Original: English

Taking another step forward: system of verification of the code of good practices in the Spanish tropical tuna purse seiner fleet operating in the Atlantic, Indian and Pacific Oceans

Jon Lopez[1], Nicolas Goñi[1], Igor Arregi[1], Jon Ruiz[2], Iñigo Krug[3], Hilario Murua[1], Jefferson Murua[2], Josu Santiago[2]

About half of the tropical tuna caught worldwide annually is fished by purse seiners mainly using fish aggregating devices (FADs). These devices, although being a very effective fishing tool, are also controversial due to their potential impacts on the ecosystem. In order to decrease impacts and improve the long-term sustainability of the fishery, the two Spanish tuna purse seiner associations, ANABAC and OPAGAC, established in 2012 a voluntary agreement for the application of good practices for responsible tuna fishing activities. The aim of this agreement is to use best fishing practices by reducing mortality of incidental catch of sensitive species (sharks, rays, mantas, whale sharks, and sea turtles) and the use of non-entangling FADs. The good practices defined in this agreement also comprise: best releasing practices for sensitive fauna, 100% observer coverage, continuous training of fishing crew and scientific observers, and the implementation of a FAD logbook. Moreover, the system also includes a Steering Committee to review the progress and functioning of the program and continuous monitoring and data analysis by the independent scientific body AZTI.

In order to monitor and assess the level of compliance of these good practices, a monitoring system was implemented, and is continuously evaluated, in all the vessels of the ANABAC and OPAGAC fleets (64 purse seiners and 23 supply vessels), including Spanish and other flags, operating globally in 4 tuna RFMOs areas (ICCAT, IOTC, WCPFC and IATTC). The monitoring is based on specifically designed forms and in-situ data recorded by trained scientific observers, and more recently, also by electronic monitoring systems. Fishing practices are assessed for each vessel every semester and results are used to provide scientific advice and identify correction mechanisms (i.e when no-compliance is observed corrective actions are suggested to vessel owners/captains). These results also allow the Steering Committee to fine-tune the program. The Code of conduct as well as the verification mechanisms are presented and discussed in this document.

The Code

The agreed code of good practices is dynamic, flexible and based on scientific advice. Since it was first developed, the code has been constantly updated and improved. In 2014, AZTI was required by both Spanish tuna purse seiner organizations to coordinate the scientific monitoring of the program. In order to better understand the level of compliance of the fleet with the code at the beginning of the program, an initial evaluation was carried out in October 2014 through questionnaires tailored to collect information about the level of application of the best practices. This information was crucial and assisted on the correct progress and development of the program at very first stages. The most significant achievements of the program are shown in Fig. 1, which reflects that the code and the program are alive and dynamic. Currently, the program includes the following points:

1. Design and deployment of non-entangling FADs (NEFADs):

As traditional FADs (mesh size >12 cm) are supposed to have higher risk of entanglement of sensitive species like sharks or turtles, the code forces the construction and deployment of FADs that eliminate or reduce as much as possible the potential of animal entanglement (mesh size <3 cm or >3 cm if constructed in sausages). As such, the replacement and use of lower entanglement risk FADs (and if possible NEFADs) is mandatory since February 2012 with minimum standards in designs and materials.

2. Safe fauna release operations

[1] AZTI. Herrera Kaia Portualdea z/g, 20100 Pasaia, Basque Country, Spain., jlopez@azti.es
[2] AZTI. Txatxarramendi ugartea z/g - 48395 Sukarrieta, Basque Country, Spain.
[3] AZTI. Laurier Rd, 361 Victoria, Seychelles.

The code develops appropriate species-specific handling procedures for sensitive fauna that always preserves crew's safety while discouraging other practices that are less favourable. These releasing procedures are based in the outputs of the EU project MADE, which have been used as standard best practice for safe release operations in tRFMOs.

3. 100% observer coverage

All the vessels of the OPAGAC and ANABAC fleet, including auxiliary vessels, need to have an observer onboard, either physical or electronic , since January 1st 2015 (January 1st 2017 for auxiliary vessels).

4. Implementation of a FAD logbook

Both organizations agree to comply with the FAD Management Plan and the FAD logbook adopted by the relevant national fishing authority as well as obey with the minimum data collection requirements adopted by the RFMOs.

5. Training of fishing crew and scientific observers

To ensure that practices are well monitored, transferred to and adopted by the skippers, crew and observers, various tools have been developed, including workshops, guidebooks, and on-line materials.

6. External verification of all fishing activities

AZTI coordinates data collection and conducts six-monthly reports based on in situ observations recorded by scientific observers. The level of compliance is measured though dedicatedly prepared R routines.

7. Creation of a Steering Committee

The program is monitored by a Steering Committee formed by science-industry members that ensures the correct function of the agreed practices, suggesting ideas for improving and adopting changes if necessary.

The System of Verification

Although many different research institutes of tropical Atlantic and Indian Ocean areas are involved in the data collection of the program, AZTI is in charge of coordinating, collecting, processing and analysing data. As such, AZTI developed specific forms in English, French and Spanish to collect detailed information on fauna release operations and FAD structure-related issues through scientific observers (annex 1). Once data is validated by the corresponding institute, is send to AZTI to double check, storing and analysis. Several R routines have been developed for data manipulation and analysis, including scripts for data depuration, pre and post-processing and compliance analysis. Although trials were conducted to include forms in the Pacific Ocean, their use was not finally established in the region. However, the successful collaboration with IATTC and WCFPC permitted to obtain data of vessels operating under its observer programs, which included information on the interaction and faith of sensitive species and FAD data.

The level of conformity and the reason of non-conformity during fauna release operations (inevitable residual mortality; lack of specific material for liberation; real non-conform procedure), as well as the time used to release animals are computed for each fishing trip and vessel, which allows to see in detail vessel-specific behaviour and evolution for each animal group. FAD structures and components are also investigated by trip and vessel, only considering for the analysis FAD left at sea. In order to better monitor the level of compliance of vessels on FAD-related habits, 6 categories are established for analysis, from less to greater entangling potential (1: Completely Conform; 2: net of >3 cm in the inferior part of the raft; 3: net of >3cm in the upper part of the raft; 4: pieces of net >3cm in the underwater part; 5: underwater part with net >3cm; 6: raft and underwater part with net >3cm), and an additional category (0) to reflect the number of FADs at sea for which the total conformity cannot be evaluated (i.e. certain parts were not checked in detail by the observer).

Based on results from the analysis, AZTI develops six-monthly reports for each fishing company, where vessel and company-specific recommendations are provided. Results are also used as base information for the Steering Committee, which takes necessary actions to ensure the correct function of the program.

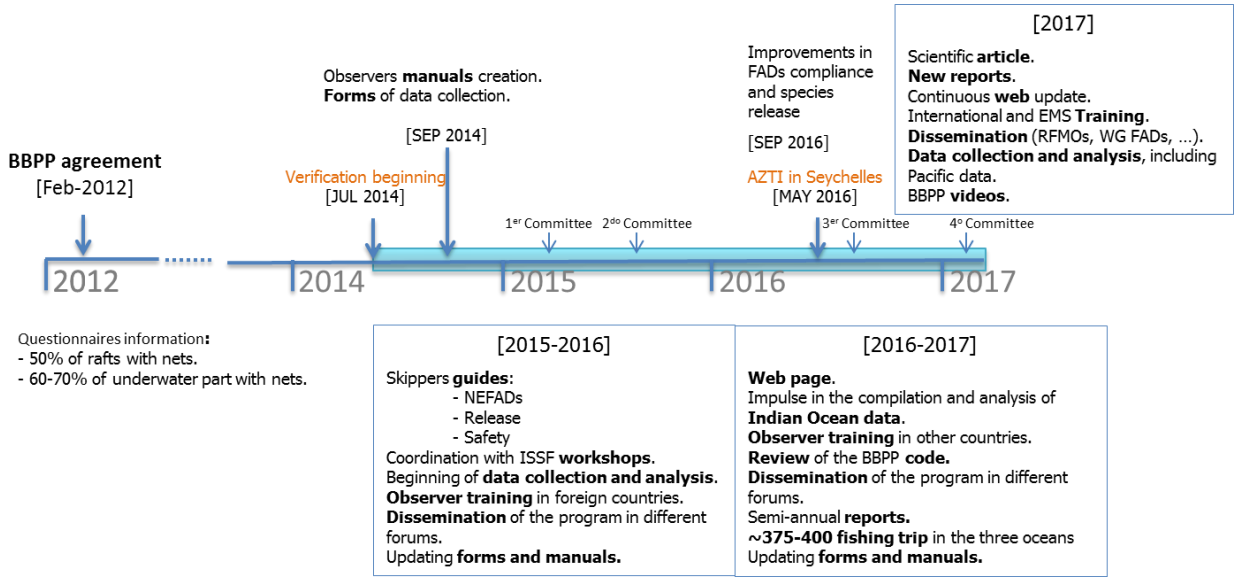

Figure 1. Timeline with the most important achievements and progress done in the Good Practices for responsible tuna fishing program since February 2012, moment at which the Code was agreed and signed by both Spanish organizations OPAGAC and ANABAC.

ANNEX I: Forms designed and used to collect information related to the Code of Good Practices.

azti tecnalia

Verification of Good Practices ANABAC/OPAGAC

RELEASE OF ASSOCIATED FAUNA

Form **B2** version 2014

fishing set n°:	Date:	fishing trip code
route form n°:	route line n°:	
fauna liberation form n°:		strapping start time (h h m m)

Released fauna - sharks (1 line by individual, see example)

	individual			release mode						time		(4) state of the animal				
	(1) species	(2) size	(3) sex	using brailer	by stretcher, fabric, sarria, cargo net	with specific equipment	manual from deck	after disentangling	non conform	animal detected	animal released	eyes	head	fins	skin	gill slits
0	FAL	140	2				1			7:35	7:47	P	P	M	M	P
1																
2																
3																
4																
5																
6																
7																
8																
9																
10																
11																
12																
13																
14																
15																
16																
17																
18																
19																
20																
21																
22																
23																
24																
25																
26																
27																
28																
29																
30																

Notes (5):

Data verified

(1) put species code - see usual observers handbook.

(2) in centimeters

(3) sex: 1 male; 2 female; 3 undetermined

(4) score: P ("perfect") intact, no damage; M ("moderate") superficial damages;
S ("severe") damages with important risk for survival; U ("unknown") cannot be observed.

(5) if photos of the individuals were taken, mention code of the corresponding photos

If more than 30 individuals are released, continue on a new form

Figure 2. Form B2 used to register the information of shark releases.

azti tecnalia

Verification of Good Practices ANABAC/OPAGAC

RELEASE OF ASSOCIATED FAUNA

Form **B3** version 2014

fishing set n°: | Date: | fishing trip code

route form n°: | route line n°:

fauna release form n°:

strapping start time: h h m m

Released fauna - whale sharks, rays (1 line/individual, see example)

	individual			release mode								time		(4) state of the animal				
	(1) species	(2) size	(3) sex	drowning the corks	notch in the net	using the brailer (small shark)	using the brailer	by stretcher, fabric, sarria, cargo net	with specific equipment	manual from deck	non conform	animal detected	animal released	eyes	head	fins	skin	gill slits
0	RHN	520	3	1								7:49	8:36	P	P	M	M	P
1																		
2																		
3																		
0	RMB	120	2							1		8:44	8:49	P	P	M	M	P
1																		
2																		
3																		
4																		
5																		
6																		
7																		
8																		
9																		
10																		
11																		
12																		

Released fauna - turtles (1 line/individual, see example)

	individual			release mode				onboard 1d	time		(4) state of the animal				
	(1) species	(2) size	(3) sex	after disentang.	manual from deck	through removing net/plastic remains or hook	non conform		animal detected	animal released	eyes	head	legs	skin	shell
0	TTL	90	1		1				9:04	9:21	P	P	P	M	P
1															
2															
3															
4															
5															
6															
7															

Notes (5):

Data verified:

(1) put species code - see usual observers handbook.
(2) in centimeters
(3) sex: 1 male; 2 female; 3 undetermined
(4) score: P ("perfect") intact, no damage; M ("moderate") superficial damages;
S ("severe") damages with important risk for survival; U ("unknown") cannot be observed.
(5) if photos of the individuals were taken, mention code of the corresponding photos

Figure 3. Form B3 used to register the information of whale sharks, rays and turtle releases.

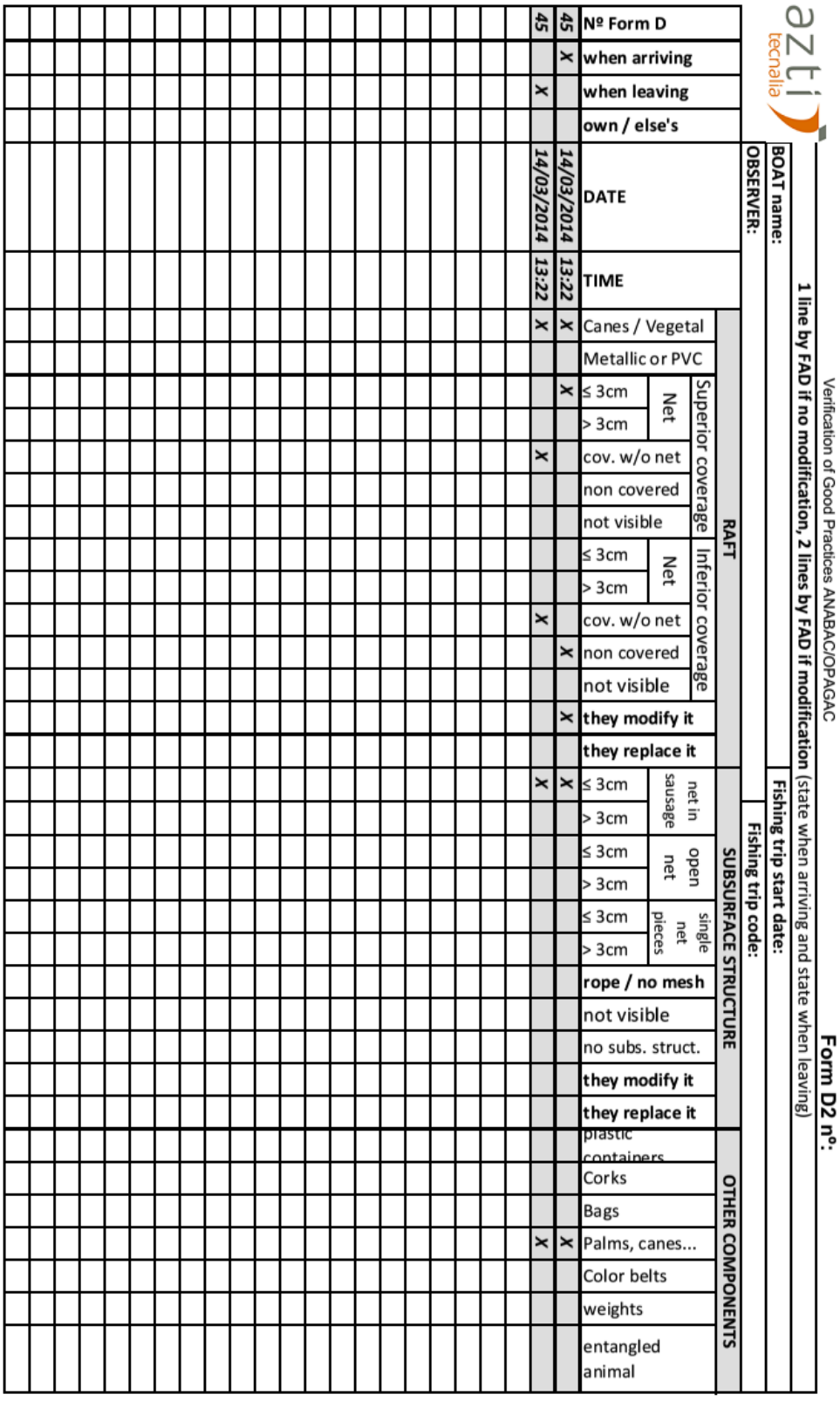

Figure 4. Form D2 used to register the characteristics of FADs and to determine their entangling or non-entangling nature.