Appendix I. Relocation Trawling Net Guidance

The relocation net specifications for a lazy line required in Appendix B Section 3.5 are based on the guidance in the memo included in this appendix.

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MEMORANDUM FOR: Stacy Carlson, Protected Resources Divison, SERO

FROM: John Mitchell & Wendy Taylor
Harvesting Systems Branch, SEFSC

SUBJECT: Recommendations for lazyline configuration to reduce dolphin interactions with turtle relocation trawlers

This memo is in reference to the conference call of November 5th during which representatives from SERO Protected Species Branch, SEFSC Harvesting Systems Branch, Army COE and several sea turtle relocation contract companies discussed methods of preventing the accidental entanglement of dolphins in the lazylines of contracted sea turtle relocation trawlers. At the conclusion of the call, I offered to summarize the various techniques which were discussed in order to provide a reference for contractors who may wish to trial a particular method during future turtle relocation work. NOAA Fisheries would like to acknowledge the efforts of Captain Steve Bosarge, of Bosarge Boats, Pascagoula Mississippi, for allowing us to provide details of his method of lazyline rigging which seems to have real potential for reducing dolphin entanglement.

Conventional lazyline rigging (Figure 1)

Conventional lazylines are attached at their forward end to the top/back edge of the inside trawl door and at their aft end to a ring in the "elephant ear", a triangle of reinforced webbing sewn to the trawl bag which acts as a lifting strap (Figure 1). The length of the lazyline is dependent on trawl size. As an example, a 55-ft. headrope length trawl might have a lazyline which is 80 to 85 feet in length. The conventional lazyline must be of sufficient length so as to allow the line to be hauled to the side of the boat upon haul back. The line is then led through a snatch block and wound around a cat head to in order to lift the bag to the side of the boat and eventually emptied on deck. When in a fishing configuration, the ample length of the lazyline forms a 10-12 foot loop behind the tailbag. This loop floats even with, or slightly above and behind the tailbag. It is in this loop of the lazyline, near the trawl bag, that underwater video obtained by NOAA Harvesting Systems gear researchers has documented dolphin interactions while the trawl is fishing. The animals appear to be using the line as a scratching post, moving back and forth against the line, rubbing it along their backs and bellies. Based on our observations, it is conceivable that a dolphin could put a complete wrap of the lazyline around it's torso. With the tail flukes acting as a stop, the animal would be unable to free itself. The following alternate lazyline rigging methods offer potential means to prevent dolphin entanglement.

Method A : Conventional rigging using stiffer lazyline (PolyDAC or Polyester)

This method simply replaces the conventional ¾" to 1" diameter polypropylene rope typically used for shrimp trawl lazylines with line made from polyDAC (a combination of polypropylene and polyester) or a polyester line. Both lines should be made with a "crab lay" which is a term relating to stiffness of the rope. Crab lay rope is used in the commercial crab fishery of the Alaska and

provides an exceptionally tight twist to the rope to prevent loops when coiling. Both a polyDAC and polyester ¾" crab lay line were evaluated by Harvesting Systems divers in June, 2007 during annual gear tests. Divers found the polyDAC and polyester lines to be significantly stiffer and less pliable underwater than the conventional polypropylene lines. It was difficult for divers to form loops in either of the two line types. Divers also noted that the polypropylene arced upward (positive buoyancy) and polydacron arced downward (negative buoyancy) while being towed.

PolyDAC or Polyester ¾" crab lay line can be purchased from major U.S. rope suppliers such as TrawlWorks, Sampson and others. A recent check of cost resulted in a price of between 50 to 60 cents/foot for either rope type.

Method B: Bosarge Method of lazyline configuration (Figure 2).

This method replaces the conventional polypropylene lazyline with a stainless steel 3/8" cable. Steve Bosarge provides a very good description of the method in the following text:

"The modification to the original system totally removes the standard lazy lines and sugar line and replaces them with two 3/8 inch by 250 foot stainless steel cables in an entirely different routing arrangement. Now the routing begins with the stainless steel cables spooled on a deck winch. From there the cables run to the top of the boom where they go through separate blocks that are affixed to the boom. The cables then run to the webbing strap (elephant ear). This new system has benefited both the crew and the observers aboard the vessel by making gear retrieval faster and safer in inclement weather."

Steve's method of rigging the lazyline is likely to be much safer for dolphins for the following reasons; 1.) The diameter of the cable is significantly smaller than standard polypropylene lazyline, and thus is probably less enticing to dolphins for rubbing and scratching interactions; 2.) The fishing angle of the cable is likely higher than that of the conventional lazyline due to the cable being led from the vessel boom. We think it would be difficult for dolphins to interact with the cable at a higher fishing angle because they would have to orient themselves somewhat vertically while maintaining forward motion to do so.3.) In comparison to conventional polypropylene line, cable requires more force/exertion in order to form a tight loop when fishing, thus decreasing the probability of entanglement.

As Steve mentions above, operational benefits to the Bosarge method include quicker and safer retrieval of the tailbags (time is not lost to crewmembers having to grapple the lazylines, feed the lines through blocks and then wind them around winch cat heads to bring bags aboard). With the cable method, both tailbags are winched aboard and positioned over the deck for emptying in one simultaneous and continuous operation.

For the average shrimp fisher, there is an additional expense and some amount of special rigging which is required to use the cable method. First, a dedicated winch, capable of hauling in two tailbags simultaneously is needed. It is very likely that a vessels' try-net winch could be used for this purpose. Approximately 500 ft. of 3/8" stainless steel cable is required (estimated cost $750.00) as well as two (2), 5-ton "fat-boy" style try-net blocks (estimated cost $100.00 ea.).

Method C: Bosarge Method of lazyline configuration using PolyDAC or PE "crab lay" line

This method is identical in all respects to the above (Method B), with the replacement of 3/8" stainless steel cable with PolyDAC or Polyethylene "crab lay" line. Routing of the lazyline is the same as in the cable method. For the contractor, the advantage to this method over Method B is that a dedicated winch for the lazyline retrieval is not necessary. The trawl winch cat heads could be used to retrieve the lazyline. When fishing, the lazylines could be "tied-off" to the pin rail just aft of the trawl winches. Because the lines are routed through the boom, as in the cable method, we expect that the in-water fishing angle of the line would be higher (like the cable). The higher fishing angle along with stiffer lazyline should lessen the potential for dolphin entanglement over a standard lazyline configuration.

In FY08, the Harvesting Systems Branch plans to conduct qualitative assessments of all three of the above methods during TED evaluations aboard the *R/V Georgia Bulldog* (Feb.-April) using trawl-mounted underwater video cameras, and a DIDSON scanning sonar system. Additionally, we plan to conduct diver assessments and obtain underwater video of all three methods during annual gear evaluations using NOAA SCUBA divers in Panama City, Florida (June, 2008).

We would greatly appreciate feedback from the turtle relocation contractors who may trial the above mitigation methods. We are especially interested to know the following.

- Do contractors feel the methods are effective at preventing dolphin interactions/entanglements?
- What are the advantages and or disadvantages to working with PolyDAC / PE crab lay line during normal relocation operations?
- Is the stiffness of the the PolyDAC / PE crab lay line resilient, or is it degraded over the course of normal operations, i.e. winding around cat heads?
- Are their additional methods and or rigging modifications that may be worth investigating?

Responses can be emailed to my attention at john.mitchell@noaa.gov.

We look forward to continued collaboration with you, and the relocation contractors on this issue and hope that you will not hesitate to contact us if you have any questions.

Figure 1
Standard Lazyline Configuration

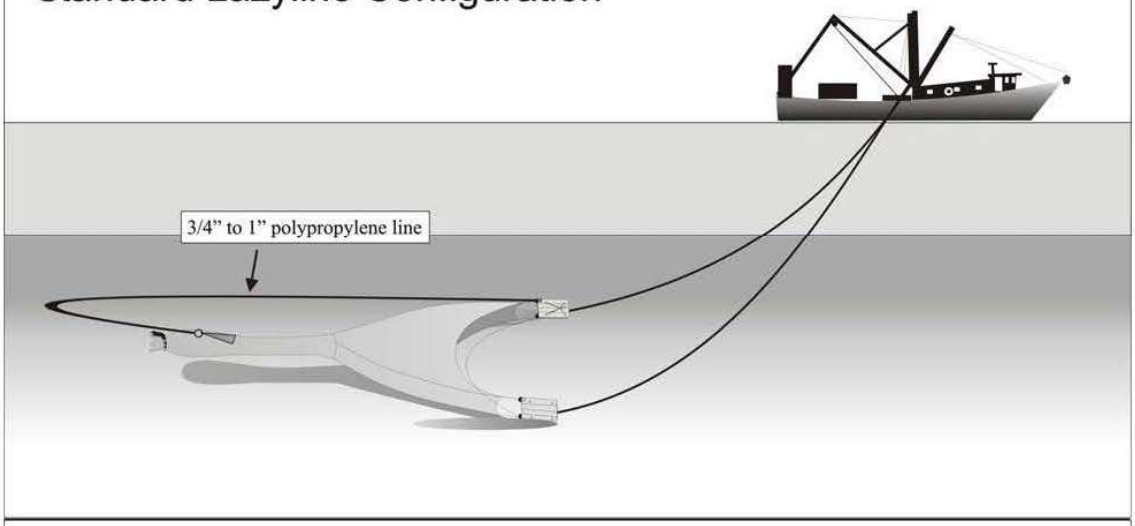

Figure 2
Bosarge Lazyline Method

Courtesy Steve Bosarge, Bosarge Boats
Pascagoula, MS