

## Best Standards for Data Collection on FOBs: Towards a Science Based FOB fishery management

*Maitane Grande (1), Jon Ruiz (1), José Carlos Báez (2), M<sup>a</sup> Lourdes Ramos (2), Pascal Cauquil (3), Josu Santiago (1), Iñigo Krug (1), Iker Zudaire (1), Pedro Pascual (2), Francisco Abascal (2), Daniel Gaertner (3), Laurent Floch (3), Alexandra Maufroy (4), Anertz Muniategi (5), Miguel Herrera (6), Hilario Murua (1)*

*(1) AZTI, Spain; (2) Instituto Español de Oceanografía (IEO), Centro Oceanográfico de Canarias, Spain; (3) MARBEC, Univ Montpellier, CNRS, Ifremer, IRD, Sète, France; (4) ORTHONGEL, Concarneau, France; (5) Asociación Nacional de Armadores de Buques Atuneros Congeladores (ANABAC), Bermeo, Spain; (6) Organización de Productores Asociados de Grandes Atuneros Congeladores (OPAGAC), Madrid, Spain. Main author contact details: mgrande@azti.es, Phone: +34 667100124*

### Summary

Tropical tuna purse seiners operating globally have increased their use of Floating Objects (FOBs), including man-made drifting Fish Aggregating Devices (dFADs) and logs, usually equipped with satellite-linked echo-sounder buoys. The use of these FOBs has contributed to improving the fishing efficiency, but potential adverse effects on target and non-target species and the marine ecosystems have been also identified (i.e. alteration of tuna behaviour, reduction in yield per recruit, increase of bycatch, damages to sensitive coastal habitats and contribution to marine littering). In recent years tuna Regional Fisheries Management Organizations (t-RFMOs) have adopted data reporting requirements and recommended arrangements for the use of high-resolution FOB data to assess those impacts. However, the standards adopted by t-RFMOs are different and levels of reporting are still low. This has hampered the work of scientific committees in evaluating the impacts of FOBs and deliver specific advice about FOB management. The aim of this work is to review current requirements and procedures and to propose standards for data collection and reporting on FOBs to t-RFMOs. The proposals included in this document are the result of a collaborative work between scientists and fishing industry.

### Introduction

The use of FOBs has continuously increased in tropical tuna purse seine fishery, with FOB-associated catches now exceeding those on free schools in the case of the European Fleet. Despite the importance of this fishery, little information is available on FOB use worldwide which is crucial for the understanding, monitoring and management of FOBs use and the impacts on pelagic ecosystems. As a result, t-RFMOs have called for FAD management plans, including data collection and reporting on deployment and use of FOBs by purse seiners and supply vessels. For example:

- IOTC: Res. 15/01; Res. 15/02; Res. 18/08, and provides specific form for reporting of FOB statistics, 3FA form;
- ICCAT: Rec. 16-01, para 21, Annex 2 FAD logbook form, Annex 3 on the nomenclature of FADs and activities; and Rec. 16-01, para 22, Annex 4 form [list of deployed FADs and buoys], and has developed and updated the ST08-FadsDep form for CPCs for data submission to the RFMO on activities with buoys and FOBs (ST08A) and buoy density (ST08B);
- IATTC: Resolution C-18-05 (Article 2 and Annex I) and C-17-02 established data collection and reporting requirements for purse seiner vessels operating with FADs, has developed and update the FAD Form 09/2018 for skippers, and request information on operational buoys through the INF1 and INF2;
- WCPFC: Collects information on FOB activities through the fishing logbooks and the Regional Observer Programs).

Although efforts are being made to record and report information on FOBs due to the complexity of this fishing strategy and the lack of unified data collection and reporting requirements (e.g. an absence of harmonized definitions for relevant terms or ambiguity among t-RFMOs), there are significant data gaps (Ramos et al., 2017; Lopez et al., 2018) and the information collected and reported has been of limited utility. Recently, several works have addressed collection and submission related problems to propose potential solutions, such as interpretations of requirements and new templates for the data collection/reporting (Báez et al., 2017a; Báez et

al., 2017b; Ramos et al., 2017; Gartner et al., 2016; Grande et al., 2018; Lopez et al., 2018). Some of these proposals have been implemented by some users, regionally or at t-RFMOs level, but not at a global level. However, standardization among CPCs and t-RFMOs would be highly desirable. The aim of the present work is to present the proposals for a standardize FOB-related data collection and submission to tRFMOs. The proposals included in this document are the result of a collaborative work between scientists and the fishing industry (extended version can be found in Grande et al., 2018), which has been done in the frame of EU RECOLAPE project.

## Results and Discussion

### Best Standards for Data Collection on FOBs by skippers

Skippers should collect information on FOBs by the use of FOB logbook on board. All interaction with FOBs (FADs or other floating objects) and buoys if present, should be recorded in the logbook. The record of each activity should provide information on the vessel, trip ID, date and time (GMT), position, buoy attached if present (including the ID of the manufacturer and ownership), type of activity, specifications on the FOB type (the information provided should allow the scientists classifying the activities and FOBs types in CECOFAD categories), and structure of the FOB allowing the assessment of the dimension, entangling character (given by the mesh size if present and configuration) and nature of the material in the floating and submerged structure, as well as the catch of fishing sets (i.e. target species and bycatch) when applicable. Some purse-seine vessels work in collaboration with other purse seiners and/or with supply vessels. In these cases, every vessel should register its own activities, even when they are supporting other vessels (Ramos et al., 2017). If vessels working in collaboration are of different flag states, the details on activities should be shared with the corresponding CPC or t-RFMOs.

If excel files are used for on-board data collection, we recommend using a unique form to record all activities on FOBs as proposed by Ramos et al. (2017). This will require to eliminate the second form or FOB inventory form which was previously used in the Spanish FAD Management Plan and it is now used in the IATTC area, which has been shown to be of limited utility. FOB inventory form was not a practical tool on board as it requires a daily update of the list, and hardly provided good quality data (Ramos et al., 2017). The information of the FOB dynamics (including activities and materials used in the construction) could be deduced from the FOB activity form (if detailed information is given in each record). On the other hand, in case of purse seiners with Electronic Reporting System (ERS) the FOB logbook and fishing logbook should be linked to minimize the errors due to double recording.

### Best Standards for data reporting requirements to t-RFMOs

Based on previous experiences (Báez et al., 2017a; Báez et al., 2017b; Ramos et al., 2017; Lopez et al., 2018) and data sources, the group recommends using two specific templates adjusted to the data collections sources (FOB logbook vs. buoy tracks):

- One dedicated form to report activities on FOBs and buoys. The information should be derived from FOB logbooks. The activities with buoys and FOBs, as well as FOB types should be in line with CECOFAD categories. Aware of the difficulties of logbook analysis we recommend reducing the request to certain activities: deployment, tagging and loss (CECOFAD categories), until the development and implementation of a standardized data collection tool is available.
- A second template dedicated to report information of density of FADs, which should be derived from buoys transmission information. Information on buoy density should be requested stratified by month and 1°x1° (i.e. average number of operational buoys belonging to the vessels over the month and 1°x1°, by summing up the total number of operational buoys recorded per day over the entire month in each grid and dividing by the total number of days in the month). This information should be extracted from buoy transmissions provided by buoy manufactures and not from FOB logbooks.

## References

- Báez, J.C., Ramos, M.L., López, J., Santiago, J., Grande, M., Herrera, M.A., Rojo, V., Moniz, I., Muniategi, A., Pascual, P.J., Murua, H., Abascal, F.J., 2017a. Interpreting ICCAT's data reporting requirements for activities on FADs: An overview from EU-Spain. SCRS/2017/217. Madrid 25-29 de septiembre 2017.
- Báez, J.C., Bach, P., Capello, M., Floch, L., Gaertner, D., Goujon, M., Grande, M., Herrera, M.A., López, J., Marsac, F., Maufroy, A., Moniz, I., Muniategi, A., Murua, H., Pascual, P.J., Ramos, M.L., Rojo, V., Sabarros, P.S., Santiago, J., Abascal, F.J., 2017b. Interpreting IOTC's data reporting requirements for activities on floating objects: an outlook from EU scientist and fishing operators. IOTC-2017-WPDCS13-27.

- Gaertner, D., Ariz, J., Bez, N., Clermidy, S., Moreno, G., Murua, H., Soto, M., Marsac, F., 2016. Results achieved within the framework of the EU research project: Catch, Effort, and eCOsystem impacts of FAD-fishing (CECOFAD). IOTC-2016-WPTT18-35.
- Grande M, Baez J.C., Ramos M.L., Ruiz J., Zudaire I., Murua H., Santiago J., Pascual P., Abascal F., Gaertner D., Cauquil P., Floch L., Maufroy A., Muniategi A., and Herrera M., 2018. Best standards for data collection and reporting requirements on FOBs: towards a science-based FOB fishery management SCRS/2018/159.
- Lopez, J., Altamirano, E., Lennert-Cody, C., Maunder, M., Hall, M., 2018. Review of IATTC resolutions C-16-01 and C-17-02: available information, data gaps, and potential improvements for monitoring the fad fishery. 3rd Meeting of the Ad Hoc Working Group on FADs La Jolla, California USA, 11-12 May 2018.
- Ramos, M<sup>a</sup>.L., Báez, J.C., Grande, M., Herrera, M.A., López, J., Justel, A., Pascual, P.J., Soto, M., Murua, H., Muniategi, A., Abascal, F.J., 2017. Spanish FADs logbook: solving past issues, responding to new global requirements. Joint t-RFMO FAD Working Group meeting Doc. No. j-FAD\_11.