Development of a Decision Tree for Large Whale Entanglements

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ABSTRACT

Entanglement in fishing gear and marine debris is a significant global concern for large whales. Oftentimes, there is a sense of urgency to respond to the report of an entanglement based on the perceived need to "do something" rather than responding based on criteria of the entanglement. Multiple nationality entanglement response programs were consulted in order to determine suitable criteria, i.e. human safety, resources available, risk assessment, distance from shore, entanglement configuration and level of constriction, etc. that were considered prior to launching a response. If human intervention was deemed appropriate, what types of responses were available, i.e. Monitor, Satellite Tag Deployment, Disentanglement, or Euthanize, based on critical decision points. Determination of suitable response options is critical in order to identify, understand and mitigate risks associated with launching a directed response.

KEY WORDS: LARGE WHALES · ENTANGLEMENT RESPONSE · DISENTANGLEMENT · EUTHANASIA · DECISION CRITERIA TREE

INTRODUCTION

Entanglement in fishing gear and marine debris is a significant problem in all ocean basins of the world. Entanglement in fishing gear can affect all species of Cetaceans, Pinnipeds, sea turtles, sea birds and fish. Globally, anywhere there is overlap between marine mammal distribution and actively fished spans of ocean there is the entanglement potential. In the case of large whales, the entanglement problem affects all large whales, including humpback whales (*Megaptera novaeangliae*), northern Atlantic right whales (*Eubalaena glacialis*), gray whales (*Eschrichtius robustus)*, bowhead whales (*Balaena mysticetus*) and to a lesser extent minke whales (*Balaenoptera acutorostrata*), fin whales (*B. physalus*), sei whales (*B.borealis*), blue whales (*B. musculus*), and Bryde's whales (*B. edeni*).

Oftentimes there is a sense of urgency for responsible agencies to react immediately to any report of an entangled large whale, largely based on the public's perceived need to "do something". This feeling to do something immediate can lead to heightened risks because of the increased pressure and can be both extremely dangerous, as well as unnecessary, for the responders as well as the entangled whale.

This paper examines some of the possible criteria that may be considered, when determining, if a response action, i.e. Monitor, Satellite Tag Deployment, Disentanglement, or Euthanasia, is warranted. The goal is to facilitate discussion amongst interested parties from different nations and cultures in order to establish appropriate criteria for specific situations they may have presented to them, acknowledging that each

country will have unique pressure from media, cultures, and politics that may potentially influence what options are available.

METHODS

Multiple countries around the globe that currently have established entanglement response and mitigation programs were consulted to determine what criteria are used when deciding when human intervention is warranted in entangled large whale cases. Decision-making criteria were compiled and listed below based on the responses of the entanglement program managers.

Criteria for Deciding when an Entanglement Response is Warranted

Human Safety – By and large the highest priority of consideration when determining if a specific case is warranted for human intervention. Various factors contribute to the level of human risk, including the level of experience and training that the responder has.

Resources Available – The second most cited criterion for deciding when a response was to be initiated was the available resources at hand. If the appropriate tools, vessels, personnel, etc. are not readily available, the mission is perceived as too risky for launching.

Severity of Entanglement – Multiple criterion were captured regarding the severity of the entanglement and how it relates to the decision of whether or not to respond to a particular entangled large whale case. Some of the identified criteria include: is the entanglement immediately life-threatening to the animal; is the entanglement life-threatening to the whale over time; how many lines are present on the whale; what is level of constriction of the lines on the whale; animal behavior and evasiveness; species of the whale and endangered status; is the whale free-swimming or anchored; are any body wraps of line cutting through the epidermis into the blubber layer; what is the degree of cyamid coverage; how many body parts of the whale are involved; and duration of the entanglement.

Distance from Shore – This criterion focused on the distance from shore and was directly related to resources available if an accident was to occur and how close the nearest emergency services may be.

Time of Day and Weather Conditions– These criterion were both based on environmental parameter, including the amount of remaining daylight available to conduct an entanglement response or suitable weather and environmental conditions to conduct the response.

The above listed criteria can all be fed into a thorough risk assessment model in order to quantify the level of risk associated with a specific entangled large whale case and identifying when the operation may be too risky to proceed.

Possible Criteria for Deciding when Euthanasia is Warranted

By close examination of previous entangled large whale cases where a disentanglement response was initiated but was unsuccessful, either due to the decreased health of the animal and thus decreased chance of survival, or because the animal's behavior precluded approaching the animal in close proximity to safely and effectively remove the life-threatening entangling gear, and ultimately the animal perished or was thought to have perished.

Eg #3107 - Tight constriction of line around peduncle.

Eg #3210 – Severely embedded line on rostrum, line no longer visible on most recent sightings. Animal presumed to have perished.

Eg #1102 – Severely constricting wrap of line around rostrum. Animal presumed to have perished.

Knowlton and Kraus (2001) stated that any tightly constricting wrap of line that penetrates through the animal's epidermis into the blubber will likely result in severe and chronic emaciation and ultimately the animal's demise.

One possible option for addressing these types of cases might be the use of medical intervention through the administration of antibiotics and/or sedatives. Specifically, the proper dosing and delivery of sedatives may assist in facilitating the removal of life-threatening gear allowing for the greatest chance of survival of the animal. However, the possibility of over-sedating, while small, is a possibility and can result in the inadvertent death of the animal.

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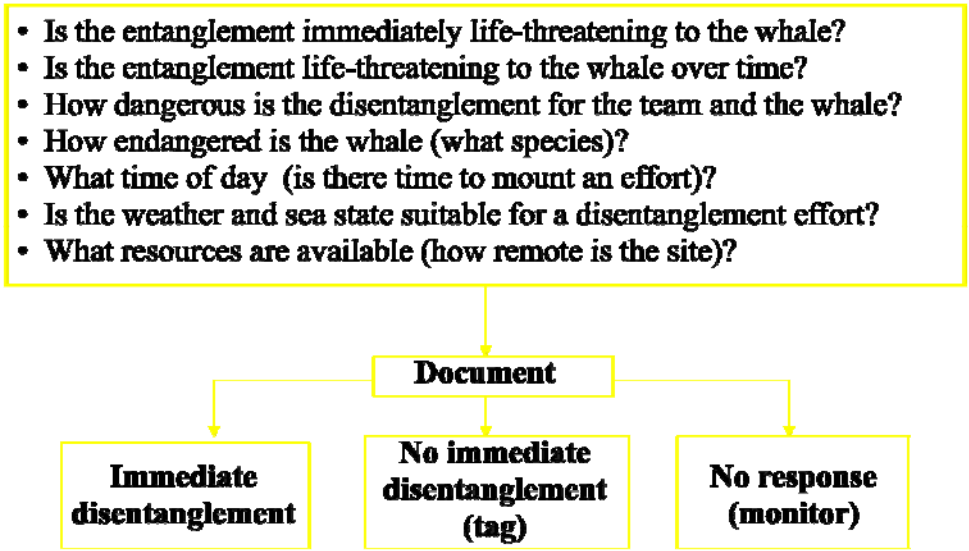
LITERATURE CITED

Knowlton AR, Kraus SD. 2001. Mortality and serious injury of northern right whales (*Eubalaena glacialis*) in the western North Atlantic Ocean. *Journal of Cetacean Research and Management* Special Issue 2, 193-208

APPENDIX

DISENTANGLEMENT DECISION TREE