A COMPARISON OF GILL NET LABELING METHODS FOR FISHER IDENTIFICATION

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Abstract

Six methods of fisher identification were applied to gill net float lines for 230 trials. Three methods marked floats and three methods were attached to the line between floats. Nets were set and retrieved using a hydraulic net reel in order to test failure rate and remarking ease under typical field conditions. Cost and application time of each marking methods was also quantified. Two of the three float marking methods (hot brand, Sharpie® marker) experienced a 0% failure rate. The third method, however, (paint) had the highest failure rate of the study (10%). Self applied float marking methods required more time to apply but were less expensive than line marking methods. All line marking methods experienced a failure rate of 2% or less. Line marking tag cost were higher due to their production by various professional tag manufacturing companies. Good retention of one of the line markers (crab pot tag) on vertical buoy lines suggests that these types of markers may offer a reasonable method of labeling such lines below buoy breakaways in pot fisheries. Neither float nor line marking methods differed significantly in number of characters which could be presented, however, imprinting restrictions (set up) would significantly increase cost if line tags had to contain specific information (mesh sizes) where as addition of such information on floats would only require additional time.

Introduction

Marine mammals are highly migratory and sometimes become entangled in commercial gear during seasonal movements. Once entangled, gear often breaks free but it can remain on an animal and be carried a great distance from its point of origin. If gear does not naturally disentangle a poor prognosis for animal health can result. Attaching personal identification codes to commercial gears such as gill nets will facilitate improved regulations that can provide superior protection of marine mammals as required under the Marine Mammal Protection Act. Currently, gear type and ownership identification are very difficult because similar floats, buoys, lines, and mesh types in the case of gill nets are used along the Atlantic coast to target a diverse variety of species in often dissimilar methods. Establishing an inexpensive easily applicable method of labeling gear ownership will aid investigators in their ability to distinguish gear types, ownership, and location of entanglement. This valuable information can then be used to improve our assessment of the factors leading to entanglement, which in turn will result in improved regulations tailored to promote avoidance of future interactions. In addition, identification markers may enhance the fisher's sense of personal responsibility thus encouraging greater self regulation.

In recognition of the value of personal identification markings, the Bottlenose Dolphin Take Reduction Team (BDTRT) recommends that labels containing vessel identification should be placed along the float line of gill-nets every 300 feet. Labeling recommendations were subsequently supported by the Mid-Atlantic Fishery Management Council (MAFMC). In the case of gill nets, if mesh size could be included in markings, it may be possible to use this additional information to distinguish if any mesh sizes are more likely to be involved in interactions. The objectives of this study were to examine

various gear marking methods, test each for longevity (failure rate), and quantify the cost of maintaining each in terms of time and money under normal field operation.

Methods

Six inexpensive readily available labeling methods, most of which were suggested by fishermen, were tested 10 at a time for 23 days. All nets were deployed and retrieved using a hydraulic net wheel of the type conventionally used on larger Atlantic coast gill net boats. Each 300 ft net tested was marked at one end as suggested by the BDTRT and MAFMC. Float markings consisted of a seven character Virginia vessel registration number (Va 2407 P). Font size was large (marker width at least 5mm, letter width at least 12 mm, and height at least 25mm) and all float markings appeared on the same float for ease of retention analysis. Manufactured line marking devices offered the advantage of reduced type set, which allowed for more characters (some up to 20). All line labels in this analysis contained 11 characters (Va 2407 P VIMS).

The first three marking methods labeled a float and the remaining three consisted of external tags connected to the float line. All methods were tested for their longevity and ease of repetitive application. Line marking methods were designed in hopes that with minor modification these methods could be applicable to vertical lines and/or other gear types. Only the crab pot tag method was tested for its retention on vertical buoy lines in this study. In all cases these tags were connected to vertical lines of buoys within a half meter of the buoy itself.

The first, second, and third labeling methods (Fig. 1) labeled the float with permanent marker (Sharpie® Professional), a paint pen (DecoColor®, opaque paint marker), and a hot brand (a wood burner was used but various methods exist). The forth, fifth, and sixth, methods (Fig. 2) used manufactured tags attached to the float line. The first two of these were manufactured by Floy® Tag and Manufacturing Inc. of Seattle Washington (800-843-1172). The first consisted of a modified flat plastic crab pot tag (14 x 53mm) containing four holes that allowed the tag to be zip tied through braided polyester float line so that tag remained stationary. The next experimental tag was a nylon double tipped wire tag. Fundamental differences in size, material, and design exist between previously produced Floy® tag crab pot and fish tags and those tested. To produce the float line tag the normally produced crab pot tag was reduced in size and four holes added. The nylon double tipped with wire tag is a modified fish tag built on wire that contains two anchors which fit inside the hollow braided float line. Both methods securely attached both ends of these external tags in an orientation parallel to the float line. This orientation and their dual anchoring systems minimize accidental entanglement in meshes and/or lose twine which often results in tag removal. The last method consisted of a size 12 stamped aluminum ring manufactured by National Band and Tag Company of Newport Kentucky (859-261-2035). This band was crimped onto the float line using a number 10 crimper so that band edges overlapped. This was done to prevent line entanglement in the ring and subsequent removal.

In addition to float line markings, the vertical lines connecting anchors to pole buoy or poly ball were also labeled with a crab pot tag. This was done for rapid gear identification by marine patrol officers, a necessity because a portion of the study was being conducted in restricted waters. All vertical lines were marked within half a meter of terminal net markers. There was also one net deployed with skiff buoys (donut like buoy far right in Fig.1) to examine how important float composition (hardness) is to mark retention.

Results and Discussion

Total cost and time required for each marking method is given in table 1. Failure rate, remarking time, and remarking ease are listed in table 2. Float marking provided the least expensive and in most cases most durable methods. Expenses were reduced because labels were self manufactured and produced from inexpensive readily available application devices. The hot branding and Sharpie® markings experienced no failures during 230 trials. The paint pen was so unsuccessful (failure rate of 10%) that it was only tested for twelve days (120 trials). Remarking with paint required drying float before application and if float was not completely dry paint would run and a new float was required to be labeled. In addition, paint labeling was not durable enough to withstand friction caused during hydraulic operations. It smudged and/or was removed and thus became unreadable. Float and font size restricted character number in these trials to seven. This character restriction could be easily circumvented by commercial fishers in future applications by using the backside of the float for labeling. Font size could be reduced, however, this is not suggested because size is an important characteristic which effects character retention and readability. Application of all three marking methods on one float prevented use of backside for separate labeling of information during this study.

All line marking methods tested consisted of identification markers produced by professional manufacturers. Per label cost increased significantly, however, professional printing can provide readable labels of much smaller font so more information could be included if desired. Set up, shipping, and handling expenses could be minimized per tag by increasing order size, however, if mesh sizes were required to be listed each would require an additional set up fee and this fee could become a significant expenditure. No difficulty in reading line marking methods occurred over time. Ease of remarking was good for all methods and time required was not overly burdensome. Failure rates were all 2% or below. Highest failure rate occurred using the crab pot tags due to zip tie breakage and this rate could likely be reduced if tag width was reduced.

Line markings, though more expensive, offer several advantages over float markings that should be discussed. Once marked, floats cannot be removed from gear as easily as line markings, therefore, if gear is sold previous owner's marks will have to be covered or somehow made illegible and new owners clearly applied. Float removal is not an option because it would change gear performance. Two of the line markers the National Band® ring and the Floy Tag® crab pot tag can be used on any vertical line. The Floy Tag® wire tag as it is currently designed requires that it be used on braided

lines because the anchors fit inside the hollow line. With modifications in anchoring mechanism this tag may provide a suitable method of marking Osprey 10 (solid core line), the line used in the crab and conch pot fisheries, because it has a very low profile that would likely allow it to pass through pot pulling apparatus. As previously mention, the bird band and crab pot tag can easily be added below buoys on any type of line to provide additional information to state required markings, however, due to their external bulk and rigidity these tags would probably not pass through hydraulic line pullers. The crab pot tag line marker tested on vertical buoy lines in this study experienced a 0% failure rate after 184 trials (2 markers per set x 4 sets x 23 trials). All float and line marking methods tested offered the advantage that they can be easily applied to existing gear. If net is hung with soft floats (commonly called donut or skiff floats, seen in fig. 1 far right) and subsequently deployed using a hydraulic net wheel, line markers are preferable to float labeling because softer floats are crushed under pressures exerted and become readily illegible.

Table 1. Labeling time, number of characters in label (character load), unit price, required expenses, and cost of marking 50 floats or lines is given in table 1. Cost of applying 50 markings is given because single unit costs are not as informative due to larger initial expenditures required when tools must be purchased.

Method	Labeling time/each (sec)	Character load	Unit price	Required tools	Tool cost	Setup charge	Shipping and handling	Cost/ 50	Time/ 50 (min)
Float marking									
Hot Brand	120	7	na	burner	$14.00	na	na	$14.00	100.0
Sharpie® Permanent Marker	60	7	$2.00	none	na	na	na	$2.00	50.0
DecoColor® Paint Pen	60	7	$4.29	none	na	na	na	$4.29	50.0
Line marking									
Floy Tag® Wire Tag	75	11	$1.80	none	na	$30.00	$10.00	$130.00	62.5
National Band® Ring	20	11	$0.16	crimping tool	$20.60	$8.00	$5.60	$42.20	16.7
Floy Tag® Crab Pot	70	11	$0.64	cable ties	1.97/100	$30.00	$10.00	$73.97	58.3

Table 2. Table two contains number of trials, number of failures during trials, failure rate, and remarking time (effort) required during trial number. Failure rate (% = # failures/# trials) is simply a percentage of time marking method failed. Remarking ease is given in the last column for all methods which required maintenance.

Method	# Trials	# Failures	Failure rate (%)	Remarking time (min)	Remarking ease
Float marking					
Hot Brand	230	0	0.000	0	na
Sharpie® Permanent Marker	230	0	0.000	0	na
DecoColor® Paint Pen	120	12	0.100	12	not good
Line marking					
Floy Tag® Wire Tag	230	1	0.004	1.3	good
National Band® Ring	230	2	0.009	0.7	good
Floy Tag® Crab Pot	230	5	0.022	2.9	good

Figure 1. Float marked with Sharpie® permanent marker are shown. Float on left is type used on float nets, middle is hard float placed on sink nets, and right is donut or skiff float. This type is relatively soft and deforms under pressures of net reels.

Figure 2. The three line marking methods tested are shown below. The low profile Floy Tag® wire tag is at top, National Band® ring in the middle, and Floy® Tag pot tag at bottom.