



**SCIENTIFIC COMMITTEE
ELEVENTH REGULAR SESSION**

Pohnpei, Federated States of Micronesia
5-13 August 2015

Project Update on Deployment Plan for Whale Shark Post-Release Mortality Tags

WCPFC-SC11-2015/ EB-IP-10

NOAA Fisheries-USA, SPC-OFP, NFA-PNG and WCPFC Secretariat-ABNJ

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Purpose and Objective

As of 1 January 2014, WCPFC CCMs are required to prohibit their flag vessels from setting a purse seine on a school of tuna associated with a whale shark if the animal is sighted prior to the commencement of the set. They are also required to ensure that all reasonable steps are taken to ensure its safe release (see CMM 2012-04). In order to determine residual mortality rates under the safe release policy, as well as to provide further insights into which methods represent “best practice” for safe release, NOAA’s Pacific Islands Fisheries Science Center (PIFSC) purchased ten electronic tags capable of reporting post-release condition for use in studying the fate of whale sharks released by the various suggested methods in the draft guidelines from purse seine nets in the western and central Pacific Ocean. NOAA has asked the WCPFC Secretariat (ABNJ Tuna Project Technical Coordinator-Sharks and Bycatch and the Regional Observer Programme) as well as the WCPFC’s Scientific Services Provider (SPC-OFP) and National Fisheries Authority of Papua New Guinea (NFA PNG) to assist with deployment of these tags. Once deployed, tag data will be reported to PIFSC for analysis and published with project collaborators.

Equipment Specification, Transfer and Tag protocols

NOAA purchased five MiniPAT-247A and five survival PAT (sPATs) tags for this project. In addition to the tags, PIFSC has provided five tagging poles¹. PIFSC delivered the equipment to SPC-OFP in Nouméa in February 2015 and tags were transferred to PNG NFA in March 2015. Both tag types are set to release and transmit data after 100 days. Tags are also set to release at a depth of 1800 m although the housing is rated to 2000 m. If the tag is shed and remains on the surface (depth is 0m) for 3 days, then a protocol triggers the tag to report.

Sampling Design Issues

Given an already infrequent incidence of sets on whale sharks in the region, which is expected to decline further with the prohibition on intentional setting, it is necessary to focus tagging efforts in the areas with the highest reported interaction rates in order to provide the greatest opportunity for deployment. Based on the latest spatial analysis of reported whale shark sets in the WCPO (Harley et al. 2013, Figure 3) the highest whale shark interactions occur in the tropical purse seine fishery in the waters of PNG. The current plans are for experienced PNG NFA observers to be deployed on purse seine vessels with a tag (or tags) so that in the event of an interaction with a whale shark these observers can opportunistically deploy a tag before the whale shark is released using one of the recommended draft handling guideline techniques. Under this method of deployment it is unknown if a sufficient number of sharks can be tagged to supply statistically viable information. An additional drawback of this encounter rate-based sampling focus is that it

¹ Five tagging poles 6' - 11' (1.8m - 3.3m) Swobbit telescoping heat-treated, anodized aluminum poles with hand grips weighing ~3 lbs have been procured. Longer poles may be advisable (see Appendix 1) and can be re-evaluated after initial trials (Appendix 1).

may only represent the handling practices and post-release mortality rates of one portion of the WCPO purse seine fleet. However, the urgent need to start gathering information on the post-release status of whale sharks freed from purse seine nets, warrants focusing the sampling design in this manner.

It is proposed to distribute the ten tags for deployment according to the following options in priority order:

1. to the most experienced NFA observers in the PNG purse seine fleet. The advantage of this is that these are the most reliable and capable observers; the disadvantage is that the number of such observers maybe limited and they are sometimes assigned to train other observers and thus may not be deployed as frequently.
2. to PNA observers in the PNG purse seine fleet according to the calendar for deployment. In this case, it is envisaged that inexperienced observers will require additional training before they can deploy tags; therefore distribution of tags would need to await a suitable opportunity for an SPC OFP personnel to provide this training.
3. to crew from cooperative vessels fishing in the PNG purse seine fishery. This approach could maximize the opportunities to tag released whale sharks, however, the lack of training could result in a higher rate of tag failure.
4. to crew from cooperative US purse seine vessels fishing throughout the WCPO. The advantage of an expected high level of cooperation and skill by these crew would need to be weighed against the possibility that these vessels may not be fishing in areas with high whale shark interactions.

Research Permit and Training for Tag Deployment

A deployment plan for whale shark tagging was presented to the PNG National Research Institute, a subdivision of PNG Foreign Affairs. The National Research Institute approved the plan and issued a Research Permit in June 2015.

After considering the 4 training options for deployment, it was decided to choose the first option. In June 2015, Mr. Bruno Leroy (SPC) traveled to PNG for the purpose of training experienced PNG observers on procedures used to tag and release whale sharks. A total of 15 observers were trained, 5 in Madang, 4 in Rabaul and 6 in Port Moresby. WCPFC-ABNJ provided funds for travel and training.

Distribution and Attachment

To the best of our knowledge this type of post-release mortality tagging has not been previously undertaken for whale sharks in the Pacific. Recent post-release mortality tagging of whale sharks in the Gulf of Guinea (Escalle et al. 2014, Murua et al. 2014) used the protocol contained in Appendix 1 to attach tags to and release six whale sharks. The WCPFC Scientific Committee's "Draft

Guidelines for the Safe Release of Encircled Animals, including Whale Sharks”² should also be referenced when providing instructions to observers and crew participating in this project.

In order to conserve battery life, it is recommended that the tags be activated immediately prior to deployment. Instructions and training to observers will be provided to allow this activation to occur onboard where possible. Alternatively, tags should be put in standby mode prior to boarding the vessel to minimize battery usage prior to deployment.

Data on tag attachment will be recorded on standard SPC fish tagging forms. These will record tag number, date of attachment, size and sex of whale shark, lat/long position and time of day. In addition, a full account of how the tagging was performed and how the whale shark was handled and behaved before and after the tag was attached will be provided. In particular, whether the whale shark became tangled in the net; whether the shark was brailed, lassoed or pushed during its release; and for how many minutes the shark was manipulated while it was sacked up, tagged and then released should all be recorded. Progress reports on tag attachments will be passed along the chain of custody and will be transmitted to PIFSC promptly upon receipt by WCPFC/SPC.

References

Escalle, L., P. Chavance, J.M. Amandé, J.D. Filmalter, F. Forget, D. Gaertner, L. Dagorn and B. Mérigot. 2014. Post-capture survival of whale sharks released from purse seine nets: preliminary results from tagging experiment. IOTC-2014-WPEB10-INF14. Available online at

<http://www.iotc.org/documents/post-capture-survival-whale-sharks-released-purse-seine-nets-preliminary-results-tagging>

Harley, S., P. Williams and J. Rice. 2013. Spatial and temporal distribution of whale sharks in the western and central Pacific Ocean based on observer data and other data sources. WCPFC-SC9-2013/EB-WP-01. Available online at <https://www.wcpfc.int/system/files/EB-WP-01-whale-sharks.pdf>

Murua, H., I. Fraile, I. Arregi, A. Delgado de Molina, J. Santiago, H. Arrizabalaga, G. Merino and J. Ariz. 2014. Investigating the post-release survivorship of whale sharks encircled by European purse seiners: first insight from electronic tagging. ICCAT-SCRS/2014/180.

Poisson, F., B. Séret, A.-L.Vernet, M. Goujon, and L. Dagorn, 2014. Collaborative research: Development of a manual on elasmobranch handling and release best practices in tropical tuna purse-seine fisheries. Marine Policy 44 : 312–320.

² <https://www.wcpfc.int/meetings/10th-regular-session-scientific-committee> (SC10 Summary Report, Attachment I)

APPENDIX 1

Procedures used to tag and release whale sharks in the Gulf of Guinea in May-July 2014 (Escalle et al. 2014, Murua et al. 2014)

Tag Preparation

1. Both studies used miniPAT tags provided by Wildlife Computers. The tags were supplied with titanium anchors which were used without modification (64mm x 16mm x 1mm).
2. The anchor was attached to the tag using a 270 lb stranded stainless steel line covered with heat-shrink tubing for protection. The length of the tag tether was 18-20 cm.
3. Applicator pins supplied by Wildlife Computers were used to attach the anchor to the tagging pole as shown in Figure 1. The applicator pin includes a metal stopper to prevent the anchor from penetrating too deeply.
4. The tag itself was secured to the pole by means of a rubber band which breaks easily when the tagging pole is retracted.



Figure 1. Configuration of tag ready for deployment in the Escalle et al. (2014) study showing 4-meter tagging pole, applicator pin, titanium anchor, 20 cm tag tether, and miniPAT tag with rubber band.

Tag Attachment

5. Tagging was performed after the net was sacked up and when the whale shark was at the surface and parallel to the vessel.
6. Tagging was conducted from the deck of the purse seine vessel because tagging from the skiff proved impossible due to its light weight in the water and the toughness of the whale shark's hide (P. Chavance, personal communication to S. Clarke, 29 October 2014 and H. Murua, personal communication to S. Clarke, 19 February 2015).

7. A 4-meter tagging pole was used by both studies; Murua et al. (2014) also had a 9-meter tagging pole onboard but this longer pole may be unwieldy and 4-meters is considered sufficient (L. Escalle, personal communication to S. Clarke 17 December 2014).
8. Tags were implanted into the muscle below the dorsal fin (Figures 2-4). The whale shark hide is very tough so considerable force is necessary when inserting the tag. The entire length of the applicator, i.e. all the way up to the stopper, should penetrate the muscle tissue (L. Escalle, personal communication to S. Clarke 17 December 2014).
9. Attachment of the tag to the ventral side (underbelly) of the shark should be avoided.

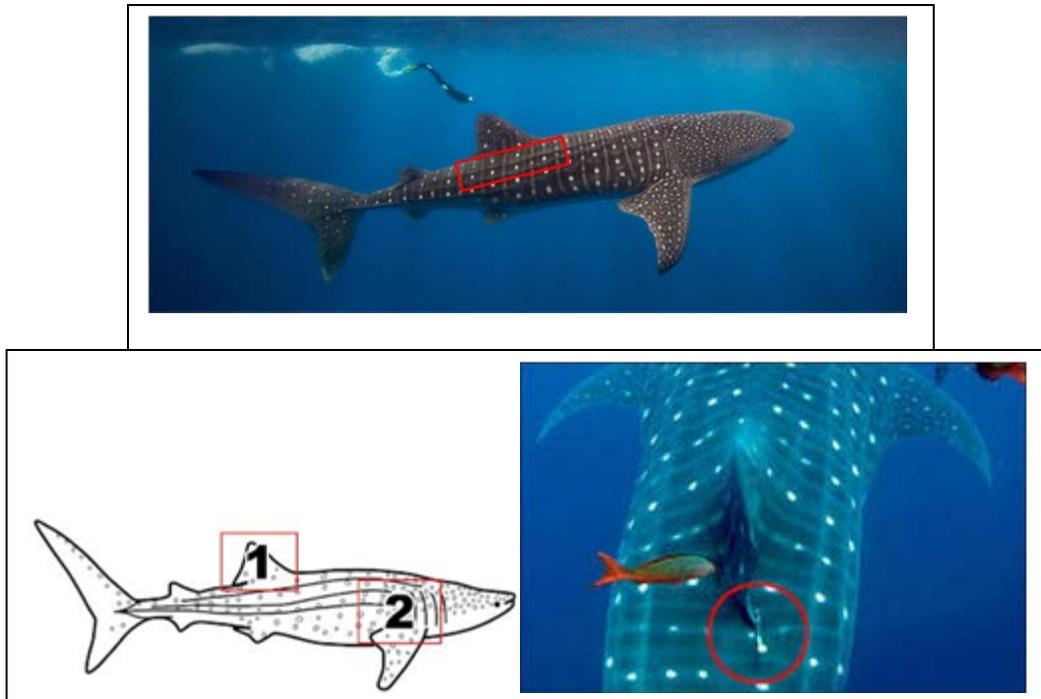


Figure 2. Target area for tag attachment as provided by L. Escalle (upper panel) and H. Murua (lower panel).



Figure 3. Tag as attached by Escalle et al. (2014)



Figure 4. Tagging of a whale shark by Murua et al. (2014)

Whale Shark Release

1. Release practices generally followed best handling guidelines proposed by Poisson et al. (2014).
2. In one study (Escalle et al. 2014) release of the whale shark occurred after most of the tuna brailing was complete in order to avoid loss of catch. In the other study, the whale shark was tagged prior to brailing of the catch (Murua et al. 2014).
3. The whale shark was maneuvered (if possible) so that it was horizontal in the water and parallel to the vessel (preferably with the head facing the bow³). A rope extending either under the whale shark or preferably under the entire sack was then alternately pulled and slacked while dropping the float line to allow the net to sink under the weight of the whale shark. The skiff was then used to help lower the floats and to move the part of the net between the power block and sack such that the whale shark's head was free to move over the slack float line.
4. If the whale shark was very large the net was cut in front of the shark to allow it to swim out before any tuna were brailed (because it was difficult to sack up the net otherwise).

³ Note that in Figure 4 (Murua et al. (2014)) it appears that the whale shark is facing the stern.