Speeds and Cost to Increase VMS Ping Rate

The HMSMT has conducted an analysis of California Gillnet Observer Database records to characterize the range of drift gillnet vessel speeds while fishing, using the 8513 observed sets of HMS drift gillnet fishing over the 1990-2014 fishing seasons for which time and location data were available at the start and end of the sets. For each set the methodology calculates the amount of fishing time by subtracting the start time from the end time; measures the distance covered while fishing as the great circle distance from the start location to the end location; and then computes the average speed as the distance covered divided by the fishing time.

Figure 1 is a histogram representing the distribution of DGN fishing speeds. The horizontal axis labels display vessel speed ranges included in the figure, and the bar heights represent percentages of observed sets, with the numeric percentages provided inside each bar. The figure documents that over 99% of observed DGN vessel speeds while fishing were on the range from 0 to 1.25 knots. Further analysis shows the median DGN vessel speed while fishing was 0.2586 knots, while the overall mean speed averaged over all included sets was 0.3241 knots, reflecting right skewness in the distribution. Normal DGN fishing operations involve the deployment of a net at dusk which is over 1 mile long during roughly a one hour period, drifting in the current while fishing overnight, and hauling the net at dawn over a period that exceeds one hour, significantly higher fishing speeds or rapid movement into and out of closures between hourly VMS pings are not technically feasible.



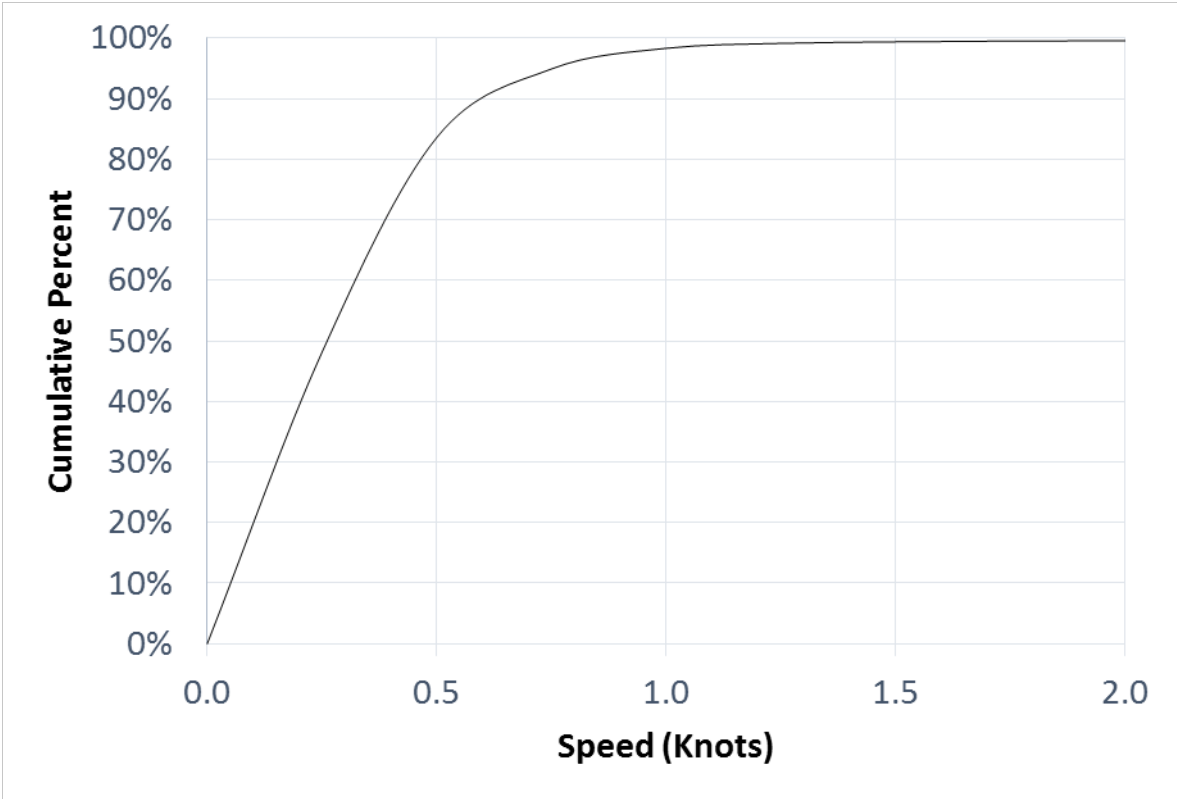
**Figure 1. Histogram of observed DGN vessel fishing speeds.**

Table 1 and Figure 2 summarize the range of observed DGN vessel fishing speeds as cumulative percentages of observed sets less than each speed shown in the first column (on the horizontal axis of the figure). So, for example, 99.6% of all observed DGN sets showed average speeds below 2 knots, while 99.9% of all observed sets had average speeds below 3.75 knots.

Cumulative Distribution of DGN Fishing Speeds	
Speed (Knots)	Cumulative Percent
0.25	48.1
0.50	83.6
0.75	94.9
1.00	98.3
1.25	99.1
1.50	99.4
1.75	99.5
2.00	99.6
2.25	99.6
2.50	99.7
2.75	99.7
3.00	99.7
3.25	99.7
3.50	99.8
3.75	99.9
4.00	99.9

**Table 1. Cumulative distribution of observed DGN vessel fishing speeds.**

Information provided by DGN fishermen indicates that typical transit speeds range from 7 to 9 knots, although inclement weather may reduce the speed to 3 knots. Some DGN vessels also participate in the albacore troll fishery, which can legally occur inside areas closed to DGN fishing; a typical speed for vessels engaged in albacore troll fishing is 5.5 knots.



**Figure 2. Cumulative distribution of observed DGN vessel fishing speeds.**

Cost Effectiveness Analysis

A further consideration in deciding whether to increase DGN vessel ping rates is comparison of the additional benefits of increasing the ping rate to the added cost. If the ability to meet the regulatory objective is unchanged for the case of DGN fishing due to increasing the ping rate from one to four per hour, the benefit of increasing the ping rate is unclear. In case no added benefit results from increasing the ping rate, a cost effectiveness analysis as described in the [Regulatory Impact Analysis primer to OMB Circular A-4](#) could be used to compare alternatives in terms of the additional regulatory cost burden due to increasing the ping rate.

VMS Vendor	Annual Cost Increase	Net Present Value
McMurdo FMCT/G	1,650	29,184
CLS America Thorium TST A2.0	2,640	46,694
CLS America Thorium LEO A2.0	660	11,674
Faria WatchDog 750VMS	14,256	252,150
Network Innovations - Sailor VMS Gold	8,470	149,811
Network Innovations - Sailor VMS Gold Plus	2,057	36,383
Skymate I 1500	660	11,674

**Table 2. Estimated Costs to Increasing the VMS Ping Rate.**

Table 2 shows estimated costs to increasing the VMS ping rate from one to four pings per hour based on information provided in Table 1-8 of the VMS scoping document. The drift gillnet fishing season lasts from mid-August through January each year, for a period of 5.5 months. Assuming the recent participation level of about 20 active DGN fishing vessels will continue, this would increase fleet wide annual operating costs by amounts on a range from \$660 to \$14,256 per year. Assuming this constant real dollar cost would continue over a 20 year period and using the 20-year real discount rate of 1.2% specified in [Appendix C to OMB Circular No. A-94](#), the estimated discounted present value of additional future regulatory costs imposed on the DGN fleet due to increasing the ping rate is on the range from \$11,674 to \$252,150. The actual cost would depend upon which of the VMS Vendor options in Table 1-8 were selected for use on DGN vessels.