



UNITED STATES DEPARTMENT OF COMMERCE
National Oceanic and Atmospheric Administration
NATIONAL MARINE FISHERIES SERVICE
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Mr. Andrew Jones, President
NIMMSA
Box 554
Alert Bay, B.C., Canada
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Dear Mr. Jones:

Thank you for your letter regarding satellite tagging killer whales. We appreciate your concerns and also appreciate the opportunity to respond to the issues you raise. In addition to your specific questions, which we address in detail below, you indicated that you were concerned that our proposed tagging could potentially harm both the animal being tagged and other animals in the vicinity. With respect to your concern that an animal would be injured during the tagging process, I am unclear how you specifically envision this might occur, but I am assuming you are both concerned with the direct effects of the tag as well as any potential harm that could occur due to boat operation in close proximity to the whales. However, I want to assure you that great caution is used during the boat approach and in the deployment of the tag so that no other whales are inadvertently injured during the tag deployment. We have chosen to target the dorsal fin for a variety of reasons, but one of its main advantages is that it is primarily a structural part of the body and it contains no vital organs. The fin does hold some large blood vessels that help it to act as a radiator of heat, but there is a lot of redundancy in these vessels so even if the tagging process disrupts a vessel it would not affect the overall function of the fin.

In the majority of cases, killer whales react to the tag attachment with only a minor flinch (a startle reaction) or no observable reaction at all. As for the risk of infection, for the 180 whales of 16 species tagged to date, we make every effort to collect follow-up photos to evaluate the tissue response. We routinely review post-tagging photos with veterinarians, in particular with Dr. Stephen Raverty (a pathologist) with the Provincial Ministry of Agriculture and Lands, Animal Health Centre in Abbotsford, BC, to assess whether there appears to be any abnormal tissue response, looking closely for any signs of infection, and/or changes to the dorsal fin which might be caused by disruption of blood flow. With respect to tagged killer whales, in all the observed cases the dorsal fin tissue has gone through the processes typically associated with proper healing (inflammation, proliferation, remodeling). To date, we have observed no evidence of infection, or subsequent loss of perfusion to the distal portions of the dorsal fin.

In regard to the concern you raised about con-specifics being injured by portions of the dart anchor system that are present as the tag migrates out, we have not observed any marks on associated animals that we can attribute to this; however, the numerous scratches present on the whales from the tooth rakes of con-specifics make marks from this source difficult to assess. If you have additional photos of any of the tagged whales we would greatly appreciate receiving them.

The following are responses to your specific questions:

How many more tags (or tag-induced wounds) can we expect to see on both Northern Residents and Transients before you have enough data to answer your question regarding their distribution?

We are currently reviewing the data from the transients tagged to date to assess how representative our sample is across areas, seasons, and the social network. Based on a preliminary assessment, it is unlikely that we will deploy any additional tags on transient killer whales in inland Washington waters in the near future. However, it is likely we will deploy 3-5 additional tags on transient killer whales on the outer coast of Washington/Oregon this spring during a NWFSC sponsored cruise; to date we have tagged only three whales on the outer coast and they have all had unique movement patterns. One of these three whales moved into British Columbia and the other two remained along the U.S. west coast, so it is possible that some of these tagged whales will again move into British Columbia. As we have done in the past, we will continue to provide our Canadian colleagues with complete access to the tracking data (in real time) so that they can assist with follow-up photos.

In addition, we are collaborating with researchers at the Alaska Fisheries Science Center to determine movements of killer whales in southeast Alaska, particularly the northern part of this region. In a study that began in 2010, five transient killer whales were tagged, and these have also shown very different movement patterns. Some of these whales moved into British Columbia. We expect to tag a small number of additional whales (4-6) in 2011 to improve our understanding of stock structure and seasonal habitat use. Consequently, it is possible that you may see some additional tagged animals.

The single Northern Resident that was tagged in 2010 was observed to travel from Washington to southeast Alaska, moving directly through a region where killer whale/fishery interactions were occurring. NMFS is concerned about the magnitude and extent of killer whale/fishery interactions in southeast Alaska. Real-time location data derived from tagged whales will be of considerable value in assessing how the whales respond to fishing operations. While there are no specific plans to tag additional Northern Residents at this time, movement data from this population would be important not only for the fishery interaction issue, but also for comparison of their winter movements with those of Southern Residents. Although we are currently permitted to tag Northern Residents we will consult with our Canadian colleagues about tagging additional whales in this population.

In future years, following each field season we will review the data received to date and assess the need to tag additional whales. Our tagging efforts on killer whales are not unique. It is important to note that there are several other killer whale satellite tagging studies being conducted by other researchers throughout the North Pacific, including projects in California, Prince William Sound, the Aleutians, and the Bering Sea. There is also a study being conducted in the Antarctic.

Will the data provided from these tags be able to answer questions about distribution that less invasive methods such as photo ID and acoustic monitoring can (or have) not?

Each method of determining locations and movements has advantages and disadvantages. We continue to rely on and support the use of photo-id and passive acoustics in many of our research projects to determine Southern Resident killer whale winter distribution. However, some significant biases exist for these alternative methods. Photo-Id is limited to areas that are most readily accessible by humans (usually protected or near-shore waters), and can be conducted only during daylight hours and in good weather. Although passive acoustic recorders

can monitor 24/7 for months, several factors that reduce their utility include: relatively high equipment and deployment/recovery costs limit the number that can be deployed, their detection distance is limited (only about 5 miles), and whales are not always vocalizing, particularly transients. You are correct that satellite tagging provides data for only a relatively short period of time – weeks or months - but it provides the most unbiased location data of the three approaches, and does so on a spatial and temporal scale that is unique. We do not see satellite tagging as an end-all approach, but rather as an intermediate step to help us determine where to target vessel surveys or deploy acoustic recorders. In addition, these location data - as we have seen with other species - will allow us to formulate better questions which will ultimately lead to better assessment of stock structure, and habitat utilization; this is critical information needed for the management and protection of a species.

Have the negative and positive effects of this technology been accurately measured and given consideration before their application to SARA listed cetacean species?

Although I cannot speak to what types of consideration are given to SARA-listed species for the use of this technology, telemetry tagging has been used for the past 30 years on a wide variety of cetaceans, including many cetaceans listed under the U.S. Endangered Species Act. It is currently being used on one of the most endangered cetaceans in the North Pacific; the North Pacific right whale. The marine mammal research permitting system in the U.S. requires very specific and rigorous information on the tag to be used, the potential impacts on the species to which it will be applied, and the potential value to species' conservation and management. Indeed, permitting in the U.S. involves a lengthy process with exhaustive federal and public review before a permit is issued. The telemetry technique we are proposing to use was initially developed in the mid-2000's by Dr. Russ Andrews at the Alaska Sea Life Center to specifically address the potential impacts of transient killer whales on marine mammal populations in Alaska by monitoring an individual whale's movements over a period of weeks or months utilizing the least invasive techniques. Although this technique appeared to be very promising, I felt that further testing and evaluation was important prior to deployment on endangered Southern Resident killer whales. In particular, I felt it was important to monitor tissue response to the tag attachment system, and I outlined an approach that was similar to the research I did for my Ph.D. work tagging small cetaceans: i.e., establishing a dedicated resighting effort. Consequently, it was important to deploy tags on a population or a species that was similar to killer whales, which were likely present year-round, had small, near-shore home ranges, and occurred where weather was conducive to frequent access. Based on the photo-id studies of Hawaiian cetaceans by Dr. Robin Baird of Cascadia Research Collective, pilot whales were identified as a species that fit these criteria. Working with Dr. Baird and Greg Schorr (also of Cascadia Research), and with Dr. Andrews, we initially applied these tags to 28 pilot whales and obtained follow-up information on behavior, attachment performance, and tissue response. Based on the minimal tissue impacts observed on the pilot whales, as well as similar results from Dr. Andrews' killer whale studies in Alaska, we expanded this work to include beaked whales, and false killer whales, a species now being proposed for listing under the ESA. In fact, the location data obtained from 23 satellite-tagged false killer whales played an important role in the assessment of this population's listing. Subsequently this technique was applied to transient killer whales in the Pacific Northwest and Southeast Alaska, and to several ESA listed species, including, blue, fin, humpback, and sperm whales.

As these killer whale populations share both American and Canadian waters, have collaborations with Canadian scientists been proposed to look at less invasive ways of answering the same questions?

Dr. John Ford, of DFO, and I recently collaborated by combining the results of our non-invasive studies on prey selection of southern resident killer whales. Although NMFS and DFO currently have complementary programs that both use similar non-invasive techniques to determine the winter range of Southern Resident killer whales we again may find that a combined approach would provide a more substantive result. We both support coastal sighting networks, undertake visual and acoustic surveys cruises on ocean-class vessels nearly every year, and deploy passive acoustic recorders off our respective coasts. Although I am not familiar with the specific details of all the projects undertaken by DFO, Dr. Ford and I do “compare notes” on our respective efforts on a semi-regular basis. In the U.S., NMFS supports an annual effort by the Center for Whale Research to maintain a coastal sighting network from Cape Flattery to Monterey Bay. In addition, the NWFSC has conducted 8-21 day cruises during the spring in four of the of the last six years, and have up to seven passive acoustic recorders deployed on the continental shelf from Cape Flattery to San Francisco. Despite these substantial efforts over the past 5 years, we have added only 15 sightings from the coastal sighting network, 7 sightings or acoustic detections from our cruises, and about 75 detections on the passive acoustic recorders. Although this is a substantial increase in data, significant multi-week or month gaps exist between these sightings/detections such that these efforts have been unable to effectively fill this winter distribution data gap. Satellite tagging, while providing location information for only weeks or a few months, can provide up to several locations per day; furthermore, unlike the non-invasive techniques discussed above, location data are completely free from biases. It is important to note that we have worked with scientists from DFO to provide these tag types and methodologies for their use on grey whales and the ESA listed fin whale in Canadian waters.

In summary, satellite tagging is a critical tool for scientists and managers to better understand the range, movements and habitat use of cetacean species, as well as potential threats of human (or other) origin. PhotoID and passive acoustics can at best give us only brief and incomplete snapshots of these things over a very disjointed and limited geographic range. By tagging whales, we essentially have the animals tell us where they go, 24 hours a day, and what areas are most important to them. Elsewhere, satellite tags have been used by other researchers to identify previously unknown habitats of importance for whales, and to assess the degree to which the movements and ranges of the animals overlap with potential anthropogenic threats (e.g. entanglement in fishing gear or ship strikes). To give just two examples: 1) recently, the tagging of humpback whales in New Caledonia (South Pacific) identified an offshore area that was clearly of considerable importance to the animals, yet the existence of this habitat was completely unsuspected by scientists before the tagging (subsequent research cruises to the area have confirmed this, and efforts are underway to include the region in a marine mammal sanctuary); 2) scientists from the Alaska Fisheries Science Center have tagged critically endangered North Pacific right whales in the Bering Sea, and confirmed that the Critical Habitat designated by NMFS was indeed a key feeding ground for this population. In 2004, one of the tagged whales also led researchers into a previously unstudied area and allowed them to find the largest aggregation of the species seen in the Bering Sea since illegal Soviet whaling decimated the population in the 1960's; this was a hugely valuable discovery. These data are now being combined with information on fishing effort to assess the potential entanglement threat to right whales. On the U.S. west coast there are several potential anthropogenic threats confronting

Southern resident killer whales including wave energy projects and a large military training range.

We view satellite tagging as a complementary approach, and will continue supporting non-invasive studies. However, recognize that while photo-ID and acoustics can provide important data from areas that are already studied (assuming researchers can undertake the considerable expense and logistical difficulty of mounting surveys to such areas), they can tell us nothing about the whales' use of important habitats that we don't know about. Only satellite tagging can do that, and these studies provide data that are critical to a better understanding of the animals, and of the best ways to protect them from the threats they may face. Further, reviews of our satellite-tagging methods, including post-tagging photographs, by veterinarians with an expertise in tissue damage and marine mammal pathogens, have concluded that the technique has at most, only a minor impact on dorsal fin tissue, and that the risk to the individual is minimal. Consequently, we feel that the benefits that tag data provide for the management and protection of this population greatly outweigh the potential risks associated with this approach.

Please do not hesitate to contact me if you have additional questions or concerns.

Sincerely,

A handwritten signature in black ink that reads "Brad Hanson". The signature is written in a cursive, flowing style.

Brad Hanson, Ph.D.
Wildlife Biologist, Marine Mammal Team Leader
Northwest Fisheries Science Center