ICCAT ATLANTIC OCEAN TROPICAL TUNA TAGGING PROGRAMME (AOTTP) - FINAL NARRATIVE REPORT

EVIDENCE BASED APPROACH FOR SUSTAINABLE MANAGEMENT OF TUNA RESOURCES IN THE ATLANTIC

Abstract

The Atlantic Ocean Tropical tuna Tagging Programme (AOTTP) was a five-year duration tag and release project implemented by the International Commission for the Conservation of Atlantic Tunas (ICCAT). Five important species of tropical tuna were targeted for tag and release using mainly baitboats, although longliners and recreational anglers were also used. During the project, approximately 120,000 fish were tagged and released with conventional tags and around 600 with electronic (pop-up and internal/archival) tags. The overall tag recovery rate was 14%.

AOTTP Coordination Team

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LIST OF ACRONYMS USED IN THE REPORT

Acronym	Definition
AGAC	Association of Large Tuna Freezers
ANABAC	National Association of Freezer Tuna Vessel Owners
AOTTP	Atlantic Ocean Tropical tuna Tagging Programme
AZTI	Centro Tecnologico Experto en Innovacion Marina y Alimentaria (Spain)
BB	Baitboat
BET	Bigeye tuna (*Thunnus obesus*)
BOT	British Overseas Territory
CEFAS	Centre for Environment Fisheries and Aquaculture Science (UK)
CIPA	Centro de Investigação Pesqueira Aplicada (Guiné-Bissau)
CISEF	Cap-Vert Cote d'Ivoire Senegal Espagne France
CLPA	Comite Local de la Peche Artisanale (Senegal)
CPC	Contracting Parties (ICCAT)
CRO-CI	Centre Recherches Oceanologiques (Cote d'Ivoire)
CRODT	Centre Recherches Oceanologiques de Dakar (Senegal)
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)
DAFF	Department of Agriculture Forestry and Fisheries (South Africa)
DCC	Developing Coastal State
DEPAq	Departamento de Pesca e Aquicultura (Brazil)
DG-DEVCO	Directorate General for International Cooperation and Development
DG-MARE	Directorate General for Maritime Affairs and Fisheries
DPMA	La Direction des Peches de la France
DP-STP	Direcao das Pescas de Sao Tome e Principe
EEZ	Exclusive Economic Zone
FADURPE	Fundação Apolonio Salles de Desenvolvimento Educacional (Brazil)
FM	Fausses marques
FSSD	Fisheries Scientific Survey Division (Ghana)
IATTC	Inter American Tropical Tuna Commission (USA)
ICCAT	International Commission for the Conservation of Atlantic Tunas
ICES	International Council for the Exploration of the Sea
IEO	Instituto Espanol de Oceanografia
IFAN	Institute fondamental Afrique noire Cheikh Anto Diop
IMAR	Instituto do Mar
IMROP	Institute Mauritanien de Recherches Oceanographiques et des Peches (Sao Tome and Principe)

INDP	Instituto Nacional para Desenvolvimento das Pescas (Cabo Verde)
IOTC	Indian Ocean Tuna Commission
IRD	Institute de recherche pour le developpment
ISRA	Institute Senegalais de Recherches Agricoles
LATEP	Laboratorio de Tecnologia Pesqueira (Brazil)
LL	Longline
LPRC	Large Pelagic Research Center (USA)
LTA	Little tunny (*Euthynnus alletteratus*)
MFRD	Marine Fisheries Research Division (Ghana)
MFV	Motor Fishing Vessel
MSE	Management Strategy Evaluation
NOAA	National Oceanic and Atmospheric Administration (USA)
NRIFSF	National Research Institute of Far Seas Fisheries (Japan)
OPAGAC	Organisation of Producers of Frozen Tuna
PAD	Port Autonome de Dakar (Senegal)
PFRP	Pelagic Fisheries Research Program (USA)
PROBITEC	Proyectos Biologicos y Tecnicos (Spain)
PS	Purse-seine
RV	Research Vessel
SC	Steering Committee
SCRS	Standing Committee on Research and Statistics
SKJ	Skipjack tuna (*Katsuwonus pelamis*)
SPC	Pacific Community (New Caledonia)
tRFMO	Tuna Regional Fisheries Management Organizations
TRO	Tag Recovery Officer
UFERSA	Universidade Federal Rural de Semiarido (Brazil)
UFPRE	Universidade Federal de Pernambuco (Brazil)
UPV	Universidad Politecnica de Valencia (Spain)
VIMS	Virginia Institute of Marine Science
WAH	Wahoo (*Acanthocybium solandri*)
YFT	Yellowfin tuna (*Thunnus albacares*)

1. DESCRIPTION

1.1. NAME OF COORDINATOR OF GRANT CONTRACT

Douglas Beare (doug.beare@iccat.int).

1.2. NAME AND TITLE OF CONTACT PERSON

Camille Jean Pierre Manel (camille.manel@iccat.int), Executive Secretary of ICCAT.

1.3. NAME OF BENEFICIARY(IES) AND AFFILIATED ENTITY(IES) IN THE ACTIVITY

International Commission for the Conservation of Atlantic Tunas.

1.4. TITLE OF THE ACTION

Evidence based approach for sustainable management of tuna resources in the Atlantic - Atlantic Ocean Tropical tuna Tagging Programme (AOTTP).

1.5. CONTRACT NUMBER

DCI-FOOD/2015/361-161

1.6. START DATE AND END DATE OF THE ACTION:

29 June 2015 to 28 February 2021.

1.7. TARGET COUNTRY(IES) OR REGION(S):

Atlantic Ocean coastal states.

1.8. FINAL BENEFICIARIES AND/OR TARGET GROUPS (IF DIFFERENT) (INCLUDING NUMBERS OF WOMEN AND MEN)

The final beneficiaries of the project are fishing communities and operators depending on the exploitation of tuna resources plus consumers of tuna fish.

1.9. COUNTRY(IES) IN WHICH THE ACTIVITIES TAKE PLACE (IF DIFFERENT FROM 1.7):

They are not different.

2. ASSESSMENT OF IMPLEMENTATION OF ACTION ACTIVITIES

2.1. EXECUTIVE SUMMARY OF THE ACTION

ICCAT-AOTTP was successful, reaching the majority of its targets during its duration (November 2015 - February 2021). During the project 53 contracts were evaluated and awarded. Overall, at least 1867 days at sea (target 1800

days) were spent on 580 tagging cruises throughout the tropical Atlantic. Tag and release targets (120,000 fish), compromised by the pandemic, were almost reached, with *ca* 119,429 fish (99.6% of the target) being tagged and released (R-1) with conventional tags in the High Seas and in the EEZs of more than 20 different countries. A total of 597 electronic tags (pop-ups and internals) were deployed and are already providing new scientific information on tuna migrations. Scientists and technicians, including women, from developing countries tagged over two-thirds of all the fish. Formal tag-recovery and awareness raising infrastructures were set up in 13 countries, with less formal arrangements in another 5 locations, including Japan and the People's Republic of China. A total of 17,162 tags were recovered with metadata so far (overall recovery rate is 14%) for which rewards (t-shirts, caps, lottery entry, cash, and mobile phone top-ups) were paid. Tag-seeding experiments are still ongoing during 2021, with an extensive network of observers throughout the Atlantic and reporting rates for the most important purse-seine fleets are: 69%, 77.3%, and 68% for BET, SKJ, and YFT respectively. A total of 21,417 fish were double-tagged, and tag-shedding rates estimated, while 9,123 fish were chemically tagged which is improving our ability to age hard parts from recaptures. ICCAT-AOTTP partners from Brazil, Senegal and Australia created a pan-Atlantic Otolith Reference Set to standardize age-determination of tropical tunas and routine ageing is ongoing. Otolith ring deposition rate validation and training was also organized with contractors from Australia providing expertise. All AOTTP data were uploaded into ICCAT relational databases using smartphone and messaging applications, which were also used very effectively to maintain communication between AOTTP and the many field operatives around the Atlantic Ocean. Training in all aspects of tagging at sea, tag-recovery, and data transmission methodologies took place throughout the project. ICCAT-AOTTP also organized a number of otolith-reading, capacity-building workshops during the project which were very successful. Two contracts for data analysis were awarded: one to investigate mortality and movement/migration; and the other to study growth. The YFT tuna stock was assessed in 2019 by SCRS and age and tag-recapture data collected by AOTTP proved to be very important. The AOTTP Final Symposium - originally planned for June 2020 in Senegal - could not take place due to the covid-19 pandemic and was replaced by an Online Symposium in January 2021.

2.2. RESULTS AND ACTIVITIES

The AOTTP was divided into the following five Phases: 1. Inception (6 months); 2. Tagging-Recovery 1 (18 months); 3. Tagging Recovery 2 (12 months); 4. Recovery and Analyses; and 5. Analyses and Symposium. AOTTP accomplishments against Indicators described in the original Grant Contract are summarized below.

EXPECTED RESULT 1 (ER1). TAG-RECAPTURE AND ASSOCIATED DATA FROM THE THREE MAIN TROPICAL TUNA AND ON NERITIC TUNA SPECIES IN THE ATLANTIC ARE STORED IN A DATABASE AT THE ICCAT SECRETARIAT

ER1 has the following objectively verifiable indicators:

- Number of tagged tunas: A minimum of 120,000 tunas are tagged (AOTTP & SCRS reports, ICCAT-AOTTP Databases)

- Reporting rates: A minimum reporting rate by gear within the range of those obtained in similar tuna tagging programmes in other oceans (e.g. purse seine fleets above 80%)

Tagging activity on AOTTP began at the end of June 2016 around the Azores (EU-Portugal). Since then, together with its partners, ICCAT-AOTTP has tagged tuna: around the Canary Islands, around Madeira, using traps off Portugal, off Senegal/Cabo Verde/Mauritania, in the Gulf of Guinea, in the territorial waters of the USA, around

Bermuda, in the Caribbean Sea, around St. Helena, off South Africa, and off Brazil and Uruguay (**see**, **Figure 1, Appendices 3** and **4**).

A total of 119,429 tropical tuna (mostly BET, SKJ, YFT, LTA, and WAH) were tagged and released during the programme (e.g. **Figure 1** and **Table 1**), and 17,162 tagged fish recovered until February 2021.

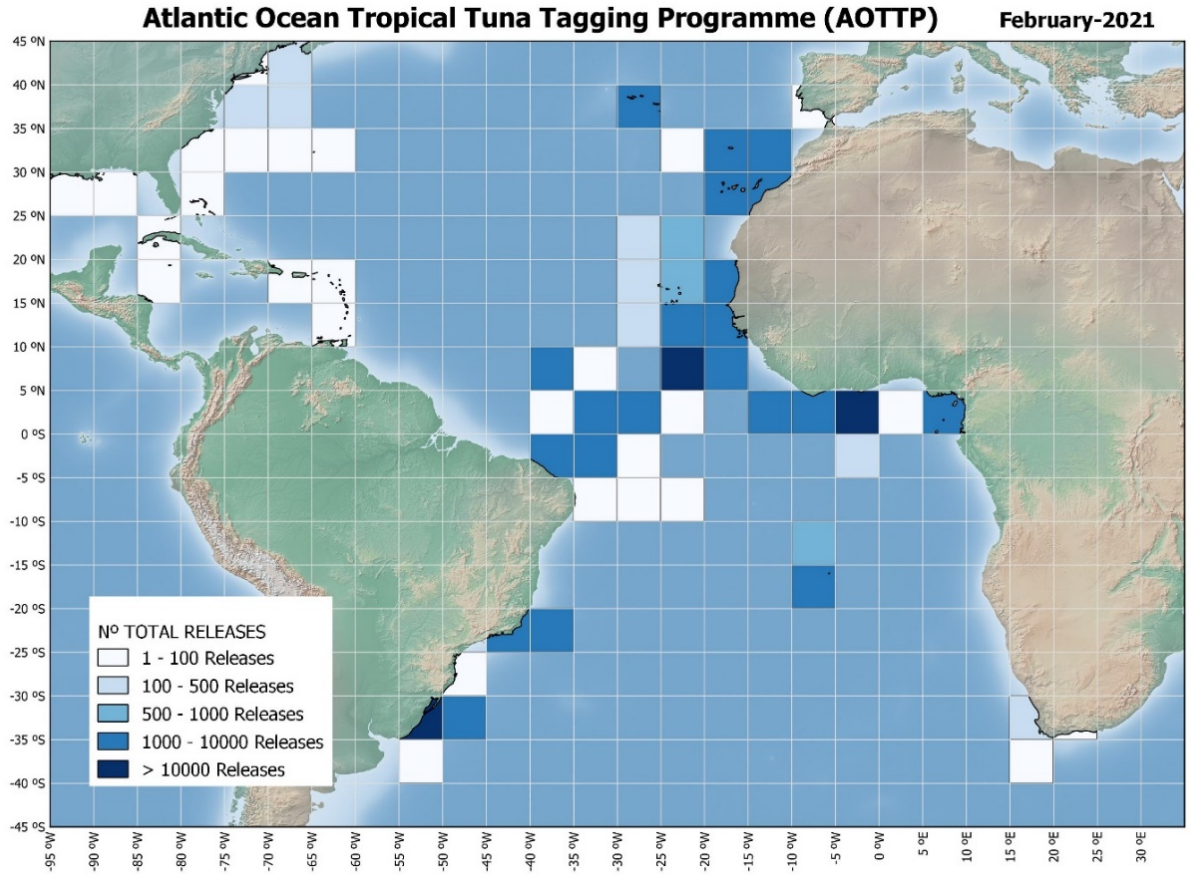

Figure 1. Spatial distribution of tropical tuna tagged and released (conventional tags only) by ICCAT-AOTTP between July 2016 and February 2021.

ICCAT-AOTTP achieved 99.5% of its overall tagging target of 120,000 fish, while the distribution between the three main tropical species was acceptable: BET at *ca* 20%; SKJ at *ca* 39%; and YFT at *ca* 34%.

All the tagging release and recovery data are stored in a relational database at the ICCAT Secretariat and were updated regularly throughout the project.

A key part of the project was related to data management. From data collection, quality control, uploading and subsequent analysis for decision making. To perform these tasks the project team designed and developed several applications, created specific servers, developed functions for data quality control, and generated tools for internal analysis or visualization of results on maps, charts, cartographic viewers or dashboards. Further details are provided in **Appendix 11**.

All the data can be explored using dashboard created and available in the AOTTP website.

The rate at which conventional tags are lost from fish (tag-shedding) is an important parameter for estimating mortality from tag-recapture data, and this was estimated by double-tagging a proportion of the fish. During AOTTP 21417 fish were double-tagged, translating to 89% of the 24,000 objective set at the outset of the project. Nevertheless, these data are enabling tag-shedding rates to be accurately assessed by the SCRS.

Table 1. ICCAT-AOTTP (R-1) tag releases by species.

	Nos Released	Nos Recovered	% Rec
Bigeye tuna (BET)	24092	4941	20.5%
Little tunny (LTA)	7832	585	7.5%
Skipjack tuna (SKJ)	46892	3540	7.5%
Wahoo (WAH)	281	2	0.7%
Yellowfin tuna (YFT)	40332	8094	20.1%
Total	119429	17162	14.4%

Table 2. Double-Tagged releases (-) by species.

	Double tagged totals	Single tagged totals	% double tagged
Bigeye tuna (BET)	4833	19259	25%
Little tunny (LTA)	1489	6343	23%
Skipjack tuna (SKJ)	8766	38126	23%
Wahoo (WAH)	33	248	13%
Yellowfin tuna (YFT)	6296	34036	18%
Total	21417	98012	22%

Size-ranges, or length frequencies, of individuals tagged and released were satisfactory overall (**Appendix 1**), given the Baitboat metiér that was used to catch and release the majority of fish. Very large BET and YFT proved difficult to catch throughout the project. Two neritic species (LTA and WAH) were targeted for tag and release by ICCAT-AOTTP after a recommendation from the SCRS Small Tunas Species Group. During the tagging phase of AOTTP, 7832 LTA and 281 WAH were tagged against an overall combined target of 10,000. Note that the target number of LTA to be tagged was increased when it proved so difficult to catch and release WAH in substantial quantities. Nevertheless, the overall target for neritic tuna was not quite reached.

ICCAT-AOTTP used electronic tags to study in more detail (than can be achieved with conventional tags) the movements/migrations of tropical tuna which can be used to infer 'stock structure'; an important consideration in stock assessment and management. Three different brands of pop-up type tag (Desert Star, Wildlife Computers and Microwave Telemetry) were used by AOTTP; and two 'models' of internal archival tag from Lotek Wireless (Arcgeo9s and Lat2810s). AOTTP partners deployed 29 Desert Star, 108 Wildlife computers and 30 Microwave Telemetry pop-up tags during the project. Similarly, 36, ArcGeo 9 (Lotek), and 394, Lat 2810 (Lotek) internal/archival tags were deployed (**Table 3**).

Table 3. AOTTP Electronic tag release numbers by species.

	Bigeye tuna (BET)	Skipjack tuna (SKJ)	Yellowfin tuna (YFT)	Total
Desert Star	22	0	7	29
Lotek ARCGEO9	30	0	6	36
Lotek LAT2810	131	9	254	394
Microwave Telemetry	19	0	11	30
Wildlife Computers	32	0	76	108
Total	234	9	354	597

Retention times of the pop-up tags were disappointing with an average of 48 days (**Tables 4 and 5**). The maximum recorded for a Desert Star tag was 192 days (on a BET), while in the case of Microwave and Wildlife Computers, the maximum number of days were 366 (on a BET) and 181 (on a YFT), respectively.

Table 4. Electronic tag mean retention times by species (number of days).

	Bigeye tuna (BET)	Yellowfin tuna (YFT)
Desert Star	52	36
Lotek ARCGEO9	134	NA
Lotek LAT2810	169	181
Wildlife Computers	76	26
Microwave Telemetry	121	73

Table 5. Electronic maximum retention times by species (number of days).

	Bigeye tuna (BET)	Yellowfin tuna (YFT)
Desert Star	192	44
Lotek ARCGEO9	782	NA
Lotek LAT2810	341	613
Wildlife Computers	151	181
Microwave Telemetry	366	156

Pop-up tag retention durations achieved by teams working in the NW Atlantic and off South Africa were, however, relatively high, and new information showing the migration of both BET and YFT tuna is emerging (**see Figure 2**). Due to the generally poor performance of both Desert Star (limited data transmitted) and Wildlife Computers (e.g. pin breakages) satellite tags, ICCAT-AOTTP opted to purchase 30 Microwave Telemetry tags for the second phase which were deployed off the east coast of the USA.

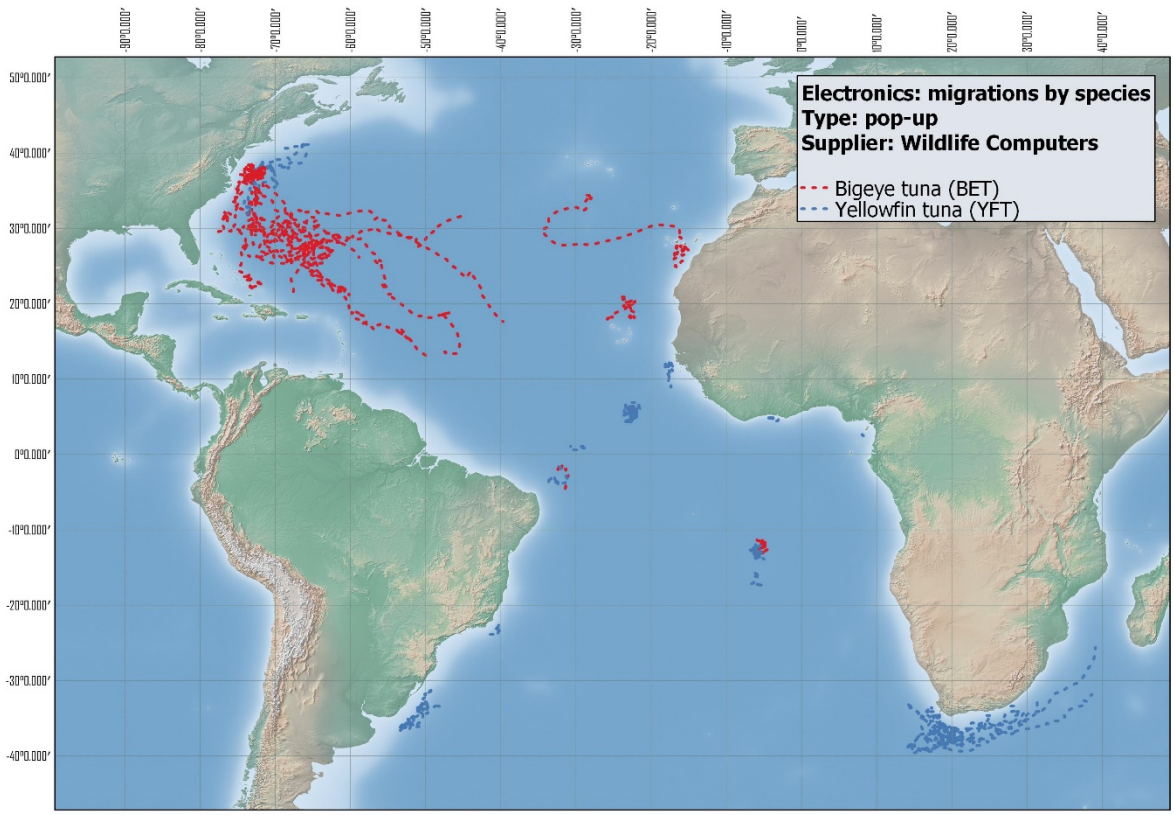

Figure 2. Migrations of BET and YFT tuna tagged with Wildlife Computer pop-up electronic tags by AOTTP partners.

Recovery rates of the internal/archival tags were low, with only 52 tags recovered, possibly due to mortality caused by the surgical implantation. A few, however, were reported to us with long periods at liberty, and hence very valuable information: one was returned in South Africa with over 12 months of data; another released and returned in Brazil has over 18 months of data; while a third also released in Brazil was found by the Abidjan TROs in Côte d'Ivoire with over 21 months of data (**see Figure 3**).

The ICCAT Secretariat has a well-developed database infrastructure for storing tagging data, which the AOTTP exploited and developed from the start.

ICCAT-AOTTP also estimated Tag Reporting Rates which is an important parameter in population assessment from tag-recapture data. The 'Reporting Rate' is a measure of the efficacy of the project's awareness-raising activities, and hence the likelihood that a tag is seen amongst fish landed and then actually reported with metadata to ICCAT. A target Reporting Rate of 80% for the Purse-seine was set at the start of AOTTP. Reporting Rates were estimated by "tag-seeding experiments", whereby scientific observers, captains and crews of fishing vessels surreptitiously insert "false" tags into fish that have been caught at all points along the value chain. The recovery and reporting of these "false" tags then allows Reporting Rates to be estimated.

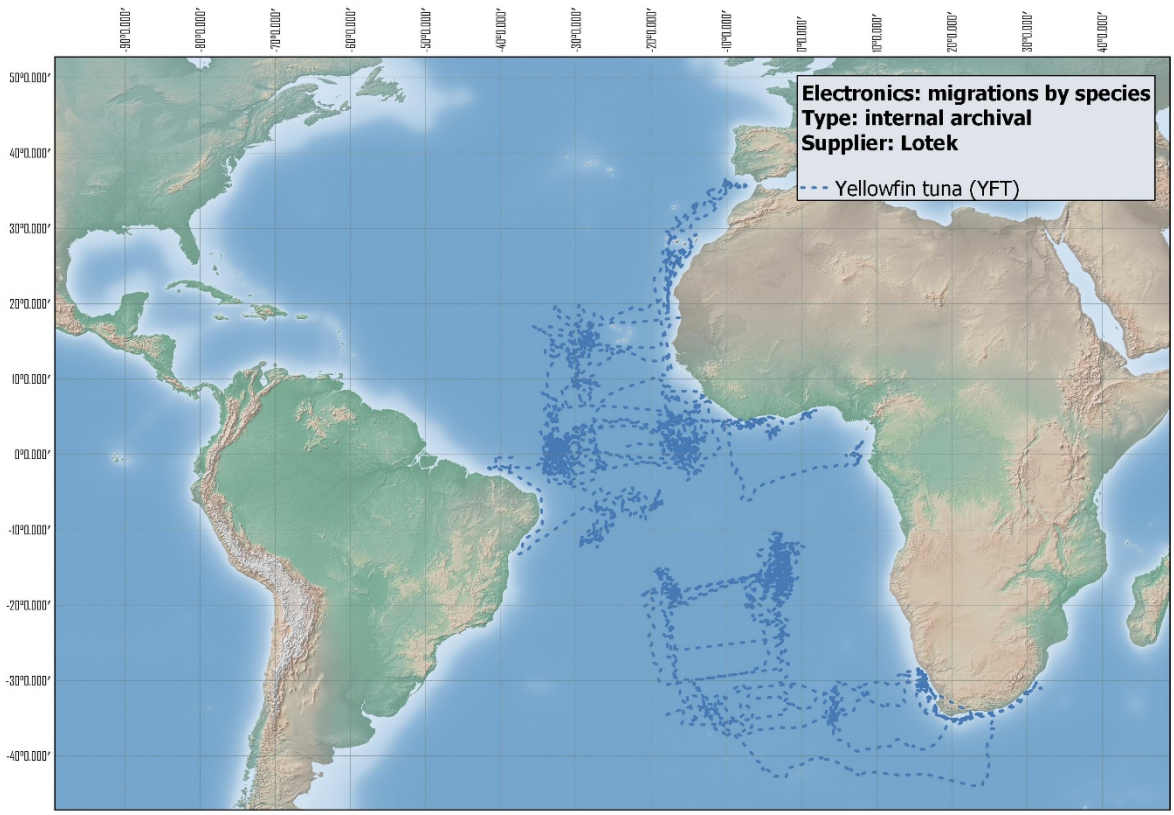

Figure 3. Migrations of YFT tuna tagged with Lotek Lat2810s tag (selected) by AOTTP Partners, estimated using a depth-correcting algorithm.

Table 6. Tag-seeding 'releases' of false tags by species and gear/location (BB - baitboat, PS purse-seine).

Species name	BB	PS
Bigeye tuna (BET)	43	100
Little tunny (LTA)	7	1
Skipjack tuna SKJ	152	260
Unknown (UNK)	40	1
Yellowfin tuna (YFT)	174	200
Total	416	562

During AOTTP 978 fish were tagged with false tags in a range of different contexts including: on board fishing boats (baitboats, long-liners, and purse-seiners); during trans-shipment; at fish markets; and, at canneries. This figure includes 416 fish (false) tagged on Bait boats and 562 on Purse-seines (**Table 6**). The focus of the tag-seeding work was the Purse-seines fleet which catches the majority of tropical tunas in the Atlantic. For Purse-seines ICCAT-AOTTP Reporting Rates for BET, SKJ, and YFT are 69%, 77.3%, and 68%, respectively. The target was almost met for SKJ, but missed for the other 2 species. As a component of the Exit Strategy, however, ICCAT and partners will

continue the tag-seeding work, and the development and improvement of awareness-raising activities. Note that both Recovery and Reporting Rates of tags are in a continual state of flux and there can be a considerable time-lag between deployment of tags, finding them, paying the reward and sending the data to ICCAT.

ACTIVITY 1.1 (A1.1). TAGGING OF TROPICAL TUNAS

There are 3 Verifiable Indicators for Activity 1.1 which are summarized as follows (means of verification in parentheses):

- Fishing vessels hired for a total period of 1800 tagging days over 30 months (Number of tuna tagged & released, AOTTP reports);
- Tagging teams deployed on board the hired vessels (Number of tagging campaigns, Cruise reports);
- Tags (conventional, chemical, electronic, sonic) and tagging equipment procured.

Over 70 different boats (if sport fishing boats are included) were used by ICCAT-AOTTP to tag fish in the Atlantic, including Txilamon Ni Son based in São Tomé e Príncipe (**Figure 4**).

Figure 4. Txilamon Ni Son - fishing boat chartered by ICCAT-AOTTP to tag in the Territorial waters of São Tomé e Príncipe in 2018.

Between the start and end of the project, ICCAT-AOTTP and partners completed 580 tagging trips (**Appendix 2**) and all the corresponding cruise reports are available on request (**Table 7**) to the ICCAT Secretariat. The total time between the start and end of each tagging event, on each tagging trip, was 1,867 days tagging, exceeding the target (1800 days).

Table 7. Tagging trips by location during AOTTP project.

Location	Number
Azores	16
Brazil/Uruguay	55
Canary Islands	17
Gulf of Guinea	206
Saint Helena	177
Senegal	10
South Africa	7
USA	39

In summary, 16 tagging trips were organized in the Azores and Madeira (**Figure 5**) region, 17 in the Canary Islands (**Figure 6**), 206 in the Gulf of Guinea region (**Figure 7**), 10 off Senegal, 7 off South Africa, 55 off Brazil (**Figure 8**) and Uruguay, 177 around St. Helena, and 39 in the EEZs of the USA and Caribbean countries.

Figure 5. Tagging Team on board Ponta Calhaú, Madeira in July 2018.

Figure 6. Tagging Team, featuring AOTTP Database Specialist Jesús García on board El Grande Primero, Canary Islands, October 2018.

Figure 7. Tagging Team on board Aita Fraxku, off West Africa.

Figure 8. Tagging off Brazil.

'Quotation Requests' and 'International Calls for Tender' were used for procuring all the tags used during AOTTP. Hallprint provided all the conventional *spaghetti* tags, including those used for tag-seeding (some with metal heads for inserting into frozen fish).

In the first phase Desert Star supplied AOTTP with 40 Seatag-3Ds, Wildlife Computers with 95 Mini PAT-348C pop-up tags, while Lotek Wireless provided 400 (LAT 2810) and 40 ARCGEO-9 internal archival electronic tags.

After reviewing the performance of all the electronic tags during the first phase (**Table 5**), it was decided to purchase 30 Microwave Telemetry pop-up satellite tags for the second phase. Fifteen additional Mini PAT-348C pop-up tags (replacements for 'pin-breakages' and 'good will' tags) were also sent to ICCAT by Wildlife Computers, and were all deployed, e.g. see **Figure 9**.

Figure 9. Pop up tagging off the Azores in 2016.

ACTIVITY 1.2 (A1.2). AWARENESS CAMPAIGNS AND RECOVERY SCHEMES

The AOTTP verifiable indicators for the awareness campaigns and recovery schemes are as follows:

- Awareness and publicity campaigns were designed and implemented in Atlantic coastal States and Distant Water Fishing Nations (Number of countries with publicity campaigns, Reporting rates, AOTTP Reports);
- Awareness and publicity campaigns would target fishermen and crew, stevedores and other fishing fleet service providers, processors and workers, etc;
- Reward schemes would be designed and developed for the different target groups.

Awareness and publicity campaigns were organized in the following 15 locations: Azores (R01) and Madeira (R10) Islands (Portugal); Canary Islands (R04) (Spain); Senegal (R02); Cabo Verde (R05); Ghana (R7); Côte d'Ivoire (R03); São Tomé e Príncipe (R11); South Africa (R06); Brazil (R09); St. Helena (R12); Uruguay (R08); and USA (R14), see **Figure 10**.

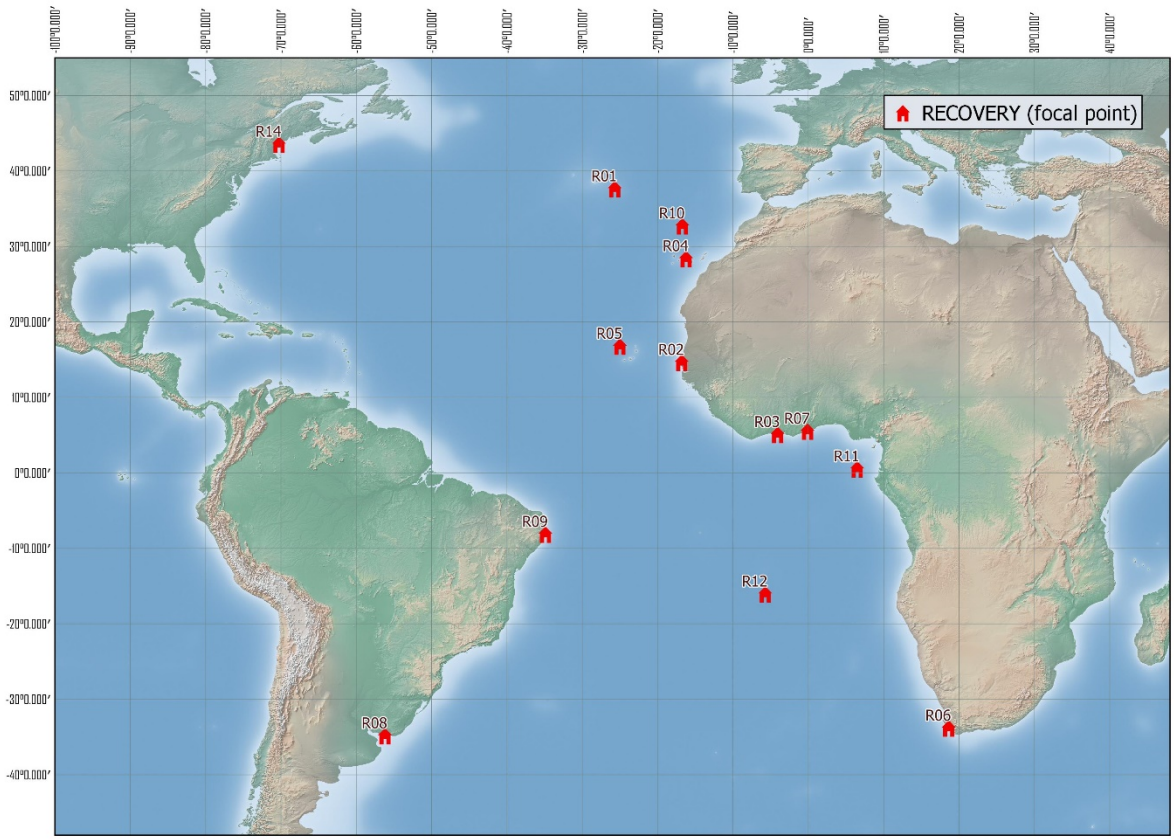

Figure 10. Distribution of ICCAT-AOTTP Recovery Teams (R) around the Atlantic Ocean.

Specific officers and staff in each location were responsible for developing and implementing the activities (**Figure 11**). Each tag recovery team drafted a quarterly report summarizing the awareness-raising activities and the numbers of tags recovered during that period (available on request to the ICCAT Secretariat). The tag recovery data themselves were sent continuously to the Telegram Recovery group for upload to the ICCAT database.

Figure 11. Awareness-raising and tag-recovery among artisanal fishers in São Tomé e Príncipe.

Awareness campaigns focused on different parts of the fisheries sector. The design and production of the awareness raising material acknowledged the specific characteristics of those most directly involved, e.g fishermen, stevedores, traders, and fish processors. Brightly coloured t-shirts and caps with ICCAT and EU logos were designed in local languages. Posters with clear messages, highlighting the rewards, the minimal required information (e.g. fish length and capture location) and contact details, were continually distributed and modified during the project. Posters were water-proof and hard-wearing so they lasted when pinned up in fishing vessels, and around fish landing and auction sites. Meetings and visits to artisanal fishing communities, processing plants, landing areas were complemented by the distribution of these materials.

The general public was also targeted by ICCAT-AOTTP. Standard press release templates were sent to every Recovery office and were adapted to the specific characteristics of the region. Many of the awareness-raising activities were also recorded as videos and uploaded to youtube channels.

The ICCAT-AOTTP reward schemes for tag and data recovery acknowledged: cultural nuances (e.g. English speaking Ghanaian fishing communities in Côte D'Ivoire); AOTTP budget constraints; and the incentives most valued in different countries by different sectors of the tuna fishing business. In the third quarter of 2019, AOTTP adopted a new preferential reward system to improve the completeness and quality of metadata being collected with recovered fish and tags. The standard practice of giving conventional tag recovers a cash (or phone credit) reward of 10€, and either a t-shirt or a cap, still stood for any tag recover who provided basic metadata on the tagged fish (at a minimum date and location fished), but an additional 10€ bonus (in the form of cash or phone credit) was given to any tag recover who presented the actual tagged fish to an AOTTP TRO, and allowed the TRO to measure the fish precisely.

If a tag was recovered and evidence of the tag was presented (either as the physical tag itself or a picture of the tag) but no metadata (at a minimum, location fished and date fished or size) were provided, then the AOTTP TRO gave out a t-shirt or cap, but no cash reward to the tag recover. This person was then informed of the preferential reward system so that larger rewards could be claimed in the future and more accurate data recorded. The use of phone credit as a reward was very popular and compensated tag-finders for the cost of phone calls to report the discovery of the tag and metadata. Note that for electronic tags, a reward of 500€ was paid (**Figure 12**). Lastly, all tag-finders were also entered into the ICCAT Annual Lottery (**Figure 12**) which offers substantial prizes.

Figure 12. ICCAT-AOTTP Rewards and Incentives. Top panel USA metal detectorist with PSAT found on Florida beach. Bottom panels ICCAT-AOTTP Lottery Presentation in Dakar in 2019.

Staff involved in the recovery of tags also had continuous access to a simple website which tracked all the released tags enabling their status to be quickly ascertained. It was important, for example, that the TROs knew if a tag had actually been released, and whether or not it had been recovered before.

ACTIVITY 1.3 (A1.3). RECOVERY OF TAGS AND TRANSMISSION OF DATA TO ICCAT SECRETARIAT

TROs have been deployed in all strategic tuna landing ports of the Atlantic. The AOTTP verifiable indicators for this activity are as follows:

- Tag Recovery Officers (TRO) teams would be deployed in strategic ports to collect recovery data (Number of TROs deployed and counterparts, Number of recoveries, AOTTP reports, Tag seeding operations on PS fleets);
- A large network of counterparts would be developed to ensure recovery data collection and transmission to ICCAT;
- Quality of the recovery data on board purse-seiners to be assessed (Tag-seeding operations on purse-seine fleets).

The data collected by ICCAT-AOTTP attest to the efficacy of the awareness raising and tag recovery activities, see **Figure 13**.

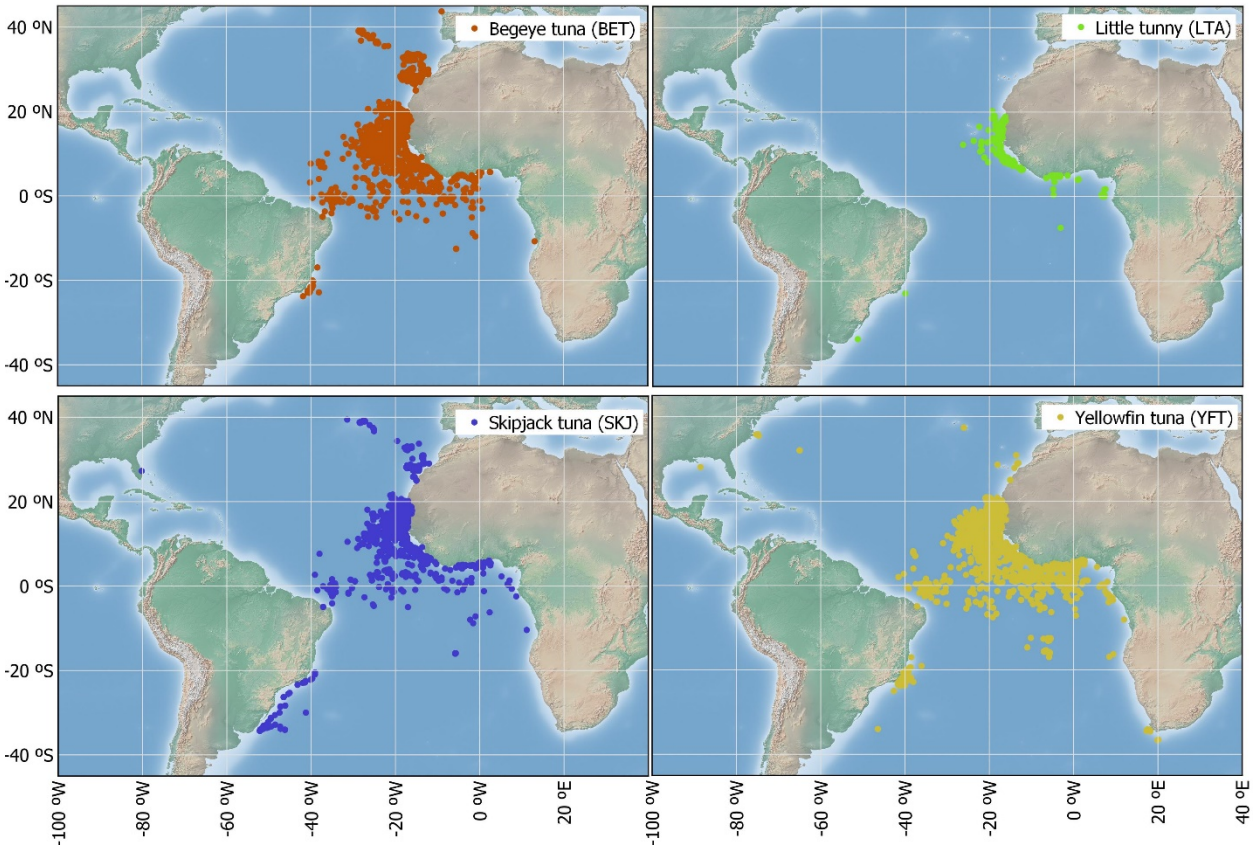

Figure 13. Spatial distribution of conventional tag recoveries June 2016 to February 2021 by species.

The number of valid tag recoveries at the formal end of the project is now (February 2021) of 17,162 (see **Figures 13 and 14**) translating to an overall recovery rate of 14.4% which is more than the rate originally predicted (10%). Of special importance is the fact that the recovery rates for BET and YFT are both each around 20%.

Table 8. First time (R-1) recoveries (in number) by species.

	No. Released	No. Recovered	% Recovered
Bigeye tuna (BET)	24092	4941	20.5
Little tunny (LTA)	7832	585	7.5
Skipjack tuna (SKJ)	46892	3540	7.5
Wahoo (WAH)	281	2	0.7
Yellowfin (YFT)	40332	8094	20.1
Total	119429	17162	14.4

Out of those, 1,967 BET, 3,650 SKJ, and 3,146 YFT were tagged chemically (**Table 9**). The total number of fish tagged chemically by ICCAT-AOTTP partners is thus 9,123, or 91.23% of the 10,000 target set at the start of the programme. Recovery rates of the chemically tagged BET and YFT were 19.5% and 15.8%, respectively (**Table 9**).

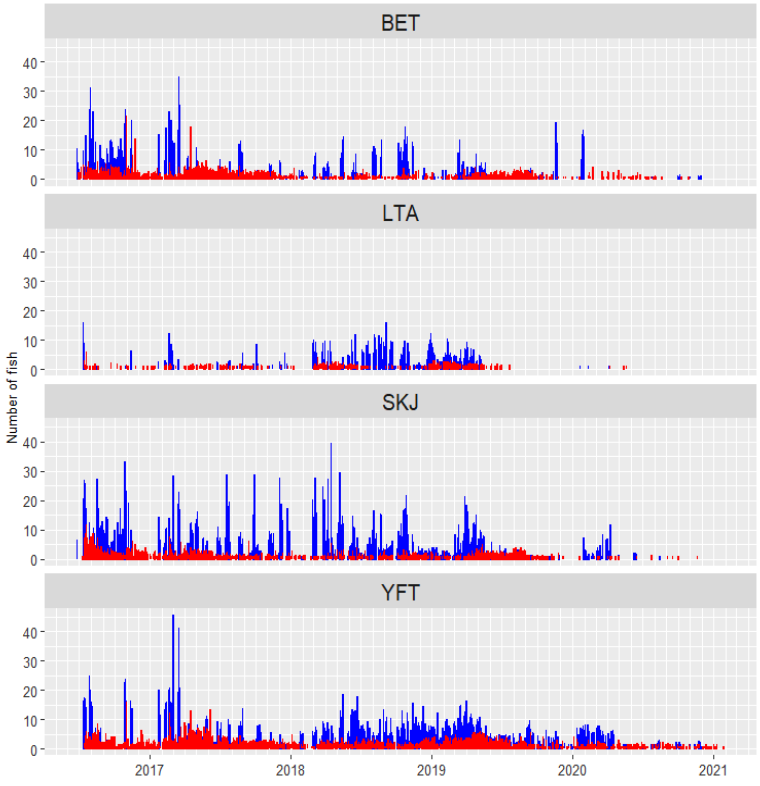

Figure 14. Total ICCAT-AOTTP releases (blue) and recoveries (red) over time by species (BET - bigeye, LTA - little tunny, SKJ - skipjack, YFT - yellowfin). The numbers have been square-root transformed so they can be seen on the same axes.

Results are being used to improve age reading protocols and provide guidance as to the utility of daily and annual increment counts for future age and growth parameter estimation. Results presented at the 2019 YFT data preparatory meeting (Ailloud et al., 2019) showed that YFT in the Atlantic appear to deposit a single opaque and translucent zone each year. Counting daily micro-increments, however, leads to underestimating age for fish any larger than 55cm FL. As AOTTP ends, more valuable and informative samples continue to become available (larger fish and longer times at liberty), helping to solidify results and recommendations for ageing of tropical tunas species.

Table 9. Chemically tagged totals by species.

	Chemically tagged releases	Chemically tagged recoveries	% Recovery rate chem tagged
Bigeye tuna (BET)	1967	384	19.5
Little tunny (LTA)	340	3	0.9
Skipjack tuna (SKJ)	3650	200	5.5
Wahoo (WAH)	20	0	0
Yellowfin tuna (YFT)	3146	498	15.8
Total	9123	1085	11.9

Communication with colleagues around the Atlantic was maintained using the Telegram (similar to WhatsApp) Application, which allowed continuous communication and exchange of information between ICCAT-AOTTP Coordination and between both tagging and tag-recovery teams. An "AOTTP Tag Recovery Group" (with 35 Members), was created, which the TROs around the Atlantic used to upload tag recovery and tag-seeding data to ICCAT-AOTTP. The system helped avoid coding mistakes and facilitated correction of data by allowing rapid feedback between AOTTP Coordination and the TROs.

Tag seeding experiments to estimate Reporting Rates were implemented by observers organized by TROs in Senegal, Côte d'Ivoire, Ghana, South Africa and Brazil. So far 987 fish have been tagged with false tags throughout the tropical Atlantic.

Several improvements were made to the tag recovery template in the third quarter of 2018. The data entry program was updated to require input on the quality of the length reported (measurement vs. estimate), the quality of the date and location information (exact vs. approximate), and the physical state of the fish when measurements were taken (fresh, frozen or thawed). In addition, new codes were added to the ICCAT database structure, such as the boat-associated bait fishing technique used by some contractors. Moreover, AOTTP Coordination was kindly provided (by ANABAC, IRD, OPAGAC) with Purse-seine logbook data so that ongoing queries could be addressed retrospectively and directly. All of these changes contributed to a continuous improvement in the quality of the data stored by ICCAT-AOTTP; ultimately improving the analyses that use the data.

EXPECTED RESULT 2 (ER2). KEY PARAMETERS SUPPORTING STOCK ASSESSMENTS ARE ESTIMATED ON THE BASIS OF DATA COLLECTED THROUGH THE PROGRAMME AND INTEGRATED IN STOCK ASSESSMENTS

The new scientific information represented by the tag-recapture data collected by the ICCAT-AOTTP will be used to support the population assessments of BET, SKJ, and YFT. The verifiable indicators for this 'Expected Result 2' are as follows:

- Biological parameters were (and will be) made available to the SCRS by the end of the programme, and integrated stock assessments are undertaken for the three species of tropical tunas (Analyses, reports and publications, SCRS Documents and reports, Publications in Peer-reviewed scientific journals, AOTTP reports)
- Indicators were developed for neritic tunas (stock structure, growth, migrations)

ICCAT-AOTTP now has a rich dataset which is now being used to estimate growth rates, mortality (including gear selectivity), and migration rates in tropical tunas. Statistics and observations (e.g. number of releases, numbers of recoveries) were presented at the SCRS Species Group Meetings in September 2017, 2018, 2019, and 2020 (Beare et al., 2017; Guemes, Garcia, and Beare, 2017; Goñi et al., 2017; Onandia et al., 2017; Ailloud and Beare, 2018; Ailloud et al., 2018; Arregui et al., 2018; Gaertner, et al., 2018; Gaertner et al., 2018); and again at the SCRS Plenaries in October 2017 (AOTTP Coordination Team 2017), 2018 (Coordination 2018), 2019 (D. Beare et al.2019; Beare et al.2019), and 2020 (Beare et al.2020). Preliminary observations on LTA have now been presented at the 2017 Small Tunas Intersessional Meeting by the ICCAT Secretariat in Miami in April 2017 (Neves dos Santos, 2017) and at the Small Tunas Intersessional Meeting in June 2019 and July 2020 by Fambaye Ngom and Kamarel Ba.

During ICCAT-AOTTP Workshop 2 in Abidjan in January 2018 our invited experts (Daniel Gaertner and Lisa Ailloud) successfully demonstrated how change in size can be estimated with non-linear models and how natural mortality (**M**) can be estimated using Brownie models.

ICCAT-AOTTP activities have stimulated the production of scientific reports and peer-reviewed manuscripts, e.g. (Niella et al. n.d.). In particular, the capacity building workshops allowed CPC scientists to familiarize themselves with the ICCAT-AOTTP tag-recapture data.

At the BET Data Preparation Meeting in April 2017 in Madrid AOTTP tag-recapture data for BET were first summarised (Beare, 2018) and then various participants of the capacity building workshops presented their analyses on: BET growth (Arregui et al., 2018); BET gear selectivity (Gaertner et al., 2018); and BET tag-shedding rates (Gaertner, et al., 2018).

More in-depth analyses were presented at the 2019 YFT data preparatory meeting concerning tag shedding rates (Gaertner et al., 2019), the FAD moratorium (Deledda-Tramoni and Gaertner, 2019), tag reporting rates (Akia et al., 2019) and progress on the otolith growth rate validation work (Ailloud et al., 2019).

The YFT assessment took place in July 2019. Prior to the meeting AOTTP Coordination formatted the tagging data for inclusion in the integrated assessment model stock synthesis. Tag-shedding (Gaertner et al., 2019) and tag Reporting rates (Akia, et al., 2019) were estimated from the AOTTP double-tagging work (**Table 7**) and tag-seeding experiments, respectively. The stock assessors were also provided with daily YFT ages from the AOTTP otolith aged reference collection together with annual ages of large YFT individuals caught off South Africa. Growth trajectories from tagging data and otolith ages were used to guide the estimation of growth within the Stock Synthesis model. Preliminary analyses of chemically marked fish from AOTTP contributed to the important decision to raise the assumed maximum age of YFT from 11 to 18 years.

At the 2016 Small Tunas Species Group meeting it was agreed that AOTTP should focus on only two species: WAH (*Acanthocybium solandri*) and LTA (*Euthynnus alletteratus*). In this way ICCAT-AOTTP will (at least) ensured that plausible indicators could be developed for two neritic species without effort being spread too thinly since there are so many potential small tuna or neritic species. During AOTTP 7,832 LTA and 281 WAH were tagged, with 585 and 2 recoveries recorded, respectively (**Tables 1 and 3**). WAH proved difficult to catch, tag and release so AOTTP Coordination focused on LTA and exceeded the initial target of 5000. The data for WAH are still too few but those for LTA, are now yielding new scientific information on growth rates and movement of the species around the coast of West Africa.

A2.1. READING OF HARD PARTS

Relevant Verifiable Indicators for this activity are:

- Hard parts (otolith, vertebrae, spines) were sampled on recovered tunas (Number of readings of hard parts, AOTTP reports)
- Reading of the hard parts were undertaken by specialists

During the AOTTP 10,000 fish were targeted for 'chemical tags', ie. they were injected with a chemical marker that allows their otoliths (or other hard parts) to be 'read', and aged more easily. Chemically tagged fish were always released with a red conventional tag (**Figure 12**), marked with 'KEEP WHOLE FISH'. When a fish with a red tag was found and reported, TROs arranged to buy the fish, pay any reward etc. take, store and process the biological samples, ultimately determining the age of the fish from the hard-parts.

Figure 12. Chemically (red) tagged LTA caught by a fisher in São Tomé.

Thus far ICCAT-AOTTP has purchased and taken biological samples from 1310 (80% of which were chemically marked fish) representing all size classes, 3 species and both sexes (**Table 10**). Other biological information like body-weight, state of sexual maturity and stomach contents has also been collected to complement eventual analyses.

Table 10. Biological samples collected during AOTTP.

	Female	Male	Unknown
Bigeye tuna (BET)	173	202	47
Little tunny (LTA)	1	1	0
Skipjack (SKJ)	147	198	9
Yellowfin tuna (YFT)	205	294	33
Total	526	695	89

An Otoliths Expert Group with specialists from Senegal, Côte d'Ivoire, France, Spain, USA, Australia and South Africa was set up by ICCAT-AOTTP with SCRS approval in 2016. The aim was to establish the procedures and protocols for the collection, preservation and reading of otoliths.

The Otolith Expert Group recommended creating a Reference Collection of otoliths for calibrating the age-readings. A Call for Tender to create the Reference Collection was thus launched in June 2017, and two contracts were awarded: one to FADURPE (Brazil, West Atlantic); and the other to IFAN (Senegal, East Atlantic). The collaboration between IFAN, FADURPE, AOTTP Coordination, and the Expert Group contributed to the capacity building objectives of AOTTP.

Twenty-five pairs, by length classes of otoliths (also other hard parts) for BET, SKJ and YFT were collected in Brazil and another 25 pairs in West Africa. Note that recent progress reports from each side of the Atlantic are available on request to the ICCAT Secretariat.

ICCAT-AOTTP thus worked in partnership with scientists in Senegal, Ivory Coast, Brazil and Australia to analyse OTC marked otoliths from fish tagged and recaptured during the programme. The ultimate objective was to test the frequency of deposition of micro-increments and examine both the frequency of deposition and the seasonality of assumed annual opaque and translucent zones across as wide a range of fish size and times at liberty allowed by the AOTTP's duration. Results were used to improve age reading protocols and provide guidance as to the utility of daily *versus* annual increment counts for future age and growth parameter estimation. Preliminary results were presented at the 2019 YFT data preparatory meeting (Ailloud et al., 2019). These results indicated that YFT in the Atlantic deposit a single opaque and translucent zone each year. For daily micro-increment counts, however, preliminary results indicated that counting micro-increments may lead to underestimating age for fish larger than 55cm FL.

Two laboratory technicians were hired by ICCAT-AOTTP partners in January 2019: one at the CRO in Abidjan; and one at the CRODT in Dakar. Dr. Khady Diouf from the IFAN (Senegal) provided these trainees with an intensive week of targeted training in otolith preparation for daily ageing in February 2019, see **Figure 11**.

Figure 13. Sadio N'fally and Venance Ngouan being trained by Dr. Khady Diouf in February 2019 in Dakar, Senegal.

These new hires also attended an otolith workshop in March 2019, where they learned more advanced techniques in otolith preparation, growth ring interpretation, and calculation of bias and precision in age readings. They underwent a further week of training in July/August 2019, which focused on the preparation and interpretation of otoliths for annual ageing (as opposed to daily ageing), and on the use of fluorescent microscopy to validate the deposition rate of otolith rings in OTC marked fish.

ACTIVITY 2.2 (A2.2). TAGGING DATA ANALYSES AND ACTIVITY 3.3 (A3.3). TRAINING IN DATA ANALYSES.

Note that the original Activities A2.2 and A3.3 were merged to integrate the formal scientific research activities with training and capacity building. A2.2 was originally envisaged with the analytical work (parameters for inclusion in the stock assessment) being done by trained and experiences scientists, while A3.3 (see below) would provide training and capacity development in this area. At a meeting in September 2018 with the AOTTP Project Officer from DG-DEVCO it was agreed that it was more sensible to merge these two activities enabling both data analysis and research to be done together with training.

The relevant Verifiable Indicators for Activities 2.2 and 3.3 are:

- Tag-recovery data collected during the AOTTP would be analyzed by scientific consultants before the end of the programme to estimate missing key parameters for stock assessments (Number of analyses undertaken, reports from consultants, scientific publications, AOTTP reports)
- Dedicated workshops would be organized to reinforce the capacity of ICCAT developing member States in data analyses, interpretation of the scientific results and development of the scientific advice.

ICCAT-AOTTP built a large and important dataset including: (i) tag-recapture data from conventional tags; (ii) tag-seeding data; (iii) data from electronic tags; and (iv) biological samples such as otoliths and spines.

Three workshops on data analysis were organized by AOTTP Coordination during the project to promote the involvement of the ICCAT SCRS scientific community in the analysis, and scientific interpretation of AOTTP tag-recapture data. Details on the respective Agendas and Syllabuses can be obtained from the Secretariat. Outcomes included: improved understanding of relational databases; increased capacity to work with ICCAT-AOTTP in the development of the tag-recapture databases; increased ability to connect with the remote databases using plotting and statistical software (R, QGIS, Excel); increased confidence to work with AOTTP data to develop and submit scientific articles to SCRS and peer-reviewed literature; and increased involvement in SCRS Working groups, particularly in relation to population assessment.

Currently ICCAT-AOTTP tag-recapture data are being used in a variety of important scientific analyses resulting in improved (more accurate) stock assessments, and peer-reviewed scientific papers. This work is being coordinated by the Chair of the SCRS, the ICCAT Secretariat, and the associated SCRS scientific community. YFT data were made available to participants of the YFT Data Preparation meeting and the YFT Stock Assessment meeting in April and July 2019, respectively. LTA and WAH data were made available to participants of all past Small Tunas Intersessional Meetings. In 2021 data will be made available to the BET Data Preparation and Stock Assessment meetings, to be held in April and July, respectively.

Partners for the more formal data analysis and capacity building work (merging of activities A2.2 and A3.2) were contracted in late 2018, after two competitive Calls for Tender: one for mortality and movement/migration work; and one focusing on the growth of tropical tuna (from hard parts, length frequencies and tag-recapture data). Both Calls

for Tender contained the following text (Section 3.4) in their terms of reference: *"AOTTP has a strong commitment to capacity development among relevant stakeholder groups from developing countries around the tropical Atlantic Ocean. Proposals must therefore include evidence of strong involvement from developing countries fisheries institutions, public bodies and/or scientists. The scoring process for proposals will be heavily weighted in favor of proposals that demonstrate a commitment to high quality capacity building. Proposals that do not demonstrate a commitment to capacity building, mentoring of junior/early career scientific staff, and training will not be considered."*

After a competitive evaluation, two project proposals focusing on data analysis were awarded (see **Table 11**) to the CISEF and VIMs/SHEDD Aquaria consortia. All of the data analytical work funded by AOTTP thus involved training, and capacity development. These two groups worked on tropical tuna mortality, movement/migration and growth (from hard parts, length frequencies and tag-recapture data from both conventional and electronic tags). All their results were presented at the AOTTP Final Symposium in January 2021, and drafts have been prepared for peer-reviewed publication. Thus far AOTTP Coordination has received 14 draft manuscripts. Note that the Terms of Reference for the scientific aspects of the work were discussed and approved at the SCRS Species Group meeting in autumn 2018. Unfortunately, all of the in-person training workshops organized as part of the CISEF and VIMs contracts were canceled due to the pandemic and the relevant travel budgets were redistributed and online versions organized instead. In mid-July 2020, for example, CISEF organized an online workshop on Bayesian methods for estimating mortality from tag-recapture data.

AOTTP also held age reading workshops, e.g. **Figures 14 and 15**. The aim of these workshops was to ensure the otoliths and other hard-parts collected from AOTTP of chemically and non-chemically tagged fish were correctly read, validated and calibrated.

Figure 14. Participants at the otolith workshop held in Dakar in October 2018.

Participants at the age reading workshops were also trained in data analysis, how to calculate bias and precision metrics, and then how to apply these skills to the reference set developed by partners in Brazil and Senegal.

Note: ICCAT-AOTTP conventional tag data (checked and validated to the extent possible) are now publically available at six monthly intervals – organized by species - from the ICCAT website. Data (less well checked) was distributed at monthly intervals to partners more specifically involved in the project (e.g. participants at capacity building workshops, SCRS meeting participants, and other contractors), e.g. AOTTP Data. Electronic tag data are available on request to the ICCAT Secretariat.

Figure 15. A researcher counting daily rings on an otolith prepared slide at the otolith workshop held in Dakar, Senegal in early 2019.

ACTIVITY 2.3 (A2.3). INFORMATION FROM STAKEHOLDERS

- An International Symposium would be organized towards the end of AOTTP in order to present and publicize the results of the AOTTP and the analyses of the tagging data (Number of participants and presentations to the Symposium, AOTTP reports)

This activity relates to the organization of the AOTTP Symposium planned for the final months of the AOTTP. The original plan was to hold the event in Dakar, Senegal in June 2020. Unfortunately, due the covid-19 pandemic the in-person Symposium was postponed (to be organized in the future by ICCAT after Commission recommendation) and replaced by an online Symposium. Note that the International Seafood Sustainability Foundation (ISSF) had offered

to support travel and subsistence for two early career scientists to attend the AOTTP Final Symposium to present their work.

The Final AOTTP Symposium was held online between 12th and 14th January 2021. Due to time zone issues the Symposium began at 12:00 noon and ended at 16:30 each day (Madrid time). A total of 185 participants initially registered although only around 150 actually attended each day. A full list of participants is provided in **Appendix 9**. In addition to four opening 'keynote' talks, 18 regular (12 min duration) talks and 17 'lightning' (5 min duration) talks were presented, see **Appendix 8**.

Presenters were asked to pre-record their talks and upload them to a cloud server prior to the Symposium. This enabled the organizers to minimize transition times between presentations and questions and answers sessions. Overall, it worked very well. The Symposium was also simultaneously interpreted into the three ICCAT official languages (English, French and Spanish) and the interpreters were thus able to prepare by listening to the pre-recordings beforehand.

In support of the Symposium, AOTTP has also organized an AOTTP Special Issue entitled, 'Experience, Results and Lessons Learnt from Oceanic Tuna Tagging Campaigns: the AOTTP in Context' in the peer-reviewed journal *Fisheries Research*. It will include a multi-author paper on 'Lessons Learnt' from the project, together with recommendations for moving forward. The SCRS Chair (Dr Gary Melvin) will coordinate the review and publication of these papers together with three Guest Editors (Piera Carpi, Jed Macdonald, and Francisco Abascal), who kindly volunteered to help with the Review process.

AOTTP Coordination has already received a number of draft papers, mostly authored by colleagues from developing countries, many of whom are students e.g. (Gaertner et al., in prep),(Perez et al., in prep), (Akia et al., in prep),(Akia et al.,, in prep 2), (Yao Aktapou, et al., in prep), (Perez et al., in prep), (Goni et al., in prep), (Goni et al., in prep 2), (Goni et al., in prep 3), (Ba et al., in prep), (Ba et al., in prep), (Arregui and Goni, in prep), (Arregui et al., in prep), (Chifflet et al., in prep) and (Galuardi et al., in prep).

Additional activities in support of A2.3 included:

- AOTTP Coordinator described AOTTP experiences with pop-up tags at the European Users Conference on Argos Wildlife held in Toulouse, France, 21-22 November 2018.
- AOTTP Coordination went to St. Helena in January 2019 (**Figure 16**) to meet key personnel, support tagging activities there and raise awareness among the fishing community. The project was presented to stakeholders in a pub, and two radio interviews were done about the project.
- AOTTP Assistant Coordinator attended a workshop organized by IATTC in La Jolla, California in January 2019. The IATTC has recently raised the funds to initiate an extensive multi-year tagging program of tropical tuna in the eastern Pacific Ocean. To get started, they planned a workshop to discuss the design of the tagging experiment and seek advice/recommendations from scientists from across tuna RFMOs, including AOTTP. The discussions were focused on the design and coordination of such programs (in particular the experimental design and logistic elements), with time allocated to discussing tagging data analysis and application to stock assessments. Representatives from the following organizations were present: SPC, IOTC, NRIFSF, PFRP and AZTI (**Figure 17**). This gave AOTTP a platform to reach other scientists involved in tuna tagging campaigns.
- AOTTP Coordinator traveled to Grenada (Caribbean) in March 2019 to support tagging activities, organized by the University of Maine, and raise awareness among the sport fishing stakeholders (**Figure 18**).

Figure 16. AOTTP Coordinator visit to St Helena. Tagging Activity, Visiting the Governor (top left), Blue Belt Programme Coordinator (bottom left), Cold Storage (middle-top), Fisheries Department (center), and article in local newspaper.

Figure 17. AOTTP Assistant Coordinator at the IATTC Workshop in La Jolla, California.

Figure 18. University of Maine tagging team on board Exile in Grenada.

- AOTTP Assistant Coordinator was asked by ICES (and supported by ICCAT-AOTTP) to review the Benchmark Assessment of Atlantic Mackerel in March 2019. In particular ICES wanted Dr Ailloud's expertise in the role of tag-recapture data in fish population assessments.
- AOTTP Coordination (Drs. Beare and Ailloud) attended the Annual European Tuna Conference in Brussels on 6 May 2019. This conference presented a good opportunity to promote awareness of the AOTTP project among a diverse group of tuna stakeholders including food processors, scientists and NGOS. AOTTP Coordination set up an Exhibition Stand with brochures, tags, posters and videos (**Figure 19**), and met and discussed all aspects of the project with diverse and interested stakeholders, including representatives of World Wildlife Fund, the Marine Stewardship Council, the Fishery & Aquaculture Unit of the Maruha Corporation in Japan, and the Global Seafood Manager of Food Service Line in France. This awareness-raising work provided AOTTP with many useful contacts, particularly for organizing the AOTTP Final Symposium, but also for promoting tag recovery worldwide.

Figure 19. Dr Ailloud at the AOTTP Exhibition Stand, European Tuna Conference, Brussels, May 2019.

- AOTTP attended the 70th Tuna Conference in California, USA between 21 and 23 May 2019. Drs. Beare and Ailloud each gave talks during the Tagging Data session. This meeting allowed AOTTP to advertise the project to yet another diverse group of tuna stakeholders including scientists, fish tag developers (Biologgers, Lotek, Wildlife Computers) and NGOs (The Pew Charitable Trust, The Nature Conservancy).
- During the September/October SCRS Plenary meetings in Madrid in 2018 and 2019, AOTTP Coordination organized football matches between AOTTP and GBYP (**Figure 20**).

Figure 20. AOTTP vs GBYP football match 2019 in September 2019.

- AOTTP Coordination organized a 'Side Event' (on Saturday 18th November) during the 2019 ICCAT Annual meeting (**Figure 21**) where the AOTTP project objectives and results were communicated to a diverse range of tropical tuna fisheries stakeholders including; managers, scientists, conservationists and fishers' representatives. The AOTTP Coordinator and Dr Amandé, who has run both AOTTP tagging and tag recovery

activities in Cote d'Ivoire, gave a short presentation on AOTTP, highlighting its most important achievements to date. This was followed by drinks and snacks and the evening came to a close after a raffle draw.

Figure 21. AOTTP Side Event, November 2019 in Mallorca, during the ICCAT Annual meeting.

- AOTTP Assistant Coordinator attended the FAO International Symposium on, "Fisheries Sustainability: Strengthening the Science-Policy Nexus" in Rome between 18th and 21st November 2019.
- AOTTP Assistant Coordinator attended an important bigeye and yellowfin hard part ageing workshop in December 2019 in Panama City, USA (Allman et al., 2020).
- AOTTP Database Specialist visited the African tag recovery offices in late 2019 and early 2020 to help the teams there troubleshoot a range of data accuracy and submission problems (**Figure 22**).
- An AOTTP short documentary film was finalised in early 2021. The film-makers interviewed a number of AOTTP partners around the coastal Atlantic States, and was 'premiered' at the Symposium, The film summarises the work done during AOTTP, and the strong relationships built between partners throughout Atlantic coastal states. It was well received.

Figure 22. AOTTP Database Specialist visits to West Africa.

EXPECTED RESULT 3 (R3). SCIENTISTS FROM DEVELOPING COUNTRY CONTRACTING PARTIES OF ICCAT ARE TRAINED IN TAGGING, DATA COLLECTION, AND TAGGING DATA/STOCK ASSESSMENT ANALYSIS (EXPECTED RESULT 3)

The indicators relevant to this result are as follows:

- Tagging techniques: 20 scientists/technicians from developing ICCAT States trained on board the tagging vessels (Number of scientists/technicians trained on board the tagging vessels, number of fish tagged by scientists/technicians from developing ICCAT Member States, AOTTP reports);
- Data collection and sampling at recovery: 30 scientists/technicians from developing coastal States trained in data collection and sampling at recovery;
- Tagging data analysis and interpretation: 80 participants from developing coastal States to workshops.

During AOTTP, substantially more than 20 scientists/technicians from developing countries were trained in tagging techniques at sea including: two from Cabo Verde, seven from Côte d'Ivoire, seven from Ghana, five from Senegal,

eight from Brazil, two from Uruguay, and five from São Tomé e Príncipe. The tagging programme within St Helena's EEZ involved a significant component of training and capacity building among the St Helena Government team and local fishers. The training was conducted by CEFAS or St. Helena Government staff 'signed off' as competent to train others and included: (1) assessing competency with the physical handling of and the tag and release procedures (including fish 'fitness' for release based on the ICCAT tagging guide); and (2) the accurate reporting of release and recovery information. By the end of the programme, a total of 15 individuals were signed-off as competent to tag, including five St Helena Government staff (Joachim Naulaerts, Leeann Henry, Martin Cranfield, Paul Cherrett and Rhys Hobbs) and seven skippers and fishers from the local fishing fleet (Waylon Thomas, Peter Benjamin, Mark Beard, Dorian Caswell, Jeremy Clingham, Michael Sim and Collin Thomas).

Many more than 30 technicians were trained in data collection and sampling at recovery during AOTTP. For example, at least 50 scientists/technicians were trained in tag recovery in: Azores Islands (Portugal), Madrid (Spain), Dakar (Senegal), Abidjan (Côte d'Ivoire), Tema (Ghana), Mindelo (Cabo Verde), Brazil, Uruguay, Cape Town (South Africa) and São Tomé e Príncipe.

ACTIVITY 3.1 (A3.1). TRAINING IN TAGGING TECHNIQUES AND DATA COLLECTION

Progress in this activity has been continuous and substantial. There is one indicator below:

- Scientists from developing ICCAT CPCs will be invited and trained to participate to tagging activities on board the tagging vessels (Number of scientists/technicians trained on board the tagging vessels, number of fish tagged by scientists/technicians from developing ICCAT Member States)

Table 11. Numbers of fish tagged by nationality of tagger during AOTTP.

Country	No. fish tagged
Brazil	33545
Cape Verde	1267
Cote d'Ivoire	17081
EU Spain	19450
EU Portugal	2865
United Kingdom	8039
Gabon	356
Ghana	863
Guiné-Bissau	10240
Mauritania	710
S. Tomé e Principe	1158
Senegal	6714
South Africa	10551
U.S.A.	195
St Helena (UK)	1034
Unclassified flag	5333
Uruguay	23
Total	119,424

Scientists/technicians, including women, from developing countries were substantially involved in all aspects of the tagging at sea. The numbers of fish tagged during the AOTTP programme by scientists from all countries, for example, are summarized in **Table 11**. It shows that over two-thirds were tagged by colleagues from developing countries, and it is thus clear that AOTTP satisfied these indicators.

ACTIVITY 3.2 (A3.2). DATA COLLECTION AND SAMPLING AT RECOVERY

The verifiable indicator is as follows:

- TRO teams and other counterparts will be trained in recovery data collection and sampling protocols to ensure the good quality of the data (Number of TROs and counterparts trained, AOTTP reports)

All TROs and Focal Points were trained in ICCAT-AOTTP protocols for collecting tag-recovery information. This included procedures for uploading data into the recovery template of the AOTTP smartphone application, the subsequent submission of data to ICCAT-AOTTP, and the resolution of any problems via the AOTTP recovery Telegram group. Training sessions were done in the facilities of each counterpart. The sessions were complemented with visits to key recovery locations such as, landing sites, tuna fishing vessels, processing plants, and artisanal fishing communities.

When red tagged fish were recovered, each fish was dissected and relevant biological parts (otoliths, spines, vertebrae, muscle tissue, stomach content) stored on site. A biological database structure, and an ageing database structure were created by AOTTP Coordination for data collected on all fish sampled for hard parts. All teams were consulted individually and trained in data entry for these database formats.

ACTIVITY 3.3 (A3.3). TRAINING IN DATA ANALYSIS

This activity was merged with A2.3 where it is discussed.

2.3. DESCRIBE IF THE ACTION WILL CONTINUE AFTER THE SUPPORT FROM THE EU HAS ENDED. ARE THERE ANY FOLLOW UP ACTIVITIES ENVISAGED? WHAT WILL ENSURE THE SUSTAINABILITY OF THE ACTION?

Exit Strategy: All the data collected will continue to be stored as a component of the ICCAT Secretariat databases and made public. Core AOTTP activities, requiring funding, that would secure the key elements of the AOTTP project are activities A1.2, A1.3, A2.1 and A3.2, see below:

A1.2-Awareness campaigns & recovery schemes & A1.3-Tag recovery and transmission to ICCAT Secretariat AOTTP set up a number of Tag Recovery Offices (TROs) and Focal Points (FPs) in coastal states around the Atlantic. TROs and FPs collected metadata from tags and sent them (using smartphones) regularly to ICCAT. Additionally, TROs organized regular awareness raising campaigns (e.g. trips to ports/fishing vessels, distributed posters, radio adverts, etc.) and distributed incentives such as cash prizes, t-shirts, caps and mobile phone top-ups. Maintaining these activities will require one person at ICCAT to scrutinize reports, check tag numbers, verify the data and upload them to the ICCAT database.

A2.1-Reading of hard parts and A3.2-Data collection and sampling at recovery AOTTP collected and analyzed hard parts to provide age-data for the three tropical tuna species. Such data are vital for our understanding of growth and

age composition and are currently lacking. The key consideration for the Exit Strategy revolves around the two new hires in Abidjan and Dakar who were trained in all aspects of tropical tuna ageing. They are now doing this on a routine basis, working with an experienced network of readers (e.g. Fish Ageing Services) and sending the data regularly to ICCAT. ICCAT-AOTTP paid their salary for one year at a cost of 7,000€ each. These trained otolith readers will be extremely valuable in future, and their work (and salaries) should be maintained for as long as possible. It would not necessarily depend on any future tagging activity. A large number of chemically tagged fish will have been released by the end of the project. Recovering and dissecting these fish will be crucial in helping validate ageing methods. Expansion of the routine ageing into other countries should also be considered. The final evaluation of AOTTP was done at the start of 2020 and the report was useful for crystallizing the Exit Strategy. Along with determining how much funding will be needed to sustain these activities, ICCAT-AOTTP helped to identify the key people and institutions who have been particularly successful in their involvement with the AOTTP and whose participation will be crucial in the planning and realization of core activities into the future. Lastly, lessons learned from AOTTP were discussed during the Final Symposium and will ultimately be published in the peer-reviewed literature.

The various tag recovery activities could be continued for 3 years for less than 112,00€ per annum. AOTTP Coordination drafted a budget for this activity, based on generous tag-recovery assumptions, which were presented at the ICCAT Meeting in November 2019. Thus far TRO activities in Cote d'Ivoire and Senegal were extended by the ICCAT Secretariat until 28 February 2021. FADURPE (Fabio Hazin) in Brazil has very kindly offered to continue tag recovery activities in Brazil at no charge for another year until 2022. ICCAT will continue to collect and upload any metadata from tags that appear.

2.4. EXPLAIN HOW THE ACTION HAS MAINSTREAMED CROSS-CUTTING ISSUES SUCH AS PROMOTION OF HUMAN RIGHTS, GENDER EQUALITY, DEMOCRACY, GOOD GOVERNANCE, CHILDREN'S RIGHTS AND INDIGENOUS PEOPLES, ENVIRONMENTAL SUSTAINABILITY AND COMBATING HIV/AIDS.

Most of these cross-cutting issues (human rights, gender equality, democracy, good government, children's rights and indigenous peoples, combating) were not formally mainstreamed into the AOTTP project since they were not part of the formal objectives and targets outlined in the AOTTP Grant Contract and Logical Framework. AOTTP Coordination made strong efforts to involve colleagues from developing coastal states and there was a good gender balance across all aspects of the project. Seynabou Kebe and Lisa Ailloud were part of AOTTP Coordination in Madrid. Women also led tagging activities (e.g. Lydia Gouveia in Madeira, Marina Chifflet from AZTI, and Serena Wright in St Helena) and tag recovery teams (e.g. Fambaye Ngom in Dakar and Constance Diaha in Abidjan). Environmental sustainability is tightly enmeshed in the project. The more accurate biological parameters that can now be calculated from the AOTTP tag-recapture data will lead to more sustainable exploitation of tuna stocks in the future. Furthermore, the data from the electronic tags may be particularly useful in the study of the impact of Climate Change on tropical tuna populations. The data on vertical movement, for example, may be informative in the future on the impact of temperature changes and the 'shoaling' of oxygen layers.

2.5. HOW AND BY WHOM HAVE THE ACTIVITIES BEEN MONITORED/EVALUATED? PLEASE SUMMARISE THE RESULTS OF THE FEEDBACK RECEIVED FROM THE BENEFICIARIES AND OTHERS.

The log-frame (**Appendix 5**), indicators (**Appendix 6**) and the log-frame activities (**Appendix 7**), originally included in the AOTTP Grant Contract were used continually by AOTTP Coordination and EU Project Officer to monitor and

evaluate the project progress. The AOTTP was also, formally, evaluated twice. The first time was a Results Orientented Monitoring (ROM) evaluation done by consultants, Andronicus Phylactopoulus and Vincent Dhiver, that took place in January 2017. The consultants independently visited ICCAT Secretariat in Madrid, and AOTTP partners in San Sebastian (Spain), Cote d'Ivoire, Ghana and Senegal. The full report is available from the ICCAT Secretariat. The recommendations can be summarized as follows, with the response of the AOTTP Coordination in italics:

Recommendation 1. AOTTP Management Team: Prepare and agree with the ICCAT Secretariat a 'concept note' detailing the approach for tagging data analysis, and capacity development activities. Based on this 'concept note' an updated and detailed work plan should be drafted. The timeline of the work plan should respect all ICCAT procedures. The ICCAT Secretariat needs to liaise with the SCRS of ICCAT to ensure its leading role in the data analysis / research, while AOTTP, with targeted interventions, could facilitate the acceleration of the research work. Capacity development plans for CPCs from developing countries should be customized to the needs and requests and include more on-the-job trainings rather than workshops. The work plan revision should also include a comprehensive update of the electronic tagging plan. The log-frame should be updated to be in line with work plan, with additional indicators to capture AOTTP outcomes and possibly impact and not only outputs (related to Conclusion C1).

This is accepted and AOTTP Coordination will work with the ICCAT Secretariat and the SCRS of ICCAT to detail an approach for tagging data analysis and capacity development. We acknowledge the point about 'on the job trainings' rather than 'workshops' and will discuss ways this can be facilitated. The plan will include a detailed e-tag plan and an update of the log-frame, indicators, targets, outcomes and potential impacts.

Recommendation 2. AOTTP Management Team: Strengthen the communication with other initiatives/ organizations/ private sector stakeholders for the sharing of experiences and the identification of areas of collaboration and synergies (particularly in capacity development). Complement ongoing publicity/ awareness activities about AOTTP and its reward scheme, with dissemination of AOTTP findings and progress (possibly in the form of a newsletter), in order to keep open communication channels to various stakeholders from the private sector to the artisanal fisheries communities and the general public (related to Conclusion C2).

Communication will be strengthened. A newsletter is already distributed to the AOTTP Steering Committee, but we will consider sending it to a wider audience; in particular those CPCs that have paid money directly to AOTTP are interested in project news.

Recommendation 3. AOTTP Management Team/ ICCAT Secretariat: Ensure that the EU Delegations (EUDs) in the countries, where AOTTP activities take place, are informed of upcoming events, receive AOTTP updates (possibly through AOTTP newsletters) and technical reports. Ensure the EU visibility guidelines are respected in all AOTTP (headquarters and in-country) outputs. The AOTTP Chief Coordinator should maintain the submission of frequent concise and informal updates (quarterly) of the AOTTP progress to the DEVCO Operational Manager (related to Conclusion C3).

AOTTP will work with the ICCAT Secretariat to ensure that the EU Delegations are better informed, receive Technical Reports etc. The DEVCO Operational Manager receives the AOTTP newsletters/updates but communication and informal updates will be improved perhaps via short, regular phone calls.

Recommendation 4. AOTTP Management Team/ ICCAT Secretariat/ In-country local counterparts: Exit strategies need to be drafted for the continuation of AOTTP activities beyond the present programme. Besides the continuation of the tag recovery plan, the various stakeholders could consider an array of activities, which would provide valuable

data for model updates and monitoring of key indicators that measure the health of the fisheries stocks (related to Conclusion C5).

Exit strategies should be developed with the ICCAT Secretariat and SCRS. AOTTP feels that it is important that we can find a way to pay rewards after 2020 as the metadata from these tags will be especially valuable.

Recommendation 5. AOTTP Publicity and Tag Recovery Coordinator: Ensure the strengthened exchange of lessons learned from the tag recovery operations among the participating Tag Recovery Officers and Focal Points, possible by creating a tag-recovery group within the instant messaging service (Telegram) already in use for the communication among AOTTP stakeholders (related to Conclusion C4).

This relates to 'lessons learnt' by both tag-release and tag-recovery teams and how best to facilitate this. The Telegram App can be used a first 'port of call' to draw the teams together; and ideas could perhaps then be developed using more detailed articles on the AOTTP website. Another possibility would be to invite members of the various teams to attend a 'mini-conference' (**Figure 23**) *to share ideas perhaps here at ICCAT HQ in Madrid.*

Figure 23. TRO 'Lessons Learned and Recommendations' Meeting, Madrid September 2019.

The second or Final Evaluation was led by Tim Huntington (TRANSTEC) and was done between October 2019 and January 2020, ie. just prior to the start of the covid-19 pandemic. TRANSTEC visited AOTTP partners in Senegal, Ghana and Cote d'Ivoire between 26 November and 6 December 2019 and, Brazil between 8 and 14 December 2019.

The Final Report was submitted on 31st January 2020 and is available from the ICCAT Secretariat. The conclusions of the report were as follows:

AOTTP has boosted DCC interest in the activities of ICCAT's SCRS and this will be maintained as tagging data is further integrated into tropical tuna stock assessment. A positive indicator of additional engagement resulting from AOTTP is that the number of papers presented to SCRS involving both tagging data and authors from developing coastal countries (DCCs) has increased substantially, especially over 2018 for BET (4 papers) and YFT (on tag seeding data, growth / movement, tag shedding, OTC validation, FAD moratorium). Although the numbers dropped in 2019, it may increase again, at least over the short-term, as tagging data becomes increasingly available to DCC stakeholders. However, the use of tagging data by the DCCs themselves is low, with little evidence that it has stimulated further, in-country scientific research or analysis. This is mainly a capacity issue, but it has been exacerbated by the focus on the large pelagic tropical tunas that are of less food security interest than the coastal neritic tunas. This said, the tagging of little tunny and frigate mackerel has stimulated considerable interest in the resultant tag return data and a desire to use this for regional science and fisheries management. The expertise on tagging / recovery built by AOTTP will be fundamental to further expand the tagging of neritic tunas through the national, cross-borders and sub-regional programmes supported by the DCCs.

Although ICCAT's SCRS fully recognizes the importance of the AOTTP outputs and their potential use in their activities, its involvement in the design and early implementation of the project could have been improved. Recommendations (see below) have been made to (i) reactivate ICCAT's 'Ad hoc WG on coordination of tagging information' and (ii) include a tuna tagging specialist in the AOTTP Steering Committee.

AOTTP data are already proving transformative in terms of supporting robust stock assessment and will be an important source of information for ICCAT's on-going Management Strategy Evaluations (MSEs). The establishment of an otolith reference collection is also an important and long-term AOTTP contribution to tuna management in the Atlantic Ocean.

It is important that tag recovery strategies are formally reconsidered for the last year of the project and the post-project period as AOTTP funding and technical support is wound down. Tag seeding has been insufficient to estimate purse-seine fleets tag reporting rates with any certainty (the level of tag seeding was only 10% of that recommended by the Feasibility Study, and of the 429 tag seeded fish with the purse-seine fleets in the Atlantic, 315 have been reported to date, giving a reporting rate of 73% (against a target of 80%)). This needs to be reconsidered over the final year of the project and the post-project period.

Compared to other regional tuna tagging programmes there was a high level of involvement by DCCs in tagging, tag recovery and preliminary scientific research - this is to be commended. Further tagging could be continued through the use of 'opportunistic tagging' by commercial fishing vessels (mainly pole & line and handline) and sports fishermen.

The DCCs now have the capacity to instigate their own sub-regional tuna tagging and recovery programmes, especially for neritic tuna that have the potential to be managed at this level. This will, however, have to be integrated into a wider capacity-development process for managing highly migratory fish stocks that move between the coastal waters of different fishing nations. It is important that DCC capacity for using tagging-related data for producing stock assessments and local management measures is further supported over the next EU development programming period (2021 – 2027).

The costs associate with AOTTP tagging and tag recovery are considerably higher than for the Indian Ocean and the Pacific Ocean (see above). There is good reason for this – the AOTTP, despite the failure to have sufficient tagging in the NW (Caribbean) quadrant, achieved tagging over a much wider area than the other two programmes, using a wider array of tagging platforms. This is likely to result in a wider distribution of

tags across different fish sizes and sub-stocks, potentially producing a more varied mix of scientific information from tag returns. However, it is possible that this might be at the cost of tagging quality and consistency, as tagging was being conducted by a larger number of less experienced taggers (RTTP and the PTTP were less capacity-building focused and had small teams of experienced taggers). This said, there is no evidence (e.g. from tag shedding rates) that this has impacted the overall quality of the tagging results.

Incentives for tag returns were judged to be appropriate. As recognized by AOTTP, it is important that a strategy and means for post-project tag recovery is put in place before the project closes at the end of November 2020. Communication by the project has improved since the 2017 Results-Oriented Monitoring (ROM) report, and the June 2020 Symposium will be key, together with developing a longer term communications strategy for the project and its activities post project closure in Nov 2020.

It is too early to assess the likely impact of AOTTP but current evidence suggests it will be subtle but considerable.

AOTTP has been highly successful in stimulating cooperation and mutual understanding across the Atlantic basin. It has been less successful at mainstreaming gender issues and environmental/ climate change issues.

2.6. WHAT HAS YOUR ORGANISATION OR ANY ACTOR INVOLVED IN THE ACTION LEARNED FROM THE ACTION AND HOW HAS THIS LEARNING BEEN UTILISED AND DISSEMINATED ?

The ICCAT SCRS and CPCs will benefit from reduced uncertainty in population assessments due to improved biological parameter estimation from AOTTP tag-recapture data. The 'learning' has been, and will be, disseminated via the AOTTP Final Symposium, peer-reviewed papers and reports. The two evaluations done (reports available from the ICCAT Secretariat) have also provided the ICCAT Secretariat with an opportunity to reflect. The management and implementation of such a large project is thus prompting ICCAT to re-evaluate, and ultimately modernize, all of its working practices and procedures, including: employment of staff, procurement of equipment, and sub-contracting.

2.7. PLEASE LIST ALL MATERIALS (AND NUMBER OF COPIES) PRODUCED DURING THE ACTION ON WHATEVER FORMAT (PLEASE ENCLOSE A COPY OF EACH ITEM, EXCEPT IF YOU HAVE ALREADY DONE SO IN THE PAST)

ICCAT-AOTTP produced and designed large numbers of materials such as posters, t-shirts, and brochures. Details are available by request from the ICCAT Secretariat.

2.8. CONTRACTS (>60000€) AWARDED BY ICCAT DURING THE AOTTP PROJECT

ICCAT-AOTTP awarded 53 contracts, of which 25 exceeded the amount of 60,000€ since the project started (**Table 12**). During the last reporting period (2019-2020) 10 contracts were awarded, with 1 above 60.000€.

Table 12. List of contracts awarded by ICCAT during AOTTP.

AOTTP Year	Date	Supplier	Award procedure	Objective
1.P	2016-01-13	HALLPRINT Pty Ltd	3 Quote request	Supply of conventional tags
1.P	2016-02-12	BDO AUDITORES S.L.P.	Negociated procedure (On the EU contract)	Expenditure Verification
1.P	2016-04-12	AZTI CONSORCIUM	International Call for TenderCall for Tender	Tagging activities in the East Atlantic
1.P	2016-04-21	SERVIGIS	International Call for TenderCall for Tender	IT consultant for AOTTP database
1.P	2016-05-23	DESERT STAR SYSTEMS, LLC	International Call for TenderCall for Tender	Supply of electronic tags
1.P	2016-05-27	WILDLIFE COMPUTERS	International Call for TenderCall for Tender	Supply of electronic tags
1.P	2016-06-02	LOTEK WIRELESS	International Call for TenderCall for Tender	Supply of electronic tags
2.P	2016-07-05	EL INSTITUTO DEL MAR "IMAR"	Quote request	Recovery activities in the East Atlantic
2.P	2016-08-01	Centre de Recherches Oceanographique Abidjan CRO-CI	International Call for TenderCall for Tender	Recovery activities in the East Atlantic
2.P	2016-08-01	Centre de Recherches Oceanographique Dakar CRODT / ISRA	International Call for TenderCall for Tender	Recovery activities in the East Atlantic
2.P	2016-10-05	MARINE FISHERIES RESEARCH "MRFD"	International Call for TenderCall for Tender	Recovery activities in the East Atlantic

Table 12 (continued). List of contracts awarded by ICCAT during AOTTP.

2.P	2016-11-03	HALLPRINT Pty Ltd	International Call for TenderCall for Tender	Supply of tag seeding tags
2.P	2016-11-14	SERVIGIS	Quote request	IT consultant for AOTTP database
2.P	2016-12-21	INSTITUTO NAC.DESENVOLVIMENTO DAS PESCAS -CABO VERDE	Quote request	Recovery activities in the East Atlantic
2.P	2017-01-05	FADURPE LED CONSORTIUM	International Call for TenderCall for Tender	Tagging activities in the West Atlantic
2.P	2017-01-25	CAPRICORN MARINE ENVIRONMENTAL (Pty) Ltd	International Call for TenderCall for Tender	Tagging activities in South East Atlantic
2.P	2017-02-22	CAPRICORN MARINE ENVIRONMENTAL (Pty) Ltd	Quote request	Awareness and Recovery activities in the South East Atlantic
2.P	2017-02-28	PROYECTOS BIOLOGICOS Y TECNICOS S.L. (PROBITEC)	International Call for Tender	Tagging activities off North West Atlantic
2.P	2017-04-11	LARGE PELAGIC RESEARCH CENTER // TAG A TINY	International Call for Tender	Tagging activities in North West Atlantic
2.P	2017-05-15	BDO AUDITORES S.L.P. (2º PERIODO)	Negociated procedure (On the EU contract)	Expenditure Verification
2.P	2017-05-25	FADURPE LED CONSORTIUM	Quote request	Awareness and tag recovery campaign for the Atlantic in Brazil
3.P	2017-07-06	FLUTUANTODISSEIA LDA	International Call for Tender	Tagging activities in the Autonomous Regions of the Azores and Madeira
3.P	2017-09-25	CENTRO INVESTIGACION Y CONSERVACION MARINA "CICMAR"	Quote request	Recovery activities in the Atlantic

Table 12 (continued). List of contracts awarded by ICCAT during AOTTP.

3.P	2017-09-27	FUN FASHION T-SHIRT S.L.	International Call for Tender	Suministro camisetas de visibilidad según el programa.
3.P	2017-11-08	FADURPE LED CONSORTIUM	International Call for Tender	Creation of a reference collection of otholitos
3.P	2017-11-08	IFAN-UNIVERSITE CHEIKH ANTA DIOP	International Call for Tender	Creation of a reference collection of otholitos
3.P	2017-12-12	AGENCIA DESENVOLVIMENTO INVESTIGAÇAO TECNOLOGIA E INOVAÇAO	Quote request	Recovery activities in Madeira
3.P	2018-02-26	FADURPE LED CONSORTIUM 2ª Phase	International Call for Tender	Tagging activities in the West Atlantic
3.P	2018-02-26	KAMAYA BUSINESS SARL	International Call for Tender	Tagging activities economic zone of Ivory Coast
3.P	2018-07-03	UNIVERSITY OF MAINE	International Call for Tender	Tagging activities in North -West Atlantic
3.P	2018-03-01	MICROWAVE TELEMETRY	Quote request	Supply of electronic tags
3.P	2018-04-11	CENTRE FOR ENVIRONMENT FISHERIES & AQUACULTURE SCIENCE (CEFAS)	International Call for Tender	Tagging activities in South -East Atlantic
3.P	2018-04-13	LARGE PELAGIC RESEARCH CENTER // TAG A TINY---FASE Nº 2	International Call for Tender	Tagging activities in North West Atlantic
3.P	2018-04-13	BDO AUDITORES S.L.P. (3º PERIODO)	Negociated procedure (On the EU contract)	Expenditure Verification
3.P	2018-05-14	FISHERIES DIRECTORATE OF SAO TOMÉ & PRINCIPE	International Call for Tender	Tagging activities in Sao Tome e Principe
3.P	2018-05-28	FISHERIES DIRECTORATE OF SAO TOMÉ & PRINCIPE	Quote request	Awareness and Recovery activities in Santo Tome

Table 12 (continued). List of contracts awarded by ICCAT during AOTTP.

4.P	2018-08-21	AZTI CONSORCIUM 2ª PHASE	International Call for Tender 21	Tagging activities in the East Atlantic
4.P	2019-01-29	IFAN-UNIVERSITE CHEIKH ANTA DIOP	Quote request	Provision of training in Otolith
4.P	2019-01-03	FISH AGEING SERVICES PTY LTD	Quote request	Otolith age readings and validation of growth
4.P	2019-03-13	BDO AUDITORES S.L.P. (4º PERIODO)	Negociated procedure (On the EU contract)	Expenditure Verification
4.P	2019-03-27	CISEF CONSORCIUM_AZTI	International Call for Tender 22	Tagging Data Analysis
4.P	2019-05-01	INVESTIGACION PANIFICACION Y DESARROLLO S.A.	Quote request	Awareness and Recovery activities in Canarias
4.P	2019-06-11	VIMS CONSORTIUM	Quote request	Tagging Data Analysis
5.P	2019-08-09	FADURPE LED CONSORTIUM	International Call for Tender 21--Annex I	Tagging activities off Northern Brazil
5.P	2020-05-27	FISH AGEING SERVICES PTY LTD	Quote request	Tagging Programme Otolith
5.P	2020-12-10	GRAFICAS AGA	Quote request	Prestacion servicio _Video divulgativo sobre programa AOTTP
5.P	2020-12-09	BDO AUDITORES S.L.P. (5º PERIODO)	Negociated procedure (On the EU contract)	Expenditure Verification
5.P	2021-01-11	INTERPRETERS: CHRISTINA LINAAE (Symposium)	Quote request	AOTTP Final Online Symposium
5.P	2021-01-14	INTERPRETERS: EVA BAENA (Symposium)	Quote request	AOTTP Final Online Symposium
5.P	2021-01-14	INTERPRETERS: CHRISTINE LIBERAS (Symposium)	Quote request	AOTTP Final Online Symposium

Table 12 (continued). List of contracts awarded by ICCAT during AOTTP.

5.P	2021-01-14	INTERPRETERS: PATRICIA HERRERO (Symposium)	Quote request	AOTTP Final Online Symposium
5.P	2021-01-15	INTERPRETERS: BEATRIZ LEBOULLEUX (Symposium)	Quote request	AOTTP Final Online Symposium
5.P	2021-01-14	INTERPRETERS: EMMA CYPHER-DOURNES (Symposium)	Quote request	AOTTP Final Online Symposium

3. BENEFICIARIES/AFFILIATED ENTITIES AND OTHER COOPERATION

3.1. HOW DO YOU ASSESS THE RELATIONSHIP BETWEEN THE BENEFICIARIES/AFFILIATED ENTITIES OF THIS GRANT CONTRACT (I.E. THOSE HAVING SIGNED THE MANDATE FOR THE COORDINATOR OR AN AFFILIATED ENTITY STATEMENT)? PLEASE PROVIDE SPECIFIC INFORMATION FOR EACH BENEFICIARY/AFFILIATED ENTITY.

ICCAT was the main beneficiary but many other partners, e.g. AZTI and CEFAS, were subcontracted by ICCAT via AOTTP, see list of contractors (**Table 12**). ICCAT-AOTTP maintained good working relationships with all the contractors/partners.

3.2. IS THE ABOVE AGREEMENT BETWEEN THE SIGNATORIES TO THE GRANT CONTRACT TO CONTINUE? IF SO, HOW? IF NOT, WHY?

The AOTTP Grant Contract was funded for 5 years. Since no additional funding became available it finished on 28 February 2021. Note, however, that the project had 2 no-cost extensions due to: (i) a delayed start and (ii) the covid-19 pandemic.

3.3. HOW WOULD YOU ASSESS THE RELATIONSHIP BETWEEN YOUR ORGANISATION AND STATE AUTHORITIES IN THE ACTION COUNTRIES? HOW HAS THIS RELATIONSHIP AFFECTED THE ACTION?

The AOTTP Action, together with the ICCAT Secretariat, maintained good relationships with the State Authorities in the target countries. AOTTP is working directly with State Authorities in Spain (Canary Islands), Portugal (Azores, Madeira), Côte d'Ivoire, Mauritania, Senegal, Brazil, USA, Ghana, Uruguay, São Tomé and Príncipe, Cabo Verde, UK (CEFAS, British Overseas Territories of St Helena and Ascension Island) and South Africa. AOTTP contractors (e.g.CRODT, CEFAS & CRO-CI) are state authorities themselves.

During the Phase 1 tagging work, for example, permission was granted to tag and release tuna, and catch live pelagic fish, in the territorial waters of 15 countries (**Table 13**), including two that are not ICCAT Contracting Parties (Guiné-Bissau and Benin).

Table 13. Permissions granted to tag and release tuna and catch live bait during the first phase tagging.

COUNTRY	DATES
Morocco	15 June to 20 October 2016
Mauritania	15 June to 20 October 2016
Senegal	15 June to 20 October 2016
Guinea Bissau	15 June to 20 October 2016
Cape Verde	15 June to 20 October 2016
Guinea (Guinea Conakry)	20 October 2016 to 15 June 2017
Sierra Leone	20 October 2016 to 15 June 2017
Liberia	20 October 2016 to 15 June 2017
Cote d'Ivoire	20 October 2016 to 15 June 2017
Ghana	20 October 2016 to 15 June 2017
Togo	20 October 2016 to 15 June 2017
Benin	20 October 2016 to 15 June 2017
São Tomé e Príncipe	20 October 2016 to 15 June 2017
Gabon	20 October 2016 to 15 June 2017
Angola	20 October 2016 to 15 June 2017

AOTTP has also carried out numerous international exchanges of biological samples, for example, between CEFAS and the University of Cape Town (UCT), mutually benefiting all parties. CEFAS and UCT have sent whole otoliths from very large BET and YFT to AOTTP for ageing, AOTTP shared the resulting data and then returned the prepared slides. In addition, AOTTP sent CEFAS 30 YFT otolith samples from very young fish/short-term recaptures caught in the Gulf of Guinea to be analyzed for isotopic signatures and determine natal origin. Results are improving our understanding of stock structure of YFT in the Atlantic, thus benefiting the stock assessment process.

ICCAT CPCs and Cooperators have also contributed funds to the AOTTP programme, including the People's Republic of China, USA, Canada, and Chinese-Taipei. The Uruguayan Research Vessel was also made available to AOTTP, without cost, to tag tropical tuna. IRD staff contributed their time without cost to analyzing AOTTP data.

3.4. WHERE APPLICABLE, DESCRIBE YOUR RELATIONSHIP WITH ANY OTHER ORGANISATIONS INVOLVED IN IMPLEMENTING THE TAGGING ACTIVITIES.

AOTTP maintained good working relationships with all its Contractors: communication with tagging teams and TROs around the world being effected using a range of media, including WhatsApp, Telegram and E-mail.

ICCAT-AOTTP worked with a Consortium, led by AZTI (Spain), to tag tuna in the Azores, the Canary Islands, and West Africa. This Consortium involved CRO-CI, CRODT, FSSD, IEO, IMAR, and MFRD/FSSD. In other areas of the Atlantic AOTTP worked with: the FADURPE Consortium (Brazil), CEFAS (UK), LPRC (USA), University of Maine (USA), NOAA (USA), Directorate of Fisheries (São Tomé and Príncipe), and Capmarine (South Africa) to tag fish at sea. In awareness-raising and tag-recovery AOTTP worked directly, and successfully, with many of the same organizations (e.g. CRO-CI, CRODT, MFRD/FSSD, IEO, and IMAR) but also with Capmarine and INDP (Cabo Verde). ICCAT-AOTTP also worked with the Saint Helena Government (BOT) with which it has an MoU for tag-recovery activities.

In the USA, LPRC wrote in their Final Report that, "*Our relationship with commercial fishermen tagging partners, all US Atlantic longliners, has been strengthened by this partnership, and the vessel crews have gained additional tagging and research experience and remain excited about future research opportunities*".

AOTTP partners at the University of Maine and NOAA worked *voluntarily* with a large range of USA sport fishing associations and organizations, including: the South Shore Marlin and Tuna Club, Sail World, Virginia Saltwater Fishing, the Billfish Foundation, the Fort Walton Beach Sailfish Club, the Billfish Rundown, Grenada Fishing Charters, The Anderson Cabot Center for Ocean Life, and ROFFS. This work was affected by the pandemic but considerable numbers fish have now been tagged and recovered by volunteers in the NW Atlantic.

AOTTP also worked with ARGOS-CLS who run the satellites that collect the data from the pop-up electronic tags and the AOTTP Coordinator was invited to present results from AOTTP at the European Users Conference on ARGOS Wildlife in late 2018.

AOTTP worked with the skippers and crews of more than 25 commercial fishing vessels and feedback with respect to the relationships between the scientific and technical teams and the fishing crews was routinely positive, according to both verbal and cruise reports from our Contractors. The fishers were usually extremely engaged, enthusiastic about the tagging work, and delighted to help in all possible ways.

AOTTP also has an agreement with IATTC to pay rewards on its behalf and collect metadata from tags where possible.

TROs in Abidjan worked closely with personnel from IRD and IEO to gain access to log-book data, essential for ascertaining where and when a tagged tuna was actually caught.

The AOTTP Steering Committee was also regularly consulted on AOTTP progress and plans, and members were involved in evaluating contracts. Members of the ICCAT SCRS are enthusiastic about AOTTP and have been undertaking research with the data.

FINAL BENEFICIARIES AND TARGET GROUPS

The 'Final Beneficiaries' of the Action are: (i) Fishing communities and operators depending on the exploitation of tuna resources; and (ii) Consumers (of tuna).

The Action has already had an impact on the 'Final Beneficiaries'. AOTTP TROs and Focal Points recovered over 17,000 tags with metadata. Recovery Rates compare well with other similar oceanic tagging campaigns. Such statistics indicate strong 'buy-in' to the project from fishers, dockers, stevedores and the tuna canning industry. More than 100 scientists and technicians from developing countries benefited directly from the employment AOTTP generated, and less directly from the training and capacity building activities they received. Thousands of euros of cash rewards, substantial lottery prizes, caps and t-shirts were distributed to many diverse fishery stakeholders.

The Target Groups are: (i) Scientists of the developing coastal states, and scientist members of the ICCAT SCRS; (ii) Fisheries authorities in the different ICCAT CPCs; and (iii) the ICCAT Secretariat.

The SCRS and its scientists benefited from the training, coaching, and mentoring provided by AOTTP and the ICCAT Secretariat during the capacity building workshops. They will also benefit from access to the AOTTP data, which will improve scientific knowledge, and lead to the publication of reports and peer-reviewed papers, thereby boosting careers. Fisheries authorities in many ICCAT CPCs are aware of the project and many of their staff benefited from training aboard the tagging vessels. Indeed, scientists from Côte d'Ivoire (CRO-CI) and São Tomé and Príncipe won and managed ICCAT-AOTTP tagging contracts. Two tagging contracts awarded by ICCAT-AOTTP (one to tag

11,000 fish of Côte d'Ivoire and the other to tag 6000 fish around São Tomé e Príncipe) were managed by African nationals who received training from the AZTI Consortium in 2016 and 2017.

The ICCAT Secretariat itself is also benefiting from the publicity and goodwill the AOTTP project generated. Its scientists now have a highly useful dataset for informing policy, and ascertaining the efficacy of management measures (e.g. spatial closures), which will result in better management of the tropical tuna fisheries in ICCAT's mandate.

OTHER THIRD PARTIES INVOLVED (INCLUDING OTHER DONORS, OTHER GOVERNMENT AGENCIES OR LOCAL GOVERNMENT UNITS, NGOS)

The FADURPE Consortium in Brazil organized tagging at sea, awareness-raising and tag-recovery activities. It comprised a large network of organizations and NGOs, including; DEPAq, LATEP, UFPRE, and UFERSA. In Cabo Frio an NGO called Projeto Albatroz worked closely with AOTTP tagging and tag-recovery teams, providing logistical support.

AOTTP and partners also worked extensively with the Observer Programs in the target countries.

In Abidjan, Dakar, and Tema the TROs liaised daily with the Port Authorities to gain access to harbors and fishing vessels. They also did awareness-raising activities at the tuna canning factories, building good relationships with their staff.

3.5. WHERE APPLICABLE, OUTLINE ANY LINKS AND SYNERGIES YOU HAVE DEVELOPED WITH OTHER ACTIONS.

In January 2019, AOTTP Coordination was invited by IATTC to attend a meeting to discuss implementation of large-scale tuna tagging programs. IATTC benefitted from hearing about the AOTTP experience; AOTTP providing expert advice and guidance on what mistakes to avoid. AOTTP also benefitted from the presence of other tuna RFMOs and national agencies (e.g. NRIFSF). In addition, Dan Fuller from the IATTC volunteered to age an OTC-marked AOTTP sample as a long-time expert in daily ageing of tropical tunas. His results helped advance the validation work being done by AOTTP.

In September 2018, AOTTP Coordination met with the vice-president of ISSF, an NGO self-described as serving as a "global bridge among industry, environmental stakeholders, scientists, and RFMOs and their members." ISSF advised AOTTP on how to reach the industry community and expressed interest in sponsoring the participation of early career scientists at the AOTTP Final Symposium. AOTTP also provided ISSF (Jefferson Morhua) with a some maps and data summarizing the AOTTP project for regular presentation at the ISSF Skippers Workshops, which reached 700 participants in 2018.

AOTTP worked productively with the Blue Belt in the BOTs of Ascension and St. Helena. The Blue Belt programe is and has tagged fish in both these locations. When Blue Belt tags are found by AOTTP TROs the rewards are paid and (release and recovery) data shared.

In March 2019 AOTTP was approached by José L Varela from Cadiz University offering to tag SKJ in the Gulf of Cadiz using sport and recreational fishers. Similarly during the SCRS Species Group meeting in September AOTTP was approached by Dr Karina Ramírez López from Instituto Nacional de Pesca y Acuacultura in Mexico who offered to do some tag-seeding experiments for AOTTP in the Gulf of Mexico which was also accepted.

Dr Barbara Block from Monterey Aquarium in the USA visited AOTTP partners in St. Helena in 2018 and joined them in tagging activities at sea, particularly in relation to pop-up tagging. The team there was grateful for her input and advice.

3.6. IF YOUR ORGANIZATION HAS RECEIVED PREVIOUS EU GRANTS IN VIEW OF STRENGTHENING THE SAME TARGET GROUP, IN HOW FAR HAS THIS ACTION BEEN ABLE TO BUILD UPON/COMPLEMENT THE PREVIOUS ONE(S)? (LIST ALL PREVIOUS EU GRANTS).

ICCAT has signed many grant agreements with the EU over the years strengthening the same target groups (see **Appendix 10**), although covering different issues (eg. from capacity building to science related issues). AOTTP, as in the case of other ICCAT-EU grant agreements, as developed synergies in view of strengthening the same target groups, through the coordination by the Secretariat on collaborative efforts and activities where possible.

3.7. HOW DO YOU EVALUATE COOPERATION WITH THE SERVICES OF THE CONTRACTING AUTHORITY?

AOTTP is satisfied with the cooperation and services provided by the Contracting Authority. Regular meetings were held between AOTTP Coordination and the relevant Project Officer from DG-DEVCO, and we worked very effectively together to organize evaluations, effect recommendations, make contract amendments, evaluate Technical and Financial Reports and deliver interim payments. The advice given by the Project Officer during the project was useful and appreciated.

4. VISIBILITY. HOW IS THE VISIBILITY OF THE EU CONTRIBUTION BEING ENSURED IN THE ACTION?

The EU logo and funding statement was always clearly visible on all AOTTP communication materials including websites, flyers, pamphlets, posters, reports, newsletters, t-shirts, and caps. The materials can be seen at harbors, at fishing beaches, and on-board fishing and recreational vessels throughout AOTTP target countries.

AOTTP, together with the ICCAT Secretariat, has developed a website packed with regularly updated information about the project.

AOTTP Coordination published quarterly newsletters about the project which, in addition to being available on the website, were also sent by email to a large number of stakeholders.

The AOTTP online symposium provided visibility and was announced at various platforms, including: the European Tuna Conference, the IATTC meeting, the Tuna Conference and ICCAT SCRS meetings. A webpage with all the Symposium presentations has been developed.

AOTTP was formally presented at many different *Fora* around the Atlantic Coastal States, including:

- ICCAT WG Stock Assessment Methods (Doug Beare, Madrid, 19 February 2016)
- ICCAT WG Yellowfin Data Prep (Doug Beare, Pasaia, 11 March 2016)
- ICCAT Small Tuna Intersessional Meeting (Doug Beare, Madrid, 6 April, 2016)

- ICCAT SCRS Plenary (Doug Beare, Madrid, 24 September, 2016)
- Fisheries Forum (Pedro Guemes, Azores, 6 July 2016)
- AOTTP summary presentation (Doug Beare, Universidade Veiga de Almeida, Brazil, 3 April 2017)
- AOTTP summary presentation (Doug Beare, Recife, 5 April 2017)
- AOTTP summary presentation (Miguel Neves dos Santos, Doug Beare, Brussels, 19 June 2017, http://ec.europa.eu/europeaid/news-and-events/atlantic-ocean-tropical-tuna-tagging-programme-aottp_en)
- AOTTP summary presentation on Small Tunas (ICCAT Secretariat, Miami, 27 April 2017)
- AOTTP presented to POPA Observers (Miguel Machete, Faial Island (Azores), April 2017)
- AOTTP summary presentation (Doug Beare, Madeira, 13 July 2017)
- ICCAT WG on Tropical Tunas Species Group (Doug Beare, 7 September 2017)
- ICCAT SCRS Plenary (Doug Beare, Madrid, 6 October, 2017)
- Maio Island Fishermans Forum (Albertino Martins, Cabo Verde, December 2017)
- AOTTP summary presentation on Small Tunas (ICCAT Secretariat, Miami, 5 April 2018)
- ICCAT WG BET Data Preparation (ICCAT Secretariat, Miami, 25 April 2018)
- AOTTP summary presentation (Doug Beare, São Tomé, 13 June 2018)
- ICCAT WG on Tropical Tunas Species Group (Doug Beare, Lisa Ailloud, Madrid, September 2018)
- ICCAT SCRS Plenary (Doug Beare, Madrid, September 2018)
- ICCAT Commission meeting (David Die, Dubrovnik, November 2018)
- European User Conference on Argos Wildlife - AOTTP summary presentation (Doug Beare, Toulouse, 22 November 2019)
- IATTC tuna tagging program - four presentations on AOTTP (Lisa Ailloud, San Diego, January 2019)
- Public presentation of AOTTP (Doug Beare, Serena Wright, St Helena, January 2019)
- ICCAT YFT data preparatory meeting - AOTTP summary presentation (Doug Beare, Madrid, April 2019)
- ICCAT YFT data preparatory meeting - tag shedding and mortality estimation (Lisa Ailloud, Madrid, April 2019)
- Poster setup at the European Tuna Conference (Doug Beare, Lisa Ailloud, Brussels, May 2019)
- The Tuna Conference - Preliminary data and results from AOTTP (Doug Beare, California, May 2019)
- The Tuna Conference - Data collection, transmission and storage on the atlantic Ocean tropical tuna tagging programme (AOTTP) – experiences, successes and failures (Doug Beare, California, May 2019)
- ICCAT Intersessional meeting on Small Tunas (Fambaye Ngom, Portugal, June 2019)

ICCAT-AOTTP directed its communication activities/materials/products at the following four main target groups or audiences:

- Direct stakeholders who actually work in commercial fishing, recreational fishing, and fish-processing industries. This group depends most directly on tuna resources in the Atlantic and is most likely to actually find and report the discovery of a tagged fish.
- Marine/fisheries scientists (includes ICCAT CPCs representatives at the SCRS, and AOTTP Steering Committee) who will analyze and interpret the AOTTP tagging data, using them to make improved estimates of stock abundance.
- Policy/decision-makers concerned with the actual management (population assessment, quota-setting etc.) of tropical tuna fisheries.
- NGOs, donors and the general public, primarily concerned with sustainable exploitation, socio-economic issues and conservation.

Each of these three four audiences is clearly very distinct from the other, and each required different communication and messaging strategies. These were outlined in detail in the Communication Plan available on request to the ICCAT Secretariat.

AOTTP was also published widely on the internet, e.g.:

- http://www.dw.com/es/el-at%C3%BAn-tropical-conocerlo-m%C3%A1s-para-pescarlo-mejor/a-39319958
- http://fis.com/fis/worldnews/worldnews.asp?l=e&country=0&special=&monthyear=&day=&id=86263&ndb=1&df=0
- https://www.simplyscience.ch/teens-liesnach-archiv/articles/volkszahlung-bei-den-thunfischen.html
- http://www.ieo.es/documents/10640/38594/NP_marcado_AOTTP_en_Canary Islands.pdf/737841fe-98f8-4b00-aa56-d1b5145643a5
- https://www.gomeratoday.com/2016/08/24/el-cabildo-insular-se-suma-a-la-campana-de-marcado-de-atunes/
- http://www.fao.org/3/a-i7244e.pdf
- https://assecom.ufersa.edu.br/2017/05/03/equipe-da-ufersa-participa-de-programa-internacional-de-marcacao-e-recaptura-de-atuns/
- http://www.fishingindustrynewssa.com/2017/08/31/tuna-tagging-positive-feedback-to-programme/
- https://www.lagomera.es/cabildo-insular-se-suma-la-campana-marcado-atunes/
- http://www.lavanguardia.com/local/Canary Islands/20160824/404168466987/la-gomera-se-suma-a-la-campana-de-marcado-de-atunes.html
- https://www.eldiario.es/agricola/pesca/Cabildo-Gomera-campana-marcado-atunes_0_551545265.html
- http://nordinfo.info/node/1724
- https://www.undercurrentnews.com/2016/06/13/azti-wins-iccat-tagging-contract/ Safari News ARGOS-CLS Sail World NOAA Saving Seafood Skiboat St Helena Terramar Project

Many of our partners have made videos and uploaded them to YouTube, eg. :

*Senegal (AZTI);

*Northern Brazil(FADURPE);

*Central Brazil(FADURPE);

*Senegal (CRODT);

AOTTP video Training Tutorials etc. can be found here:

- https://www.youtube.com/watch?v=BKEZKf4Vya0

5. LOCATION OF RECORDS, ACCOUNTING AND SUPPORTING DOCUMENTS. PLEASE INDICATE IN A TABLE THE LOCATION OF RECORDS, ACCOUNTING AND SUPPORTING DOCUMENTS FOR EACH BENEFICIARY AND AFFILIATED ENTITY ENTITLED TO INCUR COSTS.

All this information is available from the ICCAT Secretariat.

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APPENDICES

APPENDIX 1. LENGTH-FREQUENCIES (10CM LENGTH CLASSES) OF FIRST TIME (R-1) RELEASES BY SPECIES.

Size classes Species	20-30cm	30-40cm	40-50cm	50-60cm	60-70cm	70-80cm	80-90cm	90-100cm	100-110cm	110-120cm	120-130cm	130-140cm	140-150cm	150-160cm	160-170cm	170-180cm
BET	62	2144	6865	7271	5062	1316	524	413	123	76	56	37	32	12	11	7
LTA	112	2358	4768	418	22	15	8	1	0	0	0	0	0	0	0	0
SKJ	40	6665	22482	15376	2200	61	0	0	0	0	0	0	0	0	0	0
WAH	0	0	2	2	7	30	59	48	41	31	21	18	18	3	0	0
YFT	96	7804	11906	10686	4757	2489	1326	542	217	183	111	77	48	14	3	4

APPENDIX 2. AOTTP TAGGING CRUISES SINCE TAGGING ACTIVITY BEGAN ON ACORIANA ON 26TH JUNE 2016.

Gearcode	Start time	End time	Vessel name	Zone name	N days
BB	2016-06-26 10:40:00	2016-06-29 13:27:00	ACORIANA	Azores	4
BB	2016-07-11 07:56:00	2016-07-19 11:37:30	AITA FRAXKU	Senegal	9
BB	2016-07-12 14:30:00	2016-07-20 10:03:00	ACORIANA	Azores	8
BB	2016-07-23 20:54:00	2016-07-27 11:03:00	ACORIANA	Azores	4
BB	2016-07-27 08:00:00	2016-07-31 15:02:11	AITA FRAXKU	Senegal	5
BB	2016-08-05 15:02:00	2016-08-12 16:56:00	AITA FRAXKU	Senegal	8
BB	2016-08-12 16:47:00	2016-08-12 17:07:00	ACORIANA	Azores	1
BB	2016-08-16 14:14:00	2016-08-27 13:02:00	ACORIANA	Azores	11
BB	2016-08-24 12:03:00	2016-08-26 09:29:00	AITA FRAXKU	Senegal	2
BB	2016-08-26 15:03:00	2016-09-04 09:40:00	EL GRANDE PRIMERO	Canary Islands	9
BB	2016-08-30 19:24:00	2016-08-31 12:28:00	ACORIANA	Azores	1
BB	2016-09-09 11:12:00	2016-09-19 12:50:00	ACORIANA	Azores	11
BB	2016-09-11 19:08:00	2016-09-18 23:06:00	EL GRANDE PRIMERO	Canary Islands	8
BB	2016-09-20 00:09:00	2016-09-26 14:46:00	EL MACIZO	Canary Islands	7
BB	2016-09-24 12:29:00	2016-09-30 14:08:00	ACORIANA	Azores	7
BB	2016-09-25 07:20:00	2016-10-02 10:26:00	EL GRANDE PRIMERO	Canary Islands	8
BB	2016-10-04 01:00:00	2016-10-12 01:00:00	EL MACIZO	Canary Islands	8
BB	2016-10-09 09:38:00	2016-10-16 15:29:00	EL GRANDE PRIMERO	Canary Islands	8
BB	2016-10-16 01:00:00	2016-10-23 01:00:00	EL MACIZO	Canary Islands	7
BB	2016-10-23 09:05:00	2016-10-30 10:20:00	EL GRANDE PRIMERO	Canary Islands	8
BB	2016-10-27 01:00:00	2016-11-01 01:00:00	EL MACIZO	Canary Islands	6
BB	2016-10-27 08:07:00	2017-03-04 15:31:00	AITA FRAXKU	Gulf of Guinea	76
BB	2016-11-05 12:50:00	2016-11-06 19:25:00	EL GRANDE PRIMERO	Canary Islands	2
BB	2016-11-05 12:55:00	2016-11-05 12:55:00	EL MACIZO	Canary Islands	1
BB	2016-11-11 08:50:00	2016-11-16 10:34:00	AITA FRAXKU	Gulf of Guinea	6

BB	2017-02-05 08:14:00	2017-02-08 20:53:00	TARRYNAMY	South Africa	4
BB	2017-02-15 20:13:00	2017-02-17 19:01:00	TARRYNAMY	South Africa	2
BB	2017-03-01 08:33:00	2017-03-04 14:34:00	TARRYNAMY	South Africa	4
BB	2017-03-15 13:32:00	2017-03-17 13:13:00	TARRYNAMY	South Africa	2
BB	2017-03-15 16:13:00	2017-03-18 17:04:00	AITA FRAXKU	Gulf of Guinea	4
BB	2017-03-21 14:51:00	2017-03-30 18:35:00	TARRYNAMY	South Africa	10
BB	2017-04-02 08:08:00	2017-04-04 19:39:00	TARRYNAMY	South Africa	3
BB	2017-04-06 01:00:00	2017-04-12 01:00:00	ESTRELLA DALVA	Brazil-Uruguay	6
BB	2017-04-10 12:28:00	2017-04-12 08:21:00	TARRYNAMY	South Africa	2
BB	2017-04-10 13:07:00	2017-05-15 15:38:00	TUBURAO_TIGRE	Brazil-Uruguay	36
HL	2017-04-10 22:00:00	2017-04-23 07:00:00	THAVISSON III	Brazil-Uruguay	13
BB	2017-04-12 09:16:00	2017-06-06 08:26:00	TRAMSMAR I	Brazil-Uruguay	55
BB	2017-04-18 16:45:00	2017-05-05 18:45:00	KATSUSHIO MARU 8	Brazil-Uruguay	18
BB	2017-04-29 01:00:00	2017-05-04 01:00:00	ESTRELLA DALVA	Brazil-Uruguay	5
BB	2017-05-16 12:55:00	2017-05-20 06:55:00	THAVISSON III	Brazil-Uruguay	4
BB	2017-05-24 01:00:00	2017-05-29 01:00:00	ESTRELLA DALVA	Brazil-Uruguay	5
LL	2017-06-07 14:49:00	2017-06-14 16:00:00	ALDEBARAN_1	Brazil-Uruguay	8
SPOR	2017-06-09 01:10:00	2017-06-20 16:09:00	TUBURAO_TIGRE	Brazil-Uruguay	12
BB	2017-06-22 01:00:00	2017-06-25 01:00:00	ESTRELLA DALVA	Brazil-Uruguay	3
HL	2017-06-28 19:00:00	2017-07-04 09:50:00	THAVISSON III	Brazil-Uruguay	6
BB	2017-07-14 09:10:00	2017-07-14 12:34:00	PONTA CALHAU	Azores	1
BB	2017-07-18 12:31:00	2017-07-19 09:47:00	PONTA CALHAU	Azores	1
BB	2017-07-23 01:00:00	2017-07-26 01:00:00	ESTRELLA DALVA	Brazil-Uruguay	3
BB	2017-07-23 08:25:00	2017-07-26 10:11:00	PONTA CALHAU	Azores	4
LL	2017-08-02 06:27:00	2017-08-09 12:03:00	OULED SI MOHAND	Brazil-Uruguay	8
TROL	2017-08-15 11:40:00	2017-08-15 11:40:00	SINUELO	Brazil-Uruguay	1
HL	2017-08-17 08:25:00	2017-08-30 18:29:00	THAVISSON III	Brazil-Uruguay	14

BB	2017-08-25 01:00:00	2017-08-29 01:00:00	ESTRELLA DALVA	Brazil-Uruguay	4
SPOR	2017-09-16 10:08:00	2017-09-22 11:08:00	TUBURAO_TIGRE	Brazil-Uruguay	7
BB	2017-09-25 01:00:00	2017-09-28 15:00:00	PONTA CALHAU	Azores	4
TROL	2017-09-26 01:00:00	2017-09-26 01:00:00	SINUELO	Brazil-Uruguay	1
LL	2017-09-28 08:44:00	2017-10-11 11:39:00	OULED SI MOHAND	Brazil-Uruguay	14
BB	2017-10-04 01:00:00	2017-10-07 01:00:00	ESTRELLA DALVA	Brazil-Uruguay	3
BB	2017-10-06 09:00:00	2017-10-14 08:50:00	TRAMSMAR I	Brazil-Uruguay	8
BB	2017-11-04 07:10:00	2017-11-17 18:15:00	KATSUSHIO MARU 8	Brazil-Uruguay	14
HL	2017-11-07 09:00:00	2017-11-11 16:16:00	THAVISSON III	Brazil-Uruguay	5
BB	2017-11-30 01:00:00	2017-12-10 01:00:00	KATSUSHIO MARU 8	Brazil-Uruguay	10
HL	2017-12-02 15:55:00	2017-12-04 20:55:00	THAVISSON III	Brazil-Uruguay	3
LL	2017-12-03 06:27:00	2017-12-11 09:03:00	OULED SI MOHAND	Brazil-Uruguay	9
BB	2017-12-17 13:00:00	2017-12-28 14:50:00	KATSUSHIO MARU 8	Brazil-Uruguay	12
SPOR	2017-12-18 15:52:00	2017-12-21 17:44:00	TUBURAO_TIGRE	Brazil-Uruguay	4
BB	2018-01-23 01:00:00	2018-02-01 01:00:00	TRAMSMAR I	Brazil-Uruguay	9
LL	2018-01-25 06:55:00	2018-02-03 08:54:00	OULED SI MOHAND	Brazil-Uruguay	10
HL	2018-02-01 15:19:00	2018-02-03 16:09:00	TRAMSMAR I	Brazil-Uruguay	3
BB	2018-02-26 18:08:00	2018-02-26 18:08:00	ALBACORE	Gulf of Guinea	1
BB	2018-02-27 01:00:00	2018-03-08 01:00:00	KATSUSHIO MARU 8	Brazil-Uruguay	9
LL	2018-02-27 07:45:00	2018-03-08 07:00:00	OULED SI MOHAND	Brazil-Uruguay	9
BB	2018-02-28 11:56:00	2018-02-28 13:37:00	ALBACORE	Gulf of Guinea	1
BB	2018-03-01 16:30:00	2018-03-06 15:00:00	ESTRELLA DALVA	Brazil-Uruguay	5
BB	2018-03-03 00:02:00	2018-03-03 23:59:00	ALBACORE	Gulf of Guinea	1
BB	2018-03-06 10:39:00	2018-03-06 16:13:00	LEVANA	Gulf of Guinea	1
BB	2018-03-08 16:22:00	2018-03-08 17:22:00	LEVANA	Gulf of Guinea	1
BB	2018-03-09 17:23:00	2018-03-09 18:16:00	LEVANA	Gulf of Guinea	1
BB	2018-03-16 11:01:00	2018-03-16 20:22:00	LEVANA	Gulf of Guinea	1

BB	2018-03-22 23:00:00	2018-03-22 23:00:00	ALBACORE	Gulf of Guinea	1
BB	2018-03-24 01:00:00	2018-04-06 12:55:00	THAVISSON III	Brazil-Uruguay	14
BB	2018-03-24 07:30:00	2018-04-16 17:20:00	KATSUSHIO MARU 8	Brazil-Uruguay	24
BB	2018-03-24 22:00:00	2018-03-24 22:00:00	ALBACORE	Gulf of Guinea	1
LL	2018-03-25 04:20:00	2018-04-02 10:12:00	OULED SI MOHAND	Brazil-Uruguay	9
BB	2018-03-30 22:00:00	2018-03-30 22:00:00	ALBACORE	Gulf of Guinea	1
BB	2018-03-31 22:00:00	2018-03-31 22:00:00	ALBACORE	Gulf of Guinea	1
BB	2018-04-05 01:00:00	2018-04-10 01:00:00	ESTRELLA DALVA	Brazil-Uruguay	5
BB	2018-04-07 21:12:00	2018-04-07 22:46:00	ALBACORE	Gulf of Guinea	1
BB	2018-04-13 23:20:00	2018-04-13 23:20:00	ALBACORE	Gulf of Guinea	1
BB	2018-04-14 23:00:00	2018-04-14 23:00:00	ALBACORE	Gulf of Guinea	1
HL	2018-04-16 10:30:00	2018-04-21 18:16:00	THAVISSON III	Brazil-Uruguay	6
BB	2018-04-16 15:20:00	2018-04-16 15:20:00	ALBACORE	Gulf of Guinea	1
HL	2018-04-25 15:04:00	2018-05-15 15:49:00	TRAMSMAR I	Brazil-Uruguay	21
BB	2018-05-01 15:00:00	2018-05-10 17:55:00	KATSUSHIO MARU 8	Brazil-Uruguay	10
BB	2018-05-03 20:09:00	2018-05-03 20:09:00	ALBACORE	Gulf of Guinea	1
BB	2018-05-10 01:00:00	2018-05-16 01:00:00	ESTRELLA DALVA	Brazil-Uruguay	6
HL	2018-05-12 19:16:00	2018-05-18 23:38:00	THAVISSON III	Brazil-Uruguay	7
BB	2018-05-19 21:12:00	2018-05-19 21:21:00	ALBACORE	Gulf of Guinea	1
BB	2018-05-28 23:00:00	2018-05-28 23:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-05-29 23:00:00	2018-05-29 23:00:00	ALBACORE	Gulf of Guinea	1
BB	2018-05-30 23:00:00	2018-05-30 23:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-05-31 07:00:00	2018-05-31 11:46:00	FV HELENA DOROTHY	St Helena	1
BB	2018-05-31 23:00:00	2018-05-31 23:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-06-02 23:00:00	2018-06-02 23:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-06-04 23:00:00	2018-06-04 23:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-06-05 08:07:00	2018-06-08 09:26:00	FV AMALIA	St Helena	4

BB	2018-06-05 08:45:00	2018-06-05 14:10:00	FV HELENA DOROTHY	St Helena	1
BB	2018-06-05 21:00:00	2018-06-05 21:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-06-06 21:00:00	2018-06-06 21:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-06-07 07:00:00	2018-06-13 11:10:00	FV EXTRACTOR	St Helena	7
BB	2018-06-07 23:00:00	2018-06-07 23:00:00	EL CLASSICO	Gulf of Guinea	1
TROL	2018-06-08 08:58:00	2018-06-09 13:40:00	TXILAMON NI SON	Gulf of Guinea	2
BB	2018-06-09 22:00:00	2018-06-09 22:00:00	EL CLASSICO	Gulf of Guinea	1
HL	2018-06-10 00:05:00	2018-06-16 16:05:00	THAVISSON III	Brazil-Uruguay	7
BB	2018-06-11 22:00:00	2018-06-11 22:00:00	ALBACORE	Gulf of Guinea	1
BB	2018-06-12 09:00:00	2018-06-12 13:40:00	FV HELENA DOROTHY	St Helena	1
BB	2018-06-13 22:00:00	2018-06-13 22:00:00	ALBACORE	Gulf of Guinea	1
TROL	2018-06-14 08:14:00	2018-06-14 14:54:00	BOY	Gulf of Guinea	1
TROL	2018-06-15 07:20:00	2018-06-17 15:31:00	TXILAMON NI SON	Gulf of Guinea	3
BB	2018-06-15 08:30:00	2018-06-15 13:35:00	FV JOHN MELLIS	St Helena	1
BB	2018-06-15 23:00:00	2018-06-15 23:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-06-16 09:00:00	2018-06-23 17:23:00	ESTRELLA DALVA	Brazil-Uruguay	8
BB	2018-06-16 23:00:00	2018-06-16 23:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-06-17 22:06:00	2018-06-20 07:40:00	PONTA CALHAU	Azores	3
BB	2018-06-18 22:00:00	2018-06-18 22:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-06-20 23:00:00	2018-06-20 23:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-06-21 22:00:00	2018-06-21 22:00:00	EL CLASSICO	Gulf of Guinea	1
TROL	2018-06-26 09:52:00	2018-06-26 12:45:00	BOY	Gulf of Guinea	1
BB	2018-06-26 23:00:00	2018-06-26 23:00:00	EL CLASSICO	Gulf of Guinea	1
TROL	2018-06-27 05:00:00	2018-06-27 05:35:00	BOY	Gulf of Guinea	1
BB	2018-06-27 23:00:00	2018-07-03 23:00:00	EL CLASSICO	Gulf of Guinea	6
BB	2018-06-29 09:13:00	2018-06-29 11:05:00	FV HELENA DOROTHY	St Helena	1
TROL	2018-07-03 14:14:00	2018-07-08 19:48:00	TXILAMON NI SON	Gulf of Guinea	6

BB	2018-07-03 19:00:00	2018-07-03 19:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-07-04 20:00:00	2018-07-04 20:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-07-05 20:00:00	2018-07-05 20:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-07-06 20:00:00	2018-07-06 20:00:00	EL CLASSICO	Gulf of Guinea	1
TROL	2018-07-09 07:58:00	2018-07-09 14:57:00	BOY	Gulf of Guinea	1
BB	2018-07-09 20:00:00	2018-07-09 20:00:00	EL CLASSICO	Gulf of Guinea	1
HL	2018-07-10 11:00:00	2018-09-06 10:20:00	TRAMSMAR I	Brazil-Uruguay	58
BB	2018-07-10 21:00:00	2018-07-10 21:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-07-11 21:00:00	2018-07-11 21:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-07-16 09:00:00	2018-07-16 11:44:00	FV CATFISH	St Helena	1
TROL	2018-07-16 09:09:00	2018-07-16 12:18:00	BOY	Gulf of Guinea	1
TROL	2018-07-17 10:00:00	2018-07-24 16:52:00	TXILAMON NI SON	Gulf of Guinea	8
TROL	2018-07-19 09:06:00	2018-07-19 17:40:00	BOY	Gulf of Guinea	1
BB	2018-07-23 11:01:00	2018-07-23 13:03:00	FV CATFISH	St Helena	1
BB	2018-07-24 08:43:00	2018-07-24 10:28:00	FV CATFISH	St Helena	1
TROL	2018-07-24 09:32:00	2018-07-24 17:29:00	BOY	Gulf of Guinea	1
TROL	2018-07-26 10:30:00	2018-07-26 12:10:00	BOY	Gulf of Guinea	1
TROL	2018-07-27 10:01:00	2018-07-27 19:22:00	BOY	Gulf of Guinea	1
BB	2018-07-30 09:10:00	2018-07-30 09:42:00	FV CATFISH	St Helena	1
TROL	2018-07-30 12:01:00	2018-07-30 14:57:00	BOY	Gulf of Guinea	1
BB	2018-08-01 09:04:00	2018-08-05 07:55:00	PONTA CALHAU	Azores	4
TROL	2018-08-01 10:40:00	2018-08-01 17:11:00	BOY	Gulf of Guinea	1
TROL	2018-08-01 12:08:00	2018-08-15 17:13:00	TXILAMON NI SON	Gulf of Guinea	15
BB	2018-08-02 01:00:00	2018-08-02 01:00:00	FV SEAHORSE	St Helena	1
BB	2018-08-03 01:00:00	2018-08-03 01:00:00	FV HELENA DOROTHY	St Helena	1
TROL	2018-08-03 02:28:00	2018-08-03 16:11:00	BOY	Gulf of Guinea	1
BB	2018-08-03 03:36:00	2018-08-12 20:42:00	FV AMALIA	St Helena	10

BB	2018-08-08 09:00:00	2018-08-10 15:10:00	PONTA CALHAU	Azores	3
TROL	2018-08-15 16:36:00	2018-08-27 09:17:00	TXILAMON NI SON	Gulf of Guinea	12
BB	2018-08-22 16:10:00	2018-08-24 22:33:00	PONTA CALHAU	Azores	3
TROL	2018-08-23 08:04:00	2018-08-23 18:32:00	BOY	Gulf of Guinea	1
TROL	2018-08-28 09:06:00	2018-09-10 11:17:00	TXILAMON NI SON	Gulf of Guinea	14
TROL	2018-09-10 13:49:00	2018-09-10 17:48:00	BOY	Gulf of Guinea	1
TROL	2018-09-13 09:15:00	2018-09-13 17:25:00	BOY	Gulf of Guinea	1
TROL	2018-09-14 16:28:00	2018-10-01 17:33:00	TXILAMON NI SON	Gulf of Guinea	18
BB	2018-09-15 21:00:00	2018-09-15 21:00:00	EL CLASSICO	Gulf of Guinea	1
TROL	2018-09-16 12:05:00	2018-09-16 12:23:00	BOY	Gulf of Guinea	1
BB	2018-09-17 21:00:00	2018-09-17 21:00:00	EL CLASSICO	Gulf of Guinea	1
TROL	2018-09-19 15:35:00	2018-09-19 15:37:00	BOY	Gulf of Guinea	1
HL	2018-10-03 08:36:00	2018-10-22 15:40:00	TRAMSMAR I	Brazil-Uruguay	20
BB	2018-10-05 09:45:00	2018-10-12 09:30:00	FV AMALIA	St Helena	7
BB	2018-10-05 17:31:00	2018-10-14 20:15:00	AITA FRAXKU	Senegal	10
BB	2018-10-07 08:29:00	2018-10-13 17:30:00	NUEVO BATABANO I	Canary Islands	7
BB	2018-10-09 21:00:00	2018-10-09 21:00:00	EL CLASSICO	Gulf of Guinea	1
TROL	2018-10-11 07:49:00	2018-10-17 07:00:00	TXILAMON NI SON	Gulf of Guinea	6
BB	2018-10-13 10:45:00	2018-10-20 20:55:00	EL GRANDE PRIMERO	Canary Islands	8
TROL	2018-10-14 15:50:00	2018-10-24 11:01:00	TXILAMON NI SON	Gulf of Guinea	10
BB	2018-10-15 21:00:00	2018-10-15 21:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-10-19 10:45:00	2018-10-27 21:00:00	NUEVO BATABANO I	Canary Islands	9
BB	2018-10-21 11:05:00	2018-10-30 10:16:00	AITA FRAXKU	Senegal	10
TRAP	2018-10-23 10:30:00	2018-10-23 11:00:00	ARAGAO	Canary Islands	1
BB	2018-10-26 11:43:00	2018-10-31 11:50:00	FV AMALIA	St Helena	6
BB	2018-10-26 12:50:00	2018-11-03 07:45:00	EL GRANDE PRIMERO	Canary Islands	8
TROL	2018-10-29 16:42:00	2018-11-07 17:24:00	TXILAMON NI SON	Gulf of Guinea	10

BB	2018-11-01 21:00:00	2018-11-01 21:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-11-05 08:41:00	2018-11-05 09:21:00	FV CATFISH	St Helena	1
BB	2018-11-07 09:25:00	2018-11-13 07:45:00	FV AMALIA	St Helena	6
BB	2018-11-07 12:00:00	2018-11-07 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-11-11 08:30:00	2018-11-13 15:14:00	AITA FRAXKU	Senegal	3
BB	2018-11-13 12:00:00	2018-11-13 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-11-14 01:00:00	2018-11-14 08:15:00	EL GRANDE PRIMERO	Canary Islands	1
BB	2018-11-16 12:00:00	2018-11-16 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-11-18 10:12:00	2018-11-18 12:12:00	FV CATFISH	St Helena	1
BB	2018-11-18 12:00:00	2018-11-18 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-11-21 07:23:00	2018-11-25 09:50:00	FV AMALIA	St Helena	5
BB	2018-11-21 12:00:00	2018-11-21 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-11-22 12:00:00	2018-11-22 12:00:00	EL CLASSICO	Gulf of Guinea	1
LL	2018-11-26 10:38:00	2018-12-18 12:56:00	ALDEBARAN_1	Brazil-Uruguay	23
BB	2018-11-26 12:00:00	2018-11-26 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-11-27 12:00:00	2018-11-27 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-11-28 12:00:00	2018-11-28 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-11-29 12:00:00	2018-11-29 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-11-30 12:00:00	2018-11-30 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-01 12:00:00	2018-12-01 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-04 12:00:00	2018-12-04 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-05 12:00:00	2018-12-05 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-06 07:10:00	2018-12-06 11:30:00	FV HELENA DOROTHY	St Helena	1
BB	2018-12-06 12:00:00	2018-12-06 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-07 12:00:00	2018-12-07 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-08 12:00:00	2018-12-08 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-09 08:27:00	2018-12-16 12:13:00	FV EXTRACTOR	St Helena	8

BB	2018-12-09 08:30:00	2018-12-09 13:00:00	FV HELENA DOROTHY	St Helena	1
BB	2018-12-10 12:00:00	2018-12-10 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-12 12:00:00	2018-12-12 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-13 12:00:00	2018-12-13 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-14 12:00:00	2018-12-14 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-15 12:00:00	2018-12-15 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-16 07:27:00	2018-12-16 11:52:00	FV CATFISH	St Helena	1
BB	2018-12-16 07:30:00	2018-12-16 11:15:00	FV HELENA DOROTHY	St Helena	1
BB	2018-12-17 12:00:00	2018-12-17 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-18 12:00:00	2018-12-18 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-19 12:00:00	2018-12-19 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-21 12:00:00	2018-12-21 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-22 12:00:00	2018-12-22 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-23 12:00:00	2018-12-23 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-23 13:15:00	2018-12-23 14:21:00	FV CATFISH	St Helena	1
BB	2018-12-24 07:25:00	2018-12-24 10:00:00	FV HELENA DOROTHY	St Helena	1
BB	2018-12-25 12:00:00	2018-12-25 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-26 12:00:00	2018-12-26 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-27 12:00:00	2018-12-27 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-28 12:00:00	2018-12-28 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-29 12:00:00	2018-12-29 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-30 12:00:00	2018-12-30 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2018-12-31 12:00:00	2018-12-31 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-02 08:52:00	2019-01-02 10:37:00	FV HELENA DOROTHY	St Helena	1
BB	2019-01-03 10:42:00	2019-01-03 11:20:00	FV HELENA DOROTHY	St Helena	1
BB	2019-01-03 12:00:00	2019-01-03 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-04 10:17:00	2019-01-04 11:32:00	FV HELENA DOROTHY	St Helena	1

BB	2019-01-04 12:00:00	2019-01-04 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-05 12:00:00	2019-01-05 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-06 11:01:00	2019-01-06 12:06:00	FV CATFISH	St Helena	1
BB	2019-01-07 07:12:00	2019-01-07 11:40:00	FV HELENA DOROTHY	St Helena	1
BB	2019-01-07 12:00:00	2019-01-07 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-08 12:00:00	2019-01-08 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-09 07:36:00	2019-01-09 10:57:00	FV HELENA DOROTHY	St Helena	1
BB	2019-01-09 12:00:00	2019-01-09 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-10 08:00:00	2019-01-14 14:50:00	FV HELENA DOROTHY	St Helena	5
BB	2019-01-10 09:53:00	2019-01-10 10:48:00	FV Ocean Wave	St Helena	1
BB	2019-01-11 08:05:00	2019-01-11 11:42:00	FV HELENA DOROTHY	St Helena	1
BB	2019-01-13 10:44:00	2019-01-13 13:27:00	FV JOHN MELLIS	St Helena	1
BB	2019-01-14 12:00:00	2019-01-14 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-15 08:15:00	2019-01-15 14:45:00	FV JOHN MELLIS	St Helena	1
BB	2019-01-15 12:00:00	2019-01-15 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-16 12:00:00	2019-01-16 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-17 12:00:00	2019-01-17 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-18 12:00:00	2019-01-18 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-21 09:17:00	2019-01-21 09:54:00	FV JOHN MELLIS	St Helena	1
BB	2019-01-21 12:00:00	2019-01-21 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-23 12:00:00	2019-01-23 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-24 12:00:00	2019-01-24 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-28 13:04:00	2019-01-28 13:32:00	FV HELENA DOROTHY	St Helena	1
BB	2019-01-29 12:00:00	2019-01-29 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-29 12:15:00	2019-01-29 12:15:00	FV HELENA DOROTHY	St Helena	1
BB	2019-01-30 12:00:00	2019-01-30 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-01-30 12:21:00	2019-01-30 12:21:00	FV HELENA DOROTHY	St Helena	1

BB	2019-01-31 12:30:00	2019-01-31 12:30:00	FV HELENA DOROTHY	St Helena	1
BB	2019-02-01 08:45:00	2019-02-01 12:45:00	FV HELENA DOROTHY	St Helena	1
BB	2019-02-01 12:00:00	2019-02-01 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-02 12:00:00	2019-02-02 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-04 12:00:00	2019-02-04 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-05 12:00:00	2019-02-05 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-06 12:00:00	2019-02-06 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-07 12:00:00	2019-02-07 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-08 12:00:00	2019-02-08 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-09 12:00:00	2019-02-09 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-11 09:25:00	2019-02-11 12:32:00	FV HELENA DOROTHY	St Helena	1
BB	2019-02-11 12:00:00	2019-02-11 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-12 12:00:00	2019-02-12 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-13 12:00:00	2019-02-13 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-14 12:00:00	2019-02-14 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-15 12:00:00	2019-02-15 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-16 12:00:00	2019-02-16 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-18 12:00:00	2019-02-18 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-19 12:00:00	2019-02-19 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-19 12:00:00	2019-02-19 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-20 12:00:00	2019-02-20 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-25 12:00:00	2019-02-25 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-25 12:00:00	2019-02-25 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-26 12:00:00	2019-02-26 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-27 12:00:00	2019-02-27 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-02-28 12:00:00	2019-02-28 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-01 12:00:00	2019-03-01 12:00:00	EL CLASSICO	Gulf of Guinea	1

BB	2019-03-02 12:00:00	2019-03-02 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-03 08:45:00	2019-03-03 11:52:00	FV HELENA DOROTHY	St Helena	1
BB	2019-03-04 12:00:00	2019-03-04 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-05 12:00:00	2019-03-05 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-06 12:00:00	2019-03-06 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-07 12:00:00	2019-03-07 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-10 07:26:00	2019-03-10 12:40:00	FV JOHN MELLIS	St Helena	1
BB	2019-03-11 12:00:00	2019-03-11 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-11 15:25:00	2019-03-24 21:50:00	AITA FRAXKU	Senegal	14
BB	2019-03-12 12:00:00	2019-03-12 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-13 12:00:00	2019-03-13 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-14 12:00:00	2019-03-14 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-16 07:00:00	2019-03-19 12:27:00	FV AMALIA	St Helena	4
BB	2019-03-17 01:00:00	2019-03-17 11:30:00	FV CATFISH	St Helena	1
BB	2019-03-18 12:00:00	2019-03-18 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-19 08:52:00	2019-03-19 11:45:00	FV Ocean Wave	St Helena	1
BB	2019-03-19 12:00:00	2019-03-19 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-20 08:55:00	2019-03-20 11:18:00	FV Ocean Wave	St Helena	1
BB	2019-03-20 12:00:00	2019-03-20 12:00:00	EL CLASSICO	Gulf of Guinea	1
SPOR	2019-03-22 01:00:00	2019-03-22 01:00:00	EXILE	USA	1
BB	2019-03-24 08:15:00	2019-03-24 12:17:00	FV HELENA DOROTHY	St Helena	1
BB	2019-03-25 11:43:00	2019-03-25 12:15:00	FV HELENA DOROTHY	St Helena	1
BB	2019-03-25 12:00:00	2019-03-25 12:00:00	EL CLASSICO	Gulf of Guinea	1
HL	2019-03-25 17:26:00	2019-04-05 22:01:00	THAVISSON III	Brazil-Uruguay	12
BB	2019-03-26 12:00:00	2019-03-26 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-27 12:00:00	2019-03-27 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-28 12:00:00	2019-03-28 12:00:00	EL CLASSICO	Gulf of Guinea	1

BB	2019-03-29 12:00:00	2019-03-29 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-03-30 12:00:00	2019-03-30 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-01 04:22:00	2019-04-06 22:31:00	AITA FRAXKU	Senegal	6
BB	2019-04-01 07:53:00	2019-04-01 13:08:00	FV JOHN MELLIS	St Helena	1
BB	2019-04-01 12:00:00	2019-04-01 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-02 12:00:00	2019-04-02 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-03 12:00:00	2019-04-03 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-04 12:00:00	2019-04-04 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-05 07:10:00	2019-04-05 11:51:00	FV HELENA DOROTHY	St Helena	1
BB	2019-04-05 12:00:00	2019-04-05 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-06 12:00:00	2019-04-06 12:00:00	EL CLASSICO	Gulf of Guinea	1
SPOR	2019-04-07 01:00:00	2019-06-04 01:00:00	SLACK'D UP	USA	58
BB	2019-04-09 12:00:00	2019-04-09 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-10 01:17:00	2019-04-27 21:50:00	AITA FRAXKU	Senegal	18
BB	2019-04-10 12:00:00	2019-04-10 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-11 12:00:00	2019-04-11 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-12 07:54:00	2019-04-12 10:07:00	FV HELENA DOROTHY	St Helena	1
BB	2019-04-13 12:00:00	2019-04-13 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-16 12:00:00	2019-04-16 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-17 12:00:00	2019-04-17 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-18 12:00:00	2019-04-18 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-19 12:00:00	2019-04-19 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-20 12:00:00	2019-04-20 12:00:00	EL CLASSICO	Gulf of Guinea	1
SPOR	2019-04-25 01:00:00	2019-04-25 01:00:00	N.D.N.S.	USA	1
BB	2019-04-25 08:10:00	2019-04-25 10:04:00	FV HELENA DOROTHY	St Helena	1
BB	2019-04-25 12:00:00	2019-04-25 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-26 11:50:00	2019-04-26 12:00:00	FV HELENA DOROTHY	St Helena	1

BB	2019-04-26 12:00:00	2019-04-26 12:00:00	EL CLASSICO	Gulf of Guinea	1
SPOR	2019-04-27 01:00:00	2019-04-27 01:00:00	HIT N RUN	USA	1
BB	2019-04-27 12:00:00	2019-04-27 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-28 06:48:00	2019-04-29 12:24:00	FV CATFISH	St Helena	2
BB	2019-04-29 12:00:00	2019-04-29 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-04-30 12:00:00	2019-04-30 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-05-01 12:00:00	2019-05-01 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-05-02 12:00:00	2019-05-02 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-05-03 01:00:00	2019-05-03 11:15:00	FV Ocean Wave	St Helena	1
BB	2019-05-03 12:00:00	2019-05-03 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-05-04 12:00:00	2019-05-04 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-05-05 01:00:00	2019-05-05 14:57:00	FV Ocean Wave	St Helena	1
BB	2019-05-05 08:02:00	2019-05-05 11:49:00	FV HELENA DOROTHY	St Helena	1
HL	2019-05-06 11:17:00	2019-05-24 05:48:00	THAVISSON III	Brazil-Uruguay	18
BB	2019-05-06 12:00:00	2019-05-06 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-05-07 12:00:00	2019-05-07 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-05-08 12:00:00	2019-05-08 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-05-09 09:45:00	2019-05-09 11:30:00	FV CATFISH	St Helena	1
BB	2019-05-09 11:15:00	2019-05-09 11:19:00	FV HELENA DOROTHY	St Helena	1
BB	2019-05-09 12:00:00	2019-05-09 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-05-11 12:00:00	2019-05-11 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-05-12 01:00:00	2019-05-12 10:42:00	FV Ocean Wave	St Helena	1
BB	2019-05-12 08:34:00	2019-05-12 12:30:00	FV HELENA DOROTHY	St Helena	1
BB	2019-05-13 12:00:00	2019-05-13 12:00:00	EL CLASSICO	Gulf of Guinea	1
LL	2019-05-14 01:00:00	2019-05-14 01:00:00	BOBALOU	USA	1
BB	2019-05-14 12:00:00	2019-05-14 12:00:00	EL CLASSICO	Gulf of Guinea	1
SPOR	2019-05-15 01:00:00	2019-05-15 01:00:00	CONCHED OUT	USA	1

BB	2019-05-16 12:00:00	2019-05-16 12:00:00	EL CLASSICO	Gulf of Guinea	1
SPOR	2019-05-17 01:00:00	2019-05-17 01:00:00	IN GODS HANDS	USA	1
BB	2019-05-17 08:00:00	2019-05-17 12:00:00	FV Ocean Wave	St Helena	1
BB	2019-05-17 12:00:00	2019-05-17 12:00:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-05-19 09:20:00	2019-05-19 12:20:00	FV HELENA DOROTHY	St Helena	1
BB	2019-05-21 11:15:00	2019-05-21 13:10:00	FV Ocean Wave	St Helena	1
BB	2019-05-23 09:55:00	2019-05-23 13:56:00	FV Ocean Wave	St Helena	1
BB	2019-05-25 09:44:00	2019-05-25 09:44:00	FV Ocean Wave	St Helena	1
BB	2019-05-28 09:36:00	2019-05-28 15:59:00	FV Ocean Wave	St Helena	1
BB	2019-05-30 05:42:00	2019-05-30 12:20:00	FV HELENA DOROTHY	St Helena	1
BB	2019-06-02 08:14:00	2019-06-02 14:50:00	FV CATFISH	St Helena	1
BB	2019-06-06 08:58:00	2019-06-06 13:40:00	FV Ocean Wave	St Helena	1
BB	2019-06-08 09:19:00	2019-06-08 10:06:00	FV Ocean Wave	St Helena	1
BB	2019-06-09 09:58:00	2019-06-09 13:45:00	FV CATFISH	St Helena	1
BB	2019-06-11 16:25:00	2019-06-11 17:37:00	FV JOHN MELLIS	St Helena	1
BB	2019-06-13 08:33:00	2019-06-13 15:12:00	FV CATFISH	St Helena	1
BB	2019-06-30 08:46:00	2019-06-30 13:55:00	FV Ocean Wave	St Helena	1
BB	2019-07-06 10:05:00	2019-07-06 10:05:00	EL CLASSICO	Gulf of Guinea	1
BB	2019-07-09 09:40:00	2019-07-09 13:14:00	FV Ocean Wave	St Helena	1
BB	2019-07-11 09:05:00	2019-07-11 09:54:00	FV HELENA DOROTHY	St Helena	1
BB	2019-07-12 08:17:00	2019-07-12 12:08:00	FV HELENA DOROTHY	St Helena	1
BB	2019-07-13 14:00:00	2019-07-13 14:45:00	FV Ocean Wave	St Helena	1
BB	2019-07-19 09:54:00	2019-07-19 11:54:00	FV JOHN MELLIS	St Helena	1
BB	2019-07-19 11:05:00	2019-07-19 11:20:00	FV HELENA DOROTHY	St Helena	1
BB	2019-07-22 09:03:00	2019-07-23 10:04:00	FV HELENA DOROTHY	St Helena	2
BB	2019-07-26 09:03:00	2019-07-26 10:58:00	FV Ocean Wave	St Helena	1
BB	2019-08-02 09:35:00	2019-08-02 12:30:00	FV JOHN MELLIS	St Helena	1

BB	2019-08-05 10:08:00	2019-08-05 13:04:00	FV CATFISH	St Helena	1
BB	2019-08-12 09:01:00	2019-08-12 09:01:00	FV HELENA DOROTHY	St Helena	1
LL	2019-08-31 14:03:00	2019-09-15 10:51:00	ALDEBARAN_1	Brazil-Uruguay	15
BB	2019-09-04 04:13:00	2019-09-22 07:23:00	TRAMSMAR I	Brazil-Uruguay	19
BB	2019-09-08 09:05:00	2019-09-08 12:00:00	FV HELENA DOROTHY	St Helena	1
BB	2019-10-17 19:07:00	2019-10-18 10:29:00	FV HELENA DOROTHY	St Helena	1
BB	2019-10-24 06:55:00	2019-10-24 09:48:00	FV HELENA DOROTHY	St Helena	1
BB	2019-10-30 12:00:00	2019-10-31 11:35:00	FV HELENA DOROTHY	St Helena	1
BB	2019-11-01 07:52:00	2019-11-01 12:03:00	FV HELENA DOROTHY	St Helena	1
BB	2019-11-04 10:15:00	2019-11-04 10:31:00	FV HELENA DOROTHY	St Helena	1
BB	2019-11-13 10:21:00	2019-11-13 10:29:00	FV HELENA DOROTHY	St Helena	1
BB	2019-11-15 10:15:00	2019-11-15 11:14:00	FV HELENA DOROTHY	St Helena	1
BB	2019-11-19 05:28:00	2019-11-22 22:36:00	THAVISSON III	Brazil-Uruguay	4
BB	2019-11-19 11:40:00	2019-11-19 12:42:00	FV HELENA DOROTHY	St Helena	1
BB	2019-11-20 07:47:00	2019-11-20 10:04:00	FV HELENA DOROTHY	St Helena	1
BB	2019-11-22 08:00:00	2019-11-22 09:00:00	FV HELENA DOROTHY	St Helena	1
BB	2019-11-25 09:12:00	2019-11-25 12:24:00	FV CATFISH	St Helena	1
BB	2019-11-26 12:20:00	2019-11-26 14:04:00	FV CATFISH	St Helena	1
BB	2019-11-27 08:55:00	2019-11-27 08:55:00	FV HELENA DOROTHY	St Helena	1
BB	2019-12-02 10:03:00	2019-12-02 10:44:00	FV HELENA DOROTHY	St Helena	1
BB	2019-12-27 11:53:00	2019-12-27 11:53:00	FV HELENA DOROTHY	St Helena	1
BB	2020-01-08 08:35:00	2020-01-08 08:52:00	FV CATFISH	St Helena	1
BB	2020-01-12 01:00:00	2020-01-12 16:00:00	FV JOHN MELLIS	St Helena	1
BB	2020-01-13 10:35:00	2020-01-13 11:31:00	FV CATFISH	St Helena	1
BB	2020-01-14 08:23:00	2020-01-14 11:28:00	FV HELENA DOROTHY	St Helena	1
BB	2020-01-17 10:25:00	2020-01-17 14:39:00	FV CATFISH	St Helena	1
BB	2020-01-19 08:57:00	2020-01-19 12:48:00	FV HELENA DOROTHY	St Helena	1

BB	2020-01-20 08:38:00	2020-01-20 14:32:00	FV HELENA DOROTHY	St Helena	1
BB	2020-01-20 09:20:00	2020-01-20 14:10:00	FV CATFISH	St Helena	1
BB	2020-01-22 09:51:00	2020-01-22 12:07:00	FV HELENA DOROTHY	St Helena	1
BB	2020-01-23 08:40:00	2020-01-23 09:40:00	FV HELENA DOROTHY	St Helena	1
BB	2020-01-24 08:48:00	2020-01-24 12:18:00	FV CATFISH	St Helena	1
HL	2020-01-25 09:34:00	2020-01-30 18:11:00	THAVISSON III	Brazil-Uruguay	6
BB	2020-01-29 09:04:00	2020-01-29 12:00:00	FV HELENA DOROTHY	St Helena	1
BB	2020-01-29 09:55:00	2020-01-29 13:38:00	FV Ocean Wave	St Helena	1
BB	2020-01-30 08:53:00	2020-01-30 12:40:00	FV CATFISH	St Helena	1
BB	2020-02-01 11:09:00	2020-02-01 13:53:00	FV HELENA DOROTHY	St Helena	1
BB	2020-02-03 08:50:00	2020-02-03 11:24:00	FV HELENA DOROTHY	St Helena	1
BB	2020-02-03 10:00:00	2020-02-03 12:15:00	FV CATFISH	St Helena	1
BB	2020-02-04 08:42:00	2020-02-04 11:43:00	FV HELENA DOROTHY	St Helena	1
BB	2020-02-05 08:07:00	2020-02-05 13:02:00	FV CATFISH	St Helena	1
BB	2020-02-06 12:02:00	2020-02-06 13:20:00	FV Ocean Wave	St Helena	1
BB	2020-02-07 11:04:00	2020-02-07 13:45:00	FV HELENA DOROTHY	St Helena	1
BB	2020-02-10 09:55:00	2020-02-10 11:19:00	FV HELENA DOROTHY	St Helena	1
BB	2020-02-10 10:35:00	2020-02-10 13:40:00	FV CATFISH	St Helena	1
BB	2020-02-11 09:36:00	2020-02-11 14:05:00	FV HELENA DOROTHY	St Helena	1
BB	2020-02-12 07:48:00	2020-02-12 12:52:00	FV HELENA DOROTHY	St Helena	1
BB	2020-02-13 12:05:00	2020-02-13 13:33:00	FV CATFISH	St Helena	1
BB	2020-02-14 10:24:00	2020-02-14 10:37:00	FV CATFISH	St Helena	1
BB	2020-02-17 10:52:00	2020-02-17 11:44:00	FV HELENA DOROTHY	St Helena	1
BB	2020-02-19 08:15:00	2020-02-19 11:56:00	FV HELENA DOROTHY	St Helena	1
BB	2020-02-20 09:25:00	2020-02-20 11:00:00	FV CATFISH	St Helena	1
BB	2020-02-21 08:20:00	2020-02-21 12:47:00	FV HELENA DOROTHY	St Helena	1
BB	2020-02-24 09:15:00	2020-02-24 11:34:00	FV HELENA DOROTHY	St Helena	1

BB	2020-02-24 09:57:00	2020-02-24 12:28:00	FV CATFISH	St Helena	1
BB	2020-02-25 08:34:00	2020-02-25 12:34:00	FV HELENA DOROTHY	St Helena	1
BB	2020-02-26 07:51:00	2020-02-26 11:04:00	FV HELENA DOROTHY	St Helena	1
BB	2020-02-27 08:35:00	2020-02-27 11:58:00	FV HELENA DOROTHY	St Helena	1
BB	2020-03-05 01:00:00	2020-03-05 10:46:00	FV HELENA DOROTHY	St Helena	1
BB	2020-03-06 08:00:00	2020-03-06 11:42:00	FV HELENA DOROTHY	St Helena	1
BB	2020-03-07 08:28:00	2020-03-07 11:02:00	FV HELENA DOROTHY	St Helena	1
BB	2020-03-09 08:00:00	2020-03-09 10:43:00	FV HELENA DOROTHY	St Helena	1
BB	2020-03-10 08:01:00	2020-03-10 11:30:00	FV HELENA DOROTHY	St Helena	1
BB	2020-03-10 09:45:00	2020-03-10 13:50:00	SWORDFISH	St Helena	1
BB	2020-03-11 08:22:00	2020-03-11 11:24:00	FV HELENA DOROTHY	St Helena	1
BB	2020-03-12 08:12:00	2020-03-12 10:14:00	FV HELENA DOROTHY	St Helena	1
BB	2020-03-13 07:52:00	2020-03-13 11:43:00	FV CATFISH	St Helena	1
BB	2020-03-14 08:30:00	2020-03-14 11:41:00	FV HELENA DOROTHY	St Helena	1
BB	2020-03-14 10:58:00	2020-03-14 11:51:00	FV Ocean Wave	St Helena	1
BB	2020-03-16 09:48:00	2020-03-16 12:24:00	FV CATFISH	St Helena	1
BB	2020-03-18 08:10:00	2020-03-18 12:20:00	FV HELENA DOROTHY	St Helena	1
BB	2020-03-20 08:46:00	2020-03-20 10:30:00	FV JOHN MELLIS	St Helena	1
BB	2020-03-20 11:45:00	2020-03-20 12:10:00	KRISTINA	St Helena	1
BB	2020-03-21 09:04:00	2020-03-21 10:50:00	FV HELENA DOROTHY	St Helena	1
BB	2020-03-23 11:05:00	2020-03-23 11:05:00	KRISTINA	St Helena	1
BB	2020-03-25 10:10:00	2020-03-25 10:15:00	KRISTINA	St Helena	1
BB	2020-03-26 10:03:00	2020-03-26 10:31:00	FV HELENA DOROTHY	St Helena	1
BB	2020-03-27 08:30:00	2020-03-27 11:11:00	FV HELENA DOROTHY	St Helena	1
BB	2020-03-28 01:00:00	2020-03-28 12:30:00	FV JOHN MELLIS	St Helena	1
BB	2020-03-31 01:00:00	2020-03-31 11:30:00	FV JOHN MELLIS	St Helena	1
BB	2020-04-01 09:45:00	2020-04-01 13:59:00	FV HELENA DOROTHY	St Helena	1

BB	2020-04-03 08:42:00	2020-04-03 12:56:00	FV HELENA DOROTHY	St Helena	1
BB	2020-04-04 10:35:00	2020-04-04 14:20:00	FV Ocean Wave	St Helena	1
BB	2020-04-05 13:30:00	2020-04-05 16:20:00	KRISTINA	St Helena	1
BB	2020-04-06 07:30:00	2020-04-06 08:32:00	KRISTINA	St Helena	1
BB	2020-04-08 10:18:00	2020-04-08 11:44:00	FV JOHN MELLIS	St Helena	1
BB	2020-04-11 01:00:00	2020-04-11 11:23:00	FV Ocean Wave	St Helena	1
BB	2020-04-15 07:50:00	2020-04-15 09:55:00	KRISTINA	St Helena	1
BB	2020-04-16 01:00:00	2020-04-16 11:05:00	SWORDFISH	St Helena	1
BB	2020-04-17 09:40:00	2020-04-17 10:30:00	SWORDFISH	St Helena	1
BB	2020-06-09 01:00:00	2020-06-09 01:00:00	SWORDFISH	St Helena	1
BB	NA	NA	FV HELENA DOROTHY	St Helena	1
SPOR	NA	NA	LOW BID	USA	1
SPOR	NA	NA	39SEEVEE	USA	1
SPOR	NA	NA	42CUSTOM	USA	1
SPOR	NA	NA	ANGLER	USA	1
SPOR	NA	NA	FISHING FRENZY	USA	1
SPOR	NA	NA	FISHWHISTLE	USA	1
SPOR	NA	NA	HERO	USA	1
SPOR	NA	NA	KILLIN TIME II	USA	1
SPOR	NA	NA	PATRIOT	USA	1
SPOR	NA	NA	PIPE DREAMER	USA	1
SPOR	NA	NA	RESTLESS	USA	1
SPOR	NA	NA	RESTLESS KID	USA	1
LL	NA	NA	SHADY LADY	USA	1
SPOR	NA	NA	SLAP HAPPY	USA	1
LL	NA	NA	WHITEWATER	USA	1

LL	NA	NA	SHOWBOAT	USA	1
SPOR	NA	NA	MADATET FISHING	USA	1
LL	NA	NA	KIM THONH	USA	1
SPOR	NA	NA	FIN-ALLY	USA	1
SPOR	NA	NA	WHODAT	USA	1
SPOR	NA	NA	KNOT REEL	USA	1
SPOR	NA	NA	DIRTY HOOKER	USA	1
LL	NA	NA	SEABOUND	USA	1
SPOR	NA	NA	REBEL	USA	1
SPOR	NA	NA	BLUE SEA II	USA	1
SPOR	NA	NA	207 NÂ°6	USA	1
SPOR	23/07/2018	23/07/2018	CANYON RUNNER	USA	1
SPOR	25/06/2019	29/06/2019	CANYON RUNNER	USA	5
SPOR	30/06/2019	30/06/2019	CANYON RUNNER	USA	1
SPOR	02/07/2019	02/07/2019	CANYON RUNNER	USA	1
SPOR	03/07/2019	03/07/2019	CANYON RUNNER	USA	1
SPOR	05/07/2019	05/07/2019	CANYON RUNNER	USA	1
SPOR	06/07/2019	06/07/2019	CANYON RUNNER	USA	1
SPOR	12/07/2019	12/07/2019	CANYON RUNNER	USA	1
SPOR	13/07/2019	13/07/2019	CANYON RUNNER	USA	1
SPOR	22/06/2019	02/07/2019	BLUERUNNER	USA	11
SPOR	09/07/2019	21/07/2019	BLUERUNNER	USA	13
LL	15/07/2019	21/07/2019	F/V MONICA	USA	7
LL	07/08/2019	15/08/2019	F/V MONICA	USA	9
LL	10/09/2019	17/09/2019	F/V MONICA	USA	8
LL	09/10/2019	20/10/2019	F/V MONICA	USA	12
LL	05/11/2019	14/11/2019	F/V MONICA	USA	10
LL	22/11/2020	29/11/2020	F/V MONICA	USA	8
SPOR	01/08/2019	03/08/2019	TORO	USA	3

SPOR	17/08/2019	01/09/2019	TORO	USA	16
SPOR	16/09/2019	16/09/2019	TORO	USA	1
SPOR	25/07/2020	26/07/2020	TORO	USA	2
SPOR	12/08/2020	13/08/2020	TORO	USA	2
SPOR	06/09/2020	06/09/2020	TORO	USA	1
SPOR	25/09/2020	26/09/2020	TORO	USA	2
LL	12/08/2019	16/08/2019	FRANCES ANNE	USA	5
LL	23/11/2020	27/11/2020	FRANCES ANNE	USA	5
LL	09/09/2019	15/09/2019	FRANCES ANNE	USA	7
LL	07/10/2019	08/10/2019	FRANCES ANNE	USA	2
LL	15/10/2019	15/10/2019	FRANCES ANNE	USA	1
LL	06/11/2019	07/11/2019	FRANCES ANNE	USA	2
LL	12/11/2019	15/11/2019	FRANCES ANNE	USA	4
LL	05/07/2020	05/07/2020	FRANCES ANNE	USA	1
LL	31/07/2020	31/07/2020	FRANCES ANNE	USA	1
LL	31/10/2020	01/11/2020	FRANCES ANNE	USA	2
SPOR	16/01/2019	17/01/2019	KERRY-D	USA	2
SPOR	08/05/2019	08/05/2019	KERRY-D	USA	1
SPOR	27/05/2019	27/05/2019	KERRY-D	USA	1
SPOR	29/05/2019	29/05/2019	KERRY-D	USA	1
SPOR	31/05/2019	31/05/2019	KERRY-D	USA	1
SPOR	03/06/2019	03/06/2019	KERRY-D	USA	1
SPOR	01/07/2019	08/07/2019	KERRY-D	USA	8
SPOR	04/09/2019	16/09/2019	KERRY-D	USA	13
SPOR	11/10/2019	16/10/2019	KERRY-D	USA	6
SPOR	03/11/2019	27/11/2019	KERRY-D	USA	25
SPOR	12/12/2019	22/12/2019	KERRY-D	USA	11
SPOR	26/01/2019	26/01/2019	KERRY-D	USA	1
SPOR	29/12/2019	29/12/2019	KERRY-D	USA	1
SPOR	05/01/2020	05/01/2020	KERRY-D	USA	1
SPOR	09/02/2020	09/02/2020	KERRY-D	USA	1

SPOR	29/02/2020	29/02/2020	KERRY-D	USA	1
SPOR	30/04/2020	30/04/2020	KERRY-D	USA	1
SPOR	13/05/2020	18/05/2020	KERRY-D	USA	6
SPOR	16/02/2019	16/02/2019	KERRY-D	USA	1
SPOR	27/02/2019	27/02/2019	KERRY-D	USA	1
SPOR	08/03/2019	08/03/2019	KERRY-D	USA	1
SPOR	25/03/2019	26/03/2019	KERRY-D	USA	2
SPOR	31/03/2019	31/03/2019	KERRY-D	USA	1
SPOR	04/04/2019	09/04/2019	KERRY-D	USA	6
SPOR	13/04/2019	13/04/2019	KERRY-D	USA	1

APPENDIX 3. NUMBERS OF FISH TAGGED AND RELEASED BY AOTTP AND PARTNERS BY EXCLUSIVE ECONOMIC ZONE.

Exclusive Economic Zones	BET	LTA	SKJ	WAH	YFT
Bahamas	0	0	23	0	0
Bermudian	2	0	10	0	89
Brazilian	2611	309	15918	70	7443
Cameroonian	0	3	0	0	0
Canadian	2	0	0	0	0
Cape Verdean	2637	4	1267	0	470
Cayman Islands	0	0	1	0	1
Disputed Western Sahara/Mauritania	1	0	10	0	0
Equatorial Guinean	0	334	55	6	455
Gabonese	0	94	3	0	6
Ghanaian	10	0	8	0	140
Grenadian	0	0	3	0	0
Guadeloupean	0	0	0	0	14
Guinea Bissau	162	62	78	0	590
Guinean	527	49	659	0	1083
Ivory Coast	448	3296	1336	67	8296
Liberian	179	0	112	0	335
Mauritanian	984	0	2984	0	1227
Nigerian	0	2	1	0	3
Portuguese	0	77	0	0	0
Portuguese (Azores)	175	1	2257	0	3
Portuguese (Madeira)	1148	0	2243	0	1
Puerto Rican	0	0	0	0	3
Sao Tome and Principe	12	3067	799	97	2045
Senegalese	1603	356	1913	1	2218
Sierra Leonian	299	0	69	0	114
South African	0	0	108	0	87
Spanish (Canary Islands)	4295	0	6944	0	66
St. Helena	114	2	1091	40	4309
United States	108	0	51	0	611
Uruguayan	5	0	0	0	18
Virgin Islander	0	0	0	0	29
Western Saharan	38	0	20	0	1

APPENDIX 4. NUMBERS OF FISH RECOVERED AND REPORTED BY AOTTP AND PARTNERS BY EXCLUSIVE ECONOMIC ZONE.

Exclusive Economic Zones	BET	LTA	SKJ	WAH	YFT
Angolan	1	0	1	0	3
Ascension	2	0	0	0	0
Beninese	2	0	8	0	15
Bermudian	0	0	0	0	2
Brazilian	49	2	134	1	292
Cape Verdean	496	6	182	0	199
Gabonese	0	0	2	0	13
Gambian	1	0	4	0	6
Ghanaian	24	6	32	0	106
Guinea Bissau	38	12	19	0	123
Guinean	190	31	189	0	550
High Seas	1763	15	543	0	2458
Ivory Coast	32	429	89	1	1725
Liberian	29	0	21	0	76
Mauritanian	824	26	1145	0	913
Moroccan	7	0	1	0	0
Nigeria - Sao Tome and Principe Joint	0	0	1	0	0
Nigerian	0	0	0	0	1
Portuguese (Azores)	109	0	65	0	2
Portuguese (Madeira)	206	0	41	0	0
Sao Tome and Principe	0	13	3	0	10
Senegalese	232	95	440	0	425
Sierra Leonian	119	12	76	0	295
South African	0	0	0	0	6
Spanish	1	0	0	0	0
Spanish (Canary Islands)	644	0	283	0	7
St. Helena	0	0	42	0	949
Togolese	0	0	0	0	1
United States	0	0	0	0	4

APPENDIX 5. LOG-FRAME INTERNAL MONITORING TOOL.

Item	Intervention Logic	Objectively verifiable indicators of achievement	Sources and means of verification	Assumptions	Comments
Overall objective	To contribute to food security & economic growth of the developing Atlantic coastal states by ensuring sustainable management of tropical tuna resources in the Atlantic Ocean	-Budget income generated for coastal states in relation to tuna resources is increased	Budget of coastal states	Contracting parties follow the scientific advice when adopting conservation and management measures Compliance with Conservation and Management Measures by all contracting parties of ICCAT Eradication of IUU fishing	*'These will be assessed at the end of the program'*
		-Values of exports of tuna products is maintained or increased	Trade statistics		
		-Share of fish products in protein inputs is maintained or increased	FAO statistics		
		-The values of B/BMSY are kept over 1 and the values of F/FMSY are kept below 1 according to ICCAT management objectives	SCRS reports		

Specific objective	To provide evidence based scientific advice to developing coastal states, and other Contracting Parties, to support the adoption of effective Conservation and Management Measures (CMMs) in the framework of the International Commission for the Conservation of Atlantic Tunas (ICCAT)	*Qualitative objectives*: The accuracy in the estimation of reference points is increased and the uncertainty in the formulation of scientific advice is reduced. The probability to achieve the management objectives is increased. *Quantitative objectives*: Science-based advice and management measures on the following elements are produced, e.g. TACs, Reference Points and Harvest Control Rules for main tropical tuna species. Spatial management measures such as time-area closures. FAD moratorium and/or management plans. Development of indicators for neritic tunas	Commission Reports SCRS documents and/or peer-reviewed scientific journals SCRS reports ICCAT Performance review report Management Strategy Evaluation (MSE)	Results of the AOTTP are used by SCRS Adoption of CMMs by ICCAT based on scientific advice from the SCRS Progress reports on Management Strategy Evaluation (MSE) implemented by ICCAT	*'There is much interest from the SCRS in the AOTTP data and many analyses have been done, see References below'.*

Expected results	Result 1. Tag-recapture and associated data for the 3 main tropical tuna species in the Atlantic, as well as on neritic species, are stored in a database at the ICCAT Secretariat.	Number of tagged tunas: a minimum of 120,000 tunas tagged Reporting rates: A minimum reporting rate by gear within the range of those obtained in similar tuna tagging programmes (e.g. Purse seine fleets>80%)	AOTTP reports (PMU reports, Cruise Reports, etc.) SCRS report AOTTP/ICCAT databases	Access to bait and tuna fishing grounds. Availability of logbook data (in compliance with applicable confidentiality rules) to link recoveries to fishing vessel activities. Cooperation and collaboration of coastal countries and stakeholders.	*119416 fish tagged and released, 17072 recovered. All data stored in ICCAT databases. West African TROs using log-book data routinely. Reporting Rates for purse seine fleet: 77.5% BET, 82% SKJ, 73% YFT.*
	Result 2. Key parameters supporting stock assessments are estimated on the basis of data collected through the programme and integrated stock assessments of yellowfin, bigeye and skipjack are available.	Biological parameters are made available to the SCRS by the end of the programme, and integrated stock assessments are undertaken for the three species of tropical tunas. Indicators are developed for neritic tunas.	Analyses reports and publications. SCRS documents and SCRS reports. Publications in peer-reviewed journals. AOTTP Reports	A sufficient quantity of good quality data (tag, recapture) has been collected.	*Estimates of growth, mortality, selectivity and stock structure have been made, see Final Symposium and AOTTP Special Issue in Fisheries Research*

Expected results (continued)	Result 3. Scientists from developing Contracting Parties of ICCAT are trained in tagging, data collection and tagging data/stock assessment analyses.	Tagging techniques: 20 scientists/technicians from developing ICCAT States are trained on board the tagging vessels Data collection and sampling at recovery: 30 scientists/technicians from developing coastal States trained in data collection and sampling at recovery Tagging data analysis and interpretation: 80 participants from developing coastal States to workshops	AOTTP reports (PMU reports, Cruise reports) Workshop reports	Cooperation and collaboration of coastal countries.	*50+ scientists/ technicians from developing countries trained on board tagging vessels. 40 trained in data collection and sampling at recovery. 150+ cruise reports. Otolith workshops. Tagging data analyses and interpretation workshops organized.*

APPENDIX 6. INDICATIVE LIST OF INDICATORS 1

Indicator name	Unit		Baseline	Current	End target
Overall objective: contribution of the programme might not be seen before the end of the programme as these objectives are long-term					*'These indicators should be followed on the long-term to be significant'.*
Export value of tuna product: Cote d'Ivoire	M€	Value	115	NA	
		Date	Average 2008-2012	2019	
		Comments			
Export value of tuna product: Senegal	M€	Value	15.9	NA	
		Date	Average 2008-2012	NA	
		Comments			
Export value of tuna product: Ghana	M€	Value	102.2	NA	
		Date	Average 2008-2012	NA	
		Comments			
Specific objectives				NA	
Specific Management Measures adopted for YFT	Number	Value	3	NA	
		Date	2014	NA	
		Comments	1.TAC:110,000t; 2. Time-area closure for FAD/LOG fishing; 3. FAD management plan		
Specific Management Measures adopted for BET	Number	Value	5	NA	
		Date	2014	NA	
		Comments	1.Effort & capacity limits; 2. TAC: 85,000t; 3. Catch limits and quotas; 4. Time-area closure for FAD/LOG fishing; 5. FAD management plan.		
Specific Management Measures adopted for SKJ	Number	Value	2	NA	
Uncertainty around reference points B/B_{MSY} & F/F_{MSY} for YFT	Number	Value	B/B_{MSY}: 0.85 (0.61-1.12) F/F_{MSY}: 0.87 (0.68-1.40) Median (10th-90th percentiles)	B/B_{MSY}: 0.95 (0.71-1.36) F/F_{MSY}: 0.77 (0.53-1.95) Median (10th-90th percentiles)	Reduce 'cloud' of uncertainty around the Kobe phase plot by x%
		Date	2011	2016	2022 (next assessment)
		Comments	While it is not possible to estimate the reduction of uncertainty that could be brought by tagging data improvements in our knowledge on biological parameter, stock structure and movements will improve the estimate of reference points.		

Appendix 6. Indicative List of Indicators (cont.).

Indicator name	Unit		Baseline	Current	End target
Uncertainty around reference points B/B_{MSY} & F/F_{MSY} for YFT	Number	Value	B/B_{MSY}: 0.85 (0.61-1.12) F/F_{MSY}: 0.87 (0.68-1.40) Median (10th-90th percentiles)	B/B_{MSY}: 0.95 (0.71-1.36) F/F_{MSY}: 0.77 (0.53-1.95) Median (10th-90th percentiles)	Reduce 'cloud' of uncertainty around the Kobe phase plot by x%
		Date	2011	2016	2022 (next assessment)
		Comments	While it is not possible to estimate the reduction of uncertainty that could be brought by tagging data improvements in our knowledge on biological parameter, stock structure and movements will improve the estimate of reference points.		
Uncertainty around reference points B/B_{MSY} & F/F_{MSY} for BET	Number	Value	B/B_{MSY}: 1.01 (0.72-1.34) F/F_{MSY}: 0.95 (0.65-1.55) Median (10th-90th percentiles) Production model (Logistic) results represent median and 80% confidence limits	B/B_{MSY}: 0.67 (0.48-1.2) F/F_{MSY}: 1.28 (0.62-1.85 Median (10th-90th percentiles)	Reduce 'cloud' of uncertainty around the Kobe phase plot by x%
		Date	2010	2015	2018 (next assessment in 2021)
		Comments	While it is not possible to estimate the reduction of the uncertainty that could be brought by tagging data improvements in our knowledge on biological parameters stock structure and movement will improve the estimation of reference points.		
Uncertainty around reference points B/B_{MSY} & F/F_{MSY} for SKJ	Number	Value	B/B_{MSY}: likely > 1 (E stock) / probably close to 1.3 (W stock) F/F_{MSY}: likely < 1 (E stock) / probably close to 0.7 (W stock).	B/B_{MSY}: likely > 1 (E stock) / probably close to 1.3 (W stock) F/F_{MSY}: likely < 1 (E stock) / probably close to 0.7 (W stock).	Reduce 'cloud' of uncertainty around the Kobe phase plot by x%
		Date	2014	2014	2020 (next assessment possibly in 2022)
		Comments	While it is not possible to estimate the reduction of the uncertainty that could be brought by tagging data improvements in our knowledge on biological parameters stock structure and movements will improve the estimate of reference points.		

Appendix 6. Indicative List of Indicators (cont.).

Indicator name	Unit		Baseline	Current	End target
Tagged tropical tuna (YFT, BET, SKJ) in the ICCAT database	Number	Value	72066	184408	182066 (assuming 10000 neritic tuna)
		Date	2015-04-01	2021-02-28	
		Comments	Historic plus AOTTP. This includes tuna tagged during previous ICCAT programmes in the Atlantic Ocean as well as data from some other tagging activities.		
Recovered tagged tuna (YFT, BET, SKJ) in the ICCAT database	Number	Value	11177	27602	~22117 (assuming 10% recovery, AOTTP attained ~14%)
		Date	2015-04-01	2021-02-28	
		Comments	Historic plus AOTTP. This includes tuna tagged during previous ICCAT programmes in the Atlantic Ocean as well as data from some other tagging activities		
Tagged small tuna in the ICCAT database	Number	Value	0	8113	10000
		Date	2015-04-01	2021-02-28	
		Comments	Historic plus AOTTP. No small tuna have been tagged in the Atlantic thus far. Note: Small Tunas Species Group opted to tag only LTA and WAH during AOTTP		
Recovered tagged small tuna in the ICCAT database	Number	Value	0	587	1000 (Target assumes recovery rate of 10%)
		Date	2015-04-01	2021-02-28	
		Comments	No small tuna were tagged in the Atlantic Ocean before AOTTP		
Unbiased and accurate tag reporting	%	Value	Bias in tag recovery data > 65%	NA	<50%
		Date	2015	2021	
		Comments	Baseline estimated for the Pacific Ocean (Leroy et al., 2015). In 1st year identify bias and error by sampling strata in tag recovery date, position and vessel identification, and species identification and size (length and weight). Actions implemented by the AOTTP to reduce the bias in record information.		

Appendix 6. Indicative List of Indicators (cont.).

Indicator name	Unit		Baseline	Current	End target
Purse-seine Reporting rate	%	Value	Unknown	69% (BET), 77% (SKJ) 68% (YFT)	80%
		Date	2015	2021	
		Comments			
Number of hard part readings in ICCAT database	Number	Value	0	1310	1000
		Date	2015-04-01	2021-02-28	
		Comments	Assuming 10% recovery for chemically tagged fish		
Number of tagging data analyses on tropical tunas tagged during the AOTTP	Number	Value	0	17	
		Date	2015-04-01	2021-02-28	
		Comments	Manuscript drafts sent by CISEF and VIMs consortia, although many more submitted to SCRS Working Groups, etc.		
Trained scientists/technicians in tagging techniques in developing ICCAT CPCs	Number	Value	0	>50	More than 50 Scientists/Technicians from developing country CPCs were trained in tagging techniques and participate in at least 50 months tagging activities
		Date	2015	2021-02-28	
		Comments			

APPENDIX 7. LOG-FRAME ACTIVITIES

Activities	What are the key activities to be carried out to produce the expected results? Group the activities by result and number them as follows	Means: What are the means required to implement these activities, e.g. staff, equipment training, studies, supplies, operational facilities etc.	What are the sources of information on action progress costs? What are the action costs? How are they classified? Breakdown in the Budget for the Action	What preconditions must be met before the action starts? What conditions outside the Beneficiary's direct control have to be met for the implementation of the planned activities?
Indicative activities for Result 1: Mark-recapture and associated data for the three main tropical tuna species in the Atlantic, as well as on neritic species are stored in a database at the Secretariat.				
	A1.1 – Tagging of tunas	-Fishing vessels will be hired for a total period of 1800 tagging days over 30 months -Tagging teams will be deployed on board the hired vessels -Tags (conventional, chemical, electronic, sonic) and tagging equipment will be procured.	-Number of tuna tagged and released -Number of tagging campaigns AOTTP reports (PMU reports, Cruise reports) Costs: Hiring costs of the tagging vessels (including crew, diesel, travels, port costs, maintenance, etc.) - subcontracted Tags and equipment procurement costs	Programme staff will have to be recruited before the start of activities. Tenders for the vessels and the tagging teams prepared and published, and contracts drawn with the selected service providers. Access to bait and tuna fishing grounds from Atlantic coastal states will need to be secured. This has already been initiated at the level of the Commission but will need to be confirmed before the start of activities.
	A1.2 – Awareness campaigns and recovery schemes	-Awareness and publicity campaigns will be designed and implemented in Atlantic coastal states and distant water fishing nations. -Awareness and publicity campaigns will	-Number of countries with publicity campaigns -Reporting rates AOTTP reports (PMU reports)	Publicity and Tag Recovery Coordinator will have to be recruited before the start of this activity. Good knowledge of the local context will be necessary to develop well designed campaigns adapted to the different countries.

		target fishermen and crew, stevedores and other fishing fleet service providers, processors and workers etc. -Reward scheme will be designed and developed for the different target groups.		
	A1.3- Recovery of tags and transmission to ICCAT Secretariat	-Tag Recovery Officers (TRO) teams will be deployed in strategic ports to collect recovery data. -A large network of counterparts will be developed to ensure recovery data collection and transmission to ICCAT -Quantity of the recovery data on board purse seiners is assessed thanks to tag-seeding operations: in 1st year identify bias and error by sampling strata in tag recovery data, position and vessel identification, and species identification and size (length and weight)	Numbers of TROs deployed and counterparts Number of recoveries AOTTP reports (PMU reports) Tag seeding operations on PS fleets Costs: Salary costs for TROs teams in Ghana, Cote d'Ivoire and Senegal – subcontracted Costs associated to the deployment of TRO teams in Ghana, Cote d'Ivoire and Senegal (offices, vehicles, equipment etc.).	-Service providers for the TROs teams will have to be selected through competitive tenders. -Collaboration from coastal states will be necessary in order to select and nominate counterparts in order to establish an effective network. -Collaboration from fishermen, stevedores, processing factories' workers in returning recaptured tags -Collaboration with the fishing industry will need to be secured, in particular with the purse-seine fleets where detailed logbook data will need to be accessed to recover tag-recovery data (date & locations).
Indicative activities for Result 2: Key parameters supporting stock assessments are estimated on the basis of data collected through the				

programme and would be integrated in the stock assessments of yellowfin, bigeye, and skipjack.				
	A2.1-Reading of hard parts	-Hard parts (otolith, vertebrae, spines) will be sampled on recovered tunas -Reading of the hard parts will be undertaken by specialists	Number of readings of hard parts AOTTP reports (PMU reports). Costs: costs associated with reading of hard parts (salaries, equipment, etc.)	Sufficient numbers of tagged fish will be have to be recovered and sampled for hard parts.
	A2.3-Information of stakeholders	-An international Symposium will be organized towards the end of AOTTP in order to present and publicize the results of the AOTTP and the analyses of the tagging data.	Number of participants and presentations to the Symposium AOTTP reports (PMU reports) Costs Costs: related to the organisation of the Symposium (travel for participants, presenters, conference room, logistics, etc.)	Sufficient number of tagging data analyses will have to be undertaken prior to the venue of the Symposium.
	A3.1-Training in tagging techniques and data collection	-Scientists from developing ICCAT CPCs will be invited and trained to participate in tagging activities on board the tagging vessels.	Number of Scientists trained on board the tagging vessels NUmber of fish tagged by scientists from developing ICCAT member States AOTTP reports (PMU reports, Cruise reports) Costs Cost associated to the deployment of scientists/technicians from ICCAT developing member States (travel, at-sea allowance).	Collaboration from developing ICCAT member States will have to be secure to nominate and select scientists/technicians to be trained.
	A3.2-Data collection and sampling at recovery	-TRO teams and other counterparts will be trained in recovery data collection and sampling protocols to ensure the good quality of the data	Number of TROs and counterparts trained. AOTTP reports (PMU reports) Costs: travel costs for the Publicity and Tag Recovery Coordinator to train TROs in the field.	Sevice providers for the TRO teams will have to be selected through competitive tenders. Collaboration from coastal States will be necessary in order to select and nominate counterparts to be trained.

	A3.3-Training in data analysis	-Dedicated workshops will be organized to reinforce the capacity of ICCAT developing member States in data analyses, interpretation of the scientific results and development of the scientific advice.	Number of workshops held. Number of participants to the workshops AOTTP reports (PMU reports) Costs: cost associated with the organisation of the workshops (travels for participants and presenters, meeting room, logistics, etc.).	Collaboration from coastal States will be necessary in order to select and nominate workshop participants.

APPENDIX 8. FINAL SYMPOSIUM AGENDA

Experience, Results and Lessons Learnt from Oceanic Tuna Tagging Campaigns: the AOTTP in Context.

12 to 14 January 2021 12:00 noon to 16:30 every day ▪ Online

Agenda

Day 1 - 12th January 2021

(Note: R=12 minute regular 'conference' talk; L=5 minute 'lightning' talk)

Opening Session	
Camille Manel & Doug Beare	Introduction/housekeeping
Veronika Veits	EU Keynote (Delivering fisheries sustainability and economic development through better science)
Monsieur Alioune NDOYE	Senegal Keynote
Miguel Herrera	Industry Keynote (AOTTP: A view from the purse seine industry)
David Die	Scientist Keynote (AOTTP: an example of actionable science)
Doug Beare	AOTTP Video
Doug Beare	Questions
Theme Session 1 - Age and Growth (Constance Diaha & Guelson da Silva)	Ageing tropical tunas is notoriously difficult and limited information on age and growth exists, particularly for the Atlantic Ocean. Knowledge of age, longevity and growth are particularly important in stock status evaluations and much of the current uncertainty in the assessments is related to basic biological information. The AOTTP has now provided an important dataset on the age and growth of tropical tuna derived from traditional tag-recapture data, electronic internal/archival tagging, chemical tagging and direct ageing of otoliths and spines. The objective for this session will be to describe and discuss the contribution in general of tag-recapture data and specifically the update of the growth models for tropical tunas, aiming to improve the accuracy of stock assessments and the overall management in these fisheries resources in the Atlantic Ocean.
DIOUF, Khady	Détermination de l'âge des thons tropicaux dans l'Océan Atlantique à partir des microstructures des otolithes.
Ahissi, N'gouan Venance	Rapport final AOTTP de Côte d'ivoire.
Diaha, N'Guessan Constance	Relation nombre de jour après marquage nombre d'incrément déposé.
Krusic-Golub, Kyne	Results on AOTTP validation of otolith increment deposition rates in yellowfin and bigeye tuna in the Atlantic.
Agnissan, Apo Roseline	Etude comparée de la détermination de l'âge du poisson à partir de l'otolithe, l'épine et la vertèbre de *Thunnus albacares* débarqué au port de pêche d'Abidjan.

	Break
Waterhouse, Lynn	Improving Age Composition Estimates: Evaluating a Bayesian Method for Estimating Ages from Spines with Vascularized Cores.
Hoenig, John	Updated Growth Curves for Atlantic Ocean Tropical Tuna Species (Skipjack, Yellowfin, and Bigeye).
Sadio, Nfally Sadia Petit	Méthodes de comptage des incréments journaliers et annuels des coupes transversales et longitudinales des otolithes marqués à l'oxytétracycline (OTC)
Silva, Guelson	Trophic relationships revealed by dart tags found in the stomachs of large pelagic fishes in the Atlantic Ocean.
Crespo, Osman	Cookie-cutter shark *Isistius* sp. parasitism at different ontogenetic stages of the yellowfin tuna *Thunnus albacares* from the southwestern Atlantic Ocean.
Constance Diaha & Guelson da Silva	*Discussion – Age and Growth.*
	Close for the day

Day 2 - 13th January 2021

Theme Session 2 - Tagging and Spatial Dynamics (Serena Wright and Stewart Norman).	AOTTP and partners have tagged *ca* 120,000 fish with conventional tags and nearly 600 with electronic tags (both pop-ups and internal/archival tags). Electronic tags collect information on light-intensity, temperature and depth, from which the location of the fish can be inferred and habitat preferences gauged. This session will, therefore, focus on how the information on fish movement gleaned from both conventional and electronic tags can be used to update our knowledge of mixing rates and stock structures, important for stock assessments and management.
Chifflet, Marina	Characterization of the thermic habitat of yellowfin and bigeye tunas in the Atlantic Ocean.
Pascual Alayón, Pedro José	Migration patterns and residence of bigeye tuna (*Thunnus obesus*) in North Atlantic Ocean, based on recent tagging, recapture data and historical data from Canary Islands, Madeira y Azores.
TALL, Salimata	Mémoire de fin d'études/Etude de la migration et de la structure en taille du stock de thonine *Euthynnus alletteratus* en Atlantique centre-est à partir des données de marquage et de recapture.
Arregi, Igor	Methods for estimating geographic movements using conventional tags (population migration rates) and electronic tags (tracks).
Goñi, Nicolas	Migration patterns of skipjack tunas in the tropical Atlantic, described through tag attrition models based on historical and recent tag and recapture data.
García Villar, Jesús	AOTTP ha muerto, !larga vida a AOTTP!
Pascual Alayón, Pedro J.	Tuna tagging surveys on fishing vessels, effects and consequences of the handling process.

Hobbs, Rhys	Site fidelity of yellowfin tuna in the central South Atlantic Ocean.
BA, Kamarel	Studying the displacements and the size structure of the tropical tuna species (bigeye, skipjack and yellowfin) between the Senegalese and adjacent waters.
Onando, Iñigo	On the dialogue between knowledge backgrounds involved in tagging programs.
	Break
Serena Wright & Stewart Norman	*Discussion – Tagging & Spatial Dynamics*
Theme Session 3 – Mortality & Abundance (Fambaye N'Gom & Modou Thiaw).	Natural mortality (M) is one of the most influential quantities in fisheries stock assessment as it relates directly to the productivity of the stock and the estimation of sustainable yields. Typically, M is estimated through indirect means, but it can, be estimated with greater precision using tag-recapture data. AOTTP is providing a new source of information from which to derive direct estimates of natural mortality and abundance for the three main tropical tuna species, which will improve stock assessments and management advice. Auxiliary quantities tightly linked to the estimation of mortality and abundance (i.e., tag reporting, tag shedding, tag mixing, tag induced mortality) will also be discussed.
THIAW, Modou	Estimating Mortality from Mean Length Data of the little tunny, *Euthynnus alletteratus*, exploited in the Senegalese waters, 1981-2017.
Gaertner, Daniel	Tag-shedding estimates for tropical tuna species in the Atlantic Ocean from AOTTP data
Akia, Sosthene Alban Valeryn	Effects of release conditions on recovery rates of tagged tropical tunas during the AOTTP.
(Fambaye N'Gom & Modou Thiaw).	*Discussion – Mortality and Abundance.*
	Close for the day

Day 3 - 14th January 2021

Theme Session 4 – Stock assessment and Management (Shannon Cass-Calay & Fabio Hazin)	Stock Assessment and Management. A main objective of the AOTTP is that it will provide information capable of reducing uncertainty in population assessments that will lead to improved management advice and decisions towards a more sustainable exploitation of the fisheries resources. In the case of Atlantic tropical tunas, the main fishery for these species is a truly multispecies fisheries with major catches on FADs. This feature has important consequences for management, the SCRS has started a Management Strategy Evaluation (MSE) process for Atlantic Tropical tunas that will address the multispecies issue. This session will explore the AOTTP data that can provide basic information and stock/fisheries interactions for the development of the operating models for the MSE. The session will also provide an opportunity to examine the role of tag-recapture data in assessing the general impact of FADs on tropical tuna fisheries and whether the FAD related measures originally intended to protect juveniles of yellow fin and bigeye tunas, has been effective.

Cheatle, Jenny	From Science to Compliance
Norelli, Alexandra	Modeling the small-scale spatial distribution and movement of tropical tuna in the central eastern Atlantic.
Perez, Ilan	Past and current dFADs fishing moratoria in Eastern Atlantic ocean: what can aottp data tell about the current dFAD moratorium efficiency for the conservation of juvenile tunas and about alternate protected time-areas.
Kell, Laurence	Animal Telemetry and Ecosystem Based Fisheries Management.
Fonteneau, Alain	Movement patterns shown by the recoveries of tunas tagged with dart tags in various areas of the Atlantic.
Ben, Galuardi	Transition Matrices from AOTTP Bigeye Tuna
Ailloud, Lisa Elma	Determining an appropriate tag mixing period for fish tagged during the AOTTP.
Perez, Ilan	A proposal for correcting the misreporting of seamount associated schools in the schooltype variable of the AOTTP database
Wright, Serena	Yellowfin tuna vertical behaviour and catchability in the South Atlantic.
Fonteneau, Alain	Detailed overview of apparent movements of tunas tagged in 15 tagging areas in the Atlantic.
Akia, Sosthene Alban Valeryn	Estimation of tag-reporting rates for yellowfin, bigeye and skipjack tunas from tag-seeding experiments conducted during the AOTTP.
YAO, Akpatou Lydiane	Analyse de l'impact de la plateforme de marquage sur le taux de recapture des especes de thons tropicaux marques dans la Zone Economique Exclusive ivoirienne.
	Break
Shannon Cass-Calay & Fabio Hazin	*Discussion – Stock Assessment and Management.*
Final Discussion - Lessons learned. (Justin Monin Amande & Craig Brown).	***Lessons learned from large scale tagging programs (DISCUSSION SESSION).*** The objective of this discussion will be to explore the relative successes and failures of the AOTTP in the context of other oceanic tag-recapture programmes, capacity building and stakeholder engagement. The session will cover all aspects of the project and how to assure the continuation of recoveries and other pertinent data after the formal end of the AOTTP. It will also discuss improving the planning and coordination of such projects for future programs. The discussion can address, for example, coordination of AOTTP by the ICCAT Secretariat, experimental design, tagging at sea, recovery of tags, data-collection and transmission, tagging protocols, the awareness-raising and incentive schemes, communication, tag-seeding work, use of volunteers such as observers and recreational fishers, the chemical tagging and hard-part reading, capacity building, training, the collection of biological samples, and data analyses.
	Close of Symposium

APPENDIX 9. ATTENDEES TO THE AOTTP FINAL ONLINE SYMPOSIUM.

LIST OF PARTICIPANTS/LISTE DES PARTICIPANTS/LISTA DE PARTICIPANTES

Symposium of the Atlantic Ocean Tropical tuna Tagging programme (AOTTP)
(ON-LINE 12 – 14 January 2021)
Symposium du Programme de marquage des thonidés tropicaux dans l'océan Atlantique (AOTTP)
(RÉUNION EN LIGNE 12 – 14 janviere 2021)
Simposio del Programa de marcado de túnidos tropicales en el océano Atlántico (AOTTP)
(ONLINE 12 – 14 enero de 2021)

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APPENDIX 10. LIST OF ICCAT-EU GRANT AGREEMENTS SIGNED SINCE 2009.

	Programme 1
Title of the operation	Grant agreement for co-financing the "Atlantic Wide Research Programme for Bluefin Tuna" Phase 1
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets International Affairs, Law of the Sea and regional Fisheries Organisations
Year of award and duration of the operation	2009
Value of the grant, contract or loan	€ 600,000.00
	Programme 2
Title of the operation	Grant agreement for co-financing the "Atlantic Wide Research Programme for Bluefin Tuna" Phase 2
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets International Affairs, Law of the Sea and regional Fisheries Organisations
Year of award and duration of the operation	2010
Value of the grant, contract or loan	€ 2,000,000.00

	Programme 3
Title of the operation	Grant agreement for the action "Extraordinary Meeting of the Compliance Committee of ICCAT" and "Meeting of the ICCAT Working Group on Integrated Monitoring Measures"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets International Affairs, Law of the Sea and regional Fisheries Organisations
Year of award and duration of the operation	2010
Value of the grant, contract or loan	€ 67,020.90
	Programme 4
Title of the operation	Contract for the action "Capacity Building in Developing Countries"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets International Affairs, Law of the Sea and regional Fisheries Organisations
Year of award and duration of the operation	2010
Value of the grant, contract or loan	€ 80,000.00
	Programme 5

Title of the operation	Grant agreement for co-financing the "Meeting of the joint tuna RFMOs workshop on science" and "Meeting of the joint tuna RFMOs workshop on monitoring, control and surveillance measures"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets International Affairs, Law of the Sea and regional Fisheries Organisations
Year of award and duration of the operation	2010
Value of the grant, contract or loan	€ 107,864.29
	Programme 6
Title of the operation	Agreement for the ICCAT action: "22th Regular Meeting of ICCAT"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets International Affairs, Law of the Sea and regional Fisheries Organisations
Year of award and duration of the operation	2011
Value of the grant, contract or loan	€ 398,492.00
	Programme 7

Title of the operation	Grant Agreement for the ICCAT action: "Capacity Building for developing ICCAT Contracting Parties"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets The Director
Year of award and duration of the operation	2011
Value of the grant, contract or loan	€ 90,000.00
	Programme 8
Title of the operation	Grant agreement for co-financing the "Atlantic Wide Research Programme for Bluefin Tuna" Phase 3
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets International Affairs, Law of the Sea and regional Fisheries Organisations
Year of award and duration of the operation	2012
Value of the grant, contract or loan	€ 1,425,000.00
	Programme 9
Title of the operation	Agreement for the ICCAT action: "18th Special Meeting of ICCAT"

Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets International Affairs, Law of the Sea and regional Fisheries Organisations
Year of award and duration of the operation	2012
Value of the grant, contract or loan	€ 200,000.00
	Programme 10
Title of the operation	Agreement for the ICCAT action: "Implementation of the electronic Bluefin catch document (eBCD)"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets International Affairs and Markets
Year of award and duration of the operation	2012
Value of the grant, contract or loan	€ 90,000.00
	Programme 11
Title of the operation	Grant agreement for co-financing the "Atlantic Wide Research Programme for Bluefin Tuna" Phase 4 including extension

Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets
Year of award and duration of the operation	2013-2014
Value of the grant, contract or loan	€ 2,000,000.00
	Programme 12
Title of the operation	Agreement for the ICCAT action SI2.672142 – Feasibility study for the development of an Atlantic Tuna tagging Programme
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets
Year of award and duration of the operation	2013
Value of the grant, contract or loan	€ 99,986.00
	Programme 13
Title of the operation	Agreement for the ICCAT action SI2.687329 – 19th Special Meeting of ICCAT
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries

	International Affairs and markets
Year of award and duration of the operation	2014
Value of the grant, contract or loan	€ 706,552.98
	Programme 14
Title of the operation	Agreement for the ICCAT action SI2.702514 – Atlantic Wide Research Programme for Bluefin Tuna phase V
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets
Year of award and duration of the operation	2015
Value of the grant, contract or loan	€ 1,700,000.00
	Programme 15
Title of the operation	Grant Agreement for the ICCAT action SI2.710030 – 24th Regular Meeting of the Commission
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets
Year of award and duration of the operation	2015

Value of the grant, contract or loan	€ 644,525.39
	Programme 16
Title of the operation	Grant Agreement for the ICCAT action SI2.711871 – Capacity Development Funds
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets
Year of award and duration of the operation	2015
Value of the grant, contract or loan	€ 57,000.00
	Programme 17
Title of the operation	Grant Contract – External Actions of the European Union – DCI-FOOD/2015/361-161: Evidence based approach for sustainable management of tuna resources in the Atlantic – Atlantic Ocean Tuna Tagging Programme (AOTTP)
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for International Cooperation and Development - EuropeAid
Year of award and duration of the operation	2015. 60 Months
Value of the grant, contract or loan	€13,480,000.00
	Programme 18
Title of the operation	Agreement for the ICCAT action SI2.727749 - Atlantic Wide Research Programme for Bluefin Tuna Phase VI

Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets
Year of award and duration of the operation	2016 (until February 2017)
Value of the grant, contract or loan	€ 1,700,000.00
	Programme 19
Title of the operation	Agreement for the ICCAT action SI2.728538 – ICCAT Second Performance Review of ICCAT
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets
Year of award and duration of the operation	2016 (until February 2017)
Value of the grant, contract or loan	€ 160,000.00
	Programme 20
Title of the operation	Grant Agreement for the ICCAT action SI2.734636 – ICCAT - Capacity development funds
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries

	International Affairs and markets
Year of award and duration of the operation	2016 (12 months - until June 2017)
Value of the grant, contract or loan	€ 70,000.00
	Programme 21
Title of the operation	Grant Agreement for the ICCAT action SI2.736774 – ICCAT – 20th Special Meeting of the Commission
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets
Year of award and duration of the operation	2016 (1st February 2016 – 31st January 2017)
Value of the grant, contract or loan	€ 575,814.74
	Programme 22
Title of the operation	Grant Agreement SI2.743497 " ICCAT – Tuna Regional Fisheries Management Organizations – Joint FAD Working Group"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Affairs and markets
Year of award and duration of the operation	12 months (1st December 2016 – 30th November 2017)
Value of the grant, contract or loan	€ 80,000.00

	Programme 23
Title of the operation	Agreement for the ICCAT action SI2.752957- Atlantic Wide Research Programme for Bluefin Tuna Phase VII
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries
Year of award and duration of the operation	2017 (until February 2018)
Value of the grant, contract or loan	€ 1,447,188.00
	Programme 24
Title of the operation	Agreement for the ICCAT action SI2.755308: ICCAT-Development of software necessary for the treatment of Ghana statistics as regards tropical tunas
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries
Year of award and duration of the operation	2017 (until December 2018)
Value of the grant, contract or loan	€ 35,300.00
	Programme 25
Title of the operation	Agreement for the ICCAT action SI2.761564: ICCAT-Capacity Development Funds

Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries
Year of award and duration of the operation	2017 (until July 2018)
Value of the grant, contract or loan	€ 160,000.00
	Programme 26
Title of the operation	Agreement for the ICCAT action SI2.777629: ICCAT-Atlantic-Wide Research Programme for Bluefin Tuna Phase 8
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries
Year of award and duration of the operation	2018 (until February 2019)
Value of the grant, contract or loan	€ 1,400,000.00
	Programme 27
Title of the operation	Agreement for the ICCAT action SI2.778285: ICCAT-Strengthening the scientific basis for decision-making in ICCAT
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries

Year of award and duration of the operation	2018 (until January 2019)
Value of the grant, contract or loan	€ 642,000.00
	Programme 28
Title of the operation	Agreement for the ICCAT action SI2.778929 – ICCAT-Evolution of the electronic Bluefin tuna Catch Document (eBCD) system
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries
Year of award and duration of the operation	2018
Value of the grant, contract or loan	€ 100,000.00
	Programme 29
Title of the operation	Agreement for the ICCAT action SI2.782186: ICCAT-Meeting of the Compliance Committee (COC) and 21st Special Meeting of the Commission
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries
Year of award and duration of the operation	2018 (until February 2019)
Value of the grant, contract or loan	€ 536,918.45

	Programme 30
Title of the operation	Agreement for the ICCAT action SI2.782203: ICCAT-2018 ICCAT Panel 1 Intersessional Meeting
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries
Year of award and duration of the operation	2018
Value of the grant, contract or loan	€ 73,100.71
	Programme 31
Title of the operation	Grant agreement for the ICCAT action SI2.788892: "ICCAT-Capacity development funds"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries Unit B2: Regional Fisheries Management Organisations
Year of award and duration of the operation	2018
Value of the grant, contract or loan	€ 160,000.00
	Programme 32
Title of the operation	Grant agreement for the ICCAT action SI2.795824: "ICCAT-Atlantic-Wide Research Programme for Bluefin Tuna Phase 9 (GBYP9)"

Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries Unit B2: Regional Fisheries Management Organisations
Year of award and duration of the operation	2018
Value of the grant, contract or loan	€ 1,400,000.00
	Programme 33
Title of the operation	Grant agreement for the ICCAT action SI2.796102: "ICCAT-Tuna Regional Fisheries Management Organisations (t-RFMOs) – Joint working group on sharks management"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries Unit B2: Regional Fisheries Management Organisations
Year of award and duration of the operation	2018
Value of the grant, contract or loan	€ 200,000.00
	Programme 34
Title of the operation	Grant agreement for the ICCAT action SI2.796428: "ICCAT-Strengthening the scientific basis for decision-making in ICCAT"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries Unit B2: Regional Fisheries Management Organisations

Year of award and duration of the operation	2018
Value of the grant, contract or loan	€ 638,050.00
	Programme 35
Title of the operation	Grant agreement for the ICCAT action SI2.812052: "ICCAT-Intersessional Meeting of Panel 1 and 26th Regular Meeting of the Commission-Mallorca 2019"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries Unit B2: Regional Fisheries Management Organisations
Year of award and duration of the operation	2019
Value of the grant, contract or loan	€ 670,000.00
	Programme 36
Title of the operation	Grant agreement for the ICCAT action SI2.819104: "ICCAT-Capacity Development Fund"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries Unit B2: Regional Fisheries Management Organisations
Year of award and duration of the operation	2019
Value of the grant, contract or loan	€ 200,000.00

	Programme 37
Title of the operation	Grant agreement for the ICCAT action SI2.819116: "ICCAT-Strengthening the scientific basis on tuna ande tuna-like species for decision-making in ICCAT"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries Unit B2: Regional Fisheries Management Organisations
Year of award and duration of the operation	2019
Value of the grant, contract or loan	€ 850,000.00
	Programme 38
Title of the operation	Grant agreement for the ICCAT action SI2.819120: "ICCAT-Atlantic-Wide Research Programme for Bluefin Tuna Phase 10 (GBYP10)"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries Unit B2: Regional Fisheries Management Organisations
Year of award and duration of the operation	2019
Value of the grant, contract or loan	€ 1,600,000.00
	Programme 39
Title of the operation	Grant agreement for the ICCAT action SI2.839201: "ICCAT-Atlantic-Wide Research Programme for the Bluefin Tuna Phase 11 (GBYP11)"

Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries Unit B2: Regional Fisheries Management Organisations
Year of award and duration of the operation	2020 - 1st of January to the 31st of December 2021
Value of the grant, contract or loan	€ 1,600,000.00
	Programme 40
Title of the operation	Grant agreement for the ICCAT action SI2.839159: "ICCAT-Strengthening the scientific basis on tuna and tuna-like species for decision-making in ICCAT"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries Unit B2: Regional Fisheries Management Organisations
Year of award and duration of the operation	2020 - 1st of January to the 31st of December 2021
Value of the grant, contract or loan	€ 860,230.00
	Programme 41
Title of the operation	Grant agreement for the ICCAT action SI2.839492: "ICCAT - 2021 Intersessional Meeting of Panel 4, Meeting of the IMM Working Group and Online Meeting of the IMM, Panel 1 and 2"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries

	Unit B2: Regional Fisheries Management Organisations
Year of award and duration of the operation	2020 - 1st of January to the 31st of December 2021
Value of the grant, contract or loan	€ 375,000.00
	Programme 42
Title of the operation	Grant agreement for the ICCAT action SI2.839494: "ICCAT-Extending the IOMS User's support functionality with the development of the dynamic help system"
Union Programme concerned	
Union Institution or Body/Agency which took the award decision	EUROPEAN COMMISSION. Directorate-General for Maritime Affairs and Fisheries International Ocean Governance and Sustainable Fisheries Unit B2: Regional Fisheries Management Organisations
Year of award and duration of the operation	2020 - 1st of January to the 31st of December 2021
Value of the grant, contract or loan	€ 125,000.00

APPENDIX 11. DESIGN AND EXPLOITATION OF THE AOTTP TAGGING DATABASE.

OBJECTIVE

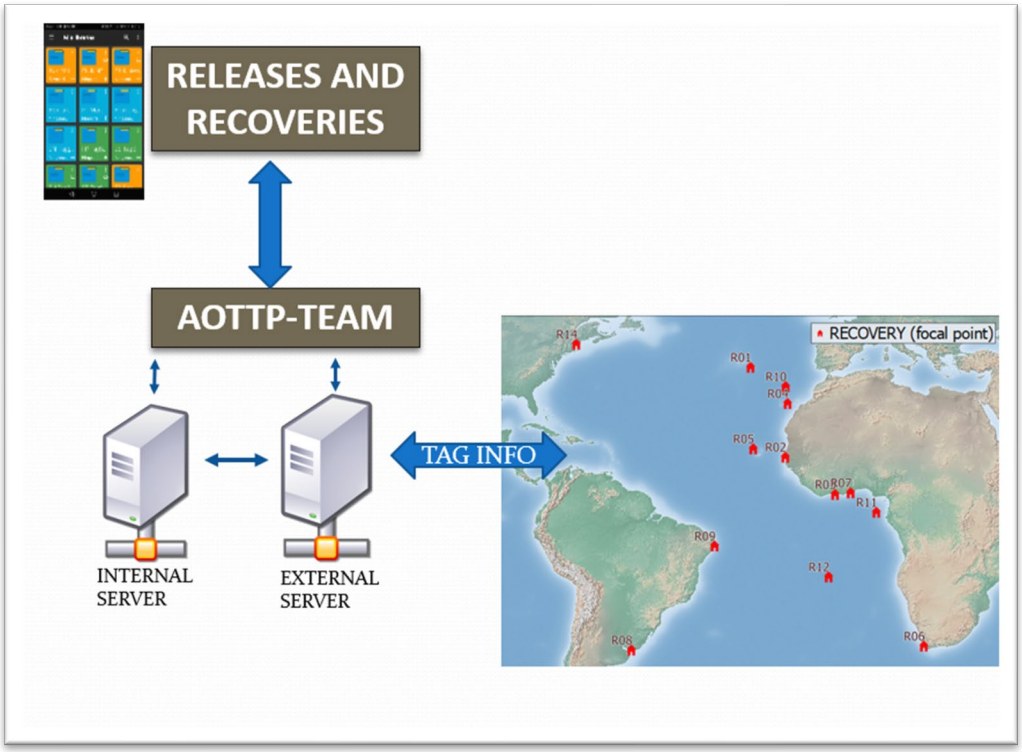
The purpose of this document is to describe the whole process from entering data or data quality control to exploitation or sharing of data aiming the analysis.

The initial goal was to design a system that is capable of storing all the information quickly and consistently so that it could be analyzed by multiple users. We had over 30 tagging teams and 14 recovery offices sending information simultaneously and it was imperative to get the data quickly, upload them and know their accuracy, consistency and completeness.

INFRASTRUCTURE DESIGNER

AOTTP Coordination developed a system for recording and sending data to ICCAT Secretariat based on smartphones with the Memento App installed, https://mementodatabase.com/. Users could enter data directly into the phone and then send them directly to ICCAT via a messaging App.

For the project, two servers were used, one for internal use only with access restrictions to authorized personnel and with security and backup systems; a second server served to run applications for the exchange of information with the teams.



General scheme of the infrastructure.

As for the loading file system, the following encoding system was designed: For each tagging equipment was assigned (prefix "E") and recovery offices (prefix "R"). They were also assigned two dates: the first corresponded to the template creation date and the second the receipt date in AOTTP. Examples:

- E01_20160630_20160715: Releases file. Template created on June 30, 2016 and shipped on July 15, 2016.
- E02_20160915_20161020: File with Dakar recoveries. Template created on September 15, 2016 and submitted the recoveries until October 20, 2016.

In this way, we have encoded each file sent by the teams in chronological order.

For file storage, the following directory system was designed:

ORIGINALES *(folder with the original files.)*

RELEASES

E01: files of tagging to team E01

RECOVERIES

R01: *Files of recoveries team Azores*

R02: *Files of recoveries team Senegal*

(**R03**, **R04**,…, **R14**). F*olders to load original files of recoveries*.

FINALES *(folder with the final files reviewed and fixed to load into database.)*

RELEASES

E01: *files of tagging to team E01*

RECOVERIES

R01: *Files of recoveries team Azores*

R02: *Files of recoveries team Senegal*

(**R03**, **R04**,…, **R14**). Files of recoveries team (rest of the teams).

SOFTWARE

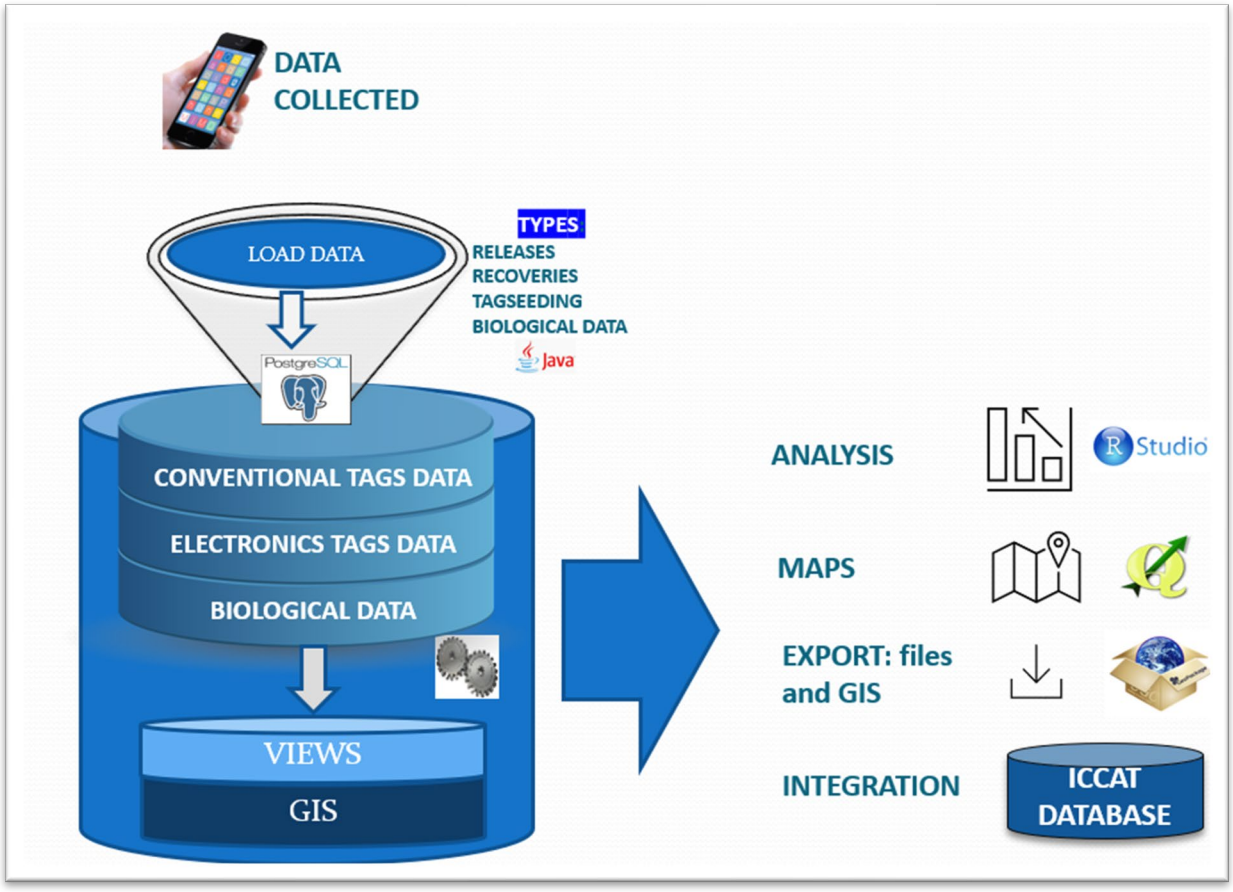
Since the start of the project, the following free software were been used:

- Linux mint as operating system. Linux mint is a community-driven Linux distribution based on Ubuntu which itself is based on Debian, and bundled with a variety of free and open-source applications
- PostgreSQL as database as open-source object-relational database system.
- PostGIS as extension of postgreSQL to geographical analyst into database
- R software mainly used for statistical analysis.
- Qgis as spatial representation and processing. Is a free and open-source cross-platform desktop geographic information system (GIS) application that supports viewing, editing, and analysis of geospatial data.

Free software used into project: Linux, postgreSQL, PostGIS, R and Qgis.

TASKS PERFORMED

A key part of the project was related to data management. From data collection, reviews, data uploading and subsequent analysis for decision making. To perform these tasks, have been designed load applications, created specific servers, developed functions for data quality control, and generated tools for internal analysis or visualization of results on maps, charts, cartographic viewers or dashboards.



General scheme of AOTTP data management

DATABASE

Based on the ICCAT tagging database on MS SQL, which has been migrated to PostgreSQL and the following analyses were performed:

- Analysis of the requirements or identification of the purpose of AOTTP
- Organization of data in tables
- Specifying primary keys and analyzing relationships
- Normalization to standardize tables

Numerous schemes were created for the storage of electronic data, GIS data or main tables. Thus, the information was better organized, allowing better and easier management.

There are currently 112 tables and 114 views. Throughout the project, about a hundred internal functions were designed that control data.

Throughout the project new features have been added according to the needs of the project, such as new tables for biological data control.

MOBILE APPLICATION FOR DATA UPLOAD AND SENT

At the beginning of the project, a mobile application for loading data on-site was designed, i.e. both taggers and recovers could load data from deployed or recovered tags. It was then expanded for the collection of tag seeding data. The purpose was to minimize errors by creating an App that closed lists of internal codes and controls.

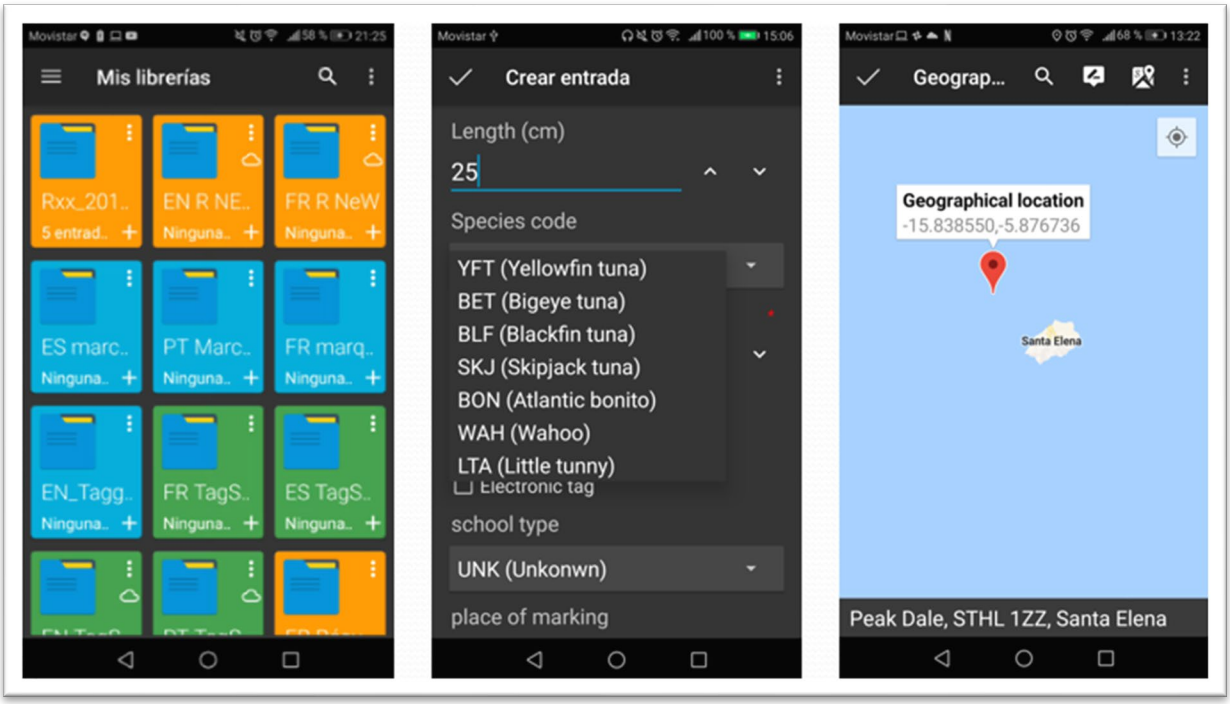
To do this, we have chosen the Google play application "memento database" http://mementodatabase.com/ with the following features: Flexibility for the design, synchronization, import and export of uploaded files, cloud storage and security.

This application allows users to generate database applications from menus and export their design in templates (.templates) to be sent to third parties. To be able to install these templates it is necessary to install the application from google play https://play.google.com/store/apps/details?id=com.luckydroid.droidbase and import the designed template.

There were pros and cons to the system. Data submission to ICCAT was potentially rapid but some difficulties were found, such as: difficult to use the phones at sea due to weather, boat movement, and the suns' glare. Data entry mistakes could occur easily, and it proved essential that (during tagging) data to be 'backed up', either by voice or written down recording.

Three main templates have been designed for this purpose. Template for tagging, recoveries and tag-seeding.

For each of the templates have been generated in four languages: English, French, Spanish and Portuguese.



Screens shots of App created to load data.

Communication with colleagues around the Atlantic was maintained using the Telegram (similar to WhatsApp) App which allowed continuous communication and exchange of information between ICCAT-AOTTP Coordination. System helped avoid coding mistakes and facilitated correction of data by allowing rapid feedback between AOTTP Coordination and the TROs.

In addition, translation documents, auxiliary tables and demonstrative videos were generated to assist in installation and handling of the App.

APPLICATION FOR LOADING DATA INTO THE DATABASE

The main purpose of the App was to load the original data, sent through the Memento App or other files to the Postgresql database and once loaded control the files loaded by computer and date.

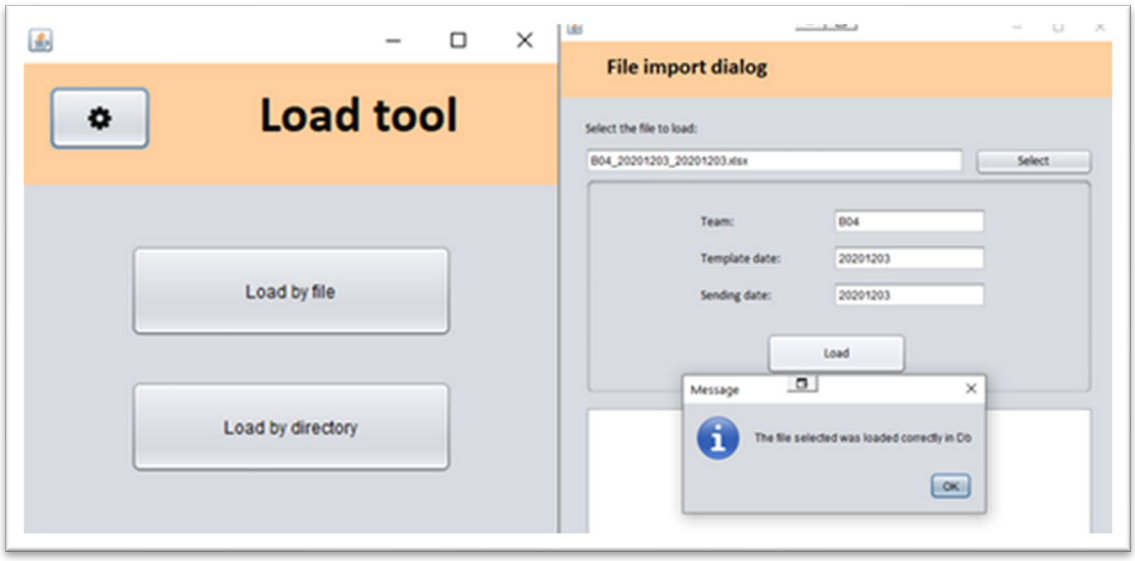
Once the original data is reviewed and adapted to the upload schema, the App performs the following tasks:

- Reading the original data
- Data validation
- Database integration
- Verification

Currently, the application loads four types of data: TAGGING, RECOVERY, TAG-SEEDING and BIOLOGICAL CONTROL.

The loading application has been developed using the Java 8 language with the Netbeans 8.1 IDE. Application lifecycle management is done with Maven. The Apache POI framework is used to read excel files.

The development of the application has been done in a flexible way to make it easier to include new fields in the upload file, that in this way are processed by the Appli with very few modifications in the code; It does not need installation (you only need to run the .jar), it is multi-user and allows adjustment of connection parameters.



Screen shots of the designed application to loading files into database.

QUALITY CONTROLS

One of the main tasks carried out considering the quantity and diversity of sources of information, has been the quality control of the data. To do this, tools were designed that allow to know if there are duplications, localization errors or inconsistencies such as recovery dates prior to those of marking tagging or negative growth values.

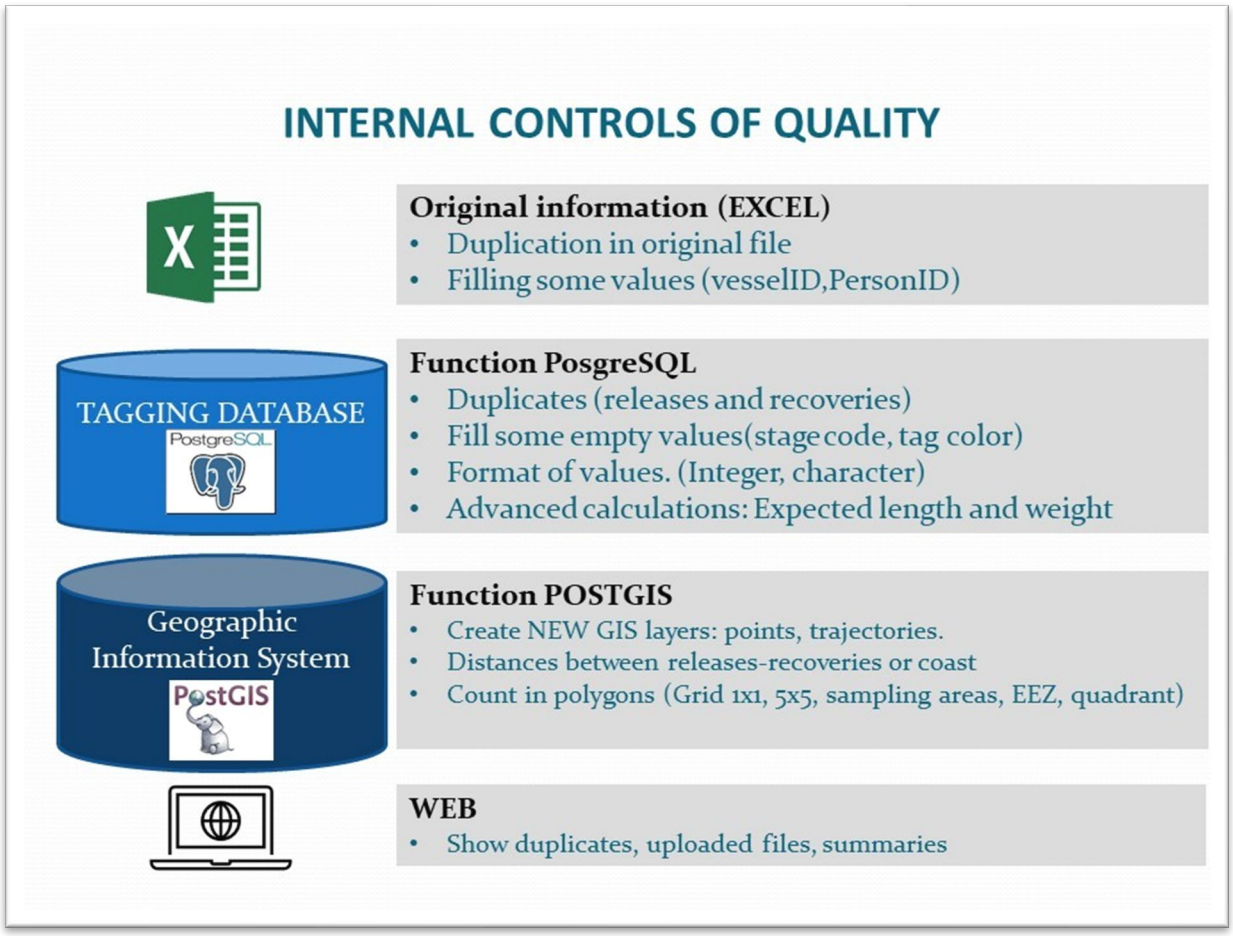
Some problems encountered where: duplicated (releases and recoveries), empty values, locations on land, increments of length disproportionate, date recoveries before releases or dates out of the campaign period.

INTERNAL CONTROLS OF QUALITY CARRY OUT BY AOTTP

The following are a series of internal controls performed for data quality control:

- **Original information**: first revision. Once the corresponding teams submit the information, a first review is required before uploading it to the database. Basically, these controls allow us to correct some values that have not been entered by teams.

- **PostgreSQL** functions: These tools can fill or calculate values automatically when the data is updated. Functions have been created to control duplications, fill in empty values (eg. vesselid or taggerid).
- **PostGIS functions**: PostGIS contains specific functions to work with geographical components (points defined with latitude and longitude). New GIS layers have been created such as apparent paths, release points, or recoveries from coordinates or new values such as distances at coast.
- **Web Page (internal)**: Display a whole series of summaries quickly as well as query individual data for a tag.
- **Web Page (external)**: Have created only for personal of TROs. They allow to consult if a tag has been deployed, has been previously recovered (false information) or if it is double tag. Offices can make on-site decisions such as paying rewards or requesting more information about the reported tag.



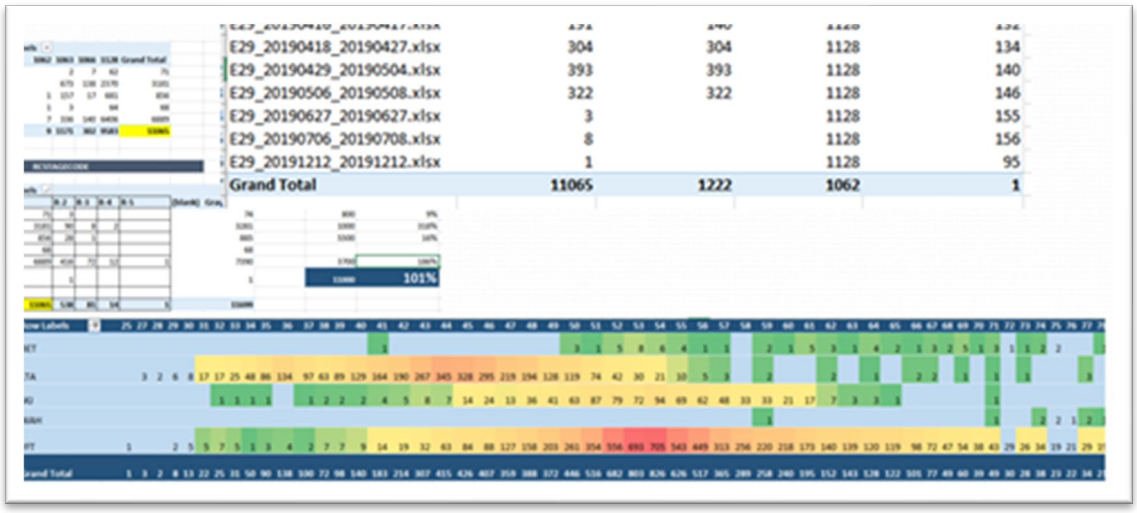
Internal controls of quality

EXTERNAL CONTROLS WITH RELEASES TEAMS

External controls with tagging teams consisted of a double review of the implemented tags and a check that the contract objectives were being met, such as species distribution or geographical scope.

These checks were carried out as follows: once the release file was uploaded to the database, a summary of all the data sent by the team was generated containing a list of errors to be corrected, size and species distribution and objectives with regard to percentages per species indicated in the contract.

For example, if an area operated with multiple vessels, AOTTP unified the information from all of the vessels and generated summary and general reports that were shared with them. In this way, they could easily analyze duplicates or the distribution of sizes/species with the purpose of achieving the objectives.



External controls of quality.

CONTROLS WITH RECOVERIES TEAMS

The process of reviewing the recovery files implied exchanging information quickly between TROs and AOTTP coordination.

It is important to know the data quickly so that we can consult the data source, that is, the people who have entered the data in the mobile Appl and, that we can correct it quickly if needed.

This task of quality control and analysis correcting small issues has been continuous throughout the project and has been the work of all participants, from AOTTP team to taggers and recoverers.

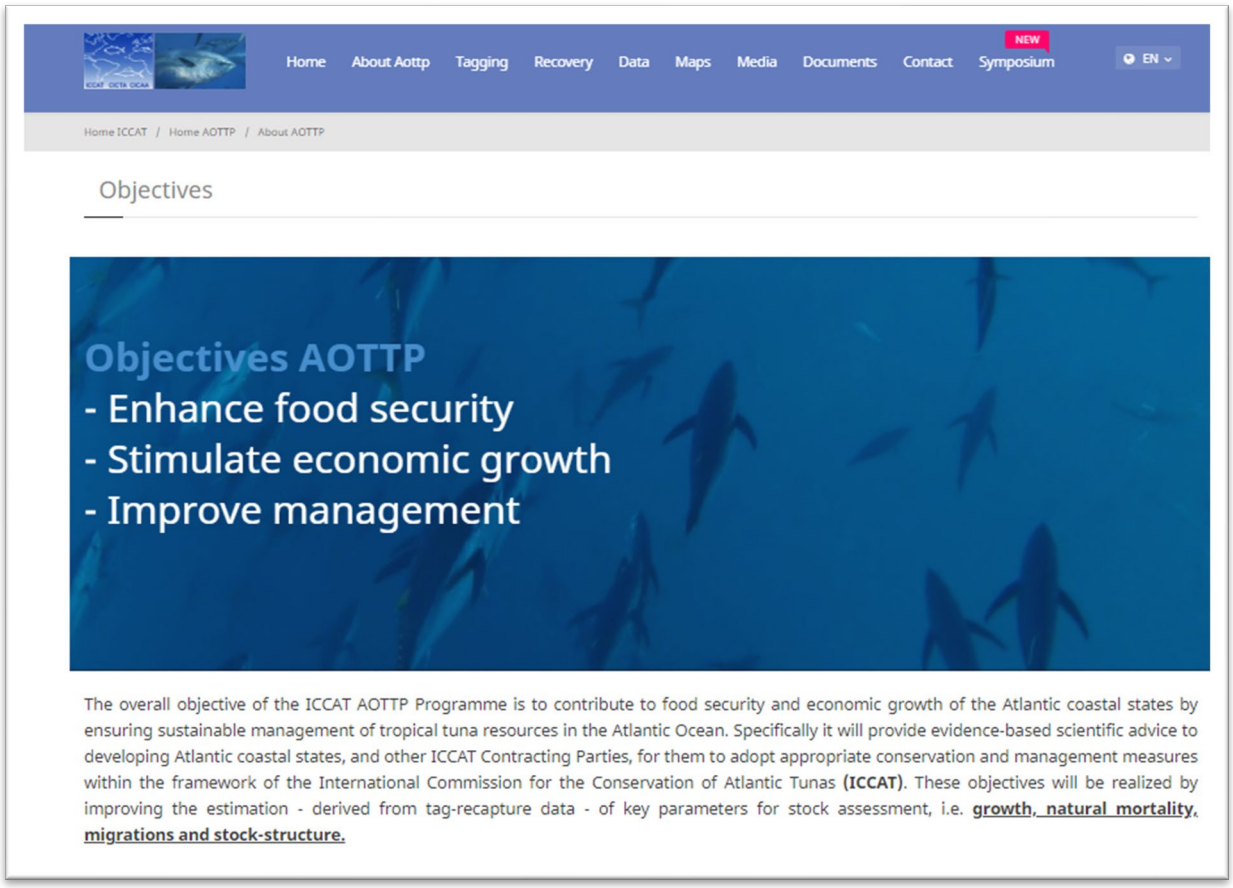
Other performed task to improve data quality related to visits the TROs. In December 2019 and early 2020 we visited the offices of Ghana, Ivory Coast and Senegal. The objective was to review the data provided by each office, analyze and solve on-site the problems detected by AOTTP, as well as digitize all the information obtained (trademark and tab record books). Other objectives were to improve the protocols or operational functioning of some aspects related to recovery. The result was a substantial improvement in the data quality, ensuring the accuracy of the data collected and reported.

TASKS PERFORMED FOR VISIBILITY OF AOTTP PROJECT

AOTTP WEBSITE EMBEDDED INTO ICCAT WEBSITE

One of the tasks in terms of visibility was the creation of a static webpage for AOTTP. A webpage containing general information, tagging data, recoveries, document download or a complete list of TROs for tags recovery was created.

The website is integrated within the ICCAT website and can be found at the following link: https://www.iccat.int/aottp/en/



AOTTP website home page

EXTERNAL WEBSITE TO CONTROL TAGS FROM TROS

The objective of this website is to provide all users with all relevant information of the programme and facilitate access to relevant information to the different teams involved. The latter includes providing access to the teams involved on tag recovery, who can track all the released tags enabling their status to be quickly ascertained. It was important, for

example, that the TROs knew if a tag had been deployed and whether it had been recovered before. In addition, the tagging teams can review the species, size, or date of deployment and compare it with the data provided by the fisherman. On some occasions, these discrepancies were due to simple errors in the transcription of the tag number, but we have also had cases where errors were detected in the release's files from the recovery information.

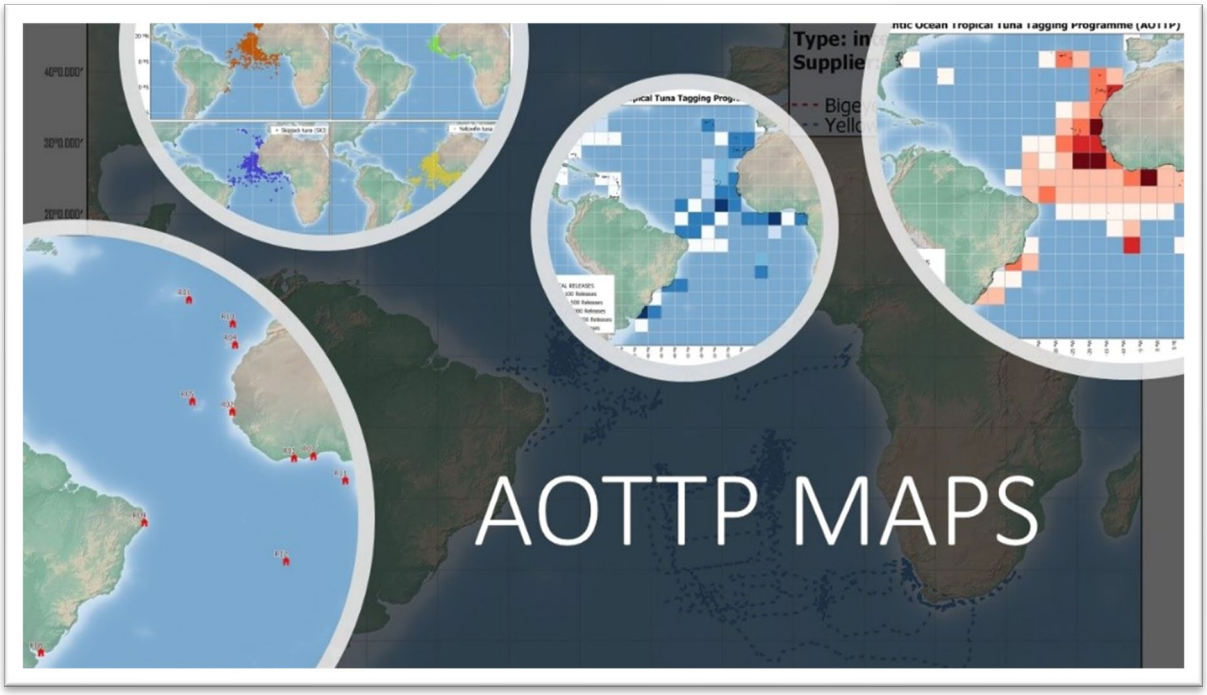
GIS: MAPS AND CARTOGRAPHIC VIEWERS

The geographical component is essential to know the distribution of trademarks or migration. For example, a key parameter for migration analysis is to know the geographic position of releases and recoveries. In order to store and manage geographic information, it is necessary to use a geographic information system that allows us to create maps, videos or cartographic viewers for the follow up and evaluation of the project.

The following maps were created in AOTTP:

Releases by grid 1x1 and 5x5 degrees.

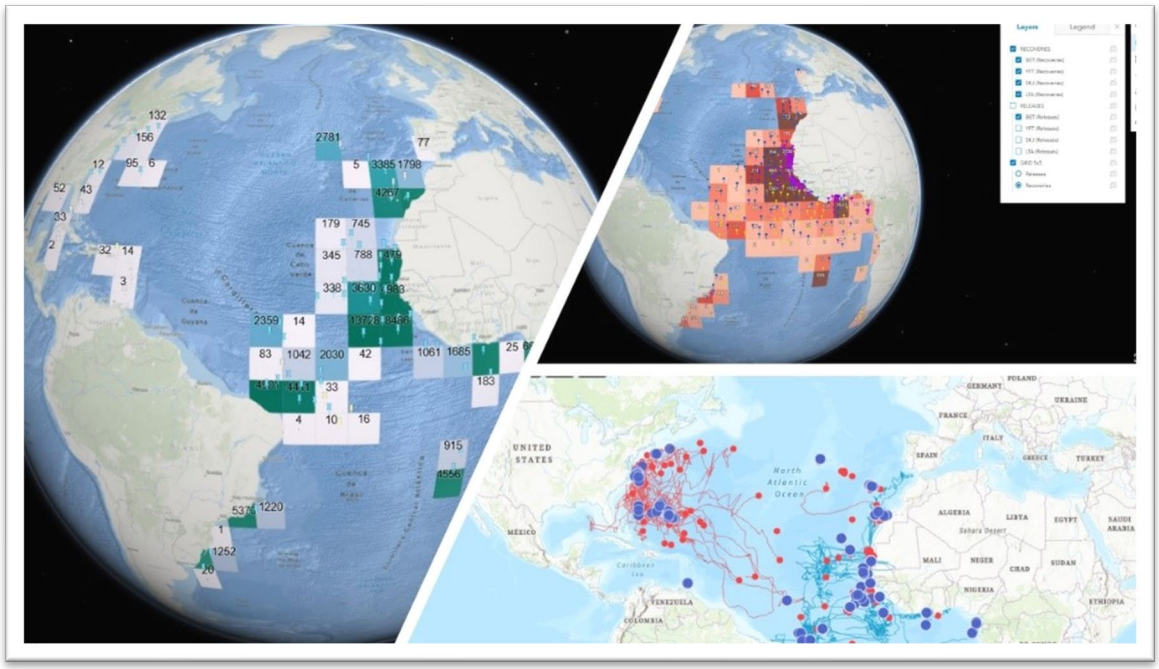
- Recoveries by grid 1x1 and 5x5 degrees
- Releases (only red tag) by grid 1x1 and 5x5 degrees
- Recoveries (only red tag) by grid 1x1 and 5x5 degrees
- Releases by quadrant
- Recoveries by quadrant
- Red tag releases by quadrant
- Red tag recoveries by quadrant
- Total and percent recoveries (all areas) of fish released in areas of 5x5 degrees.
- Location of team of releases and recoveries offices
- Apparent trajectories



AOTTP maps.

Maps with static elements give us a look of a particular moment of the project. Cartographic viewers allow us to interact with the element of the application, besides allowing generating filters, turn layers on or off or get info among other options.

A global viewer (conventional tag and electronics) for a general viewing of the project was generated, but other more regional and specific were created for teams or zones.



Maps viewers

DASHBOARD

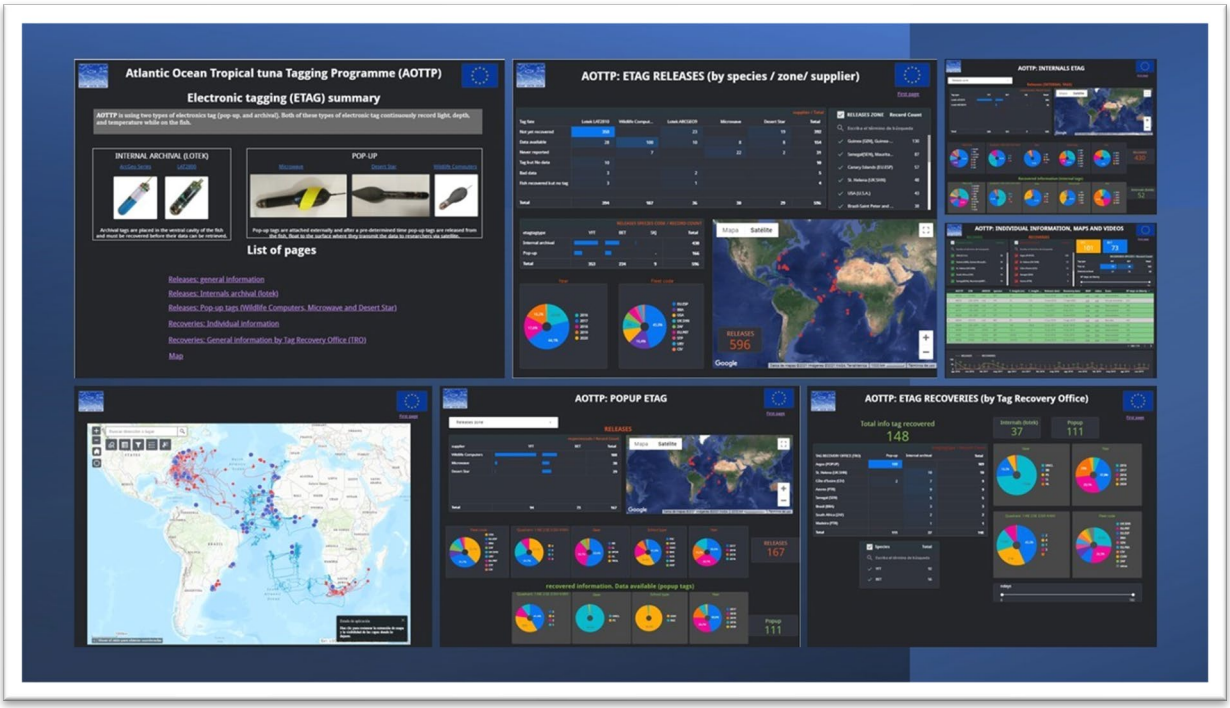
A data dashboard is an information management tool that visually tracks, analyzes and displays key performance indicators (KPI), metrics and key data points to monitor a specific process.

Two dashboards have been generated for the AOTTP project. One for electronic tags and another for conventional tags.

Dashboard

The electronics dashboard displays a summary of electronic tags based on their typology (internal or popup).

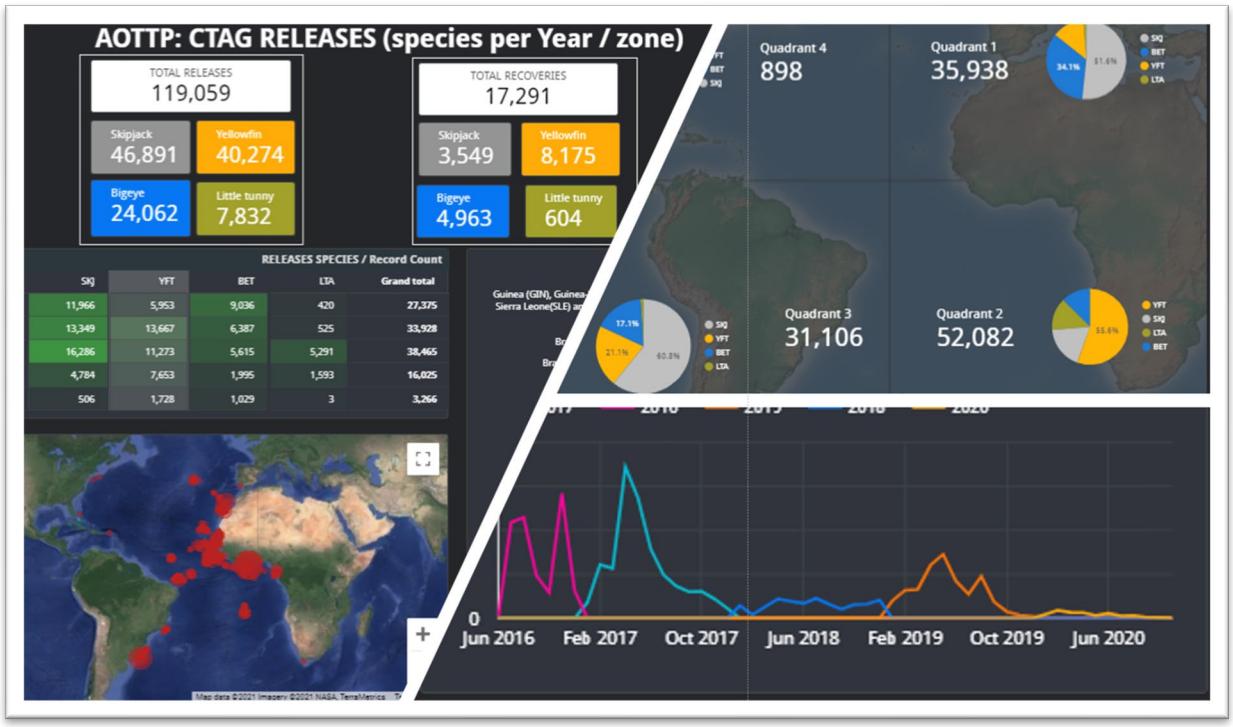
In addition, it is possible consult some metadata, as well as maps and videos of those that have been recovered.



Electronics dashboard

The conventional tag dashboard shows us a complete summary of tagging and recoveries statistics, addressing some of the most frequently questions on where, when, or how was recovered each tag. The replies to usual question (eg.

What was the distribution in time of the tags deployed? What is the number of conventional tags deployed by zones and species?) are easier to find in this platform.



Conventional dashboard

CONCLUSIONS AND RECOMMENDATIONS

- The use of an App to capture information and programs to upload into database has been a quick and effective way to handle information. In this sense, the developed App has allowed a unification of formats and criteria in the collection of information and the loading tool in the database has facilitated the uploading tasks.

- A key aspect of AOTTP was the use of a relational database for the storage and management of information. It has been essential for the project, allowing multiple connections for the analysis of information. The spatial component is very important in this type of project and the postGIS extension has enabled users to create spatial analysis quickly and automatically. It is recommended to use a relational database with geographic extensions for such project. As complementary it is very important to use a Geographic Information System to created maps, consult info or calculate some parameters with the component geographical.

- The use of free software such as Qgis or R has allowed us to share predefined projects for data visualization or analysis. AOTTP have been used Qgis as GIS, which allowed us to create projects and shared these with other people since are based on free software that do not requires buying a license to used it.

- Data quality controls, both internal and external, are vital to ensure that the result is optimal, so they need to be implemented from the start of the project. The project created quality controls in different stages of the process, achieving a high percentage of good quality of data collected. It is recommendable the creation of controls at all project stages to minimize potential errors and involve all parties to this process.

- The quality of data it is fundamental for the result of future analysis. To achieve a high level of quality it is necessary to have controls into different stages of the project. It is very important a quick analysis of information received, as new data can be uploaded regularly and duplication, localization errors or inconsistencies may often occur, which must be reported back to the corresponding teams for correction and review soon after the data being received, especially as tagging teams might not be available for long after their task is complete. The communication with TROs it is very important and it necessary to interchange all types of problems. Visiting TROs regularly helps improving protocols and ultimately raise the quality of the data. In addition, a closed contact with the people involved in the project helps improving the fluidity of communication between the coordination team and TROs. Finally, it is recommended that once the data has been analyzed, the results shall be integrated into the database and any inconsistencies corrected. This procedure has increased the quality of the AOTTP database and ensure that the results of the analyses have a high degree of reliability.